

# **STATUS PAPER ON PULSES**

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## **PULSES**

The Union Ministry of Agriculture comprises of Indian Council of Agricultural Research (ICAR), Department of Agriculture & Cooperation (DAC) & Animal Husbandry, Dairying and Fisheries. The ICAR is headed by Director General and Secretary. The DAC and AHDF are headed by Secretaries. There are nine Crop Development Directorates (CDDs) including Directorate of Pulses Development under Crops Division of Department of Agriculture & Cooperation. Directorate of Pulses Development is responsible for performing a number of functions including monitoring of Centrally Sponsored Schemes in respect of Nodal crop - pulses and major crops of Madhya Pradesh and Chhattisgarh, besides administration. It was established in the year 1971 at Lucknow (Uttar Pradesh) merging the Regional Extension Unit operating at Ahmedabad to it with the re-organization of Crop Development Directorates in the year 1995. National Head Quarter of DPD operates from Vindhyachal Bhavan, Bhopal, Madhya Pradesh.

For increasing pulses production by bringing the awareness, it was felt necessary to prepare a comprehensive document as a status paper on pulses comprising different aspects as given below:

### **1. Pulse Crops Description**

### **1.1. Origin**

A variety of pulse crops are grown in India (**Figure 1-4: p203-205**) and world. Among the crops, the major ones are Gram, Pigeonpea, Lentil, Fieldpeas etc. According to history, origin of Gram is in South West Asia – probably Afghanistan and Persia, Pigeonpea in Africa, Lentil in Turkey to South Iran and Fieldpeas in Mediterranean Region of Southern Europe and Western Asia. The origin place of each pulse crops has been presented in **Column 1.2. of Annexure 1 (p 51-55)**.

### **1.2. Importance**

Pulses are consumed as Dal, which is a cheap source of plant protein. These are consumed because of body building properties due to presence of various amino acids. These also have medicinal properties. By products of pulses like leaves, pod coats and bran are fed to animals in the form of dry fodder. Some pulse crops like Gram, Lobia, Urdbean & Moongbean are fed to animals as green fodder. Moong plants are also used as green manure which improve soil health and adds nutrient into the soil. Importance of pulse crops has been presented in **Column 1.3. of Annexure 1 (p 51-55)**.

### **1.3. Scientific name**

Scientific name in accordance with binomial nomenclature alongwith the details of chromosome number and synonyms of the pulse crops are given in **Columns 1.4. & 1.5 of Annexure 1 (P 56)**.

### **1.4. Morphology**

Most of the cultivated pulse plants are annuals having shrub / herb habits and these are important for maintaining soil health as biological nitrogen is fixed in soil by their root nodules. Morphology in respect of all pulse plants is presented in **Column 1.6. of Annexure 1 (p 57-60)**.

### **1.5. Species**

In ancient period, all plant species were in wild form. With passage of time, humans as per their necessity identified useful and cultivable plants including pulses. Identification of more cultivable plants by scientific community from wild species is still continued. The details about wild / cultivated plant species and their major growing areas are presented in **Columns 1.7 and 1.9 of Annexure 1 (p 57-60 and p 61-63)**.

### **1.6. Nutritional value**

Pulses are major source of plant protein and carbohydrates. Other nutrients like Phosphorus, Minerals, Vitamin C, Riboflavin and essential Amino acids are also major constituent. The details of nutritional value each of pulses are given in **Column 1.8. of Annexure 1 (p 61-63)**.

### **1.7. Important major growing zones / states**

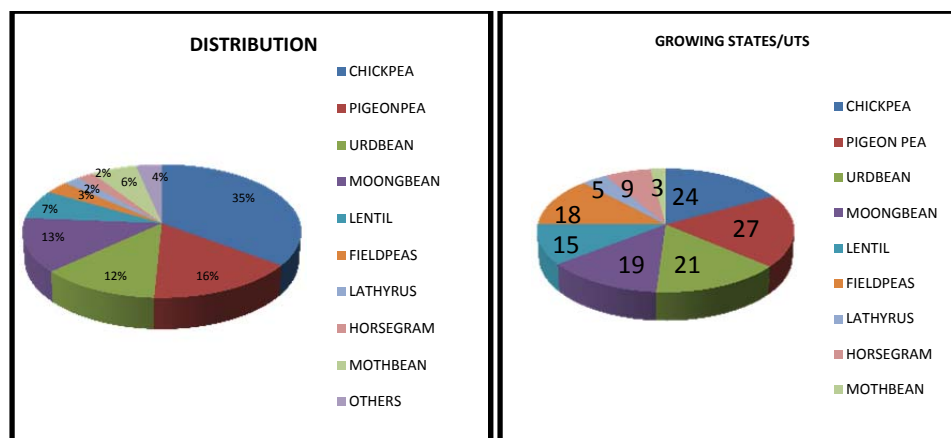


Varietal Development programme of pulses got strengthened in 1967 with the initiation of All-India Co-ordinated Research Improvement Programme. Through this programme, the varieties suitable for Northern Hills Zone, North West Plain Zone, North East Plain Zone, Central Zone and South Zone are evolved. The pulse wise growing states / UTs are **given in Column 1.9 of Annexure 1 (p 61-63)**.

### 1.8. Crop distribution

The pulses are grown across the country. This information is available in **Annexure 2 (p 64-70)**. Based on triennium ending 2010-11, it is mentioned that the contribution of Chickpea to total pulses area was 35 %, Pigeonpea 16%, Urdbean 12%, Moongbean 13%, Lentil 7%, Fieldpeas 3%, Horsegram 2% and Lathyrus 2%.

Chickpea is grown by 22 states and 02 UTs of D & N Haveli and Delhi, Pigeonpea by 24 states and 03 UTs of A & N Island, D & N Haveli and Delhi, Urdbean by 20 states and 01 UT i.e. D & N Haveli, Moongbean by 19 states, Lentil by 15 states, Fieldpeas by 18 states and Lathyrus by 5 states. Major Kharif, Rabi and total pulse producing districts are given in **Annexure 3 (p 71-75)**. Pulse crop wise contributions to total area with number of growing states are shown in pie diagram 1 and 2 respectively.



Pie Diagram 1

Pie Diagram 2

### 1.9. Demand and supply scenario of pulse produce

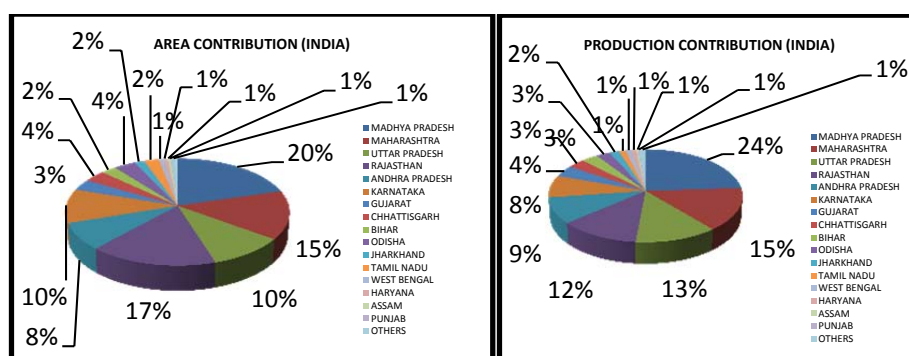
For the triennium ending 2010-11, the domestic consumption of pulses in India was 186.5 lakh tonnes. Against this, India produced an average quantity of 158 lakh tonnes. During this period, there was a gap of 28.5 lakh tonnes of pulses in demand and supply. This gap was due to higher growth of population as compared to pulse production.

## 2. Comparative analysis

### 2.1. Area, production and yield of major pulse crops growing states in India

There was 239 lakh ha area in India at triennium ending 2010-11, which was mainly contributed by Madhya Pradesh, Rajasthan, Maharashtra, Karnataka and Uttar Pradesh. From this area, 158 lakh tonnes produce of pulse was received. The major contributors of this production were Madhya Pradesh, Maharashtra, Uttar Pradesh, Rajasthan and Andhra Pradesh. During this period, productivity of pulses was recorded 661 kg / ha with highest in Punjab (905 kg/ha), Haryana (891), Bihar (839), Uttar Pradesh (823) and West Bengal (811).

The state / crop / season wise area, production and yield of pulses in India are given in **Annexure 2 (p 64-70)**. State wise contribution to the total area and production is shown in pie diagram 3 and 4 respectively.



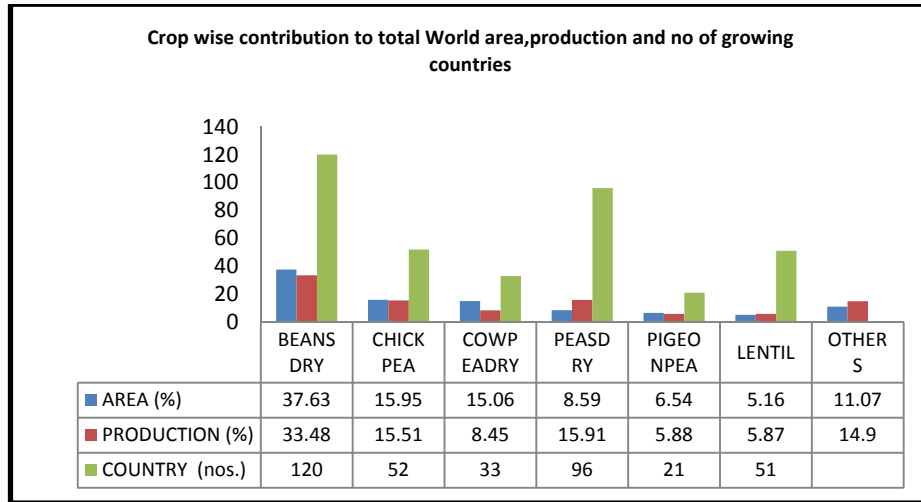
**Pie Diagram 3**

**Pie Diagram 4**

## 2.2. Area, production and yield of major pulse crops growing countries in the World

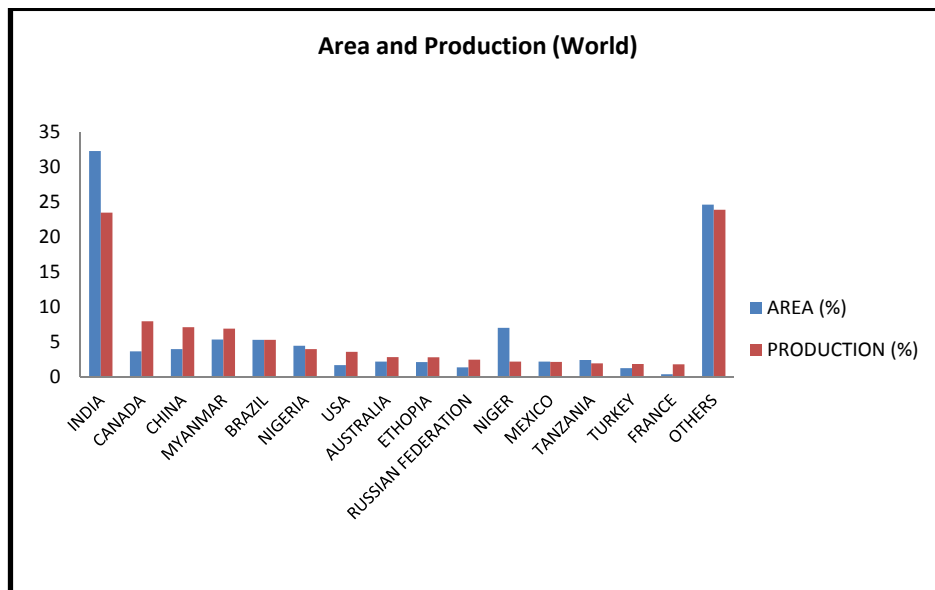
In the world, pulses are grown by 171 countries. At triennium ending 2010-11, the total area under pulses was 723 lakh ha. This area provided about 644.08 lakh tonnes of pulses with a productivity of 890 kg / ha. The highest area was contributed by India (32.24 %) followed by Niger (7), Myanmar (5.33), Brazil (5.29) and Nigeria (4.44). Similarly, the contribution to total production by India was 23.46%, Canada 7.93, China 7.09, Myanmar 6.89 and Brazil 5.29. The highest productivity was of France (4219 kg / ha) followed by Canada (1936), USA (1882), Russian Federation (1643) and China (1596). At triennium ending 2010, Beansdry was cultivated by 120 countries, which contributed 37.63 % area to total world area, Chickpea by 52 contributed 15.95 %, Cowpeadry by 33 contributed 15.06 %, Peasdry by 96 contributed 8.59 %, Pigeonpea by 21 contributed 6.54 %, Lentil by 51 contributed 5.16 % & others 11.07 %. The share to World production of Beansdry was 33.48 % followed by Peasdry 15.91, Chickpea 15.51, Cowpeadry 8.45, Pigeonpea 5.88, Lentil 5.87 & others 14.9. The pulse wise and country wise area, production & yield are given in **Annexure 4 (p 76-78)**.

Bar Diagram 05 is showing pulse crop wise contribution to total area, production and growing country in the World.



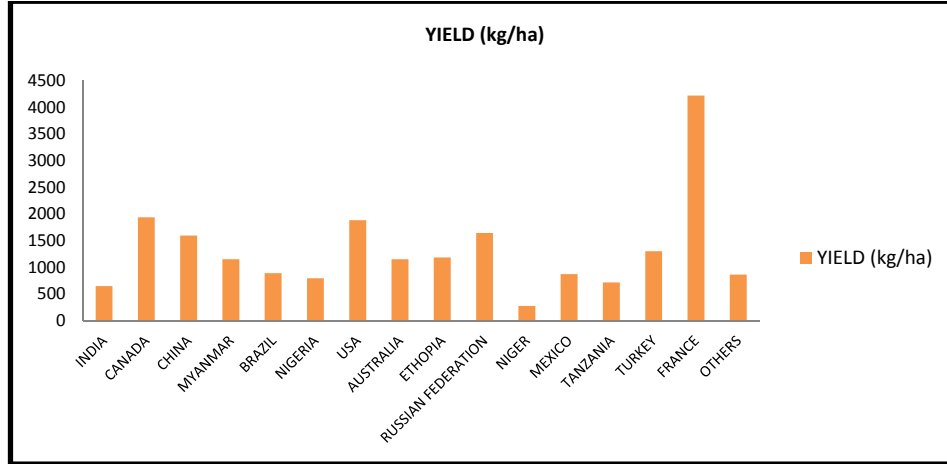
**Bar Diagram 5**

Country wise area and production of pulses in the world is represented in Bar Diagram 6.



**Bar Diagram 6**

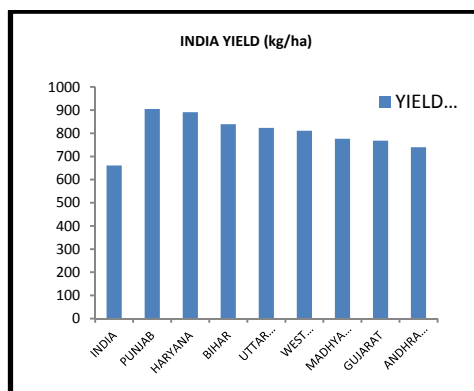
Bar Diagram 7: Productivity of major pulse producing countries in the World.



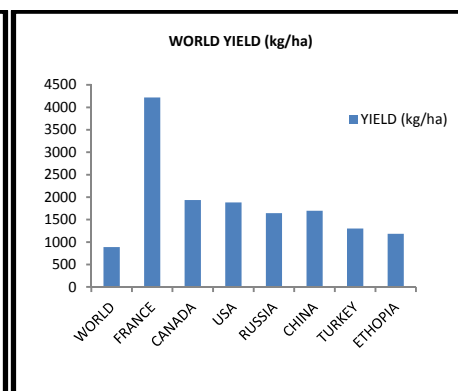
**Bar Diagram 7**

### 2.3. Gap of yield with other countries

The average yield of world triennium ending 2010 was 890 kg/ha, whereas in the same period, the yield of India was 648 kg/ha. As such, there was a gap of 242 kg or 27 %. Among the pulse producing countries, which have sizeable area, the highest productivity at triennium ending 2010 was of France (4219 kg / ha) followed by Canada (1936), USA (1882), Russia (1643) and China (1596). Higher yields in these countries might be due to prevailing environmental condition and crop management practices. Moreover, area under these pulses in said countries are smaller than India. Highest productivity states of pulses in India vis- a- vis country in the world is shown in Bar Diagram 8 and 9.



**Bar Diagram 8**



**Bar Diagram 9**

### 2.4. Export- import status

2.4.1. The additional requirement of pulses is fulfilled by importing pulses from other countries like Desi chickpea, pigeonpea, moongbean and kidneybean from Burma,

kabuli chickpea and peas from Canada, Australia, Mexico, Turkey & Iran and lentil from Nepal and Syria. In the world, India is the largest importer, producer, processor and consumer of pulses. The names of countries and quantity, from where pulses were imported by India during 2010-11, are given in Table 01.

Table 01: Quantity of pulses imported by India during 2010-11.

Sl. No.	Country	Qty (lakh tonnes)
1.	Canada	13.91
2.	Myanmar	6.91
3.	USA	2.62
4.	Australia	2.25
5.	United Rep. of Tanzania	1.26
6.	China	0.88
7.	Mozambique	0.64
8.	Malawi	0.39
9.	Kenya	0.31
10.	Nambia	0.22
	Others	0.72
	<b>Total</b>	<b>30.11</b>

The

quantity of pulses exported from India to other countries during 2010-11 is given in Table 2.

Table 2: Quantity of pulses exported from India during 2010-11.

Sl.No.	Country	Qty (lakh tonnes)
1.	Pakistan	0.74
2.	Algeria	0.26
3.	Turkey	0.23
4.	Srilanka	0.17
5.	United Arab Emirates	0.16
6.	Saudi Arabia	0.08

Sl.No.	Country	Qty (lakh tonnes)
7.	Spain	0.08
8.	Portugal	0.03
9.	Tunisia	0.04
10.	Egypt Arab Republic	0.07
	Others	0.23
	<b>Total</b>	<b>2.09</b>

The quantity imported and exported from India during the year 2006-07 to 2009-10 is given in Table 03.

Table 03: Quantity imported and exported from India during the year 06-07 to 09-10.  
Qty. in lakh tonnes)

Year	Import	Export
2006-07	22.71	2.51
2007-08	28.35	1.64
2008-09	24.75	1.36
2009-10	35.09	0.99

Producer price in different pulse producing countries in the world were compiled and the figures are given in **Annexure 5 (p 79)**. As seen, the farmer of Cyprus country, on an average, got Rs.160 per kg, Greece Rs.123/-, Jamaica Rs.122/-, Armenia Rs.92/-, Yemen Rs.70/-, Tajikistan Rs.68/-, Sudan Rs.64/- and Latvia Rs.24/- kg.

### 3. Varietal development

The matters in connection with seeds of major crops including pulses are monitored under Seed Act 1966. The varieties / hybrids recommended by agricultural research system for cultivation on commercial scale are notified by Central Varietal Release Committee / State Varietal Release Committee for the production of certified seed on large scale for distribution among the growers. It appears that the private research system is not working in order to evolve pulse varieties / hybrids.

#### 3.1. Important varieties notified

The crop wise varieties released and notified by CVRC / SVRC for commercial cultivation of pulses in our country are given in **Annexure 6 (p 80-92)**.

#### 3.2. Varieties / Hybrids preferred by farmers

The varieties preferred by the farmers of Gujarat, Bihar, Tamil Nadu, Puducherry, Maharashtra and Mizoram are given in **Annexure 9 (p 137)**. The farmers prefer to cultivate old varieties on commercial scale as they like their performance and profile. The Seeds Division of Department of Agriculture and Cooperation, Ministry of Agriculture, compiles season wise and variety wise requirement and availability of seeds of major varieties including pulses. The information in respect of pulses during 2010-11 to 2012-13 is given in **Annexure 8 (p 100-136)**. State wise ICAR recommended new alternative varieties to be promoted in place of old varieties of pulses are also given in **Annexure 7 (p 93-99)**.

### 3.3. Yield of Frontline demonstrations (FLDs) vis-à-vis National / State yield and yield gap analysis.

Frontline demonstrations on new production and protection technologies like High yielding varieties, Sulphur application, Zinc application, Foliar application of 2 % urea, Insect pest management, Seeds and soil treatment with Rhizobium + PSB, Package technology, Weeds, Diseases and Nematodes management / control are conducted by research system of ICAR, IIPR, SAUs, KVKs, at farmers' fields to disseminate modern production technologies. FLDs were conducted by IIPR, Kanpur on different technologies of pulses during the period from 2004-05 to 2008-09. The average yield of FLDs' vis-a-vis farmers' field during 2004-05 to 2008-09 in respect of Kharif, Rabi & Summer pulse crops are given in Table 04.

Table 04: FLD productivity vis-a-vis productivity of farmers' field during 2004-05 to 2008-09.

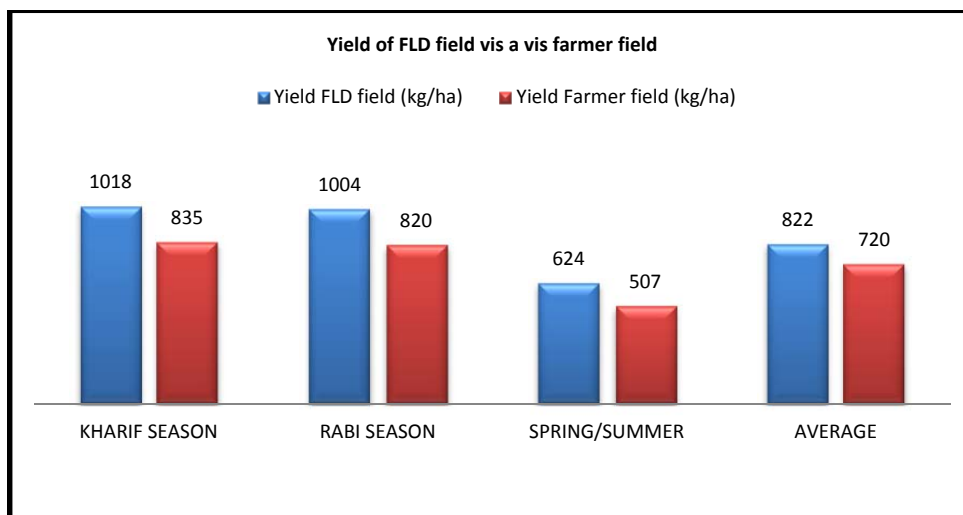
Crop season /	Average Yield in Kg/ha (2004-05 to 2008-09)		Difference (+/-) in Kg.
	FLD field	Farmer field	
<b>Kharif</b>			
Pigeonpea	1475	1185	<b>290</b>
Mungbean	727	594	<b>133</b>
Urdbean	853	725	<b>128</b>

Crop season /	Average Yield in Kg/ha (2004-05 to 2008-09)		Difference (+/-) in Kg.
	FLD field	Farmer field	
<b>Rabi</b>			
Chickpea	1459	1241	<b>218</b>
Mungbean	692	586	<b>106</b>
Urdbean	751	645	<b>106</b>
Lentil	1126	919	<b>207</b>
Fieldpea	1203	962	<b>241</b>
Khesari	884	673	<b>211</b>
Rajmash	915	711	<b>204</b>
<b>Spring / Summer</b>			
Mungbean	618	473	<b>145</b>
Urdbean	630	540	<b>90</b>
<b>Average</b>	<b>822</b>	<b>722</b>	<b>100</b>

Source – IIPR, Kanpur

The FLDs' average yield of Kharif, Rabi and summer pulses together got 822 Kg. per hectare during the period from 2004-05 to 2008-09.

In the same period, the yield of control field received was 720 kg per hectare. As such, there was a difference of 100 kg per hectare (Bar Diagram 10 depicts the yield data).



**Bar Diagram: 10**

The state wise result of FLDs organized during the period from 2001-02 to 2005-06 vis-a-vis National and State yields of pulses are presented in Table 05.

Table 05: Details of FLDs' yield vis-à-vis National and State yield during 2001-02 to 2005-06.

State	Crop	Ave. Yield in Kg/ha (2001-02 to 2005-06)		
		National	State	FLD
Andhra Pradesh	Pigeonpea	657	420	509
	Urdbean (Rabi)	551	616	985
	Moongbean (Kharif)	346	372	566
	Moongbean (Rabi)	422	315	741
	Chickpea	792	1084	1772
Bihar	Lentil	667	858	1880
Chhattisgarh	Pigeonpea	657	477	NA
	Urdbean (Kharif)	376	284	793
	Chickpea	792	690	1330
Gujarat	Pigeonpea	657	651	1256
	Moongbean (Kharif)	346	406	717
Haryana	Pigeonpea	657	947	NA
	Chickpea	792	785	1391
Karnataka	Pigeonpea	657	427	833



	Urdbean (Kharif)	376	256	NA
	Moongbean (Kharif)	346	210	898
	Chickpea	792	518	1290
M.P.	Pigeonpea	657	743	1287
	Urdbean (Kharif)	376	328	NA
	Chickpea	792	867	1224
	Lentil	667	459	1517
Maharashtra	Pigeonpea	657	671	978
	Urdbean (Kharif)	376	407	NA
	Moongbean (Kharif)	346	432	648
	Chickpea	792	555	1052
Orissa	Urdbean (Kharif)	376	264	620
Punjab	Moongbean (Kharif)	346	878	1141

Crop season /	Average Yield in Kg/ha (2004-05 to 2008-09)			Difference (+/-) in Kg.
	FLD field	Farmer field		
Rajasthan	Urdbean (Kharif)	376	344	500
	Moongbean (Kharif)	346	318	760
	Chickpea	792	696	1021
Tamil Nadu	Urdbean (Rabi)	551	427	738
	Moongbean (Rabi)	422	423	538
Uttar Pradesh	Pigeonpea	657	1094	662
	Urdbean (Kharif)	376	359	877
	Moongbean (Kharif)	346	290	712
	Chickpea	792	929	1785
	Lentil	667	780	1525
West Bengal	Urdbean (Kharif)	376	613	NA
	Chickpea	792	914	NA
	Lentil	667	690	953

**Source:** FLD information, IIPR, Kanpur; other information, DES, DAC, Krishi Bhavan, New Delhi.

As seen, the productivity of pulses at National and State level was always lower than FLD yields. The results shown in FLD outcome can only be achieved, by cultivating pulses following scientific cultivation practices.

#### **4. Climatic requirement**

##### **4.1. Temperature for different critical stages**

Pulse crops are cultivated in Kharif, Rabi and Zaid seasons of the Agricultural year. Rabi crops require mild cold climate during sowing period, cold climate during vegetative to pod development and warm climate during maturity / harvesting. Similarly, Kharif pulse crops require warm climate throughout their life from sowing to harvesting. Summer pulses are habitants of warm climate. The climatic conditions recommended for pulses are given in **Annexure 10 (p 138-140)**. The temperature needed by pulse crops for different stages are given in **Annexure 11(p 141)**.

##### **4.2. Important growing ecologies**

The pulse crops are normally grown in all ecologies from J&K to Kerala. Performance of pulse crops keeping in view the contribution to area and production is better of Central India. State wise, commodity wise performance of pulses in different ecologies under area, production and yield are presented in **Annexure 12 (p 142-143)**. It is added that North West India covers the states of Haryana, Himachal Pradesh, J & K, Punjab, Rajasthan, U.P. and Uttarakhand. Central India states are Chhattisgarh, Gujarat, M.P., Maharashtra & Odisha. Southern Peninsula includes the states of Andhra Pradesh, Karnataka, Kerala & Tamil Nadu, whereas East & North India part covers the states of Assam, Bihar, Jharkhand & West Bengal.

The performance of pulse crops in different ecologies in the world based on triennium ending 2010 is presented in **Annexure 13 (p 144)**.

##### **4.3. Impact on yield of rise in temperature**

In India, Pulse crops are grown by farmers in poor fertile soils and areas where less rain is received. The genotypes of pulses have inbuilt potential to provide relatively good production even in stress conditions i.e. drought, frost and water logging. However, it is observed that extreme abnormal temperature at the time of fruit setting to pod development stages may reduce the productivity due to less fruit setting, non healthy development of grain and forced maturity of grain.

##### **4.4. Suggestion for cultivation of crop in view of climatic changes**

The farmers should be empowered with latest crop production technologies as per behaviour of monsoon through capacity building using resources available with them.

Already evolved / notified varieties of pulses suitable for different weather conditions / tolerant to all eco system changes including biotic and a biotic stresses are available, which are given in **Annexure 6 (p 80-92)**.

In this connection for further improvement, the research system i.e. ICAR, IIPR, SAUs, KVKs, ICRISAT and ICARDA are already working to evolve higher yield varieties for cultivation in extreme stresses under present climatic changes.

## 5. Genetic potentiality advancement

### 5.1. Genetic break through for yield improvement.

ICAR/SAUs/ International organizations have been screening the accessions / germplasm lines since inception of research for yield and other improvements. A number of good improved varieties of pulse crops have been evolved using traditional and nontraditional techniques of plant breeding like selection, back cross and cytoplasmic male sterility (CMS). Old varieties of pulses are working well on farmers' field compared to newly evolved / notified and therefore, farmers prefer old variety seeds. ICRISAT has evolved ICPH 2671 hybrid, which has been notified by the State Varietal Release Committee of Madhya Pradesh for cultivation in Madhya Pradesh. GTH- 1 cytoplasmic hybrid of pigeonpea has also been evolved by Gujarat Agricultural University for cultivation in Gujarat.

### 5.2. Status of transgenic.

Efforts are being made in Indian Public Research Institutions since early eighties to develop transgenic crops. The Government of India has been very supportive of the efforts to develop transgenic crops and invested liberally through the Department of Biotechnology, Department of Science, Department of Technology and Indian Council of Agriculture Research. As a result many transgenic crops have been developed and are being tested by various public and private institutions.

The crops covered are Brinjal, Castor, Groundnut, Potato, Rice, Tomato, Chickpea, Sorghum, Watermelon, Papaya, Sugarcane, Mustard, Cabbage, Cauliflower, Maize and Okra including pulses. At present, the Institutions working in respect of pulses are given in Table 06 along with traits being handled by them.

Table 06: Institution working in pulses

Crops	Year	Institute	Traits
Chickpea	2009	ICRISAT, Hyderabad	A biotic stress tolerance
Chickpea		NRCPB: IIPR, Kanpur	Resistant to pod borer
Pigeonpea		NRCPB: IIPR, Kanpur	Resistant to pod borer

The work for development of transgenic pulses is in progress at the aforesaid centres.

## **6. Seed scenario**

### **6.1. State wise share of state seed agencies and private sector in seed supply in different states.**

About 20.83 lakh quintals of certified / quality pulse seeds produced by various agencies like National Seeds Corporation (NSC), National Agricultural Cooperative Federation of India Limited (NAFED), Indian Farmers Fertilizer Cooperative Limited (IFFCO), Krishak Bharti Cooperative Limited (KRIBHCO) and States Seed Corporations were supplied to pulse producing farmers during 2010-11. This quantity of seed involved 12.50 lakh quintals of Gram, 0.74 of Lentil, 1.47 of Fieldpeas, 1.96 of Urdbean, 1.76 of Moongbean and 1.52 of pigeonpea.

### **6.2. State wise seed replacement rate (SRR) of crop.**

The average SRR of pulses in India was 19.66% at the end of year 2008. At the same time, the SRR of gram was 14.38 %, Urdbean 26.31 %, Moongbean 21.94% and pigeonpea 16.02%. During this period, the highest SRR of pulses was in Andhra Pradesh (56%) followed by Maharashtra (34.50%). The state wise and pulse wise SRR during the period from 2002 to 2008 is given in **Annexure 14 (p 145-148)**.

Taking into consideration, the certified / quality seeds of pulses distributed by seed producing agencies during 2010-11, the SRR of total pulses was 22.51 %. During the same year, SRR of Gram was 23.33 %, Lentil 20.70, Fieldpeas 24.94, Urdbean 31.15, Moongbean 26.01 and Arhar 21.23. During 2006-07, SRR of total pulses was 10.41%, which rose to 20.83 % in 2010-11. As such, there was an increase of about 12.10 %.

### **6.3. Critical gap in availability of pulses seed.**

On an average, pulses are sown in an area of 239 lakh ha. To sow this area, about 101 lakh quintals of seeds are required including 63 lakh quintals of Gram, 4 lakh quintals of Lentil, 7 lakh quintals of fieldpeas, 5.5 lakh quintals of Urdbean, 6 lakh quintals of Moongbean and 7 lakh quintals of pigeonpea. Against this requirement, on an average, 20.83 lakh quintals of certified / quality seeds were supplied, including 12.5 lakh quintals of Gram, 0.74 of Lentil, 1.47 of Fieldpeas, 1.96 of Urdbean, 1.76 of Moongbean and 1.52 of Arhar. As such, it may be concluded that, at 100% SRR, about 80.17 lakh quintals of certified / quality seed more is required. To maintain the seed production chain for arranging quality seeds for 239 lakh hectare area or production of 101 lakh quintals of pulses seed, the exact quantities of nucleus, breeder and foundation seeds of pulses are continuously required, are given in Table 07.

Table 07: Requirement of nucleus, breeder and foundation seed of pulses for maintaining seed multiplication chain.

Crop	Total requirement of seeds in quintals (100%)		
	Nucleus	Breeder	Foundation
Pigeonpea	0.75	75	7470
Urdbean	9.00	371	14825
Moongbean	10.00	393	15700
Gram	6309	63090	630900
Lentil	16.00	468	14033
Fieldpea	732	7320	73200
Others	12	464	17632
<b>Total</b>	<b>7089</b>	<b>72181</b>	<b>773760</b>

As per information provided by Seeds Division of Union Ministry of Agriculture in respect of triennium ending 2012-13, the total seed requirement was calculated as 2453835 quintals, for sowing the area of 7010957 hectares. Against this requirement, the availability was 2678915 quintals for sowing the area of 7654043 hectares. The details are given Table 08:

Table 08: Requirement and availability of certified / quality seed of pulses.

Year	Requirement of seed (Qtls)			Availability of seed (Qtls)		
	Kharif	Rabi	Total	Kharif	Rabi	Total
10-11	582149	1662742	2244891	629876	2006664	<b>2636540</b>
11-12	710065	1789568	2499633	708283	2097444	<b>2805727</b>
12-13	569588	2047392	2616980	702655	1891824	<b>2594479</b>
<b>Avg.</b>	<b>6,20,601</b>	<b>18,33,234</b>	<b>24,53,835</b>	<b>6,80,271</b>	<b>19,98,644</b>	<b>26,78,915</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

It is shown by the figures of table 08 that the Seeds Division of DAC prepared average seed requirement and availability of seed for about 32 % of area at triennium ending 2012-13. However, the actual quantity of certified / quality seed distributed was 20.85 lakh quintals during 2010-11, which covered 25 % of total area under pulses.

## 7. Crop production practices

### 7.1. Major crop sequences / rotations followed in various states

Pulse crops are grown as solecrop, intercrop, mixed crop, catch crop, relay crop and utera crop, depending upon the agro climatic conditions of the place where they are cultivated. The major crop rotations / sequences recommended are given in **Annexure 15 (p 149-150)**. The crop sequences / rotations followed by Tamil Nadu state are given in **Annexure 16 (p 151)**.

## 7.2. State and season wise time of sowing and harvesting

Pulses are sown in all seasons across the country. In Kharif, most of the pulses are sown at the onset of monsoon from June to July, whereas Rabi Pulse from September to November and summer from January to Mid April. The details of state wise, season wise and crop wise sowing time is given in **Annexure 17 (p 152-154)**.

Harvesting of the Kharif pulses is mostly completed up to October excluding Pigeonpea. This crop is harvested from January to March. The Rabi pulse crops are mostly harvested during the period from February to March or April and summer pulse crops up to June. Details are given in **Annexure 18 (p 155-157)**.

## 7.3. Sowing of crop

(i) Different methods of sowing: Most of the pulse crops like Arhar, Moongbean, Urdbean, Mothbean, Kulthi, Gram, Lentil, Fieldpeas, Lathyrus, Rajmash and Cowpeas are sown by line sowing method and some farmers also undertake sowing by broadcasting method. Some states sow the seeds of Pigeonpea by drilling / dibbling. The methods followed by pulse producing states are given in **Annexure 20 (p 159)**.

(ii) Land preparation – Soils are prepared keeping in view the cultivation of specific pulse crops. Generally, farmers use tractor drawn plough, soil turning plough & harrow for pre tillage operations. The farm implements used for primary tillage are given in Table 9.

Table 9: Farm implements used for primary tillage.

State	Equipment used for land preparation
Gujarat	Tractor drawn plough, Blade harrow, Rotavator
Bihar	Soil turning plough, harrow
Maharashtra	Plough, harrow, Rotavator
Mizoram	Indigenous implements

Source: State Departments of Agriculture.

## 7.4. Seeding technologies.

The information in respect of Kharif, Rabi & Summer pulses with regard to recommended sowing time, seed rate, distance, depth and plant population are given in **Annexure 19 (p 158)**. State / crop wise seedling technology followed by state governments like Gujarat, Bihar, Mizoram, Puducherry, Maharashtra & Tamil Nadu are given in **Annexure 21 (p 160-162)**.

#### 7.5. Nutrients management:

Doses per ha of major nutrients, minor nutrients, organic manures and biological fertilizers applied in pulses by the farmers in Bihar, Gujarat, Maharashtra, Mizoram & Puducherry are given in **Annexure 23 (p 166-168)**. Crop wise recommended nutrients management is given in **Annexure 22 (p 163-165)**.

#### 7.6. Water management:

The crop wise recommended water management for various states in respect of pulses is given in **Annexure 24 (p 169-170)**. Pulse farmers of Gujarat, Bihar & Mizoram, normally irrigate the crop at branching, vegetative and pod formation stages. The irrigations are provided using raingun, ridge and furrow and flood methods (**Figure 9: p 210**). The state wise, crop wise specific information is given in Table: 10.

Table 10: State wise, crop wise water management in pulse crops followed by states

State	Crop	Irrigation		
		No.	Stages	Method
Gujarat	Pigeonpea	2	Branching and pod formation	Ridge & Furrow
	Urdbean	2		Ridge & Furrow
	Moongbean	2-3		Ridge & Furrow
	Chickpea	3-4	Pre sowing, vegetative, & Pod formation	
	Fieldpea	5-6		Ridge & Furrow
	Rajmash	7-8		Ridge & Furrow
	Urdbean (Summer)	7-8		Ridge & Furrow
	Moongbean	7		Ridge & Furrow

Bihar	Chickpea	1	Vegetative stage	Flood
	Lentil	2	Vegetative & Pre-flowering	Sprinkler
	Fieldpea	2	Vegetative & Pre-flowering	Flood
	Moongbean (Summer)	2	Vegetative & Pre-flowering	Flood
Mizoram	Pigeonpea			Raingun
	Cowpea			Raingun
	Ricebean			Raingun
	Cowpea			Raingun
	Fieldpea			Raingun
	Rajmash (Frenchbean)			Raingun

Source: State Departments of Agriculture.

For cultivation of pulses, very less irrigations are required than other crops and therefore, even in very adverse conditions, pulse crops give better yields.

#### 7.7. Weed management:

It is learnt that about 17-20% losses in pulses are caused due to weeds. The major weeds (**Figure 11: p 214**) affecting pulse crops in Kharif, Rabi and summer are given in Table 11.

Table 11: Major weeds affecting pulse crops in Kharif, Rabi and summer

Season	Weeds	Local Name
Kharif	<i>Saccharum spontaneum</i>	Kans or tigergrass
	<i>Cynodon dactylon</i>	Dubgrass
	<i>Boerhavia diffusa</i>	Santhi or Patharchatha
	<i>panicum crusgalli</i>	Sava or water grass
	<i>Digra arvensis</i>	Lahsuva
	<i>Dectyloctenium aegypticum</i>	Makada
Rabi	<i>Cyprus rotundus</i>	Mautha or Koko
	<i>Chinopodium album</i>	Bathua
	<i>Chinopodium murale</i>	Khartua
	<i>Melilotus indica</i>	Pili sainji
	<i>Anagallis arvensis</i>	Krishn nil
	<i>Asphodelus tenuifolius</i>	Pyaji
	<i>Convolvulus arvensis</i>	Hiran khuri



	<i>Fumaria parviflora</i>	Gajari
	<i>Lathyrus aphaca L</i>	Jangali matari
Summer	<i>Cyprus rotundus</i>	Mautha or Koko
	<i>Boerhavia diffusa</i>	Santhi or Patharchatha
	<i>Cynodon dectylone</i>	Dubgrass

Weed management measures recommended are in **Annexure 25 (p 171-173)**. The Weed management followed by states of Bihar, Mizoram, Maharashtra, Gujarat, Puducherry and Tamil Nadu in pulse crops is presented in **Annexure 26 (p 174-176)**.

### 7.8. Plant protection:

Pulse crops are highly susceptible to pests (**Figures 11-12: p 212-215**) which cause them maximum damage. Crop wise estimated loss incurred in agro climatic zones by pests, is given in Table 12.

Table 12: Crop wise estimated loss by insect pests.

Crop / Pest	Zone / state	Estimated loss (%)
<b>I. Insect pests</b>		
<b>A. Chickpea</b>		
Gram podborer	NWPZ, Bundelkhand region of CZ, SZ	10-90
Gram cutworms	Tal area of NEPZ	05-30
Termites	NWPZ	5-15
Semilooper	NEPZ	0-10
<b>I. Insect pests</b>		
<b>B. Pigeonpea (Early maturing)</b>		
<b>Podborer complex</b>		
<i>Maruca vitrata</i>	NWPZ, CZ, NEPZ	40-60
<i>Helicoverpa armigera</i>	CZ, SZ, NEPZ	
<i>Grapholita critica</i>	NWPZ, NEPZ	
<i>Lampides boeticus</i>	NWPZ, NEPZ, CZ	
<i>Exelastis atomosa</i>	NWPZ, NEPZ	
<i>Melanagromyza obtuse</i>	NWPZ, NEPZ	
<i>Blister beetle</i>	NWPZ, SZ, CZ	5-10
<i>Clavigralla gibbosa</i>	NEPZ, CZ	10-15
<b>C. Pigeonpea (Late maturing)</b>		
Gram podborer	NEPZ, NWPZ, CZ, SZ	15-20
Podfly	NEPZ, NWPZ, CZ	25-40

<b>D. Vigna (mungbean / urdbean)</b>		
Thrips	SZ, NWPZ, NEPZ (Summer crop)	20-40
Galerucid beetle	CZ	10-30
Blister beetle	SZ	5-10
Hairy caterpillar	NEPZ	05-15
Maruca vitrata	CZ, SZ	
NEPZ, U.P., Bihar, W.B. and Assam; NWPZ, Delhi, Punjab, Haryana, North Rajasthan and western U.P., CZ, M.P., Rajasthan and Maharashtra and SZ, Odisha, Karnataka, Tamil Nadu and Kerala.		

Source: IIPR, Kanpur

Losses are also incurred by diseases. Information based on the research work done by IIPR, Kanpur on extent of damage to pulses, is given in Table 13.

Table 13: Crop wise extent of damage.

<b>Crop</b>	<b>Disease</b>	<b>Zone / State</b>	<b>Extent to damage (%)</b>
Chickpea	Wilt / Root	NEPZ(UP, Bihar, WB), CZ( Maharashtra, Gujarat, MP) and SZ ( Karnataka & AP).	20-25
	Ascochyta blight	NWPZ (West Rajasthan, West UP, Haryana and Punjab).	5-10 ( Upto 50 % in epidemic years)
	Botrytis greymould	Tarai areas of UP and Tal areas of Bihar.	5-10 ( Upto 50 % in epidemic years)
Pigeonpea	Wilt	NEPZ(UP, Bihar, WB), CZ( Maharashtra, Gujarat, MP) and SZ ( Karnataka & AP)	10-15
	Phytophthora blight	NEPZ(UP and WB), CZ( Maharashtra, Gujarat, MP) and SZ ( Karnataka & AP)	5-10 ( Upto 25 % in early crop)
	Sterility Mosaic	NEPZ(UP and Bihar), CZ( Maharashtra) and SZ ( Tamil Nadu and Karnataka)	10-15
	Alternaria blight	NEPZ(East UP and Bihar), CZ( Maharashtra) and SZ ( Tamil Nadu and Karnataka)	10-15
Moongbean	Yellow Mosaic	NEPZ(UP, Bihar, WB and Assam), NWPZ (Haryana,	15-20

		Punjab, West Rajasthan)	
Urdbean	Powdery Mildew and leafspots	SZ (Coastal areas of AP in Rabi)	15-25
	Yellow Mosaic	NEPZ(UP, Bihar and WB )	15-25
Fieldpea	Powdery Mildew	All crop growing areas	15-20
	Rust	NEPZ (Bihar and UP)	10-15
Lentil	Wilt	CZ (Bundelkhand)	25-30
	Rust	NEPZ (Bihar and UP)	10-15
Rajmash	Bean Common Mosaic	NEPZ (UP)	Upto 30 %

Source: IIPR, Kanpur.

The recommended plant protection measures are given in **Annexure 27 (p 177-185)**. To minimize losses to productivity of pulses, the measures followed by state governments are given in **Annexure 28 (P 186-187)**.

#### **7.9. Harvesting, threshing and storage:**

Pulses i.e. Moongbean, urdbean, fieldpeas, lentil, chickpea, cowpea, mothbean, khesari and horsegram are harvested manually using sickle. Pigeonpea crop is harvested by sickle as well as gadasa. At maturity of pigeonpea crop, the field is irrigated and after 3-4 days crop is uprooted by the farmers. This practice helps farmers to sow the seeds of succeeding crop in time.

Most of the pulse crops are dried in the fields for 2-3 days and thereafter, threshed by normal thresher and this is also done by beating the dried plant by heavy sticks. Pigeonpea grains are separated by beating the plants on some hard objects like stone and heavy wood. To avoid storage losses in pulses, these should have 9-10 % moisture at the time of placing in storage. Farmers, who have small quantity of pulses, store them in storage bins (Tin made) mixing them with Neem leaves. If the quantity is big, then it may be kept in scientific storage of Central Warehousing Corporation (CWC) and Food Corporation of India (FCI) to minimize the storage losses by pests.

#### **7.10. Farm implements and machines used for different operations.**

A number of farm implements are used for attending the work of primary and secondary tillage including post harvest operations (**Figures 6-10: p 207-211**). The field is ploughed by cultivators, disc harrow and sowing is done by seed drill, fertilizer-cum-seed drill and zero till seed drill. No machine/equipment has been designed or made for harvesting of pulses and therefore, it is recommended that the scientists working under engineering research system should develop low cost equipment / machine suitable for harvesting. This apart, the breeders working under research system should also work on development of varieties amenable to harvesting by equipment/machines.

## 8. Cropping system

As per Agricultural Statistics at a Glance 2009, the total geographical area of India is 3287.3 lakh ha. Out of this, 1403 lakh ha is net sown area (42.67 %). The net irrigated area is 608.6 lakh ha, which is 43.37 % of the net sown area. States with alluvial, sandy, sandy loam and black soils and irrigation facilities, cultivate 2-3 crops in a year, which is deteriorating the soil health and therefore, incorporation of pulse crops in crop rotations is required for restoration of soil health. The major recommended crops sequences / rotations, intercropping are given in **Annexure 15 (p 149-150)**.

## 9. Crop products and their uses:

Pulse crops provide grain and residues. On an average, about 158.23 lakh quintals of grains of pulses and 3, 27, 53,828 tonnes of crop residues (straw and stalk) are received per year. In India, pulse grains are converted into split pulses (Dal) for consumption. This Dal is used for making many products like sweets, Dalmoth, Dal, Sauce etc. Many of processing machines are engaged in processing of pulse grains and it's by products. Residues of pulses are used for animals and making toys, green manure etc.

### 9.1 Processing units:

The details provided by states of Tamil Nadu, Bihar and Maharashtra are given in Table 14.

Table 14: Processing units with their processing capacity including types of products manufactured.

State	Processing unit type				Product manufactured
	Traditional		Modern		
	No.	Capacity	No.	Capacity	
Tamil Nadu	Major 16, capacity 1000 mt / annum Medium 2, capacity 500 mt / annum Mini 63, capacity 200 mt / annum				
Bihar	Processing of pulses is done by local methods and some by dal mills on small scale for domestic consumption		Very limited modern dal mills are available		Major product of dal (split pulses, besan & cattle feed)
Maharashtra			Dal mill		

**Source:** State Departments of Agriculture.

## 10. Crop Development programmes:

The Union Ministry of Agriculture has been implementing Centrally Sponsored Scheme (CSS) of National Food Security Mission (NFSM) covering Rice, Wheat & Pulses for overall improvement of these crops scenario through Rice / Wheat / Pulses producing states since Rabi 2007-08. Some other Centrally Sponsored Schemes are also under implementation. The scheme wise details are as follows:

### 10.1. National Food Security Mission – Pulses

Objectives: i) Restoring soil fertility and productivity at individual farm level, ii) Creation of employment opportunities, iii) Enhancing farm level economy to restore confidence among the farmers, and iv) Creating awareness about the use of improved seed and crop Production technology.

Implementing Agencies: Ministry of Agriculture is implementing this programme through

- i) Commissioners/Directors of Agriculture of pulse producing states,
- ii) Central Government Institutes: ICAR and IIPR, and
- iii) International Institutes: ICRISAT and ICARDA.

Area of operation: Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka,, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

Funding: 100 % by Union Ministry of Agriculture, Krishi Bhavan, New Delhi.

Major Interventions: 1) Seed: Distribution of Certified seed, 2) Demonstrations: Cluster and Front Line Demonstrations, 3) Integrated Nutrient Management (INM): Micronutrients, Lime / gypsum, Rhizobium culture, 4) Integrated Pest Management (IPM): Encouraging farmers to adopt Mechanical / Biological / Bio-fertilizer / Bio-pesticide tactics, 5) Resource Conservation Technologies / Tools: Knapsack Sprayers, Zero Till Seed Drills, Multi Crop Planter, Seed Drills, Ridge Furrow Planters, Rotavators and Laser Land Levelers, and 6) Efficient Water Application Tools: Distribution of Sprinkler sets, Incentive for Mobile Sprinkler Rainguns, Incentive for Pumpset and Pipe for carrying water from source to the Field. Progress of implementation is given in Table 15.

Table 15: Progress of implementation of NFSM-Pulses.

Year	Fund Released (Rs. in Crores)	Expenditure incurred (Rs. in Crores)
2007-08	103.65	36.50
2008-09	270.15	242.69
2009-10	373.98	399.77
2010-11	312.88	359.61

2011-12	468.20	395.32
2012-13 (Tentative)	619.08	249.50
<b>Total</b>	<b>2147.94</b>	<b>1683.39</b>

During the period indicated in Table 14, the fund utilization was 78.37 % against the total fund released.

**10.2 Accelerated Pulses Production Programme (A3P):** This has been implementing since Kharif 2010-11.

Objectives: To demonstrate plant nutrient and plant protection centric technologies and management practices in compact units of 1000 hectares each for five major pulse crops viz. Bengalgram, Blackgram (Urdbean), Redgram (Arhar), Greengram (Moongbean), and Lentil (Masur).

Implementing agencies: DAC is implementing this programme through

- i) Commissioners/Directors of Agriculture of pulse producing states, and
- ii) Central Government Institutes: NCIPM of ICAR.

Area of operation: Andhra Pradesh (14 districts), Assam (10), Bihar (13), Chhattisgarh (8), Gujarat (11), Haryana (5), Jharkhand (15), Karnataka (13), Madhya Pradesh (20), Maharashtra (18), Odisha (10), Punjab (7), Rajasthan (16), Tamil Nadu (12), Uttar Pradesh (19), and West Bengal (5 districts).

Funding pattern: 100 % funding by Union Ministry of Agriculture, GOI, Krishi Bhavan, New Delhi.

Cost Norm / Expenditure for INM and IPM for One hectare:

For conducting A3P demonstrations in respect of Pigeonpea, Urdbean, Moongbean, Gram and Lentil, the DAC of Ministry of Agriculture has provided an financial assistance of Rs.5400/-, Rs.4800/-, Rs.4800/-, Rs.5600/- and Rs.5000/- respectively per ha for the items of A3P Unit like, Seed Minikit, Gypsum, Micronutrient (Zinc Sulphate, Borex, Ferrous Sulphate, Micronutrient Mixture), Rhizobium Culture, PSB culture, Urea (Folior spray), Fungicide for seed treatment, Insecticide / Fungicide / Bio-agent (NPV), Bio-pesticide, Weedicides and e-pest surveillance. Progress of implementation of A3P is presented in Table 16.

Table 16: Progress of implementation of A3P.

(Rs. in crores)

<b>Year</b>	<b>Release</b>	<b>Expenditure</b>
2010-11	308.28	248.04
2011-12	146.10	225.35
2012-13 (Tentative)	326.34	152.55
<b>Total</b>	<b>780.72</b>	<b>625.94</b>

As seen, the fund utilization during the period indicated in table 15 was 80.17% against the fund released by GOI.

**10.3. Special initiatives for pulses and oilseeds in dryland areas of 60000 villages programme under RKVY 2010-11.**

Objective: To provide services of mechanization on custom hiring basis, especially for soil preparation and sowing for improving production and productivity of pulses and oilseeds.

Implementing agencies: DAC implemented this programme through Commissioners / Directors of Agriculture / Engineering of respective states.

Area of operation: Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh.

Funding pattern: 100 % funded by GOI.

Interventions: Ensuring timely land preparation and planting of the crops on ridges so as to facilitate *in-situ*-water conservation in watershed. Under this approach, a set of implements such as tractors, rotavators and ridge furrow planter alongwith some working capital at 6000 designated watershed centric locations were provided during 2010-11 to a nominated agency for providing custom hiring services to pulses and oilseeds growers of adjoining 10 villages in a hub and spoke model covering 60, 000 villages.

Progress of implementation: A total of Rs.300.00 crores were allocated for implementation during 2010-11 against which Rs. 287.57 were utilized (95.86% fund utilized).

#### **10.4. Integrated Development of 60000 Pulses villages in Rainfed Areas 2011-12.**

Objective: To increase production and productivity of pulse crops by disseminating latest production technologies at the farmers' field.

Implementing agencies: DAC implemented this programme through Commissioners / Directors of Agriculture of respective states.

Area of operation: Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu and Uttar Pradesh.

Funding pattern: 100 % funded by GOI.

Interventions: Conduction of large scale demonstration on A3P pattern for eight pulses (Pigeonpea, Urdbean, Moongbean, Gram, Lentil, Mothbean, fieldpeas and Rajmash), construction of farm pond with or without lining and lining of old farm ponds, Market linked supply chain by organizing pulses farmers in to farmer producer organization. Small farmers' Agribusiness Consortium (SFAC) has been assigned the responsibility of organizing the farmer producer organizations and establishing this chain.

Progress of implementation: Rs. 300 crores were allocated against which amount Rs. 213.94 crores were spent. The fund utilization was 71.31%.

#### **10.5. Special Plan to achieve 19+ million tonnes of Pulses production during Kharif 12-13**

Objective: Utilization of new areas through intercropping, improving planting techniques and irrigation use efficiency for inclusive water management and use of important critical but low cost inputs like sulphur and weedicides and productivity boosters.

Implementing agency: DAC implemented this programme through Commissioners / Directors of Agriculture of respective states.

Area of Operation: Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Karnataka, Madhya Pradesh, Odisha and Rajasthan.

Funding pattern: 100 % funded by GOI.

Interventions: Intercropping of Pigeonpea / Urd / Moong / Moth with Cotton / Oilseeds / Maize / Sorghum / Pearl millets, In-situ moisture conservation (Ridge & furrow), Critical inputs / plant growth regulators / nutrient mixtures.

Progress of implementation: Rs.7.42 crores tentatively spent against allocation of Rs.55.32 crores.

#### **10.6. Additional area coverage of Pulses Rabi/Summer under NFSM-Pulses for additional Rabi/Summer production during 2012-13**

Objective: Additional area coverage for additional production during Rabi / summer 2012-13.

Implementing agency: DAC implemented this programme through Commissioners / Directors of Agriculture of respective states.

Area of operation: Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka,, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

Funding pattern: 100 % funded by GOI.

Interventions: Distribution of certified seed, INM, IPM, Water carrying pipes, PP chemicals, A3P demonstrations.

Progress of implementation: Rs.30.65 crores were spent against allocated amount of Rs.94.98 crores (tentative).

#### **10.7. Macro Management of Agriculture (MMA)**

Objective: To accelerate the productivity of major crops including pulses of areas, which are not covered in other schemes.

Implementing agencies: DAC implemented the scheme from 2001-02 to 2012-13 through Commissioners / Directors of Agriculture of respective states.

Funding pattern: 90:10 between Central & State Governments

Interventions: Seed: Production of Breeder seed, Production of Foundation and Certified seed, distribution of certified seed, distribution of seed minikits, Strengthening of SSCA, INM, IPM etc.

Pattern of financial assistance under aforesaid Centrally Sponsored Schemes has been shown in **Annexure 33 (P 200-202)**.

#### **10.8. Suggestions for improvement in scenario of pulses:**

Pulse production is affected by a number of biotic and a biotic factors including others like inadequate marketing facilities and less recovery of pulses due to use of obsolete processing machines. Some of the important points as constraints in pulse production and necessary suggestions to resolve them are given as under:



- 1) A total of 101 lakh quintals of seeds of pulses are required at 100% SRR. About 20-25% area is sown with certified / quality seeds and the remaining is sown with seeds of farmers. It is understood that about 10 - 20% pulses production may be increased by increasing distribution of certified / quality seeds covering 50 % of the total area under pulses. To sow this area, 50 lakh quintals of certified seed is required. It will be a positive approach in the direction of increasing pulse production by increasing supply of quality seeds maintaining multiplication chain involving nucleus, breeder and foundation seeds.
- 2) Pigeonpea and chickpea are major pulses, which contribute about 60% of total pulse production. Among the insect pests and diseases, *Helicoverpa armigera* and wilt are the major pests, damaging about 20-30% of the productivity. To minimize the losses by the above and other pests to pulses, aggressive implementation of IPM and INM technologies is required. In addition, development of pulses varieties resistant to pests, especially podborer and wilt of Arhar and gram are urgently required.
- 3) Many rainfed rice fallow lands in Chhattisgarh, Madhya Pradesh, Jharkhand, Bihar, Odisha and Andhra Pradesh remain uncultivated during rabi season due to lack of cultivation knowledge of field crops in non availability of irrigation water. Hence, the farmers of such areas are required to be guided to grow pulses in Rabi season on residual moisture, lentil in upland, chickpea / Batry in medium and lowlands as pulse crops provide better production in the aforesaid conditions.
- 4) Mechanization of pulse production, processing and handling is very important in order to increase production and saving of losses. It also helps in timeliness of operations, better utilization of resources, reduction of drudgery, increasing production and productivity leading to economic benefits.
- 5) At present, more than 80% area of pulses is rainfed and therefore, arranging irrigation at critical stage by micro irrigation devices (Sprinkler set and Raingun etc.) may increase production by about 10-15%.
- 6) About fourteen Pulse crops are cultivated across the country by major and minor states (**Figure 1-4: p 203-205**) and marketing facility is available for buying Arhar, Moongbean, Urdbean, gram and Lentil on Minimum Support Price (MSP) under Price Support Scheme in Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. Creation / development of such facility in minor pulse producing states and inclusion of some more important crops under price support scheme (PSS) may help in increasing production.
- 7) Inter cropping of pulses with suitable crops like sugarcane, tomato, soyabean, cotton and with other main crops may increase production by expansion in area. Better recovery of Dal by processing grain of pulses with modern machines,

besides minimizing losses in storage by utilizing scientific storage may also help improving pulses scenario.

- 8) Pulse crops require well drained soils. During south west monsoon, it has been observed that most of the crops affected are in lowlying areas. This may be minimized by growing pulses in well drained soils or making well drainage system. This apart, crops are also affected by high and low temperatures, especially when crop of pigeonpea, chickpea and lentil are in flowering to pod development stages. Farmers are to be guided to cultivate varieties tolerant / resistant to these problems.
- 9) It has also been observed that most of the farmers do not follow proper crop rotations, besides, growing pulses in less fertile lands. There appears a need for creating awareness among the farmers to grow pulses following crop rotations for increasing production by restoration of soil fertility and biological nitrogen for long life of soil.
- 10) The states, which produce pulses as Inter (**Figure 5: p 205-206**) / mixed crops, do not estimate area, production and yield. As such, estimation of area, production and yield of inter crops separately may also help in better planning to achieve goal of improving pulses scenario.
- 11) Production of pulses in the off seasons that is summer / rabi is affected by stray cattle and Blue Bull, which damage pulse crops such as Arhar, Moongbean and Urdbean more than any other crop. Proper management of the aforesaid may definitely help to increase the magnitude of pulses production.
- 12) Maintenance of genetic purity of old popular highyielding varieties of pulses may also support in increasing production.
- 13) Development of short duration varieties of Arhar are required with synchronized maturity, especially for central zone states cultivating Arhar- Gram / wheat cropping sequence.
- 14) Varieties of pulses suitable for harvesting by harvester need to be developed.
- 15) It is observed that in some of the states extreme cold & heat are affecting production of Gram, Arhar and lentil and therefore, it has become necessary to develop tolerant and resistant varieties.

**Suggestions offered by the states of Bihar, Gujarat, Rajasthan and Assam for improving pulses scenario in their respective state are reproduced below:**

**Bihar:**

1. Harvest index of pulses are hardly 15-20% as compared to 40-45% of high yielding cereals. More vegetative growth of chickpea in North Bihar occurs which adversely affects the pulses production. Hence, this problem should be resolved.
2. Most of the pulses varieties are developed under rainfed situation. So, variety for high rainfall and irrigated condition should be developed.

3. Pulses, in general, have higher rate of flower drops. In pigeonpea, over 80% flower produced on plants are shed. So, there is a need for minimizing flower drops by breeding programme / use of hormones.
4. Cold, frost and heat tolerant variety of pulses are needed.
5. Drought and salinity are the most important abiotic constraints for limiting pulses in Bihar. So, stress tolerant variety of pulses should be developed.
6. Among biotic constraints, pests are more serious factor limiting pulse production. The most important pests are *Helicoverpa armigera* and wilt in chickpea & lentil, sterility mosaic virus in pigeonpea, yellow mosaic virus & powdery mildew. So, proper control measure should be developed.
7. Recently *Cuscuta reflexa* weed is also creating problem in lentil & chickpea in Bihar, particularly in Tal area and hence, control measures should be developed.
8. In most of the pulse districts of Bihar, blue bull is creating problems and is considered as number one enemy of the pulses and its control measures should be undertaken.
9. Inclusion of high yielding variety of pulses in cereal based cropping system.
10. By adopting short duration cultivars of pulses for catch crop efficiently.
11. To develop more nitrogen fixing variety, this will play crucial role in future sustainable pulse production.
12. Reducing storage loss and improving marketing facilities.
13. Need for improvement and adoption of bakla (*Vicia fava*) which is one of the highest yield potential pulse crop.
14. To find out suitability of pulses for growing in tail end area of canal as enough water is not available for growing wheat crop in rabi season.
15. Adopting wide spaced sugarcane crop as inter-cropping system.
16. Replacement of uneconomical crop like sorghum, kauni kodo with pigeonpea in rainfed areas.
17. Popularization of rabi arhar in un-transplanted rice field.
18. Urdbean/Moongbean as summer crop after harvest of Rabi crops, particularly potato, sugarcane & mustard.
19. Use of rhizobium for N fixation VAM, PSB for P solubilizing biofertilizer in rainfed area.
20. Use of INM & IPM technology for pulse production.
21. Govt. procurement should be made on pulses like wheat & rice.
22. Weather based crop insurance for pulses with minimum premium should be made compulsory.

### **Gujarat:**

1. Seed treatment with rhizobium culture is very useful as it enhances yield level. However, the availability of rhizobium culture is constraint and there is a need for mass multiplication and should be promoted for extensive use by farmers.
2. To get higher prices, there is a need to improve post harvest technology to recover maximum dal from grain.

3. Improper fertilizer use in intercrop, poor plant stand and proper plant protection measures are very important to realize higher yields in pulse crops.
4. Developments of high yielding genotypes suitable to different agro climatic zones are needed.
5. Value addition by fortification of pulses with other food items to enhance food value.
6. Modernization of dal milling industry for higher recovery of dal and quality of pulses.

**Rajasthan:**

1. Development of high yielding, drought resistant, short duration varieties of pulses.
2. Preparation of IPM model to combat insect pests and diseases.
3. To develop post harvest management technology for higher economic returns to the farmers.
4. Effective weedicides for weed control in standing crop of moongbean and mothbean crops.
5. Yellow Mosaic Virus (YMV) tolerant/resistant varieties of moongbean and mothbean crops.
6. Suitable control measures for effective pyazi weed and wilt in gram.

**Assam:**

1. Development of genetically modified high yielding varieties of pulses suitable for rice fallow areas.
2. Development of agro-techniques for rice-fallow area as well as for *char* and riverine area.
3. Development of suitable agro-techniques to fit in relay cropping to increase cropping intensity.
4. Development of suitable cropping system with pulses to enhance cropping intensity.
5. Development of agro-techniques to mitigate climate change.
6. Moisture stress management in *Rabi* and summer pulses.
7. Development of short duration, thermo-insensitive summer pulses (Greengram and Blackgram) with synchronized maturity and resistant to pre harvest sprouting.
8. Development of pulse variety tolerant to major insect pests and diseases predominant in Assam (Podborer, Stored Grain Pests, Wilt, Rust, Cercospora, Web-Blight).
9. Development of Field-pea resistant to rust / escaping rust disease.
10. Development of an effective IPM model against major pests.
11. Evaluation of bio-pesticides against major insect-pests and disease of pulses.
12. Refinement of ITKs for the management of major pests of pulse crops.
13. Development of short duration (130 days) high yielding varieties of Arhar with resistance to pests, especially *Helicoverpa armigera* and wilt.
14. Development of IPM for pulse-based cropping system and for *utera* cultivation.
15. Development of need based safe storage structure / techniques.

**Chhattisgarh:**

1. High yielding early and extra early varieties of pigeonpea with resistance to podborer, sterility mosaic and wilt are not available. These need to be evolved.
2. Varieties of major pulses amenable to mechanical harvest are to be developed.
3. Adequate quantity of certified seeds of high yielding recommended varieties need to be arranged in time.
4. Development of wilt resistant variety of Kabulichana is required.
5. Effective and timely application of recommended Agricultural inputs, besides, efficient and timely use of available water as life saving irrigation.
6. Efficient utilization of available moisture by introducing farm machinery.
7. Effective adoption of IPM and INM techniques.
8. Development of varieties having resistance to prevalent pests, frost and drought of various pulse crops.

**11. Special initiatives taken****11.1 . Minimum Support Price (MSP).**

National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED), Nafed House, Sidhartha Enclave, New Delhi – 110 014 is the Nodal agency of Government of India to undertake procurement of Redgram, Moongbean, Urdbean in Kharif and Gram and Lentil in Rabi under Price Support Scheme (PSS). Purchases under PSS [(Annexure 29 (p 188-196)] are undertaken through major procurement centres when the prices of commodities referred above go at or below the declared support prices for a particular year.

The grade specifications of Tur, Moongbean, Urdbean for Kharif 2012-13 marketing season and Gram and Lentil for Rabi 2011-12 marketing season prescribed by the Govt. of India under PSS for fair average quality (FAQ) are as follows:

**General characteristics: Gram**

- be the dried mature grains.
- have uniform size, shape and colour.
- be sweet, hard, clean wholesome and free from moulds, living insects, obnoxious smell, discolouration, admixture of deleterious substances and all other impurities except of the extent indicated in schedule below:
- be in sound merchantable condition.
- conform to PFA Rules.

Schedule showing maximum permissible limits of different refraction:

Grade	Foreign matter %	Other food grains %	Damage grains %	Slightly damaged touched grains %	Immature shriveled & broken grains %	Admixture of other varieties %	Weevilled grains %
FAQ	1.0	3.0	3.0	4.0	6.0	5.0	4.0

Note: Moisture upto 14% allowed. Stocks having more than 14% moisture are not to be accepted.

**Definitions:**

Foreign matter: It includes organic and inorganic matter. The inorganic matter shall include sand, gravel, dirt, pebbles, stones, lumps of earth, clay and mud. The organic matter shall include chaff, straw, weedseed and inedible grains.

**General characteristics: Lentil**

- be the dried mature grain (of *Cajanus cajan*, syn. *Cajanus indicus phaseolus*, syn. *Phaseolus radiatus* /phaseoju mungo /lentilla jens, syn. *lens culinaris*, *lens esculenta*, *ervum lens* / *pisum arvensu*/ *phaseolus acontifolius*);
- have reasonably uniform size, shape and colour;
- be sweet, clean wholesome and free from moulds, weevils, obnoxious smell, discolouration, admixture of deleterious substances and all other impurities except of the extent indicated in schedule.
- be in sound merchantable condition.
- not have moisture exceeding 12%; and
- have good cooking quality.

**Special characteristics:**

Maximum limits of tolerance (%)

General characteristics	Grade designation	Foreign matter	Ad-mixture	Damage d pulses	Slightly damaged pulses	Im-mature & shrivelled pulses	Wee-villed pulses
		FAQ	2.0	3.0	3.0	4.0	3.0

**Special characteristics: Tur, Moongbean & Urdbean.**

Pulses shall have reasonably uniform size, shape and colour.

Pulses shall be sweet, clean wholesome and free from moulds, weevils, obnoxious smell, discolouration, admixture of deleterious substances (including added colouring matter) and all other impurity except to the extent indicated in the schedule.

S. No.	Special characteristics	Maximum limit of tolerance (% by weight per qtl.) for FAQ:
1	Foreign matter	2
2	Admixture	3
3	Damaged pulses	3
4	Slightly damaged pulses	4
5	Immature and shrivelled pulses	3
6	Weevilled pulses	4
7	Moisture	12

**Note:**

1. Foreign matters Include dust, stones, lumps of earth, chaff husks stem, straw or any other impurity including edible and non-edible seeds.
2. Admixture means any pulses other than the principal pulses.
3. Damaged pulses are those pulses that are internally/ damaged or discoloured to such an extent that the damage or discolouration materially affects the quality of the pulses.
4. Slightly damaged pulses are those pulses that are superficially damaged or discoloured, such damage or discolouration not materially affecting the quality of the pulses.
5. Immature and shrivelled pulses are those pulses that are not properly developed.
6. Weevilled pulses are those pulses that are partially or wholly bored or eaten by weevil or other grain insects.

Commission for Agriculture Costs & Prices (CACP) is the Nodal agency for fixing MSP of identified agricultural commodities including pulse crops of Arhar, Moongbean, Urdbean, Gram and Lentil. MSP of each agricultural commodity is formulated every season considering the cost of cultivation, International prices and farmer benefit and views of stakeholders. The MSP declared by Govt. of India on suggestion of CACP for recent past years is given in Table 17.

Table 17: Minimum Support Price of identified crops of pulses declared by the Govt. of India.

(Rs. per quintal)

Crop / Year	Arhar	Moongben	Urdbean	Gram	Lentil
2001-02	1320	1320	1330	1200	1300
2002-03	1320 + 5 *	1330 + 5 *	1330 + 5 *	1220 + 5 *	1300 + 5 *
2003-04	1360	1370	1370	1400	1500
2004-05	1390	1410	1410	1425	1525
2005-06	1400	1520	1520	1435	1535
2006-07	1410	1520	1520	1445	1545
2007-08	1550 <sup>^^</sup>	1700 <sup>^^</sup>	1700 <sup>^^</sup>	1600	1700
2008-09	2000	2520	2520	1600	1700
2009-10	2300	2760	2520	1730	1870
2010-11	3000	3170	2900	1760	1870
2011-12	3200 + 5**	3500 + 5**	3300 + 5**	2100	2250
2012-13	3850	4400	4300	2800	2800

\* : Special drought relief.

<sup>^^</sup>: A bonus of Rs.40 per quintal is payable over and above the MSP.

\*\* : Farmers be given additional incentive @ of Rs.5 per kg of Arhar, Urdbean and Moongbean sold during the harvest / arrival period of two months to procurement agencies.

## 11.2. Quantity of crop produce procured.

By and large population of India is vegetarian. Therefore, pulse in diet is essential to keep body physically fit. The farmers, who produce pulses, sell the production reducing the quantity required for their family. The quantity of pulses purchased by NAFED on MSP is given in Table 18.

Table 18: Quantity of pulses purchased by NAFED on MSP during 10-11.

Commodity	Qty. Purchased in MTS	Values (Loose) in Rs. Lakhas
Arhar (Toor)	168.00	52.46
Urdbean	1.60	0.63
Grand Total	169.60	53.09

This apart, NAFED purchased 18625.68 MTS Pulses valued at Rs.51.78 crore viz. Arhar, Gram, Masoor, Moongbean, Urdbean and assorted Pulses in its outright account. The details are given in Table 19.

Table 19: Details of quantity with value purchased under outright account.

Commodity	Quantity (in MTs)	Value (Rs.in lakhs)
Arhar	391.94	123.50
Assorted Pulses	579.22	290.15
Gram	12718.38	2925.44
Masoor	203.87	56.51
Moongbean	2291.59	932.67
Urdbean	2440.68	849.71
<b>Total</b>	<b>18625.68</b>	<b>5177.98</b>

### 11.3. Prevalent Marketing channels:

The channels, which are followed to transfer grains / pulses from producer to consumers, are called marketing channels. The various channels followed in this regard by private and regulated markets are as under:

**Private:** (i) Producer – Dal Miller – Consumer, (ii) Producer – Village Trader – Dal Miller – Wholesaler – Retailer – Consumer, (iii) Producer – Dal Miller - Retailer - Consumer, (iv) Producer – Wholesaler – Dal Miller - Retailer – Consumer, (v) Producer – Wholesaler – Dal Miller – Wholesaler - Retailer – Consumer, (vi) Producer – Wholesaler – Retailer – Consumer (For whole Greengram), and (vii) Producer – Commission Agent – Dal Miller – Wholesaler – Retailer - Consumer.

**Institutional:** (i) Producer – Procuring Agency - Dal Miller – Consumer, (ii) Producer – Procuring Agency – Dal Miller – Wholesaler – Retailer - Consumer, and (iii) Producer – Procuring Agency – Dal Miller – Retailer – Consumer.

For imported pulses, the channel will be followed as Exporting country – Importing country – Private / Government Agencies – Wholesaler / Cooperative Societies – Retailer / Village Societies – Consumer



Arrivals of pulses in domestic markets and their prices during the period from 11.01.2013 to 22.04.2013 have shown in **Annexure 30 (p 197)**. Among the pulse arrivals, the highest was 3, 14,568 tonnes on 04.03.2013.

#### **11.4. Important markets in India and abroad.**

As on 31.03.2011, there were 7246 regulated markets in India comprising of 2433 Principal markets and 4813 Sub market yards. These markets are situated in 35 states / UTs through which agriculture produce including whole grains of pulses / Dal are sold / bought. All activities are performed in these as per the guidelines. The important markets of pulses are in **Annexure 31 (p 198)**.

In the world, major markets importing the pulses are 1) Small chickpea: Burma, Tanzania, Australia, China, UAE, 2) Pigeonpea: Burma, China and Tanzania, 3) Blackgram: Burma, Singapore and Thailand; 4) Mungbean: Burma, Singapore, China and Australia; 5) Green and yellow peas: Canada, Australia, Hungary, Tanzania and US, 6) Lentil: Netherland, Syria, Canada, Turkey, China and 7) Large Chickpea or Kabuli: Australia, Canada, Turkey, Iran and Burma. The prominent markets for export of pulses from India are Bangladesh, Sri Lanka and UAE and minor USA, Nepal, Saudi Arabia, Kuwait, UK, Egypt, Malaysia, Canada, Spain, Italy, Pakistan, Yemen Republic, Algeria and Bahrain.

#### **11.5. Major problems associated with storage of grains.**

Surplus production of pulses at farmer level and stock available with Wholesaler / Millers is essentially stored for longer or shorter duration either for consumption or as seed for sowing during the next cropping season. In storage, wheat, Rice and other food materials are damaged by many insect pests (**Figure 12: p 215**). Some of them are i) Khapra beetle (*Trogoderma granarium*), ii) Pulse beetle (*Callosobruchus chinensis Linn*), iii) Rice weevil (*Sitophilus orizae*), iv) Rice Moth (*Corcyra cephalonica*), v) Lesser Grain Borer (*Rhyzopertha dominica*), vi) Pea Weevil (*Bruchus pisorum*), vii) Cowpea weevils (*Callosobruchus species*), viii) Birds, ix) Fungi, x) Mites, xi) Bacteria and xii) Rodents. Grain moisture more than 10 % is not good for storage. If the grain has more than the said moisture content that invites more problems.

Losses in storage may be minimized by storing the materials in scientific warehouses of Central Warehousing Corporation (CWC), State Warehousing Corporation (SWC) and Food Corporation of India (FCI).

#### **11.6. Provisions for credit:**

The Institutional credit facilities to agriculture are disbursed through co-operatives, which was targeted 43 percent share in rural credit flow in agriculture during 2002-03 (Rs.82073 crore), Commercial Banks (50 per cent) and Regional Rural Banks (7 percent). The institutional credit to agriculture is offered in the form of short term, medium term and long term credit facilities.

**Short term and medium term loans:** For arranging the short and medium terms crop loans, the crop loan scheme is under implementation. Under this scheme all categories of farmers are eligible and they are required to repay the loans not exceeding 18 months. Kisan Credit Card Scheme is also under implementation in which all agriculture clients having good track record for the last two years are eligible to avail loans. Main objectives of this scheme are 1) Farmers to meet their production credit and contingency needs, 2) The farmers to avail the crop loans as and when they need, 3) Based on operational land holding, cropping pattern and scale of finance, 4) Convenient withdrawal slips. The Kisan Credit Card is valid for 3 years subject to annual review, and 5) Permanent disability; a maximum amount of Rs.50,000 and Rs.25,000 respectively.

**Long term loans:** Under Agricultural Term Loan Scheme, all categories of farmers (small/medium and agricultural labourers) are eligible, provided they have necessary experience in the activity and required area. Main objectives / facilities are 1) Assets facilitating crop production / income generation, 2) Development, minor irrigation, farm mechanization plantation and horticulture, dairying, poultry, sericulture, dry land / waste land development schemes etc. and 3) Farmers with a repayment span not less than 3 years and note exceeding 15 years.

The holders of Kisan Credit Cards are getting benefits like relaxation in interest rate of loans, input subsidy etc. Among the pulse producing states during 2010-11, the states of Bihar and Tamil Nadu provided the information which is given in **Annexure 32 (p 199)**.

#### **11.7. Crop insurance:**

National Agricultural Insurance Scheme is available to all farmers, loanee and non-loanee both irrespective of the size of their holding. The objectives / facilities under this scheme are 1) In the vent of failure of any of the notified crops as a result of natural calamities, pests and diseases attack, 2) Farming practices, high value inputs and higher technology in agriculture, 3) Disaster years, 4) Implementing agency, 5) Yield of the area insured, 6) Pulses, oilseeds and annual commercial / horticultural crops and 7) 50 percent of premium charges from them. The subsidy will be phased out over a period of 5 years on sunset basis. Among the pulse producing states, Bihar and Tamil Nadu have given information about number of farmers covered etc which is presented in **Annexure 32 (p 199)**.

#### **12. Workshops, conference and seminars**

##### **12.1. Outcomes / recommendations of annual workshop conducted by ICAR / SAUs.**

Four Group Meetings in respect of Urdbean & Moongbean for Kharif, Lentil, fieldPeas, Lathyrus & Rajmash for Rabi and separately for pigeonpea and chickpea are organized by the India Institute of Pulses Research (IIPR), Kanpur of ICAR

under All India Coordinated Research Project. Recommendations of such group meetings are as under:

- Breeders involved in developing varieties HK 05-169, JSC 55 and JSC 56 are requested to submit the release and notification proposal to CVRC for their release. The basic seed of these varieties should also be provided to SFCI for multiplication of test stock seed.
- Dr. Ashutosh Sarkar, ICARDA suggested to attempt multiple crosses involving 6 to 8 parents for gene pyramiding for ancillary characters and resistance
- DDG (CS) and chairman suggested conducting field days at centres to share the breeding materials generated through pre breeding.
- It is not just the frequency alone but yield superiority and trial size (total no. of entries) would also be considered and the PC unit will decide retaining of entries or otherwise in the traits.
- In AVT-2, if the entries are less, filler entries would be added from the PC unit or clubbed with AVT-1 for conducting of the traits.
- All varietal evaluation trails would be done at Hariyur instead of Bangalore.
- While taking ELSK trials, it has been recommended that best agronomic practices and precautions should be adopted like pre irrigation, timely sowing, seed treatment etc. Breeders were advised to ensure that the seed of ELSK entries should be infestation free and treated with fungicides before dispatching to PC unit.
- Chairman advised the microbiologist to conduct the trials on farmers' field and make observations on yield of promising cultures.
- DDG (CS) instructed to PS (Microbiology) to write a letters to know the status of mesorhizobia deposited at IARI and also stressed upon the molecular characterization of all the strains and their registration.
- Root parameters for all the genotypes to be evaluated at least at two locations i.e. Durgapura and Gulbarga.
- Director, IIPR pointed out that besides field screening emphasis must be given to management of diseases, race specific screening of AVT-1 and AVT -2 entries and identification of races of major diseases.
- Studies on races / pathotypes will be carried in controlled conditions at IARI, JNKVV, Jabalpur and IIPR by using new set of differentials. All entries are required to supply pure cultures to above places before crop season.
- It is mandatory that main and sub centre has to take up experiments for at least two diseases.
- All genotypes exhibiting consistency in resistance against the diseases should be multiplied at their location (at least 1 kg seed) for further utilization.
- Project Coordinator suggested initiating the work on control of cut worm and storage grain pests.
- All scientists were urged to ensure proper reporting of data (the data should be analyzed with proper transformation methods and summarized using mean, F

values, SEM and CV along with multiple range test comparing the means and indicating the differences among them and with the control.

### **12.2. Recommendation of important conference / seminar / brainstorming sessions.**

A brainstorming meeting on pulses production was organized under the chairmanship of Hon'ble Union Agriculture Minister at NASC Complex, Pusa, New Delhi. The recommendations of this meeting are presented below:

Specific short term recommendations of Pulses Expert Group would be implemented in various programmes and schemes of the Ministry of Agriculture. Suitable steps would be initiated in respect of policy interventions etc to operationalize medium and long term recommendations.

- Process of popularizing newly released varieties should be reviewed for accelerating adoption rate.
- Hybridization, genomics and transgenic research in pulses should be imparted appropriate thrust. Modalities for Involvement of the private sector in research collaboration should be worked out by ICAR.
- Utilization of rice fallows/other fallow land for pulse cultivation.
- Summer moong in North Western Region should be more actively promoted.
- Intercrops should be targeted, particularly to cover very large sugarcane and oilseeds area in Kharif.
- Until major technological breakthroughs were achieved, there was a big scope to extend simple measures like seed priming, seed treatment, planting techniques for dry land farming, etc. to improve productivity. Intensive work in selected districts could create visible impact on productivity increase.
- Crop insurance coverage of pulse crops should be increased with promotion of innovative insurance products. A working paper should be prepared and shared with the States in the coming Rabi Conference.
- Price signals were critical as also assured marketing structures. There is need to study the merits of several innovative marketing arrangements tried out in different States to explore newer ways of engaging financial institutions, spot exchanges, grading agencies, storage management, and warehousing receipts. It would be appropriate to form a small group to look at various marketing options for developing a programme on marketing of pulses.

### **13. Important websites**

#### **13.1. Important National and International Organization involved in pulse improvement**

##### **(A) National:**

- (i) Indian Council of Agricultural Research (ICAR), Ministry of Agriculture, Krishi Bhavan, New Delhi – 110 114.
- (ii) Indian Agricultural Research Institute (IARI), Pusa, New Delhi – 110 012.
- (iii) Indian Institute of Pulses Research (IIPR), Kalyanpur, Kanpur – 208 024 (Uttar Pradesh).
- (iv) **All Agricultural Universities in India.**

- a) JNKVV, Jabalpur, Madhya Pradesh – 482 004.
- b) Rajmata Vijayraje Scindia Krishi Vishwavidyalaya, Gwalior (Madhya Pradesh).
- c) Indira Gandhi Krishi Vishwavidyalaya, Raipur – 492 012 (Chhattisgarh)
- d) Acharya N.G. Ranga Agricultural University, Hyderabad – 500 030.
- e) Anand Agricultural University, Anand – 388 110 (Gujarat).
- f) Assam Agricultural University, Jorhat – 785 013 (Assam).
- g) Bidhanchandra Krishi Vishwavidyalaya, Mohanpur, Nadia – 741 252 (West Bengal).
- h) Birsa Agricultural University, Ranchi – 834 006 (Jharkhand).
- i) Chandrashekhar Azad University of Agriculture & Technology, Kanpur – 208 002 (Uttar Pradesh).
- j) Choudhary Charan Singh Haryana Agricultural University, Hisar – 125 004 (Haryana).
- k) Dr. Punjabrao Deshmukh Krishi Vidyapeeth, Akola – 444 104 (Maharashtra)
- l) Govind Vallabh Pant University of Agriculture & Technology, Pantnagar – 263 145 (Uttarakhand).
- m) Ch. Sharwan Kumar Krishi Vishwavidyalaya, Palampur – 176 062 (Himachal Pradesh).
- n) Junagadh Agricultural University, Junagadh – 362 001 (Gujarat).
- o) Kerala Agricultural University, Vellanikkara, Distt. Trichur – 680 656 (Kerala).
- p) Dr. Balasahib Sawant Konkan Krishi Vidyapeeth, Dapoli – 415 712 (Maharashtra).
- q) Mahatma Phule Krishi Vidyapeeth, Rahuri – 413 722 (Maharashtra).
- r) Marathwada Agricultural University, Parbhani – 431 402 (Maharashtra).
- s) Maharana Pratap University of Agriculture & Technology, Udaipur – 313 001 (Rajasthan).
- t) Narendradeva University of Agriculture & Technology, Faizabad – 224 229 (Uttar Pradesh).
- u) Navsari Agricultural University, Navsari – 396 450 (Gujarat).
- v) Orissa University of Agriculture & Technology, Bhubaneswar – 751 003 (Odisha).
- w) Punjab Agricultural University, Ludhiana – 141 004 (Punjab).
- x) Rajasthan Agricultural University, Bikaner – 334 002 (Rajasthan).
- y) Rajendra Agricultural University, Samastipur – 848 125 (Bihar).
- z) Sardar Krushi Nagar Dantiwada Agricultural University, Dantiwada – 385 506 (Gujarat).
- aa) Sardar Vallabhbhai Patel University of Agriculture & Technology, Modipuram, Meerut – 250 110 (Uttar Pradesh).
- bb) Sher-e-Kashmir University of Agricultural Science & Technology, Srinagar – 191 121 (J&K).
- cc) Sher-e-Kashmir University of Agricultural Sciences & Technology, 45-B, Gandhinagar, Jammu – 180 012 (J&K).

- dd) Tamil Nadu Agricultural University, Coimbatore – 641 003 (Tamil Nadu).
- ee) University of Agricultural Sciences, GKVK Campus, Bangalore – 560 065 (Karnataka).
- ff) University of Agricultural Sciences, Dharwad – 580 005 (Karnataka).
- gg) Uttar Banga Krishi Vishawavidyalaya Pundivari Coochbehar – 763 165 (West Bengal).

**(B) International:**

- (i) International Crop Research Institute for Semi Arid Tropics (ICRISAT), Patancheru, Hyderabad, Andhra Pradesh.
- (ii) International Centre for Agricultural Research in the Dry Land Areas (ICARDA), Aleppo, Syria.

**13.2. National and international important websites for farmers, development officials, policy planners and scientific community.**

**13.2.1. Websites for farmers & other stake holders.**

**(A) National:**

- (i) [www.nfsm.gov.in](http://www.nfsm.gov.in)
- (ii) [www.icar.org.in](http://www.icar.org.in)
- (iii) [www.iari.res.in](http://www.iari.res.in)
- (iv) [www.iipr.nic.in](http://www.iipr.nic.in)
- (v) [www.ciphet.in](http://www.ciphet.in)
- (vi) [www.nafed-india.com](http://www.nafed-india.com)
- (vii) [www.iffco.nic.in](http://www.iffco.nic.in)
- (viii) [www.kribhco.net](http://www.kribhco.net)
- (ix) [www.indiaseeds.com](http://www.indiaseeds.com)
- (x) [www.sfci.nic.in](http://www.sfci.nic.in)
- (xi) [www.seednet.gov.in](http://www.seednet.gov.in)
- (xii) All KVKs under Extension division of ICAR.

**(A) State:**

- (i) [www.jnkvv.nic.in](http://www.jnkvv.nic.in)
- (ii) [www.rvskvv.nic.in](http://www.rvskvv.nic.in)
- (iii) [www.igau.edu.in](http://www.igau.edu.in)
- (iv) [www.pdkv.ac.in](http://www.pdkv.ac.in)
- (v) [www.dbskv.org](http://www.dbskv.org)
- (vi) [www.mah.nic.in](http://www.mah.nic.in)
- (vii) [www.mkv.ac.in](http://www.mkv.ac.in)
- (viii) [www.csauk.ac.in](http://www.csauk.ac.in)
- (ix) [www.gbpuat.ac.in](http://www.gbpuat.ac.in)
- (x) [www.nduat.ernet.in](http://www.nduat.ernet.in)
- (xi) [www.svbmeerut.ac.in](http://www.svbmeerut.ac.in)
- (xii) [www.mpuat.ac.in](http://www.mpuat.ac.in)
- (xiii) [www.raubikaner.org](http://www.raubikaner.org)
- (xiv) [www.angrau.net](http://www.angrau.net).

- (xv) [www.uasbangalore.edu.in](http://www.uasbangalore.edu.in)
- (xvi) [www.uasd.edu](http://www.uasd.edu).
- (xvii) [www.aau.in](http://www.aau.in)
- (xviii) [www.jau.in](http://www.jau.in)
- (xix) [www.nau.in](http://www.nau.in)
- (xx) [www.sdau.edu.in](http://www.sdau.edu.in)
- (xxi) [www.pusavarsity.org.in](http://www.pusavarsity.org.in)
- (xxii) [www.ouat.ac.in](http://www.ouat.ac.in)
- (xxiii) [www.bckv.edu.in](http://www.bckv.edu.in)
- (xxiv) [www.hau.ernet.in](http://www.hau.ernet.in)
- (xxv) [www.skvastkashmir.ac.in](http://www.skvastkashmir.ac.in)
- (xxvi) [www.tnau.ac.in](http://www.tnau.ac.in)
- (xxvii) [www.hillagric.ernet.in](http://www.hillagric.ernet.in)
- (xxviii) All KVKs under agricultural universities

**(B) International:**

- (i) [www.icrisat.org](http://www.icrisat.org)
- (ii) [www.icarda.org](http://www.icarda.org)
- (iii) [www.faostat.fao.org](http://www.faostat.fao.org)

**13.3. Website of advisory services to farmers.**

- (i) [www.nfsm.gov.in](http://www.nfsm.gov.in)
- (ii) [www.icar.org.in](http://www.icar.org.in)
- (iii) [www.ncipm.org.in](http://www.ncipm.org.in)
- (iv) [www.jnkvv.nic.in](http://www.jnkvv.nic.in)
- (v) [www.angrau.net](http://www.angrau.net)
- (vi) [www.bckv.edu.in](http://www.bckv.edu.in)
- (vii) [www.csauk.ac.in](http://www.csauk.ac.in)
- (viii) [www.hau.ernet.in](http://www.hau.ernet.in)
- (ix) [www.dbskkv.org](http://www.dbskkv.org)
- (x) [www.pdkv.ac.in](http://www.pdkv.ac.in)
- (xi) <http://igau.edu.in>
- (xii) [www.mpkv.mah.nic.in](http://www.mpkv.mah.nic.in)
- (xiii) [www.mkv2.mah.nic.in](http://www.mkv2.mah.nic.in)
- (xiv) [www.nduat.ernet.in](http://www.nduat.ernet.in)
- (xv) [www.ouat.ac.in](http://www.ouat.ac.in)
- (xvi) [www.raubikaner.org](http://www.raubikaner.org)
- (xvii) [www.pusavariety.org.in](http://www.pusavariety.org.in)
- (xviii) [www.submeerut.ac.in](http://www.submeerut.ac.in)
- (xix) [www.jau.in/caet](http://www.jau.in/caet)
- (xx) [www.skvastkashmir.ac.in](http://www.skvastkashmir.ac.in)
- (xxi) [www.tnau.ac.in](http://www.tnau.ac.in)
- (xxii) [www.rvskvv.nic.in](http://www.rvskvv.nic.in)
- (xxiii) [www.hillagric.ernet.in](http://www.hillagric.ernet.in)

(xxiv) www.mpuat.ac.in

**14. Awards and scholarships**

**14.1. Awards given to farmers at national and international level.**

Awards are given to farmers for their remarkable / notable achievements, especially in productivity of pulses so that other farmers may come forward for increasing their productivity. The details of awards given by DAC are given below: -

S.N	Name of Organization	Name of Awards & Recipients	
		National level	International level
1.	DAC, Union Ministry of Agriculture.	Krishi Karman Award 2011-12	-
		Smt. Radha Bai Dubey, Vill. Pandajhir, Dist. Raisen, Madhya Pradesh	
		Mr. Damodar Chaudhary, Vill. Mallah Toli, Dist. Palamau, Jharkhand	
		Smt. Seemu Sardar, Vill. Balijuri Bansjuri, Dist. East Singhbhum, Jharkhand	

**14.2. Awards given to development officials, policy planners and scientists for their contribution.**

S. N	Name of Award	Development officials	Policy planners	Scientists for their contribution
1.	Krishi Karman Award 2011-12	-	Madhya Pradesh for Total Food Grains including pulses – Category -I	--
		-	Tamil Nadu for Total Food Grains including pulses – Category -II	
		-	Nagaland for Total Food Grains including pulses – Category -III	
		-	Manipur for Total Food Grains including pulses – Category –III	
		-	Jharkhand for pulses	

S. N	Name of Award	Development officials	Policy planners	Scientists for their contribution
2.	Commend	-	Punjab & Rajasthan for Total	



	ation awards		Food Grains including pulses – Category –I	
		-	Gujarat & Uttarakhand for Total Food Grains including pulses – Category –II	
		-	Tripura, Arunachal Pradesh & Mizoram for Total Food Grains including pulses – Category –III	
		-	West Bengal & Assam for pulses	

### 14.3. Important website for scholarships.

- (i) [www.icar.org.in](http://www.icar.org.in)
- (ii) [www.iari.res.in](http://www.iari.res.in)

### 15. Researchable issues

To make pulses cultivation economical and viable in India, research on the following points are required to be undertaken on priority basis:

- A. **Varieties:** A number of varieties of pulses have been evolved and notified suitable to different agro climatic zones of India. By and large, old varieties are performing better in field than the newly notified varieties of pulses. The breeding programmes are being carried out by research institutes for improvement in pulses. Among the pulses, pigeonpea and chickpea are kings of pulses, as these together contribute 64 % to the total pulses production. *Helicoverpa armigera* and *Wilt* are very dangerous for Pigeonpea and chickpea, causing 20-40 % losses in a normal year to productivity. Therefore, there is an urgent need to undertake intensive research work for evolving varieties of Gram and Pigeonpea having resistance to *Helicoverpa*. This apart, there is also need of evolving varieties of major pulses having ever higher production vigour and resistance to drought, frost, flood & weeds.
- B. **Production technologies:** Area specific refinement in package of practices of major popular old varieties of cultivation of pulses are required, especially in technologies like, seeding, IPM, INM, fertilizer and bio-fertilizer application including insecticides and bio-pesticides and Irrigation technology to harvest the maximum yield in present climatic and soil conditions.
- C. **Farm implements & Machinery:** To make agriculture a profit making business, effective use of farm implements and machinery are required for completing primary and secondary tillage operations in recommended time for better productivity and higher recovery and also for reduction in cost of cultivation

including processing cost. For this purpose, manufacturing of machines suitable for major pulse producing states at affordable price for attending the operations like sowing, application of pesticides for management of insect pests and diseases, INM for balanced use of fertilizers and Bio-fertilizers, Micro irrigation devices, harvester, threshing and post harvest etc are required.

- D. Climate change:** There have been drastic changes in behavior of climate for the last so many years, recurrence of such behaviour has been experienced during the last ten years, especially rains, temperature and cold etc. Considering all these attributes of climate, the DAC of Ministry of Agriculture has already taken initiatives involving research system of pulses family to combat the adverse effects and situations of climatic changes in the following areas. However, intensive and effective researches are required to pursue efforts for all crops.
- Improving Heat Tolerance in Chickpea for enhancing its productivity in warm growing conditions and mitigating impact of climate change.
  - Exploiting host plant resistance for Helicoverpa management to increase the production and productivity of Chickpea and Pigeonpea under Rainfed condition in India.
  - Seed system in legume development and popularization of Model seed system for quality seed production of major legumes to ensure seed sufficiency at village level.
  - Enhancing yield and stability of pigeonpea through Heterosis breeding.
  - Taking pigeonpea hybrids to the doorsteps of farmers.
  - Enhancing Lentil production for food, nutritional security and improved rural livelihood.
  - Pre breeding and genetic enhancement in breaking yield barriers in lentil and kabuli chickpea.
  - Enhancing Grasspea production for safe human food, animal feed and sustainable rice based production system in India.
- E. Product development:** Most of the products available in market are of Gram. A few items are of Moong & Urd. Therefore, there is a need to work on evolution of new items using the aforesaid and other pulses.
- F. Value addition:** Mechanization of crop production practices, processing and value addition is very important. Development of post harvest machines and practices are required for increasing recovery of pulses & minimizing the losses in processing. This apart, modernization of obsolete processing machines is required. Training for refreshing knowledge of personnel on modern production, protection and processing technologies is required.
- G. Marketing:** Government of India has taken lot of initiatives for facilitating marketing of pulses through the available markets across the country. However,

there are inadequate marketing facilities in minor pulse producing states / remote areas in North Eastern states. To create confidence in farmers cultivating pulses, the Ministry of Agriculture through NAFED ensures to purchase pulses at MSP under price support scheme in Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal, if prices go down below the MSP level. There is a need to open purchase centres for pulses under PSS in minor pulse producing states. At present, the MSP is declared by GOI for Arhar, Moongbean, Urdbean, Lentil and Gram under Price Support Scheme (PSS).

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**Annexure 1: Pulse crops description (Continued).**

<b>Pulse Crops</b>	<b>Origin</b>	<b>Importance</b>
<b>1.1</b>	<b>1.2</b>	<b>1.3</b>
<b>1) Pigeonpea</b>	Africa	Rich source of protein and supplies a major share of the protein requirement of the vegetarian population of the country and is mainly eaten in the form of split pulse as

		<p>‘dal’. Seeds are rich in iron and iodine, besides essential amino acids like lycine, tyrocene, cystine and arginine. The outer covering of its seed together with part of the kernel provides a valuable feed for milch cattle. The husk of pods and leaves obtained during threshing constitute a valuable cattle feed. Woody parts of the plant are used for fuel. It is a legume crop and, consequently, possesses valuable properties including restorer of biological nitrogen ranging 31-97 kg/ha to the soil for next succeeding crop. Plant residues also received ranging 20-25 quintal per ha, besides 50-60 quintals of sticks.</p>
<b>2) Moongbean</b>	India and Central Asia	<p>It is an excellent source of high quality protein about 25% with easy digestibility hence referred to patients too. It is consumed as whole grains as well as dal in variety of ways in homes. Sprouted whole moong is used in South India for preparing curry or a savoury dish. Moong halwa is very nutritious. Moong dal (split) and dehusked fried in fat goes very well with tea or drinks as a snack. Moong can be used as a feed for cattle. After harvesting the pods, green plants are uprooted or cut from ground level and chopped into pieces and fed to the cattle. Husk of the seed can be socked in water and used as cattle feed. It fixes biological nitrogen ranging 30-74 kg / ha in the soil and also provides plant residues 15-20 quintals per ha. Plants are also used for making green manures.</p>
<b>3) Urdbean</b>	India	<p>Consumed in the form of ‘dal’ (whole or split, husked and un-husked) or perched. Urd differs from other pulses in its peculiarity of attaining a mucilaginous pasty character when soaked in water. In south, it is consumed in variety of ways across north to south in preparation of different regular and popular dishes like vada, idli, dosa, halwa, imarti in combination with other foodgrains. Also used as a nutritive fodder for milch cattle. This apart, it provides residues about 12.5-17.5 quintals / ha.</p>

**Annexure 1: Pulse crops description (Continued).**

<b>Pulse Crops</b>	<b>Origin</b>	<b>Importance</b>
<b>1.1</b>	<b>1.2</b>	<b>1.3</b>
<b>4) Mothbean</b>	India	Recognized as the potent source of several confectionary items like papad, bhujia, namkeen, wada etc. Used as daily snacks as well as Dal. Source of food, feed, fodder and green manuring. Green pods are delicious source of vegetables. Mothbean is known for higher proportion of albumin and glutamine fraction of protein alongwith a good source of lysine and leucine amino acids. This crop provides residues about 8-10 quintals / ha.
<b>5) Kulthi</b>	Peninsular India	An important crop of south India. It's grain is used for human consumption as 'dal' as well as in preparation so called 'rasam' and also as a concentrated feed for cattle. It may also be used as green manure. Crop is generally grown when the cultivator is unable to show any other crop for want of timely rains. It provides plant residues in the range of 7-8 quintals / ha.
<b>Chickpea</b>	South West Asia – probably Afganistan and Persia.	Consumed as 'Dal' (split cotyledons) and chhole. Many attractive dishes viz – sweets, snacks and namkeen are also prepared from its flour called besan. Also eaten as whole fried or boiled and salted. Fresh green leaves (sag) are used as vegetables and green grains as hare chhole or chholia. Straw of gram is an excellent fodder while both husk and bits of 'Dal' are valuable cattle feed. Leaves consist of mallic and citric acids and are very useful for stomach ailments and blood purifier. The field, in which this crop is grown, gets natural nitrogen ranging 41-134 kg / ha for next succeeding crop. It also provides 25-30 quintals / ha crop residues.
<b>7) Lentil</b>	Turkey to South Iran	In Indian sub continent, it is mostly consumed as 'Dal'. Whole pulse grain as 'dal' and snack preparation and soup preparation is also served, in Restraus of mega cities. It is easily digestible with high biological value, hence, also referred to patient too. Dry leaves, stems, empty pods and broken pods are used as valuable cattle feed. This is only the crop among the pulses, provides highest natural nitrogen fixation in the range of 60-147 kg /ha besides 30-35 quintals of crop residues.

**Annexure 1: Pulse crops description (Continued)**

<b>Pulse Crops</b>	<b>Origin</b>	<b>Importance</b>
<b>1.1</b>	<b>1.2</b>	<b>1.3</b>
<b>8) Fieldpea</b>	Mediterranean Region of Southern Europe and Western Asia	It provides a variety of vegetarian diet hence liked throughout the world. The mature seeds are used as whole or split into Dal and put to use in various ways for human consumption. Besides vegetable purpose, it is also grown as a forage crop for cattle and cover crop to prevent soil erosion but mainly for matured seeds for human consumption. Local races of peas are grown as utera crop on residual moisture, which provides about 4-6 quintals of yield per ha. From fieldpeas, about 25 quintals / ha plant residues are received.
<b>9) Lathyrus</b>	South Europe and Western Asia	Considered as drought-tolerant hardy crop, and is grown in low-rainfall regions under rainfed conditions. It is grown in Rabi, where lentil and chickpea, are not expected to give good yields. The crop has unique tolerance ability against stress environmental conditions not only drought but also for water logging. In addition to use as dal and chapatti, it is usually grown as fodder crop. Its grain and other parts contain a neurotoxin called ODAP ( $\beta$ -N-Oxalyl-L, $\beta$ -diaminopropionic acid), which is supposed to cause lathyrism, characterized by paralysis of lower limbs to human beings, if regularly consumed. Lathyrus fixes biological nitrogen in the range of 36-48 kg / ha for the use of succeeding cereal crop. This also provides 10-15 quintals / ha plant residues.
<b>10) Rajmash</b>	Central America and south Mexico	Its cultivation during Rabi and summer is gaining popularity in northern Indian plains. Traditionally, Rajmash is grown during Kharif in Hills of Himalayas, however, high yield is attainable in Rabi in plains due to better management. Plant residues are received in the range of 40-50 quintals / ha. Rajmashes are consumed as whole grain in the form of Dal. It is rich in protein.

**Annexure 1: Pulse crops description (Continued)**

<b>Pulse Crops</b>	<b>Origin</b>	<b>Importance</b>
<b>1.1</b>	<b>1.2</b>	<b>1.3</b>
<b>11) Cowpea</b>	Africa	Crop is known as drought hardy nature, its wide and droopy leaves keep soils and soil moisture conserved due to shading effect. Initial fast growth with fast penetrating root system and strong stomatal sensitivity justify its initial establishment in soil moisture deficit conditions. Seed is a nutritious component in the human diet, and cheap livestock feed as well. The tender green leaves are also used as source, especially by small scale farmers in the rural areas. Choice of cowpea as vegetable is due to being palatable, highly nutritious and relatively free of metabolites or other toxins. Fresh leaves and fast growing twigs are often picked up and eaten like spinach. Immature shaped pods are used in some way as snap beans often being mixed with other foods. Both the green and dried seeds are suitable for canning and boiling as well. It provides residues in the range of 25-30 quintal per ha.
<b>12) Broadbean</b>	Mediterranean Region of Southern Europe and Western Asia	Broad-bean has high yield potential. In many countries this species is the main food legume. This crop is presently being grown sporadically in UP, Haryana, Punjab, Bihar, Rajasthan and Madhya Pradesh as a minor vegetable. However, dry seeds are also used as 'Dal'. Its seed is edible and nutritive. There appears to be every possibility of popularizing broad-bean as a new pulse crop in India. Broad-bean has shown response to inputs and better management practices and hence, can be fitted into intensive cropping systems.
<b>13) Ricebean</b>	Himalayan region of North east	One of the important minor food legumes, which can be grown under a wide range of soil and climatic conditions in the hilly areas of Himachal Pradesh, Uttarakhand and north-east hill regions, serving dual purpose. Its grains are also cooked in place of rice that's why it is known as rice bean. It is also grown as green manure crop. Its grain production potentiality is considerably high and can serve as a good pulse crop. It has the potential to yield as high as 15-25q/ha. All the pods on a plant mature almost simultaneously and can be harvested in a single operation. There are many types and varieties of rice-bean differing in maturity, plant type and seed characteristics. Some varieties are completely free from fungal and viral diseases.

**Annexure 1: Pulse crops description (Continued).**

<b>Pulse Crops</b>	<b>Origin</b>	<b>Importance</b>
<b>1.1</b>	<b>1.2</b>	<b>1.3</b>
<b>14) Sem</b>	India or South East Asia	Crop is grown for its green pods, while dry seeds are used in various vegetable food preparations. It is also grown in home gardens as annual crop or on fences as perennial crop. It is one of the major protein sources in the diet in southern India. Being a legume, it can fix atmospheric nitrogen to the extent of 170 kg / ha, besides leaving enough crop residues to enrich the soils with organic matter. It can be grown either as pure crop or mixed crop and matures in 110 to 120 days. In pure stands, seed yields are around 10-15 qtl. / hectare, whereas in inter crop condition, the yields are around 4-5 qtls / ha. In garden types, the green pod yield is 26-45 q/ha. It also yields 5-10 Tonnes / hectare of green matter, which can be used as fodder or green manure. It improves the soil conditions and is relatively drought tolerant.



**Annexure 1: Pulse crops description (Continued).**

<b>Pulse Crops</b>	<b>Scientific Name / Chromosome No.</b>	<b>Synonyms</b>
<b>1.1</b>	<b>1.4</b>	<b>1.5</b>
<b>1) Pigeonpea</b>	<i>Cajanus cajan</i> 2n= 22	Congopea, Fio-fio, Noeyepa, Kadios, Tur and Redgram.
<b>2) Moongbean</b>	<i>Vigna huckli L Wilczek</i> 2n=24	Greengram and Moong.
<b>3) Urdbean</b>	<i>Vigna mungo L.Hepper</i> 2n= 24	Blackgram, Biri, Mash and Urd
<b>4) Mothbean</b>	<i>Vigna acontifolia</i> 2n= 22	Moth, Haricot beans
<b>5) Kulthi</b>	<i>Macrotiloma uniflerium (Lam) Verdi</i> 2n=24	Horsegram
<b>6) Chickpea</b>	<i>Cicer arietinum L.</i> 1) <i>arietinum</i> : 2 n = 14 2) <i>kabulium</i> : 2 n = 16	Chickpea, Bengalgram, Chana and Gram
<b>7) Lentil</b>	<i>Lens esculanta Moench</i> 2n=14	Masoor and Malka
<b>8) Fieldpea</b>	<i>Pisum sativum</i> 2n= 14	Gardenpea, pea and Matar.
<b>9) Lathyrus</b>	<i>Lathyrus sativus L.</i> 2n= 14	Khesari, Teora, Grasspea & huckling pea,
<b>10) Rajmash</b>	<i>Phaseolus vulgaris L.</i> 2n=22	Frenchbean, kidneybean & Haricatebean.
<b>11) Cowpea</b>	<i>Vigna sinensis L.</i> 2n= 22	Lobia, Black - eye - pea and Barbati
<b>12) Broadbean</b>	<i>Vicia faba Linn.</i> 2n = 24	Bakla,Fababean
<b>13) Ricebean</b>	<i>Vigna umbellate (Thunb.)</i> 2n = 22	Japanese Rice bean, bomboobean, climbing bean and mountainbean
<b>14) Sem</b>	<i>Dolichos lablab L.</i> 2n=22	Lablab bean, Bonavist bean, Hyacinth bean and Indian butter bean

**Annexure 1: Pulse crops description (Continued).**

Pulse Crop	Morphology	Species
<b>1.1</b>	<b>1.6</b>	<b>1.7</b>
<b>1) Pigeonpea</b>	Plant is an erect shrub with considerable variation in height from 1-4 metre depends upon variety, growing season and management practices adopted. Mostly branching begins from 6 <sup>th</sup> to 10 <sup>th</sup> node i.e. from 15-25 cm above ground. Leaves are trifoliately compound with central leaflets longer than laterals. Root System consists of a well developed central tap root with numerous secondary and lateral branches bearing nodules on them like other legumes. Inflorescence is axillary raceme often forming a terminal panicle. Pod length varies from 5-10 cm and width from 0.6 to 0.9 cm and colour variation from green to dark brown. Seeds are round or lens shaped, the colour of the seed coat varied dirty white to silver white, light brown to chestnut brown and dark mottled brown to pinkish black with yellow cotyledons.	Total: 11 Cultivated: 1 ( <i>C. cajan</i> ) Wild: 10
<b>2) Moongbean</b>	A small herbaceous annual plant growing to a height of 30 to 100 cm with a slight tendency to twining in the upper branches. Depending upon the plant type and nature of crop is grown. Central stems are more or less erect while side branched are semi erect. Leaves are trifoliolate with long petioles. Both the stem and leaves are covered with short hairs, generally shorter than urd. Flowers are various shades of yellow colour produced in cluster of 10-20 in axillary racemes. Crop is fully self-fertile. Pods are 6-10 cm long hairy and round having 7-10 seeds inside. Hilum is white and flat. Germination type epigeal and colour of cotyledons is yellow.	Cultivated: 1 ( <i>Vigna radiata</i> L. Wilczek)
<b>3) Urdbean</b>	It is an annual herbaceous plant attaining a height of 30 to 100 cm. Leaves are large, trifoliolate and are also hairy, generally with a purplish tinge. The inflorescence consists of a cluster of five to six flowers at the top of a long hairy peduncle. The flowers of urd start opening early in the morning and are completely open between 7 am and 8 am. Self fertilization is the general rule in urd crop. The pods are long and cylindrical being about 4-6 cm in length. There are four to ten seeds in a pod. The seeds are generally black or very dark brown. The split seed of black gram is white in colour. The germination of seed is of epigeal type.	Cultivated: Two ( <i>Mungo niger</i> , <i>Mungo viridis</i> )

**Annexure 1: Pulse crops description (Continued).**

<b>Pulse Crop</b>	<b>Morphology</b>	<b>Species</b>
<b>1.1</b>	1.6	1.7
<b>4) Mothbean</b>	Trailing herb, 10-30 cm tall, deeply lobed leaflets. Flower yellow, seed colour is yellow to brown or mottled black. Pod colour is brown or pale grey when mature.	Cultivated: 1 ( <i>Vigna acontifolia</i> )
<b>5) Kulthi</b>	Annual herb, slender, with slightly twinning branches, semi-erect, low growing habit 3—50 cm height. Leaves are trifoliate yellowish green to green in colour. Pods are short, 3-5 cm long, linear, with secured beak and 5-7 seeds. Seeds are flattened, 3-6 mm long, light red brown, black or mottled with hard seed coat.	Cultivated: 1 [( <i>Macrotiloma uniflerium</i> (Lam) Verdi)]
<b>6) Chickpea</b>	Small herbaceous branched plant with maximum height of 45-60 cm. Roots include a strong central tap root with extensive lateral branches spread out in all directions in upper soil layers. There are numerous bacterial nodules found on primary and secondary roots used as a site of atmospheric 'N' fixation. Stem is branched with numerous granular hairs on it. Flowers are typical Papilionaceous consisting of five sepals, five petals (compared of one standard, two wings and two keels), ten stamens (nine fused to form one staminal column and one free) and a carpel with the style borne laterally on the ovary. They are singly, axillary, racemes usually solitary having pink or white colour with pink or blue shades. Anthesis takes place between 9 am to 3 pm. Self fertilization before opening is the rule but cross pollination upto 5-10% extent also takes place by insect. Pods are rectangular, swollen structure, about 2 cm long and usually contain 2 seed in them. A single plant produces approximately 50-150 pods. Seeds are spherical in shape, wrinkled or smooth with a pointed beak. Its head is similar to chicken's head with a characteristic 'beak' hence called as ckickpea.	Total : 10 Cultivated: 2 ( <i>Cicer arietinum</i> & <i>C. kabulium</i> )  Wild : 8 ( <i>C. reticulatum</i> , <i>echinospermum</i> , <i>pinnatifidum</i> , <i>judiacum</i> , <i>bijugum</i> , <i>cuneatum</i> , <i>chorassanicum</i> , & <i>yamashitae</i> )

**Annexure 1: Pulse crops description (Continued).**

<b>Pulse Crop</b>	<b>Morphology</b>	<b>Species</b>
<b>1.1</b>	1.6	1.7
<b>7) Lentil</b>	Herbaceous annual plant, mostly erect and bushy type with four to six primary branches, plant height not exceeding 50-60 cm in general. It has a well developed root system including a central tap root with several lateral branches, spreading in all directions. Root nodules, the site of atmospheric 'N' fixation are mainly concentrated on primary root. Stem is weak and quadrangular and ends of leaflets some time forms tendrils. Inflorescence is a raceme of two to four flowers. Flowers are small and white with blue, violet or pink tinged. Ovary is short with one or two ovules. Hence, pods are one to two seeded. Anthesis takes place in buds, it sometimes before opening of flowers in the next morning. Hence, self pollination is a general rule. Pods are one to one and half cm in length with a curved beak. Grains are often light brown in colour with lens shaped.	Cultivated: 1 <i>Lens esculanta Moench</i>
<b>8) Fieldpea</b>	It is an annual herbaceous, semi erect to erect, succulent plant with a tendency to climb when support is available, grow up to a height of 30-200 cm. Plants bear taproot system with nodules on the surface. Leaves are typically compound, with each leaf has one to three pairs of leaflets and terminal branched tendrils. The flowers are small coloured with standard being pale lilac, wings purplish and yellowish white keel. Inflorescence is axillary raceme. Peas are generally self fertilized but cross pollination may also occur up to some extent. Fruit is a typical pod varying 5-9 cm in length containing 5-10 seeds inside them. Seed germination is hypogeal when cotyledons remain below the ground surface during emergence.	Cultivated: 2 (Garden pea: <i>Pisum sativum var. hartense</i> & Fieldpea <i>Pisum sativum var. arvense</i> .)
<b>9) Lathyrus</b>	Khesari Dal is a very hardy leguminous plant which is grown in Rabi season with the residual moisture, particularly in the paddy fields. The plant is so hardy that it grows well on various types of soils which can hardly sustain in any other crop. Plant of Lathyrus is herbaceous annual with slender, glabrous well branched, winged procumbent stems. Pods are flattened, oblong, up to 4 cm long, two winged dorsally, up to five seeded. Seeds are wedge shaped, angular, white or brown sometimes mottled. Germination is hypogeal.	Total: 5 Cultivated: 1 ( <i>Lathyrus sativus L</i> ) Wild: 4 ( <i>L cicera, tingitanus, ochrus, &amp; latifolius</i> )

**Annexure 1: Pulse crops description (Continued).**

<b>Pulse Crop</b>	<b>Morphology</b>	<b>Species</b>
<b>1.1</b>	1.6	1.7
<b>10) Rajmash</b>	Plants may be bushy or climbing type. Bushy cultivars are day neutral, early maturing, dwarf plants, 20-60 cm tall with lateral and terminal inflorescence and consequently determinate growth habit. Climbing cultivars are indeterminate, and may grow 2-3 m tall if they have support to climb by twining. The pods are slender, 10-20 cm long, straight or curved and terminated by a pointed beak. They contain 4-6 seeds which vary greatly in size and colour. Germination is epigeal.	Cultivated: 1 ( <i>Phaseolus vulgaris</i> L.)
<b>11) Cowpea</b>	Plants are usually glabrous, annual herbs, with a strong taproot with many branches in the surface soil. Pods vary greatly in size and colour, the seeds are white, brown, red, black or variously mottled and spotted. Germination is epigeal type.	Cultivated: 3 ( <i>Vigna sinensis</i> L., <i>sinensis</i> sub species <i>Catjang</i> , <i>sinensis</i> sub species <i>sequipedalis</i> )
<b>12) Broadbean</b>	Strong, erect annual herbs with the plant height up to 1.5 metre and roots like other legume. Inflorescence – axil with 6 flowers of 3-7 cm long mostly white in colour. Self pollination is a rule but cross pollination by insect may also occur. Pods are strong and semi-cylindrical up to 30 cm in length. Seeds are greenish or brownish white to black. Test weight vary 10-40 g. It is cultivated in Rabi season.	Cultivated : 1 <i>Vicia faba</i> Linn
<b>13) Ricebean</b>	It is an annual deep rooted herb with plant height of 30-100 cm with fast spreading habit surrounding 100-120 cm. Leaves are oval and trifoliate with 6-9 cm long. Inflorescences are 4-7 cm long with 10-18 bright yellow flowers. Flowering in 100 days. Pod length vary 12-18 cm with 6-10 grain inside them. Grain colours vary from yellow, brown, black or straw with epigeal germination and white hilum. It is cultivated in Kharif season.	Cultivated: 1 <i>Vigna umbellate</i> [(Thunb.) {Ohwi & Ohashi}]
<b>14) Sem</b>	It is a semi-erect, bushy, perennial herb, cultivated as an annual. It shows little or no tendency to climb. Leaflets innately trifoliate and flowers borne on a straight upright stalk, often a foot high on which they open in succession. Pods oblong, flat and broad, firm-walled and fibrous contain 4-6 seed with their long axis at right angles to the suture. Seeds almost rounded white, brown are black. The plant emits a characteristics odour. Stem is cylindrical and inflorescence is a stiff acillary raceme with many flowers. Flowers are white, red, pink or purple colored, in clusters of 4-5, each with 2 large basal bracts, anther uniform, upper 2 sepals' connate purple to pink or white, 2-4 at each node in an elongating raceme up to 2.5 cm long. Pods flate are inflated, pubescent or smooth, papery, straight or somewhat curved, white, green or purplish in colore and can vary in length from approximately 5-20 cm and in width from 1-5 cm. Germination is epigeal. Seed is reported to remain viable for two to three years. Sowing is done in June and July and harvesting from Nov. to March.	Cultivated: 1 <i>Dolichos lablab</i>

**Annexure 1: Pulse crops description (Continued).**

<b>Pulse Crop</b>	<b>Nutritional value</b>	<b>Major growing zones</b>
<b>1.1</b>	<b>1.8</b>	<b>1.9</b>
<b>1) Pigeonpea</b>	Protein- 22.3%, Calcium – 73 mg / 100 g , Fat–1.7%, Phosphorus-304 mg / 100 g, Minerals–3.5%, Iron–5.8 mg /100 g , Fiber–1.5%, Calorific value – 335, Carbohydrate –57.6% & Moisture–13.4%.	CZ (Maharashtra), SZ (Karnataka, Andhra Pradesh), CZ (Madhya Pradesh), NEPZ (Uttar Pradesh) & CZ (Gujarat).
<b>2) Moongbean</b>	Protein–24-25%, Calcium–124 mg / 100 g, Fat–1.3%, Phosphorus-326 mg / 100 g, Minerals–3.5%, Iron–7.3 mg / 100 g, Fiber–4.1%, Calorific value–334, Carbohydrate–56% & Moisture–10%.	CZ (Rajasthan, Maharashtra), SZ (Karnataka, Andhra Pradesh, Odisha), CZ (Gujarat) & SZ (Tamil Nadu).
<b>3) Urdbean</b>	Protein – 24%, Calcium – 154 mg/100 g, Fat– 1.4%, Phosphorus-385 mg / 100 g, Minerals–3.2%, Iron–9.1 mg / 100 g, Fiber–0.9%, Calorific value – 347, Carbohydrate–59.6%, Moisture – 10.9% & it is richest in phosphoric acid among the pulses.	CZ (Madhya Pradesh), NEPZ (Uttar Pradesh), SZ (Andhra Pradesh), CZ (Maharashtra), SZ (Tamil Nadu, Odisha) & CZ (Rajasthan).
<b>4) Mothbean</b>	Protein – 24%, Calcium – 202 mg / 100 g, Fat– 1.1%, Phosphorus- 385 mg /100 g, Minerals–3.5%, Fiber–4.5%, Calorific value– 330 & Carbohydrate–56.5%.	CZ (Rajasthan, Gujarat & Maharashtra).
<b>5) Kulthi</b>	Protein–22%, Carbohydrate– 57 %, Phosphorus–311 mg /100 g, Iron – 7 mg/100 g, Calcium–287 mg / 100g & Calorific value–321.	SZ (Karnataka, A.P. & Tamil Nadu), CZ (Maharashtra & Gujarat).

**Annexure 1: Pulse crops description (Continued).**

<b>Pulse Crop</b>	<b>Nutritional value</b>	<b>Major growing zones</b>
<b>1.1</b>	<b>1.8</b>	<b>1.9</b>
<b>6) Chickpea</b>	Protein-18-22%, Calcium- 280 mg / 100 g, Carbohydrate – 61-62%, Iron – 12.3mg / 100 g, Fat-4.5%, Phosphorus – 301mg / 100 g & Calorific value – 396.	CZ (Madhya Pradesh, Rajasthan, Maharashtra), SZ (Karnataka, Andhra Pradesh), NEPZ (Uttar Pradesh), CZ (Chhattisgarh & Gujarat).
<b>7) Lentil</b>	Protein-24-26%, Carbohydrate- 57 – 60%, Fat-1.3%, Fibre – 3.2%, Phosphorus-300 mg /100 g , Iron – 7 mg /100 g, Vitamin C 10-15 mg /100 g, Calcium – 69 mg /100g & Calorific value-343 with rich source of vitamin A (450 IU) and Riboflavin.	NEPZ (Uttar Pradesh), CZ (Madhya Pradesh), NEPZ (Bihar, West Bengal), CZ (Rajasthan), NEPZ (Assam and Jharkhand).
<b>8) Fieldpea</b>	Protein – 22.5%, Calcium – 64 mg / 100g, Fat –1.8%, Iron-4.8 mg / 100g, Carbohydrate – 62.1% & Moisture – 11%.	NEPZ (Uttar Pradesh), CZ (Madhya Pradesh), NEPZ (Jharkhand, Bihar), CZ (Maharashtra), NEPZ (Assam), CZ (Chhattisgarh), NEPZ (West Bengal) & CZ (Rajasthan).
<b>9) Lathyrus</b>	Protein -31.9%, Carbohydrate-53.9%, Fat- 0.9% & Ash-3.2%.	CZ (Chhattisgarh), NEPZ (Bihar), CZ (Madhya Pradesh), NEPZ (West Bengal) & CZ (Maharashtra).
<b>10) Rajmash</b>	Protein-22.9%, Calcium-260 mg / 100g, Fat- 1.3%, Phosphorus – 410 mg / 100g, Iron-5.8 mg /100g & Carbohydrate 60.6%.	Hilly Himalayan region and Satara district of Maharashtra and North East plains during Rabi.

**Annexure 1: Pulse crops description.**

<b>Pulse Crop</b>	<b>Nutritional value</b>	<b>Major growing zones</b>
<b>1.1</b>	<b>1.8</b>	<b>1.9</b>
<b>11) Cowpea</b>	Protein-22-24%, Calcium-0.08-0.11%, Iron-0.005%, essential amino acids (Lysine, leucine and phenylalanine).	Crop is grown across the country. Major states are SZ (Karnataka, Kerala, Tamil Nadu) and CZ (Madhya Pradesh). Cultivated in Kharif season, especially for grain and summer season for fodder.
<b>12) Broadbean</b>	Consumed as vegetable and dry seeds used as 'Dal'. Its seed is edible and nutritive.	It is presently grown sporadically in Punjab, Haryana, Uttar Pradesh, Rajasthan, Bihar and Madhya Pradesh as a minor vegetable and dry seeds are used as 'Dal'.
<b>13) Ricebean</b>	It has 14 to 24% protein and is free from anti-nutritional factors.	It is grown in hilly areas of Himachal Pradesh, Uttrakhand and north-east hill regions.
<b>14) Sem</b>	It is one of the major sources of protein in the diets of southern states in India. Pods are used as vegetable. Dryseeds are used in various vegetables for preparation	Within in India, Lablab is a field crop mostly confined to the peninsular region and cultivated to a large extent in Karnataka and adjoining districts of Tamil Nadu, Andhra Pradesh and Maharashtra.



## Annexure 2: State and Season-wise area, production &amp; yield of Pulses in India (Continued).

## (A) Kharif

## (a) Pigeonpea

Area = Lakh ha, Prod= Lakh tonnes, Yield = Kg/ha

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Maharashtra	10.090	10.930	13.020	11.347	30.36	6.050	9.190	9.760	8.333	32.90	600	841	750	734	108
Karnataka	5.970	6.040	8.910	6.973	18.66	3.150	2.820	5.290	3.753	14.83	528	467	594	538	79
Uttar Pradesh	3.150	3.050	3.440	3.213	8.59	2.880	2.020	3.090	2.663	10.52	914	662	898	829	122
Gujarat	2.660	2.660	2.770	2.697	7.28	2.630	2.410	2.730	2.590	10.24	989	906	986	960	142
M.P.	3.212	3.621	4.875	3.903	10.44	2.584	3.080	1.645	2.436	9.63	804	851	337	624	92
Andhra Pradesh	4.430	4.630	6.388	5.149	13.78	2.020	2.030	2.650	2.233	8.83	456	438	415	434	64
Odisha	1.385	1.329	1.354	1.356	3.63	1.191	1.118	1.240	1.183	4.67	860	841	916	872	129
Jharkhand	1.034	0.612	1.038	0.895	2.39	0.637	0.533	0.712	0.627	2.48	616	871	686	701	104
Bihar	0.281	0.279	0.260	0.273	0.73	0.331	0.422	0.365	0.373	1.47	1178	1513	1404	1363	201
Haryana	0.330	0.220	0.250	0.267	0.71	0.360	0.230	0.270	0.287	1.13	1091	1045	1080	1075	159
Chhattisgarh	0.530	0.600	0.550	0.560	1.50	0.309	0.306	0.242	0.286	1.13	583	510	440	510	75
Tamil nadu	0.293	0.265	0.358	0.305	0.82	0.178	0.203	0.237	0.206	0.81	608	766	662	675	100
Rajasthan	0.193	0.183	0.213	0.196	0.52	0.149	0.070	0.162	0.127	0.50	772	383	761	647	96
Punjab	0.059	0.046	0.042	0.049	0.13	0.057	0.044	0.039	0.047	0.18	966	957	929	952	141
Assam	0.054	0.062	0.071	0.062	0.17	0.038	0.044	0.051	0.044	0.17	704	710	718	711	105
West Bengal	0.006	0.008	0.016	0.010	0.03	0.005	0.006	0.022	0.011	0.04	833	750	1375	1100	162
Other	0.102	0.122	0.112	0.112	0.30	0.086	0.120	0.106	0.104	0.41	843	984	946	929	137
All India	33.779	34.657	43.667	37.368		22.655	24.646	28.611	25.304		671	711	655	677	

## (b) Urdbean

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Uttar Pradesh	3.630	5.530	5.560	4.907	21.74	1.950	2.240	3.720	2.637	25.83	537	405	669	537	119
Maharashtra	3.240	3.540	4.820	3.867	17.14	1.000	1.170	3.290	1.820	17.83	309	331	683	471	104
Madhya Pradesh	4.763	4.986	5.846	5.198	23.04	1.833	1.895	2.281	2.003	19.62	385	380	390	385	85
Gujarat	0.960	0.970	1.020	0.983	4.36	0.640	0.500	0.690	0.610	5.98	667	515	676	620	137
Rajasthan	1.372	1.164	1.278	1.271	5.63	0.406	0.306	0.941	0.551	5.40	296	263	736	433	96
Jharkhand	0.864	0.632	0.896	0.797	3.53	0.506	0.351	0.719	0.525	5.15	586	555	802	659	146
Odisha	1.195	1.227	1.257	1.226	5.43	0.335	0.368	0.367	0.357	3.49	280	300	292	291	64
Andhra Pradesh	0.690	0.830	0.820	0.780	3.46	0.400	0.130	0.460	0.330	3.23	580	157	561	423	94
West Bengal	0.502	0.430	0.450	0.461	2.04	0.348	0.301	0.285	0.311	3.05	693	700	633	676	150
Karnataka	1.010	1.090	1.180	1.093	4.85	0.240	0.100	0.410	0.250	2.45	238	92	347	229	51
Chhattisgarh	1.052	1.058	1.024	1.045	4.63	0.308	0.292	0.293	0.298	2.92	293	276	286	285	63
Bihar	0.214	0.204	0.148	0.189	0.84	0.180	0.182	0.126	0.163	1.59	841	892	851	862	191
Tamil nadu	0.290	0.301	0.394	0.328	1.46	0.113	0.120	0.209	0.147	1.44	390	399	530	449	99
Punjab	0.029	0.028	0.028	0.028	0.13	0.014	0.013	0.016	0.014	0.14	483	464	571	506	112
Other	0.355	0.345	0.475	0.392	1.74	0.1681	0.140	0.266	0.191	1.87	474	406	560	489	108
All India	20.166	22.335	25.196	22.566		8.441	8.108	14.073	10.207		419	363	559	452	

Source: DES, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

## Annexure 2: State and Season-wise area, production & yield of Pulses in India (Continued).

### (c) Mungbean

Area = Lakh ha, Prod= Lakh tonnes, Yield = Kg/ha

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Rajasthan	8.857	9.229	10.500	9.529	37.87	3.732	0.440	6.525	3.566	38.82	421	48	621	374	102
Maharashtra	4.270	4.280	5.540	4.697	18.67	1.060	1.420	3.720	2.067	22.50	248	332	671	440	121
Andhra Pradesh	2.070	2.050	2.610	2.243	8.92	0.920	0.210	1.220	0.783	8.53	444	102	467	349	96
Gujarat	1.620	1.650	1.770	1.680	6.68	0.700	0.590	0.890	0.727	7.91	432	358	503	433	119
Karnataka	2.660	3.700	3.910	3.423	13.61	0.350	0.440	1.080	0.623	6.79	132	119	276	182	50
Odisha	1.082	1.424	1.039	1.182	4.70	0.242	0.322	0.239	0.268	2.91	224	226	230	227	62
Madhya Pradesh	0.763	0.816	0.958	0.846	3.36	0.269	0.277	0.343	0.296	3.23	353	339	358	350	96
Uttar Pradesh	0.310	0.720	0.890	0.640	2.54	0.110	0.320	0.620	0.350	3.81	355	444	697	547	150
Tamil nadu	0.167	0.193	0.279	0.213	0.85	0.074	0.090	0.178	0.114	1.24	443	466	638	535	147
Jharkhand	0.146	0.140	0.469	0.252	1.00	0.085	0.077	0.235	0.132	1.44	582	550	501	526	144
Punjab	0.089	0.070	0.078	0.079	0.31	0.079	0.064	0.063	0.069	0.75	888	914	808	869	238
Haryana	0.148	0.130	0.220	0.166	0.66	0.073	0.070	0.120	0.088	0.95	493	538	545	528	145
Bihar	0.086	0.084	0.091	0.087	0.35	0.056	0.055	0.059	0.057	0.62	651	655	648	651	178
Chhattisgarh	0.091	0.087	0.093	0.090	0.36	0.024	0.022	0.026	0.024	0.26	264	253	280	266	73
West Bengal	0.005	0.021	0.009	0.012	0.05	0.003	0.017	0.006	0.009	0.09	600	810	667	743	204
Other	0.020	0.024	0.020	0.021	0.08	0.012	0.022	0.008	0.014	0.15	600	917	400	656	180
All India	22.384	24.618	28.476	25.159		7.789	4.436	15.332	9.186		348	180	538	365	

### (d) Mothbean

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Rajasthan	12.208	12.728	15.934	13.623	95.64	3.251	0.398	7.747	3.799	94.68	266	31	486	279	99
Gujarat	0.470	0.220	0.220	0.303	2.13	0.110	0.050	0.130	0.097	2.41	234	227	591	319	113
Maharashtra	0.230	0.210	0.220	0.220	1.54	0.070	0.050	0.074	0.065	1.61	304	238	336	294	104
Others	0.078	0.086	0.130	0.098	0.69	0.043	0.044	0.069	0.052	1.30	551	512	531	531	188
India	12.986	13.244	16.504	14.245		3.474	0.542	8.02	4.012	100.00	268	41	486	282	

### (e) Horsegram

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Karnataka	0.940	1.150	0.880	0.990	31.67	0.410	0.560	0.510	0.493	36.73	436	487	580	498	116
Odisha	0.587	0.643	0.690	0.640	20.47	0.160	0.199	0.221	0.193	14.40	274	309	320	302	70
Chhattisgarh	0.489	0.474	0.473	0.479	15.31	0.154	0.131	0.135	0.140	10.42	315	276	285	292	68
Bihar	0.113	0.106	0.099	0.106	3.39	0.104	0.102	0.097	0.101	7.52	920	962	984	953	222
Jharkhand	0.140	0.140	0.209	0.163	5.21	0.061	0.061	0.172	0.098	7.30	436	436	822	601	140
Maharashtra	0.290	0.200	0.190	0.227	7.25	0.100	0.060	0.085	0.082	6.08	345	300	447	360	84
M.P.	0.240	0.234		0.237	7.58	0.076	0.071		0.074	5.47	317	303		310	72
Tamil Nadu	0.226	0.160	0.147	0.178	5.68	0.098	0.048	0.084	0.077	5.71	434	301	573	432	100
Andhra Pradesh	0.040	0.200	0.060	0.100	3.20	0.02	0.13	0.030	0.060	4.47	500	650	500	600	140
Other	0.051	0.048	0.160	0.086	2.76	0.018	0.014	0.119	0.050	3.75	353	292	744	583	136
India	3.116	3.355	2.908	3.126		1.201	1.376	1.453	1.343		385	410	500	430	

Source: DES, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 2: State and Season-wise area, production & yield of Pulses in India (Continued).****(f) Total Kharif**

Area = Lakh ha, Prod= Lakh tonnes, Yield = Kg/ha

State	Area in Lakh Ha					Production in Lakh Tonnes					Yield in Kg / Ha				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Maharashtra	18.480	19.850	24.67	21.000	19.26	8.390	12.100	17.378	12.623	23.65	454	610	704	601	123
Rajasthan	23.842	25.810	29.161	26.271	24.09	8.174	1.447	16.036	8.552	16.02	343	56	550	326	67
Karnataka	11.900	13.410	16.39	13.900	12.75	5.100	4.720	8.33	6.050	11.34	429	352	508	435	89
Uttar Pradesh	7.093	9.303	9.89	8.762	8.04	4.941	4.581	7.43	5.651	10.59	697	492	751	645	132
Madhya Pradesh	9.029	9.702	11.72	10.150	9.31	4.779	5.339	4.278	4.799	8.99	529	550	365	473	97
Gujarat	5.970	5.800	6.12	5.963	5.47	4.240	3.770	4.61	4.207	7.88	710	650	753	705	144
Andhra Pradesh	7.330	7.800	9.968	8.366	7.67	3.400	2.530	4.39	3.440	6.45	464	324	440	411	84
Orissa	5.070	5.504	5.127	5.234	4.80	2.443	2.493	2.517	2.484	4.65	482	453	491	475	97
Jharkhand	2.370	1.870	2.992	2.411	2.21	1.374	1.188	2.047	1.536	2.88	580	635	684	637	130
Chhattisgarh	2.214	2.274	2.19	2.226	2.04	0.813	0.768	0.712	0.764	1.43	367	338	325	343	70
Bihar	0.728	0.690	0.631	0.683	0.63	0.692	0.776	0.678	0.715	1.34	951	1125	1074	1047	214
Tamil nadu	1.403	1.344	1.749	1.499	1.37	0.549	0.556	0.823	0.643	1.20	391	414	471	429	88
Haryana	0.539	0.420	0.59	0.516	0.47	0.461	0.330	0.44	0.410	0.77	855	786	746	795	163
West Bengal	0.523	0.473	0.483	0.493	0.45	0.364	0.334	0.318	0.339	0.63	696	706	658	687	140
Punjab	0.179	0.144	0.148	0.157	0.14	0.152	0.121	0.118	0.130	0.24	849	840	797	830	170
Assam	0.054	0.062	0.071	0.062	0.06	0.038	0.044	0.051	0.044	0.08	704	710	718	711	145
Other	1.357	1.368	1.296	1.340	1.23	0.955	0.946	1.045	0.982	1.84	704	692	806	733	150
All India	98.081	105.824	123.196	109.034	100.000	46.865	42.043	71.201	53.370	100.000	478	397	578	489	

**Annexure 2: State and Season-wise area, production & yield of Pulses in India (Continued).****(B) Rabi****(a) Chickpea**

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Madhya Pradesh	28.405	30.855	31.121	30.127	35.80	27.864	33.041	26.866	29.257	38.57	981	1071	863	971	108
Maharashtra	11.430	12.910	14.380	12.907	15.34	7.740	11.140	1300	10.627	14.01	677	863	904	823	91
Andhra Pradesh	6.070	6.470	5.840	6.127	7.28	8.570	8.460	7.2000	8.077	10.65	1412	1308	1233	1318	146
Rajasthan	12.595	8.844	17.833	13.091	15.55	9.812	5.346	16.007	10.388	13.69	779	605	898	794	88
Uttar Pradesh	5.540	6.180	5.700	5.807	6.90	5.620	5.090	5.300	5.337	7.03	1014	824	930	919	102
Karnataka	7.260	9.720	9.590	8.857	10.52	4.010	5.740	6.310	5.353	7.06	552	591	658	604	67
Chhattisgarh	2.397	2.522	2.519	2.479	2.95	1.992	2.219	2.415	2.209	2.91	831	880	959	891	99
Gujarat	1.750	1.320	1.760	1.610	1.91	1.770	1.250	2.000	1.673	2.21	1011	947	1136	1039	115
Haryana	1.230	0.840	1.120	1.063	1.26	1.280	0.620	1.100	1.000	1.32	1041	738	982	940	104
Jharkhand	0.895	0.630	0.699	0.741	0.88	0.803	0.576	0.735	0.705	0.93	897	914	1052	951	105
Bihar	0.612	0.576	0.508	0.565	0.67	0.566	0.584	0.603	0.584	0.77	925	1014	1187	1034	115
Odisha	0.376	0.450	0.419	0.415	0.49	0.249	0.337	0.327	0.304	0.40	662	749	780	733	81
West Bengal	0.217	0.218	0.221	0.219	0.26	0.225	0.242	0.237	0.235	0.31	1037	1110	1072	1073	119
Tamil nadu	0.069	0.074	0.073	0.072	0.09	0.044	0.045	0.049	0.046	0.06	638	608	671	639	71
Punjab	0.029	0.030	0.021	0.027	0.03	0.034	0.034	0.027	0.032	0.04	1172	1133	1286	1188	132
Assam	0.017	0.018	0.018	0.018	0.02	0.009	0.009	0.009	0.009	0.01	529	500	500	509	57
Other	0.033	0.035	0.034	0.034	0.04	0.032	0.026	0.026	0.028	0.04	970	743	765	824	91
All India	78.925	81.692	91.856	84.158		70.620	74.759	82.211	75.863		895	915	895	901	

Source: DES, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi

**Annexure 2: State and Season-wise area, production & yield of Pulses in India (Continued).**

**(b) Lentil**

Area = Lakh ha, Prod= Lakh tonnes, Yield = Kg/ha

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Uttar Pradesh	5.210	5.924	5.860	5.665	33.63	4.600	4.759	4.110	4.490	45.99	883	803	701	793	137
Madhya Pradesh	5.314	5.413	5.905	5.544	32.91	2.684	2.844	1.779	2.436	24.95	505	525	301	439	76
Bihar	1.638	1.711	2.386	1.912	11.35	1.286	1.505	2.147	1.646	16.86	785	880	900	861	148
West Bengal	0.497	0.517	0.574	0.529	3.14	0.324	0.471	0.534	0.443	4.54	652	911	930	837	144
Jharkhand	0.195	0.112	0.209	0.172	1.02	0.158	0.128	0.172	0.153	1.56	810	1143	823	888	153
Rajasthan	0.206	0.270	0.441	0.306	1.81	0.179	0.242	0.384	0.268	2.75	869	896	871	878	151
Assam	0.217	0.214	0.239	0.223	1.33	0.111	0.108	0.118	0.112	1.15	512	505	494	503	87
Chhattisgarh	0.156	0.160	0.139	0.152	0.90	0.051	0.049	0.042	0.047	0.48	327	306	302	312	54
Maharashtra	0.080	0.088	0.040	0.069	0.41	0.030	0.032	0.02	0.027	0.28	375	364	500	394	68
Haryana	0.043	0.050	0.033	0.042	0.25	0.032	0.040	0.026	0.033	0.33	744	800	788	78	13
Punjab	0.011	0.011	0.010	0.011	0.06	0.007	0.007	0.007	0.007	0.07	636	636	700	656	113
Other	6.192	0.328	0.138	2.219	13.18	0.071	0.131	0.099	0.100	1.03	11	399	717	45	8
<b>All India</b>	<b>19.759</b>	<b>14.798</b>	<b>15.974</b>	<b>16.844</b>		<b>9.533</b>	<b>10.316</b>	<b>9.438</b>	<b>9.762</b>		<b>482</b>	<b>697</b>	<b>591</b>	<b>580</b>	

**(c) Fieldpeas**

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Uttar Pradesh	3.510	3.120	3.04	3.223	44.02	4.240	4.004	3.530	3.925	61.41	1208	1283	1161	1218	139
Madhya Pradesh	2.229	2.887	2.265	2.460	33.60	1.110	1.467	0.625	1.067	16.70	498	508	276	434	50
Bihar	0.238	0.222	0.200	0.220	3.00	0.229	0.224	0.210	0.221	3.46	962	1009	1050	1005	115
Jharkhand	0.258	0.427	0.362	0.349	4.77	0.349	0.345	0.342	0.345	5.40	1353	808	945	989	113
Assam	0.209	0.209	0.224	0.214	2.92	0.130	0.198	0.138	0.155	2.43	622	947	616	726	83
Rajasthan	0.037	0.028	0.113	0.059	0.81	0.058	0.049	0.116	0.074	1.16	1568	1750	1027	1253	144
Maharashtra	0.150	0.165	0.330	0.215	2.94	0.080	0.086	0.170	0.112	1.75	533	521	515	521	60
West Bengal	0.088	0.094	0.116	0.099	1.36	0.067	0.118	0.136	0.107	1.67	761	1255	1172	1077	123
Chhattisgarh	0.150	0.172	0.148	0.157	2.14	0.056	0.059	0.050	0.055	0.86	373	343	338	351	40
Punjab	0.020	0.040	0.032	0.031	0.42	0.024	0.018	0.041	0.028	0.43	1200	450	1281	902	103
Haryana	0.006	0.010	0.021	0.012	0.17	0.008	0.010	0.019	0.012	0.19	1333	1000	905	1000	115
Other	0.237	0.209	0.400	0.282	3.85	0.206	0.140	0.522	0.289	4.53	869	670	1305	1026	118
<b>All India</b>	<b>7.132</b>	<b>7.583</b>	<b>7.251</b>	<b>7.322</b>		<b>6.557</b>	<b>6.718</b>	<b>5.899</b>	<b>6.391</b>		<b>919</b>	<b>886</b>	<b>814</b>	<b>873</b>	

**(d) Urdbean**

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Andhra Pradesh	2.690	3.460	3.820	3.323	47.07	1.800	2.560	2.070	2.143	57.52	669	740	542	645	122
Tamil nadu	2.330	2.296	2.650	2.425	34.35	0.675	0.867	1.029	0.857	23.00	290	378	388	353	67
Uttar Pradesh	0.540	0.540		0.360	5.10	0.330	0.330		0.220	5.90	611	611		611	116
Assam	0.397	0.422	0.488	0.436	6.17	0.231	0.239	0.272	0.247	6.64	582	566	557	568	108
West Bengal	0.068	0.070	0.119	0.086	1.21	0.051	0.056	0.107	0.071	1.91	750	800	899	833	158
Maharashtra	0.120	0.132		0.084	1.19	0.060	0.064		0.041	1.11	500	485		492	93
Karnataka	0.110	0.090	0.090	0.097	1.37	0.050	0.040	0.040	0.043	1.16	455	444	444	448	85
Odisha	0.097	0.073	0.080	0.083	1.18	0.038	0.025	0.030	0.031	0.83	392	342	375	372	70
Madhya Pradesh	0.074	0.069	0.071	0.071	1.01	0.025	0.026	0.028	0.026	0.71	338	377	394	369	70
Chhattisgarh	0.049	0.041	0.032	0.041	0.58	0.012	0.010	0.009	0.010	0.28	245	244	281	254	48
Other	0.055	0.054	0.056	0.055	0.78	0.034	0.033	0.038	0.035	0.94	618	611	679	636	121
<b>All India</b>	<b>6.530</b>	<b>7.247</b>	<b>7.406</b>	<b>7.061</b>		<b>3.306</b>	<b>4.250</b>	<b>3.623</b>	<b>3.726</b>		<b>506</b>	<b>586</b>	<b>489</b>	<b>528</b>	

Source: DES, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi

**Annexure 2: State and Season-wise area, production & yield of Pulses in India (Continued).****(e) Mungbean**

Area = Lakh ha, Prod= Lakh tonnes, Yield = Kg/ha

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Bihar	1.627	1.547	1.634	1.603	25.66	1.089	0.789	0.982	0.953	37.07	669	510	601	595	144
Andhra Pradesh	1.130	1.010	1.170	1.103	17.67	0.440	0.410	0.44	0.430	16.72	389	406	376	390	95
Odisha	1.253	1.477	1.842	1.524	24.40	0.365	0.465	0.613	0.481	18.70	291	315	333	316	77
Tamil nadu	1.219	1.189	1.437	1.282	20.52	0.240	0.377	0.399	0.339	13.17	197	317	278	264	64
Uttar Pradesh	0.340	0.340		0.227	3.63	0.250	0.250		0.167	6.48	735	735		735	178
West Bengal	0.137	0.147	0.168	0.151	2.41	0.071	0.075	0.116	0.087	3.40	518	512	690	580	141
Maharashtra	0.090	0.099	0.040	0.076	1.22	0.030	0.032	0.02	0.027	1.06	333	324	500	358	87
Assam	0.056	0.069	0.090	0.072	1.15	0.026	0.032	0.041	0.033	1.28	464	460	456	460	112
Karnataka	0.080	0.090	0.110	0.093	1.49	0.020	0.030	0.03	0.027	1.04	250	333	273	286	69
Chhattisgarh	0.069	0.078	0.065	0.071	1.13	0.016	0.017	0.015	0.016	0.62	232	218	231	226	55
Madhya Pradesh	0.028	0.026	0.033	0.029	0.46	0.007	0.007	0.007	0.007	0.27	250	269	212	241	59
Other	0.014	0.013	0.017	0.015	0.23	0.003	0.003	0.008	0.005	0.18	0	0	471	318	77
All India	6.043	6.085	6.606	6.245		2.557	2.487	2.671	2.572		423	409	404	412	

**(f) Lathyrus**

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Chhattisgarh	3.503	2.809	3.493	3.268	65.18	2.028	1.756	2.124	1.969	58.80	579	625	608	603	90
Bihar	0.972	0.871	0.738	0.860	17.16	0.798	0.822	0.737	0.786	23.46	821	944	998	913	137
M.P.	0.494	0.434	0.482	0.470	9.37	0.355	0.317	0.274	0.315	9.42	719	730	568	671	100
West Bengal	0.277	0.281	0.258	0.272	5.42	0.174	0.197	0.302	0.224	6.70	628	700	1172	825	123
Maharashtra	0.090	0.099	0.240	0.143	2.85	0.040	0.043	0.080	0.054	1.62	444	433	333	380	57
All India	5.336	4.494	5.211	5.014		3.395	3.135	3.517	3.349		636	698	675	668	

**(g) Horsegram**

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Karnataka	1.220	1.130	1.330	1.227	58.72	0.470	0.550	0.830	0.617	59.41	385	487	624	503	101
Andhra Pradesh	0.340	0.390	0.310	0.347	16.59	0.14	0.23	0.130	0.167	16.06	412	590	419	481	97
Tamil Nadu	0.222	0.312	0.326	0.287	13.72	0.113	0.170	0.133	0.139	13.36	509	545	408	484	97
Maharashtra	0.140	0.154	0.150	0.148	7.08	0.080	0.086	0.060	0.075	7.26	571	556	400	509	102
Chhattisgarh	0.048	0.022	0.019	0.030	1.42	0.014	0.006	0.005	0.008	0.80	292	273	263	281	57
Odisha	0.001	0.003	0.004	0.003	0.13		0.001	0.004	0.003	0.24		296	1050	938	189
Madhya Pradesh	0.004	0.004	0.004	0.006	0.29	0.001	0.001	0.001	0.002	0.14	250	250	310	250	50
Others	0.055	0.054	0.024	0.044	2.12	0.039	0.038	0.012	0.030	2.86	709	704	500	669	135
India	2.03	2.069	2.167	2.089		0.857	1.082	1.175	1.038		422	523	542	497	

Source: DES, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi

**Annexure 2: State and Season-wise area, production & yield of Pulses in India (Continued).**

**(h) Total Rabi**

Area = Lakh ha, Prod= Lakh tonnes, Yield = Kg/ha

State	Area in Lakh Ha					Production in Lakh Tonnes					Yield in Kg / Ha				
	2008-09	2009-10	2010-11	Avg.	% contri.	2008-09	2009-10	2010-11	Avg.	% contri.	2008-09	2009-10	2010-11	Avg.	Yield Index
Madhya Pradesh	36.569	39.703	39.898	38.723	29.73	32.052	37.707	29.584	33.114	31.58	876	950	741	855	106
Uttar Pradesh	15.140	16.104	14.6	15.281	11.73	15.040	14.433	12.94	14.138	13.48	993	896	886	925	115
Andhra Pradesh	10.380	11.520	11.35	11.083	8.51	11.080	11.760	10.01	10.950	10.44	1067	1021	882	988	123
Maharashtra	12.340	13.910	15.71	13.987	10.74	8.170	11.600	13.62	11.130	10.61	662	834	867	796	99
Rajasthan	12.883	9.200	18.445	13.509	10.37	10.090	5.690	16.561	10.780	10.28	783	618	898	798	99
Karnataka	8.970	11.380	11.53	10.627	8.16	4.620	6.460	7.32	6.133	5.85	515	568	635	577	72
Chhattisgarh	6.384	5.815	6.424	6.208	4.77	4.173	4.119	4.663	4.318	4.12	654	708	726	696	86
Bihar	5.129	4.959	5.492	5.193	3.99	3.999	3.948	4.7	4.216	4.02	780	796	856	812	101
Gujarat	1.870	1.530	2.78	2.060	1.58	1.850	1.400	2.62	1.957	1.87	989	915	942	950	118
Tamil nadu	3.958	4.003	4.619	4.193	3.22	1.096	1.486	1.637	1.406	1.34	277	371	354	335	42
Orissa	2.979	3.168	3.664	3.270	2.51	1.430	1.501	1.752	1.561	1.49	480	474	478	477	59
Jharkhand	1.506	1.287	1.27	1.354	1.04	1.433	1.049	1.249	1.244	1.19	952	815	983	918	114
West Bengal	1.303	1.346	1.48	1.376	1.06	0.921	1.168	1.443	1.177	1.12	707	868	975	855	106
Haryana	1.279	0.900	1.174	1.118	0.86	1.320	0.670	1.145	1.045	1.00	1032	744	975	935	116
Assam	1.083	1.091	1.193	1.122	0.86	0.607	0.602	0.65	0.620	0.59	560	552	545	552	69
Punjab	0.060	0.057	0.064	0.060	0.05	0.065	0.059	0.075	0.066	0.06	1083	1035	1172	1099	137
Other	1.017	1.063	1.187	1.089	0.84	0.856	0.925	1.239	1.007	0.96	842	870	1044	924	115
<b>All India</b>	<b>122.850</b>	<b>127.036</b>	<b>140.880</b>	<b>130.255</b>	<b>100.000</b>	<b>98.802</b>	<b>104.577</b>	<b>111.208</b>	<b>104.862</b>	<b>100.000</b>	<b>804</b>	<b>823</b>	<b>789</b>	<b>805</b>	

**Total Urdbean (K + R)**

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Uttar Pradesh	4.170	6.070	5.56	5.267	17.78	2.280	2.570	3.720	2.857	20.50	547	423	669	542	115
Andhra Pradesh	3.380	4.290	4.64	4.103	13.85	2.200	2.690	2.530	2.473	17.75	651	627	545	603	128
Maharashtra	3.360	3.672	4.82	3.951	13.34	1.060	1.234	3.290	1.861	13.36	315	336	683	471	100
Madhya Pradesh	4.837	5.055	5.917	5.270	17.79	1.858	1.196	2.309	1.788	12.83	384	237	390	339	72
Tamil Nadu	2.620	2.597	3.044	2.754	9.30	0.788	0.987	1.238	1.004	7.21	301	380	407	365	78
Gujarat	0.960	0.970	1.020	0.983	3.32	0.640	0.500	0.690	0.610	4.38	667	515	676	620	132
Rajasthan	1.372	1.164	1.278	1.271	4.29	0.406	0.306	0.941	0.551	3.95	296	263	736	433	92
Jharkhand	0.864	0.632	0.896	0.797	2.69	0.506	0.351	0.719	0.525	3.77	586	555	802	659	140
Odisha	1.292	1.300	1.337	1.310	4.42	0.373	0.393	0.397	0.388	2.78	289	302	297	296	63
West Bengal	0.570	0.500	0.569	0.546	1.84	0.399	0.357	0.392	0.383	2.75	700	714	689	700	149
Chhattisgarh	1.101	1.099	1.056	1.085	3.66	0.320	0.302	0.302	0.308	2.21	291	275	286	284	60
Karnataka	1.120	1.180	1.270	1.190	4.02	0.290	0.140	0.450	0.293	2.11	259	119	354	246	52
Assam	0.397	0.422	0.488	0.436	1.47	0.231	0.239	0.272	0.247	1.78	582	566	557	568	121
Bihar	0.214	0.204	0.148	0.189	0.64	0.180	0.182	0.126	0.163	1.17	841	892	851	862	183
Punjab	0.029	0.028	0.028	0.028	0.10	0.014	0.013	0.016	0.014	0.10	483	464	571	506	108
Other	0.410	0.399	0.531	0.447	1.51	0.202	0.898	0.304	0.468	3.36	493	2251	573	1048	223
<b>All India</b>	<b>26.696</b>	<b>29.582</b>	<b>32.602</b>	<b>29.627</b>		<b>11.747</b>	<b>12.358</b>	<b>17.696</b>	<b>13.934</b>		<b>440</b>	<b>418</b>	<b>543</b>	<b>470</b>	

Source: DES, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 2: State and Season-wise area, production & yield of Pulses in India.****Total Mungbean (K + R)**

Area = Lakh ha, Prod= Lakh tonnes, Yield = Kg/ha

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Rajasthan	8.857	9.229	10.500	9.529	30.35	3.732	0.440	6.525	3.566	30.33	421	48	621	374	100
Maharashtra	4.360	4.379	5.580	4.773	15.20	1.090	1.425	3.74	2.085	17.73	250	325	670	437	117
Andhra Pradesh	3.200	3.060	3.780	3.347	10.66	1.360	0.620	1.66	1.213	10.32	425	203	439	363	97
Bihar	1.713	1.631	1.725	1.690	5.38	1.145	0.844	1.041	1.010	8.59	668	517	603	598	160
Odisha	2.335	2.901	2.881	2.706	8.62	0.607	0.787	0.852	0.749	6.37	260	271	296	277	74
Gujarat	1.620	1.650	1.770	1.680	5.35	0.700	0.590	0.89	0.727	6.18	432	358	503	433	116
Karnataka	2.740	3.790	4.020	3.517	11.20	0.370	0.470	1.11	0.650	5.53	135	124	276	185	49
Uttar Pradesh	0.650	1.060	0.890	0.867	2.76	0.360	0.570	0.62	0.517	4.39	554	538	697	596	159
Tamil nadu	1.386	1.382	1.716	1.495	4.76	0.314	0.467	0.577	0.453	3.85	227	338	336	303	81
Madhya Pradesh	0.791	0.842	0.991	0.875	2.79	0.276	0.284	0.35	0.303	2.58	349	337	353	347	93
Jharkhand	0.146	0.140	0.469	0.252	0.80	0.085	0.077	0.235	0.132	1.13	582	550	501	526	141
West Bengal	0.142	0.168	0.177	0.162	0.52	0.074	0.092	0.122	0.096	0.82	521	548	689	591	158
Haryana	0.148	0.130	0.220	0.166	0.53	0.073	0.070	0.12	0.088	0.75	493	538	545	528	141
Punjab	0.089	0.070	0.078	0.079	0.25	0.063	0.064	0.063	0.069	0.58	888	914	808	869	232
Chhattisgarh	0.160	0.165	0.158	0.161	0.51	0.040	0.039	0.041	0.040	0.34	250	236	259	248	66
Assam	0.056	0.069	0.090	0.072	0.23	0.026	0.032	0.041	0.033	0.28	464	464	456	460	123
Other	0.014	0.037	0.037	0.029	0.09	0.015	0.052	0.016	0.028	0.24	1071	1405	432	943	252
<b>All India</b>	<b>28.407</b>	<b>30.703</b>	<b>35.082</b>	<b>31.397</b>		<b>10.346</b>	<b>6.923</b>	<b>18.003</b>	<b>11.757</b>		<b>364</b>	<b>225</b>	<b>513</b>	<b>374</b>	

**Total Horsegram (K + R)**

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Karnataka	2.160	2.280	2.210	2.217	42.51	0.880	1.110	1.340	1.110	46.62	407	487	606	501	110
Andhra Pradesh	0.380	0.590	0.370	0.447	8.57	0.160	0.360	0.160	0.227	9.52	421	610	432	507	111
Tamil Nadu	0.448	0.472	0.473	0.464	8.90	0.211	0.218	0.217	0.215	9.04	471	462	459	464	101
Odisha	0.588	0.646	0.694	0.643	12.32	0.160	0.200	0.225	0.195	8.19	272	310	324	303	66
Maharashtra	0.430	0.354	0.340	0.375	7.18	0.180	0.146	0.145	0.157	6.59	419	412	426	419	92
Chhattisgarh	0.537	0.496	0.492	0.508	9.75	0.168	0.137	0.140	0.148	6.23	313	276	285	292	64
Bihar	0.113	0.106	0.099	0.106	2.03	0.104	0.102	0.097	0.101	4.24	920	962	980	953	208
Jharkhand	0.140	0.140	0.209	0.163	3.13	0.061	0.061	0.172	0.098	4.12	436	436	823	601	132
Madhya Pradesh	0.244	0.238	0.004	0.243	4.66	0.077	0.072	0.001	0.075	3.15	316	303	250	309	68
Other	0.106	0.102	0.184	0.131	2.51	0.057	0.052	0.131	0.080	3.36	538	510	712	612	134
<b>All India</b>	<b>5.146</b>	<b>5.424</b>	<b>5.075</b>	<b>5.215</b>		<b>2.058</b>	<b>2.458</b>	<b>2.628</b>	<b>2.381</b>		<b>400</b>	<b>453</b>	<b>518</b>	<b>457</b>	

**Total Pulses (Kharif + Rabi)**

State	Area					Production					Yield				
	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	% contri.	2008-09	2009-10	2010-11	Average	Yield Index
Madhya Pradesh	45.598	49.405	51.618	48.874	20.426	36.831	43.046	33.862	37.913	23.960	808	871	656	776	117
Maharashtra	30.820	33.760	40.380	34.987	14.622	16.560	23.700	30.998	23.753	15.011	537	702	768	679	103
Uttar Pradesh	22.233	25.407	24.490	24.043	10.048	19.981	19.014	20.370	19.788	12.506	899	748	832	823	125
Rajasthan	36.725	35.010	47.606	39.780	16.625	18.264	17.137	32.597	19.335	12.218	497	204	685	486	74
Andhra Pradesh	17.710	19.320	21.318	19.449	8.128	14.480	14.290	14.400	14.390	9.094	818	740	675	740	112
Karnataka	20.870	24.790	27.920	24.527	10.250	9.720	11.180	15.650	12.183	7.700	466	451	561	497	75
Gujarat	7.840	7.330	8.900	8.023	3.353	6.090	5.170	7.230	6.163	3.895	777	705	812	768	116
Chhattisgarh	8.598	8.089	8.614	8.434	3.525	4.986	4.887	5.375	5.083	3.212	580	604	624	603	91
Bihar	5.857	5.649	6.123	5.876	2.456	4.691	4.724	5.378	4.931	3.116	801	836	878	839	127
Odisha	8.049	8.672	8.790	8.504	3.554	3.873	3.994	4.269	4.045	2.557	481	461	486	476	72
Jharkhand	3.876	3.157	4.262	3.765	1.573	2.807	2.237	3.296	2.780	1.757	724	709	773	738	112
Tamil nadu	5.361	5.347	6.368	5.692	2.379	1.645	2.042	2.460	2.049	1.295	307	382	386	360	54
West Bengal	1.826	1.819	1.962	1.869	0.781	1.285	1.503	1.761	1.516	0.958	704	826	898	811	123
Haryana	1.818	1.320	1.764	1.634	0.683	1.781	1.000	1.585	1.455	0.920	980	758	899	891	135
Assam	1.137	1.153	1.264	1.185	0.495	0.645	0.645	0.664	0.640	0.420	567	560	555	560	85
Punjab	0.239	0.201	0.212	0.217	0.091	0.217	0.180	0.193	0.197	0.124	908	896	910	905	137
Other	2.374	2.394	2.484	2.417	1.010	1.811	1.869	2.285	1.988	1.257	763	781	920	823	124
All India	220.93	1	232.823	264.075	239.276	145.667	146.619	182.41	158.232		659	630	691	661	

Source: DES, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi

**Annexure 3: Major pulse producing districts in India**

**a) Total Kharif**

State	Major districts of Kharif Pulses		
	Arhar (Pigeonpea)	Moongbean (Greengram)	Urdbean (Blackgram)
<b>Andhra Pradesh (2003-04 to 2005-06)</b>	Prakasham, Mahaboobnagar, Guntur, Adilabad, Anantpur, Khammam, Kurnool, Nalgonda, Warangal & Medak.	Nalgonda, Medak, Warangal, Khammam, East Godavari, Guntur, Krishna, Kurnool, Prakasham, Shrikakulam, & Mahaboobnagar.	Krishna, Guntur, Adilabad, East Godavari, Nizamabad, Prakasham, Srikakulam, Medak & Nellore.
<b>Bihar (2002-03 to 2004-05)</b>	Champan west, Champan east, Gaya, Saran, Siwan, Bhabua, Araia, Samastipur, Gopalganj & Begusarai.	Mahadevpura, Muzaffarpur, Purnea, Saharsa, Samastipur, Supaual, Kishanganj, Araia, Madhubani & Vaishali.	Bhagalpur, Katihar, Khagaria, Samastipur, Saharsa, Araia, Madhubani, Muzaffarpur Supaoul & Bagusarai.
<b>Chhattisgarh (2006-07 to 2008-09)</b>	Rajnandgoan, Sarguja, Bilaspur, Raipur, Durg, Jaspur, Kabirdham, Rajgarh, Korla & Dantewara.	Kanker, Mahasamund, Rajnandgoan, Bilaspur, Raipur, Rajgarh, Korla, Dantewara, Kabirdham & Sarguja.	Sarguja, Jaspur, Jagdalpur, Rajnandgoan, Rajgarh, Bilaspur, Raipur, Durg, Korla & Kanker.
<b>Haryana (2006-07 to 2008-09)</b>	Jhajjar, Rohtak, Bhiwani, Sonapat, Faridabad & Jind.	Hisar, Bhiwani, Sirsa, Faridabad & Fatehabad.	Panchkula, Yamunanagar, Ambala, Panipat, Karnal, Sonapat & Rohtak.
<b>Karnataka (2006-07 to 2007-08)</b>	Bidar, Bijapur, Gulbarga, Raichur, Tummkur, Belgaum, Chitradurga & Davangere.	Gulbarga, Gadak, Dharwad, Bidar, Bijapur, Bellari, Bagalkot, Koppal, Tummkur & Haveri.	Bidar, Bellari, Gulbarga, Mysore, Dharwad, Bellari & Chamrajnagar.
<b>Madhya Pradesh (2006-07 to 2008-09)</b>	Nasinghpur, Chhindwara, Betul, Raisen, Jabalpur, Khandwa, Rewa, Seoni, Hosangabad & Khargone.	Chhatarpur, Jhabua, Narsinghpur, Sagar, Shivpuri, Tikamgarh, Sidhi, Mandsaur & Ashoknagar	Barwani, Tikamgarh, Chhatarpur, Guna, Jhabua, Rajgarh, Rewa, Satna, Shivpuri, Tikamgarh & Barwani.
<b>Maharashtra (2006-07 to 2008-09)</b>	Yavatmal, Amrawati, Latur, Akola, Aurangabad, Buldhana, Hingoli, Jalana, Nagpur, Nanded, Osmanabad, Parbhani, Vardha & Washim.	Amrawati, Latur, Akola, Aurangabad, Buldhana, Hingoli, Jalana, Nagpur, Nanded, Parbhani, Vardha, Washim & Dhule	Buldhana, Pune, Jalgaon, Jalna, Latur, Nanded, Nashik, Osmanabad, Parbhani, Washim & Nandurwar



**Annexure 3: Major pulse producing districts in India (Continued).**

**a) Total Kharif**

State	Major districts of Kharif Pulses		
	Arhar (Pigeonpea)	Moongbean (Greengram)	Urdbean (Blackgram)
<b>Odisha (2006-07 to 2008- 09)</b>	Kalahandi, Keonjhar, Rayagada, Ganjam, Bolangir, Angul, Gajapatti, Mayurbhanj, Nawapara, Phulbhani & Sundargarh.	Kalahandi, Keonjhar, Dhenkanal, Baragarh Ganjam, Bolangir, Angul, , Nawapara, Phulbani, Sundargarh & Sambalpur.	Kalahandi, Keonjhar, Dhenkanal, Baragarh Ganjam, Bolangir, Angul, Mayurbhanj, Nawapara, Phulbani, Sundargarh, Nawrangpur & Sambalpur.
<b>Punjab (2003-04 to 2005- 06)</b>	Ludhiana, Fatehgarh sahib, Jalandhar, Mansa & Ropar.	Ludhiana, Sangrur, Firozpur, Amritsar, Jalandhar, Moga, Kapurthala, Mansa & Ropar.	Ludhiana, Batinda, Faridkot, Fatehgarh sahib, N. Shahar & Patiala.
<b>Rajasthan (2006-07 to 2008- 09)</b>	Chittorgarh, Jaipur, Alwar, Dholpur, Sawaimadhopur, Sirohi , Karoli, Jaisalmer, Jhalawar, Banswara, Dungarpur, Udaipur & Pratapgarh.	Ajmer, Churu, Ganganagar, Jaipur, Jodhpur, Nagaur, Tonk, Jalore, Pali & Bhilwara.	Ajmer, Chittorgarh, Kota, Tonk, Sawaimadhopur, Jhalawar, Banswara, Dungarpur, Udaipur & Bhilwara.
<b>Tamil Nadu (2006-07 to 2008- 09)</b>	Erode, Namakkal, Thiruvallur, Tiruvannmalai, Vellore, Dharampuri, Karur, Krishnagiri, Madurai, Theni & Tiruchirapalli.	Coimbatore, Erode, Nagapattinam, Namakkal, Thirvarur , Thoothukudi, Virudunagar, Dindiquil-Quaid-D-Milleth, Tanjavur & Tirunelveli.	Cuddalore, Nagapattinam, Thiruvarur , Thoothukudi, Villupuram, Virudunagar, Dindiquil-Quaid-D-Milleth, Tanjavur, Trichuirapalli & Tirunelveli.
<b>Uttar Pradesh (2006-07 to 2008- 09)</b>	Banda, Chitrakut, Fatehpur, Hamirpur, Kanpur dehat, Kaushambhi, Mirzapur, Sitapur, Aligarh & Kanpur City.	Banda, Chitrakut, Fatehpur, Hamirpur, Jalaun, Jhansi, Lalitpur, Mahoba, Aligarh, Kanpur City & Pratapgarh.	Barabanki, Fatehpur, Jalaun, Jhansi, Lalitpur, Mahoba, Sitapur, Muradabad & Hardoi.
<b>West Bengal (2003-04 to 2005- 06)</b>	Murshidabad, Nadia, Purulia, Bankura, Burdwan, Midnapur (W) & West Dinajpur.	Nadia, Purulia, 20 Parganas (South ), Cooch-Behar, Darjeeling, Jalpaiguri, Midnapur (E), Midnapur (W) & West Dinajpur.	Malda, Murshidabad, Nadia, Purulia, Cooch- Behar, Dinajpur (North) & Jalpaiguri,
<b>Gujarat (Kharif) (2006-07 to 2008- 09)</b>	Vadodara, Panchmahal, Kutch, Bharuch, Bansakantha, Dahod, Narmada, Patan, Sabarkantha & Surat.		

**Annexure 3: Major pulse producing districts in India (Continued).**

**b) Total Rabi**

State	Major districts of Rabi Pulses		
	Chickpea	Fieldpeas	Lentil (Masur)
<b>Andhra Pradesh (2003-04 to 2005-06)</b>	Kurnool, Prakasham, Cuddapah, Medak, Anantpur, Mahaboobnagar, Guntur, Adilabad, Nizamabad & Ranga Reddy.		
<b>Bihar (2002-03 to 2004-05)</b>	Patna, Bhabua, Gaya, Rohtas, Aurangabad, Bhojpur, Lakhisaria, Nalanda, Bhagalpur & Jahanabad.	Patna, Bhojpur, Bhagalpur, Aurangabad, Khagaria, Bagusarai, Champaran west, Bhabua & Mahadevpura, Arval.	Patna, Buxar, Aurangabad, Nalanda, Champaran west, Bhojpur, Champaran east, Bhabua, Madhubani & Lakhisaria,
<b>Chhattisgarh (2006-07 to 2008-09)</b>	Durg, Kabirdham, Bilaspur, Rajnandgaon, Raipur, Sarguja, Dhamtari, Kanker, Jaspur, Jagdalpur & Rajgarh.		Durg, Raipur, Sarguja, Bilaspur, Rajnandgaon, Kabirdham, Dhamtari, Korla, Jaspur & Janigir.
<b>Haryana (2006-07 to 2008-09)</b>	Bhiwani, Hisar, Mohindergarh, Sirsa, Jhajjar, Rohtak, Faridabad, Mewat & Jind.	Karnal, Panipat, Hisar, Kurukshetra, Panchkula, Jhajjar, Faridabad & Sonapat.	Ambala, Yamunanagar, Kurukshetra, Mewat, Karnal, Kaithal, Panchkula, Rohtak & Panipat.
<b>Karnataka (2006-07 to 2007-08)</b>	Gulbarga, Bijapur, Raichur, Dharwad, Bellari, Bagalkot, Bidar, Belgaum, Gadak & Koppal.		
<b>Madhya Pradesh (2006-07 to 2008-09)</b>	Vidisha, Narsinghpur, Raisen, Sagar, Damoh, Dewas, Ujjain, Ashoknagar, Sehore & Shajapur.	Vidisha, Raisen, Sagar, Ashoknagar, Jabalpur, Narsinghpur, Panna, Damoh, Satna & Rewa.	Jabalpur, Datia, Narsinghpur, Tikamgarh, Chhatarpur, Mandla, Sagar, Damoh, Seoni & Chhindwara.
<b>Maharashtra (2006-07 to 2008-09)</b>	Amrawati, Ahmednagar, Buldhana, Aurangabad, Yavatmal, Osmanabad, Akola, Washim, Nagpur & Jalgaon.		

**Annexure 3: Major pulse producing districts in India (Continued).**

**b) Total Rabi**

State	Major districts of Rabi Pulses		
	Chickpea	Fieldpeas	Lentil (Masur)
<b>Odisha (2006-07 to 2008-09)</b>	Kalahandi, Mayurbhanj, Keonjhar, Nawrangpur, Nawapara, Sundargarh, Bolangir, Angul, Boudh & Dhenkanal.		Nawapara, Phulbani, Keonjhar, Koraput, Sundargarh & Bolangir.
<b>Punjab (2003-04 to 2005-06)</b>	Sangrur, Ropar, Kapurthala, Moga, Faridkot, Ludhiana, Batinda, Mansa, & Firozpur.		N. Shahar, Batinda, Faridkot, Patiala, Ludhiana, Gurdaspur, Mukastar & Fatehgarh sahib.
<b>Rajasthan (2006-07 to 2008-09)</b>	Bikaner, Churu, Hanumangarh, Ganganagar, Jhunjhunu, Sikar, Jaisalmer, Nagaur, Pratapgarh & Jhalawar.		Bundi, Jhalawar, Bhilwara, Pratapgarh, Chittorgarh, Bharatpur, Baran, Tonk, Alwar & Banswara.
<b>Tamil Nadu (2006-07 to 2008-09)</b>	Coimbatore, Dindigul, Virudunagar, Dharampuri & Madurai.		
<b>Uttar Pradesh (2006-07 to 2008-09)</b>	Banda, Fatehpur, Hamirpur, Kanpur dehat, Mahoba, Lalitpur, Jalaun, Jhansi, Chitrakut & Mirzapur.	Lalitpur, Jalaun, Jhansi, Mahoba, Hamirpur, Mirzapur, Kanpur dehat, Ambedkarnagar, Ghazipur & Kanpur City.	Beharaich, Balampur, Lalitpur, Barabanki, Balia, Banda, Sitapur, Kheri, Hamirpur & Ghazipur.
<b>West Bengal (2003-04 to 2005-06)</b>	Nadia, Murshidabad, Malda, Birbhum, Dinajpur north, Parganas (North), Burdwan, Midnapur (W), West Dinajpur & Purulia.	Murshidabad, Nadia, Darjeeling, Hooghly, Parganas (North), Birbhum, Parganas (South), Malda, Jalpaiguri & Midnapur (W).	Murshidabad, Nadia, Malda, Parganas (North), Birbhum, Burdwan, Jalpaiguri, Dinajpur (North), Parganas (South) & Hooghly.
<b>Gujarat (Rabi) (2006-07 to 2008-09)</b>	Dahod, Jamnagar, Porbandar, Ahmedabad, Junagadh, Rajkot, Surendranagar, Patan, Amreli & Panchmahal,		

**Annexure 3: Major pulse producing districts in India.****c) Total pulses (Kharif + Rabi)**

<b>States</b>	<b>Major pulse growing districts in India</b>
<b>Andhra Pradesh</b>	Kurnool, Prakasam, Guntur, Krishna, Mahaboobnagar, Anantpur, Medak, Cuddapah, Adilabad and Ranga Reddy.
<b>Bihar</b>	Patna, Rohtas, Aurangabad, Supaul, Champaran (West) and Nalanda
<b>Chhattisgarh</b>	Durg, Bilaspur, Raipur, Rajnandgaon, Surguja and Kabirdham.
<b>Gujarat</b>	Vadodra, Panchmahal, Dahod, Bharuch and Jamnagar.
<b>Haryana</b>	Rohtak, Jhajjar, Sonapat, Hisar, Bhiwani and Faridabad.
<b>Karnataka</b>	Gulburga, Bijapur, Bidar, Dharwad, Raichur, Bellary, Bagalkot, Gadag and Belgaum.
<b>Madhya Pradesh</b>	Vidisha, Raisen, Sagar, Damoh, Ashoknagar, Jabalpur, Dewas, Panna, Chhatarpur and Guna.
<b>Maharashtra</b>	Amravati, Yavatmal, Buldhana, Osmanabad, Washim, Akola, Latur, Jalgaon, Nanded and Parbhani.
<b>Orissa</b>	Kalahandi, Ganjam, Cuttak, Bolangir, Angul and Nuapada.
<b>Punjab</b>	Sangrur, Ferozpur, Ludhiana, Amritsar and Moga.
<b>Rajasthan</b>	Nagaur, Churu, Bikaner, Hanumangarh Ganganagar, Jhunjhunu, Jaipur, Sikar, Pali and Bhilwara.
<b>Tamilnadu</b>	Thoothukudi, Thiruvarur, Nagapattinum, Tirunelveli, Cuddalore and Virudhunagar.
<b>Uttar Pradesh</b>	Lalitpur, Jalaun, Banda, Hamirpur, Fatehpur, Jhansi, Mahoba, Kanpur (Dehat), Beharaich and Chitrakut.
<b>West Bengal</b>	Murshidabad, Nadia, Malda, Midnapur (East), and Cooch-behar.

## Annexure 4: Country / crop -wise area, production and yield of Pulses in the world (Continued).

## (A) Pigeonpea

Area = Lakh ha, Prod= Lakh tonnes, Yield = Kg/ha

Country	Area					Production					Yield				
	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	Yield Index
India	37.29	33.80	35.30	35.46	74.89	30.76	22.70	24.60	26.02	68.59	825	672	697	734	92
Myanmar	6.12	6.05	5.81	5.99	12.66	7.19	7.65	7.24	7.36	19.40	1175	1264	1246	1228	153
Malawi	1.68	1.76	2.36	1.93	4.08	1.50	1.84	1.83	1.72	4.54	893	1045	775	891	111
Uganda	0.88	0.90	0.92	0.90	1.90	0.90	0.91	0.93	0.91	2.41	1023	1011	1011	1015	127
Kenya	1.96	1.18	1.59	1.58	3.33	0.84	0.46	1.03	0.78	2.05	429	390	648	493	61
U.R.of Tanzania	0.70	0.72	0.75	0.72	1.53	0.52	0.54	0.55	0.54	1.41	743	750	733	742	93
Dominican Republic	0.22	0.25	0.28	0.25	0.53	0.18	0.26	0.25	0.23	0.61	818	1040	893	920	115
Nepal	0.21	0.21	0.21	0.21	0.44	0.19	0.18	0.19	0.19	0.49	905	857	905	889	111
D.R.of the Congo	0.10	0.10	0.10	0.10	0.21	0.06	0.06	0.06	0.06	0.16	600	600	600	600	75
Haiti	0.07	0.07	0.07	0.07	0.15	0.02	0.03	0.02	0.02	0.06	286	429	286	333	42
Panama	0.05	0.05	0.04	0.05	0.10	0.02	0.02	0.02	0.02	0.05	400	400	500	429	54
Burundi	0.02	0.02	0.02	0.02	0.04	0.02	0.02	0.02	0.02	0.05	1000	1000	1000	1000	125
Venezuela	0.02	0.02	0.02	0.02	0.04	0.01	0.02	0.02	0.02	0.04	500	1000	1000	833	104
Trinidad & Tobago	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.03	1000	1000	1000	1000	125
Bangladesh	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.03	1000	1000	1000	1000	125
Others	0.03	0.03	0.03	0.03	0.06	0.03	0.03	0.03	0.03	0.08	964	988	886	945	118
World	49.37	45.18	47.52	47.36		42.26	34.74	36.81	37.94		856	769	775	801	

## (B) Chickpea

Country	Area					Production					Yield				
	200'8	2009	2010	Average	% contri.	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	Yield Index
India	75.44	78.90	82.10	78.81	68.30	57.49	70.60	74.80	67.63	67.69	762	895	911	858	99
Pakistan	11.07	10.81	10.67	10.85	9.40	4.75	7.41	5.62	5.93	5.93	429	685	527	546	63
Turkey	4.86	4.55	4.46	4.62	4.01	5.18	5.63	5.31	5.37	5.38	1066	1237	1191	1162	134
Australia	3.38	3.63	5.00	4.00	3.47	4.43	4.45	6.02	4.97	4.97	1311	1226	1204	1241	143
Myanmar	2.80	2.82	2.72	2.78	2.41	3.48	3.98	4.02	3.83	3.83	1243	1411	1478	1376	159
Ethiopia	2.27	2.33	2.13	2.24	1.94	2.87	3.12	3.10	3.03	3.03	1264	1339	1455	1353	156
Iran	4.26	5.60	5.08	4.98	4.32	1.13	2.09	2.40	1.87	1.87	265	373	472	376	43
Mexico	0.91	0.78	0.89	0.86	0.75	1.65	1.32	1.32	1.43	1.43	1813	1692	1483	1663	192
Canada	0.42	0.40	0.77	0.53	0.46	0.67	0.76	1.28	0.90	0.90	1595	1900	1662	1704	197
USA	0.33	0.38	0.59	0.43	0.38	0.51	0.65	0.88	0.68	0.68	1545	1711	1492	1569	181
Yemen	0.22	0.19	0.19	0.20	0.17	0.58	0.51	0.52	0.54	0.54	2636	2684	2737	2683	310
Morocco	0.65	0.81	0.78	0.75	0.65	0.38	0.52	0.57	0.49	0.49	585	642	731	656	76
Malawi	0.99	1.08	0.95	1.01	0.87	0.38	0.52	0.48	0.46	0.46	384	481	505	457	53
Syrian Arab Rep.	0.76	0.74	0.68	0.73	0.63	0.27	0.57	0.43	0.42	0.42	355	770	632	583	67
Russian Federation	0.13	0.14	0.15	0.14	0.12	0.31	0.50	0.28	0.36	0.36	2385	3571	1867	2595	300
Others	2.29	2.45	2.65	2.47	2.14	1.92	1.92	2.17	2.00	2.01	835	784	819	813	94
World	110.78	115.61	119.81	115.40		86.00	104.55	109.20	99.92		776	904	911	866	

## (C) Lentil

Country	Area					Production					Yield				
	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	Yield Index
Canada	7.00	9.63	13.36	10.00	26.76	10.43	15.10	19.47	15.00	39.67	1490	1568	1457	1501	148
India	13.10	13.80	13.00	13.30	35.61	8.10	9.50	9.00	8.87	23.45	618	688	692	667	66
Turkey	1.96	2.10	2.34	2.13	5.71	1.31	3.02	4.47	2.93	7.76	668	1438	1910	1375	136
USA	1.06	1.65	2.66	1.79	4.79	1.09	2.66	3.93	2.56	6.77	1028	1612	1477	1430	141
Nepal	1.89	1.84	1.87	1.87	5.00	1.61	1.48	1.52	1.54	4.06	852	804	813	823	81
China	0.69	0.62	0.63	0.65	1.73	1.50	1.20	1.25	1.32	3.48	2174	1935	1984	2036	201
Australia	1.17	1.04	1.42	1.21	3.24	0.64	1.43	1.40	1.16	3.06	547	1375	986	956	94
Ethiopia	1.07	0.95	1.06	1.03	2.75	0.94	1.24	1.23	1.14	3.01	879	1305	1160	1107	109
Iran	1.53	1.90	1.62	1.68	4.51	0.56	0.84	0.79	0.73	1.93	366	442	488	434	43
Syrian Arab Republic	1.36	1.01	1.31	1.23	3.28	0.34	1.02	0.77	0.71	1.88	250	1010	588	579	57
Bangladesh	0.73	0.71	0.77	0.74	1.97	0.72	0.61	0.72	0.68	1.80	986	859	922	923	91
Morocco	0.35	0.35	0.41	0.37	0.99	0.09	0.23	0.28	0.20	0.53	257	657	683	541	53
Spain	0.17	0.23	0.29	0.23	0.62	0.13	0.13	0.15	0.14	0.36	765	565	517	594	59
Pakistan	0.30	0.31	0.24	0.28	0.76	0.15	0.14	0.11	0.13	0.35	500	452	458	471	46
France	0.07	0.09	0.11	0.09	0.24	0.08	0.13	0.16	0.12	0.33	1143	1444	1455	1370	135
Others	0.73	0.76	0.81	0.76	2.05	0.58	0.59	0.60	0.59	1.56	796	780	739	771	76
World	33.18	36.99	41.90	37.35		28.27	39.32	45.84	37.81		852	1063	1094	1012	

**Annexure 4: Country / crop -wise area, production and yield of Pulses in the world (Continued).**

**(D) Peasdry**

Area = Lakh ha, Prod= Lakh tonnes, Yield = Kg/ha

Country	Area					Production					Yield				
	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	Yield Index
Canada	15.82	14.87	13.22	14.64	23.55	35.71	33.79	28.62	32.71	31.80	2257	2272	2165	2235	135
Russian Federation	6.35	7.70	8.20	7.42	11.93	12.57	13.49	12.18	12.75	12.39	1980	1752	1485	1719	104
China	9.25	8.75	8.82	8.94	14.38	11.00	9.60	9.91	10.17	9.89	1189	1097	1124	1138	69
India	6.80	6.80	6.50	6.70	10.78	7.50	7.50	7.00	7.33	7.13	1103	1103	1077	1095	66
France	1.00	1.14	2.50	1.55	2.49	4.51	5.47	10.98	6.99	6.79	4510	4798	4392	4517	273
USA	3.43	3.39	3.06	3.29	5.30	5.57	7.77	6.45	6.60	6.41	1624	2292	2108	2003	121
Ukraine	2.01	2.73	2.79	2.51	4.04	4.55	4.94	4.52	4.67	4.54	2264	1810	1620	1861	112
Australia	3.00	2.85	2.77	2.87	4.62	2.38	3.56	2.80	2.91	2.83	793	1249	1011	1014	61
Ethiopia	2.12	2.31	2.27	2.23	3.59	2.32	2.36	2.32	2.33	2.27	1094	1022	1022	1045	63
Spain	1.02	1.64	2.02	1.56	2.51	1.38	1.60	1.94	1.64	1.59	1353	976	960	1051	64
Germany	0.48	0.48	0.59	0.52	0.83	1.41	1.66	1.77	1.61	1.57	2938	3458	3000	3123	189
UK	0.30	0.43	0.38	0.37	0.60	0.91	1.51	1.47	1.30	1.26	3033	3512	3868	3505	212
Myanmar	0.55	0.56	0.54	0.55	0.88	0.60	0.62	0.63	0.62	0.60	1091	1107	1167	1121	68
Pakistan	1.06	0.97	0.83	0.95	1.53	0.64	0.60	0.54	0.59	0.58	604	619	651	622	38
Colombia	0.29	0.27	0.25	0.27	0.43	0.54	0.50	0.50	0.51	0.50	1862	1852	2000	1901	115
Others	7.11	7.82	8.42	7.78	12.52	10.11	10.46	9.80	10.12	9.84	1421	1338	1164	1301	79
World	60.59	62.71	63.16	62.15		101.70	105.43	101.43	102.85		1678	1681	1606	1655	

**(E) Cowpeadry**

Country	Area					Production					Yield				
	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	Yield Index
Nigeria	42.89	25.25	25.20	31.11	28.56	29.16	23.70	22.43	25.09	46.06	680	939	890	807	161
Niger	52.42	41.56	55.71	49.90	45.80	15.44	7.87	17.74	13.69	25.12	295	189	319	274	55
Burkina Faso	11.44	9.65	13.32	11.47	10.53	5.38	4.54	6.26	5.39	9.90	470	470	470	470	94
Myanmar	1.57	1.59	1.26	1.47	1.35	1.76	1.88	1.70	1.78	3.27	1120	1183	1353	1209	242
Cameroon	1.30	1.30	1.32	1.31	1.20	1.30	1.32	1.35	1.32	2.43	1001	1015	1023	1013	203
Mali	2.50	2.84	2.39	2.58	2.36	0.80	1.33	1.29	1.14	2.09	320	470	539	443	89
Sengal	2.72	2.16	1.28	2.05	1.89	1.26	0.87	0.49	0.87	1.60	465	401	381	425	85
Tanzania	1.30	1.30	1.60	1.40	1.29	0.85	0.85	0.90	0.86	1.59	650	650	563	617	123
Uganda	0.74	0.77	0.80	0.77	0.71	0.79	0.84	0.85	0.83	1.52	1068	1091	1063	1074	215
Kenya	1.48	1.24	1.68	1.47	1.35	0.48	0.60	0.72	0.60	1.10	324	484	430	409	82
Dem Rep. of Congo	1.26	1.28	1.30	1.28	1.17	0.58	0.59	0.60	0.59	1.08	460	461	462	461	92
Sudan	1.74	1.90	1.39	1.68	1.54	0.73	0.34	0.18	0.42	0.76	421	179	129	249	50
Malawi	0.81	1.15	1.15	1.04	0.95	0.52	0.25	0.26	0.35	0.63	646	217	227	333	67
Peru	0.21	0.20	0.23	0.21	0.20	0.28	0.27	0.34	0.30	0.55	1306	1343	1513	1391	278
Haiti	0.40	0.37	0.37	0.38	0.35	0.28	0.26	0.25	0.26	0.48	703	703	676	694	139
Others	0.83	0.89	0.79	0.84	0.77	0.87	1.11	0.98	0.98	1.81	1040	1248	1231	1174	235
World	123.61	93.45	109.80	108.95		60.47	46.61	56.35	54.48		489	499	513	500	

Source: FAO Stat.

### Annexure 4: Country / crop -wise area, production and yield of Pulses in the world.

#### (F) Beansdry

Area = Lakh ha, Prod= Lakh tonnes, Yield = Kg/ha

Country	Area					Production					Yield				
	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	Yield Index
India	80.00	60.00	108.00	82.67	30.36	30.10	24.30	48.70	34.37	15.93	376	405	451	416	52
Brazil	37.82	41.00	34.24	37.69	13.84	34.61	34.87	31.59	33.69	15.62	915	850	923	894	113
Myanmar	27.25	27.19	27.46	27.30	10.03	32.18	33.75	30.30	32.08	14.87	1181	1241	1103	1175	148
China	10.04	9.04	9.11	9.40	3.45	17.08	14.89	13.39	15.12	7.01	1701	1647	1469	1609	203
USA	5.85	5.92	7.74	6.50	2.39	11.59	11.50	14.42	12.51	5.80	1982	1943	1865	1924	243
Mexico	15.06	12.05	16.30	14.47	5.32	11.23	10.41	11.56	11.07	5.13	746	864	709	765	97
Tanzania	8.23	9.99	12.70	10.31	3.79	5.76	6.99	9.50	7.42	3.44	700	700	748	720	91
Uganda	8.96	9.25	9.30	9.17	3.37	4.40	4.52	4.55	4.49	2.08	491	489	489	490	62
Kenya	6.42	9.61	6.89	7.64	2.81	2.65	4.65	3.91	3.74	1.73	413	484	567	489	62
Argentina	2.55	2.77	2.68	2.67	0.98	3.37	3.13	3.38	3.29	1.53	1321	1131	1261	1235	156
Rwanda	3.37	3.46	3.19	3.34	1.23	3.08	3.27	3.27	3.21	1.49	915	944	1026	960	121
Indonesia	2.78	2.88	2.58	2.75	1.01	2.98	3.14	2.92	3.01	1.40	1072	1091	1130	1097	138
Korea	3.70	3.75	2.43	3.29	1.21	3.25	3.35	2.24	2.95	1.37	878	893	924	895	113
Cameroon	2.08	2.10	2.15	2.11	0.78	2.71	2.75	2.85	2.77	1.28	1300	1310	1327	1312	166
Ethiopia	2.31	2.67	2.44	2.48	0.91	2.41	2.85	2.63	2.63	1.22	1043	1066	1078	1063	134
Others	47.39	52.29	51.74	50.47	18.54	41.92	44.17	44.02	43.37	20.11	885	845	851	859	108
World	263.81	253.97	298.95	272.25		209.32	208.55	229.23	215.70		793	821	767	792	

#### (G) Total Pulses

Country	Area					Production					Yield				
	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	% contri.	2008	2009	2010	Average	Yield Index
India	228.62	209.30	261.66	233.19	32.24	140.65	141.60	171.10	151.12	23.46	615	677	654	648	73
Canada	24.50	26.05	28.62	26.39	3.65	49.48	51.89	51.92	51.09	7.93	2019	1992	1814	1936	217
China	29.95	27.64	28.23	28.61	3.95	48.96	43.31	44.71	45.66	7.09	1635	1567	1583	1596	179
Myanmar	38.30	39.55	37.80	38.55	5.33	45.22	44.06	43.90	44.39	6.89	1181	1114	1161	1152	129
Brazil	38.26	41.48	35.02	38.25	5.29	34.86	35.14	32.28	34.09	5.29	911	847	922	891	100
Nigeria	44.13	25.99	26.25	32.13	4.44	29.69	24.12	22.89	25.57	3.97	673	928	872	796	89
USA	10.78	11.53	14.19	12.17	1.68	18.93	23.45	26.34	22.91	3.56	1755	2033	1856	1882	211
Australia	15.25	14.47	17.46	15.73	2.17	17.21	18.04	19.01	18.09	2.81	1129	1247	1089	1150	129
Ethiopia	15.10	15.79	14.83	15.24	2.11	17.74	18.40	18.06	18.07	2.80	1175	1165	1217	1185	133
Russian Federation	9.85	9.38	10.00	9.74	1.35	18.25	15.79	13.99	16.01	2.49	1853	1683	1398	1643	185
Niger	53.13	42.28	56.43	50.61	7.00	15.73	8.17	18.04	13.98	2.17	296	193	320	276	31
Mexico	16.36	13.19	17.58	15.71	2.17	14.13	12.91	14.12	13.72	2.13	864	979	803	873	98
Tanzania	16.79	17.54	17.73	17.35	2.40	12.01	12.60	12.73	12.45	1.93	715	718	718	717	81
Turkey	9.20	9.06	8.96	9.07	1.25	9.60	12.37	13.43	11.80	1.83	1044	1366	1499	1301	146
France	1.75	2.19	4.23	2.72	0.38	7.95	10.22	16.30	11.49	1.78	4542	4674	3850	4219	474
Others	171.60	181.27	180.83	177.90	24.59	144.02	159.19	157.74	153.65	23.86	839	878	872	864	97
World	723.58	686.71	759.83	723.38		624.43	631.28	676.53	644.08		863	919	890	890	

Source: FAO stat.

**Annexure 5: Producer price in different pulse producing countries of the world.**

Country	Chickpea (2008-10)		Lentil (2008-10)		Peas (2008-10)		Pigeonpea (2008-10)		Cowpea (2008-10)		Country Ave.
	Ave. price/kg		Ave. price/kg		Ave. price/kg		Ave. price/kg		Ave. price/kg		
	US \$	IC	US \$	IC	US \$	IC	US \$	IC	US \$	IC	IC (Rs.)
Bangladesh	0.54	29.14	0.83	45.03	0.00	0.00	0.00	0.00	0.00	0.00	37.09
Canada	0.53	28.79	0.61	33.10	0.22	12.06	0.00	0.00	0.00	0.00	24.65
Cyprus	1.41	76.07	1.44	77.71	0.00	0.00	0.00	0.00	6.04	326.30	160.03
Egypt	0.65	34.94	1.15	62.23	0.00	0.00	0.00	0.00	0.75	40.45	45.87
Ethiopia	0.41	21.99	0.65	35.00	0.42	22.69	0.00	0.00	0.00	0.00	26.56
Greece	2.51	135.33	2.07	111.54	0.00	0.00	0.00	0.00	0.00	0.00	123.43
Sri Lanka	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	47.98	47.98
Iran	0.74	39.84	1.04	56.22	0.00	0.00	0.00	0.00	0.00	0.00	48.03
Israel	0.94	50.92	0.76	41.07	0.44	23.55	0.00	0.00	0.00	0.00	38.51
Jordan	0.48	25.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.88
Mexico	0.63	34.08	0.48	26.08	0.39	20.83	0.00	0.00	0.00	0.00	27.00
Peru	1.08	58.24	0.83	44.74	0.66	35.76	0.00	0.00	0.51	27.72	41.62
Spain	0.91	48.98	0.88	47.47	0.28	15.23	0.00	0.00	0.00	0.00	37.22
Sudan	1.19	64.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64.18
Tunisia	1.24	67.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	67.16
Turkey	1.05	56.51	1.25	67.55	1.01	54.32	0.00	0.00	0.00	0.00	59.46
America	0.64	34.60	0.62	33.70	0.23	12.28	0.00	0.00	0.00	0.00	26.86
Yamen	0.56	30.48	1.76	95.22	1.57	84.61	0.00	0.00	0.00	0.00	70.10
Azerbaijan	0.00	0.00	0.87	47.08	0.74	40.14	0.00	0.00	0.00	0.00	43.61
Bulgaria	0.00	0.00	0.68	36.94	0.38	20.37	0.00	0.00	0.00	0.00	28.65
Ecuador	0.00	0.00	0.80	42.99	0.94	50.50	0.00	0.00	0.00	0.00	46.74
Hungary	0.00	0.00	1.13	61.01	0.61	32.72	0.00	0.00	0.00	0.00	46.87
Madagascar	0.00	0.00	0.54	29.07	0.00	0.00	0.00	0.00	0.00	0.00	29.07
Slovakia	0.00	0.00	0.80	43.44	0.36	19.47	0.00	0.00	0.00	0.00	31.45
Tajikistan	0.00	0.00	1.59	85.82	0.92	49.53	0.00	0.00	0.00	0.00	67.67
Albania	0.00	0.00	0.00	0.00	0.59	31.66	0.00	0.00	0.00	0.00	31.66
Armenia	0.00	0.00	0.00	0.00	1.71	92.36	0.00	0.00	0.00	0.00	92.36
Brazil	0.00	0.00	0.00	0.00	0.70	37.88	0.00	0.00	0.00	0.00	37.88
Croatia	0.00	0.00	0.00	0.00	0.68	36.65	0.00	0.00	0.00	0.00	36.65
Jamaica	0.00	0.00	0.00	0.00	2.35	127.01	2.28	123.38	2.16	116.89	122.43
Kyrgyzstan	0.00	0.00	0.00	0.00	0.94	50.70	0.00	0.00	0.00	0.00	50.70
Latvia	0.00	0.00	0.00	0.00	0.44	23.93	0.00	0.00	0.00	0.00	23.93
New Zealand	0.00	0.00	0.00	0.00	0.50	27.23	0.00	0.00	0.00	0.00	27.23
Norway	0.00	0.00	0.00	0.00	0.46	24.82	0.00	0.00	0.00	0.00	24.82

IC Indian Currency, US \$ Rs. 54 per Dollar.



## Annexure 6: Notified varieties of pulses ( Continued).

### 1. Pigeonpea (Arhar)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
UPAS 120	GBPUAT	1976	U.P.	11-15	125-150	Early maturing
BDN 2	MAU	1978	Maharashtra	10.12	150-160	Indeterminate, white seed, tolerant to wilt.
HY 3C	IARI	1982	A.P.	17.0	170-180	White bold seeded
LRG 30 (Palandu)	ANGRAU	1982	A.P.	17-19	170-180	Medium maturing
C 11	PKV	1982	Maharashtra	15-20	190-200	Tolerant to wilt.
TT 6 (Vishakha 1)	BARC	1983	CZ, SZ	10-17	130-140	Compact, medium bold seeded
T 15-15	GAU	1985	Gujarat	15-20	200-210	Medium maturing
CO 5	TNAU	1985	Tamil Nadu	8-12	100-115	
Manak (H 77-216)	CCSHAU	1985	NWPZ	18-20	120-130	Early maturing
Pusa 84	IARI	1985	NWPZ	15-16	140-150	Determinate plant
Bahar	RAU, Dholi	1986	Bihar, U.P.	20-25	230-250	Resistant to SMD, seed bold and pale brown
Pragati (ICPL 87)	ICRISAT	1986	CZ, SZ	11-19	116-125	Determinate plant, seed light brown
Maruti (ICPL 8863)	ICRISAT	1986	A.P., Karnataka	10-12	115-160	Resistant to wilt
TTB 7	UAS, Bangalore	1988	Karnataka	15-17	160-170	Semi-spreading
Pusa 33	IARI	1988	NWPZ, CZ	18-20	120-150	Indeterminate plant
Jagriti (ICPL 151)	ICRISAT	1989	NHZ, NWPZ, CZ	18-20	120-140	Determinate plant, seed cream brown
Abhaya (ICPL 332)	ANGRAU/ ICRISAT	1989	A.P.	18-20	170-175	Resistant to pod borer
ICPH 8*	ICRISAT	1991	CZ	20-25	115-135	
BSMR 175	MAU	1991	Maharashtra	11-12	165-170	White seeded, res. to Sterility Mosaic & Wilt
JA 4	JNKVV	1991	Madhya Pradesh	16-18	180-200	Tolerant to wilt & SMD
Birsa Arhar 1	BAU	1992	Bihar	10-15	180-200	Wilt resistant
Gujarat Tur 100	GAU	1992	Gujarat.	16-18	120-135	Tolerant to wilt & SMD white, bold- seeded.
Vamban 1	TNAU	1993	Tamil Nadu	8-10	95-100	Suitable for inter cropping with Peanut
Asha (ICPL-87119)	ICRISAT	1993	CZ & SZ	16-18	160-170	Resistant to wilt & SMD, Bold seeded., Indeterminate
Pusa 855		1993	NWPZ	24-25	145-150	Plant Indeterminate, Medium bold seeded.
Pusa 9	IARI	1993	NEPZ	22-26	210-248	Tolerant to <i>Alternaria</i> & SMD, Tall & bold- seeded, Suitable for pre-rabi.
CO 6	TNAU	1993	Tamil Nadu	8-10	170-180	Tolerant to Pod borer. Indeterminate
Sharad (DA 11)	RAU, Dholi	1993	Bihar	18-20	240-250	Resistant to <i>Alternaria</i> blight & Sterility Mosaic
COPH 1*	TNAU	1994	TN	9-11	115-120	
Sarita (ICPL 85010)	ICRISAT	1994	A.P.	10-12	130-140	Determinate.
TS 3	UAS, Gulberga	1995	Karnataka	14-16	180-190	White, bold seeded, resistant to Wilt
AL 201	PAU	1995	Punjab.	15-16	140-150	Indeterminate variety.
Durga (ICPL 84031)	ICRISAT	1995	Andhra Pradesh.	8-10	120-125	Determinate.
Jawahar (KM 7)	JNKVV	1996	CZ and SZ	18-20	173-180	Tolerant to wilt & <i>Phytophthora</i> blight. Seeds dark brown
BSMR 736	MAU	1996	Maharashtra	12-18	180-185	Resistant to wilt and SMD. Brown seeded. Indeterminate
Narendra Arhar 1 (NDA 88-2)	NDUAT	1997	Uttar Pradesh.	20-22	240-260	Resistant to SMD and tolerant to wilt and <i>Phytophthora</i> blight.
Amar (KA 32-1)	CSAUAT	1997	Uttar Pradesh.	16-20	250-270	Compact, resistant to SMD, tolerant to wilt, Seed brown
H 82-1 (Paras)	CCSHAU	1998	Haryana	15-20	133-145	Indeterminate
Malviya Vikalp (MA 3)	BHU	1999	CZ	20-22	178-162	Spreading, Constricted Pod, resistant to pod fly.
Azad (K 91-25)	CSAUAT	1999	U.P. & Bihar	20-22	250-260	Wilt tolerant, Sterility Mosaic Resistant
AKT 8811	Akola	2000	Mahrashtra	13-14	145-150	Indeterminate
Laxmi (ICPL 85063)	ICRISAT	2000	Andhra Pradesh	18-20	160-200	Pre-rabi
Vaishali (BSMR 853)	MAU	2002	Maharashtra	16-17	165.170	Resistant to wilt and SMD.
Sel 31		2002	Karnataka	12	100-110	
MA 6	BHU	2002	Central & Eastern U.P.	20-23	248-267	Late, Spreading type
Pusa 991	IARI	2003	Delhi	16-20	140	Tolerant to wilt, <i>Phytophthora</i> blight and SMD
Pusa 992	IARI	2004	Har., Punjab, Delhi, Western UP and Raj.	17	119-162	Tolerant to SMD and wilt

## Annexure 6: Notified varieties of pulses (Continued).

### 1. Pigeonpea (Arhar)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
GT 101	GAU	2004	Gujarat	13	Early	Tolerant to wilt and SMD
Malviya chatatkar (MAL 13)	BHU	2005	UP & W.B.	27-29	189-271	Moderately resistant to wilt and SMD. Recommended for Kharif & pre-rabi seasons.
VL Arhar 1	VPKAS, Almora	2006	Uttarakhand	19	150	Resistant to wilt, Alternaria leaf blight and rot
CORG 9701	TNAU	2006	Tamil Nadu, Karnataka, A.P., Odisha	11	120-130	Tolerant to wilt, SMD & phytophthora blight, Tol. to pod borer & pod fly
Amol (BDN 708)	ARS Badnapur	2007	Maharashtra	15	160-165	Moderately resistant to wilt & SMD, Tol. to pod borer & pod fly
Vipula	MPKV	2007	Maharashtra	16	145-160	Resistant to <i>Fusarium</i> wilt, Moderately resistant to sterility mosaic disease
Lam-41	ANGRAU	2007	A.P.	12	Medium	Tolerant to <i>Helicoverpa</i> pod borer
Jawahar (JKM 189)	JNKVV	2007	M.P.	21	116-124	Res. to wilt, Mod. resistant to SMD&Phytophthora blight
GTH 1* (SKNPCH-10)	SDAU	2007	Gujarat	18	135-145	No incidence of sterility mosaic disease.
TT-401	BARC	2007	M.P., MS, Guj. & CG	16	138-156	Tolerant to pod borer & tolerant to wilt
Pusa 2002	IARI	2008	Delhi	17	110-150	Sowing in first week of June, Suited for double cropping system, Tolerance to moisture stress.
PAU 881 (AL 1507)	PAU	2008	Punj., Har., Western UP and plains of Uttarakhand	16-18		Early maturing
Pant Arhar 291 (PA 291)	GBPAUT	2008	Uttarakhand	17	140-150	Early maturing, tolerant to phytophthora blight and pod borer
NDA 2	NDUA&T	2008	U.P, Bihar, WB, Assam & Jharkhand	25-28	240-260	Long duration, resistant to SMD, wilt and root knot nematode
TJT 501	BARC & ZARS, Kharigone	2009	CZ	18	135-183	Tol. to SMD, wilt and Phytophthora. Tol. to pod borer and pod fly
BRG 2	UAS, Bangalore	2009	SZ	12-16	175-185	Moderately tolerant to wilt, SMD and pod borers
Surya (MRG-1004)	ARS Madhira	2009	Andhra Pradesh	20-22	166-180	Tolerant to Macrophomina Stem Canker/Wilt.
TS-3R	ARS, Gulbarga	2011	Karnataka	11-17	150-160	Kharif and Late sown cropping system. Res. to Wilt.
Anand grain tur 2 (AGT 2)	AAU	2012	Gujarat	16	175-180	No severe disease was observed.
BDN 711 (BDN2004-3)	ARS Badnapur	2012	Maharashtra	15-23	150-160	Mod. resistant to Wilt and SMD.

\*-Hybrid

### 2. Greengram (Moongbean)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Pusa Baisakhi	IARI	1974	NWPZ	8.0	60-65	Early, for spring/summer, erect type
PS 16	IARI	1980	NWPZ, NEPZ, CZ	8.0	60-70	Early, for spring/summer, erect type
K 851	CSAUAT	1982	All Zones	8.0	75-80	Wide adaptability, semi-spreading
ML 131	PAU	1982	CZ, SZ	14.0	85	YMV resistant, seed small
KM 2	TNAU	1982	Tamil Nadu	6-8	65-70	Erect & compact type
Jalgaon 781	MPKV	1982	Maharashtra	6-8	65-70	Tolerant to stresses, seed bold
SML 32	PAU	1982	Punjab	8.0	65-70	Early, for spring/summer, seed dull green
Pant mung 2	GBPAUT	1983	NEPZ, CZ	8-10	65-70	YMV resistant, seed small
Pant mung 3	GBPAUT	1985	NWPZ	11.0	75-85	YMV resistant, seed small
Paiyur 1	TNAU	1985	Tamil Nadu	7-8	85-90	Tolerant To YMV, seed dull green
ML 267	PAU	1987	NWPZ	10-11	75	YMV resistant, seed small
PDM 11	IIPR	1987	CZ	8.5	75	YMV resistant, summer
PDM 54	IIPR	1987	NEPZ, CZ	9.5	65	YMV resistant, seed medium bold
Pusa 105	IARI	1987	NWPZ, CZ	10.0	75	YMV resistant, seed deep green
Vamban 1	TNAU	1989	Tamil Nadu	8.0	65	YMV tolerant, seed medium bold

## Annexure 6: Notified varieties of pulses (Continued).

### 2. Greengram (Moongbean)

Variety	Source	Year of Release/Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
RMG 62	RAU, Durgapura	1991	Rajasthan	7.0	65-70	Tolerant to stresses, erect type
ADT 3	TNAU	1991	Tamil Nadu	10.7	65-70	Tolerant to YMV. Seed small
Co 5	TNAU	1991	Tamil Nadu	9.0	70-75	Tolerant to YMV. Seed small
MUM 2	Meerat University	1992	Punjab, Haryana, Delhi & West UP	12.0	60-70	Resistant to YMV, small seeded, early
BM 4	MAU	1992	M.P., MS, Gujarat	10-12	65	Early, tolerant to YMV and PM, Bold Seeded
Phule M 2	MPKV	1992	Maharashtra	6.9	65	Tolerant to YMV, early, small seed
AKM 8803	PKV	1992	Maharashtra	10.5	65-70	Tolerant to YMV. Seed small
Narendra Mung 1	NDUAT	1992	Uttar Pradesh	10.0	60-70	Tolerant to YMV.
AKM-8803	PKV	1992	Maharashtra	10.5	65-70	Tolerant to YMV.
Asha	CCSHAU	1993	Haryana.	12.0	75-80	Tolerant to YMV.
MH 88-111		1993	NWPZ			Spring
TARM 2	BARC/PKV	1994	Maharashtra	9.5	65	Tolerant to PM.
Pusa 9072	IARI	1995	SZ	8-10	65-75	Tolerant to Powdery Mildew. Rabi
Warangal 2 (WCG 2)		1995	A.P.	14.0	65-70	Suitable for all Season, Tolerant to YMV
Madhira 295	ANGRAU	1995	A.P.	14.0	65-70	Tolerant to YMV
LGG 407 (Lam 407)		1995	A.P.	14.0	70-75	Tolerant to YMV.
JM 721	JNKVV	1996	Madhya Pradesh	12.4	70-75	Tolerant to PM.
ML 613	PAU	1996	Punjab	13.0	84	Resistant to YMV, Bacterial leaf spot and Pod- leaf spot. Seed medium bold
PDM 84-178		1996	A.P.	8.1	65-70	Tolerant to YMV & PM, suitable for summer and early kharif.
SML 134	PAU	1996	Punjab.	11.0	68	For summer/spring.
TARM	BARC/PKV	1997	Maharashtra	8-12	85	Resistant to PM, Suitable for Rabi. Small seed
Pant Mung 4	GBPUAT	1997	Eastern UP, Assam, Bihar, W.B	7.5	68	Resistant to YMV.
PKV mung 8802	PDKV	1997	Maharashtra	10-12	56-68	Resistant to PM, Suitable for Kharif, sole crop as well as intercrop.
HUM 1	BHU	1999	Gujarat, MS, MP, TN, KN	8-9	60-65	Res. to YMV, Summer season
CO 6	TNAU	1999	Tamil Nadu	10.0	65	Suitable for all season, Resistant to YMV.
Pusa 9531	IARI	2000	M.P., MS, Guj., Punjab, Haryana, Delhi, West U	10-12	60	Res. to YMV, Tolerant to Jassids and whitefly, suitable for summer.
Pusa Vishal	IARI	2000	NWPZ	11.0	62	Res. to YMV, Tol. to Jassids and whitefly, suitable for summer, very bold seeded (6 g/100 seed)
LAM 460	ANGRAU	2001	A. P.	12.0	70-75	Tolerant to YMV
PDM 139	IIPR	2001	Uttar Pradesh.	12-15	50-60	Summer season, Mod. res. to YMV
Ganga 8 (Gangotri)	RAU, Sriganaganagar	2001	NWPZ	9.2	72	Kharif, tolerant to stem fly and pod borer.
OUM 11-5	OUAT	2002	SZ	7.00	62	Kharif, Moderately resistant to diseases
Malviya Jagriti (HUM 12)	BHU	2003	U.P., Bihar, Jharkhand, W.B.	11-12	66	Mod. Res. MYMV, CLS, Summer Season
IPM 99-125	IIPR	2004	NEPZ	10.00	66	Resistant to YMV, Summer Season
TM 99-37	BARC	2005	NEPZ	11.00	65	Moderate resistant To YMV, Summer
COGG 912	TNAU	2005	SZ	8.00	62	Res. To YMV, CLS, Kharif
Kamdeva (OUM 11-5)	OUAT	2004	SZ	8.00	46-69	Mod. Rest. to PM, MYMV & CLS
Muskan (MH 96-1)	CCS HAU	2004	Haryana	15.00	70-75	Resistant to YMV, Anthracnose and Leaf Crinkle
Ganga-1 (Jamnotri)	ARS, Sriganaganagar	2004	Rajasthan	14.00	76	Mod. Res. to YMV, CLS, PM, anthracnose, Bacterial leaf blight, Macrophomina & web blight & Rhizopus, Moderate tolerant to white fly and jassids
Shalimar Moong-1	SKUAST	2005	J & K	9.00	105-115	Res. to leaf spot, pod blight
BM-2002-1	ARS, Badnapur	2005	Maharashtra	10-12	65-70	Moderate resistant to PM
HUM 16 (Malviya Jankalyani)	BHU	2006	NEPZ	14-16	55-58	Summer, Resistant to YMV, Root Knot and Leaf Crinkle
Tromday pesara (TM-96-2)	ANGRAU	2006	Andhra Pradesh	6.00	69-73	Rabi & summer, Resistant to PM and Cercospora leaf spot
Tromday Jawahar mung-3 (TJM-3)	JNKVV	2006	MP	8-10	61-75	Kharif & summer, Resistant to YMV, PM and Rhyzoctonia root rot
SML 668	CSK HPKV, Palampupr	2007	Low Hills Sub-tropical Zone	11-12	75-85	Under Irrigated Condition in Summer as Contingent crop or intercrop in Sugarcane. Resistant to Anthracnose, Cercospora leaf spot & YMV
KM 2241	CSAUAT	2008	North Hill Zone of the Country in timely sown condition	9.00		Resistant to MYMV, suitable for Kharif
Satya	CCSHAU	2008	NWPZ	16-17	70	Suitable for Kharif

## Annexure 6: Notified varieties of pulses (Continued).

### 2. Greengram (Moongbean)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
IPM 2-3	IIPR, Kanpur	2009	Rajasthan, Punjab and Jammu region	10.00	70-72	Resistant to MYMV, large seed, suitable for Kharif and spring
Pusa 0672	IARI	2009	Jammu & Kashmir, Manipur and Tripura	16.0	52-103	Resistant to MYMV, suitable for Kharif
Madhira Pesara 347	ARS, Madhira	2009	Andhra Pradesh	12.0	60-70	Tolerant to Cercospora, YMV, Powdery Mildew, Thrips and Stem Fly.
Pant Mung 5	GBPUAT	2009	Uttar Pradesh	10-12	62-79	Resistant to YMV, Cercospora, Leaf spot and Anthracnose.
KKM 3	ARS, Kathalagere	2009	Karnataka	8-9		Moderately tolerant to Powdery Mildew and YMV and Pod Borer.
Paury Mung	-	2010				
Basanti	CCSHAU	2010	Haryana	15-17	65	Resistant to MYMV, suitable for Kharif and spring
MH 125	CCSHAU	2010	Haryana	12.00	64	Resistant to MYMV, Leaf crinkle, Web blight, Anthracnose, moderately resistant to Cercospora leaf spot
VBN(Gg)3	NPR, Vamban	2010	Tamilnadu	8-9	65-70	Moderately Resistant to Powdery Mildew.
PKVAKM 4 (AKM 9904)	PDKV	2011	Karnataka, Tamil Nadu and Odisha	10-11	57-80	Tolerant to PM, suitable for Kharif
PKV green gold	PDKV	2011	Maharashtra			
IPM 02-14	PDKV	2011	AP, Karnataka, Tamil Nadu and Odisha	10-12	62-70	Resistant to MYMV, large seed, suitable for summer
KM 2195 (Swati)	CSAUAT	2012	Uttar Pradesh	10-12	65-70	Resistant to MYMV, Cercospora leaf spot, Web blight and Anthracnose, suitable for Kharif
MH 421	CCSHAU	2012	Haryana	12	60	Non-shattering, resistant to YMV, suitable for Kharif, spring & Summer
BM 2003-2	ARS, Badnapur	2012	Maharashtra	8-11	65-70	

### 3. Blackgram (Urdbean)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
T 9	CSAUAT	1975	All Zones	8-10	70-75	Wide adaptability, erect
Pant U 19	GBPUAT	1982	NEPZ	8-10	85	Resistant to YMV, erect
Pant U 30	GBPUAT	1982	CZ, SZ	8-10	75	Resistant to YMV, erect
Sarala	Ouat	1985	Odisha	9.00	75	Tolerant to YMV, seed brownish black
Jawahar Urd 2	JNKVV	1987	Madhya Pradesh	13.00	67	Tolerant to Macrophomia, CLS & YMV.
Jawahar Urd 3	JNKVV	1987	Madhya Pradesh	13.00	70	Tolerant to Macrophomia, CLS & YMV
Pant U 35	GBPUAT	1987	UP	10.80	75-80	Pods hairy
Teja (LBG 20)	ANGRAU	1991	Andhra Pradesh	14.00	70-75	Tolerant to YMV
Vamban 1	TNAU	1991	Tamil Nadu	8.00	65-70	Tolerant to YMV
ADT 4	TNAU	1991	Tamil Nadu	8-9	65-70	Tolerant to YMV
ADT 5	TNAU	1991	Tamil Nadu	8.00	65-70	Tolerant to YMV, dwarf & erect
Basant Bahar (PDU 1)	IIPR	1991	All India except South & Hill Zone	12-14	70-80	Spring, tolerant to YMV
Prabha (LBG 402)	ANGRAU	1991	SZ	10.00	78	Rabi, seed bold & dull black
TPU 4	BARC/ MAU	1992	M.P., M.S. & Central part of Rajasthan	8.00	75	Plant erect, medium tall. seed bold & dull black
TAU 2	BARC/PKV	1993	Maharashtra	10.00	70	seed bold & purplish black
Narendra Urd 1 (NDU 88-8)	NDUAT	1993	Uttar Pradesh.	10.00	60-70	Resistant to YMV, Black, medium bold seeded.
LBG 611	ANGRAU	1995	A.P.	14.00	85-90	Resistant to wilt.
WBU 108	BCKV	1996	Punjab, West UP, Rajasthan, Karnataka, A.P. TN.	12.00	85	Tolerant to YMV, kharif
Mush 338	PAU	1996	Punjab.	9.00	85-90	Tolerant to YMV. Seed bold
Mash 414	PAU	1996	Punjab.	10.00	72	Tolerant to root rot, Spring
Birsa Urd-1	BAU	1996	Bihar.	11.00	80	Tolerant to YMV.
Melghat (AKU 4)	PKV	1996	Maharashtra	10.00	93	Tolerant to stress, for rabi season.
KBG 512	TNAU	1997	Tamil Nadu.	7-8	70-75	Tolerant to stem fly, pods hairy.
Vamban 2	TNAU	1997	Tamil Nadu.	12.00	70	Tolerant to YMV & drought.
KU 301 (Shekhar 1)	CSAUAT	1998	SZ	12.00	70	Resistant to YMV, Rabi season
TU 94-2 (Trombay urid)	BARC	1998	SZ	15.00	69	High yielding & YMV resistant early, rabi season
Azad Urd 1 (KU 92-1)	CSAUAT	1999	UP, Bihar, WB.	10.00	80	Spring, resistant to YMV
WBG 26	ANGRAU	1999	Karnataka, A.P., Orissa, TN	10.00	70	Resistant to PM

## Annexure 6: Notified varieties of pulses (Continued).

### 3. Blackgram (Urdbean)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Barkha (RBU 38)	RAU, Bansawara	1999	MP, MS & Central part of Rajasthan	12.00	75	Bold seeded, resistant to <i>Cercospora</i> leaf spot
IPU 94-1 (Uttra)	IIPR	1999	NWPZ, Gujarat, Bihar, W.B.	11-12	85	Resistant to YMV, Kharif season.
Shekhar 2 (KU 300)	CSAUAT	2001	Punjab, Haryana, Delhi, West UP & North Rajasthan	11-12	70	Resistant to YMV, spring season.
NDU 99-3	NDAUT	2003	NHZ	10.00	85	Resistant To YMV, Kharif season
KU 96-3	CSAUAT	2003	CZ	8.00	73	Resistant To YMV, Kharif season
Goutam (WBU 105)	ARS, Berhanpur	2004	West Bengal	13-15	69-90	Resistant to YMV, Mod. res. to <i>Cercospora</i> leaf spot
Shekhar 3 (KU 309)	CSAUAT	2004	U.P	10.00	66-84	Kharif, Resistant to YMV, leaf crinkle, CLS
Mash 1008	PAU	2004	Punjab	12.00	72	Early, Resistant to MYMV & leaf Crinkle virus
Gujarat urd 1	SDAU	2004	Gujarat	12.00	late	Late, Moderately resistant to PM & CLS
AKU 15	PDKV	2006	Maharashtra	10-12	65-83	Kharif, Tolerant to PM
Lam 709	ANGRAU	2006	Andhra Pradesh	14.00	Medium	Tolerant to YMV
Sulata (WBU 109)	PORS Berhanpur	2008	UP, Bihar, WB, Assam & Jharkhand	15-16	80-83	Resistant to YMV, spring season
Pant Urd 31	-	2008				
Pant Urd 40	-	2008				
Prasad	-	2008				
VBN (BG)5	-	2009				
Madhra Minumu 207	ARS, Madhira	2009		13	75-80	Tolerant to YMV & Stress.
IPU 02- 43	IIPR, Kanpur	2009	AP, Odisha, Karnataka, Tamil Nadu	9-11		Resistant to MYMV and PM, Kharif season.
KU 99-21	CSAUT, Kanpur	2009	Punjab, Haryana, Western UP and plains of Uttarakhand	10-11		Kharif season
Mash 479 (KUG 479)	PAU, Ludhiana	2010	Punjab, Haryana, Western UP and plains of Uttarakhand	12.00	82	Resistant to MYMV and PM, Spring season.
UPU 00-31 (Himachal Mash 1)	CSKHPKV, Palampur	2010	Low Hill Subtropical Zone in Kharif Season. (H.P.)	14-16		Resistant to Anthracnose, YMV and Leaf Crinkle and Tolerant to CLS and PM, lister Beetle and Hairy Caterpillar.
Mash 114		2010	Irrigated areas of Punjab State	9.0		Resistant to MYMV
LAM Minumu 752	ANGRAU	2010	Andhra Pradesh	15	75-82	Resistant to Wilt and YMV
CO 6 (COBG 653)	TNAU, Coimbatore	2011	AP, Karnataka, Tamil Nadu and Odisha	8-10	65-70	Resistant to MYMV and PM, Rabi season.
Mash 391 (LU 391)	PAU, Ludhiana	2011	Tamil Nadu, AP, Karnataka and Odisha	8.00	71	Resistant to MYMV, Leaf crinkle virus, <i>Cercospora</i> leaf spot, Anthracnose and Powdery mildew, Spring season.
UH 1 (UH 04-06)	CCSHAU	2011	Haryana	11.0	73	Resistant to YMV, Kharif season.
VBN (BG)7 (VBG04-008)	TNAU, Coimbatore	2012	Tamil Nadu, AP, Karnataka and Odisha	8.00	63-90	Resistant to MYMV and PM
VBN 6	NPRC, Vanban	2012	Tamil Nadu	9.00		Resistant to YMV
Vishwas (NUL-7)	Nirmal seeds, Pachora (MS)	2012	Maharashtra, Gujarat, M.P., Chhattisgarh, U.P. & Rajasthan	10.00	69-73	Tolerant to major diseases

### 4. Mothbean

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Gujarat Moth 1	GAU	1978	Gujarat	7.00	110-115	Seed chocolate colour
Jadra	RAU	1980	Rajasthan	5.00	80-90	Seed dark brown
Jwala	RAU	1985	Rajasthan	6.00	85-102	Seed light brown
Maru Moth 1	CAZRI	1988	Rajasthan	7.00	80-85	Tolerant to YMV
Moth 880	RAU	1989	Rajasthan	8.00	90-100	Tolerant to YMV
Rajasthan Moth 40	RAU	1994	Rajasthan	8.00	60-70	Seed light brown
FMM 96	RAU Fatehpur	1996	Rainfed areas	6.00	58-60	Early maturing, erect
Maru Vardhan (RMO 225)	RAU Bikaner	1999	Rajasthan, Gujarat and Maharashtra	6.00	62-64	Early, erect
CAZRI Moth 1 (CZM 79)	CAZRI	1999	For low rainfall areas (300-400 mm)	6.00	70-72	Semi-erect, resistant to YMV

## Annexure 6: Notified varieties of pulses (Continued).

### 4. Mothbean (continued)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Maru Bahar (RMO 435)	RAU	2002	Rajasthan, Gujarat, Maharashtra	6-6.5	65-67	Early maturing
CAZRI Moth 2	CAZRI	2003	Rainfed areas	5-7	70-72	
CAZRI Moth 3	CAZRI	2004	Rainfed areas	6-5	62-64	Erect, upright growth lush green foliage
RMO 423	ARS, Bikaner	2004	Rajasthan	5-6	67-70	Tolerant to disease insect & pests
RMO 257	RAO	2005	Rajasthan	6-7	63-65	Semi erect
Cazri moth 3	CAZRI, Jodhpur	2005	Rajasthan	6.00	60-88	Resistant to YMV and dry root rot
TMV (Mb)1	TNAU	2007	T.N.		65-70	
Rajasthan moth (RMO 257)	RAU, Bikaner	2007	Rajasthan	5-6	66	Tolerant to YMV

### 5 Horsegram (Kulthi)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Madhu	BAU	1978	Bihar	15	108	Seed creamy with red spots
VL Gahat 1 (VLG 3)	VPKAS, Almora	2007	U.P. Hills	7.5-8.5	125-130	Tolerant to blight
Dapoli 1	KKV	1986	Maharashtra	9-10	90-100	
Deepali (HPK 6)	HPKV	1988	H.P.	10-12		
Marukulthi 1	CAZRI	1989	Rajasthan	7	93	Seed light brown
Man	MPKV	1989	Maharashtra	7	105	
KS 2	RAU	1991	Rajasthan	6-7	80-85	Early maturing, seed brown
Palem 1	ANGRAU	1998	A.P	10-12	80-85	Early maturing, Semi-spreading
Palem 2	ANGRAU	1998	A.P	8-9	100-105	Med. maturing
Arja Kulthi 21 (AK-21)	MPUAT (Bhilwara)	1998	Rainfed areas of NW parts	8-9	70-105	Early maturing
Paiyur 2	TNAU	2001	SZ	8-9	100-106	For Sept- Oct sowing
PHG 9	UAS	2001	SZ	7-9	100-105	Semi spreading thick foliage
Pratap Kulthi 1 (AK 42)	MPUAT	2005	Rajasthan, Gujarat, M.P. Haryana	10-12	83-87	Protein 30% lush green foliage with wax deposition
VL Gahat 8	VPKAS, Almora	2007	Uttarakhand	12.00	92-106	Resistant to Anthracnose and stem rot
VL Gahat 10	VPKAS, Almora	2007	Uttarakhand	10	110-115	Resistant to yellow mosaic, root rot and leaf spot
GPM 6	AICRP, Bijapur	2008	Karnataka	8-9	120-130	Resistant to YMV, Moderately resistant to Rhizoctonia Root Rot
VL Gahat 15	VPKAS, Almora	2009	Northern India		95-105	Resistant to Anthracnose and Leaf Spot
CRIDA 1-18 R	CRIDA, Hyderabad	2009	Karnataka, AP and TN	8	72-102	Tolerant to powdery mildew, YMV, Leaf blight and Root rot.
VL Gahat 19	VPKAS, Almora	2010	North Zone	5.00	88-94	Multiple disease resistant to important disease.
CRIDALATHA (RHG 4)	CRIDA	2010	South Zone	8.0	72-110	Tolerant to YMV, powdery mildew, Leaf blight, Root rot and Mites.
Indira Kulthi 1 (IKGH 01-01)	IGKV	2010	Chhattisgarh	7.0	92	-
Gujarat Dantiwada Horsegram-1 (GHG-5)	SDAU, SKNagar	2012	Gujarat, Rajasthan, Ultrakhand, Jharkhand, U.P. & Maharashtra	5-6	89-100	Resistant to root rot, moderately resistant to PM, Collar rot, Cercopsora leaf spot and leaf blight.

### 6. Chickpea (Gram)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
L 550	PAU	1978	All Zones	17-20	136-140	Seed bold, salmon white
K 850	CSAUAT	1982	Uttar Pradesh	25-28	145-150	Bold seed, reddish brown
Radhey	CSAUAT	1982	Uttar Pradesh	20-25	150-155	Suitable for late sowing, seed bold
GL 769	PAU	1982	Punjab	17-20	160-165	Suitable for late sowing, seed brown
JG 315	JNKVV	1984	CZ	19-20	125-130	Wilt resistant, seed brown and wrinkled
Mahamaya 2 (B 115)	BCKV	1984	West Bengal	20-21	130-135	Suitable for early and late sowing, seed small
Gaurav	CCS HAU	1985	NWPZ	18-20	150-155	Bold seed, dark brown, resistant to <i>Ascochyta</i> blight
ICCC 32	ICRISAT	1985	CZ, NWPZ	24-26	130-150	Seed medium size, resistant to wilt
Pusa 256	IARI	1985	NEPZ	18-20	135-145	Bold seed, light brown
CO 3	TNAU	1985	Tamil Nadu	9-11	80-85	Bold seeded, Resistant to wilt & Collar rot
Phule G 5 (Vishwas)	MPKV	1986	CZ	18-20	130-135	Bold seeded
Avrodhi	CSAUAT	1987	U.P.	22.0	150-155	Wilt resistant, seed brown
PBG 1	PAU	1988	NWPZ	16-18	156-160	Tolerant to <i>Ascochyta</i> blight
Kranti (ICCC 37)	ICRISAT	1989	CZ, SZ	19-20	110-125	Tolerant to wilt, seed small

## Annexure 6: Notified varieties of pulses (Continued).

### 6. Chickpea (Gram)

Variety	Source	Year of Release/Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Haryana Chana 1 (HC 1)	CCS HAU	1990	NWPZ	22-23	145-150	For late sowing, seed small, wilt resistant
JG 74	JNKVV	1991	Madhya Pradesh	11-13	110-115	Wilt resistant, late sown, seed yellowish brown
RSG 44	RAU, Durgapura	1991	Rajasthan	20-23	135-150	Tolerant to drought and frost, double podded
KPG 59 (Udai)	CASUAT	1992	NWPZ	20.0	135-140	Tolerant to root rot & wilt stunt. Tolerant to pod borer. Bold seeded. (late sown)
Bharati (ICCV10)	ICRISAT	1992	SZ & CZ	18-20	95-100	Resistant to <i>Fusarium</i> wilt & dry root rot.
Sadabahar	CSAUAT	1992	U.P.	21-23	145-150	Tolerant to wilt.
Pusa 372 (BG 372)	IARI	1993	NEPZ, NWPZ, CZ	21-23 14.00 14-15	135-150	Moderately resistant to wilt, blight & root rot., Small seed, light brown
Sweta (ICCV 2)	ICRISAT	1993	Maharashtra, A.P	12-13	80-90	Kabuli gram variety. Resistant to wilt & Botrytis grey mould.
Pusa 329	IARI	1993	NWPZ	21-23	145-155	Moderately resistant to Wilt, bold seeded
Vijay (Phule G-81-1-1)	MPKV	1994	CZ	19-21	105-110	Resistant to wilt, Tolerant to terminal moisture stress.
Pragati (K 3256)	CSAUAT	1994	Uttar Pradesh.	17-20	140-150	Tolerant to wilt.
Vardan (GNG 663)	RAU, Sriganganagar	1995	NWPZ	22-25	150-155	Resistant to wilt.
GPF 2 (GF 89-36)	PAU	1995	NWPZ	21-23	152	Resistant to wilt & tolerant to <i>Ascochyta</i> blight. Seed yellowish brown
Pusa 362 (BG 362)	IARI	1995	NWPZ	23-24	145-150	Tolerant to wilt, Bold seeded.
KWR 108	CSAUAT	1996	NEPZ	20-23	130-135	Resistant to wilt, Seeds are dark brown and small.
JG 218	JNKVV	1996	Madhya Pradesh.	18-19	115-120	Early maturing, Tolerant to wilt.
Vishal (Phule G-87207)	MPKV	1996	CZ	20.00	110-115	Resistant to wilt, Tolerant to pod borer, Early maturing.
Alok (KGD 1168)	CSAUAT	1996	NWPZ	19-21	140-150	Med. Bold, Res. to Wilt & Root rot
Pant G-186	GBPUAT	1996	Uttar Pradesh	18-20	135-140	Tolerant to wilt & late sown. Small seeded
Hirwa Chaffa (AKGS 1)	PKV	1996	Maharashtra	15-17	105-110	Green seeded
Samrat (GNG 469)	RAU, Sriganganagar	1997	NWPZ	20-22	145-150	Res. to <i>Ascochyta</i> blight. Tolerant to wilt and root rot. Suitable for rainfed and irrigated areas.
Pusa 391 (BG 391)	IARI	1997	CZ	17-18	110-120	Moderately resistant to wilt & root rot. Bold seeded. Light brown
PDG 3 (GF 89-133)	PAU	1997	Punjab	15-17	160-165	Tolerant to pod borer.
Karnal Chana 1 (CSG 8962)	CSSRI, Karnal	1997	NWPZ	22-25	140-147	Recommended for salt affected areas; Wilt resistant.
DCP 92-3	IIPR	1997	NWPZ	19-20	145-150	Lodging and wilt resistant. Yellowish brown and medium bold seeds. Suitable for high fertility and excessive moisture conditions.
JGG 1	JNKVV	1997	M.P.	13-15	120-125	Seed pink
(BG 1003) (Pusa Kabuli)	IARI	1999	NEPZ	17-19	140-150	White bold seeded, tolerant to wilt.
JG 11	ICRISAT/ PKV/ JNKVV	1999	SZ	15-17	95-100	Resistant to wilt, moderately resistant to root rot. Bold seeded
Gujarat Gram 1	GAU	1999	CZ	17-22	115-120	Wilt resistant, Dark brown, medium bold.
Dharwad Pragati (BGD 72)	IARI	1999	CZ	25-30	115-120	Resistant to wilt & root rot, bold seeded
CO 4	TNAU	1999	Tamil Nadu	9-11	80-85	Bold seeded, tol. to root rot
JG 322	JNKVV	1999	Madhya Pradesh	18-20	110-115	Suitable for wilt prone areas.
WCG 2 (Surya)	Meerut Uni.	1999	Uttar Pradesh	20-25	135-150	Res. to rot, tolerant to stunt & dry root rot
L-551	PAU	1999	Punjab.	18-20	135-140	Wilt tolerant.
Gujarat Gram 2 (GCP 107)	GAU	1999	Gujarat	22-24	95-100	Tolerant to wilt and bold seeded
Pusa Chamatkar (G 1053)	IARI	1999	NWPZ	17-19	140-150	Tolerant to wilt
Gujarat Gram 4 (GCP 105)	GAU	2000	NEPZ	18-20	135-130	Resistant to wilt. Seeds are dark brown.

## Annexure 6: Notified varieties of pulses (Continued).

### 6. Chickpea (Gram)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
PKV Kabuli-2 (KAK 2)	PKV	2000	CZ	17-18	125-130	Bold seeded
SAKI-9516 (Jawahar gram 16)	JNKVV	2001	CZ	18-20	110-120	Resistant to wilt.
Vaibhav (RG 2918)	IGKV	2001	Chhattisgarh	14-15	110-115	Seeds wrinkled and bold
Kranti (ICCC 37)	ICRISAT	2001	Andhra Pradesh	16-20	90-100	Resistant to wilt and dry root rot
WCG 10 (Pant G 10)	GBPUAT	2001	U.P.	21-25	147	Resistant to root rot, Mod. Res. to stunt virus, wilt and dry root rot.
Haryana Kabuli 1 (HK 89-131)	CSSHAU	2002	Haryana	20	142	Resistant to wilt
Virat (Kabuli)	MPKV	2002	Maharashtra	20	108-118	Resistant to wilt
JG 130 Jawahar gram 130	JNKVV	2002	Madhya Pradesh	15-16	110-115	Bold, Resistant to wilt.
Jawahar Gram 1 (JGK 1)	JNKVV	2002	CZ	15-18	110-115	Moderate resistant to wilt
Vihar (Phule G 95311)	MPKV	2002	Karnataka, A.P., TN, Odisha	16-18	90-100	Seed Bold, Resistant to wilt
Anubhav (RSG 888)	RAU	2003	NWPZ	20-22	130-135	For rainfed, Moderately resistant to wilt & root rot
Pusa 1088	IARI	2003	Delhi	25-30	Med. early	Resistant to wilt and root rots diseases.
Pusa 1103	IARI	2004	Delhi	19-23	Early	Resistant to root diseases.
Pusa 1105	IARI	2004	Delhi	25-30	Med. early	Moderate resistant to root diseases.
Anuradha	Research station, Berhanpur	2004	West Bengal	22-25	120-130	Moderate resistant to wilt.
Haryana Kabuli Chana 2 (HK 94 134)	CCS HAU	2004	U.P and Bihar	14	138	Resistant to wilt, Collar rot, dry root rot.
Asha (RSG 945)	ARS, Durgapura	2005	Rajasthan	17	75-80	Moderate resistant to dry root rot and wilt.
PGC 1 (Pratap Channa 1)	ARS, Banswara	2005	Rajasthan	12-14	90-95	Moderate resistant to wilt & pod borer.
Arpita (RSG 895)	RAU, Bikaner	2005	Rajasthan	14	125-130	Moderately resistant to dry root rot, wilt & B.G.M.
Haryana Chana 5 (H 96-99)		2005	Haryana	20	Medium	Resistant to Fusarium wilt and root rots
Aadhar (RSG 963)	ARS Durgapura	2005	Raj, Hary, Punjab, Delhi, J & K, Uttrakhand and U.P	15-20	125-130	Moderate resistant to wilt, dry root rot, BGM and collar rot, Moderately resistant to pod borer and nematode
Himachal chana 2	CSK HP KVV	2006	CZ	19	187	Resistant to wilt, moderately resistant to root rots and collar rots, tol. To <i>Ascochyta</i> blight
Abha (RSG 973)	ARS Durgapura	2006	Rajasthan	15-16	120-125	Moderate resistant to wilt, dry root rot
Abha (RSG 807)	ARS Durgapura	2006	Rajasthan	18	120-125	Moderate resistant to dry root rot
Himachal chana 2 (HK 94-134)	CSK HP	2006	Himachal Pradesh	19	Medium	Resistant to wilt, Moderate resistant to root rot & collar rots, tolerant to <i>Ascochyta</i> blight
Digvijay	MPKV	2006	Maharashtra	19	105-110	Resistant to <i>Fusarium</i> wilt
JG-63	JNKVV, Jabalpur	2006	M.P.	20-25	110-120	Resistant to wilt, dry root rot and moderate resistant to collar rot & <i>Helicoverpa</i> Spp.
Akash (BDNG 797)	MPKV	2007	Maharashtra	15-16	100-105	Resistant to wilt, tolerant to pod borer
Rajas (Phule G 9425-9)	MPKV	2007	Punjab, Haryana, Uttrakhand, Delhi, Raj., and Jammu	18	136	Resistant to <i>Fusarium</i> wilt
JGK-2	JNKVV	2007	M.P.	15	95-110	Resistant to collar rot, root rot, Mod. res. to wilt and dry root rot
Lam shanaya (LBeG 7)	ANGRAU	2007	M.P.	20-25	90	Tolerant to wilt and drought condition.
JGK 3 (JGK 19)	JNKVV	2007	M.P.	14-15	92-121	Resistant to wilt
Jawahar Gram 226 (JG 226)	JNKVV	2007	M.P.		112-115	Resistant to wilt and root rot complex
GNG 421 (Gauri)	ARS, Sriganaganagar	2007	Rajasthan	18	127-160	Tolerant to dry root rot, stunt and wilt
GNG 1488 (Sangam)	ARS, Sriganaganagar	2007	Rajasthan	18	99-157	Tolerant to dry root rot and stunt
RSG 991(Aparna)	ARS, Durgapura	2007	Rajasthan	12-15	130-135	Moderate resistant to dry root rot, wilt, collar rot
RSG 896 (Arpan)	ARS, Durgapura	2007	Rajasthan	12-15	130-135	Moderate resistant to dry root rot, wilt, pod borer
RSG 902 (Aruna)	ARS, Durgapura	2007	Rajasthan	15-20	130-135	Moderate resistant to dry root rot, wilt, pod borer
JAKI 9218	PDKV	2008	Maharashtra	18-20	93-125	Resistant to <i>Fusarium</i> wilt, root rot and collar rot
GNG 1581 (Ganguar)	ARS, Sriganaganagar	2008	NWPZ	24.00	127-177	Resistant to logging
WCG 3 (Vallabh Kallar Channa 1)	SVBPUAT, Meerut	2008	Uttar Pradesh	19.00		



## Annexure 6: Notified varieties of pulses (Continued).

### 6. Chickpea (Gram)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
JG 6	JNKVV	2008	M.P.	20.00	103-132	Resistant to <i>Fusarium</i> wilt and moderate resistant to dry root rot. Tolerant to pod borer
Pusa 2024		2008	Delhi			
BGD 103	UAS	2009	Karnataka	11-13	95-100	
JG 14	JNKVV	2009	M.P.	20-25	113	Moderate resistant to wilt, dry root rot and pod borer
Shubra (IPCK 2002-29)	IIPR	2009	CZ	21.00	104-108	Moderate resistant to wilt, escape terminal moisture stress and heat
Ujjawal (IPCK 2004-29)	IIPR	2010	CZ	20.00	103-111	Moderate resistant to wilt and tolerant to BGM, escape terminal moisture stress and heat
Phule G 0517	MPKV	2010	M.S., M.P., Karnataka	18.00		
Pant Kabuli Chana 1	GPBUAT, Pantnagar	2010	Uttarakhand	30.00		Resistant to <i>Botrytis</i> grey mould
PKVKabuli 4	PDKV	2010	Maharashtra, Madhya Pradesh	15-16	100-110	Moderately resistant to <i>Fusarium</i> wilt, dry rot and <i>Botrytis</i> grey mould.
Gujarat Junagarh Gram 3 (GJG 0207)	JAU, Junagarh	2010	Gujarat	15.00	98	Moderately resistant to wilt and tolerant to pod borer
GPF 2	PAU	2010	NWPZ	22.00	134-188	
MNK 1	UAS, Raichur	2011	Karnataka, A.P., Odisha and Tamil Nadu	13.00	95-110	Moderately resistant to wilt
RSG 974 (Abhilasha)	ARS, Duragapura	2010	Rajasthan		130-135	Moderately resistant to wilt, dry root rot BGM and sterility mosaic
Raj Vijay Kabuli gram 101 (JSC 42)	RVSKVV	2012	Madhya Pradesh	15-20	90-110	Moderately resistant to <i>Fusarium</i> wilt and moderately tolerant to pod borer
Raj Vijay gram 201 (JSC 40)	RVSKVV	2012	Madhya Pradesh	20-25	95-113	Resistant to <i>Fusarium</i> wilt
HK 4 (HK 05-169)	CCSHAU	2012	NEPZ	15.00	136	Resistant to wilt, bold seeded
Raj Vijay gram 202 (RVG 202)	RVSKVV	2012	CZ	18-20	105	Suitable for late sown condition in paddy/cotton/soybean-chickpea cropping system
Raj Vijay gram 203 (RVG 203)	RVSKVV	2012	CZ	19-20	100	Moderately resistant to wilt and dry root rot
PBG-5	PAU, Ludhiana.	2012	Punjab	17.00		Resistant to <i>Ascochyta</i> Blight disease.
PKV Harita (AKG 9303-12)	PDKV	2012	Vidarbha region of Maharashtra	12-18	106-110	Bold seeded, tolerant to wilt and drought, useful for culinary purpose.

### 7. Lentil (Masur)

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Pant L 406	GBPUAT	1980	NWPZ, NEPZ	12-16	140	Rust resistant, small seeds
Asha (B 77)	BCKV	1980	West Bengal	12-17	122-125	Rust resistant, small seeds
Pant L 639	GBPUAT	1980	NWPZ, NEPZ	12-16	140	Rust resistant, small seeds
Vipasha	HPKV	1982	HP	10	170-180	Rust resistant, bold seeds
LL 56	PAU	1983	Punjab	12-17	150-155	Rust resistant, small seeds
Ranjan	BCKV	1984	West Bengal	15-16	120-125	Small seeds
Mallika (K 75)	CSAUAT	1986	NEPZ & CZ	14	135	Bold seeds
Arun	RAU, Dholi	1986	Bihar	12	130	Bold seeds, tolerant to rust
L 147	PAU	1988	Punjab	14	140	Rust resistant, small seeds
JL 1	JNKVV	1991	MP	8.0	120-125	Early, tolerant to wilt, Seed bold
Sapana (LH 84-8)	CCSHAU	1991	NWPZ	15.0	135-140	Tolerant to rust & bold seeded
VL Masoor 4	VPKAS	1991	Uttarakhand	12.5	168	Tolerant to wilt & rust, small seeded & black.
Pant lentil 4 (PL 81-17)	GBPUAT	1993	NWPZ	16.0	140-145	Resistant to rust & tolerant to wilt
Lens 4076	IARI	1993	NWPZ, CZ	14.0	130-135	Tolerant to wilt & rust, Seed bold
DPL 15 (Priya)	IARI	1995	NWPZ	15-18	130-135	Tolerant to wilt & rust, bold seeded
Pusa Vaibhav (L 4147)	IARI	1996	NWPZ	20-24	130-135	Resistant to rust & tolerant to wilt, small seeded.
Garima (LH 84-6)	CCSHAU	1996	Haryana.	15-20	135-140	Tolerant to rust, wilt & blight. Bold seeded.
Narendra Masoor 1	NDAUT	1997	Uttar Pradesh	14.0	125-130	Resistant to rust & tolerant to wilt
DPL 62 (Sheri)	IIPR	1997	NWPZ	17.0	130-135	Resistant to rust & wilt, bold seeded

## Annexure 6: Notified varieties of pulses (Continued).

### 7. Lentil (Masur)

Variety	Source	Year of Release/Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Subrata	BCKV	1998	West Bengal	12-18	120-125	Tolerant to rust, bold seeded
JL 3	JNKVV	1999	CZ	15-19	115-120	Tolerant to wilt, bold seeded
VL Masoor 103	VPKAS	2000	Uttarakhand	12-14	1645	Tolerant to rust, small seeded
Noori (IPL 81)	IIPR	2000	CZ	17-18	110-120	Tolerant to rust, wilt, bold seeded
Pant Lentil 5	GBPUAT	2001	Uttarakhand	15-18	135	Resistant to rust, bold seeded
Malaviya Vishwanath (HUL 57)	BHU	2005	Eastern and Central U.P., Bihar, Jharkhand, WB and Assam	14.0	130	Resistant to rust & wilt, small seeded.
KLS 218	CSAUAT	2005	NEPZ	14-15	125-130	Tol. to rust, wilt, small seeded
VL Masoor 507	VPKAS, Almora	2006	J&K, H.P., Uttarakhand, North Eastern Hills	10-12	140-209	Resistant to wilt
Haryana Masar 1 (LH 89-48)	CCSHAU	2006	Haryana	14	138	Moderate resistant to all disease
VL Masoor -125	VPKAS, Almora	2006	Uttarakhand	19-20	115-117	Resistant to Wilt. No infestation of Pod Borer
VL Masoor 126 (VL 126)	VPKAS, Almora	2007	Uttarakhand, H.P., J&K and North Eastern Hills	12-13	126-212	Resistant to GM and Moderate resistant to wilt and rust.
IPL 406 (Angoori)	IIPR	2007	Punjab, Har., North Raj., Plains of Uttarakhand and Western UP (NWPZ)	17	120-155	Resistant to rust and wilt
Pusa Masoor 5 (L-4594)	IARI	2008	Delhi	17-18	120-128	Resistant to rust, Moderately resistant to pod borer
Moitree WBL 77	PORS, Berhampore (WB)	2009	East U.P., Bihar, Jhar., Assam and WB	15	117	Resistant to wilt and grey mould
Shekhar Masoor 2 (KLB-303)	CSAUAT	2009	Uttar Pradesh	14	128	Moderately resistant to wilt & rust
Sekhar Massor 3 (KL 320)	CSAUAT	2009	Uttar Pradesh	14	128	Moderately resistant to wilt & rust
Pant Lentil 7 (PL 024)	GBPUAT	2010	Punjab, Haryana, UP	15	147	Res. to rust and wilt Resistant to pod borer
Pant Lentil 8 (Pant L 063)	GBPUAT	2010	Punjab, Haryana, Plains of Uttarakhand, Western U P, Delhi and Rajasthan	15	135	Mod. Resistant to rust and wilt. Resistant to pod borer.
Pant Lentil-6 (PL-02)	GBPUAT	2010	Uttarakhand	11	125-145	Resistant to Rust, Wilt, Ascocyta Blight and Tolerant to Pod Borer.
VL Masoor-129	VPKAS, Almora	2010	Uttarakhand	9.0	151	Resistant to Wilt and Root Rot and No infestation of Pod Borer.
VL Masoor 133 (VL 133)	VPKAS, Almora	2011	Uttarakhand	11	-	Resistant to Wilt, Root Rot and Rust
VL Masoor 514 (VL 514)	VPKAS, Almora	2011	Uttarakhand	10	149-159	Moderate resistant to Wilt and Root Rot disease. Tolerant to pod borer
LL 931	PAU	2012	Punjab	12-13	146-147	Resistant to lentil rust. Tolerant to pod borer.

### 8. Fieldpea

Variety	Source	Year of Release/Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Rachna	CSAUAT	1982	All Zones	20-25	120-125	Resistant to PM, seed white, round and bold
RPG 3	RAU, Durgapura	1987	Rajasthan	15	120	Tolerant to stresses
Pant P 5	GBPUAT	1987	NWPZ	20	140	Resistant to PM
Aparna (HFP 4)	CCSHAU	1988	NWPZ	26	145	Dwarf, Resistant to PM
Malviya Matar 2	BHU	1988	NEPZ	21	120-140	Resistant to PM
JP 885	JNKVV	1992	CZ	21	120-140	Resistant to PM
KFP 103 (Shikha)	CSAUAT	1993	NWPZ	15-20	130-140	Resistant to PM
DMR 7 (Alankar)	IARI	1996	NWPZ	20-25	115-135	Resistant to PM
Uttra (HFP 8909)	CCSHAU	1996	NWPZ	20-25	120-140	Resistant to PM., dwarf
Sapna (KPMR 144-1)	CSAUAT	1997	Uttar Pradesh	20-25	120-130	Resistant to PM. dwarf
Jayanti HFP 8712	CCSHAU	1998	Haryana	20-25	120-140	Resistant to PM., Bold Seeded
Swati (KFPD 24)	CSAUAT	1999	Uttar Pradesh	25-30	110-125	Res. to PM. & tol. to rust, Dwarf, escapes leaf miner
Malviya Matar 15 (HUDD 15)	BHU	1999	NEPZ, NHZ	25-30	110-130	Resistant to PM., rust and leaf miner

## Annexure 6: Notified varieties of pulses (Continued).

### 8. Fieldpea

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
DDR 23 (Pusa Prabhat)	IARI	2000	NEPZ	15.0	95-115	Extra early, Resistant to PM
Ambika	IGKV	2000	CZ	15-20	100-125	Resistant to PM, Tall Plants
DDR 27 (Pusa Panna)	IARI	2001	NWPZ	18.0	100-115	Resistant to PM
Indra (KPMR 400)	CSAUAT	2001	CZ	20.0	105-115	Dwarf type, Resistant to PM
Shubhra (IM 9101)	IGKV	2001	Chhattisgarh	15-20	90-95	Resistant to PM
Jay (KPMR 522)	CSAUAT	2001	NWPZ	23.0	120-140	Dwarf type, Resistant to PM
Adarsh (IPF 99-25)	IIPR	2004	CZ	23	110-115	Resistant to Powdery Mildew
Vikas (IPFD 99-13)	IIPR	2005	H.P., MS, C.G., Gujarat, Bundelkhand region of U.P.	23	102	Resistant to PM and tolerant to rust
Prakash (IPFD 1-10)	IIPR	2006	M.P., C.G., MS, Guj., Bundelkhand region of UP, J&K, H.P. and Uttarakhand	21	94-121	Resistant to PM and tolerant to rust
Paras	IGAU, Raipur	2006	Chhattisgarh	18-24	92-119	Resistant to powdery mildew
Pant P 14	GBPUAT	2006	Uttarakhand	15-22		Res. to rust and PM
VL Matar 42	VPKAS, Almora	2007	Eastern U.P., Bihar, Jharkhand, West Bengal, Assam	20	108-155	Resistant to PM, Moderate resistant to rust
Hariyal (HFP 9907B)	CCSHAU	2007	Punjab, Haryana, Rajasthan, Delhi, Western U.P.	17-20	128	Resistant to PM & tolerant to rust
Pant Pea-25	GBPUAT	2007	Uttarakhand	18-22		Res.to PM and Mod. resistant to Rust.
HFP-9426	CCSHAU, Hisar	2008	Irrigated areas of Haryana	20	135	Res. to PM and tolerant to root rot. Mod. resistant to Nematodes.
Pant Pea-42	GBPUAT	2008	Western U.P., Northern Rajasth an, Punjab, Harya na and Plains of Uttarakhand	22	113-149	Resistant to Powdery Mildew and Rust . Moderately resistant to pod borer and stemfly
Swarna Tripti	ICAR, RS, Plandu, Ranchi	2008	Jharkhand, Bihar and West Bengal.	25	65-70	Resistant to powdery mildew. Tolerant to pod borer
Vivek Matar-10 (VP101)	VPKAS, Almora	2008	Uttar Pradesh and Uttarakhand.	72-98 (Pods)	120-130	Mod.resistance to PM and resistance to white rot, wilt & leaf blight.Less incidence of pod borer
Pant P 13	-	2008				-
GOMATI (TRCP-8)	ICAR NHE Regional Centre, Lembucherr a	2010	Uttarakhand Hills , Jammu & Kash mir and North Ea stern States	22-24	87-297	Suitable for late sown condition. Resistant to PM. Tolerant to pod borer and stemfly.
Aman (IPF 5-19)	IIPR	2010	Punj., Har. Plains of Uttarakhand, West U.P., Delhi and parts of Rajas than	22	124-137	Resistant to PM and tolerant to rust. Mod. resistant to pod borer and stemfly
IPF 4-9	IIPR, Kanpur	2011	Suitable for Irrigate d areas.	17.0	129	Resistant to Powdery Mildew and Mod .resistant to Rust, pod borer & stemfly.
VL Matar 47 (VL 47)	VPKAS, Almora	2011	Uttarakhand	14.0	142-162	Resistance to Wilt, Rust and Powdery Mildew.
Dantiwada Fieldpea 1 (SKNP 04-09)	S.D. Agril. University, Sardar Krushinagar	2011	Uttar Pradesh, Bi har, Jharkhand an d West Bengal.	17.0	98-123	-

### 9. Lathyrus

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Bio L 212 (Ratan)	IARI	1997	NEPZ	15.0	108-116	Tol. to stress, Low ODAP, Bold seed, Blue flower.
Prateek		2001	M.P.	6-9 (utera) 11-15 (sole)	110-115	Tol.to Downy mildew & mod. resistant to Powdery mildew.
Mahateora	IGKV	2007	Chhattisgarh	15	94	Tol.to Nematode & thrips, mod. resistant to PM

## Annexure 6: Notified varieties of pulses (Continued).

### 10. Rajmash

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Him 1	HPKVV	1978	HP	15-20	75-80	Seed light pink and red
VL 63	VPKAS	1982	UP hills	12	73	Seed light red with deep patches
Uday (PDR 14)	IIPR	1987	NEPZ	18	125	Seed red white variegated
Malviya Rajmash 15	BHU	1989	NEPZ	15	120	Seed white
HUR 137 (Malviya Rajmash 137)	BHU	1991	NEPZ	18-22	112-120	Erect semi dwarf, Red.
HPR 35	HPKVV	1992	Maharashtra	14-15	73	Seed red with Purple strips.
Varun (ACPR 94040)	IIPR	2002	Maharashtra	14-16	66-68	Tolerant to Anthracnose
IPR 96-4 (Amber)	IIPR	2002	NEPZ	15-16	139	Resistant to BCMV & Leaf Curl. Red
Ankur (RSJ 178)		2005	Rajasthan	12	110-120	Moderate resistant to root rot, leaf crinkle and leaf spot dry root rot.
Gujarat Rajma 1	SDAU	2006	Gujarat	20		Moderate resistant to bean common mosaic virus
VL rajma 125	VPKAS	2007	Uttarakhand	12	82	Resistant to bacterial blight
Swarn Lata (CH 819)		2007				
Swarn Priya (CH 812)		2007				
VL Bean 2	VPKAS, Almora	2008	Uttarkhand	14-15		Resistant to root rot, Mod. resistance to Anthracnose, angular leaf spot & rust
Arka Anup		2012	Karnataka			

### 11. Cowpea

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Pusa 152	IARI	1978	SZ	15-20	90-100	Seed brown
Kalnakmani	TNAU	1980	Kerala	14	75-80	Seed maroon
S 488	UAS	1980	Karnataka	14-15	65-70	Seed grey
Amba (V 16)	IARI	1984	All Zones	10	85-95	Resistant to bacterial blight
Gujarat Cowpea 2	GAU	1985	Gujarat	11-12	65-75	Seed yellowish
Krishna Mani	TNAU	1985	Kerala	8	75-80	Seed black
Paiyur	TNAU	1986	Tamil Nadu	7-8	85-90	Seed brick red
CO 5	TNAU	1986	Tamil Nadu	15	85	
RC 19	RAU, Durgapura	1987	Rajasthan	10-12	65	Seed brownish white
Gujarat Cowpea 3	GAU	1990	SZ	12-14	65-85	Resistant to pod shattering
V 240	IARI	1993	All Zones	14.0	80	Tall, Indeterminate, seed red
Vamban 1	TNAU	1997	Tamil Nadu	9.5	65	Erect, dwarf, seed white
Gujarat Cowpea 4	GAU	1999	Gujarat	8-5	80-90	Seed bold, amber colour
KBC 2	UAS	2001	Karnataka	9.5	95-105	Semi-determinate, seed light brown
RC 101	TNAU	2001	Rajasthan	8.5	85-90	Early, Determinate, seed white
CO 6	TNAU	2001	Tamil Nadu	14.0	85-90	Early, bold seeded
V 578 (Pusa Sampada)	IARI	2004	Delhi	12		Early, Resistant to yellow mosaic virus
CL 367	PAU	2006	Punjab	12	95-100	Tolerant to YMV
RCP 27 (FTC 27)	RAU	2006	Rajasthan	6-13	69-79	Resistant to YMV
UPC 622	GBPUAT	2007	Uttarakhand, U.P., J & K, H.P., Punj., Har., Raj., M. P., Bihar, Jharkhand, WB, Odisha and Assam.	4-5	145-150	Tolerant to Drought Resistant to YMV, Anthracnose, Root/Collar Rot and Bacterial Leaf Blight, Aphids, Leaf Miner, Flea Beetle, Pod Borer/Bugs and Root Knot Nematode & Bruchids.
Khalleshwari	IGKV, Raipur	2007	Chhattisgarh	6-7		RRF in Rabi with Restricted irrigations and Rainfed Uplands in Kharif Season.
Swarna Harita (IC285143)	ICAR Res. Station, Plandu, Ranchi	2008	WB, Assam, Bihar, Jharkhand, U.P., Punj, Odisha, CG, A.P., Kerala & TN	60-150 (Pods)	75-90	Resistant to rust and mosaic viral disease & tolerant to podborer.

## Annexure 6: Notified varieties of pulses.

### 11. Cowpea

Variety	Source	Year of Release/ Notification	Area of adoption Zone/State	Ave. yield (Q/ha)	Days to maturity	Remarks
Kashi Kanchan (VRCP-4)	IIVR, Varanasi	2008	Punjab, U.P., Bihar, Jharkhand, Odisha, CG, M.P , A.P and MS	150-175 (pods)	50-55	Resistant to Golden mosaic virus and Pseudocercospora cruenta diseases. Moderately tolerant to jassid, aphid and pod borer.
UPC 625 IT-38956-1	- UAS, GKVK, Bangalore	2009	- Karnataka	- 10-12	- 80-85	-
Hissar Cowpea 46 (HC 98-46)	CCSHAU	2009	Haryana	10	65-70	Resistant to YMV
Pant Lobia-1	GBPUAT	2010		20		Moderately resistance to Aphids, Thrips, Bruchid & Other Field Pests. Suitable for during Spring, Summer and Kharif Season.
KM 5 UPC 628	GBPUAT	2010	Uttarakhand, HP, J&K, Punj., Har., Raj., UP, MP, CG, Bihar, Jharkhand, WB, Odisha, Assam, Guj. and MS	350-400 (pods)	145-150	Tolerant to Drought and Other Edaphic/Abiotic Stresses. Resistant to YMV, Anthracnose/Leaf Blight, Aphids, Semilooper, Flea Beetle/Defoliator s, Pod Borer/Bugs and Root Knot Nematode. Tolerant to Storage Weevil.
Hidrudaya	ORARS, Kayamkulam Kerala	2010	Kerala	10-11	50-55	Tolerant to Leaf Rust, Aphid Pod Borers and American Serpentine Leaf Miner (Summer season)
C 519 (Himachal Lobiya 11)	CSK, HPKV, Palampur.	2010	H.P.	15-16	80-85	Res. to Cercospora Leaf Spot, & YMV. Low Hills, Sub Tropical Zone Under Rainfed Condition in Kharif
PKB4	UAS, GKVK, Bangalore	2012	Karnataka	11-13	80-85	Resistant to Bacterial Leaf Blight, Rust and Pod Borer. Suitable for Early Kharif Season
PKB 6	UAS, GKVK, Bangalore	2012	Karnataka	10-12	80-85	Resistant to Bacterial Leaf Blight, Rust and Pod Borer. Suitable for Late Kharif and Summer Season

**NHZ:** North Hilly Zone (H.P., J & K, U.P. hills), **CZ:** Central Zone (Maharashtra, Gujarat, Madhya Pradesh, Chhattisgarh), **SZ:** South Zone (Andhra Pradesh, Karnataka, Odisha, Tamil Nadu), **NEPZ:** North Eastern Plane Zone (Bihar, East U.P, Jharkhand, West Bengal), **NWPZ:** North Western Plane Zone (Punjab, Haryana, Delhi, West U.P., & North Rajasthan) **Res.:** Resistant, **Tol.:** Tolerant, **Mod.:** Moderately, **SMD:** Sterility Mosaic Disease, **YMV:** Yellow Mosaic Virus, **CLS:** Cercospora leaf Spot, **PM:** Powdery Mildew, **ODAP:**  $\beta$ -N-Oxalyl-L,  $\beta$ -diaminopropionic acid.

**Annexure 7: State wise ICAR recommended new alternative varieties to be promoted in place of old varieties of pulses (Continued).**

State	Crop	Old varieties	Alternative varieties to be promoted
AP	Mungbean	-	Recommended Varieties LGG 407, LGG 450, Pusa 9072, LGG 410, TM 96-2, WGG 2, LGG 460, Madhira Peasara 347
	Urdbean	LBG 20	LBG 752 / IPU 2-43 Recommended Varieties KU 301, WBU 108, LBG 648, PU 30, LBG 685, PU 31, LBG 625, IPU 2-43, TU 94-2, LBG 20, LBG 402, LBG 623, LBG 709, LBG 752
	Horsegram	Varieties to be deleted/old: Palem-1, Palem-2 (1998)	Recommended Varieties VLG-19 (2010), VLG-15 (2008), A.K. 21 (1999), A.K- 42 (2005)
Assam	Mungbean	-	Recommended Varieties Pratap, PM 2, PM 4, NDM 1, IPM 2-3, PDM 139, Pusa Vishal, Meha, PM 5, TMB 37, HUM 16
	Urdbean	-	Recommended Varieties WBU 109, WBU 108, Uttara
	Lentil	-	Recommended Varieties NDL 1, KLS 218, HUL 57, WBL 77
	FieldPea	-	Recommended Varieties Rachna, Malviya Matar 15, VL 42, Prakash, TRCP 8
	Horsegram	-	Recommended Varieties VLG-19 (2010), VLG-15 (2008), A.K. 21 (1999), A.K- 42 (2005)
Bihar	Chickpea	BG 256	GCP 105, BG 372
	Mungbean	Sunaina	IPM 02 – 3 / MH 2 – 15 Recommended Varieties PM 2, PM 4, NDM 1, MH 2-15, IPM 2-3, PDM 139, Pusa Vishal, Meha, PM 5, TMB 37, HUM 16
	Urdbean	PU 19	Uttara Recommended Varieties Uttara, Birsa U 1, PU 19, PU 30, WBU 108, PU 31, WBU 109
		PU 30	Uttara
	Lentil	-	Recommended Varieties PL 406, PL 639, K 75, NDL 1, WBL 58, HUL 57, KLS 218
	Fieldpea	-	Recommended Varieties Rachna, HUDP 15, DDR 23, VL 42
	Horsegram	Varieties to be deleted: Bihar Kulthi-1 (Before 1970)	Recommended Varieties VLG-19 (2010), VLG-15 (2008), A. K. 21 (1999), A. K- 42 (2005)

**Annexure 7: State wise ICAR recommended new alternative varieties to be promoted in place of old varieties of pulses (Continued).**

State	Crop	Old varieties	Alternative varieties to be promoted
Chhatisgarh	Urdbean	RBU 38	Azad U 3 <b>Recommended Varieties</b> TPU 4, JU 2, JU 3, PU 31, PU 40, PU 31, Azad U 3
	Lentil	-	<b>Recommended Varieties</b> K 75, L 4076, IPL 81, JL 3
	Horsegram		<b>Recommended Varieties</b> Indira Kulthi (2010), VLG-19 (2010), VLG-15 (2008)
Gujarat	Chickpea	Dahod Yellow	Pratap Chana 1, Gujarat Gram 2, Gujarat Junagadh Gram 3
	Mungbean	K 851	GM 4 <b>Recommended Varieties</b> K 851, BM 4, GM 3, Pusa 9531, PM 2, GM 4, PDM 139, Meha
	Urdbean	RBU 38	Azad U 3
		T 9	Azad U 3
		TAU 2	AKU 4 <b>Recommended Varieties</b> TPU4, T 9, TAU2, WBU108, GU1, PU31
	Mothbean	Baleshwar-12 (Before 70) MG-1 (Before 70) GMO-1	<b>Recommended Varieties</b> GMO-2 (2004)
	Cowpea	Charodi-1 (1970s) GC-1 & GC-2	<b>Recommended Varieties</b> GC-4 (2005), GC-5 (2005) GC-3 (1997), V585 (1997), V240 (1993), UPC-628 (2010), UPC-62 5(2009)
Horsegram	-	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A. K. 21 (1999), A. K- 42 (2005)	
Haryana	Mungbean	MUM 2	MH 2 – 15 (Basanti) <b>Recommended Varieties</b> MUM 2, Pusa Vishal, Ganga 8, Muskan, MH 2-15, IPM 2-3, Basanti, Pusa Vishal, SML 668, PM 5
	Urdbean	UG 218	Uttara
		PU 19	Uttara <b>Recommended Varieties</b> PU 19, Sekhar 2, WBU 108, Uttara, PU 31
	Fieldpea	-	<b>Recommended Varieties</b> Rachna, DMR 7, KPMR 522, DDR 27, Hariyal, HFP 9426, Pant P 42, IPF 5-19
	Chickpea	C 235	GNG 1581, Haryana Chana 3, Haryana Chana 5
	Mothbean	Varieties to be deleted: T-2, T-3, T-16, T-18, T-23, T-25 (All- before 1970)	
	Horsegram	-	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A.K. 21 (1999), A.K- 42 (2005)

**Annexure 7: State wise ICAR recommended new alternative varieties to be promoted in place of old varieties of pulses (Continued).**

State	Crop	Old varieties	Alternative varieties to be promoted
<b>Himachal Pradesh</b>	Urdbean	UG 218	Pant U 31 / Pant U 40
		PDU 1	Pant U 31 / Pant U 40 <b>Recommended Varieties</b> PU 31, Pant U 40
	Lentil	-	<b>Recommended Varieties</b> PL 406, PL 639, VL 507, VL 126, HUL 57
	Field pea	-	<b>Recommended Varieties</b> Rachna, Prakash, HUDP 15
	Horsegram	HPK1 & 2 (Before 1970)	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A. K. 21 (1999), A. K- 42 (2005)
<b>Jammu &amp; Kashmir</b>	Field pea	-	Varieties in Seed Chain Rachna, HUDP 15, Prakash, TRCP 8
	Chickpea	C 235	GNG 1581, Haryana Chana 3, Haryana Chana 5
	Lentil	-	<b>Recommended Varieties</b> PL 406, PL 639, VL 4, VL 507, HUL 57, Salimar M 1, VL 126
	Horsegram	-	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A. K. 21 (1999), A. K- 42 (2005)
<b>Jharkhand</b>	Mungbean	Sunaina	IPM 02 – 3 / MH 2 – 15
	Urdbean	PU 19	Uttara
		PU 30	Uttara <b>Recommended Varieties</b> Uttara, Birsa U 1, PU 19, PU 30, WBU 108, PU 31, WBU 109
	Lentil	-	<b>Recommended Varieties</b> PL 406, PL 639, K 75, NDL 1, WBL 58, HUL 57, KLS 218
	Horsegram	-	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A.K. 21 (1999), A.K- 42 (2005)
<b>Karnataka</b>	Mungbean	ML 131	IPM 2 – 14
		PDM 84 – 178	IPM 2 – 14
		China moong	IPM 2 – 14 <b>Recommended Varieties</b> TM 96 – 2 , KKM 3, IPM 2 – 14
	Urdbean	-	<b>Recommended Varieties</b> KU 301, WBU 108, Mash 391, VBN 7, IPU 2 – 43
	Chickpea	Annegiri 1	JG 11
	Horsegram	HH-1&2 (Before 1970) BGM-1 (1990)	<b>Recommended Varieties</b> BJPL-1 (2008), VLG-19 (2010), VLG-15 (2008), A. K. 21 (1999), A. K- 42 (2005) B.
	Cowpea	-	<b>Recommended Varieties</b> Vamban-1 (1998), KM-5(2008), IT-38956-1 (2007) CO(CP)7 (2005), KBC-2 (1998)



**Annexure 7: State wise ICAR recommended new alternative varieties to be promoted  
inplace of old varieties of pulses (Continued).**

State	Crop	Old varieties	Alternative varieties to be promoted
Madhya Pradesh	Mungbean	-	<b>Recommended Varieties</b> BM 4, JM 721, Meha, Pusa 9531, PDM 139
	Urdbean	RBU 38	Azad U 3 <b>Recommended Varieties</b> TPU 4, JU 2, JU 3, PU 31, PU 40, PU 31, Azad U 3
	Lentil	-	<b>Recommended Varieties</b> K 75, L 4076, IPL 81, JL 3
	Fieldpea	-	<b>Recommended Varieties</b> Adrash, Rachna, KPMR 400, Vikas, Prakash
	Chickpea	JG 315	JG 16, JG 130, JG 14, JAKI 9218, JG 63
	Horsegram	-	<b>Recommended Varieties</b> VLG-19(2010), VLG-15(2008), A. K. 21(1999), A. K- 42(2005)
Maharashtra	Mungbean	ML 131	AKM 4 <b>Recommended Varieties</b> Kopergaon, BM 4, TARM 1, TARM 18, TARM 2, PKVM 8802, AKM 4, Pusa 9531
	Urdbean	RBU 38	Azad U 3
		PDU 1	AKU 4
		PU 30	TPU 4 <b>Recommended Varieties</b> TPU 4, TAU 1, TAU 2, AKU 15, Azad U 3, AKU 4
	Lentil	-	<b>Recommended Varieties</b> K 75, L 4076, IPL 81, JL 3
	Chickpea	Phule G 5	Digvijay, Virat, Vijay, Vihar
	Field Pea	-	<b>Recommended Varieties</b> Adarsh, Rachna, KPMR 400, Vikash, Prakash
	Horsegram	D-40-1(1990)	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A.K. 21 (1999), AK- 42 (2005)
Cowpea	VCM-8 (1980s), EC-4216 (1978)		
New Delhi	Mungbean	ML 267	MH 2 – 15 <b>Recommended Varieties</b> PM 1, ML 267, HUM 2, Ganga 8, MH 2-15, IPM 2-3, Pusa Vishal, Ganga 8, SML 668
	Lentil	-	<b>Recommended Varieties</b> PL 639, L 4076, Sapna, PL 4, DPL 15, L 4147, DPL 62
	Fieldpea	-	<b>Recommended Varieties</b> Rachna, KPMR 522, HFP 8909, Hariyal, IPF 5-19, Pant P 74
	Chickpea	Radhey	KWR 108, KPG 59, GCP 105
		BG 256	GCP 105, BG 372
	Cowpea	Pusa phalguni (1974) Pusa-152 (1978)	-
Horsegram	-	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A. K. 21 (1999), A. K- 42 (2005)	

**Annexure 7: State wise ICAR recommended new alternative varieties to be promoted in place of old varieties of pulses (Continued )**

State	Crop	Old varieties	Alternative varieties to be promoted
<b>Odisha</b>	Mungbean	ML 131	OUM 11 – 5 / IPM 2-14 <b>Recommended Varieties</b> PDM 139, COGG 912, Pusa 9072, TARM 1, OBG 52, LGG 460
	Urdbean	T 9	OBG 17 / IPU 2-43 <b>Recommended Varieties</b> KU 301, WBU 108, T 9, Sarla , Pant U 31, IPU 02-43, OBG 17, B 3-8-8
	Lentil	-	<b>Recommended Varieties</b> HUL 57, WBL 77
	Horsegram	-	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A.K. 21 (1999), A.K- 42 (2005)
<b>Punjab</b>	Mungbean	MUM 2	ML 818/PAU911 <b>Recommended Varieties</b> ML 5, ML 267, MUM 2, Ganga 8, ML 818, MH 2-15, IPM 2-3, PAU 911, ML 267, MUM 2, Ganga 8, ML 818, MH 2-15, IPM 2-3, PAU 911
	Urdbean	PDU 1	Mash 1008 <b>Recommended Varieties</b> Uttara, WBU 108, Mash 414, Mash 338, Shekar 2, Mash 479
	Lentil	-	<b>Recommended Varieties</b> PL 406, PL 639, L 4076, LL 147, PL 4, L 4147, DPL 62, Sapna, IPL 406, LL 699
	Field Pea	-	<b>Recommended Varieties</b> Rachna, DMR 7, KPMR 522, DDR 27 IPF 5-19, Pant P 74
	Chickpea	L 550	BG 1053, L 551
	Cowpea	-	<b>Recommended Varieties</b> CL-367 (2006)
	Horsegram	-	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A. K. 21 (1999), A. K- 42 (2005)
<b>Rajasthan</b>	Field pea	Rachna, HFP 8909, KFP 103, DMR 7, KPMR 522, DDR 27	Varieties in Seed Chain Rachna, KPMR 522, DDR 27, Hariyal, Pant P 42 HFP 529
	Chickpea	RGS 44	RGS 888, RGS 896, RSG 974, RGS 902
		C 235	GNG 1581, Haryana Chana 3, Haryana Chana 5
		Dahod Yellow	Pratap Chana 1, Gujarat Gram 2, Gujarat Junagadh Gram 3
	Munbean	RMG 62	IPM 02 – 3
		RMG 268	MH 2 – 15
MUM 2		IPM 02 – 3 <b>Recommended Varieties</b> RMG 62, Ganga 8, RMG 268, MUM 2, SML 608, RMG 492, IPM 2-3, MH 2-15, SML 668, PDM 139, Meha, MH 2- 15	

**Annexure 7: State wise ICAR recommended new alternative varieties to be promoted in place of old varieties of pulses (Continued).**

State	Crop	Old varieties	Alternative varieties to be promoted
<b>Rajasthan</b>	Urdbean	RBU 38	Uttara <b>Recommended Varieties</b> Uttara, WBU 108, KU 300, PU 31
	Lentil	-	<b>Recommended Varieties</b> K 75, L 4076, DPL 62, IPL 406
	Mothbean	Varieties for deletion: Jadia (1980) Maru-moth-1 (1988) Moth-880 (1989) Indents to be decreased FMM-96 (1998), CZM-1 (1999), CZM-3 (2005), Jwala (1985)	<b>Recommended Varieties</b> RMO-40 (1994) RMO-257 (2005) RMO-423 (2004) RMO-435 (2002) RMO-225 (1999) CZM-2 (2003)
	Horsegram	Varieties for deletion: Maru Kulthi-1 (1989) KS-2 (1991)	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A.K. 21 (1999), A.K- 42 (2005)
	Cowpea	Varieties for deletion: JC-10, JC-8, RS-6 (1970s) Indents to be decreased: RC-19 (1987), V-130 (1993)	<b>Recommended Varieties</b> RC-101 (2001) GC-3 (1997), V585 (1997), V-240 (1993)
	<b>Tamil Nadu</b>	Mungbean	ADT 3
Urdbean		PU 30	Shekhar 1 / IPU 2-43
			<b>Recommended Varieties</b> Vamban 2, WBU 108, Shekhar 1, Vamban 3, VBN 4, ADT 5, IPU 02-43, VBN 5, VBN 7
Horsegram		-	<b>Recommended Varieties</b> CRIDA 1-18, PHG-9 (1997) A.K.-21 (1999), A.K.42 (2005)
Cowpea		-	<b>Recommended Varieties</b> CO(CP)7 (2005), KBC-2 (1998) Vamban-1 (1998)
Horsegram		-	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A. K. 21 (1999), A. K- 42 (2005)
<b>UttaraKhand</b>	Mungbean	-	<b>Recommended Varieties</b> PM 2, PM 3, NDM 1, PM 4, PDM 139, Pusa Vishal, Meha, PM 5, TMB 37, HUM16
	Urdbean	NDU 3	PU 31
		PU 19	PU 40
		PU 30	PU 40 <b>Recommended Varieties</b> Uttara, WBU 108, PU 40, Azad U 1, Shekhar 2, WBU 109, PU 31, Mash 479
	Lentil	-	<b>Recommended Varieties</b> PL 406, PL 639, PL 4, PL 5, VL 126, VL 507, PL 6, PL 7
	Horsegram	-	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), VLG-8 (2006), VLG-19 (2010), A.K. 21 (1999), A.K- 42 (2005)
	Chickpea	Pant G 114	Pant G 186, Pant Kabuli Chana 1

**Annexure 7: State wise ICAR recommended new alternative varieties to be promoted in place of old varieties of pulses.**

State	Crop	Old varieties	Alternative varieties to be promoted
Uttar Pradesh	Urdbean	NDU 3	PU 31
		PU 19	PU 40
		PU 30	PU 40
	Lentil	PL 234	HUL 57 <b>Recommended Varieties</b> PL 406, PI 639, PI 234, K 75, L 4076, NDL 1, DPL 62, DPL 15, PL 4, PL 5, L 4147, IPL 81, IPL 406, HUL 57, KLS 218, WBL 77
	Fieldpea	-	<b>Recommended Varieties</b> Adrash, Rachna, KPMR 400, KPMR 522, HUDP 15, VL 42, Vikas, Prakash, Pant P 42, Hariyal, IPF 5-19,
	Chickpea	Radhey	KWR 108, KPG 59, GCP 105
		BG 256	GCP 105, BG 372
	Cowpea	Varieties for deletion: UP-124(1970s)	
Horsegram		<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008)	
West Bengal	Mungbean	-	<b>Recommended Varieties</b> NDM 1, PM 4, MH 2-15, PDM 139, Pusa Vishal, Meha, PM 5, TMB 37, HUM 16
	Urdbean	PDU 1	WBU 109 <b>Recommended Varieties</b> Uttara, WBU 108, Pant U 31, WBU 109
	Lentil	-	<b>Recommended Varieties</b> Ranjan, Asha, K 75, WBL 58, PL 406, PL 639, NDL 1, HUL 57, KLS 218, WBL 77
	Chickpea	Mahamaya 1, Mahamaya 2	Anuradha (WBG 39/2), GCP 105
	Fieldpea	-	<b>Recommended Varieties</b> Rachna, HUDP 15, DDR 23, VL 42
	Horsegram	-	<b>Recommended Varieties</b> VLG-19 (2010), VLG-15 (2008), A.K. 21 (1999), AK- 42 (2005)
NEH Region	Lentil	B 77	HUL 57 / PL 6 <b>Recommended Varieties</b> PL 406, PL 631, DPL 62, HUL 57, VL 507, VL 126, PL 6
NSC	Chickpea	Annegiri 1	JG 11

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Andhra Pradesh**

Quantity in Quintals

Crop/Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
<b>URDBEAN</b>												
LAM 623 (LBG 623)	2001	4100	500	520	1001	2285	5000	5124	4901	4921	9603	9658
LAM 648 (LBG 648)	1	1500	850	9000	1251	2925	1400	1480	1001	1054	25469	7200
LAM - 709	800	800	0	0	0	0	0	0	0	0	0	0
T- 9	5001	17787	0	0	2881	43398	32601	33372	11306	15633	8501	16556
Lam Minumu-752	0	0	1225	12000	2601	30253	1	5487	18526	18558	1	9863
LAM – 685 (LBG 685)	0	0	75	100	303	2351	0	0	0	0	0	0
TAU - 1	0	0	150	455	501	6121	0	0	1500	1534	1	613
LBG-20	0	0	0	0	0	0	0	0	56	67	1	100
Other	0	0	0	0	0	0	0	0	32021	30024	0	0
<b>MOONGBEAN</b>												
K-851	2001	5100	0	0	0	0	0	0	0	0	0	0
LAM-460	4501	6000	2300	3235	2001	6998	5963	6935	1666	5432	17386	18545
LAM-407 (LGG-407)	1	2400	0	0	0	0	0	0	0	0	1	5945
MADHIRA- 295	6801	12300	5001	5010	1001	2401	6501	7550	1201	1496	1251	1500
ML- 267	10201	15100	12000	8800	13595	17082	6853	7000	9563	10870	5201	10245
Other	0	0	0	0	0	0	1001	1650	0	0	0	0
Madhira Pesara - 347	0	0	501	668	0	0	0	0	0	0	0	0
TMB – 37 (TM 99-37)	0	0	200	2500	1001	1715	0	0	0	0	200	0
PUSHKARA (LGG-450)	0	0	0	0	1	698	0	0	356	29	5840	0
SML - 668	0	0	0	0	56	800	0	0	0	0	0	0
<b>ARHAR</b>												
ICPH-2671 (ICPH2043 A-LINE)	100	100	0	0	0	0	0	0	0	0	1	100
ICPL – 87119 (ASHA)	2201	7300	4000	9084	600	0	151	1064	56	100	875	1000
Lam – 41	22101	35042	28000	33944	32518	36500	1	520	120	43100	2055	8000
LAXMI (ICPL-85063)	2200	3400	4500	21640	1649	9212	101	990	210	6810	500	2000
Palem Khandi (PRG-158)	3900	9278	1000	1182	275	300	81	495	121	160		
PALNADU (IRG-30)	4501	9975	0	0	0	0	0	0	0	0	0	0
LRG- 36	0	0	2500	4800	1648	3800	2611	3115	530	2900	450	500
<b>RABI GRAM</b>												
ANNIGER-1	0	0	0	0	0	0	72210	72292	46751	57898	18388	18542
JG – 11	0	0	0	0	0	0	293472	502657	238890	470790	298406	298549
KAK – 2	0	0	0	0	0	0	39409	39856	103361	140895	122361	122412
Other	0	0	0	0	0	0	9045	17047	0	0	0	0
JAKI - 9298	0	0	0	0	0	0	0	0	14000	41142	15001	23562
Iccv-37	0	0	0	0	0	0	0	0	0	0	12897	12954
<b>Total</b>	66311	130182	62802	112938	62883	166839	476401	706634	486136	853413	467503	476519

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Assam**

Quantity in Quintals

Crop/Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
<b>URDBEAN</b>												
T - 9					9125	9125	10350	10350	11000	11000	4500	4500
PANT U - 19					1000	1000	0	0	0	0	0	0
<b>MOONGBEAN</b>												
K-851					0	0	1000	1000	2000	2000	0	0
PRATAP (SG-1)					0	0	2000	2000	1000	1000	0	0
<b>FIELD PEAS</b>												
Aparna					0	0	7000	7000	3000	3000	7000	7000
Rachna					0	0	8000	8000	12000	12000	14100	14100
Azad (P-1)					0	0	0	0	0	0	325	325
<b>LENTIL</b>												
L- 9 – 12					0	0	3000	3000	3000	3000	2700	2700
PANT L - 406					0	0	4000	4000	3000	3000	4000	4000
VL Masoor – 126 (VL-126)					0	0	0	0	2000	2000	5050	5050
<b>Total</b>					10125	10125	35350	35350	37000	37000	37675	37675

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Bihar**

Crop/Variety	Quantity in Quintals											
	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
R	A	R	A	R	A	R	A	R	A	R	A	
<b>URDBEAN</b>												
AZAD URD – 1 (KU 91-2)	200	200	0	0	0	0						
NAVIN	100	100	50	250	50	50						
PANT U – 19	200	200	0	0	0	0						
PANT U – 35	200	200	0	0	0	0						
PANT U – 31	80	25	0	0	0	0						
T – 9	300	300	525	525	525	525						
SHEKHAR-1 (KU-301)	0	0	500	375	500	375						
<b>MOONGBEAN</b>												
HUM-6 (MALVIYA JANPRIYA)	50	50	0	0	0	0						
MALVIYA JANCHETNA (HUM-12)	50	0	0	0	0	0						
MALVIYA Jankalyani (HUM-16)	100	0	0	0	0	0						
Meha (IPM-99-125)	50	101	0	0	0	0						
PDM – 139	140	0	0	0	400	200						
PUSA VISHAL	50	152	0	0	0	0						
SML-668	50	207	0	0	0	0						
TMB – 37 (TM 99-37)	50	0	0	0	0	0						
GANGA – 8 (GANGOTRI)	0	0	600	500	600	500						
HUM- 1	0	0	200	100	200	100						
HUM – 2	0	0	300	1500	300	200						
<b>ARHAR</b>	0	0	0	0	0	0						
BAHAR	500	150	2100	2100	2100	2100						
LAXMI (ICPL-85063)	500	0	0	0	0	0						
Malviya Chamatkar (MAL-13)	500	0	0	0	0	0						
Narendra Arhar-I (NDA 88-2)	160	85	400	400	400	400						
UPAS -120	500	90	500	500	500	500						
<b>Rabi- GRAM</b>	0	0	0	0	0	0						
AVRODHI	0	0	0	0	0	0	1000	195	4000	2760	2000	1000
C- 235	0	0	0	0	0	0	1000	300	0	0	0	0
DCP-92-3	0	0	0	0	0	0	500	2	0	0	0	0
JG – 11	0	0	0	0	0	0	500	5000	0	0	0	0
PANT G – 114	0	0	0	0	0	0	1000	22	0	0	0	0
PKV KABULI-2	0	0	0	0	0	0	500	1200	0	0	0	0
PUSA – 256	0	0	0	0	0	0	1500	46	5000	5000	0	0
PUSA – 372 (BG-372)	0	0	0	0	0	0	1500	2500	0	0	0	0
SAMRAT (GNG-469)	0	0	0	0	0	0	500	2080	4000	6500	500	500
VARDAN (GNG-663)	0	0	0	0	0	0	2200	2610	1000	500	0	0
VIIAY (PHULE G 81-1-1)	0	0	0	0	0	0	500	1210	0	0	2000	2000
<b>Sub Total</b>	<b>3780</b>	<b>1860</b>	<b>5175</b>	<b>6250</b>	<b>5575</b>	<b>4950</b>	<b>10700</b>	<b>15165</b>	<b>14000</b>	<b>14760</b>	<b>4500</b>	<b>3500</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).  
State – Bihar (Continued)**

Quantity in Quintals

Crop/Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
DHARWAD PRAGTI (BGD-72)							0	0	2000	500	1000	500
VAIBHAV (RG-9218)							0	0	5000	5000	3000	2122
ALOK (KGD-1168)							0	0	0	0	3000	1500
ASHA (RSG - 945)							0	0	0	0	200	1350
JAKI - 9218							0	0	0	0	4000	3300
PUSA CHAMTKAR BG-1053							0	0	0	0	3000	2500
PUSA -391 (BG-391)							0	0	0	0	1500	1500
UDAY							0	0	0	0	1000	500
<b>FIELD PEA</b>							0	0	0	0	0	0
AMBIKA (IM-9102)							1000	1018	0	0	0	0
APARNA							1000	250	0	0	0	0
ARKEL							1000	2515	0	0	0	0
RACHNA							1000	1358	0	0	1000	1000
T- 163							1000	15	0	0		0
HARIYAL (HFP-9907 B)							0	0	0	0	1000	800
PRAKASH (IPFD 1-10)							0	0	0	0	1000	1352
VIKAS (IPFD 99-33)							0	0	0	0	4000	2920
<b>LENTIL</b>							0	0	0	0	0	0
ARUN							1000	542	0	0	6500	6000
GARIMA (LH 82-6)							500	20	0	0	0	0
HUL-57 (Mal vishwanath)							1000	323.10	7000	1100	0	0
L-9-12							2500	9	0	0	0	0
MALIKA (K-75)							2000	1635	4000	5040	5000	553
NARENDRA MASOOR-1 (NDL 92-1)							500	325	0	0	0	0
PANT – 406							500	150	0	0	0	0
PANT LENTIL- 5							500	250	0	0	0	0
PL- 4							500	100	1000	1715	0	0
PRIYA (DPL-15)							500	58	0	0	0	0
SHERI DPL – 62							500	525	0	0	10000	200
<b>Sub Total</b>							<b>15000</b>	<b>9093.1</b>	<b>19000</b>	<b>13355</b>	<b>27500</b>	<b>26097</b>
<b>Grant Total</b>	<b>3780</b>	<b>1860</b>	<b>5175</b>	<b>6250</b>	<b>5575</b>	<b>4950</b>	<b>25700</b>	<b>106096</b>	<b>33000</b>	<b>28115</b>	<b>32000</b>	<b>29597</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.



**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Chhattisgarh**

Quantity in Quintals

Crop/Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
<b>URDBEAN</b>												
AZAD URD – 1 (KU 91-2)	100	55	250	0	260	0	0	0	0	0	0	0
BARKHA (RBU-38)	100	23	0	0	0	0	0	0	0	0	0	0
Goutam (WBU-105)	100	0	0	0	0	0	0	0	0	0	0	0
PANT U – 30	100	6	163	0	117	0	5	0	5	0	0	0
T – 9	100	1000	229	0	204	0	45	0	50	0	0	0
Trombay Udid 94-2 (TU-94-2)	500	98	650	17	495	306	9	13	17	0	0	0
AZAD URD – 3 (KV-96-3)	0	0	247	81	45	120	60	0	56	163	211	8
TPU – 4	0	0	418	1	374	0	25	0	35	0	16	0
SUMAN - JANA	0	0	80	0	0	0	0	0	0	0	0	0
TAU-1	0	0	187	1000	276	12	0	0	0	0	60	0
<b>MOONGBEAN</b>												
BM - 4	30	0	12	0	2	0	0	0	0	0	0	0
HUM-1	100	24	270	12	274	19	59	8	115	0	57	1
MALVIYA JAGRITI (HUM-2)	40	0	50	2	18	0	4	8	12	245	13	0
HUM-6 (MALVIYA JANPRIYA)	100	0	0	0	0	0	20	0	0	0	0	0
K – 851	50	0	178	0	137	0	53	7	65	15	38	25
MALVIYA Jankalyani (HUM-16)	60	0	25	12	0	0	0	0	0	0	100	0
Muskan (MH 96-1)	70	0	55	0	21	0	0	0	10	0	10	0
PUSA VISHAL	150	1	122	0	70	0	55	12	55	12	20	0
PRAGYA	0	0	0	0	0	0	13	0	0	0	10	0
PAIRY MUNG	0	0	33	0	0	0	0	0	0	0	7	0
MALVIYA JANCHETNA (HUM-12)	0	0	0	0	0	0	0	0	0	0	20	0
<b>ARHAR</b>												
BSMR – 736	200	165	40	2170	55	80	0	0	0	0	0	0
BSMR 853 (VAISHALI)	200	0	0	0	110	0	0	0	0	0	0	0
ICPL – 87119 (ASHA)	1000	1366	1446	4939	2000	3142	0	0	0	0	0	0
LAXMI (ICPL-85063)	500	0	609	60	360	84	0	0	0	0	0	0
Malviya Vikash (MA-6)	200	75	0	0	75	77	0	0	0	0	0	0
UPAS - 120	500	0	699	32	642	0	0	0	0	0	0	0
Malviya chatmatkar	0	0	35	182	10	0	0	0	0	0	0	0
Rajiv Lochan	0	0	370	77	55	45	0	0	0	0	0	0
TJT- 501	0	0	0	0	15	16	0	0	0	0	0	0
OTHER	0	0	0	0	723	610	0	0	0	0	0	0
<b>Rabi-GRAM</b>												
ANNIGERE-1	0	0	0	0	0	0	505	390	740	300	30	350
ANUBHAV (RSG-88)	0	0	0	0	0	0	50	0	0	0	0	0
BHARATI (ICCV-10)	0	0	0	0	0	0	62	0	0	0	0	0
<b>Sub Total</b>	<b>4200</b>	<b>2813</b>	<b>6168</b>	<b>8585</b>	<b>6338</b>	<b>4511</b>	<b>965</b>	<b>438</b>	<b>1160</b>	<b>735</b>	<b>592</b>	<b>384</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Chhattisgarh**

Quantity in Quintals

Crop/Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
DHARWAD PRAGATEE (BGD-72)							964	0	1880	0	0	0
DIGVIJAY							290	35	245	39	1081	1046
ICCV-2							653	976	720	0	239	0
JAKI – 9218							120	234	560	0	7069	339
JAWAHAR GRAM 130 (JG-130)							1485	1401	1725	174	1230	652
JAWAHAR GRAM 16 (SAKI – 9516)							50	1800	0	0	300	165
<b>GRAM</b>							0	0	0	0	0	0
JG- 11							6810	1800	7631	973	5274	527
JG- 218							320	642	380	153	500	82
JG-315							4240	729	3616	1671	4968	2093
JG-322							1545	142	1912	166	834	144
JG-63							0	49	100	76	1624	799
JG-74							8721	9652	8385	16423	12422	11314
KAK- 2							125	15	130	0	28	0
KRANTI (ICCV-37)							20	17	0	0	0	0
PUSA-372 (BG-372)							700	0	0	0	0	0
PUSA-391 (BG-391)							290	0	310	0	205	0
SAMRAT (GNG-469)							300	0	0	0	0	0
UDAY (KPG-59)							0	18	0	0	100	0
UJJAIN - 21							330	0	700	200	0	0
VAIBHAV (RG-9218)							2245	396	2342	691	3742	1380
VARDAN (GNG-663)							25	0	175	0	0	0
VIJAY (PHULE G 81-1-1)							3130	5311	4049	3252	2655	767
VISHAL PHULE (G 87207)							2431	4001	2971	1386	1475	702
VIRAT PHULE (G-87207)							0	0	20	16	50	0
JAWAHR GRAM -226							0	0	0	0	1287	185
JAWAHR GRAM - 6							0	0	0	0	376	0
JG- 14							0	0	0	0	1080	80
Pant Kabuli chana - 1							0	0	0	0	118	0
<b>FIELD PEA</b>							0	0	0	0	0	0
AMBIKA (IM-9102)							152	24	153	41	72	5
APARNA							166	0	155	0	143	0
ARKEL							344	139	399	201	317	100
<b>Sub Total</b>							<b>35456</b>	<b>27381</b>	<b>38558</b>	<b>25462</b>	<b>47189</b>	<b>20380</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Chhattisgarh (Continued)**

Quantity in Quintals

Crop/Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
AZAD (P-1)							50	0	0	0	0	0
AZAD (P-3)							40	0	0	0	0	0
JAWAHAR MATAR- 6							35	12	70	7	4	0
JP-885							82	0	18	0	95	0
KPMR-400 (INDRA)							80	134	80	6	21	0
PARAS							21	2	80	26	93	47
RACHNA							110	0	168	0	137	0
SHUBHRA (IM-9101)							40	28	50	100	171	0
JP - 179							0	0	86	0	0	0
PRAKASH (IPFD 1-10)							0	0	26	0	31	28
SAPNA							0	0	12	0	0	0
JAWAHAR MATAR -1							0	0	0	0	6	0
PANT PEA - 42							0	0	0	0	23	25
<b>LENTIL</b>							0	0	0	0	0	0
JKL-3							170	98	115	84	130	83
JLS-1							41	0	1	0	1	0
MALIKA (K-75)							183	125	164	0	179	0
SHERI DPL-62							20	14	60	0	0	0
PANT LENTIL – 4							0	0	100	50	0	0
PRIYA (DPL -15)							0	0	43	0	41	0
PANT LENTIL 7 (PL-024)							0	0	0	0	7	0
PANT LENTIL 8 (PL-063)							0	0	0	0	11	0
SEKHAR MASOOR 3 (KL-320)							0	0	0	0	0	0
<b>LATHYRUS</b>							0	0	0	0	0	0
Maha tiwara							0	0	10	53	61	28
MAHA TEORA							0	0	38	64	0	0
RATAN							0	0	130	0	35	56
<b>Sub Total</b>							<b>872</b>	<b>413</b>	<b>1251</b>	<b>390</b>	<b>1046</b>	<b>267</b>
<b>Grant Total</b>	<b>4200</b>	<b>2813</b>	<b>6168</b>	<b>8585</b>	<b>6338</b>	<b>4511</b>	<b>37293</b>	<b>28232</b>	<b>40969</b>	<b>26587</b>	<b>48827</b>	<b>21031</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Orissa**

Quantity in Quintals

Crop/Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
<b>URDBEAN</b>												
PANT U – 30	300	300	497	0	749.5	0	2845	7	1932	0	2091.5	0
PANT U – 35	300	300	39	0	251	0	921	0	650	0	411	0
PRASAD	150	150	0	0	0.1	1403	0	0	0	0	1	680
SHEKHAR -2 (KU-300)	300	300	60	0	70	878	50	0	190	0	185	360
Trombay Udid 94-2 (TU-94-2)	500	502	0	0	0.1	2512	76	0	0	0	1	1080
UJALA (OBG-17)	250	250	0	0	0.1	1073	10	0	10	0	35	350
WBU – 108	300	300	0	0	0	0	21	0	155	0	120	0
BASANT BAHAR (PDU-1)	0	0	0	0	0	0	331	0	88	0	50	0
PANT U – 19	0	0	117	0	0	0	227	0	166	0	115	50
SEKHAR -1 (KU-301)	0	0	0	0	0.1	750	296	0	0	0	1	680
T-9	0	0	935	0	1334	0	1380	0	1933	0	1547.02	0
PANT U - 31	0	0	0	0	142	2596	0	0	0	0	156	1360
PDU - 19	0	0	0	0	125	112	0	0	0	0	0	0
SARALA (B-12-4)	0	0	0	0	15	0	0	0	0	0	0	0
<b>MOONGBEAN</b>	0	0	0	0	0	0	0	0	0	0	0	0
DHAULI	35	35	0	0	20	0	0	0	0	0	0	0
OBGG-52	100	100	0	0	0	0	0	0	0	0	0	0
PDM - 11	515	515	252	0	353.5	0	1467	0	1758	0	1273	0
PDM-54	200	200	761	0	838.7	0	2204	0	2346	0	2030.1	0
TARM – 1	500	500	152	0	140	1700	1055	0	497	0	732	15.58
TARM – 2	500	500	0	0	0.1	150	81	0	22	0	18.5	72
HUM-1	0	0	0	0	0	0	98	0	0	0	0	0
K- 851	0	0	153	0	250	0	288	0	415	0	440	820
PDM - 139	0	0	340	0	106.8	3000	463	0	421	7	336.8	1450
PUSA BAIKAKHI	0	0	0	0	460	0	25	0	24	0	0	0
PUSA VISHAL	0	0	1	0	0.1	800	124	0	35	0	20	384
SUJATA	0	0	0	0	30	0	31	0	0	0	8	0
PUSKARA (LGG-450)	0	0	76	0	0	0	0	0	0	0	0	0
IPM 02-3	0	0	0	0	0.1	35	0	0	138	0	80	18
MALVIYA JANKALYANI (HUM 16)	0	0	0	0	0.1	435	0	0	196	0	1	216
MEHA (IPM-99-125)	0	0	0	0	0	0	0	0	145	0	45	0
SML-68	0	0	0	0	0	0	0	0	90	0	0	0
KAMDEVA (OUM-11-5)	0	0	0	0	0.1	2000	0	0	0	0	1	980
LAM -460	0	0	0	0	70	0	0	0	0	0	0	0
OBGG -52	0	0	0	0	0.1	875	0	0	0	0	20	420
JYOTI	0	0	0	0	0	0	0	0	0	0	8	0
SML-668	0	0	0	0	0	0	0	0	0	0	158	0
<b>Sub Total</b>	<b>3950</b>	<b>3952</b>	<b>3383</b>	<b>0</b>	<b>4956.5</b>	<b>18319</b>	<b>11993</b>	<b>7</b>	<b>11211</b>	<b>7</b>	<b>9884.92</b>	<b>8935.58</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Orissa (Continued)**

Quantity in Quintals

Crop/Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
<b>ARHAR</b>	0	0	0	0	0	0	0	0	0			
DURGA (ICPL-84031)	100	0	0	0	0	0	0	0				
ICPL – 87 (PRAGATI)	50	0	186	0	68.2	0	0	0				
ICPL – 87 119(ASHA)	200	0	95	0	89	1020	0	0				
LAXMI (ICPL-85063)	100	0	2	0	2.5	0	0	0				
PUSA – 855	50	0	0	0	0	0	0	0				
UPAS - 120	150	0	518	106	652.3	300	0	0				
MARUTI (ICP-8863)							0	0				
<b>RABI GRAM</b>							0	0				
ANNIGER-1							617	0	799	0	624.8	0
ICCV -2							118	0	28	0	54	0
JG - 11							278	0	395	0	388.9	0
RADHEY							93	0	113	0	9.8	0
ICCV-37							0	0	0	0	51.5	0
<b>FIELD PEA</b>							0	0	0	0	0	0
APARNA							304	0	390	0	386	0
PRAKASH (IPFD-1-10)							40	0	2037	0	0	0
RACHNA							1871	0	0	0	1759.5	0
VIKAS (IPFD-99-33)							17	0	0	0	0	0
ADARSH (IPF-99-25)							0	0	0	0	1	90
<b>Sub Total</b>	<b>650</b>	<b>0</b>	<b>801</b>	<b>106</b>	<b>840.5</b>	<b>1320</b>	<b>3338</b>	<b>0</b>	<b>3762</b>	<b>0</b>	<b>3275.5</b>	<b>90</b>
<b>Total</b>	<b>4600</b>	<b>3952</b>	<b>4184</b>	<b>106</b>	<b>5797</b>	<b>19659</b>	<b>15331</b>	<b>7</b>	<b>14973</b>	<b>7</b>	<b>13160.42</b>	<b>9025.58</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Punjab**

Quantity in Quintals

Crop/Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
<b>URDBEAN</b>	100	0										
MASH - 1008	200	12			100	100						
MASH – 338	0	0	140	140	200	200						
MASH -114	0	0	35	35	100	106						
<b>MOONGBEAN</b>	0	0	0	0	0	0						
12/333	100	0	0	0	0	0						
ML-818	100	52	50	56	100	56						
SML-668	300	313	3700	3850	300	368						
ML-613	0	0	20	20	100	20						
<b>ARHAR</b>	0	0	0	0	0	0						
AL- 201	500	10	500	2050	500	502						
<b>RABI GRAM</b>												
GPF-2							200	29	100	151	60	78
PBG-1							200	1	150	191	110	114
PDG-3(GF-89-133 & GPF-133)							200	11	0	0	0	0
PDG-4							200	0	100	150	0	0
ANUBHAV (RSG-88)							0	0	100	103	100	170
HARYANA CHANA (H-86-18)							0	0	100	130	100	120
L - 550							0	0	0	0	80	88
PBG-5							0	0	0	0	150	244
<b>FIELD PEA</b>							0	0	0	0	0	0
AZAD (P-3)							19800	19800	0	0	0	0
MATAR AGETA-6							1530	1530	0	0	200	298
<b>LENTI</b>							0	0	0	0	0	0
LL-699							125	125	125	143	125	129
MALIKA (K-75)									100	100	0	0
LL 931									0	0	100	237
<b>Total</b>	<b>1300</b>	<b>387</b>	<b>4445</b>	<b>6151</b>	<b>1400</b>	<b>1352</b>	<b>22255</b>	<b>21496</b>	<b>775</b>	<b>968</b>	<b>1025</b>	<b>1478</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – West Bengal**

Quantity in Quintals

Crop/Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
<b>URDBEAN</b>												
GOUTAM (WBU-105)	500	500							1050	1050	700	680
KALNDI (B-76)	970	970			823	823						
PANTU – 19	50	50	998	998	285	285						
PANTU – 30	210	210	0	0	210	210			700	700	600	600
WBU - 108	1520	1520	2000	2000	1837	1837			950	950	1000	990
PANTU - 35	0	0	0	0	110	110					635	635
<b>MOONGBEAN</b>												
K – 851	30	30	424	424	265	265			100	100	485	485
PANT MOONG – 2	10	10	0	0	0	0						
PDM – 54	15	15	0	0	0	0						
SONALI (B-1)	20	20	500	500	358	358			1400	1400	800	800
PANNA (B-105)	0	0	0	0	312	312						
PDM - 139	0	0	0	0	0	0					500	500
<b>ARHAR</b>												
LAXMI (ICPL-85063)	30	30	100	100	70	70						
Malviya Chamtkar (MAL-13)	20	20	0	0	0	0						
PUSA – 855	40	40	60	60	73	73						
UPAS - 120	100	100	200	200	225	225						
PUSA - 9					92	105						
<b>RABI GRAM</b>												
ANUBHAV (RSG-88)							400	400				
ANURADHA (WBG-39/2)							2100	2100	1800	1800	1600	1593
B-115 (MAHAMAYA-2)							1500	1500	1400	1400	1800	1790
Pusa Kabuli Gram-128 (Pusa Shubhra) / bgd-128							300	300	0	0	300	300
MAHAMAYA-I (B-108)							0	0	1510	1510	1900	1900
<b>LENTIL</b>												
ASHA (B-77)							2770	2770	2000	2000	1330	1330
RANJAN (B-256)							629	629	1000	1000	1250	1250
MALAVIYA VISHWANATH (HUL-57)							307	307	0	0	50	50
MALIKA (K-75)							305	305	500	500	4200	4200
SUBRATA (WBL-58)							2259	2259	2500	2500	0	0
AZAD MASUR-1 (JKLS-218)									440	440	0	0
<b>KHESARI</b>												
NIRMAL (B-1)									1900	1900	2500	2500
RATAN (BIO L-212)									1590	1590	1350	1350
<b>Total</b>	<b>3515</b>	<b>3515</b>	<b>4282</b>	<b>4282</b>	<b>4660</b>	<b>4673</b>	<b>10570</b>	<b>10570</b>	<b>14640</b>	<b>14640</b>	<b>16280</b>	<b>16263</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State- Karnataka**

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Urdbean	Others	600	600										
	TAU 1	4900	5050	5335	5350	3175	3121	515	560	500	505	960	1080
	WBU 108			700	700								
	T 9							90	115	70	80	300	370
Cowpea	Others	300	300							50	50		
	Pusa 152	4650	4675	4875	4890			950	2500	1100	2650	1861	1861
	Cowpea 263			300	300								
	KBC 1							40	40			85	105
Moongbean	Others	750	750			1445	1504						
	Pusa Baisakhi	1750	1750	1210	1225	1265	1275	77	77	75	80	275	300
	Shining Moong 1	12900	12905	14375	14400	10550	9558	275	685	385	390	1210	1275
	AKM 8803			775	775								
	SML 668			200	200	240	240						
Arhar	BRG-1	2050	2050	2500	3110	3100	3123						
	BRG-2	1650	1650	2375	2920	3715	3720						
	BSMR-736	2000	2000	4150	4325	2185	2185						
	HY-3C	2050	2050	2050	2050	2750	2750						
	Laxmi (ICPL-85063)	1500	1600	500	500	685	690						
	Maruti (ICP-8863)	13500	13500	13000	13050	11550	10708						
	Others	3000	3000										
	PT-221	750	750	400	400	655	657						
	TTB-7	3500	3500	3175	3205	4250	4274						
	BSMR 175			300	300								
	Asha (ICPL 87119)			500	500	750	755						
	TS 3			1500	2025	3025	3125						
	WRP 1			750	755	750	795						
Horsegram	Palem 1			415	415								
Gram	Annigere-1							100550	100575	72750	72850	120750	96448
	ICCV-37							1000	2000	1000	8250	1010	1062
	JG-11							8450	22222	48250	53855	95250	61309
	Vijay (Phule G 81-1-1)							2500	2505	1500	1525	1200	1260
	JAKI 9218											3800	3864
<b>Total</b>		<b>55850</b>	<b>56130</b>	<b>59385</b>	<b>61395</b>	<b>51415</b>	<b>49808</b>	<b>114447</b>	<b>131279</b>	<b>125680</b>	<b>140235</b>	<b>226701</b>	<b>168934</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.



**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**

State- Madhya Pradesh

Crop	Variety	Kharif						Rabi													
		2010		2011		2012		2010		2011		2012									
		R	A	R	A	R	A	R	A	R	A	R	A								
Urdbean	Basant Bahar (PDU-1)	1000	60																		
	IPU-94-1	800	800	261	230																
	Jawahar Urid 3	800	502	0		915	210														
	KU-91 (Azad Urd 2)	300	790	1700	1430																
	LBG-20	1000	0	0																	
	Pant U 19	350	30	0		790	0														
	Pant U 30	250	262	510	450	203	724														
	Pant U 35	1000	1922	1926	1623	1745	564														
	Shekhar 2 (KU-300)	300	2	3590	3080																
	TAU 1	800	488	266	235	140	815														
	TPU 4	1000	600	0		893	0														
	Trombay Udid 94-2 (TU 94-2)	50	2	51	31	456	741														
	Type 9	2350	4528	2549	41	2118	600														
	LBG 20			340	296	2155	11														
	Jawahar Urid 2			0		395	19														
	LBG 685			0		65	17														
	Others			0		3795	339														
	PDU 19			0		1205	0														
	Shekhar 1 (KU-301)			0		532	0														
	TAU 2			0		265	125														
Moong bean	HUM 1	650	0	163	129	568	0														
	HUM 2 (Malviva Jagriti)	50	50	543	500																
	JM 721	1000	36	0		640	366														
	K 851	900	3073	869	973	2212	1000														
	PDM 11	500	0	99	41																
	Pusa Vishal	200	206	54	18																
	Pusa 9531	200	1000	0																	
	Vaibhav (Phule M 9339)	500	13	543	500	45	0														
	Malviya Jankalyani			326	288																
	Malviya Janchetna			383	313																
	PDM 139			549	505	341	0														
	TMB 37			33	30	10	381														
	Trmbay Jawahr Moong 3			380	346																
	BR 2			0		120	20														
	Others					164	200														

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**

State- Madhya Pradesh (continued)

Crop	Variety	Kharif						Rabi													
		2010		2011		2012		2010		2011		2012									
		R	A	R	A	R	A	R	A	R	A	R	A								
Arhar	Azad K 91-25 (M)	500	24																		
	ICPL 87 (Pragati)	1000	1000	1146	1400	1996	2000														
	ICPL 87119 (ASHA)	4300	4272	3439	3700	6568	5000														
	JA 4	200	500	229	300	533	0														
	Jawahar KM 7	500	500	580	200	55	0														
	Jawahar Tur JKM 189	200	0	229	0	320	0														
	Laxmi (ICPL 85063)	3000	2200	6305	6500	3128	0														
	Malviya Vikalp (MA 3)	500	500	0																	
	NO. 148	500	100	0																	
	Pusa 33	500	500	430	0																
	Pusa 991	200	0	229	0	50	0														
	Pusa 992	300	104	344	0																
	TJT 501	300	248	315	0	1510	0														
	Pusa 885			115	0																
	Pusa 9			229	0																
	UPAS 120			459	359	750	2097														
	JA 3			0		8	0														
	ICPL 151 (Jagriti)			0		570	0														
	Malviya Chamatkar (ML 13)			0		10	0														
	Maruti (ICP 8863)			0		30	0														
Cowpea	Pusa Komal			500	500																
Gram	Annigere 1							10	0	50	11000	50	0								
	Dharwad Pragatee (BGD 72)							2640	579	1657	500										
	GG 1							528	216			2816	0								
	ICCV 2							264	84	500	0	970	17								
	ICCV 37							10000	3175	4105	1635	4635	0								
	JAKI 9218							4302	240	1822	10852	9678	42607								
	Jawahar Gram-130 (JG 130)							25883	23345	37690	33841	43745	19506								
	Jawahar Gram 16 (SAK 19516)							10000	11910	11717	14779	17441	12768								
	JAWAHAR Gram226 (JG 226)							1000	371	1105	0	555	114								
	Jawhar Gram Kabuli 1							527	162			300	0								
	JG 11							46297	11275	20701	38747	25689	31617								
	JG 218							4640	1504	8842	971	12877	1104								
JG 315							25841	58022	65263	67737	60617	183156									
JG 322							30721	31103	36225	28882	35415	20705									

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**

State- Madhya Pradesh (continued)

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Gram	JG 63							3475	4660	8936	11742	17444	18386
	JG 74							12413	15331	15346	8656	16987	14393
	JGG 1							460	187	432	143		
	KAK 2							1504	82	2303	5384	2585	7326
	Pusa Chamatkar (BG 1053)							200	0				
	Uday (KPG 59)							512	217	10	0	1700	0
	Vaibhav (RG 9218)							500	473	490	319	4294	494
	Vijay (Phule G 81-1-1)							19540	19823	11879	3553	20749	1479
	Virat (Phule G 95418)							50	15				
	Vishal (Phule G 87207)							2500	17407	15287	1745	11820	23428
	Bharti (ICCV 10)									61	0		
	JG 6									1558	8	1200	0
	JG 14									1500	306	3852	418
	JGK 2									185	170	1575	0
	JGK 3 (JGK 19)									385	49	625	164
	Pusa 362									300	0		
	Pusa 391 (BG 391)									456	0	1108	0
	Radhey									53	0		
	Ujjain 21									1906	0	3151	0
	Others									11668	0	9916	14
Fieldpea	Adarsh (IPF 99-25)							100	15	100	24		
	Ambika (IM 9102)							95	13	1364	2	1509	5
	Arkel							9189	3792	11821	6410	10950	1274
	Azad (P 1)							990	754	814	771	691	1215
	Azad (P 3)							1862	1996	12	546	1046	613
	Jawahar Matar 6							229	195	370	348	140	0
	JP 885							306	290			555	0
	KPMR 144-1							150	109	55	0		
	KPMR 400 (Indra)							1548	248	1340	0	1683	0
	KPMR 522 (JAY)							520	121	1230	482	1200	707
	PG 3							351	421	3100	0	725	0
	Prakash (IPFD 1-10)							50	33	755	397	995	1620
	Pusa Prabhat (DDR 23)							135	109	60	0	86	0
	Shubhra (IM 9101)							275	9				
	Swati (KFPD 24)							700	106				
	JP 179									335	0		
	Rachna									165	0	256	0
	Sapna									387	0	32	0

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State- Madhya Pradesh**

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Lentil	Azad Masur 1 (KLS 218)							300	258				
	Jawahar Lentil 3 (SLC 6)							2093	4657	6428	2964	2517	825
	JKL 3							50	67	1410	0	1516	32
	JLS 1							1559	1716	2233	1881	3588	506
	Malaviya Vishwanath (HUL 57)							200	519				
	Malika (K 75)							1988	2154	3622	1200	1305	0
	Noori (IPL 81)							10	9	1004	0	1325	0
	Pant Lentil 5							300	477	560	159		
	Lens 4076									55	0	50	0
	Sheri DPL 62									5	117		
	Pusa Masoor 5											130	36
<b>Total</b>		<b>26000</b>	<b>24312</b>	<b>29684</b>	<b>24018</b>	<b>35300</b>	<b>15229</b>	<b>226807</b>	<b>218249</b>	<b>299657</b>	<b>256320</b>	<b>342093</b>	<b>384529</b>

**Source:** Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**

State- Maharashtra

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Urdbean	AKU 15	500	45	1000	1100	1000	1235						
	T 9	500	1000	0									
	TAU 1	24000	18498	16000	18980								
	TAU 1	11000	10000	0		19000	19400						
	LBG 623			300	350								
	WBU 108			19420	17612								
	Others			0		17080	17034						
Moong bean	BM 2002-1	1500	1300	1600	1400	5000	1425						
	BM 4	500	185	200	150	500	95						
	Kopargaon	29700	26140	27500	29400	7500	3700						
	PKV Moong 8802	500	340	200	150	500	90						
	TMB 37(TM 99-37)	500	500	500	600	300	300						
	Utkarsha	3000	2850	0		2500	1680						
	Vaibhav (Phule M 9339)	300	192	0		100	30						
	AKM 8803			7800	5648								
	TARM 2			2700	2500								
	BPMR 145			0		100	0						
	Othres			0		15800	25101						
	PKV AKM 4 (AKM 9904)			0		100	15						
	Arhar	Amol (BDN 708)	2500	1757	3000	3250	4000	1750					
BSMR 736		10000	15715	11000	12486	6000	7600						
BSMR 853 (Vaishali)		8000	7505	4500	4615	4500	3950						
ICPL 87 (Pragati)		5000	5100	4000	3660	500	300						
ICPL 87119 (Asha)		8500	7703	5800	5600	4000	4000						
Maruti (ICP 8863)		9000	9200	9000	9177	6500	9210						
Other		1000	1029	0		30788	30159						
Vipula		10000	6503	7000	6400	3000	3550						
AL 201				18175	33291								
BDN 2				300	250								
Pusa Komal				19910	20000								
Rajma	Arka Komal (Sel 9)			30000	30000	20000	20000						

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
State- Maharashtra

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Gram	Akash (BDNG 797)							1000	200	2000	60	500	45
	Annigere 1							5000	12000	4400	4400	10000	12000
	Bharati (ICCV 10)							1500	2050	200	200		
	CHAFFA							800	800				
	Digvijay							17000	19100	29000	29452	35000	27100
	ICCV 37							9000	7800	15000	16555	11000	11810
	JAKI 9218							15000	15000	13000	15734	20000	18000
	KAK 2							2000	1600	2000	401	1000	350
	Others							1600	800	48040	47300	66800	93620
	Phule G 12							2000	1050	1500	602		
	Vijay (Phule G 81-1-1)							96000	100000	65300	66792	45000	42450
	Virat (Phule G 95418)							5000	3600	2500	1709	5000	3625
	Vishal (Phule G 87207)							7000	7000	4000	41260	3000	2700
	Dharwad Pragati (BGD 72)									300	300		
	ICCV 2									200	200		
	PKV Kabuli 2											2000	2000
	Rajas (Phule G 9425-9)											1000	1000
	Vihar (Phule G 95311)											1000	1000
<b>Total</b>		<b>126000</b>	<b>115562</b>	<b>189905</b>	<b>206619</b>	<b>148768</b>	<b>150624</b>	<b>162900</b>	<b>171000</b>	<b>187440</b>	<b>224965</b>	<b>201300</b>	<b>215700</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).****State- Manipur**

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Urdbean	T 9	362	362	600	600	600	600						
Moongbean	Asha	122	122	250	250	250	250						
Arhar	UPAS 120	81	81	300	300	300	300						
Gram	Pusa 267 (BG 267)							560	560	600	600	600	600
Lentil	Malika (K 75)							228	228	230	230	230	230
Fieldpea	Rachna							5000	5600	5500	5500	8300	8300
<b>Total</b>		<b>565</b>	<b>565</b>	<b>1150</b>	<b>1150</b>	<b>1150</b>	<b>1150</b>	<b>5788</b>	<b>6388</b>	<b>6330</b>	<b>6330</b>	<b>9130</b>	<b>9130</b>

**State-Mizoram**

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Moongbean	K 851			15	15	17	17			16	16		
Cowpea	Local black					29	29						
Rajmash	Pant Bean 2			11	11								
Fieldpea	Rachna									96	96		
<b>Total</b>				<b>26</b>	<b>26</b>	<b>46</b>	<b>46</b>			<b>112</b>	<b>112</b>		

**State-Meghalaya**

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Moongbean	Kopargaon												
<b>Total</b>												<b>720</b>	<b>720</b>

**State- Goa**

Qty. in Qtls

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Urdbean	TAU-1	5	0	0	0	0	0	5	5	2	2	0	0
Cowpea	Pusa Do-Fasli	5	5	0	0	0	0	0	0	0	0	0	0
	DPL VS 20	0	0	5	0	0	0	10	10	0	0	5	5
	Pusa Komal	0	0	0	0	0	0	0	0	8	8	0	0
Moong bean	Shining Moong 1	10	10	5	5	0	0	20	20	25	25	10	10
Arhar	GS-1	5	5	0	0	0	0	0	0	0	0	0	0
<b>Total</b>		<b>25</b>	<b>20</b>	<b>10</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>15</b>	<b>15</b>

R= Requirement, A= Availability, **Source:** Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**

State- Gujrat

Qty. in Qtls

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Urdbean	Gujarat Urd-1	1328	1328	5900	5900	150	2529	0	0	0	0	1263	1263
	T-9	6640	6640	5000	5000	7000	7337	0	0	0	0	4932	4932
	TAU-1	332	1332	100	100	50	66	0	0	0	0	304	304
Moong bean	GM-4	2400	4400	10200	10500	7000	8731	4500	4500	6644	16744	6800	7000
	Gujarat Mung-3	25	158	0	0	0	0	0	0	0	0	0	0
	K-851	10200	10200	4000	4000	5300	11520	6500	7000	2856	2856	1200	1200
	Moong Gujarat-1	125	125	0	0	0	0	0	0	0	0	0	0
	PDM 139			800	800	1200	1940	0	0	2500	2500	0	0
Arhar	BDN-2	10133	10133	6500	6500	3900	3931	0	0	0	0	0	0
	BSMR-853 (Vaishali)	500	715	6000	6000	6000	6048	0	0	0	0	0	0
	GT-101	1017	1017	400	400	45	45	0	0	0	0	0	0
	GTH-1 (SKNPCH-10)	550	550	200	200	0	0	0	0	0	0	0	0
	ICPL-87 (Pragati)	3100	3100	5000	5000	450	472	0	0	0	0	0	0
	Other	200	450	0	0	4605	4650	0	0	0	0	0	0
	Gujarat Vegetable Tuver 1	0	0	0	0	500	502	0	0	0	0	0	0
Gram	BGD 72	0	0	0	0	0	0	8873	8874	1000	1000	0	0
	GG 1	0	0	0	0	0	0	4167	4168	4000	4228	4500	4500
	Gujarat gram 2	0	0	0	0	0	0	7391	7392	10000	10013	10000	10088
	JG 130	0	0	0	0	0	0	1000	1000	0	0	0	0
	JG 11	0	0	0	0	0	0	2540	2540	1000	1000	0	0
	Vijay	0	0	0	0	0	0	7529	7541	0	0	0	0
	Gujarat Junagarh Gram 3 (GJG 0207)	0	0	0	0	0	0	0	0	315	315	3500	3500
	others	0	0	0	0	0	0	0	0	8920	9183	9100	9100
	Vijay	0	0	0	0	0	0	0	0	1265	1265	1802	1802
	<b>Total</b>	<b>15500</b>	<b>15965</b>	<b>44100</b>	<b>44400</b>	<b>36200</b>	<b>47771</b>	<b>42500</b>	<b>43015</b>	<b>38500</b>	<b>49104</b>	<b>43401</b>	<b>43689</b>

R= Requirement, A= Availability, Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.



**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**

State- Haryana

Qty. in Qtls

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Urdbean	Others	250	321	0	0	100	159	0	0	0	0	0	0
	T-9	350	349	0	0	100	135	0	0	0	0	0	0
Moong bean	ASHA	500	498	500	498	0	0	0	0	0	0	0	0
	K-851	400	444	400	444	500	747	0	0	0	0	0	0
	Muskan (MH-96-1)	400	400	400	0	0	0	0	0	0	0	0	0
	Others	100	257	0	0	500	806	0	0	0	0	0	0
	Pusa Vishal	70	168	70	168	0	0	0	0	0	0	0	0
	SML-668	4000	2898	4000	3898	18000	14152	0	0	0	0	0	0
	HUM 6 (Malviya Janpriya)	0	0	0	0	500	559	0	0	0	0	0	0
Satya	0	0	0	0	500	1780	0	0	0	0	0	0	
Arhar	MANAK (H-77-216)	2700	3855	2700	3855	2700	4535	0	0	0	0	0	0
	Others	250	316	0	0	500	883	0	0	0	0	0	0
	AL 201	0	0	150	175			0	0	0	0	0	0
	PARAS (H 82-1)	0	0	800	691	1000	1211	0	0	0	0	0	0
Mothbean	Rjasthan Moth 40	0	0	250	197	300	365	0	0	0	0	0	0
Gram	C 235	0	0	0	0	0	0	1000	1142	1800	1947	4000	4860
	Haryana Chana No. 1	0	0	0	0	0	0	2000	2047	3500	4499	2500	2604
	Haryana Chana 5 (H-96-99)	0	0	0	0	0	0	500	764	600	664	1000	1185
	Others	0	0	0	0	0	0	1000	2067	700	777	0	0
	Haryana Chana 3 (H-86-18)	0	0	0	0	0	0	0	0	150	82	800	805
	Haryana Kabuli 1 (HK 89-131)	0	0	0	0	0	0	0	0	500	500	0	0
	Garima (LH 82-6)	0	0	0	0	0	0	30	100	50	100	150	335
Lentil	Haryana Masar 1 (LH 89-48)	0	0	0	0	0	0	50	54	350	516	200	273
	Sapana (LH 84-8)	0	0	0	0	0	0	30	36	200	347	150	181
	<b>Total</b>	<b>9020</b>	<b>9506</b>	<b>9270</b>	<b>8984</b>	<b>1300</b>	<b>1576</b>	<b>4610</b>	<b>6210</b>	<b>7850</b>	<b>9432</b>	<b>8800</b>	<b>10243</b>

R= Requirement, A= Availability, Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State- Himachal Pradesh**

Qty. in Qtls

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Urdbean	Basant Bahar (PDU-1)	850	850	0	0	0	0	0	0	0	0	0	0
	Kulu Mash NO.4	400	400	225	225	2	2	0	0	0	0	0	0
	Pant U-19	1500	1500	475	475	21	21	0	0	0	0	0	0
	UG-218	4150	4150	2300	2300	27	27	0	0	0	0	0	0
	Azad Urd 1	0	0	1350	1350	0	0	0	0	0	0	0	0
	Birsa Urd 1	0	0	325	325	0	0	0	0	0	0	0	0
	LBG 623	0	0	90	90	0	0	0	0	0	0	0	0
	KU 93-6	0	0	0	0	3800	3800	0	0	0	0	0	0
	MASH 1	0	0	0	0	18	18	0	0	0	0	0	0
	Palampur 93	0	0	0	0	900	900	0	0	0	0	0	0
	TMV 1	0	0	0	0	25	25	0	0	0	0	0	0
Moongbean	Pusa Baisakhi	450	450	0	0	0	0	0	0	0	0	0	0
Rajmash	Contender	0	0	700	780	0	0	0	0	0	0	0	0
Gram	C 235	0	0	0	0	0	0	200	200	54	54	20	20
	Himachal Chana 2	0	0	0	0	0	0	600	600	1123	1123	370	370
	HPG 17	0	0	0	0	0	0	100	100	1521	1521	65	65
	GPF 2	0	0	0	0	0	0	0	0	0	0	300	300
	Hare Chhole No 1	0	0	0	0	0	0	0	0	0	0	45	45
Lentil	Vipasha masar (HPL 5)	0	0	0	0	0	0	500	500	500	500	0	0
	Markanday	0	0	0	0	0	0	0	0	100	100	0	0
	<b>Total</b>	<b>7350</b>	<b>7350</b>	<b>5465</b>	<b>5545</b>	<b>4793</b>	<b>4793</b>	<b>1400</b>	<b>36696</b>	<b>3298</b>	<b>3298</b>	<b>800</b>	<b>800</b>

R= Requirement, A= Availability

**State- Jammu & Kashmir**

Qty. in Qtls

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Urdbean	Pant U-19	87	87	100	100	0	0	0	0	0	0	0	0
	T-9	4	4	0	0	0	0	0	0	0	0	0	0
	IPU 94-1	0	0	200	200	0	0	0	0	0	0	0	0
Moongbean	PS-16	246	46	400	400	0	0	0	0	0	0	0	0
	ML 131	0	0	100	100	0	0	0	0	0	0	0	0
	PDM 54	0	0	100	100	0	0	0	0	0	0	0	0
	TARM 1	0	0	100	100	0	0	0	0	0	0	0	0
Rajmash	Ark Komal (Sel 9)	0	0	1040	1040	2713	2713	0	0	0	0	0	0
	Contender	0	0	2951	2952	0	0	0	0	0	0	0	0
Gram	C 235	0	0	0	0	0	0	300	300	30	30	10	10
	GNG 469	0	0	0	0	0	0	0	0	26	26	67	67
	SCS 3	0	0	0	0	0	0	0	0	0	0	40	40
Lentil	L 9-12	0	0	0	0	0	0	100	100	20	20	0	0
	Shalimar masoor 1	0	0	0	0	0	0	100	100	0	0	0	0
	Pusa vaibhav	0	0	0	0	0	0	0	0	0	0	50	50
Fieldpea	Rachna	0	0	0	0	0	0	0	0	1537	1537	2120	2120
	<b>Total</b>	<b>337</b>	<b>137</b>	<b>4991</b>	<b>4992</b>	<b>2713</b>	<b>2713</b>	<b>500</b>	<b>500</b>	<b>1613</b>	<b>1613</b>	<b>2287</b>	<b>2287</b>

R= Requirement, A= Availability, Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).****State- Jharkhand**

Qty. in Qtls

Crop	Variety	Kharif						Rabi					
		2010		2011		2012		2010		2011		2012	
		R	A	R	A	R	A	R	A	R	A	R	A
Urdbean	Pant U-19	4800	4800	0	0	0	0	0	0	0	0	0	0
	T 9	0	0	4800	3250	0	0	0	0	0	0	0	0
	Birsa Urd 1	0	0	0	0	7920	9723	0	0	0	0	0	0
Moong bean	K-851	4500	2700	1350	0	0	0	0	0	0	0	0	0
	SML 668	0	0	0	0	1980	20173	0	0	0	0	0	0
Arhar	BAHAR	1000	15	0	0	10560	1995	0	0	0	0	0	0
	Birsa Arhar-1	500	5	0	0	0	0	0	0	0	0	0	0
	Laxmi (KANKE-3)	4000	3825	0	0	0	0	0	0	0	0	0	0
	UPAS-120	5500	4725	10000	4385	0	0	0	0	0	0	0	0
Gram	Haryana Kabuli Chana 2 (HK 94-134)	0	0	0	0	0	0	1000	1000	0	0	0	0
	JG 11	0	0	0	0	0	0	4500	4500	0	0	0	0
	KAK 2	0	0	0	0	0	0	1500	1500	0	0	4500	4000
	KWR 108	0	0	0	0	0	0	1000	1000	101900	2048	15000	0
	Pusa 362	0	0	0	0	0	0	2000	2000	0	0	0	0
	Pusa 372	0	0	0	0	0	0	2000	2000	0	0	15000	1000
	Udai (KPG 59)	0	0	0	0	0	0	4000	4000	0	0	15000	759
	Fieldpea	Arkel	0	0	0	0	0	0	6000	6000	0	0	4500
Lentil	Azad (P 1)	0	0	0	0	0	0	1000	1000	0	0	0	0
	DDR 23	0	0	0	0	0	0	900	900	0	0	0	0
	Swarna Rekha (1436)	0	0	0	0	0	0	900	900	0	0	0	0
	Malviya matar 15	0	0	0	0	0	0	0	0	0	0	15000	0
	Pusa Prabhat	0	0	0	0	0	0	0	0	0	0	2000	0
	Malika (K 75)	0	0	0	0	0	0	1500	1500	0	0	2188	1050
	Pant L 406	0	0	0	0	0	0	500	500	13725	2910	2000	0
Lentil	Sheri (DPL 62)	0	0	0	0	0	0	500	500	0	0	0	0
	Azad masur 1 (KLS 218)	0	0	0	0	0	0	0	0	0	0	2000	0
	<b>Total</b>	<b>20300</b>	<b>16070</b>	<b>16150</b>	<b>7635</b>	<b>20460</b>	<b>31891</b>	<b>27300</b>	<b>27300</b>	<b>115625</b>	<b>4958</b>	<b>77188</b>	<b>11109</b>

R= Requirement, A= Availability, Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Rajasthan**

Crop/ Variety	Quantity in Quintals											
	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
R	A	R	A	R	A	R	A	R	A	R	A	
<b>Urdbean</b>												
T-9	5000	7142	1500	698	1250	1256	0	0	0	0	0	0
TAU-2	1000	2045	1000	723	280	286	0	0	0	0	0	0
AZAD URD-1	0	0	300	213	200	210	0	0	0	0	0	0
IPU-94-1	0	0	150	139	25	25	0	0	0	0	0	0
Pant Urd-31	0	0	100	99	0	0	0	0	0	0	0	0
SHEKHAR-1	0	0	700	0	125	128	0	0	0	0	0	0
SHEKHAR-2	0	0	750	575	400	401	0	0	0	0	0	0
AZAD URD-3	0	0	0	0	400	401	0	0	0	0	0	0
TAU-1	0	0	0	0	500	500	0	0	0	0	0	0
WBU-108	0	0	0	0	10	13	0	0	0	0	0	0
TU-94-2	0	0	0	0	20	24	0	0	0	0	0	0
<b>Cowpea</b>												
RCV-7	4000	4000	0	0	0	0	0	0	0	0	0	0
KBC-2	3000	3000	0	0	0	0	0	0	0	0	0	0
RC-101	2500	2500	5000	170	0	0	0	0	0	0	0	0
RC-19	3700	3700	5000	1926	3400	3396	0	0	0	0	0	0
RCP-27	800	953	10	12	0	0	0	0	0	0	0	0
SEL-2603	0	0	990	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	7100	750	0	0	0	0	0	0
<b>Moongbean</b>												
ASHA	1200	1200	600	665	0	0	0	0	0	0	0	0
GANGA-8	400	403	0	0	475	478	0	0	0	0	0	0
GM-4	600	608	800	810	800	800	0	0	0	0	0	0
K-851	25450	25485	12500	12485	5700	5730	0	0	0	0	0	0
Meha	150	164	300	333	120	120	0	0	0	0	0	0
ML 818	100	114	900	901	270	273	0	0	0	0	0	0
MUM-2	3000	3080	80	84	0	0	0	0	0	0	0	0
Others	20	29	0	0	80	83	0	0	0	0	0	0
PDM-139	550	577	100	278	70	70	0	0	0	0	0	0
PUSA VISHAL	30	35	0	0	70	69	0	0	0	0	0	0
RMG -268	2050	2066	3440	3444	450	451	0	0	0	0	0	0
RMG-492	2200	2205	2330	2337	680	686	0	0	0	0	0	0
RMG-62	800	800	740	744	2100	2136	0	0	0	0	0	0
SML-668	18450	18472	28700	28773	20000	15341	0	0	0	0	0	0
GANGA-1	0	0	1400	2832	44	44	0	0	0	0	0	0

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**

Quantity in Quintals

**State – Rajasthan (continued)**

Crop/ Variety	Season											
	Kharif 2011						Rabi 2011					
	2010		2011		2012		2010		2011		2012	
R	A	R	A	R	A	R	A	R	A	R	A	
<b>Moongbean</b>												
RMG 344	0	0	3000	3021	20	22	0	0	0	0	0	0
TYPE-44	0	0	510	534	4000	4040	0	0	0	0	0	0
BM 2002-1	0	0	0	0	1500	1524	0	0	0	0	0	0
HUM-6	0	0	0	0	573	573	0	0	0	0	0	0
HUM-16	0	0	0	0	400	403	0	0	0	0	0	0
Oters (2)	0	0	0	0	11338	6280	0	0	0	0	0	0
Pant moong-4	0	0	0	0	90	91	0	0	0	0	0	0
PDM-54	0	0	0	0	240	241	0	0	0	0	0	0
<b>Mothbean</b>												
CZM-45	1000	1100	0	0	100	1639	0	0	0	0	0	0
RMO-435	500	239	1000	1491	13000	14236	0	0	0	0	0	0
RMO-225	1700	0	0	0	800	863	0	0	0	0	0	0
RMO-257	300	0	500	0	200	264	0	0	0	0	0	0
RM-40	9000	2499	12400	6313	5000	5041	0	0	0	0	0	0
RMO-423	2500	1600	600	544	900	904	0	0	0	0	0	0
MARU VARDHAN	0	0	500	416	0	0	0	0	0	0	0	0
<b>Arhar</b>												
LAXMI	500	600	0	0	200	200	0	0	0	0	0	0
MANAK	200	221	700	763	200	59	0	0	0	0	0	0
UPAS-120	300	430	50	0	100	0	0	0	0	0	0	0
BDN-2	0	0	50	0	220	200	0	0	0	0	0	0
BSMR-175	51992	51800	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	460	1188	0	0	0	0	0	0
Pusa-992	0	0	0	0	20	19	0	0	0	0	0	0
<b>Gram</b>												
ABHA	0	0	0	0	0	0	3200	278	14300	14820	4400	4438
ABHAR	0	0	0	0	0	0	500	546	400	489	700	703
ANUBHAV	0	0	0	0	0	0	8500	8249	8000	8442	14000	6225
Anuradha	0	0	0	0	0	0	400	580	0	0	0	0
AVRODHI	0	0	0	0	0	0	300	0	100	482	2000	2048
C-235	0	0	0	0	0	0	5000	4256	2500	2588	1000	1124
CSJD-884	0	0	0	0	0	0	150	274	0	0	1300	1317
DAHOD YELLOW	0	0	0	0	0	0	3600	2099	2300	2315	3000	608
DCP-92-3	0	0	0	0	0	0	600	54	0	0	400	400
BGD-72	0	0	0	0	0	0	3500	4336	2300	2350	500	525
Gangaur	0	0	0	0	0	0	1500	1770	9200	33359	25000	22332

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).  
State – Rajasthan.**

Quantity in Quintals

Crop/ Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
<b>Gram</b>												
PGC-1	0	0	0	0	0	0	200	252	3300	10	1800	1765
BG-1003	0	0	0	0	0	0	133	97	0	0	0	0
PUSA-1008	0	0	0	0	0	0	200	22	0	0	0	0
Pusa-1103	0	0	0	0	0	0	900	1106	0	0	0	0
PUSA-256	0	0	0	0	0	0	100	115	0	0	0	0
PUSA-372	0	0	0	0	0	0	1700	3070	800	2162	1000	1191
PUSA-391	0	0	0	0	0	0	1900	3221	400	410	700	739
RSG-44	0	0	0	0	0	0	2800	283	700	753	1000	316
SAMRAT	0	0	0	0	0	0	11000	10352	0	0	0	0
UDAY	0	0	0	0	0	0	700	0	0	0	900	969
VARDAN	0	0	0	0	0	0	32250	42305	42000	55592	40000	4354
AADHAR	0	0	0	0	0	0	0	0	3000	3077	5700	5738
ASHA	0	0	0	0	0	0	0	0	1800	1881	7500	7470
GNG-469	0	0	0	0	0	0	0	0	11800	11946	15000	2636
GNG-1499	0	0	0	0	0	0	0	0	500	811	0	0
JG-11	0	0	0	0	0	0	0	0	5000	5329	0	0
Pusa-547	0	0	0	0	0	0	0	0	2000	8241	2900	2902
RSG-896	0	0	0	0	0	0	0	0	500	602	500	276
RSG-902	0	0	0	0	0	0	0	0	1300	1505	1000	230
Others	0	0	0	0	0	0	0	0	6800	7840	5000	6109
Arpita	0	0	0	0	0	0	0	0	0	0	2000	1573
GNG-1292	0	0	0	0	0	0	1000	18	0	0	200	293
GNG-1488	0	0	0	0	0	0	650	654	6000	11974	3500	873
<b>Total</b>	<b>142992</b>	<b>137067</b>	<b>86700</b>	<b>71323</b>	<b>83930</b>	<b>71458</b>	<b>80783</b>	<b>83937</b>	<b>125000</b>	<b>176978</b>	<b>141000</b>	<b>77154</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Tamilnadu**

Quantity in Quintals

Crop/ Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
<b>Urdbean</b>												
ADT-3	620	1200	346	748	1476	6017	3631	3631	1905	1976	5400	5573
T-9	0	0	0	0	396	1906	0	0	365	427	0	0
ADT-5	763	750	290	683	2240	2310	3548	3631	1603	1710	4100	4182
TMV-1	560	1750	196	615	0	0	0	0	2007	2247	1800	1823
VBN-5	0	0	0	0	0	0	0	0	2958	2996	620	679
VAMBAN-3	350	500	204	3258	600	600	3448	3448	756	792	4100	4154
VBN-4	420	400	416	1645	0	0	3095	3095	2285	2580	2800	2849
SHEKHAR-1	0	0	270	1317	245	245	2000	2000	2180	4555	0	0
VAMBAN-2	0	0	620	1858	0	0	2463	2463	1728	1728	530	572
APK-1	0	0	182	468	0	0	0	0	1048	1048	0	0
VAMBAN-1	0	0	296	1089	0	0	0	0	2465	3861	0	0
TU 94-2	0	0	0	0	0	0	0	0	0	0	1289	4590
<b>Cowpea</b>												
Co (CP)-7	818	457	1258	1259	930	3888	660	660	958	1004	885	935
CO 6	1000	559	822	822	600	2964	540	540	644	698	45	80.64
VAMBAN-1	690	385	0	0	0	0	0	0	598	610	120	211.68
PUSA 152	0	0	1250	1453	240	240	0	0	0	0	0	0
<b>Moongbean</b>												
ADT-3	500	480	224	2027	242	2000	2694	2694	1025	1250	1520	1600
CO 6	300	266	342	342	356	1936	3421	3421	870	870	0	0
KM-2	220	250	620	661	452	452	1045	1929	983	985	1200	1250
VBN 3	0	0	0	0	0	0	0	0	680	700	1200	1262
VBN	720	620	246	422	450	450	2100	2100	1252	1651	1100	1184
COGG-912	0	0	120	228	245	2200	356	356	1050	1188	0	0
K-851	0	0	0	0	325	854	1000	1000	690	696	1100	1144
VRM	0	0	98	132	310	1000.72	0	0	1030	1889	1900	1953
VRM (GG1)	0	0	0	0	0	0	0	0	0	0	62931.40	68855.81
<b>Arhar</b>												
Laxmi	0	0	340	390	163	165	72	73	30	30	0	0
APK-1	750	110	0	0	722	722	0	0	90	235	0	0
CORG-9701	1020	150	970	974	614	614	0	0	68	181	0	0
VAMBAN 2	598	88	820	827	0	0	0	0	65	140	0	0
VBN 3	620	91	720	720	640	642	174	174	95	219	0	0
CO 6	0	0	0	0	842	842	0	0	72	126	0	0
<b>Gram</b>												
Co 4	0	0	0	0	0	0	800	800	0	0	820	821
<b>Horsegram</b>												
Paiyur	0	0	450	461	2034	2676	0	0	400	857	4680	4680
<b>Total</b>	<b>9949</b>	<b>8056</b>	<b>11100</b>	<b>22399</b>	<b>14122</b>	<b>32723.72</b>	<b>31047</b>	<b>32015</b>	<b>29900</b>	<b>37249</b>	<b>98140.4</b>	<b>108399.13</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Uttarakhand**

Quantity in Quintals

Crop/ Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
Urdbean												
Pant U-19	300	324			1350	15						
Pant U-30	200	218	1300									
Pant U-35	1000	1000	2200	1230	2300	1983						
TYPE-9	500	600										
Pant Urd-31			800	797	850	3500						
Pant Urd-40					800	449						
Arhar												
Upas-120	1000	1000	1100	300	300	1200						
VI Arhar-1			1100	500	900	235						
Gram												
AVRODHI							50	50	55	482	210	300
PANT G-186							65	65			90	15
RADHEY							50	50	55			
PANT G-114									60	15		
Fieldea												
Pant Pea-14							40		40	0	55	0
RACHNA							20		20	100	55	318
VL42							40		40	0	110	0
Lentil												
Pant L-406							500					
Pant L-4							2000	940	2000	1593	1000	1500
Pant L-5							2000	2475	2000	2000	1000	500
Sheri DPL-62							200	200	1000	1500		
VL Masoor-125							300					
Moongbean												
Pant Moong-4			200	60	200	200						
Horsegram												
VLG-15					1100	60						
Rajmash												
VL R-63	500											
<b>Total</b>	<b>3500</b>	<b>3142</b>	<b>6700</b>	<b>2887</b>	<b>7800</b>	<b>7642</b>	<b>5265</b>	<b>3780</b>	<b>5270</b>	<b>5690</b>	<b>2520</b>	<b>2633</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.



**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).****State – Uttar Pradesh**

Quantity in Quintals

Crop/ Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
Urdbean												
Azad urd-3	400	6950	2000	10463	5900	5910	0	0	0	0	0	0
Azad urd -1	4800	10587	2000	18543	3000	3975	0	0	0	0	0	0
IPU-94-1	2300	2363	0	0	3600	3605	0	0	0	0	0	0
KU-91	200	4500	0	0	0	0	0	0	0	0	0	0
NARENDRA URD 1	1000	5	1000	517	0	0	0	0	0	0	0	0
PANT U 19	6000	7979	1000	6777	0	0	0	0	0	0	0	0
PANT U-19	300	200	0	0	0	0	0	0	0	0	0	0
PANT U 30	2000	2250	0	0	0	0	0	0	0	0	0	0
PANT U 30	300	300	0	0	0	0	0	0	0	0	0	0
PANT U-35	3500	4641	1000	13605	1200	3014	0	0	0	0	0	0
PANT U-35	500	250	0	0	0	0	0	0	0	0	0	0
Pant Urd-31	3000	3739	3500	6592	1500	5500	0	0	0	0	0	0
Pant Urd-31	100	100	0	0	0	0	0	0	0	0	0	0
Pant Urd-40	5000	1700	2000	2200	3000	2797	0	0	0	0	0	0
Pant Urd-40	100	150	0	0	0	0	0	0	0	0	0	0
0hekhar-1	1000	348	7000	6439	3500	2180	0	0	0	0	0	0
Shekhar-2	100	144	1000	6669	3600	3380	0	0	0	0	0	0
Shekhar-3	200	2000	4000	4420	3500	3855	0	0	0	0	0	0
T-9	200	500	11500	12181	4500	2955	0	0	0	0	0	0
T-9	4000	6424	0	0	0	0	0	0	0	0	0	0
Vamban-3	0	0	1000	4881	0	0	0	0	0	0	0	0
TU 94-2	0	0	0	0	3600	3605	0	0	0	0	0	0
Moongbean												
Ganga-8	100	100	0	0	0	0	0	0	0	0	0	0
GM-4	150	150	0	0	0	0	0	0	0	0	0	0
HUM-1	500	300	0	0	500	520	0	0	0	0	0	0
HUM-1	500	150	0	0	0	0	0	0	0	0	0	0
HUM-2	400	300	0	0	500	545	0	0	0	0	0	0
HUM-2	80	80	0	0	0	0	0	0	0	0	0	0
HUM-6	500	298	0	0	0	0	0	0	0	0	0	0

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Uttar Pradesh (continued)**

Quantity in Quintals

Crop/ Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
Moongbean												
HUM-6	120	120	0	0	0	0	0	0	0	0	0	0
K-851	100	100	500	454	400	400	0	0	0	0	0	0
LAM-460	100	400	0	0	0	0	0	0	0	0	0	0
Pant Moong- 2	500	54	0	0	0	0	0	0	0	0	0	0
Pant Moong-4	100	0	250	250	0	0	0	0	0	0	0	0
PDM-139	2000	2007	1580	1592	1000	3064	0	0	0	0	0	0
PDM-54	100	200	0	0	0	0	0	0	0	0	0	0
PUSA-9531	820	20	0	0	0	0	0	0	0	0	0	0
PUSA-9972	100	30	0	0	0	0	0	0	0	0	0	0
SML 668	10000	200	1000	1560	870	2300	0	0	0	0	0	0
TMB-37	100	400	0	0	0	0	0	0	0	0	0	0
TYPE-44	500	0	0	0	0	0	0	0	0	0	0	0
ASHA	0	0	1600	150	600	600	0	0	0	0	0	0
Malaviya jankalyani	0	0	660	660	800	1000	0	0	0	0	0	0
Narendra moong-1	0	0	0	0	1000	610	0	0	0	0	0	0
Meha	0	0	150	150	0	0	0	0	0	0	0	0
Pusa vishal	0	0	0	0	450	450	0	0	0	0	0	0
Sattya	0	0	0	0	100	160	0	0	0	0	0	0
PDM-154	0	0	0	0	680	680	0	0	0	0	0	0
Arhar												
Amar	10	100	0	0	100	150	0	0	0	0	0	0
Bahar	3290	5700	20000	2200	4560	8800	0	0	0	0	0	0
Bahar	100	3300	0	0	0	0	0	0	0	0	0	0
BRG-1	1000	100	0	0	0	0	0	0	0	0	0	0
CHUNI	1000	300	0	0	0	0	0	0	0	0	0	0
DURGA	1000	2000	0	0	0	0	0	0	0	0	0	0
JAGRITI	1000	100	0	0	0	0	0	0	0	0	0	0
LAM-41	1000	400	0	0	0	0	0	0	0	0	0	0
MAL-13	1000	2370	0	0	0	0	0	0	0	0	0	0

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Uttar Pradesh (continued)**

Quantity in Quintals

Crop/ Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
Arhar	0	0	0	0	0	0	0	0	0	0	0	0
MAL-13	100	500	0	0	1800	1098	0	0	0	0	0	0
MA-3	100	500	0	0	1200	732	0	0	0	0	0	0
MA-6	1500	1450	0	0	1500	915	0	0	0	0	0	0
MA-6	100	500	0	0	2200	1342	0	0	0	0	0	0
NDA-88-2	200	600	0	0	0	0	0	0	0	0	0	0
NDA-88-2	8000	3200	0	0	0	0	0	0	0	0	0	0
PUSA-2001	1000	50	0	0	0	0	0	0	0	0	0	0
UPAS-120	8000	9777	5750	8496	3200	4212	0	0	00	0	0	0
UPAS -120	500	2500	0	0	0	0	0	0	0	0	0	0
PARAS	0	0	4000	100	1500	915	0	0	0	0	0	0
Azad k-91-25	0	0	0	0	1800	1950	0	0	0	0	0	0
NDA-98-1	0	0	0	0	800	500	0	0	0	0	0	0
Pusa-992	0	0	0	0	2000	1216	0	0	0	0	0	0
Cowpea	0	0	0	0	0	0	0	0	0	0	0	0
Pusa Komal	0	0	85288	0	0	00	0	0	0	0	0	0
Gram	0	0	0	0	0	0	0	0	0	0	0	0
Alok	0	0	0	0	0	0	700	819	5000	5153	14150	5341
Anubhav	0	0	0	0	0	0	2000	2160	2101	2101	1000	911
Avrodhi	0	0	0	0	0	0	3330	6421	22000	22229	3700	8505
Big gram	0	0	0	0	0	0	0	0	0	0	100	2000
BGD-103	0	0	0	00	0	0	0	0	0	00	100	10200
DCP-92-3	0	0	0	0	0	0	6000	8091	500	409	5000	4210
GNG-1488	0	0	0	0	0	0	0	0	10791	10841	100	500
GCP-105	0	0	0	0	0	0	0	0	0	0	100	4000
Haryana chana 51H-96-99	0	0	0	0	0	0	1000	1000	0	0	500	856
JAKI-9218	0	0	0	0	0	0	0	0	0	0	1000	1171
JG-63	0	0	0	0	0	0	0	0	0	0	100	2500
KRANTI	0	0	0	0	0	0	0	0	0	0	5000	4149
KWR-108	0	0	0	0	0	0	0	0	2000	2108	5000	5093
PRAGATI	0	0	0	0	0	0	0	0	1000	1193	15000	5525
PUSA-1103	0	0	0	0	00	0	80	80	0	0	100	2500

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Uttar Pradesh (continued)**

Crop/ Variety	Quantity in Quintals											
	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
R	A	R	A	R	A	R	A	R	A	R	A	
Gram	0	0	0	0	0	0	0	0	0	0	0	0
PUSA-256	0	0	0	0	0	0	3000	3422	0	0	5000	8472
PUSA-362	0	0	0	0	0	0	2500	2500	4000	4091	5000	5000
PUSA-372	0	0	0	0	0	0	2500	2671	0	0	2000	2820
RADHEY	0	0	0	0	0	0	1000	1231	0	0	15000	2432
RSG-902	0	0	0	0	0	0	0	0	0	0	50	50
RSG-974	0	0	0	0	0	0	0	0	0	0	100	900
RSG-991	0	0	0	0	0	0	0	0	0	0	100	2500
SAMRAT	0	0	0	0	0	0	4500	4816	0	0	15000	5532
UDAY	0	0	0	0	0	0	3000	4185	5000	4527	15000	10914
VAIBHAV	0	0	0	0	0	0	0	0	1500	1514	5000	2004
VARDAN	0	0	0	0	0	0	14000	14447	9000	9276	10000	15227
ABHA	0	0	0	0	0	0	1500	2281	0	0	0	0
Avrodhi	0	0	0	0	0	0	20000	20000	0	0	0	0
C-235	0	0	0	0	0	0	1200	1200	0	0	0	0
BGD-72	0	0	0	0	0	0	350	394	0	0	0	0
GNG-1292	0	0	0	0	0	0	2000	3240	1000	844	0	0
H. chana 1	0	0	0	0	0	0	2500	4600	2500	2809	0	0
H-86-18	0	0	0	0	0	0	1000	1000	1000	1030	0	0
HK-89-131	0	0	0	0	0	0	900	932	0	0	0	0
JG-11	0	0	0	0	0	0	29000	29220	0	0	0	0
JG-315	0	0	0	0	0	0	1000	1000	1000	939	0	0
JG-322	0	0	0	0	0	0	1200	1200	0	0	0	0
PANT G-186	0	0	0	0	0	0	50	50	4500	5208	0	0
BG-1053	0	0	0	0	0	0	90	92	100	100	0	0
BG-1003	0	0	0	0	0	0	400	474	0	0	0	0
PUSA 256	0	0	0	0	0	0	10000	10000	5208	4421	0	0
PUSA 391	0	0	0	0	0	0	1000	1195	0	0	0	0
RADHE	0	0	0	0	0	0	10000	10000	5000	6544	0	0
HK-94-134	0	0	0	0	0	0	0	0	5800	5800	0	0

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Uttar Pradesh (continued)**

Quantity in Quintals

Crop/ Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
Gram												
GNG-469	0	0	0	0	0	0	4500	4500	0	0	0	0
KPG-59	0	0	0	0	0	0	15000	15000	0	0	0	0
GNG-1581	0	0	0	0	0	0	0	0	26000	26562	0	0
Vijay	0	0	0	0	0	0	10500	10500	0	0	0	0
Vishal Phule	0	0	0	0	0	0	1400	1400	0	0	0	0
Lentil												
VL-507	0	0	0	0	0	0	0	0	0	0	1000	1954
LH 89-48	0	0	0	0	0	0	2000	1850	0	0	1000	1792
HUL-57	0	0	0	0	0	0	8000	5810	0	0	1000	1802
MALIKA	0	0	0	0	0	0	15000	12925	0	0	6000	7283
NDL-92-1	0	0	0	0	0	0	5980	5849	0	0	6000	5953
IPL-81	0	0	0	0	0	0	5000	5000	0	0	7000	2480
PANT LENTIL-5	0	0	0	0	0	0	0	0	0	0	2000	1776
DPL-15	0	0	0	0	0	0	2500	2616	0	0	1400	1554
L-4147	0	0	0	0	0	0	0	0	0	0	3000	3000
KL-320	0	0	0	0	0	0	0	0	0	0	3000	5017
SHERI DPL-62	0	0	0	0	0	0	2500	1769	0	0	6000	7178
VL-507	0	0	0	0	0	0	4000	3844	0	0	5000	2022
HUL-57	0	0	0	0	0	0	500	500	0	0	0	0
NDL-92-1	0	0	0	0	0	0	1000	1000	0	0	0	0
JL-1	0	0	0	0	0	0	100	135	0	0	0	0
PRIYA	0	0	0	0	0	0	2000	2000	0	0	0	0
Pant L-406	0	0	0	0	0	0	20	29	0	0	0	0
PANT L-406	0	0	0	0	0	0	1000	1000	0	0	0	0
SHERI DPL-62	0	0	0	0	0	0	1000	1000	0	0	0	0
K-75	0	0	0	0	0	0	1000	1000	0	0	0	0
Fieldpea	0	0	0	0	0	0	0	0	0	0	0	0
ADARSH	0	0	0	0	0	0	1750	216	300	412	10000	6249
AMBIKA	0	0	0	0	0	0	0	0	0	0	3000	3290
KPMR-144-1	0	0	0	0	0	0	0	0	0	0	8000	8265
KPMR-400	0	0	0	0	0	0	16150	11138	25000	25833	13000	12132
KPMR-552	0	0	0	0	0	0	0	0	20000	20328	13000	13507
	0	0	0	0	0	0	0	0	0	0	0	0
HUDP-15	0	0	0	0	0	0	8600	5807	4000	6266	8700	7669

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Uttar Pradesh.**

Quantity in Quintals

Crop/ Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
Fieldpea	0	0	0	0	0	0	0	0	0	0	0	0
Pant p-14	0	0	0	0	0	0	0	0	500	540	10000	10021
Prakash	0	0	0	0	0	0	250	260	300	323	10000	11704
RACHNA	0	0	0	0	0	0	10000	10000	28000	22654	10000	10807
SWATI	0	0	0	0	0	0	5000	5000	300	353	10000	10029
UTTRA	0	0	0	0	0	0	0	0	0	0	5000	4300
Vikas	0	0	0	0	0	0	0	0	1000	1160	10000	11420
Apama	0	0	0	0	0	0	10000	7488	10000	14768	0	0
Apama	0	0	0	0	0	0	4000	4000	0	0	0	0
Arkel	0	0	0	0	0	0	5000	2000	0	00	0	0
KFP(103)	0	0	0	0	0	0	5000	21115	0	0	0	0
KPMR-400	0	0	0	0	0	0	15000	15000	0	0	0	0
KPMR-522	0	0	0	0	0	0	15000	10788	0	0	0	0
KPMR-522	0	0	0	0	0	0	2000	2000	0	0	0	0
HUDP-15	0	0	0	0	0	0	1000	1000	0	0	0	0
Rachna	0	0	0	0	0	0	14000	12264	0	0	0	0
Sapna	0	0	0	0	0	0	6500	4941	4300	3751	0	0
Sapna	0	0	0	0	0	0	3000	3000	0	0	0	0
Shikha	0	0	0	0	0	0	5000	5000	6300	5543	0	0
<b>Total</b>	<b>80670</b>	<b>92915</b>	<b>157778</b>	<b>108003</b>	<b>64460</b>	<b>72935</b>	<b>336050</b>	<b>337465</b>	<b>215000</b>	<b>219630</b>	<b>276300</b>	<b>264516</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**  
**State – Tripura**

Crop/ Variety	Quantity in Quintals											
	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
R	A	R	A	R	A	R	A	R	A	R	A	
<b>Urdbean</b>												
Pant U 1	150	150	170	170	102	102	40	40	0	0	0	0
Azad U 1	0	0	0	0	0	0	0	0	0	0	50	50
<b>Moongbean</b>												
PDM-54	60	60	0	0	0	0	0	0	35	35	0	0
HUM-2	0	0	0	0	0	0	28	28	0	0	0	0
K 851	0	0	30	30	54	54	0	0	0	0	30	30
Malaviya Jankalyani	0	0	30	30	0	0	0	0	15	15	0	0
PDM 139	0	0	10	10	0	0	0	0	0	0	0	0
Pusa Vishal	0	0	5	5	0	0	0	0	0	0	0	0
<b>Arhar</b>												
UPAS 120	150	150	209	209	157	0	0	0	0	0	0	0
Narendra Arhar 1	0	0	1	1	0	0	0	0	0	0	0	0
<b>Fieldpea</b>												
HUDP-15	0	0	0	0	0	0	285	285	59	59	280	280
Rachna	0	0	0	0	0	0	0	0	316	316	0	0
<b>Lentil</b>												
SAPANA	0	0	0	0	0	0	57	57	0	0	0	0
NOORI	0	0	0	0	0	0	0	0	65	65	0	0
<b>Cowpea</b>												
Cowpea	0	0	100	100	0	0	0	0	0	0	0	0
<b>Gram</b>												
C-235	0	0	0	0	0	0	0	0	0	0	30	30
<b>Total</b>	<b>360</b>	<b>360</b>	<b>555</b>	<b>555</b>	<b>313</b>	<b>156</b>	<b>410</b>	<b>410</b>	<b>490</b>	<b>490</b>	<b>390</b>	<b>390</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 8: State / Crop wise requirement and availability of certified / quality seed of Pulses (Continued).**

**State – Puducherry**

Quantity in Quintals

Crop/ Variety	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
	R	A	R	A	R	A	R	A	R	A	R	A
<b>Urdbean</b>												
<b>T-9</b>	10		20	25	20	20			100	100	50	
<b>T-9</b>	7	7										
<b>ADT-3</b>									150	150	25	
<b>VAMBAN-1</b>									25	25	0	
<b>VBN(Bg)5</b>									0	0	25	
<b>Moongbean</b>												
<b>ADT-3</b>	3	3	20	10	10	0						
<b>ADT-3</b>	5				10	10						
<b>KN-2</b>											25	
<b>VRM(GG-1)</b>											25	
<b>Total</b>	<b>25</b>	<b>10</b>	<b>40</b>	<b>35</b>	<b>40</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>275</b>	<b>275</b>	<b>150</b>	<b>0</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.



**Annexure 8: Total requirement and availability of certified / quality seed of Pulses in India.**

State	Quantity in Quintals											
	Season											
	Kharif						Rabi					
	2010		2011		2012		2010		2011		2012	
R	A	R	A	R	A	R	A	R	A	R	A	
Andhra Pradesh	66311	130182	62802	112938	62883	166839	476401	706634	486136	853413	467503	476519
Assam	0	0	0	0	10125	10125	35350	35350	37000	37000	37675	37675
Bihar	3780	1860	5175	6250	5575	4950	25700	106096	33000	28115	32000	29597
Chhattisgarh	4200	2813	6168	8585	6338	4511	37293	28232	40969	26587	48827	21031
Odisha	4600	3952	4184	106	5797	19659	15331	7	14973	7	13160	9026
Punjab	1300	387	4445	6151	1400	1352	22255	21496	775	968	1025	1478
West Bengal	3515	3515	4282	4282	4660	4673	10570	10570	14640	14640	16280	16263
Karnataka	55850	56130	59385	61395	51415	49808	114447	131279	125680	140235	226701	168934
Madhya Pradesh	26000	24312	29684	24018	35300	15229	226807	218249	299657	256320	342093	384529
Maharashtra	126000	115562	189905	206619	148768	150624	162900	171000	187440	224965	201300	215700
Manipur	565	565	1150	1150	1150	1150	5788	6388	6330	6330	9130	9130
Mizoram	0	0	26	26	46	46	0	0	112	112	0	0
Meghalaya	0	0	0	0	0	0	0	0	0	0	720	720
Goa	25	20	10	5	0	0	35	35	35	35	2	2
Gujarat	15500	15965	44100	44400	36200	47771	42500	43015	38500	49104	43401	43689
Haryana	9020	9506	9270	8984	1300	1576	4610	6210	7850	9432	8800	10243
Himachal Pradesh	7350	7350	5465	5545	4793	4793	1400	36696	3298	3298	800	800
Jammu Kashmir	337	137	4991	4992	2713	2713	500	500	1613	1613	2287	2287
Jharkhand	20300	16070	16150	7635	20460	31891	27300	27300	115625	4958	77188	11109
Rajasthan	142992	137067	86700	71323	83930	71458	80783	83937	125000	176978	141000	77154
Tamil Nadu	9949	8056	11100	22399	14122	32724	31047	32015	29900	37249	98140	108399
Uttarakhand	3500	3142	6700	2887	7800	7642	5265	3780	5270	5690	2520	2633
Uttar Pradesh	80670	92915	157778	108003	64460	72935	336050	337465	215000	219630	276300	264516
Tripura	360	360	555	555	313	156	410	410	490	490	390	390
Puducherry	25	10	40	35	40	30	0	0	275	275	150	0
<b>Total</b>	<b>582149</b>	<b>629876</b>	<b>710065</b>	<b>708283</b>	<b>569588</b>	<b>702655</b>	<b>1662742</b>	<b>2006664</b>	<b>1789568</b>	<b>2097444</b>	<b>2047392</b>	<b>1891824</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 9: State / Season wise varieties under cultivation preferred by farmers.**

Crop/ State	Gujarat Varieties	Bihar Varieties	Tamil Nadu Varieties	Pondicherry Varieties	Maharashtra Varieties	Mizoram Varieties
<b>Kharif</b>						
<b>Pigeonpea</b>	GT-101, GTH-1, GT-102, Vaishali, AVPT-1, AGT-2, GT-1, GT-100	Pusa- 9, Mal-13, Narendra Arhar, Bahar, BR-65	VBN-2, CD(Rg)-7, CO-6, VBN-1, APK-1, BSR-1		BDN-708, Vipula, BSMR-853, PKV-TAT-9629,GTH-1, AT-8811,AKPH-410, ICPH-2671,2740, BSMR-736, ICPL-87119, 87, ICP- 8863.	LGG-26
<b>Urdbean</b>	GU-1, T-9, TAU-2, AKU-4	T-9, Narendra urd-1, BDU-1, Pant urd-31, Azad-1.	VBN(BG)-4, T-9, CO-5, ADT-3, 5, VBN-1,2,3,		AKU-15, KU-96-3, TU-94-2, BARKHA (RBU-38)	
<b>Moongbean</b>	GM-4, MEHA, K-851, GM-3, CO-4.	SML-668, MH-96-1, HUM-16, Pant moong-6, PS-16, Sona, Pusa, Vaisakhi, Pusa vishal, PDM-54	KM-2, ADT-3, CO-6, VBN-1,2, K-1, CO-4.		PKV Moong-8802, BM-2002-1, BPMR-145, VAIBHAV, Kopargaon, AKM-8803	
<b>Mothbean</b>	GM-2, GMO-1		CO(CP)-7		Maru Bahar-(RMD-435)	
<b>Cowpea</b>			CO-6, CO-2, Paiyur-1, VBN-1,2.			Local
<b>Horsegram</b>	GDHG-5, Local	Madhu, BR-5,10, M-18, CO-1, Local.	CO-1, Paiyur-2.		Seena, Maan	
<b>Rabi</b>						
<b>Chickpea</b>	GJG-3, GG-1,2.	PG-114,10, Vaibhav, GLP-105, P-256,372, Smart, Vishal, Uday, SG-2, Rachana, Avrodhi, C-235, L-550, BG-1053, DCP-92-3.	CO-3,4.		JAK 1-92-18, GULAK-1, PKV-KABULI-2, Sokoli-9516, Vijay, Digvijay, Pusa suprabha, Jawahar gram Kabuli KAK-2, Virat, Vijay, Kranti, ICCV-10, 37,32, BHARATI, Vishwas, Phule-4-5.	
<b>Lentil</b>		HUL-57, KLS-218, K-75, Noori, Arun- 77-12, PL-639, DPL-15,62, BR-25			Noori (IPL-81), JL-3	
<b>Fielpea</b>	DF-1, Local	Swati, Pusa, Panna, Sikha, Malria, Matar-15, Rehana, Arpana, Pusa Prabhat, Harivajan, DDR-13			KPMR-400, IPFD-99-13, JP-885, Ambika	Arkel
<b>Lathyrus</b>		Local varieties, BR-13, Local			Ratan	
<b>Moogbean</b>		Pant Moong-6, SML-668, HUM-12,16, PDM-139, TMB-37, MH-69-1, Pant Moong-4, PDM-54, Pusa vishal, Sona, PS-16, Pusa vaishakhi.	KM-2, ADT-3, CO-6, VBN-1,2, K-1, CO-4	KM-2, ADT-3, VBN-2	PKV-Moong-8802, BM-2002-1, BPMR-145, Vaibhav, Kopargaon, AKM- 8803.	
<b>Cowpea</b>			CO-6, 2, Paiyur-1, VBN- 1, 2, CO(LP)-7			
<b>Horsegram</b>			CO-1, Paiyur-2		Seena, Maan	
<b>Urdbean</b>				T-9, VBN-3, 4, ADT-3	AKU-15, KV-96-3, TU-94-2, RBU-38	
<b>Rajmash</b>					Varun, HPR- 35	
<b>Summer</b>						
<b>Urdbean</b>					AKU-15, KV 96-3, TU- 94-2, BARKHA	
<b>Moongbean</b>					PKV Moong-8802, BM-2002-1, BPMR-145, Kopergaon, AKM- 8803	

Source: State Departments of Agriculture

**Annexure 10: Recommended climatic conditions for pulses (Continued).**

<b>Crop</b>	<b>Germination</b>	<b>Vegetative &amp; Branching</b>	<b>Reproductive Flowering, fruit, grain maturity</b>	<b>Harvesting</b>	<b>Threshing</b>	<b>GrainMoisture for storage (%)</b>
<b>Arhar</b>	30-35 °C	20-25 °C	Flowering & pod setting about 15-18°C. Maturity- 35-40 °C.	Best time for harvesting is when two third to three fourth pods are mature judged by changing their colour to brown. The plants are usually cut with a sickle within 75-25 cm above the ground.	Harvested plants should be left in the field for sun drying for 3-6 days depending on season. Then threshing is done either by beating the pods with stick or using other suitable threshing method.	8-10 %
<b>Moong bean</b>	30-35 °C	Crop needs high temperature, less humidity and moderate rainfall about 60-80 cms.	Flowering & pod setting 15-18°C. Maturity 25-30 °C.	Harvested when more than 80% pods are mature.	Plants are cut with the sickle and dried on the threshing floor and these are then threshed by beating with sticks or by trampling with bullocks.	
<b>Urdbean</b>	30-35 °C	Crop requires hot and humid climate for best growth with about 27-30 °C temperature.	Flowering & pod setting 15-18°C. Maturity 25-30 °C	Harvested when most of the pods turn black.	Harvested crop should be dried on threshing floor for few days and then threshed.	
<b>Mothbean</b>	Optimum temperature requirement for growth and development of the crop is 25-37 °C.			Crop may be harvested when pods get mature and turn brown.	Grains and plant residues are separated by threshing.	

**Annexure 10: Recommended climatic conditions for pulses (Continued).**

<b>Crop</b>	<b>Germi- nation</b>	<b>Vegetative &amp; Branching</b>	<b>Reproductive Flowering, fruit, grain maturity</b>	<b>Harvesting</b>	<b>Threshing</b>	<b>Grain Moisture for Storage (%)</b>
<b>Kulthi</b>	Crop is grown in Kharif as well as Rabi season. About 20-35 °C temperature is required for development of the crop.			Crop is harvested on its maturity.	Grains and plant residues are separated by threshing.	
<b>Gram</b>	28-30 °C	15-25 °C	20-30 °C	Crop becomes ready for harvest when leaves begin to fall, stem and pod turn brown or straw in colour and seeds are hard and rattle (most important) with 15% moisture inside them. Over ripening may lead to fall of pods as well as shattering and seed cracking if seed moisture falls below 10% due to delay in harvesting.	Crop is allowed to dry for 2-4 days on threshing floor (depending on situation) and threshed by manually or bullock / power drawn thresher.	
<b>Lentil</b>	28-30 °C	Optimum 15-25 °C	20-30 °C	Crop becomes ready for harvest when leaves begin to fall, stem and pod turn brown or straw in colour and seeds are hard and rattle (most important) with 15% moisture inside them. Over ripening may lead to fall of pods as well as shattering and seed cracking if seed moisture fall below 10% due to delay in harvesting.	Crop is allowed to dry for 4-7 days on threshing floor (depending on situation) and threshed by manually or bullock / power drawn thresher.	

**Annexure 10: Recommended climatic conditions for pulses.**

<b>Crop</b>	<b>Germination</b>	<b>Vegetative &amp; Branching</b>	<b>Reproductive Flowering, fruit, grain maturity</b>	<b>Harvesting</b>	<b>Threshing</b>	<b>Grain Moisture for Storage (%)</b>
<b>Fieldpea</b>	28-30 °C	15-25 °C	20-30 °C	It should be harvested when they are fully ripe and threshed after sufficient drying in the sun.	Harvested fieldpea plants should be sun dried 3-4 days.	
<b>Lathyrus</b>	It needs about 20-30 °C temperature for completing its life cycle.			Harvest the crop with the help of sickle when colour of pods change to brown and grains are at dough stage having approximately 15% moisture inside them.	Harvested produce may be allowed to dry in sunlight for a week and after threshing is done by beating with sticks or trampling under the feet of bullocks.	
<b>Frenchbea</b>	For good health of the crop, temperature ranging 12- 25 °C is required. Flowers shedding strat above 30 °C.			Crop matures in 125-130 days. Plants are cut with sickles after attaining full maturity judged by severe leaf fall, changing colour of pods and hardness of the grains.	Harvested materials, after 3-4 days sun drying, are collected in bundles to the threshing floors. Threshing is done by beating with sticks or trampling under the feet of bullocks.	
<b>Cowpea</b>	15-30 °C			Green pods for use as vegetable can be harvested 45-90 DAS depending on the variety. For grains, the crop can be harvested in about 90-125 DAS when pod are fully matured	Harvested materials after 3-4 days sun dried then threshed.	

**Annexure 11: State / crop wise temperature for different stages of pulse crops.**

Temperature in (°C)

Season	State/crop	GUJARAT						BIHAR						MIZORAM						
		Germ ination	Seed ling	Veget ative.	Flowe ring	Pod formation	Matu rity	Germ ination	Seed ling	Veget ative.	Flowe ring	Pod formation	Matu rity	Germ ination	Seed Ling	Veget ative.	Flowe ring	Pod forma tion	Mat urity	
<b>kharif</b>	Pigeonpea	24.9	22.1	28-35	28-35	28-35	28-35	25	26	30	32	38	43	26-30	26-30	29-34	29-35	29-35	23-26	
	Urdbean	28-35	28-35	28-35	28-35	28-35	28-35	25	25	25	26	26	28							
	Moongbean	28-35	28-35	28-35	28-35	28-35	28-35	25	24	25	26	27	27							
	Mothbean	28-35	28-35	28-35	28-35	28-35	28-35													
	Horsegram	28-35	28-35	28-35	28-35	28-35	28-35	25	25	26	26	27	28							
	Cowpea														26-30	26-30	29-34	29-35	29-35	23-26
	Ricebean														26-30	26-30	29-34	29-35	29-35	23-26
<b>Rabi</b>	Chickpea	28	26	25	18	20	22	20-30	28	32	36	39	44							
	Lentil							20	22	24	29	39	43							
	Fieldpea	15-25	15-25	15-25	15-25	15-25	15-25	20	22	24	28	32	38	20-27	20-25	20-23	18-23	18-23	18-20	
	Khesari							20	21	23	26	32	40							
	Cowpea														20-27	20-25	20-23	18-23	18-23	18-20
	Rajmash	35-45	35-45	35-45	35-45	35-45	35-45								20-27	20-25	20-23	18-23	18-23	18-20
<b>Summer</b>	Urdbean	35-45	35-45	35-45	35-45	35-45	35-45													
	Moongbean	35-45	35-45	35-45	35-45	35-45	35-45	40	41	42	43	43	44							
	Cowpea	35-45	35-45	35-45	35-45	35-45	35-45													

Source = State Departments of Agriculture.

### Annexure 12: Performance of pulses in different ecologies in India (Continued).

Crop		Performance of pulses based on area, production and yield at triennium ending 2010.
<b>Kharif Pulses</b>		
<b>Pigeonpea</b>	<b>A</b>	1. Maharashtra, 2. Karnataka, 3. Andhra Pradesh, 4. Madhya Pradesh, 5. Uttar Pradesh, 6. Gujarat, 7. Odisha, 8. Jharkhand, 9. Chhattisgarh, 10. Tamil Nadu, 11. Bihar, 12. Haryana, 13. Rajasthan, 14. Assam, 15. Punjab, 16. West Bengal.
	<b>P</b>	1. Maharashtra, 2. Karnataka, 3. Uttar Pradesh, 4. Gujarat, 5. Madhya Pradesh, 6. Andhra Pradesh, 7. Odisha, 8. Jharkhand, 9. Bihar, 10. Haryana, 11. Chhattisgarh, 12. Tamilnadu, 13. Rajasthan, 14. Punjab, 15. Assam, 16. West Bengal.
	<b>Y</b>	1. Bihar, 2. West Bengal, 3. Haryana, 4. Gujrat, 5. Punjab, 6. Odisha, 7. Uttar Pradesh, 8. Maharashtra, 9. Assam, 10. Jharkhand, 11. Tamilnadu, 12. Rajasthan, 13. Madhya Pradesh, 14. Karnataka, 15. Chhattisgarh, 16. Andhra Pradesh.
<b>Urdbean</b>	<b>A</b>	1. Madhya Pradesh, 2. Uttar Pradesh, 3. Maharashtra, 4. Rajasthan, 5. Odisha, 6. Karnataka, 7. Chhattisgarh, 8. Gujrat, 9. Jharkhand, 10. Andhra Pradesh, 11. West Bengal, 12. Tamilnadu, 13. Bihar, 14. Punjab.
	<b>P</b>	1. Uttar Pradesh, 2. Madhya Pradesh, 3. Maharashtra, 4. Gujrat, 5. Rajasthan, 6. Jharkhand, 7. Odisha, 8. Andhra Pradesh, 9. West Bengal, 10. Chhattisgarh, 11. Karnataka, 12. Bihar, 13. Tamilnadu, 14. Punjab.
	<b>Y</b>	1. Bihar, 2. West Bengal, 3. Jharkhand, 4. Gujrat, 5. Uttar Pradesh, 6. Punjab, 7. Maharashtra, 8. Tamilnadu, 9. Rajasthan, 10. Andhra Pradesh, 11. Madhya Pradesh, 12. Odisha, 13. Karnataka, 14. Chhattisgarh.
<b>Moongbean</b>	<b>A</b>	1. Rajasthan, 2. Maharashtra, 3. Karnataka, 4. Andhra Pradesh, 5. Odisha, 6. Gujrat, 7. Madhya Pradesh, 8. Uttar Pradesh, 9. Jharkhand, 10. Tamilnadu, 11. Haryana, 12. Chhattisgarh, 13. Bihar, 14. Punjab, 15. West Bengal.
	<b>P</b>	1. Rajasthan, 2. Maharashtra, 3. Andhra Pradesh, 4. Gujrat, 5. Karnataka, 6. Uttar Pradesh, 7. Madhya Pradesh, 8. Odisha, 9. Jharkhand, 10. Tamilnadu, 11. Haryana, 12. Punjab, 13. Bihar, 14. Chhattisgarh, 15. West Bengal.
	<b>Y</b>	1. Punjab, 2. West Bengal, 3. Bihar, 4. Uttar Pradesh, 5. Tamilnadu, 6. Haryana, 7. Jharkhand, 8. Maharashtra, 9. Gujrat, 10. Rajasthan, 11. Andhra Pradesh, 12. Madhya Pradesh, 13. Chhattisgarh, 14. Odisha, 15. Karnataka.
<b>Mothbean</b>	<b>A</b>	1. Rajasthan, 2. Gujrat, 3. Maharashtra.
	<b>P</b>	1. Rajasthan, 2. Gujrat, 3. Maharashtra.
	<b>Y</b>	1. Gujrat, 2. Maharashtra, 3. Rajasthan.
<b>Horsegram</b>	<b>A</b>	1. Karnataka, 2. Odisha, 3. Chhattisgarh, 4. Madhya Pradesh, 5. Maharashtra, 6. Jharkhand, 7. Tamilnadu, 8. Bihar, 9. Andhra Pradesh.
	<b>P</b>	1. Karnataka, 2. Odisha, 3. Chhattisgarh, 4. Bihar, 5. Jharkhand, 6. Maharashtra, 7. Madhya Pradesh, 8. Tamilnadu, 9. Andhra Pradesh.
	<b>Y</b>	1. Bihar, 2. Jharkhand, 3. Andhra Pradesh, 4. Karnataka, 5. Tamilnadu, 6. Maharashtra, 7. Madhya Pradesh, 8. Odisha, 9. Chhattisgarh.
<b>Kharif</b>	<b>A</b>	1. Rajasthan, 2. Maharashtra, 3. Karnataka, 4. Madhya Pradesh, 5. Uttar Pradesh, 6. Andhra Pradesh, 7. Gujarat, 8. Odisha, 9. Jharkhand, 10. Chhattisgarh, 11. Tamil Nadu, 12. Bihar, 13. Haryana, 14. West Bengal, 15. Punjab, 16. Assam.
	<b>P</b>	1. Maharashtra, 2. Rajasthan, 3. Karnataka, 4. Uttar Pradesh, 5. Gujarat, 6. Andhra Pradesh, 7. Madhya Pradesh, 8. Odisha, 9. Jharkhand, 10. Tamil Nadu, 11. Chhattisgarh, 12. Bihar, 13. Haryana, 14. West Bengal, 15. Punjab, 16. Assam.
	<b>Y</b>	1. Bihar, 2. Punjab, 3. Haryana, 4. Assam, 5. Gujarat, 6. West Bengal, 7. Uttar Pradesh, 8. Jharkhand, 9. Maharashtra, 10. Odisha, 11. Madhya Pradesh, 12. Karnataka, 13. Tamil Nadu, 14. Andhra Pradesh, 15. Rajasthan, 16. Chhattisgarh.
<b>Rabi Pulses</b>		
<b>Chickpea</b>	<b>A</b>	1. Madhya Pradesh, 2. Maharashtra, 3. Rajasthan, 4. Karnataka, 5. Andhra Pradesh, 6. Uttar Pradesh, 7. Chhattisgarh, 8. Gujrat, 9. Haryana, 10. Jharkhand 11. Bihar, 12. Odisha, 13. West Bengal, 14. Tamilnadu, 15. Punjab, 16. Assam.
	<b>P</b>	1. Madhya Pradesh, 2. Maharashtra, 3. Rajasthan, 4. Andhra Pradesh, 5. Karnataka, 6. Uttar Pradesh, 7. Chhattisgarh, 8. Gujrat, 9. Haryana, 10. Jharkhand, 11. Bihar, 12. Odisha, 13. West Bengal, 14. Tamilnadu, 15. Punjab, 16. Assam.
	<b>Y</b>	1. Andhra Pradesh, 2. Punjab, 3. West Bengal, 4. Gujrat, 5. Bihar, 6. Madhya Pradesh, 7. Jharkhand, 8. Haryana, 9. Uttar Pradesh, 10. Chhattisgarh, 11. Maharashtra, 12. Rajasthan, 13. Odisha, 14. Tamilnadu, 15. Karnataka Assam
<b>Lentil</b>	<b>A</b>	1. Uttar Pradesh, 2. Madhya Pradesh, 3. Bihar, 4. West Bengal, 5. Rajasthan, 6. Assam, 7. Jharkhand, 8. Chhattisgarh, 9. Maharashtra, 10. Haryana, 11. Punjab
	<b>P</b>	1. Uttar Pradesh, 2. Madhya Pradesh, 3. Bihar, 4. West Bengal, 5. Jharkhand, 6. Rajasthan, 7. Assam, 8. Chhattisgarh, 9. Haryana, 10. Maharashtra, 11. Punjab
	<b>Y</b>	1. Jharkhand, 2. Rajasthan, 3. Bihar, 4. West Bengal, 5. Uttar Pradesh, 6. Punjab, 7. Assam, 8. Madhya Pradesh, 9. Maharashtra, 10. Chhattisgarh, 11. Haryana
<b>Field Pea</b>	<b>A</b>	1. Uttar Pradesh, 2. Madhya Pradesh, 3. Jharkhand, 4. Bihar, 5. Maharashtra, 6. Assam, 7. Chhattisgarh, 8. West Bengal, 9. Rajasthan, 10. Punjab, 11. Haryana
	<b>P</b>	1. Uttar Pradesh, 2. Madhya Pradesh, 3. Jharkhand, 4. Bihar, 5. Assam, 6. Maharashtra, 7. West Bengal, 8. Rajasthan, 9. Chhattisgarh, 10. Punjab, 11. Haryana
	<b>Y</b>	1. Rajasthan, 2. Uttar Pradesh, 3. West Bengal, 4. Bihar, 5. Haryana, 6. Jharkhand, 7. Punjab, 8. Assam, 9. Maharashtra, 10. Madhya Pradesh, 11. Chhattisgarh

**Annexure 12: Performance of pulses in different ecologies in India (Continued).**

Crop		Performance of pulses based on area, production and yield at triennium ending 2010.
Urdbean	A	1. Andhra Pradesh, 2. Tamilnadu, 3. Assam, 4. Uttar Pradesh, 5. Karnataka, 6. West Bengal, 7. Maharashtra, 8. Odisha, 9. Madhya Pradesh, 10. Chhattisgarh
	P	1. Andhra Pradesh, 2. Tamilnadu, 3. Assam, 4. Uttar Pradesh, 5. West Bengal, 6. Karnataka, 7. Maharashtra, 8. Odisha, 9. Madhya Pradesh, 10. Chhattisgarh
	Y	1. West Bengal, 2. Uttar Pradesh, 3. Andhra Pradesh, 4. Assam, 5. Maharashtra, 6. Karnataka, 7. Odisha, 8. Tamilnadu, 9. Madhya Pradesh, 10. Chhattisgarh
Moongbean	A	1. Bihar, 2. Odisha, 3. Tamilnadu, 4. Andhra Pradesh, 5. Uttar Pradesh, 6. West Bengal, 7. Karnataka, 8. Maharashtra, 9. Assam, 10. Chhattisgarh, 11. Madhya Pradesh
	P	1. Bihar, 2. Odisha, 3. Andhra Pradesh, 4. Tamilnadu, 5. Uttar Pradesh, 6. West Bengal, 7. Assam, 8. Maharashtra, 9. Karnataka, 10. Chhattisgarh, 11. Madhya Pradesh
	Y	1. Uttar Pradesh, 2. Bihar, 3. West Bengal, 4. Assam, 5. Andhra Pradesh, 6. Maharashtra, 7. Odisha, 8. Karnataka, 9. Tamilnadu, 10. Madhya Pradesh, 11. Chhattisgarh
Lathyrus	A	1. Chhattisgarh, 2. Bihar, 3. Madhya Pradesh, 4. West Bengal, 5. Maharashtra
	P	1. Chhattisgarh, 2. Bihar, 3. Madhya Pradesh, 4. West Bengal, 5. Maharashtra
	Y	1. Bihar, 2. West Bengal, 3. Madhya Pradesh, 4. Chhattisgarh, 5. Maharashtra
Horsegram	A	1. Karnataka, 2. Andhra Pradesh, 3. Tamilnadu, 4. Maharashtra, 5. Chhattisgarh, 6. Madhya Pradesh, 7. Odisha
	P	1. Karnataka, 2. Andhra Pradesh, 3. Tamilnadu, 4. Maharashtra, 5. Chhattisgarh, 6. Odisha, 7. Madhya Pradesh
	Y	1. Odisha, 2. Maharashtra, 3. Karnataka, 4. Tamilnadu, 5. Andhra Pradesh, 6. Chhattisgarh, 7. Madhya Pradesh
Rabi	A	1. Madhya Pradesh, 2. Uttar Pradesh, 3. Maharashtra, 4. Andhra Pradesh, 5. Rajasthan, 6. Karnataka, 7. Chhattisgarh, 8. Bihar, 9. Tamil Nadu, 10. Odisha, 11. Gujarat, 12. Jharkhand, 13. West Bengal, 14. Haryana, 15. Assam, 16. Punjab.
	P	1. Madhya Pradesh, 2. Uttar Pradesh, 3. Maharashtra, 4. Andhra Pradesh, 5. Rajasthan, 6. Karnataka, 7. Chhattisgarh, 8. Bihar, 9. Gujarat, 10. Odisha, 11. Tamil Nadu, 12. Jharkhand, 13. West Bengal, 14. Haryana, 15. Assam, 16. Punjab.
	Y	1. Punjab, 2. Andhra Pradesh, 3. Gujarat, 4. Haryana, 5. Uttar Pradesh, 6. Jharkhand, 7. Madhya Pradesh, 8. West Bengal, 9. Bihar, 10. Rajasthan, 11. Maharashtra, 12. Chhattisgarh, 13. Karnataka, 14. Assam, 15. Odisha, 16. Tamil Nadu.
Horsegram (K+R)	A	1. Karnataka, 2. Odisha, 3. Chhattisgarh, 4. Tamil Nadu, 5. Andhra Pradesh, 6. Maharashtra, 7. Madhya Pradesh, 8. Jharkhand, 9. Bihar.
	P	1. Karnataka, 2. Andhra Pradesh, 3. Tamil Nadu, 4. Odisha, 5. Maharashtra, 6. Chhattisgarh, 7. Bihar, 8. Jharkhand, 9. Madhya Pradesh.
	Y	1. Bihar, 2. Jharkhand, 3. Andhra Pradesh, 4. Karnataka, 5. Tamil Nadu, 6. Maharashtra, 7. Madhya Pradesh, 8. Odisha, 9. Chhattisgarh.
Urdbean (K+R)	A	1. Madhya Pradesh, 2. Uttar Pradesh, 3. Andhra Pradesh, 4. Maharashtra, 5. Tamilnadu, 6. Karnataka, 7. Odisha, 8. Rajasthan, 9. Chhattisgarh, 10. Gujarat, 11. Jharkhand, 12. West Bengal, 13. Assam, 14. Bihar, 15. Punjab
	P	1. Uttar Pradesh, 2. Andhra Pradesh, 3. Maharashtra, 4. Madhya Pradesh, 5. Tamilnadu, 6. Gujarat, 7. Rajasthan, 8. Jharkhand, 9. Odisha, 10. West Bengal, 11. Chhattisgarh, 12. Karnataka, 13. Assam, 14. Bihar, 15. Punjab
	Y	1. Bihar, 2. West Bengal, 3. Jharkhand, 4. Gujarat, 5. Andhra Pradesh, 6. Assam, 7. Uttar Pradesh, 8. Punjab, 9. Maharashtra, 10. Rajasthan, 11. Tamilnadu, 12. Madhya Pradesh, 13. Odisha, 14. Chhattisgarh, 15. Karnataka
Moongbean (K+R)	A	1. Rajasthan, 2. Maharashtra, 3. Karnataka, 4. Andhra Pradesh, 5. Odisha, 6. Bihar, 7. Gujarat, 8. Tamil Nadu, 9. Madhya Pradesh, 10. Uttar Pradesh, 11. Jharkhand, 12. Haryana, 13. West Bengal, 14. Chhattisgarh, 15. Punjab, 16. Assam.
	P	1. Rajasthan, 2. Maharashtra, 3. Karnataka, 4. Andhra Pradesh, 5. Odisha, 6. Bihar, 7. Gujarat, 8. Tamil Nadu, 9. Madhya Pradesh, 10. Uttar Pradesh, 11. Jharkhand, 12. Haryana, 13. West Bengal, 14. Chhattisgarh, 15. Punjab, 16. Assam.
	Y	1. Punjab, 2. Bihar, 3. Uttar Pradesh, 4. West Bengal, 5. Haryana, 6. Jharkhand, 7. Assam, 8. Maharashtra, 9. Gujarat, 10. Rajasthan, 11. Andhra Pradesh, 12. Madhya Pradesh, 13. Tamil Nadu, 14. Odisha, 15. Chhattisgarh, 16. Karnataka.
Total Pulses (K+R)	A	1. Madhya Pradesh, 2. Rajasthan, 3. Maharashtra, 4. Karnataka, 5. Uttar Pradesh, 6. Andhra Pradesh, 7. Odisha, 8. Chhattisgarh, 9. Gujarat, 10. Bihar, 11. Tamilnadu, 12. Jharkhand, 13. West Bengal, 14. Haryana, 15. Assam, 16. Punjab
	P	1. Madhya Pradesh, 2. Maharashtra, 3. Uttar Pradesh, 4. Rajasthan, 5. Andhra Pradesh, 6. Karnataka, 7. Gujarat, 8. Chhattisgarh, 9. Bihar, 10. Odisha, 11. Jharkhand, 12. Tamilnadu, 13. West Bengal, 14. Haryana, 15. Assam, 16. Punjab
	Y	1. Punjab, 2. Haryana, 3. Bihar, 4. Uttar Pradesh, 5. West Bengal, 6. Madhya Pradesh, 7. Gujarat, 8. Andhra Pradesh, 9. Jharkhand, 10. Maharashtra, 11. Chhattisgarh, 12. Assam, 13. Karnataka, 14. Rajasthan, 15. Odisha, 16. Tamil Nadu.



**Annexure 13: Performance of pulses in different countries in the world.**

Crops	Performance of pulses based on area, production and yield at triennium ending 2010.	
Pigeonpea	A	1. <b>India</b> , 2. Myanmar, 3. Malawi, 4. Kenya, 5. Uganda, 6. UR Tanzania, 7. Dominican Republic, 8. Nepal, 9. DR Congo, 10. Haiti, 11. Panama, 12. Burundi, 13. Venezuela, 14. Trinidad & Tobago, 15. Bangladesh.
	P	1. <b>India</b> , 2. Myanmar, 3. Malawi, 4. Uganda, 5. Kenya, 6. UR Tanzania, 7. Dominican Republic, 8. Nepal, 9. DR Congo, 10. Haiti, 11. Panama, 12. Burundi, 13. Venezuela, 14. Trinidad & Tobago, 15. Bangladesh.
	Y	1. Myanmar, 2. Uganda, 3. Burundi, 4. Bangladesh, 5. Dominican Republic, 6. Malawi, 7. Nepal, 8. Trinidad & Tobago, 9. Venezuela, 10. UR Tanzania, <b>11. India</b> , 12. DR Congo, 13. Kenya, 14. Panama, 15. Haiti
Chickpea	A	1. <b>India</b> , 2. Pakistan, 3. Iran, 4. Turkey, 5. Australia, 6. Myanmar, 7. Ethiopia, 8. Malawi, 9. Mexico, 10. Morocco, 11. Syrian arab, 12. Canada, 13. USA, 14. Yeman, 15. Russian Fed.
	P	1. <b>India</b> , 2. Pakistan, 3. Turkey, 4. Australia, 5. Myanmar, 6. Ethiopia, 7. Iran, 8. Mexico, 9. Canada, 10. USA, 11. Yeman, 12. Morocco, 13. Malawi, 14. Syrian arab, 15. Russian Fed.
	Y	1. Yeman, 2. Russian Fed., 3. Canada, 4. Mexico, 5. USA, 6. Myanmar, 7. Ethiopia, 8. Australia, 9. Turkey, <b>10. India</b> , 11. Morocco, 12. Pakistan, 13. Syrian arab, 14. Malawi, 15. Iran
Lentil	A	1. <b>India</b> , 2. Canada, 3. Turkey, 4. Nepal, 5. USA, 6. Iran, 7. Syrian arab, 8. Australia, 9. Ethiopia, 10. Bangladesh, 11. China, 12. Morocco, 13. Pakistan, 14. Spain, 15. France
	P	1. Canada, <b>2. India</b> , 3. Turkey, 4. USA, 5. Nepal, 6. China, 7. Australia, 8. Ethiopia, 9. Iran, 10. Syrian arab, 11. Bangladesh, 12. Morocco, 13. Spain, 14. Pakistan, 15. France
	Y	1. China, 2. Canada, 3. USA, 4. Turkey, 5. France, 6. Ethiopia, 7. Australia, 8. Bangladesh, 9. Nepal, <b>10. India</b> , 11. Spain, 12. Syrian arab, 13. Morocco, 14. Pakistan, 15. Iran
Peasdry	A	1. Canada, 2. China, 3. Russian Fed., <b>4. India</b> , 5. USA, 6. Australia, 7. Ukraine, 8. Ethiopia, 9. Spain, 10. France, 11. Pakistan, 12. Myanmar, 13. Germany, 14. United Kingdom, 15. Colombia
	P	1. Canada, 2. Russian Fed., 3. China, <b>4. India</b> , 5. France, 6. USA, 7. Ukraine, 8. Australia, 9. Ethiopia, 10. Spain, 11. Germany, 12. United Kingdom, 13. Myanmar, 14. Pakistan, 15. Colombia
	Y	1. France, 2. United Kingdom, 3. Germany, 4. Canada, 5. USA, 6. Colombia, 7. Ukraine, 8. Russian Fed., 9. China, 10. Myanmar, <b>11. India</b> , 12. Spain, 13. Ethiopia, 14. Australia, 15. Pakistan
Cowpea	A	1. Niger, 2. Nigeria, 3. Burkina faso, 4. Mali, 5. Kenya, 6. UR Tanzania, 7. Sudan, 8. Cameroon, 9. DR Congo, 10. Senegal, 11. Myanmar, 12. Malawi, 13. Uganda, 14. Haiti, 15. Peru
	P	1. Nigeria, 2. Niger, 3. Burkina faso, 4. Myanmar, 5. Cameroon, 6. Mali, 7. Senegal, 8. UR Tanzania, 9. Uganda, 10. Kenya, 11. DR Congo, 12. Sudan, 13. Malawi, 14. Peru, 15. Haiti
	Y	1. Peru, 2. Myanmar, 3. Uganda, 4. Cameroon, 5. Nigeria, 6. Haiti, 7. UR Tanzania, 8. Burkina faso, 9. DR Congo, 10. Mali, 11. Senegal, 12. Kenya, 13. Malawi, 14. Niger, 15. Sudan
Beansdry	A	1. <b>India</b> , 2. Brazil, 3. Myanmar, 4. Mexico, 5. UR Tanzania, 6. China, 7. Uganda, 8. Kenya, 9. USA, 10. Rwanda, 11. Korea, 12. Indonesia, 13. Argentina, 14. Ethiopia, 15. Cameroon
	P	1. <b>India</b> , 2. Brazil, 3. Myanmar, 4. China, 5. USA, 6. Mexico, 7. UR Tanzania, 8. Uganda, 9. Kenya, 10. Argentina, 11. Rwanda, 12. Indonesia, 13. Korea, 14. Cameroon, 15. Ethiopia
	Y	1. USA, 2. China, 3. Cameroon, 4. Argentina, 5. Myanmar, 6. Indonesia, 7. Ethiopia, 8. Rwanda, 9. Korea, 10. Brazil, 11. Mexico, 12. UR Tanzania, 13. Uganda, 14. Kenya, <b>15. India</b>
Total pulses	A	1. <b>India</b> , 2. Niger, 3. Myanmar, 4. Brazil, 5. Nigeria, 6. China, 7. Canada, 8. UR Tanzania, 9. Australia, 10. Mexico, 11. Ethiopia, 12. USA, 13. Russian Fed., 14. Turkey, 15. France
	P	1. <b>India</b> , 2. Canada, 3. China, 4. Myanmar, 5. Brazil, 6. Nigeria, 7. USA, 8. Australia, 9. Ethiopia, 10. Russian Fed., 11. Niger, 12. Mexico, 13. UR Tanzania, 14. Turkey, 15. France
	Y	1. France, 2. Canada, 3. USA, 4. Russian Fed., 5. China, 6. Turkey, 7. Ethiopia, 8. Myanmar, 9. Australia, 10. Brazil, 11. Mexico, 12. Nigeria, 13. UR Tanzania, <b>14. India</b> , 15. Niger

**Annexure 14: State / pulse wise SRR in pulse producing states (Continued).**

State	Year	Seed Replacement Rate increase of important pulse crops in %				
		Gram	Urd	Moong	Arhar	Average
Andhra Pradesh	2001	3.00	18.00	22.70	12.50	<b>14.05</b>
	2002	6.00	51.00	13.00	14.00	<b>21.00</b>
	2003	8.00	44.00	17.00	28.00	<b>24.25</b>
	2004	15.00	43.00		19.00	<b>25.66</b>
	2005	38.00	25.00	25.00	33.00	<b>30.25</b>
	2006	49.00	27.00	32.00	37.00	<b>36.25</b>
	2007	56.00	26.00	30.00	34.00	<b>36.50</b>
	2008	78.00	43.00	48.00	55.00	<b>56.00</b>
	<b>Average</b>	<b>31.63</b>	<b>34.63</b>	<b>23.46</b>	<b>29.06</b>	<b>29.69</b>
Karnataka	2001	5.00	7.00	7.00	8.00	<b>6.75</b>
	2002	6.00	7.00	6.00	8.00	<b>6.75</b>
	2003	12.00	18.00	6.00	8.00	<b>11.00</b>
	2004	14.30	11.00	12.00	20.00	<b>14.33</b>
	2005	15.00	23.00	12.00	14.00	<b>16.00</b>
	2006	16.00	20.00	15.00	15.00	<b>16.50</b>
	2007	16.00	19.00	15.00	15.00	<b>16.25</b>
	2008	18.00	24.00	18.00	15.00	<b>18.75</b>
	<b>Average</b>	<b>12.79</b>	<b>16.13</b>	<b>11.38</b>	<b>12.88</b>	<b>13.29</b>
Tamil Nadu	2001	0.46	17.50	13.70	6.00	<b>9.42</b>
	2002	12.50	12.50	12.50	12.50	<b>12.50</b>
	2003	20.60	12.50	12.50	1.50	<b>11.78</b>
	2004	3.50	18.50	14.10	3.70	<b>9.95</b>
	2005	2.00	12.11	9.00	2.70	<b>6.45</b>
	2006	5.50	11.90	8.40	5.00	<b>7.70</b>
	2007	9.50	9.50	9.50	9.50	<b>9.50</b>
	2008	5.00	42.00	21.00	6.00	<b>18.50</b>
	<b>Average</b>	<b>7.38</b>	<b>17.06</b>	<b>12.59</b>	<b>5.86</b>	<b>10.72</b>
Kerala	2001				20.00	<b>20.00</b>
	2002				20.00	<b>20.00</b>
	2003				20.00	<b>20.00</b>
	2004				20.00	<b>20.00</b>
	2005				20.00	<b>20.00</b>
	2006				20.00	<b>20.00</b>
	2007				20.00	<b>20.00</b>
	2008				20.00	<b>20.00</b>
	<b>Average</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>20.00</b>	<b>20.00</b>
Gujarat	2001	3.42	14.40	22.20	10.45	<b>12.62</b>
	2002	4.05	16.80	25.60	10.13	<b>14.15</b>
	2003	2.01	17.40	23.80	10.41	<b>13.41</b>
	2004	2.80	12.24	23.84	9.65	<b>12.13</b>
	2005	2.09	23.44	27.76	14.76	<b>17.01</b>
	2006	16.18	34.20	18.84	21.89	<b>22.78</b>
	2007	15.31	27.40	22.20	16.78	<b>20.42</b>
	2008	22.37	29.01	24.10	18.12	<b>23.40</b>
	<b>Average</b>	<b>8.53</b>	<b>21.86</b>	<b>23.54</b>	<b>14.02</b>	<b>16.99</b>
Maharashtra	2001	6.00	44.00	26.00	13.00	<b>22.25</b>
	2002	6.00	45.00	22.00	13.00	<b>21.50</b>
	2003	9.00	41.00	17.00	13.00	<b>20.00</b>
	2004	10.00	41.00	16.00	14.00	<b>20.25</b>
	2005	9.00	41.00	17.00	13.00	<b>20.00</b>
	2006	9.00	45.00	3.00	15.00	<b>18.00</b>
	2007	16.00	46.00	25.00	20.00	<b>26.75</b>
	2008	19.00	47.00	43.00	29.00	<b>34.50</b>
	<b>Average</b>	<b>10.50</b>	<b>43.75</b>	<b>21.13</b>	<b>16.25</b>	<b>22.91</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 14: State / pulse wise SRR in pulse producing states (Continued).**

State	Year	Seed Replacement Rate increase of important pulse crops in %				
		Gram	Urd	Moong	Arhar	Average
Rajasthan	2001	6.64	3.08	8.67	14.30	8.17
	2002	7.28	5.15	7.58	7.03	6.76
	2003	3.09	5.39	9.01	9.93	6.86
	2004	3.13	4.33	5.06	14.18	6.68
	2005	3.96	5.07	7.59	8.95	6.39
	2006	3.91	5.16	9.12	8.80	6.75
	2007	5.19	2.14	12.18	27.81	11.90
	2008	4.44	11.66	21.36	22.41	14.97
	<b>Average</b>	<b>4.71</b>	<b>5.28</b>	<b>10.07</b>	<b>14.18</b>	<b>8.56</b>
Madhya Pradesh	2001	1.29	1.39	2.47	2.78	1.98
	2002	2.26	4.13	4.65	3.85	3.72
	2003	1.88	6.26	7.19	5.56	5.22
	2004	2.33	3.11	7.54	2.79	3.94
	2005	1.85	3.85	9.21	4.33	4.81
	2006	2.15	1.17	7.58	6.00	4.23
	2007	3.21	4.56	15.98	3.72	6.87
	2008	4.51	7.39	27.40	8.86	12.18
	<b>Average</b>	<b>2.44</b>	<b>4.05</b>	<b>10.25</b>	<b>4.74</b>	<b>5.37</b>
Uttar Pradesh	2001	4.13	7.24	13.89	12.05	9.33
	2002	8.16	8.80	16.20	13.20	11.59
	2003	9.00	10.90	15.30	13.50	12.18
	2004	11.07	11.45	18.99	15.60	14.28
	2005	11.50	11.20	23.06	18.23	16.00
	2006	14.31	12.23	20.73	18.86	16.53
	2007	14.89	16.21	56.53	19.20	26.71
	2008	19.06	21.23	94.24	18.80	38.33
	<b>Average</b>	<b>11.52</b>	<b>12.41</b>	<b>32.37</b>	<b>16.18</b>	<b>18.12</b>
Haryana	2001	6.27	46.60		48.64	33.84
	2002	11.56	40.51		50.30	34.12
	2003	11.59	50.69		54.35	38.88
	2004	7.09	52.00			29.55
	2005	10.27	56.29			33.28
	2006	10.50	69.00			39.75
	2007	11.00	70.00			40.50
	2008	10.51	77.00			43.76
	<b>Average</b>	<b>9.85</b>	<b>57.67</b>	<b>0.00</b>	<b>19.16</b>	<b>28.92</b>
Punjab	2001	22.00	11.00		26.00	19.67
	2002	22.00	12.00		21.00	18.33
	2003	30.00	30.00		20.00	26.67
	2004	74.00	15.00			44.50
	2005	79.00	22.00			50.50
	2006	56.00	38.00			47.00
	2007	50.00	35.00			42.50
	2008	36.00	25.00			30.50
	<b>Average</b>	<b>46.13</b>	<b>23.50</b>	<b>0.00</b>	<b>8.38</b>	<b>26.00</b>
H. Pradesh	2001	3.47	18.30			10.89
	2002	3.82	20.67			12.25
	2003	3.23	20.00			11.62
	2004	3.23	20.00			11.62
	2005	3.99	21.66			12.83
	2006	3.47	16.66			10.07
	2007	3.50	17.00	55.00		25.17
	2008	3.50	96.00	64.00		54.50
	<b>Average</b>	<b>3.53</b>	<b>28.79</b>	<b>14.88</b>	<b>0.00</b>	<b>15.73</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 14: State / pulse wise SRR in pulse producing states (Continued).**

State	Year	Seed Replacement Rate increase of important pulse crops in %				
		Gram	Urd	Moong	Arhar	Average
J & K	2001	19.13		15.6		17.37
	2002	3.07		6.88		4.98
	2003	11.74		11.74		11.74
	2004	6.72		5.87		6.30
	2005	4.75		5.34		5.05
	2006	3.07		0.07		1.57
	2007	7.25		8.29		7.77
	2008	1.63		9.63		5.63
	<b>Average</b>	<b>7.17</b>	<b>0.00</b>	<b>7.93</b>	<b>0.00</b>	<b>7.55</b>
Odisha	2001	7.72	2.3	1.52		3.85
	2002	15.62	1.36	0.49	1.29	4.69
	2003	23.67	1.65	0.84	1.13	6.82
	2004	26.42	1.05	0.69	0.64	7.20
	2005	21.70	0.62	0.90	1.39	6.15
	2006	12.02	2.35	2.16	2.68	4.80
	2007	24.54	1.61	1.28	1.98	7.35
	2008	15.11	4.13	1.17	2.40	5.70
	<b>Average</b>	<b>18.35</b>	<b>1.88</b>	<b>1.13</b>	<b>1.44</b>	<b>5.70</b>
West Bengal	2001	15.00	24.00	24.00	33.00	24.00
	2002	17.00	25.00	25.00	34.00	25.25
	2003	19.00	26.00	26.00	36.00	26.75
	2004	20.00	27.00	27.00	38.00	28.00
	2005	21.00	28.00	28.00	39.00	29.00
	2006	22.00	28.50	29.00	40.00	29.88
	2007	23.00	29.00	30.00	41.00	30.75
	2008	24.00	30.00	31.00	42.00	31.75
	<b>Average</b>	<b>20.13</b>	<b>27.19</b>	<b>27.50</b>	<b>37.88</b>	<b>28.17</b>
Bihar	2001	NA				
	2002	1.20				1.20
	2003	1.20				1.20
	2004	7.00				7.00
	2005	8.00				8.00
	2006	8.00				8.00
	2007	10.00	9.00	30.00	4.00	13.25
	2008	8.00	10.00	10.00	6.00	8.50
	<b>Average</b>	<b>6.20</b>	<b>2.71</b>	<b>5.71</b>	<b>1.43</b>	<b>4.01</b>
Chhattisgarh	2003	1.81	1.72	2.45	7.15	3.13
	2004	2.38	2.25	2.80	8.20	3.91
	2005	5.6	3.50	4.50	9.8	5.85
	2006	7.8	5.00	6.75	12	7.89
	2007	7.00	1.36	20.13	1.85	7.59
	2008	11.88	3.27	12.21	6.87	8.56
<b>Average</b>	<b>5.97</b>	<b>2.85</b>	<b>8.14</b>	<b>7.65</b>	<b>6.15</b>	
Jharkhand	2004	10.00				10.00
	2005	10.00				10.00
	2006	3.00				3.00
	2007	3.00	12.00			7.50
	2008	10.00	7.00			8.50
	<b>Average</b>	<b>7.20</b>	<b>3.80</b>	<b>0.00</b>	<b>0.00</b>	<b>5.50</b>
Tripura	2005					0.00
	2006		39.00	30.00	29.00	32.67
	2007		50.00	16.00	50.00	38.67
	2008		41.00	20.00	50.00	37.00
	<b>Average</b>	<b>0.00</b>	<b>43.33</b>	<b>22.00</b>	<b>43.00</b>	<b>36.11</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 14: State / pulse wise SRR in pulse producing states.**

State	Year	Seed Replacement Rate increase of important pulse crops in %				
		Gram	Urd	Moong	Arhar	Average
Manipur	2005	7.14				7.14
	2006	35.71				35.71
	2007	96.15				96.15
	2008		82.75			82.75
	<b>Average</b>	<b>34.75</b>	<b>20.69</b>	<b>0.00</b>	<b>0.00</b>	<b>27.72</b>
Sikkim	2005		1.45			1.45
	2006		9.58			9.58
	2007					0.00
	2008					0.00
	<b>Average</b>	<b>0.00</b>	<b>5.52</b>	<b>0.00</b>	<b>0.00</b>	<b>5.52</b>
Mizoram	2005					
	2006					
	2007				20.00	20.00
	2008					
	<b>Average</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>20.00</b>	<b>20.00</b>
Nagaland	2005					
	2006	25		18	5	16.00
	2007	26		19	5.2	16.73
	2008					
	<b>Average</b>	<b>25.50</b>	<b>0.00</b>	<b>18.50</b>	<b>5.10</b>	<b>16.37</b>
Arunachal Pradesh	2005					
	2006		44	44		51.00
	2007		44	44	65	51.00
	2008					
	<b>Average</b>	<b>0.00</b>	<b>44.00</b>	<b>44.00</b>	<b>65.00</b>	<b>51.00</b>
All India	2001	4.17	16.55	13.47	8.71	10.73
	2002	4.23	17.06	13.8	8.84	10.98
	2003	7.09	20.48	19.48	13.6	15.16
	2004	9.87	17.24	12.34	9.80	12.31
	2005	9.41	15.70	12.50	10.48	12.02
	2006	9.04	13.65	19.97	11.56	13.56
	2007	11.90	23.89	21.75	16.05	18.40
	2008	14.38	26.31	21.94	16.02	19.66
	<b>Average</b>	<b>8.76</b>	<b>18.86</b>	<b>16.91</b>	<b>11.88</b>	<b>14.10</b>

Source: Seeds Division, DAC, Ministry of Agriculture, Krishi Bhavan, New Delhi.

**Annexure 15: Major recommended crop sequences/rotations, inter cropping (Continued).**

<b>Crop</b>	<b>Crop rotation</b>	<b>Inter cropping /mixed crop</b>
<b>Arhar</b>	i) Maize – Pigeonpea (Rabi), ii) Pigeonpea-Urd-Wheat, iii) Pigeonpea-Sugarcane, iv) Mung+Pigeonpea-Wheat, and v) Pigeonpea (early)-Potato- urdbean.	1. Central & southern States: Pigeon pea + Sorghum (1:2 ratio). 2. Upland plateau of Bihar & Jharkhand: Pigeon pea + Rice (1:2 ratio). 3. Gujarat, A.P., and Maharashtra: Pigeon pea + Groundnut (1:3 ratio). 4. M.P., A.P., MS., and Gujarat: Pigeon pea + Cotton (1:1 ratio), Pigeonpea + Soybean (2:2 ratio). 5. Rajasthan and Eastern India: Pigeon pea + Maize/Bajra (1:1 ratio).
<b>Moongbean</b>	Rice-Wheat-Moong (Summer) , Rice-Rice-Greengram (South India), Maize+Moong-Wheat-Moong, Moong-Wheat/Barley, Maize (early)-Potato (early)-wheat-Moong.	Sugarcane+Moong (Summer 1:2), Sunflower+Moong (summer 2:2), Cotton + Greengram (1:3 in Central India 60/90 cm Paired Row), Moong+Pigeonpea (2:1).
<b>Urdbean</b>	i) Maize+urd-wheat, ii) Maize-potato-urd, iii) Maize-Mustard-urd, iv) sorghum+urd-chickpea (Central & South India), v) Maize-Wheat-urd, vi) Rice-urdbean (Rice fallow of Central & Southern Area), vii) Paddy-wheat-urd (Summer) North India, viii) Pigeonpea+Urd-wheat-urd (Summer) North India and, ix) Sugarcane + urdbean (1:2) (Spring) North India.	
<b>Mothbean</b>		Pearl millets + mothbean (2:1), Maize + mothbean (4:4)
<b>Kulthi</b>		Crop is grown as pure crop as well as mixed crop with sorghum, pearl millet, pigeon pea, sesame or niger.
<b>Gram</b>	i) Kharif fallow–Gram (in barani areas), ii) Paddy–Gram, iii) Maize–Gram, iv) Bajra–Gram, and v) Jowar–Gram.	i) Chickpea + Mustard (2:1 to 4:1), ii) Chickpea + Linseed (2:2), iii) chickpea + wheat/Barley (2:2), iv) Chickpea + Safflower (2:2) and v) Chickpea + Coriander (2:2).
<b>Lentil</b>	i)Kharif fallow – lentil (rainfed areas) , ii)Paddy– lentil, iii)Maize–lentil, iv)Cotton – lentil, v)Bajra– lentil, vi)Jowar–lentil,& Groundnut –lentil.	i) Lentil + Sugarcane (Autumn)- Two rows of lentil at 30 cm row spacing in between two rows of sugarcane, ii)Lentil + Linseed (2:2), and Lentil + Mustard (2:1)

**Annexure 15: Major recommended crop sequences/rotations, inter cropping.**

<b>Crop</b>	<b>Crop rotation</b>	<b>Inter cropping /mixed crop</b>
<b>Fieldpea</b>	Maize – pea, Paddy – pea – wheat – (being popular in Northern India), Cotton – pea, Jowar – pea, Bajra – pea.	It can be sown as intercrop with autumn sugarcane as two rows of pea at 30 cm row spacing in the centre of two sugarcane rows at 90 cm apart.
<b>Lathyrus</b>	Grown as single crop in areas where water gets accumulated during rainy season or as a relay crop after paddy often as utera / paira crop in standing paddy, due to its ability to withstand in high moisture conditions at sowing time and moisture stress during growth period.	
<b>Rajmash (French bean)</b>	In plains, it is grown as spring season crop after harvesting of potato and mustard. It is also found quite compatible for intercropping with early potato due to its high nitrogen requirement and wet moisture regime in 2:2 or 2:3 row ratios.	In hills, it is grown as intercrop with maize in 1:2 ratio. In-between two rows of maize sown at 90 cm apart, two rows of Rajmash are adjusted at 30 cm spacing with the plant population of 120000 of Rajmash and 40000 of maize. It is also grown mixed with maize and soybean.
<b>Cowpea</b>	a) For grain /vegetable purpose Cowpea-Wheat-Mung/Cheena, Cowpea-Potato-urd/bean, Maize/Rice-Wheat-Cowpea, Maize-Toria-Wheat-Cowpea, Rice-Rice-Cowpea, Rice-Cowpea, and Rice-Mustard-Cowpea. b) Fodder Sorghum +cowpea-berseem-maize +cowpea. Maize-berseem/oat- maize+cowpea Sudan grass- berseem/oat- maize+ cowpea. Cowpea-berseem-maize+cowpea.	Growing one or two rows of cowpea in widely spaced crops and incorporating of their biomass after picking pods can increase soil fertility and yield of companion crop. The improvement in this system can further be made by pairing the rows of main crops and taking one or two rows of cowpea in between two paired rows of either of pigeonpea, maize and sorghum. Here, we can get 5-7 Q grain yield of cowpea without any adverse effect on main crop yield. It can also be grown as floor crop in coconut garden and intercrop in tapioca in Kerala. As sole crop in single or double crop rice fallows in Rabi or summer season respectively.

**Annexure 16: Specific crop sequences / rotations followed by Tamil Nadu.**

States	Crop sequences
<b>Tamil Nadu</b>	<ol style="list-style-type: none"><li>1. Redgram + Groundnut</li><li>2. Blackgram + Cotton, Blackgram + Millets</li><li>3. Greengram + Millets</li><li>4. Cowpea + Millets</li><li>5. Horsegram</li><li>6. Bengalgram + Coriander</li><li>7. Redgram + Groundnut</li><li>8. Blackgram – Rice fallows</li><li>9. Greengram – Rice fallows</li><li>10. Cowpea + Millets</li><li>11. Horsegram</li><li>12. Bengalgram + Coriander.</li></ol>

Source: State Department of Agriculture, Tamil Nadu.



**Annexure 17: State / season / crop wise sowing time followed by states (Continued).**

State	Crop	Time of sowing		
		Kharif	Rabi	Summer
<b>Andhra Pradesh</b>	Chickpea		1 <sup>st</sup> Oct. to 30 Nov.	
	Pigeonpea	1 <sup>st</sup> June to 31 <sup>st</sup> July	15 <sup>th</sup> Sep. to 15 <sup>th</sup> Oct.	
	Greengram	1 <sup>st</sup> June to 31 <sup>st</sup> July	31 <sup>st</sup> Oct. to 30 <sup>th</sup> Nov.	1 <sup>st</sup> to 31 <sup>st</sup> January
	Urdbean	1 <sup>st</sup> June to 31 <sup>st</sup> July	31 <sup>st</sup> Oct. to 30 <sup>th</sup> Nov.	
<b>Assam</b>	Chickpea		15 <sup>th</sup> Oct. - 15 <sup>th</sup> Nov.	
	Pigeonpea	June - July		
	Urdbean	15 <sup>th</sup> Aug.- 15 <sup>th</sup> Sep.		15 <sup>th</sup> Feb.- 15 <sup>th</sup> March
	Moongbean	15 <sup>th</sup> Aug.- 15 <sup>th</sup> Sep.		15 <sup>th</sup> Feb.- 15 <sup>th</sup> March
	Fieldpea		15 <sup>th</sup> Oct. - 15 <sup>th</sup> Nov.	
	Lentil		15 <sup>th</sup> Oct. - 15 <sup>th</sup> Nov.	
	Lathyrus		Mid Oct - Mid Nov	
<b>Bihar</b>	Chickpea		10 Oct. to 10 Nov.	
	Lentil		15 Oct. - 25 Nov.	
	Greengram			15 March - 10 April
<b>Gujarat</b>	Chickpea		1 <sup>st</sup> Oct. to 25 Nov.	
	Pigeonpea	15 <sup>th</sup> June (Sole Crop), 15 <sup>th</sup> Aug.(Relay Crop)		
	Greengram	15 <sup>th</sup> June to 15 <sup>th</sup> July		15 <sup>th</sup> to 20 <sup>th</sup> February
	Urdbean	15 <sup>th</sup> June to 15 <sup>th</sup> July		
<b>Haryana</b>	Chickpea		Mid-Oct to mid-Nov.	
	Pigeonpea	Mid-May to mid-July		
	Greengram	1-15 July		15 <sup>th</sup> March to 15 <sup>th</sup> April
	Lentil		Nov. to mid-Dec.	
	Fieldpea		November	
	Urd		Onset of monsoon	
<b>J &amp; K</b>	Greengram	1 <sup>st</sup> June to ending June		
	Fieldpea		Oct. to Nov.	
	Beans	1 <sup>st</sup> week of May		
<b>Karnataka</b>	Chickpea		1 <sup>st</sup> Oct. to 30 Nov.	
	Pigeonpea	1 <sup>st</sup> June to 30 <sup>th</sup> July		
	Greengram	1 <sup>st</sup> June to 15 <sup>th</sup> July		1 <sup>st</sup> to 15 <sup>th</sup> January
	Urdbean	1 <sup>st</sup> June to 15 <sup>th</sup> July		1 <sup>st</sup> to 15 <sup>th</sup> January
	Cowpea	1 <sup>st</sup> June to 15 <sup>th</sup> July		1 <sup>st</sup> to 15 <sup>th</sup> January
	Avare	1 <sup>st</sup> June to 15 <sup>th</sup> July		1 <sup>st</sup> to 15 <sup>th</sup> January
	Horse gram	20 <sup>th</sup> Aug. to 15 <sup>th</sup> Sep.		
<b>Madhya Pradesh</b>	Chick pea		1 <sup>st</sup> Oct-30 <sup>th</sup> Nov.	
	Pigeon pea	10 <sup>th</sup> June- 15 <sup>th</sup> July		
	Urd	10 <sup>th</sup> June- 15 <sup>th</sup> July		15 <sup>th</sup> Feb. - 15 <sup>th</sup> March
	Moong	10 <sup>th</sup> June- 15 <sup>th</sup> July		15 <sup>th</sup> Feb. - 20 <sup>th</sup> March
	Fieldpea		20 <sup>th</sup> Sept.-15 <sup>th</sup> Dec.	
	Lentil		1 <sup>st</sup> Oct-15 <sup>th</sup> Nov.	

DAS: Days after sowing, Source: State Departments of Agriculture

**Annexure 17: State / season / crop wise sowing time followed by states(continued).**

State	Crop	Time of sowing		
		Kharif	Rabi	Summer
<b>Maharashtra</b>	Chickpea		October - November	
	Pigeonpea	June-July		
	Greengram	June-July		
	Urdbean	June-July		
<b>Mizoram</b>	Chickpea		November	
	Pigeonpea	June - July		
	Moongbean	June - July	October - November	March - April
	Fieldpea		October - November	
	Lentil		October	
<b>Nagaland</b>	Chickpea		October - November	
	Pigeonpea	March - April		
	Urdbean	March - April		
	Moongbean	March - April		
	Fieldpea		October - November	
	Lentil		October - November	
	Rajma	March - April	August - September	
	Ricebean	March - April	July to August	
	Fababean		September - October	
<b>Odisha</b>	Chickpea		1 <sup>st</sup> Oct.- 30 <sup>th</sup> Nov.	
	Pigeonpea	1 <sup>st</sup> June- 15 <sup>th</sup> July		
	Urd	1 <sup>st</sup> June- 31 <sup>st</sup> July	1 <sup>st</sup> Oct.- 30 <sup>th</sup> Nov.	1 <sup>st</sup> Jan.- 28 <sup>th</sup> Feb.
	Moong	1 <sup>st</sup> June- 31 <sup>st</sup> July	1 <sup>st</sup> Oct.- 30 <sup>th</sup> Nov.	1 <sup>st</sup> Jan.- 28 <sup>th</sup> Feb.
	Fieldpea		1 <sup>st</sup> Oct.- 30 <sup>th</sup> Nov.	
	Lentil		1 <sup>st</sup> Oct.- 30 <sup>th</sup> Nov.	
	Kulthi		1 <sup>st</sup> Oct.- 30 <sup>th</sup> Nov.	
	Cowpea	1 <sup>st</sup> June- 31 <sup>st</sup> July	1 <sup>st</sup> Oct.- 30 <sup>th</sup> Nov.	1 <sup>st</sup> Jan.- 28 <sup>th</sup> Feb.
<b>Tamil Nadu</b>	Chickpea		Nov. 15 <sup>th</sup> - Dec. 15 <sup>th</sup>	
	Pigeonpea	June 15 <sup>th</sup> - Aug.15 <sup>th</sup>	Sep 15 <sup>th</sup> - Oct 15 <sup>th</sup> -Nov 15 <sup>th</sup>	Feb. 15 <sup>th</sup> - March 15 <sup>th</sup>
	Greengram	June 15 <sup>th</sup> - Aug.15 <sup>th</sup>	Sep. 15 <sup>th</sup> - Nov. 15	Jan. 15 <sup>th</sup> -March 15 <sup>th</sup>
	Urdbean	June 15 <sup>th</sup> - Aug.15 <sup>th</sup>	Sep 15 <sup>th</sup> - Oct 15 <sup>th</sup> -Nov 15 <sup>th</sup>	Feb. 15 <sup>th</sup> - March 15 <sup>th</sup>
	Cowpea	June 15 <sup>th</sup> - Aug.15 <sup>th</sup>	Sep 15 <sup>th</sup> - Oct 15 <sup>th</sup> -Nov 15 <sup>th</sup>	Feb. 15 <sup>th</sup> - March 15 <sup>th</sup>
	Horsegram		Sep. 15 <sup>th</sup> - Nov.	

DAS: Days after sowing, Source: State Departments of Agriculture

**Annexure 17: State / season / crop wise sowing time followed by states.**

State	Crop	Time of sowing		
		Kharif	Rabi	Summer
<b>Rajasthan</b>	Chickpea		15 Oct. to 15 Nov.	
	Pigeonpea	15 June to 15 July		
	Greengram	1 July to 23 July		23 March to 10 April
	Urdbean	1 July to 23 July		
	Mothbean	15 July to 15 August		
	Cowpea	1 July to 23 July		
	Fieldpea		15 Oct. to 15 Nov.	
	Lentil		15 Oct. to 15 Nov.	
<b>Uttar Pradesh</b>	Chickpea		1 <sup>st</sup> Oct. to 30 Nov.	
	Pigeonpea	10 June - 15 July		
	Moongbean	25 July - 10 Aug.		March
	Lentil		15 October-15 Nov.	
	Fieldpea		Mid. Oct. - Mid. Nov.	
	Urdbean	25 July- 10 Aug.		1 <sup>st</sup> week of Feb to 1st week of March.
<b>West Bengal</b>	Chickpea		Mid. Nov.-mid. Dec.	
	Pigeonpea	Mid May-mid. July	2 <sup>nd</sup> /3 <sup>rd</sup> week of Sep.	
	Greengram			Mid. Feb.-mid April
	Lentil		Mid Sep. to mid Nov.	
	Fieldpea		Mid Oct. to mid Dec.	
	Urdbean	Mid Aug.-mid Sep.		Mid Feb.-mid April
	Lathyrus		15 <sup>th</sup> Oct.-15 <sup>th</sup> Nov.	
	Kulthi (HG)		Sep. to Oct.	

**DAS:** Days after sowing, **Source:** State Departments of Agriculture

**Annexure 18: State / season / crop wise harvesting time followed by states  
(Continued).**

State	Crop	Time of harvesting		
		Kharif	Rabi	Summer
<b>Andhra Pradesh</b>	Chickpea		1 <sup>st</sup> Jan. to 30 <sup>th</sup> March	
	Pigeonpea	2 <sup>nd</sup> Dec. to 2 <sup>nd</sup> Feb.	26 <sup>th</sup> Jan. to 26 <sup>th</sup> Feb.	
	Greengram	6 <sup>th</sup> Aug. to 5 <sup>th</sup> Sep.	6 <sup>th</sup> Dec. to 5 <sup>th</sup> Jan.	6 <sup>th</sup> Mar. to 5 <sup>th</sup> April
	Urdbean	25 <sup>th</sup> Aug. to 24 <sup>th</sup> Sep.	25 <sup>th</sup> Dec. to 24 <sup>th</sup> Jan.	
<b>Assam</b>	Chickpea		15 <sup>th</sup> Mar.- 30 <sup>th</sup> Mar.	
	Pigeonpea	Dec. - Jan.		
	Urdbean	15 <sup>th</sup> Nov.- 15 <sup>th</sup> Dec.		30 <sup>th</sup> April- 31 <sup>st</sup> May**
	Moongbean	30 <sup>th</sup> Oct- 15 <sup>th</sup> Nov.		30 <sup>th</sup> April- 7 <sup>th</sup> June
	Fieldpea		20 <sup>th</sup> Feb - 20 <sup>th</sup> Mar.	
	Lentil		25 <sup>th</sup> Feb - 25 <sup>th</sup> Mar.	
	Lathyrus		Mid Feb - Mid Mar	
<b>Bihar</b>	Chickpea		140-150 DAS	
	Lentil		135- 140 DAS	
	Greengram			75-80 DAS
<b>Haryana</b>	Chickpea		150- 160 DAS	
	Pigeonpea	125-150 DAS		
	Greengram	65-85 DAS		60-65 DAS
	Lentil		120-140 DAS	
	Fieldpea		120-140 DAS	
	Urdbean	75-90 DAS		
<b>J &amp; K</b>	Greengram	August to September		
	Fieldpea		June	
	Beans	80-90 DAS		
<b>Karnataka</b>	Chickpea		1 <sup>st</sup> March to 30 <sup>th</sup> April	
	Pigeonpea	1 <sup>st</sup> Dec. to 15 <sup>th</sup> Dec.		
	Greengram	15 <sup>th</sup> Aug. to 15 <sup>th</sup> Sep.		15 <sup>th</sup> to 30 <sup>th</sup> March
	Urdbean	15 <sup>th</sup> Aug. to 15 <sup>th</sup> Sep.		15 <sup>th</sup> to 30 <sup>th</sup> March
	Cowpea	15 <sup>th</sup> Aug. to 15 <sup>th</sup> Sep.		15 <sup>th</sup> to 30 <sup>th</sup> March
	Avare	15 <sup>th</sup> Aug. to 15 <sup>th</sup> Sep.		15 <sup>th</sup> to 30 <sup>th</sup> March
	Horsegram		30 <sup>th</sup> Nov. to 10 Dec.	

DAS: Days after sowing, Source: State Departments of Agriculture

**Annexure 18: State / season / crop wise harvesting time followed by states (Continued).**

State	Crop	Time of harvesting		
		Kharif	Rabi	Summer
<b>Madhya Pradesh</b>	Chickpea		10 <sup>th</sup> Feb.-15 <sup>th</sup> March	
	Pigeonpea	20 <sup>th</sup> Oct.-25 <sup>th</sup> Jan.		
	Urdbean	10 <sup>th</sup> Sept. - 15 <sup>th</sup> Oct.		05 <sup>th</sup> May - 10 <sup>th</sup> June
	Moongbean	31 <sup>st</sup> Aug. - 05 <sup>th</sup> Oct.		01 <sup>st</sup> May - 10 <sup>th</sup> June
	Fieldpea		15 <sup>th</sup> Jan.- 05 <sup>th</sup> May	
	Lentil		1 <sup>st</sup> Feb.- 05 <sup>th</sup> April.	
<b>Maharashtra</b>	Chickpea		110-120 DAS	
	Pigeonpea	160-170 DAS		
	Greengram	65-70 DAS		
	Urdbean	75-80 DAS		
<b>Mizoram</b>	Chickpea		January - February	
	Pigeonpea	January - March		
	Moongbean	July - August	November- December	April - May
	Fieldpea		January - February	
	Lentil		December - January	
<b>Nagaland</b>	Chickpea		100 - 115 DAS	
	Pigeonpea	120 - 150 DAS		
	Urdbean	90 - 100 DAS		
	Moongbean	90 - 100 DAS		
	Fieldpea		110 -140 DAS	
	Lentil		110 -130 DAS	
	Rajmash	90 - 100 DAS	90 -100 DAS	
	Ricebean	150 - 180 DAS	115 -130 DAS	
	Fababean		120 -150 DAS	
<b>Odisha</b>	Chickpea		1 <sup>st</sup> Jan.- 28 <sup>th</sup> Feb.	
	Pigeonpea	1 <sup>st</sup> Nov. - 31 <sup>st</sup> January		
	Urdbean	1 <sup>st</sup> Sep.- 31 <sup>st</sup> Oct.	1 <sup>st</sup> Mar.- 30 <sup>th</sup> April	1 <sup>st</sup> Mar.- 30 <sup>th</sup> April
	Moongbean	1 <sup>st</sup> Sep.- 31 <sup>st</sup> Oct.	1 <sup>st</sup> Mar.- 30 <sup>th</sup> April	1 <sup>st</sup> Mar.- 30 <sup>th</sup> April
	Fiel pea		15 <sup>th</sup> Dec.- 31 <sup>st</sup> Jan.	
	Lentil		1 <sup>th</sup> Dec.- 31 <sup>st</sup> Jan.	
	Kulthi		15 <sup>th</sup> Dec.- 31 <sup>st</sup> Jan.	
	Cowpea		1 <sup>st</sup> Mar.- 30 <sup>th</sup> April	

DAS: Days after sowing, Source: State Departments of Agriculture

**Annexure 18: State / season / crop wise harvesting time followed by states.**

State	Crop	Time of harvesting		
		Kharif	Rabi	Summer
<b>Rajasthan</b>	Chickpea		130-140 DAS	
	Pigeonpea	150-160 DAS		
	Greengram	65-70 DAS		70-75 DAS
	Urdbean	75-80 DAS		
	Mothbean	70-75 DAS		
	Cowpea	60-75 DAS		
	Fieldpea		130-140 DAS	
	Lentil		135-145 DAS	
<b>Tamil Nadu</b>	Chickpea		70 DAS	
	Pigeonpea	120-130 DAS	120-130 DAS	120-130 DAS
	Greengram	55 DAS	55 DAS	55 DAS
	Urdbean	60 DAS	60 DAS	60 DAS
	Cowpea	70 DAS	70 DAS	70 DAS
	Horsegram		100 DAS	
<b>Uttar Pradesh</b>	Chickpea		140-150 DAS	
	Pigeonpea	250-270 DAS		
	Moongbean	80-85 DAS		75 DAS
	Lentil		120-140 DAS	
	Fieldpea		140-150 DAS	
	Urdbean	75-80 DAS		75 DAS
<b>West Bengal</b>	Chickpea		March to April	
	Pigeonpea	Nov. to Jan.	Jan.-Feb./March	
	Greengram			Mid April to mid June
	Lentil		Feb. to March	
	Fieldpea		Jan. to Feb.	
	Urdbean	Mid. Nov. to Dec.		Mid May to July
	Lathyrus		Mid Jan.-Feb.	
	Kulthi (HG)		Jan. to Feb.	

Source: State Departments of Agriculture , DAS: Days after sowing.

**Annexure 19: Crop wise recommended seed rate, method of sowing, spacing, depth of seed.**

Crop	Seed rate in Kg.			Method of sowing		Spacing (cm.)		Depth of seed (cm.)
	Sole	Inter crop	Mixed crop	B.C.	L. S.	R x R	P x P	
Arhar	12 to 15				√	60 75	15 20	
Moongbean	15-20		7-8		√	30	10	
Urdbean	K 12-15 R 18-20 S 30-35				√	K 30/45 R 30 S 20/25	10 15 5/8	
Mothbean	10-15				√	30/45	15	
Kulthi	BC 40 Kg LS 22-30 Kg				√	K 40/45 R 25/30		2-5
Gram	Small 50-60 Bold 80-90				√	Rainfed 30 Irr. 45 Late 25	10 10 10	8 to 10
Lentil	Small seed 30-40, Bold 50-60 Utera 60				√			3 to 4
Fieldpea	Small 50-60, Bold 80-90				√	D 25/30 T30/40	8/10 10/12	
Lathyrus	70-80 Kg Utera 40-60				√	30	10	
Rajmash (Frenchbean)	Bold 100-125, Small 70-75				√	K 40/50 R&S 40 Rainfed- 30	8/10 10 10	
Cowpea	20-25				√	30/45	10/15	3-5

**BC=** Broadcasting, **LS=**Line sowing, **R x R** = Row x Row, **P x P** = Plant to Plant, **K** = Kharif, **R** = Rabi, **S** = Summer, **D** = Dwarf, **T=** Tall.

**Annexure 20: State / crop wise methods of sowing followed by state Governments.**

Season	Crop/State	Bihar			Mizoram			Maharashtra			Gujarat			Puduchhery			Tamilnadu		
		B	L	D	B	L	D	B	L	D	B	L	D	B	L	D	B	L	D
<b>Kharif</b>	Pigeonpea	√	√	-	-	-	√	-	√	√	-	√	√				-	√	√
	Urdbean	√	√	-				√	√	-	√	√	-				-	√	
	Moongbean	√	√					√	√	-	√	√	-				-	√	
	Mothbean							-	√	-	√	√	-				-	-	-
	Horsegram	√	-	-				-	√	-	√	√	-				-	-	-
	Cowpea				-	-	√										-	√	√
	Ricebean				-	-	√												
<b>Rabi</b>	Chickpea	√	√	-				√	√	-	-	√	-				-	√	-
	Lentil	√	√	-				√	√	-									
	Fieldpea	√	√	-	-	√	-	-	√	-	-	√	-						
	Urdbean							√	√	-				√	√	-	-	√	-
	Moongbean	√	√	-				√	√	-	-	√	-	√	√	-	-	√	-
	Khesari	√	√	-				-	-	-									
	Horsegram							-	√	-									
	Cowpea				-	-	√	-	√	-									
Rajmash				-	-	√	-	√	-	-	√	-							
<b>Summer</b>	Urdbean							√	√	-	√	√	-						
	Moongbean							√	√	-	√	√	-						
	Cowpea							-	√	√	√	√	-						

Source: State Departments of Agriculture, B: Broadcasting, L: Line Sowing, D: Drilling / Dibbling.



**Annexure 21: State / crop wise Seeding technology followed by states (Continued).**

State	Crop	Seeding technology								
		Time	Seed rate (Kg/ha)				Distance (cm)		Depth (cm)	Plant population (Nos.)
			Sole crop	Inter crop	Mixed crop	Catch Crop	RxR	PxP		
Gujarat	Pigeonpea	Onset of monsoon	15	2	2		90	30	5-10	37,037
	Urdbean	-do-	17.5	7.5	7.5		45	10	5-10	2,22,222
	Mungbean	-do-	17.5	5-7.5	5-7.5		45	10	5-10	2,22,222
	Mothbean	-do-	15	4	4		45	10	5-10	2,22,222
	Kulthi	-do-	12				30	10	5	3,33,333
	Gram	Last week of October	70				45	5	15	4,44,444
	Fieldpea	1 <sup>st</sup> week of Nov.	80				30	10	5	3,33,333
	Moongbean	1 <sup>st</sup> FN of Nov	15				30	10	5	3,33,333
	Rajmash	November 1 <sup>st</sup> fortnight	100				30	10	5	3,33,333
	Urdbean	15 <sup>th</sup> March	20				30	10	5	3,33,333
	Moongbean	15 <sup>th</sup> March	20				30	10	5	3,33,333
Cowpea	15 <sup>th</sup> March	20				45	10	5	2,22,222	
Bihar	Pigeonpea	25 May to 1 <sup>st</sup> week of July	20-25		14-15		60	20	4-5	83, 333
	Urdbean	June –July Aug-Sept (Catch crop)	20-25		15	20	30	10	3-4	3,33,333
	Moongbean	June –July	20-25		10	20	30	10	3-4	3,33,333
	Kulthi	Aug-Oct.	40-45		20	40	30	10	3-4	3,33,333
	Gram	Mid Nov. to 1 <sup>st</sup> week of December	75-80	35	40		30	10	5-6	3,33,333
	Lentil	Mid Oct. to Nov.	35-40	15	20		25	10	3-4	4,00,000
	Fieldpea	Mid Oct. to mid Nov.	65-75	30	40		30 20	10 5	4-5	3,33,333 10,00,000
	Lathyrus	Oct.-Nov.	40-45		10		35	10	2-3	2,85,714
	Moongbean	Mar-April	20-25				30	7	5-6	4,76,190
Mizoram	Pigeonpea	March-April							5	
	Cowpea	June-July	30				30	15	5	2,22,222
	Ricebean	April							5	
	Cowpea	Sept.- Oct.	30				30	15	5	2,22,222
	Fieldpea	Nov.-Dec.	50				30	10	5	3,33,333
	Rajmash (French bean)	Sept.- Oct.	50				45	45	5	49,382
Pudu-cherry	Urdbean (Rabi)	3 <sup>rd</sup> week of January to 2 <sup>nd</sup> week of Feb.	20	10	10	30 (RF)	30	10	2-3	3,33,333
	Moongbean (Rabi)	3 <sup>rd</sup> week of January to 2 <sup>nd</sup> week of Feb.	20	10	10	25 (RF)	30	10	2-3	3,33,333

Source: State Departments of Agriculture.

**Annexure 21: State / crop wise seedling technology followed by states (Continued).**

State	Crop	Seeding technology								
		Time	Seed rate (Kg/ha)				Distance (cm)		Depth (cm)	Plant population (Nos.)
			Sole crop	Inter crop	Mixed crop	Catch crop	RxR	PxP		
Maha-rashtra	Pigeonpea	3 <sup>rd</sup> week of June to 1 <sup>st</sup> week of July	15-25		6-9		45 60 90	10 20 25/30	5-8	2,22,222 83,333 44,444/37,037
	Urdbean	2 <sup>nd</sup> week of June to 1 <sup>st</sup> week of July	15-20		6-9		30	10	3-5	3,33,333
	Moongbean	2 <sup>nd</sup> week of June to 1 <sup>st</sup> week of July	15-20		2-6		30	10	3-5	3,33,333
	Mothbean	3 <sup>rd</sup> week of June to 1 <sup>st</sup> week of July	11-20		2-6		20 30	10	3-5	3,33,333
	Kulthi	3 <sup>rd</sup> week of June to 1 <sup>st</sup> week of July	16-18				30	10	5-8	3,33,333
	Gram	2 <sup>nd</sup> FN of Oct. to 1 <sup>st</sup> FN of Nov.	65-70 80-90(K)				30 45 (K)	10	8-12(R) 5-8 (I)	3,33,333
	Lentil	Oct.-Nov.	30-35				20 30	5 10	3-5	3,33,333
	Fieldpea	Oct.-Nov.	80-120				30 45	10	5-8	3,33,333
	Urdbean	Oct.-Nov.	15-16		6-9		30	10	3-5	3,33,333
	Moongbean	Oct.-Nov.	18-20		2-6		30	10	3-5	3,33,333
	Kulthi		16-18				30	10	5-8	3,33,333
	Rajmash						30	10	8-12	3,33,333
	Cowpea		25-30		4-5		30	10	5-8	3,33,333
	Urdbean	Feb-March	15-16		6-9		30	10	3-5	3,33,333
	Moongbean	2 <sup>nd</sup> week of March	15-20		2-6		30	10	3-5	3,33,333
	Cowpea	Feb-March	25-30		4-5		30	10	5-8	3,33,333

Source: State Departments of Agriculture.

**Annexure 21: State / crop wise seedling technology followed by states.**

State	Crop	Seeding technology								
		Time	Seed rate (Kg/ha)				Distance (cm)		Depth (cm)	Plant population (Nos.)
			Sole crop	Inter crop	Mixed crop	Catch crop	RxR	PxP		
Tamil Nadu	Pigeonpea	June-August	20	10			45 120	30 30		74,074 27,777
	Urdbean	June-August	20	10			30	10		3,33,333
	Moongbean	June-August	20	10			30	10		3,33,333
	Cowpea	June-August	20	10			30 45	10		3,33,333 2,22,222
	Kulthi	Sept-Nov	20				30	10		3,33,333
	Gram	November	90/75				30	10		3,33,333
	Pigeonpea	Sept-Nov	20	10			45 120	30 30		74,074 27,777
	Urdbean	Sept-Nov	20	10			30	10		3,33,333
	Moongbean	Sept-Nov	20	10			30	10		3,33,333
	Cowpea	Sept-Nov	20				30 45	15		2,22,222 1,48,148
	Kulthi	November	20				30	10		3,33,333
	Pigeonpea	Feb-March	20	10			45 120	30 30		74,074 27,777
	Urdbean	Feb-March January (Rice fallows)	20	10			30	10		3,33,333
	Moongbean	Feb-March January (Rice fallows)	20	10			30	10		3,33,333
Cowpea	Feb-March	20				30 45	15		2,22,222 1,48,148	

**Source:** State Departments of Agriculture, R = Rainfed, I = Irrigated, FN = Fortnight, RF = Rice fallows, K = Kabuli, R x R = Row to Row, P x P = Plant to Plant, Cm = Centimetres.

**Annexure 22: Crop wise recommended Nutrient management (Continued).**

Crop	Particulars
Pigeonpea	<p>Apply 25-30 kg N, 50-75 Kg P<sub>2</sub>O<sub>5</sub>, 30 kg K<sub>2</sub>O and 10-15 kg ZnSO<sub>4</sub> in one ha area as dose. Apply 20 kg S per ha in addition to NP at the time of sowing. For correcting Zn deficiency, foliar spray of 0.5 kg ZnSO<sub>4</sub> with @ 0.25 kg lime or soil application of ZnSO<sub>4</sub> @ 25 kg per ha to one crop on Zn deficient soils is helpful to both the crop of pulse based cropping system. Mo deficiency can be corrected by applying 1 kg sodium molybdate per ha and for boron deficient soils foliar spray of B @ 1.0 – 1.5 kg B per ha or soil application of 4 kg borax. Spray 1.0% FeSO<sub>4</sub> to recoup crop from Fe deficiency.</p> <p><b>Nutrient management in Intercropping:</b> Application of full dose of nutrients to cereal component of pigeonpea intercrop (N<sub>60</sub>P<sub>40</sub>) along with full dose of fertilizers for pigeonpea (N<sub>18</sub>P<sub>40</sub>), has been found beneficial. In irrigated pigeonpea - cereal intercrop, the N should be split into two doses.</p>
Greengram	<p><b>Kharif:</b> The response to phosphorus is highest on red and laterite soils. Application of P<sub>2</sub>O<sub>3</sub> @ 30-40 kg/ha along with a starter dose of 10-15 kg nitrogen is adequate. Phosphorus application has always a significant effect in increasing the yields. Seeds should be treated with an efficient Rhizobium culture for obtaining higher yields. Rhizobial inoculation may reduce the nitrogen requirement of the crop.</p> <p><b>Summer:</b> A starter dose of 10 kg of nitrogen/ha along with 40 kg P<sub>2</sub>O<sub>5</sub> /ha is optimum for summer greengram. In a 3-crop sequence of maize-wheat-summer greengram, the greengram need not be given any nitrogenous or phosphatic fertilizer, if the previous 2 cereal crops had received the recommended doses of nitrogen and phosphorus. The fertilizers may be drilled in furrows drawn 25-30 cm apart with the seed, 5-6 cm below the seed, through seed drill. It is also necessary to treat the seed with an efficient Rhizobium culture.</p>
Blackgram	<p>Being a leguminous crop, urd needs a small quantity of nitrogen for early growth period on those soils which are poor in organic matter. Such soils should get about 15-20 kg nitrogen per ha as a starter dose. However, phosphatic and potassic fertilizers should be applied as per soil test values. In case, soil test facilities are not available, one can apply 50-60 kg P<sub>2</sub>O<sub>5</sub> and 30-40 kg K<sub>2</sub>O per ha. The fertilizers should be applied by drilling at the time of sowing in such a way that they are placed about 5-7 cm below the seed.</p>
Mothbean	<p>Besides their N-fixing capacity they have greater power for absorbing less soluble form of 'P'. Roots have greater CEC and hence, capable of absorbing divalent cations like Ca<sup>++</sup> and Mg<sup>++</sup> but can not compete with cereals for mono valiant K<sup>+</sup>. Recommendation is 20-25 t FYM for improving physical condition and improving water holding capacity of soil along with 10 kg N + 40 kg P<sub>2</sub>O<sub>5</sub>/ha as basal at the time of sowing or last preparation.</p>
Horsegram	<p>10 kg nitrogen and 20 kg P<sub>2</sub>O<sub>5</sub> per ha as basal application at the time of sowing 2-5 cm below and in the side of the seed with the help of ferti.-seed drill is enough for good management of crop.</p>

**Annexure 22: Crop wise recommended Nutrient management (Continued).**

<b>Crop</b>	<b>Particulars</b>
Chickpea	<p>About 5 t FYM or compost or biogas spent slurry with 50% recommended dose of fertilizers (RDF) plus rhizobium inoculation for better yields and FUE. Recommended fertilizer dose is 15-20 kg N and 40 kg P<sub>2</sub>O<sub>5</sub> per ha as basal dressing in separate furrow bands before sowing chickpea. In late sown chickpea after rice, apply 40 kg N per ha as basal dose. On S deficient soils, use 20 kg S as gypsum, iron pyrites or single super phosphate to meet the S demands of chickpea. Application of 25 kg zinc sulphate and 10 kg borax per ha has positive effect on root growth, biological nitrogen fixation and yield.</p> <p>Seed treatment with rhizobium @ 5 g per kg seed and soil inoculation of phosphate solubilizing bacteria @ 500 g per ha by mixing with 50 kg well decomposed FYM just at the time of sowing improves the FUE. For correcting Zn deficiency, foliar spray of 0.5% ZnSO<sub>4</sub> with 0.25% lime or soil application of ZnSO<sub>4</sub> @ 25 kg per ha to one crop on Zn deficient soils is helpful to both the crop of pulse based cropping system. Mo deficiency can be corrected by applying 1 kg sodium molybdate per ha and for boron deficient soils foliar spray of B @ 1.0 – 1.5 kg B per ha or soil application of 4 kg borax. Spray 1.0 per cent FeSO<sub>4</sub> to recoup the crop from Fe deficiency.</p>
Lentil	<p>Being a legume, it does not respond to nitrogen except for some types for initial boosting of growth whereas response to potash is inconsistent due to good 'K' supply status of most of the Indian soils. However, phosphorus definitely plays a vital role in root development, nodulation and growth and yield of the crop. General recommendation is 15-20 kg N and 50-60 kg 'P' as basal placement at soil depth of 10-15 cm during sowing / last ploughing could be met easily through 100 kg DAP/ha. Lentil also respond positively to 'S' (20-40 kg/ha) giving an average nutrient use efficiency of 10-15 kg grain/kg S especially in light textured sandy loam soils of Northern India. SSP is the best source of 'P' followed by Gypsum and 'Pyrite'.</p> <p>Among micro-nutrient, Zn is most critical in intensive Rice-Wheat cropping system areas of Punjab, Haryana, Rajasthan (Eastern), U.P. and Bihar. General recommendation is 25 kg zinc sulphate as basal, a foliar spray of 0.5% ZnSO<sub>4</sub> + 0.25% lime (5 kg zinc sulphate + 2.5 kg lime in 1000 Lt. of water per ha). 'Mo' and 'Fe' are the integral components of enzyme 'nitrogenous' for '<b>N</b>' fixation. Mo deficiency may create twin deficiency of 'N' and 'Mo'. 'B' and 'Mo' is found deficient in acidic soil of Eastern India hence 10 kg borax and 1 kg ammonium <b>molybdate</b> as soil application and Foliar spray of 2% each of <b>DAP and 'KCL'</b> at pre flowering and pod development enhance yield by 10-15% along with increasing its ability to resist terminal drought.</p> <p><b>Tips for low input INM:</b>  Application of 2-2.5 tonnes 'vermicompost' or 5 t FYM to the 'kharif' crop in rotation and seed inoculation with efficient strain of Rhizobia takes care about initial nitrogen requirement and no need to apply 'N' as booster (required especially in low fertile and paddy soils).  Dual inoculation with 'Rhizobium' and 'PSB' takes care of 'N' as well as reduces 25-30% of phosphorus requirement by making available the initial fixed soil 'P' to the plants.</p> <p>Rhizobium inoculation is must after paddy as it is aerobic bacteria and most of its population dies during flooding and compaction for want of oxygen.</p> <p>In-situ management of rice straw/residues takes care of Zinc and other micronutrient and no need to apply them separately.</p>

**Annexure 22: Crop wise recommended Nutrient management.**

<b>Crop</b>	<b>Particulars</b>
Fieldpea	<p>Apply 2.5-5 t biogas slurry / compost per ha, apply 60 kg P<sub>2</sub>O<sub>5</sub> per ha as basal dose in furrow bands for higher P use efficiency for which single super phosphate (contains 12% S) to di-ammonium phosphate should be preferred. On light textured soils of northern region, application of 0.5 kg molybdenum (1 kg sodium molybdate) per ha has additional effect on yield of fieldpea. Foliar spray of B @ 1-1.5 kg B per ha or soil application of 4 kg borax per ha is recommended on boron deficient soils. Apply 20 kg K<sub>2</sub>O per ha alongwith NP is beneficial in K deficient areas. Apply 20 kg sulphur per ha in acid soils, rhizobium inoculated seed should be treated with 1.5 kg of finally powdered lime (CaCO<sub>3</sub>, 300 mesh).</p> <p>For correcting Zn deficiency, foliar spray of 0.5 kg ZnSO<sub>4</sub> with 0.25 kg lime or soil application of ZnSO<sub>4</sub> @ 25 kg per ha to one crop on Zn deficient soils is helpful to both the crop of pulse based cropping system.</p>
Lathyrus	<p>Under utera cropping, the crop is grown on residual fertility of rice. However, it responds well to phosphorus up to 40-60 kg /ha except in the case if grown on highly phosphorus fertilized paddy field. For normal crop, 100 kg DAP + 100 kg gypsum/ha is a optimum dose of fertilizer applied as basal dose 2-3 cm side and below the seed with the help of ferti-seed drill, is recommended.</p>
Rajmash	<p>Unlike other Rabi pulses, Rajmash is very inefficient in biological nitrogen fixation owing to poor nodulation due to non availability of suitable and efficient Rhizobium strain for Indian plains. Hence, it requires relatively higher doses of fertilizer N. For enhanced productivity, application of 90-120 kg N ha<sup>-1</sup> has been found optimum. Half of the nitrogen should be applied as basal during sowing and rest half as top dressing after first irrigation.</p> <p>Rajmash responds well to phosphorus application like cereals. Its P requirement is distinctly higher than other pulse crops, significant response to P application has been obtained up to a level of 60-80 kg P<sub>2</sub>O<sub>5</sub> per ha.</p>
Cowpea	<p>Apply FYM/Compost- 5-20 t/ha as basal with last ploughing. Both these bulky organic manures can be substituted by Humic substances granule. 15-20 Kg N/ ha as starter dose in poor soil (organic carbon&lt;0.5%), 50-60 Kg/ha P<sub>2</sub>O<sub>5</sub> &amp; 10-20 Kg. K<sub>2</sub>O/ha to promote growth and to mitigate the impact of water stress in plants when subjected to sub optimal soil stress. In acidic soil, lime pelleting of seed is beneficial alongwith Rhizobium inoculation. Add finely powdered (300 mesh) calcium carbonate to moist freshly Rhizobium treated seeds and mix for 1-3 minutes until each seed is uniformly pelleted. Lime requirement varied from 0.05 Kg to 1 Kg/ 10 Kg seed depending on seed size.</p>
Broadbean	20 kg N + 40-50 kg P <sub>2</sub> O <sub>5</sub> /ha
Ricebean	Grown on residual soil fertility.

## Annexure 23: State / Season / Crop wise Nutrient Management followed by states (Continued).

State	Season/crop	Major Nutrients (Kg/ha)			Minor Nutrients (Kg/ha) (S/Zn/Mo/Mg/Fe/B)	Organic (qtl/ha)			Biological (Kg/ha)		
		N	P	K		FYM	Vermi-compost	Green Manuring	PSB	Rhizobium culture	
Bihar	<b>Kharif</b>										
	Pigeonpea	20	40		20-25 Kg/ha Zinc sulphate + 2 Kg sulphur 80% WDG or 200 Kg/ha Phosphogypsum	50-60	5	1.5	5	1	
	Urdbean	20	40		-do-	-do-	-do-	-do-	-do-	-do-	
	Moongbean	20	40		-do-	-do-	-do-	-do-	-do-	-do-	
	Horsegram	20	40		-do-	-do-	-do-	-do-	-do-	-do-	
	<b>Rabi</b>										
	Chickpea	20	40		20-25 Kg/ha Zinc sulphate + 2 Kg sulphur 80% WDG or 200 Kg/ha Phosphogypsum	50-60	5	1.5	5	1	
	Lentil	20	40		-do-	-do-	-do-	-do-	-do-	-do-	
	Fieldpea	20	40		-do-	-do-	-do-	-do-	-do-	-do-	
	Lathyrus	20	40		-do-	-do-	-do-	-do-	-do-	-do-	
	Summer										
	Moongbean	20	40		20-25 Kg/ha Zinc sulphate + 2 Kg sulphur 80% WDG or 200 Kg/ha Phosphogypsum	50-60	5	1.5	5	1	
	Gujarat	<b>Kharif</b>									
		Pigeonpea	20	40		20 Kg/ha Sulphur	100	20	150	0.45	0.45
Urdbean		20	20		-do-	100	-	8-9	0.525	0.525	
Moongbean		20	40		-do-	20	-	12-16	0.525	0.525	
Mothbean		20	40		10 Kg/ha ZnSo4	100	-	-	0.45	0.45	
Horsegram		20	40		-	100	-	10-12	0.36	0.36	
<b>Rabi</b>											
Chickpea					-	-	-	-	-	-	
Lentil					-	-	-	-	-	-	
Fieldpea		20	40		-	100	-	4-5	2.4	2.4	
Urdbean					-	-	-	-	-	-	
Moongbean		20	40		-	100	-	12-16	0.45	0.45	
Lathyrus					-	-	-	-	-	-	
Horsegram					-	-	-	-	-	-	
Cowpea		10	20		0.5% Znso4, 0.25% Lime@500lit/ha	-	-	-	2.5	2.5	
Rajmash		120	40		-	100	-	-	3	3	
Spring/Summer											
Urdbean		20	40		-	100	-	-	0.6	0.6	
Moongbean		20	40		-	100	-	-	0.6	0.6	
Cowpea	10	20		-	100	-	-	0.6	0.6		

Source: State Departments of Agriculture.

**Annexure 23: State / Season / Crop wise Nutrient Management followed by states (Continued).**

State	Season/crop	Major Nutrients (Kg/ha)			Minor Nutrients (Kg/ha) (S/Zn/Mo/Mg/Fe/B)	Organic (qtl/ha)			Biological (Kg/ha)	
		N	P	K		FYM	Vermi- compost	Green Manuring	PSB	Rhizobium culture
Maharashtra	<b>Kharif</b>									
	Pigeonpea	20	50		25 Kg/ha Zinc	300-500				
	Urdbean	20	40			300-500				
	Moongbean	20	40			300-500				
	Mothbean		25			300-500				
	Horsegram		25			300-500				
	<b>Rabi</b>									
	Chickpea				0.5% Fe foliar spray, 25 Kg/ha Zinc	300-500				
	Lentil									
	Fieldpea	20	40							
	Urdbean	20	40			300-500				
	Moong bean	20	40			300-500				
	Lathyrus									
	Horsegram		25			300-500				
	Cowpea		25			300-500				
	Rajmash									
	<b>Spring/Summer</b>									
	Urd bean	20	40			300-500				
	Moong bean	20	40			300-500				
Cowpea		25			300-500					
Mizoram	<b>Kharif</b>									
	Pigeon pea	10	20			5	0.5			
	Cowpea	10	12			5	0.5			
	Rice bean	10	15			5	0.5			
	<b>Rabi</b>									
	Cowpea	10	12			5	0.5			
Field Pea	10	20			5	0.5				
French bean	15	20	10		5	0.5				
Puducherry	<b>Rabi</b>									
	Urd bean	25	50	25	S-20 Kg/ha, Zn-25 Kg/ha	125			2	2
	Moongbean	25	50	25	S-20 Kg/ha, Zn-25 Kg/ha	125			2	2

Source: State Departments of Agriculture.



**Annexure 23: State / Season / Crop wise Nutrient Management followed by states.**

State	Season/crop	Major Nutrients (Kg/ha)			Minor Nutrients (Kg/ha) (S/Zn/Mo/Mg/Fe/B)	Organic (qtl/ha)			Biological (Kg/ha)	
		N	P	K		FYM	Vermi-compost	Green Manuring	PSB	Rhizobium culture
Tamil Nadu	<b>Kharif</b>									
	Pigeonpea	I-25	50	25	S-20 Kg/ha, Zn-25 Kg/ha	125			0.6	0.6
		R-12.5	12.5	12.5	S-25 Kg/ha, Zn-12.5 Kg/ha					
	Urdbean	I-25	50	25	S-20 Kg/ha, Zn-25 Kg/ha	125			0.6	0.6
		R-12.5	12.5	12.5	S-25 Kg/ha, Zn-12.5 Kg/ha					
	Moongbean	I-25	50	25	S-20 Kg/ha, Zn-25 Kg/ha	125			0.6	0.6
		R-12.5	12.5	12.5	S-25 Kg/ha, Zn-12.5 Kg/ha					
	Cowpea	I-25	50	25		125			0.6	0.6
		R-12.5	12.5	12.5						
	Horsegram	25	50	25		125			0.6	0.6
	<b>Rabi</b>									
	Pigeonpea	I-25	50	25	S-20 Kg/ha, Zn-25 Kg/ha	125			0.6	0.6
		R-12.5	12.5	12.5	S-25 Kg/ha, Zn-12.5 Kg/ha					
	Urdbean	I-25	50	25	S-20 Kg/ha, Zn-25 Kg/ha	125			0.6	0.6
		R-12.5	12.5	12.5	S-25 Kg/ha, Zn-12.5 Kg/ha					
	Moongbean	I-25	50	25	S-20 Kg/ha, Zn-25 Kg/ha	125			0.6	0.6
		R-12.5	12.5	12.5	S-25 Kg/ha, Zn-12.5 Kg/ha					
	Cowpea	I-25	50	25		125			0.6	0.6
		R-12.5	12.5	12.5						
	Horsegram	25	50	25		125			0.6	0.6
	Chickpea	I-25	50	25	S-20 Kg/ha, Zn-25 Kg/ha	125			0.6	0.6
		R-12.5	12.5	12.5	S-25 Kg/ha, Zn-12.5 Kg/ha					

**Source:** State Departments of Agriculture.

**Annexure 24: Crop wise recommended Water Management (Continued).**

Crop	Particulars
Pigeonpea	<p>Being a deep rooted crop, it can tolerate drought. In crop planted in June, one or two pre-monsoon irrigations should be given as per requirement. After the start of monsoon, there is no need to irrigation but in case of prolonged drought during the reproductive period of growth, one or two irrigations may be needed.</p> <p>A pre-requisite for the success of arhar is proper drainage. Ridge planting is effective in areas where sub-surface drainage is poor. This provides enough aeration for the roots during the period of excess rainfall. During rainy season, water should not stand anywhere in the field.</p>
Greengram	<p><b>Kharif:</b> Greengram does not require any irrigation if the monsoon rainfall is well distributed. However, for good crop growth, one irrigation under drought situation for longer period at flowering stage, particularly in sandy loam soil, is recommended.</p> <p><b>Summer:</b> The number of irrigations and their time of application vary according to seasonal conditions. At least 3 irrigations, the first at pre-flowering stage (20-25 days), the second at flowering (25-40 days) and the third at grain-filling stage, are necessary. Pre-sowing irrigation is a must to ensure adequate soil moisture for germination. The availability of water is generally scarce in the canals during the summer months but there is a great scope of growing summer mungbean around tube wells.</p>
Blackgram	<p>For rainy season crop, irrigation is not needed but good drainage is essential. Irrigation facilities should be available for raising the crop during summer season. Number and frequency of irrigation depend upon the soil type and weather, prevailing during the growth period. Generally, the crop should get irrigation at an interval of 10-15 days. From flowering to pod development stages, there is need of sufficient moisture in the field.</p>
Horsegram	<p>Grown as rain fed.</p>
Chickpea	<p>‘Gram’ grown as rainfed crop in general in India, invariably suffers from moisture stress as ‘terminal drought at most critical pod development stage due to high atmospheric and soil temperature coupled with high wind velocity. So, to minimize transpiration loss and conserving residual soil moisture for longer time, a foliar spray of 2% KCL is giving promising results.</p> <p>However, under assured irrigation, one irrigation each at maximum branching and pod development resulted in 25-70% increase in yield in absence of winter rain. In no case, irrigation should be given earlier than four weeks after sowing and during active flowering because earlier situation is harmful for maximum ‘N’ fixation as the Rhizobial bacteria work only in aerobic conditions and later, excess irrigation may reverse the crop again to vegetative phase with severe depression in yield due to ultimately shorter reproductive phase.</p>
Lentil	<p>Most critical stage for moisture stress is pod formation followed by flower initiation. In absence of winter rains and where contribution of soil moisture is negligible viz in Central India, two light irrigations may be applied for significant yield improvement.</p>
Fieldpea	<p>Fieldpea is mostly grown as rainfed / un-irrigated crop on residual soil moisture and can sustain drought condition up to some extent. One or two irrigations at 45 DAS and if needed, at pod filling stage, may be the best recommended irrigation schedule.</p>

**Annexure 24: Crop wise recommended Water Management.**

<b>Crop</b>	<b>Particulars</b>
Lathyrus	The crop is grown as rainfed crop on residual moisture. However, under high moisture stresses one irrigation at 60-70 days after sowing may be remunerative in terms of production.
Rajmash	Rajmash is the most irrigation responsive pulse crop due to its shallow root system and high nutrient requirements. It requires 2 to 3 irrigations in NEPZ and 3 to 4 irrigation in CZ for achieving highest productivity. Irrigation at 25 days after sowing is most critical followed by irrigation at 75 days after sowing.
Cowpea	<p>For rainy season crop drainage is more essential than irrigation. Crop can tolerate flooding upto 2 days at flowering and pod setting thereafter, a marked decrease in yield and its attribute. Early sown rainy season crop may require one or two irrigation in pre monsoon/delayed onset of monsoon.</p> <p><b>For summer</b> crop-irrigation is most critical among all inputs followed by weeding and fertilizer. Generally, crop required 5-6 irrigation depending on soil, prevailing weather condition etc, at an interval of 10-15 days. Increasing moisture regime from dry to medium wet, resulted in significant yield improvement. The response to irrigation is in order of flowering&gt; pod filling&gt;vegetative.</p>
Ricebean	Grown as rainfed in high rainfall areas hence instead of irrigation, drainage is important.

**Annexure 25: Crop wise recommended Weed Management Practices (Continued).**

Crop	Particulars
Pigeonpea	<p>Weeds poses serious problem during rainy season by robbing the crop of precious nutrients and moisture and also give shelter to various insects and pests. The period of early 60 days is very critical for weed management point of view. Therefore, field should be kept free from weeds by giving two weeding through hand or wheel hoe at 25-30 and 45-50 days after sowing, respectively. If manual weeding is not possible either due to continuous rains or non availability of labour etc., weeds can also be managed successfully by using either of any one herbicides @ of 1 kg a.i./ha viz. Metachlor, Oxadiazon and Pendimithalin as pre-emergence spray or Basaline as pre-plant incorporation in soil.</p> <p>Weed Management in Intercropping System: An initial 45 and 30 days after sowing period is found very critical for severe weed crop competition causing a loss of about 46.1% and 34% in NWPZ, 73% and 81% in CZ and 43 and 56% in NEPZ for pigeonpea intercropping with cereals and short duration pulses like greengram / blackgram / cowpea / soybean, respectively.</p> <p>Besides manual weeding with hand or wheel hoe, weeds may also be effectively controlled in pigeonpea intercropping system with pre-emergence application of Pendimethalin @ 0.5 – 1 kg a.i./ha depending upon weed intensity and soil type.</p>
Greengram	<p>Two hand-weedings, the first 25 days after sowing and the second 45 days after sowing, are adequate to check weed infestation. Subsequently, greengram grows rapidly and the weeds are smothered. Alternatively, any one of the pre-emergence weedicides among pendimethalin, Tok E-25 or Lasso 1 litre in 1,000 liters of water may be sprayed in a hectare, just after sowing. However, weedicides control only broad-leaved weeds whereas motha (<i>Cyperud rotundus</i>) is the major problem in the summer season. Therefore, one hand-weeding, preferably before the first irrigation will take care of this problem.</p> <p>The highest crop yield was obtained when weeds were removed 35 days after sowing. Any further delay in weed removal results in a corresponding decrease in yield. A maximum of 2 hand-weedings in the initial stages of crop growth up to 30-35 days is adequate to take care of the weed problem. However, whenever labour is in short supply or the rainfall pattern does not allow early hand-weeding, herbicides need to be used. Pre-emergence application of Lasso or Tok E-25 @ 2 kg ai/ha in 1,000 litres of water ensures complete weed control.</p>
Blackgram	<p>One or two hand weedings should be done up to 40 days of sowing depending upon the weed intensity. Weeds can be controlled by the use of chemicals too. Use Basalin 1 kg a.i. per ha in 800-1000 liters of water as pre-planting spray. It should be well incorporated in the soil before sowing.</p>
Mothbean	<p>One hand weeding at 30 DAS + pre plant incorporation of fluchloralin (Basalin) @ 0.5 to 1 kg a.i./ha effectively controlled the weeds in mothbean.</p>
Horsegram	<p>Due to luxuriant growth an early weeding/hoeing is enough for weed management in kharif.</p>

**Annexure 25: Crop wise recommended Weed Management Practices (Continued).**

Crop	Particulars
Chickpea	<p>Major weeds infesting gram are <i>Chenopodium spp.</i> (Bathua), <i>Fumaria parviflora</i> (gajri), <i>Lathyrus aphaca</i> (Chatri matri), <i>Vicia sativa</i> (ankari), <i>Crisium arvense</i> (Kateli), <i>Melilotus alba</i> (senji), <i>Asphodelus enuifolius</i> (jungli piaji), <i>Convolvulus agvensis</i> (Krishan neel), <i>Phalaris minor</i> and <i>Avena Wdoriciana</i>.</p> <p>Gram, being a dwarf stature crop, suffers adversely by heavy weed infestation up to 30-45 Days after sowing (DAS), the critical period. One hand weeding/inter culture with hand hoe or wheel hoe at 30 DAS and another at 55-60 DAS, if second flush of weeds appear heavily other-wise crop will suppress the weed by it self.</p> <p>A mechanical operation is always better than the herbicide based as later also provides aeration to the roots for maximum efficacy of 'N' fixing bacteria as well as soil moisture conservation for its longer availability by breaking soil capillaries and creating dust mulch.</p> <p>However, an alternate Integrated weed management practice is application of either of Fluchoralin (Basalin) as pre plant incorporation or Pendimethalin (Stomp) as Pre-emergence @ 0.75 kg a.i./ha and one hand weeding in between 30-45 DAS, depending on sowing time, gives maximum grain yield.</p>
Lentil	<p>Major weeds infesting lentil are <i>Chenopodium spp.</i> (Bathua), <i>Fumaria parviflora</i> (gajri), <i>Lathyrus aphaca</i> (Chatri matri), <i>Vicia sativa</i> (ankari), <i>Crisium arvense</i> (Kateli), <i>Melilotus alba</i> (senji), <i>Asphodelus enuifolius</i> (jungli piaji), <i>Convolvulus avensis</i>, <i>Phalaris minor</i> and <i>Avena ludoriciana</i>. Orobanche, a parasitic weed is also seen as major problem at some places. Similarly <i>V sativa</i> adultrate the grain due to its size, shape &amp; colour.</p> <p>One hand weeding/inter culture at 30 DAS and another at 55-60 DAS, depending upon the intensity of weed infestation, provides efficient soil oxygen environment to rhizobium bacteria along with soil moisture conservation breaking soil capillaries, creating dust mulch.</p>
Fieldpea	<p>One weeding 30-45 days after sowing, depending upon the field conditions. Application of solution MCPB or 2,4D-B @ 1.2 kg a.i./ha in 500-600 liters of water after 6 weeks sowing, as post emergence, is effective in sandy loam soils. Application of Pendimethalin (STOMP) 30 EC @ 1 kg a.i./ha as pre-emergence application can also be used to control the weed up to 50 days.</p>

**Annexure 25: Crop wise recommended Weed Management Practices.**

<b>Crop</b>	<b>Particulars</b>
Lathyrus	For normal sown crops one hand-weeding at 30-35 days after sowing (if soil condition permit). Weeds can also be managed effectively by spray of fluchloralin (Basalin) 35 EC @ 1 kg a.i./ha in 500-600 litres of water as pre-plant incorporation.
Rajmash	One hand weeding / hoeing at 30-35 days after sowing or application of a pre-emergence herbicide like pendimethalin @ 1 to 1.5 kg a.i./ha in 500-600 litres of water immediately after sowing helps to keep the losses by weeds below <i>ETL</i> (Economic Threshold Level).
Cowpea	<p>Weed can reduce crop yield upto 50-62%. Integrated approach includes agronomic (improved) practices like sowing at proper time, proper cropping geometry, optimum plant density, intercropping intercultivation, irrigation and the need based supplement, use of chemical herbicides. One hand weeding at 20-30 DAS-followed by one more weeding after 20-25 DAS if required.</p> <p>Chemically, weed can be controlled by pre-planting spray of Basalin @ 1 Kg a.i./ha as pre emergence in 800-900 liters of water. Application of pendimethaline @ 0.75 Kg.a.c./ha combined with one hand weeding at 35 DAS resulted in two fold increase in marginal benefit cost ratio and highest weed control efficiency.</p>
Broadbean	Two hoeing at 30 and 60 DAS. Alternatively, Fluchloralin or Pendimethalin (Pre emergence) @ 1 kg a.i./ha can be used for effective weed management.
Ricebean	One hoeing after 30 DAS is enough.

## Annexure 26: State / Season / Crop wise Weed Management followed by states (Continued).

Season	Crop/State	weed management																		
		Mechanical	Bihar								Mechanical	Mizoram								
			Chemical									Chemical								
			Pre-emergence				Post-emergence					Pre-emergence				Post-emergence				
			Narrow leaf		Broad leaf		Narrow leaf		Broad leaf			Narrow leaf		Broad leaf		Narrow leaf		Broad leaf		
Name	Dose	Name	Dose	Name	Dose	Name	Dose	Name	Dose	Name	Dose	Name	Dose	Name	Dose	Name	Dose			
Kharif	Pigeonpea	Spading & khurpi	1)Fluchloralin 2)Pendimethalin	1 kg a.i./ha	-do-	-do-	Not used				Handhoe and weeder	Butachlor @ 2 lit./ha								
	Urdbean	-do-	Chemical is not used																	
	Moongbean	-do-	Pendimethalin @ 1 kg a.i./ha.				None of the herbicides is used													
	Mothbean																			
	Horsegram		No weed management is done								Handhoe and weeder	Butachlor @ 2 lit./ha								
	Cowpea		No weed management is done								Handhoe and weeder	Butachlor @ 2 lit./ha								
	Ricebean		No weed management is done								Handhoe and weeder	Butachlor @ 2 lit./ha								
Rabi	Chickpea	Handhoe and weeder	Pre emergence application of pendimethalin @ 1 kg a.i./ ha. within 2-3 DAS																	
	Lentil	Handhoe and weeder	Pre emergence application of pendimethalin @ 1 kg a.i./ ha. within 2-3 DAS																	
	Fieldpea	Handhoe and weeder	Pre emergence application of pendimethalin @ 1 kg a.i./ ha. within 2-3 DAS																	
	Khesari		No weed management is done																	
	Horsegram		No weed management is done																	
	Cowpea		No weed management is done								Hand hoe and weeder	Butachlor @ 2 lit./ha								
	Rajmash		No weed management is done								Hand hoe and weeder	Butachlor @ 2 lit./ha								
Summer	Moongbean		No weed management is done																	

Source: State Departments of Agriculture.

**Annexure 26: State / Season / Crop wise Weed Management followed by states (Continued).**

weed management																		
Season	Crop/ State	Puducherry								Tamil Nadu								
		Mechanical	Chemical								Mechanical	Chemical						
			Pre-emergence				Post-emergence					Pre-emergence			Post-emergence			
			Narrow leaf		Broad leaf		Narrow leaf		Broad leaf			Narrow leaf		Broad leaf	Narrow leaf		Broad leaf	
Name	Dose/ha	Name	Dose	Name	Dose	Name	Dose	Name	Dose	Name	Dose / ha	Name	Dose / ha	Name	Dose / ha			
Kharif	Pigeonpea									Hand-hoe and weeder	Pendi-methalin	2 lit.	Fluchloralin	1.5 lit	Quizalofop ethy 15 % EC	300-400 ml.	Propanil 10% EC	500-750 ml.
	Urdbean	Handhoe and weeder	Pendi methalin	2 lit. ai 3 DAS in 500 lit. water														
	Moongbean	Handhoe and weeder	Pendi methalin	2 lit. ai 3 DAS in 500 lit. water														
	Horsegram																	
	Cowpea																	
Rabi	Chickpea																	
	Urdbean																	
	Moongbean																	
	Horsegram																	
	Cowpea																	

Source: State Departments of Agriculture.



## Annexure 26: State / Season / Crop wise Weed Management followed by states.

Season	Crop/ State	weed management																	
		Mecha-nical	Maharashtra								Mechanical	Gujarat							
			Chemical				Chemical					Pre-emergence			Post-emergence				
			Pre-emergence		Post-emergence		Pre-emergence		Post-emergence			Narrow leaf		Broad leaf		Narrow leaf		Broad leaf	
			Name	Dose/ha	Name	Dose	Name	Dose/ha	Name	Dose / ha		Name	Dose/ha	Name	Dose/ha	N	D	N	D
Kharif	Pigeonpea	Handhoe and weeder	Alachlor, metachlore	1-1.5 lit.	Para-quat				Bentazone	0.75-1.5 lit.	Hand hoe and weeder	pendimethalin, Fluchloralin	1 lit 2.3 lit	pendimethalin, Fluchloralin	2.3 lit 2.3 lit	No recommendation has been made for post emergence in pulse crops			
	Urdbean	Handhoe and weeder	Alachlor, metachlore	1-1.5 lit.				Bentazone	0.75-1.5 lit.	Handhoe and weeder	pendimethalin	0.5 kg,	pendimethalin	0.5 kg,					
	Moongbean	Handhoe and weeder	Alachlor, metachlore	1-1.5 lit.				Bentazone	0.75-1.5 lit.	Handhoe and weeder	Fluchloralin pendimethalin	0.5 kg,	Fluchloralin pendimethalin	0.5 kg,					
	Mothbean									Handhoe and weeder	Fluchloralin pendimethalin	0.5 kg,	Fluchloralin pendimethalin	0.5 kg,					
	Horsegram									Handhoe and weeder	pendimethalin	1 lit	pendimethalin	1 lit					
Rabi	Chickpea	Handhoe and weeder	Isoproturan	1-1.25 lit			Fluchloralin	0.5-1.0	Trifluralin	0.5-0.75 lit		pendimethalin	1 lit	pendimethalin	1 lit				
	Fieldpea									Handhoe and weeder	pendimethalin	1 lit	pendimethalin	1 lit					
	Urdbean	Handhoe and weeder	Alachlor, metachlore	1-1.5 lit.					Bentazone	0.75-1.5 lit.									
	Moongbean	Handhoe and weeder	Alachlor, metachlore	1-1.5 lit.					Bentazone	0.75-1.5 lit.	Handhoe and weeder	pendimethalin	0.5 lit	pendimethalin	0.5 lit				
	Cowpea	Handhoe and weeder									Handhoe and weeder	pendimethalin	0.75 kg a.i.	pendimethalin	0.75 kg a.i.				
	Rajmash										Handhoe and weeder	pendimethalin	0.75 kg a.i.	pendimethalin	0.75 kg a.i.				
Summer	Urdbean	Handhoe and weeder	Alachlor, metachlore	1-1.5 lit.					Bentazone	0.75-1.5 lit.	Handhoe and weeder	pendimethalin	0.75 kg a.i.	pendimethalin	0.5 kg a.i.				
	Moongbean	Handhoe and weeder	Alachlor, metachlore	1-1.5 lit.					Bentazone	0.75-1.5 lit.	Handhoe and weeder	pendimethalin	0.5 kg a.i.	pendimethalin	0.5 kg a.i.				
	Cowpea	Handhoe and weeder								Handhoe and weeder	pendimethalin	0.5 kg a.i.	pendimethalin	0.75 kg a.i.					

Source: State Departments of Agriculture.

**Annexure 27: Recommended Plant Protection (Continued).**

Name of pests & causal organism		Nature of Damage/ Symptoms	Control Measures
<b>Pigeonpea</b>			
Insect-Pests	1. Pod borer	Larva feeds on tender leaves, twings and at pod formation, they puncture the pod and feeds on developing grains.	Spraying with Monocrotophos (0.04%) or Chloropyriphos (0.05%) or Fenvalerate (0.004%) or Cypermethrin (0.004%) or NPV @ 200-300 LE/ha.
	2. Tur pod fly	Larvae feed on soft grains within the pod making them unfit for consumption.	Monocrotophos (0.04%) or Dimethoate (0.03%).
	3. Tur plume moth	Larvae damage the seeds as well as cause flowers, buds and pods to drop.	Chloropyriphos (0.05%).
	4. Hairy caterpillar	Hairy caterpillars damage the crop at seedling stage. It feeds on leaves eating away the green matter of the leaves.	Chloropyriphos (0.05%) or Fenvelerate (0.004%) or Quinolphos (0.05%).
	5. Beetle	Adult beetle stipples the leaves with small and more or less circular holes. Severe attack adversely affects the vigour & growth of the plant.	Thimet 10% granules @ 10 Kg/ha.
Diseases	1. Fusarium Wilt ( <i>Fusarium udum</i> )	Leaves on lower branches of the affected plants turn yellow, drop and finally the whole plant dry out. Withering and drying up symptoms appear as if the plants were suffering from drought.	1. Carbendazim (1g) + Thiram 2 g/Kg 2. Solarize the field during summer. 3. Mixed cropping/inter cropping of pigeonpea with sorghum, Metalaxyl (6g/kg seed) + ridge planting. 4. Rogueing of infected plants and destroying them.
	2. Phytophthora blight ( <i>Phytophthora cajani</i> )	Brown to dark brown lesions are formed on the stem near the soil surface. Lesions rapidly girdle the whole stem due to which plant starts drying. High humidity, rainfall and storm, water stagnation during the monsoon favour disease spread.	1. Seed treatment with Ridomil (Metalaxyl+Mancozeb) @ 3 g/Kg seed. 2. Waterlogging should be avoided. 3. Inter-row spacing should be increased.
	3. Sterility mosaic Virus	Affected plants become light greenish in colour, stunted and branch profusely due to that they appear bushy. Upright vegetative growth and lack of flowering branches resulting in loss of total yield.	1. Grow resistant varieties. 2. Control of vector mites through Kelthane or Metasystox @ 0.1% 3. Destroy infected plants at early stage.

**Annexure 27: Recommended Plant Protection (Continued).**

Name of pests & causal organism		Nature of Damage/ Symptoms	Control Measures
<b>Greengram</b>			
Insect-Pests	1.Hairy caterpillar	Young caterpillars feed on the leaf tissues having chlorophyll and skeletonise the leaf.	Chloropyriphos (0.05%) or Monocrotophos (0.04%).
	2. Jassid	Adults and nymphs suck the sap from leaves and as a result leaves turn brown and leaf surface become uneven. In severe infection leaves dry up and fall and weaken the plants.	Monocrotophos 40 EC @ 0.04% or Confidor (Imidachoprid) 200 SL @ 7.5 ml/10 liter of water.
	3. White fly	It causes damage by sucking the plant sap.	Monocrotophos (0.04%) or Dimethoate (0.03%).
	4. Galerucid beetle	Adult beetle stipples the leaves with small and more or less circular hole.	Thimet 10% G @ 10 Kg/ha.
Diseases	1.Cercospora leaf spot ( <i>Cercospora canescens</i> )	Small round spots, violet red in colour is observed on leaves. Such spots are also observed on pods which turned into black colour.	1. Seed treatment with Thiram or Captan @ 2.5 g/Kg of seed. 2. Spray the crop with Bavistin (0.025%) at 30 and 45 days after sowing.
	2.Yellow Mosaic Virus Vector – white fly	Symptoms firstly appear on young leaves in the form of yellow, diffused, round spots scattered on the leaf lamina. Infected leaves turn necrotic. Diseased plants usually mature later and bear relatively few flowers and pods. Pods are stunted and mostly remain immature but whenever seeds are formed they are small in size.	1. Grow resistant varieties. 2. Destroy the infected plants. 3. Apply Phorate or Disulfuron granule @ 1 Kg a.i./hectare at the time of sowing. 4. Spray the crop with Metasystox @ 1 ml per litre of water to control vector population.
	3. Powdery Mildew ( <i>Erysiphe polygoni</i> )	White, powdery growth is developed on the leaves. In case of severe infection, defoliation occurs and failure of pod development.	Spray the crop with wettable Sulphur @ 3 g/litre of water or Dinocap @ 1 ml/litre water.

**Annexure 27: Recommended Plant Protection (Continued).**

Name of pests & causal organism	Nature of Damage/ Symptoms	Control Measures
4. Macrophomina blight <i>(Macrophomina phaseoli)</i>	Symptoms of this disease are root and stem rottings. Rotting starts from the roots and proceeds towards the stem due to which reddish brown to black coloured spots are formed near the soil surface. At the end, affected stem turns black.	1. Seed treatment with Thiram or Captan @ 3 g/Kg of seed. 2. Spray the crop with Bavistin (Carbendazim) @ 0.05 g/litre of water at 15 days interval.
5. Leaf Curl Virus	First symptoms appear on young leaves in the form of chlorosis around veins near the margin. Affected leaves show curling of margins downwards while the veins on the under surface of the leaf show reddish brown descolouration. Plants remain stunted and die due to top necrosis.	1. Grow resistant varieties. 2. Control of vector through Metasystox (0.1%), two to three spray at 10 days interval.
<b>Blackgram</b>		
Insect-Pests	1. Hairy caterpillar	Young caterpillars feed on the leaf tissues having chlorophyll and skeletonise the leaf.
	2. Jassid	Adults and nymphs suck the sap from leaves and as a result leaves turn brown and leaf surface become uneven. In severe infection leaves dry up and fall and weaken the plants.
	3. White fly	This pest causes damage by sucking the plant sap.
	4. Galerucid beetle	Adult beetle stippled the leaves with small and more or less circular hole.
Diseases	1. Cercospora leaf spot <i>(Cercospora canescens)</i>	1. Seed treatment with Thiram or Captan @ 2.5 g/Kg of seed. 2. Spray the crop with Bavistin (Carbendazim) (0.025%) at 30 and 45 days after sowing.

**Annexure 27: Recommended Plant Protection (Continued).**

Name of pests & causal organism		Nature of Damage/ Symptoms	Control Measures
	2. Yellow Mosaic Virus Vector – white fly	Symptoms firstly appear on young leaves in the form of yellow, diffused, round spots scattered on the leaf lamina. Infected leaves turn necrotic. Diseased plants usually mature later and bear relatively few flowers and pods. Pods are stunted and mostly remain immature but whenever seeds are formed they are small in size.	<ol style="list-style-type: none"> <li>1. Grow resistant varieties.</li> <li>2. Destroy the infected plants.</li> <li>3. Apply Phorate or Disulfuron granule @ 1 Kg a.i./hectare at the time of sowing.</li> <li>4. Spray the crop with Metasystox @ 1 ml per litre of water to control vector population.</li> </ol>
	3. Powdery Mildew ( <i>Erysiphe polygoni</i> )	White, powdery growth is developed on the leaves. In case of severe infection, defoliation occurs and failure of pod development.	<ol style="list-style-type: none"> <li>1. Spray the crop with wettable Sulphur @ 3 g/litre of water or Dinocap @ 1 ml/litre water.</li> </ol>
	4. Macrophomina blight ( <i>Macrophomina phaseoli</i> )	Symptoms of this disease are root and stem rottings. Rotting starts from the roots and proceeds towards the stem due to which reddish brown to black coloured spots are formed near the soil surface. At the end, affected stem turns black.	<ol style="list-style-type: none"> <li>1. Seed treatment with Thiram or Captan @ 3 g/Kg of seed.</li> <li>2. Spray the crop with Bavistin @ 0.05 g/litre of water at 15 days interval.</li> </ol>
	5. Leaf Curl Virus	First symptoms appear on young leaves in the form of chlorosis around veins near the margin. Affected leaves show curling of margins downwards while the veins on the under surface of the leaf show reddish brown discolouration. Plants remain stunted and die due to top necrosis.	<ol style="list-style-type: none"> <li>1. Grow resistant varieties.</li> <li>2. Control of vector through Metasystox (0.1%), two to three spray at 10 days interval.</li> </ol>
<b>Mothbean</b>			
Insect-Pests	1. Jassid	These are mostly observed during vegetative and fruit setting stages.	<ul style="list-style-type: none"> <li>• Early sowing</li> <li>• Inter-cropping with Pearl Millet (1:4).</li> <li>• Application of Phorate or aldicarb @ 1.25 kg a.i. effective upto 4 week.</li> <li>• Spray with monocrotophos @ 25 kg a.i./ha or dimethoate @ 0.15 kg a.i./ha.</li> </ul>
	2. White fly		
	3. Thrips		
	4. Aphid & mite		

**Annexure 27: Recommended Plant Protection (Continued).**

Name of pests & causal organism		Nature of Damage/ Symptoms	Control Measures
	5.White grub	Vegetative to fruit setting stages.	Soil application of Phorate @ 1.25 a.i./ha before sowing.
	6.Termite	Entire cropping Season.	Soil application of Phorate or @ 1.25 a.i./ha before sowing.
	7.Root Knot Nematode		carbofuran @ 2 kg a.i./ha.
Disease	Anthracoise ( <i>Collectotrichum spp.</i> )	Circular, black sunken spots with dark centres and bright red or orange margins on leaves and pods. In severe infection affected parts wither off.	1. Seed treatment with Thiram 3 gm/kg of seed. 2. Spraying the crop with Dithane M 45 @ 2.5 gm/litre of water.
<b>Horsegram</b>			
Insect-Pests	1. Aphid	Adults and nymphs suck the juice from the leaves as a result turn brown and crumpled and the plants look sick.	Monocrotophos @ 0.04% or Metasystox.
	2. Jassid	Adults and nymphs suck the juice from the leaves as a result leaves turn brown and leaf surface become uneven. In severe infection leaves dry up and fall and weaken the plants.	Monocrotophos 40 EC @ 0.04% or conc or confidor (Imidachoprid) 200 SL @ 7.5 ml/10 litre of water.
	3. Pod borer	It is a polyphagous insect. Caterpillar makes hole in pods, sometime also feed seed.	Monocrotophos 36 EC or NPV @ 250 LE/ha.
Disease	1.Yellow Mosaic Virus <u>vector-white fly</u>	Symptoms firstly appear on young leaves in the form of yellow, diffused, round spots scattered on the leaf lamina. Infected leaves turn necrotic. Diseased plants usually mature later and bear relatively few flowers and pods. Pods are stunted and mostly remained immature but whenever seeds are form they are small in size.	1. Grown resistant varieties. 2. Destroy the infected plants. 3. Apply Phorate or Disulforon granules @ 1 kg a.i. per ha. at the time of sowing. 4. Spray the crop with Metasystox @ 1 ml per litre of water to control Vector population.
	2. Root rot ( <i>Rhizoctonia solani</i> )	Roots rot and plants show yellowing of the lower-most leaves followed by wilting.	1. Seed treatment with 2 g captan/kg of seed. 2. Avoid early sowing in infested areas.

**Annexure 27: Recommended Plant Protection (Continued).**

Name of pests & causal organism		Nature of Damage/ Symptoms	Control Measures
<b>Chickpea</b>			
Insect-Pests	1. Cutworm	Caterpillar cut the plants or branches during night. Pest is active during night time and during day time. Larvae hide themselves under the clods	Monocrotophos 36 WSC @ 0.04%.
	2. Gram pod borer	It is a polyphagous found through out the country and may cause very heavy damage (upto 20-60%). Normally, larvae remain hidden in the foliage of crop unnoticed till the formation of pods. After pod formation, they feed on developing seeds after making a round hole in the pod and putting its head inside.	0.04%. Monocrotophos 36 EC or NPV @ 250 LE/ha. BT formulation @ 1.0-1.5 kg/ha.
Diseases	1. Wilt ( <i>Fusarium</i> <i>Oxyспорum</i> )	Seedling gets affected first but in advance stages symptoms of disease may also appear. Plant becomes yellowish and finally dries out. Roots become black and ultimately decompose.	1. Sowing should not be done when temperature is high. 2. Soil Solarization. 3. Seed treatment with BenlateT @ 1.5 g/Kg seed.
	2. Ascochyta Blight ( <i>Ascochyta rabiei</i> )	Infected plant shows yellowish appearance, which become brown after some time and finally dryout. Brown coloured spots with white cottony growth of fungus may also be seen.	1. Seed treatment with Calaxin M or Thiobendazole @ 3 gm/Kg of seed. 2. Chlorothalonil @ 3 ml/litre water should be sprayed on the crop. 3. Use disease free seed.
	3. Botrytis Grey mold ( <i>Botrytis cinerea</i> )	Disease is most prevalent during humid weather. Grey to dark brown lesions may formed on the stem, leaves, branches and pods.	1. Seed treatment with Thiram + Bavistin (1:1) @ 3 gm/Kg of seed. 2. Adopt wider spacing. 3. Inter-cropping with linseed.
	4. Rust ( <i>Uromyces ciceris</i> )	Small rounded, oval postules of dark brown-black colour are formed on the stem, leaves. Young leaves show mild vein yellowing and mild mottling, later on leaf tips necrose and drop giving an impression of wilting.	1. Dithane M-45 @ 2% at interval of 10 days. 2. Grow resistant varieties.

**Annexure 27: Recommended Plant Protection (Continued).**

Name of pests & causal organism		Nature of Damage/ Symptoms	Control Measures
	5. Stunt virus		1. Close spacing should be adopted. 2. Vector should be controlled.
<b>Lentil</b>			
Insect-Pests	1. Pod borer	Caterpillar defoliates the tender leaves and also bores the green pods and feeds upon the ripening grains.	Cypermethrin (0.02%) or Monocrotophos (0.04%).
	2. Aphid	Aphid suck the sap and in case of severe damage the growth is suppressed.	Metasystox or Monocrotophos (0.04%).
Diseases	1. Wilt ( <i>Fusarium lentis</i> )	Growth of the plant is checked due to yellowing of leaves, drying of plants. Roots of affected plants remain under-developed look light brown in colour.	1. Seed Treatment with Thiram + Benomyl (1:1) @ 3 gm/Kg of seed. 2. Adopt crop rotation. 3. Use healthy seeds.
	2. Rust ( <i>Uromyces fabae</i> )	Pink to brown pustules appear on leaves and stems. In severe attack, the affected plants may dry.	1. Grow early maturing/ duration variety. 2. Seed Treatment with Agrosan GN @ 2.5 g/Kg seed. 3. Spray the crop with Maneb, Zineb or Ferbam @ 2.5 g/litre of water.
<b>Fieldpea</b>			
Insect-Pests	1. Pea Stem fly	Maggot of the insect damages the internal tissue, consequently the entire plant dies. Damage is more acute when crop is sown early.	Thimet granules @ 10 kg/ha.
	2. Leaf miner	Larvae of the insect makes tunnel in the leaf causing severe damage. Damage is more during the month of Dec. to Mar.	Metasystox 20 EC (1 litre in 1000 litre of water) per ha.
	3. Pea Aphid	Aphids sucks the cell sap, resulting yellowing of leaves, Ultimately plant growth get stunted.	Metasystox (1 litre in 100 litre of water).
	4. Spiny Pod borer	It is a polyphagous pest. Caterpillar makes hole in pods feed upon developing seed. Late varieties are prone to more damage than earlier one.	Monocrotophos 36 EC or NPV @ 250 LE/ha.



**Annexure 27: Recommended Plant Protection (Continued).**

Name of pests & causal organism		Nature of Damage/ Symptoms	Control Measures
Diseases	1. Powdry Mildew ( <i>Erysiphe polygoni</i> )	White circular powdery spots are formed on the upper surface of leaf. It also appeared on stem petiole and pod. During prevalent stage whole plant get covered by a powdery mass.	1. Adopt early duration varieties. 2. Spraying with wettable sulphur @ 3 gm/litre or Dinocap @ 1 ml/litre of water.
	2. Wilt ( <i>Fusarium oxysporum</i> )	Symptoms are premature yellowing and withering of young leaves during seedling stage and advance stage. Disease caused maximum loss if crop is early sown.	1. Seed Treatment with Thiram + Benomyl (1:1) @ 3 gm/kg of seed 2. Adopt crop rotation 3. Use healthy seeds
	3. Rust ( <i>Uromyces Fabae</i> )	During advance stages affected plants dries out.	1. Adopt early duration varieties. 2. Spray with Maneb @ 2 gm/litre of water.
<b>Lathyrus</b>			
Insect-Pests	Aphid	Adults and nymphs suck the juice from the leaves as a result, leaves turn brown and crumpled and the plant look sick.	Monocrotophos @ 0.04% or Metasystox.
Diseases	1. Rust ( <i>Uromyces fabae</i> )	Pink to brown pustules appeared on leaves and stems. In severe attack, the affected plants amy dry.	1. Grow early maturing variety. 2. Seed Treatment with Agrosan GN @ 2.5 g/kg seed. 3. Spray the crop with Maneb, Zined or Ferbam @ 2.5 gm/litre.
	2. Downy Mildew ( <i>Peronospora spp.</i> )	Brownish cottony growth of fungus may be seen on the lower surface of leaf. Inside growth yellow to greenish spots are also visible.	Spray with Agrosan GN (0.25%)
	3. Powdery Mildew ( <i>Erysiphe polygoni</i> )	Symptoms first appeared on all the aerial part of plant. While powdery masses of spores formed on leaves which may collapse and cover the whole leaf with powdery growth.	Wettable Sulphur @ 3 gm/ litre or Dinocap @ 1 l/litre of water.

**Annexure 27: Recommended Plant Protection.**

Name of pests & causal organism		Nature of Damage/ Symptoms	Control Measures
<b>Cowpea</b>			
Insect-Pests	1. Hairy caterpillar	Caterpillar eats away all the green matter of the leaves.	Chloropyriphos @ 0.05% or Monocrotophos @ 0.04%
	2. Aphid	Adults and nymphs suck the juice from the leaves as a result, leaves turn brown and crumpled and the plants look sick	Monocrotophos @ 0.04% or Metasystox.
Diseases	1. Bacterial Blight ( <i>Xanthomonas Viginicola</i> )	Disease firstly witnessed at the cotyledens and tender leaves. Necrotic spots may be seen on the terminal of leaf. Cankers may also be found on stem.	1. Grow resistant variety. 2. Use Disease-free seeds. 3. Use Bactericide for control of pathogen.
	2. Mosaic Virus	A viral disease transmitted by aphid affects the leaves first. Pale yellow leaves show mottling, crunckling and reduction in its size.	1. Use resistant varieties. 2. Control of vector through spraying Metasystox 0.1 ml/litre of water.
	3. Powdery Mildew ( <i>Erysiphe polygoni</i> )	Symptoms first appeared on all the aerial parts of plant. White powdery masses of spores formed on leaves which may collapse and cover the whole leaf with powdery growth.	Wettable sulphur @ 3 g/litre or Dinocap @ 1 ml/lite of water.
	4. Rust ( <i>Uromyces endiculatus</i> )	Symptoms clearly visible from the lower surface of leaves in the form of small white pustules. These brown coloures spots are Uridii which may be replaced with black coloured tilia.	1. Grow early maturing varieties. 2. Seed Treatment with Agrosan GN @ 2.5 gm/kg seed.
<b>Broadbean</b>			
Insect-Pests	Aphid, Leaf minor, Leaf weevil, Stem borer.	These pests infest crop during vegetative to flowering period. They may be managed by using control measurs indicated for management of Lentil pests.	
Diseases	Root rot, Aschochyta blight, Botryls grey mold, Cercosporal Leaf spot & Rust	Diseases rarely infect the plants. However, if infection goes at severe level, then it may be managed by using control measures suggested for management of Chickpea diseases.	

**Annexure 28: Plant Protection methods followed by states (Continued).**

Crop/Season	Pest	Control method					
		Biological		Botanical		Chemical	
		Name	Dose	Name	Dose	Name	Dose
<b>Bihar</b>							
Kharif-Pigeonpea	Podborer Cutworm	Neem extract	1.5 lit /ha	Neem extract	1.5 lit /ha	For Podborer -Endosulfan 35 EC or Triazophos 40 EC or Prophenophos 50 % EC for cutworm- Chlorpyriphos 20 % EC for Wilt – Carbendazim 50% WP or Dithane M 45 + Dimethoate 30% EC	2 lit. or 1.5 /ha, 8 g/ kg seed 1.5 lit /ha Spray 2 g/ kg seed or 500 gm or 1.5 lit /ha spray
	Wilt	For wilt- Trichoderma viridi	5 g/ kg seed				
Urdbean				-do-			
Moongbean							
Horsegram							
Rabi -Chickpea							
Lentil							
Fieldpea							
Khesari							
<b>Mizoram</b>							
Kharif Pigeonpea	1)Pod borer 2) Pod fly					Diclorovos (DDVP) or Monocrotophos	2 lit./ha
Cowpea	1)Aphid 2) Pod borer					Diclorovos (DDVP) or Monocrotophos	2 lit./ha
Rice bean	Pod Borer					Diclorovos (DDVP) or Monocrotophos	2 lit./ha
Rabi Cowpea	Pod borer					Diclorovos (DDVP) or Monocrotophos	
Field pea	Pod borer					Diclorovos (DDVP) or Monocrotophos	
Frenchbean	Pod borer					Diclorovos (DDVP) or Monocrotophos	
<b>Maharashtra</b>							
Kharif Pigeonpea	Podborer, Podfly, Leaf caterpillar	Tricograma, NPV	50000 No/ha 500 LE			Thiodicoarb 75 WP Indoxacarb Chlorpyriphos	1 gm/ lit of water
Urdbean	Podborer, Leaf caterpillar, Aphid, Jassid					Acephate 75 SP Methyldematon	
Moongbean	Podborer, Fleabeetle, Aphid, Jassid						
Mothbean	Podborer, Fleabeetle,						
Rabi Chickpea	Podborer, Cutworm	Neem oil	5 ml/ lit			Thiodicoarb 75 WP	
Urdbean	Podborer, leaf miner						
Moongbean	Pod borer, Flea beetle, Aphid, Jassid						
Cowpea	Pod borer, Flea beetle,						
Summer Urdbean	Pod borer, Leafminer						
Moongbean	Podborer, Fleabeetle,						
Cowpea	Pod borer, Fleabeetle,						

## Annexure 28: Plant Protection methods followed by states.

Crop/Season	Pest	Control method					
		Biological		Botanical		Chemical	
		Name	Dose	Name	Dose	Name	Dose
<b>Gujrat</b>							
Kharif Pigeonpea	Podborer, Maruca, Blue butterfly,	HaNPV Bt powder	250 LE 1 kg/ ha	NSKE 5%	500g/10 lit water 50ml/10 lit water	Profenophos 50EC Indoxacarb 14.5 %,	750g a.i./ha 75g a.i./ha
	Podfly, Tur podbug, Aphid, Jassid, Whitefly	Lady bird beetle, Chrysopa	5000/ha	Neem oil	50ml/10 lit water	Seed treatment: Imidacloprid Dimethoate For spray: Triazophos Dimethoate	3ml/kg 5 ml/kg 3ml/10 lit. of water 10ml/10 lit of water
Urdbean	Aphid, Jassid, Whitefly	Lady bird beetle, Chrysopa	5000/ha	Neem oil	50ml/10 lit water	Seed treatment: Imidacloprid Dimethoate For spray: Triazophos Dimethoate	3ml/kg 5 ml/kg 3ml/10 lit. of water 10ml/10 lit of water
Moongbean							
Mothbean	Aphid, Jassid, Whitefly	Lady bird beetle, Chrysopa	5000/ha	Neem oil	50ml/10 lit water	Seed treatment: Imidacloprid Dimethoate For spray: Triazophos Dimethoate	3ml/kg 5 ml/kg 3ml/10 lit. of water 10ml/10 lit of water
Horsegram							
Rabi Chickpea	Podborer, Gram cutworm	HaNPV Bt powder Pheromone Trap	250 LE 1 kg/ ha 6 traps/ha	NSKE 5%	500g/10 lit water 50ml/10 lit water	Lambdacyhalothrin 4.9%CS Profenophos50EC Indoxacarb 14.5 %,	25 g a.i./ha 750g a.i./ha 75g a.i./ha
Fieldpea	Aphid, Jassid, Whitefly,	Lady bird beetle, Chrysopa	5000/ha	Neem oil	50ml/10 lit water	Seed treatment Imidacloprid Dimethoate For spray- Triazophos Dimethoate	3ml/kg 5 ml/kg 3ml/10 lit. of water 10ml/10 lit of water
	Podborer	HaNPV Bt powder	250 LE 1 kg/ ha	NSKE 5%	500g/10 lit water	Lambdacyhalothrin 4.9%CS	25 g a.i./ha
Cowpea	Podborer	Bt powder	1 kg/ ha	NSKE 5%	500g/10 lit water 50ml/10 lit water	Indoxacarb 14.5 %,	3.5 ml/10 lit water
	Maruca Aphid Jassid Whitefly Thrips			Neem oil		Spinosad 45 % SC Emamectin benzoate Thiodicarb Phosphomidon, Triazophos Dimethoate	1.6 ml/10 lit of water 3ml/10 lit. of water 3ml/10 lit. of water -do- -do- 10 mi/10 lit.of water
Rajmash	Rootfly					Seed treatment with Chlorpyrifos	8 ml/ kg
Summer Urdbean	Jassid and Whitefly	As above					
Moongbean	Maruca						
Cowpea	Aphid, Jassid Whitefly, Thrips						
<b>Puduchhery</b>							
Kharif Urdbean	Podborer	Pheromone traps	5 traps/ ha	Release of Trichogramma chilonis at weekly intervals 4 times Neem oil/ Pungam oil 80EC	2 ml/litre	Dusting carbaryl 5D	25 kg/ ha
	Tobacco caterpillar	Bird perches	50 Nos./ha			Quinalphos 4 D	25 kg/ha
		Light Trap	One/5 acre			Spray Quinalphos 25EC	1 L/ha.
		Trichogramma chilonis	Weekly intervals 4 times				
		BT	600gm/ha				
Moongbean	Bees, Aphids, Whitefly				Phosphomidon WSC	250ml/ha	
	Yellow mosaic virus			Remove affected plants		Seed treatment with Imidachloprid 70 WS to control vector foliar spray	5ml/kg

**Annexure 29: State / district wise major procurement centres of Moongbean, Urdbean, and Pigeonpea on MSP under PSS (Continued).**

S.No.	Name of the District	Name of the Centre	
<b>Maharashtra</b>			
1.	Akola	Akola, Washim, Karanja, Risod, Manglurpur, Murtizapur	
2.	Amravati	Amravati, Chandur, Bazar, Daryapur, Chadur rly, Achalpur, Anajngaon	
3.	Buldana	Mehekar, Chikhli, Malkapur, Lonar, Khamgaon, Shegaon	
4.	Nanded	Nanded	
5.	Latur	Latur, Udgir	
<b>Madhya Pradesh</b>			
S.No.	Division	District	Name of Centre
1.	Indore	Indore	Depalpur, Betma, Gautampur
		Khargone	Khargon, Bhikangaon, Sanawad
		Khandwa	Khandwa
		Badwani	Badwani, Sendhwa, Anjad
		Dhar	Dhar Manawar, Kukshi, Badnawar, Dhamnod
		Burhanpur	Burhanpur
2.	Ujjain	Mandsore	Mandsore, Shyamgarh, Paliyamandi, Sitamau
		Neemuch	Neemuch, Javad, Manasa
		Ratlam	Ratlam, Jaora
3.	Bhopal	Bhopal	Bhopal, Bairasia
		Vidisha	Vidisha, Ganjbasoda, Kurwai, Siron, Shamshabad
		Betul	Betul
4.	Sagar	Sagar	Sagar, Bina, Khurai
		Damoh	Damoh, Pathria
		Panna	Devandranagar, Ajaygarh
		Tikamgarh	Tikamgarh
		Chhatarpur	Chhatarpur, Badamalhera, Lodiarpalpur
5.	Gwalior	Gwalior	Gwalior
		Morena	Morena, Kailaras, Ambah, Porsa,
		Guna	Guna, Binaganj, Radhogarh
		Ashoknagar	Ashoknagar, Mungawali
6.	Jabalpur	Chhindwara	Chhindwara
		Seoni	Seoni
		Dindori	Dindori
		Umariya	Umariya
		Anuppur	Anuppur
		Mandla	Mandla
7.	Rewa	Siddhi	Siddhi
		Satna	Satna, Amarpatan, Nagod

**Annexure 29: State / district wise major procurement centres of Moongbean, Urdbean, and Pigeonpea on MSP under PSS (Continued).**

<b>Gujarat</b>		
<b>S.No.</b>	<b>Name of District &amp; Centre</b>	
1.	Rajkot	
2.	Gondal	
3.	Junagadh	
4.	Amreli	
5.	Jamnagar	
6.	Kalavad	
7.	Talod	
8.	Modasa	
9.	Himatnagar	
10.	Tarapur	
11.	Anand	
12.	Borsad	
13.	Dahod	
14.	Bharuch	
15.	Surat	
<b>Rajasthan</b>		
<b>S.No.</b>	<b>Name of the District</b>	<b>Name of the Centre</b>
1.	Chittorgarh	Chittorgar, Nimbahera, Badaisadri
2.	Ajmer	Vijaynagar, Kekri, Kishangarh
3.	Jhalawar	Jhalrapatan, Bhawanimandi, Chomela
4.	Udaipur	Fatehpur, Bhinder
5.	Banswara	Banswara, Partapur
6.	Kota	Ramganjmandi, Kota, Sangod, Itawa
7.	Bhilwara	Bhilwara, Gulabpura, Vijaynagar, Mandalgarh
8.	Baran	Baran, Atru, Chabra
9.	Sikar	Sikar, Neem ka thana, Srimadhapur
10.	Nagaur	Nagaur , M. city, Didwana, K. city
11.	Badmer	Balotra
12.	Jhunjhunu	Jhunjhunu, Surajgarh
13.	Pali	Pali, Sojatrod, Sumerpur
14.	Jodhpur	Jodhpur, Bilara, Phalodi
15.	Churu	Churu, Sujangarh, Sadulpur, Rajgarh, Taranagar
16.	Tonk	Malpura, Tonk, Niwai, Unara, Toda raisingh.
17.	Jaipur	Chomu, Sambher
18.	Swaimadhapur	Swaimadhapur, Chottkbarwara
19.	Pratapgarh	Pratpgarh, Beggu
20.	Dausa	Dausa
21.	Jalore	Jalore, Bhimmal
22.	Bundi	Bundi

**Annexure 29: State / district wise major procurement centres of Moongbean, Urdbean, and Pigeonpea on MSP under PSS (Continued).**

<b>Uttar Pradesh</b>			
<b>S.No.</b>	<b>Name of the District</b>	<b>Name of the Centre</b>	
1.	Etah	Kasganj, Gandundwara	
2.	Hathras	Shadabad, Mathura	
3.	Badaun	Ujhani, Wazirganj, Badaun, Babrala	
4.	Moradabad	Chandausi, Moradabad	
5.	Bulandshar	Sayana, Gulawati, Shikandrabad	
6.	Bareilly	Bareilly, Aonla	
7.	Bahraich	Bahraich, Nonpura, Risiya	
8.	Jallaun	Jallun, Orai, Kalpi, Konchi	
9.	Jhansi	Chirgaon, Mauranipur, Jhansi	
10.	Banda	Attara, Banda, Bahura	
11.	Fatehpur	Fatehpur, Bindki	
12.	Mirzapur	Chunar, Sonbhadra	
13.	Hardoi	Hardoi, Madhoganj, Sandila	
14.	Sitapur	Sitapur, Biswn	
15.	Agra	Agra, Achhanera	
16.	Kanpurdehat	Rura, Pukhraya	
17.	Raibareilly	Raibareilly, Lalganj	
18.	Hamirpur	Mushara, Rath	
19.	Kannauj	Chibramau, Gurshaiganj	
20.	Chitrakoot	Chitrakoot, Karvi	
21.	Lakhimpur	Lakhimpur, Khiri	
22.	Basti	Basti	
23.	Gonda	Balrampur	
24.	Aligarh	Aligarh, Atraula, Sahsani	
25.	Rampur	Rampur, Swar	
26.	Lalitpur	Lalitpur, Mahrauni	
<b>Karnataka</b>			
<b>S.No.</b>	<b>District and Centre</b>	<b>S.No.</b>	<b>District and Centre</b>
1.	Gulbarga	8.	Bijapur
2.	Bidar	9.	Yadgir
3.	Sedam	10.	Chincholi
4.	Chitapur	11.	Hubli
5.	Bhalki	12.	Dharwad
6.	Shahapur	13.	Mysore
7.	Raichur		
<b>Andhra Pradesh</b>			
1.	Suryapet	6.	Warangal
2.	Tandur	7.	Jogipet
3.	Khammam	8.	Narayanpet
4.	Vikarabad	9.	Madhira
5.	Ongole		

**Annexure 29: State / district wise major procurement centres of Moongbean, Urdbean, and Pigeonpea on MSP under PSS (Continued).**

<b>Chhattisgarh</b>			
S.No.	Districts & Centre	S.No.	Districts & Centre
1.	Kawardha	4.	Rajnandgaon
2.	Bemetra	5.	Bhatapara
3.	Mungei		
<b>Tamil Nadu</b>			
1.	Tiruvarur, RMC		
2.	Thanjore, RMC		
3.	Nagapattinam, RMC		
4.	Mayiladudurai, RMC		
<b>Jharkhand</b>			
1.	Dumka		
2.	Bano		
3.	Chatra		
4.	Simdega		
5.	Kolebira		
6.	Daltungunj		
<b>Bihar</b>			
1.	Purnea		
2.	Katihar		
3.	Khagaria		
4.	Nowgachia		
<b>Assam</b>			
1.	Barpeta		
2.	Kharupatia		
3.	Nagaon		
4.	Dhubri		
5.	Nalbari		

**Annexure 29: State / district wise major procurement centres of Gram and Masur on MSP under PSS (Continued).**

S.No.	District	Centre
<b>Rajasthan (Gram)</b>		
1.	Ajmer	Kishangar, Beawar, Kekri
2.	Jaipur	Kotputli, Chomu, Achrol, Bassi, Pawta, Kukarkhera, Kishangarh, Rainwal
3.	Dausa	Dausa, Bandikui, Lalsot, Hahuwa
4.	Sikar	Sikar, Srimadhapur, Neem ka thana, Dataramgarh
5.	Jhunjhunu	Jhunjhunu, Surajgarh, Dundlodmandi, Udaipurwati, Chirawa
6.	Alwar	Alwar, Khairthal, Khrilaganj
7.	Bharatpur	Bharatpur, Kaman, Kumher, Nadbai, Bayana, Nagar, Deeg



**Annexure 29: State / district wise major procurement centres of Gram and Masur on MSP Under PSS (Continued).**

S.No.	District	Centre
<b>Rajasthan (Gram)</b>		
8.	Swaimadhampur	Swaimadhampur, Gangapurcity
9.	Karoli	Hindoncity
10.	Nagaur	Nagaur, M. City, Kuchman
11.	Baran	Baran, Atru, Anta, Chabra
12.	Kota	Kota, Itawa, R'mandi
13.	Bundi	Bundi, K'patan
14.	Jhalawar	Raipur, J'apatan, Eklera, Bhawanimandi, Bakani, Chomela
15.	Dugapur	Dugapur
16.	Bhilwara	Gulabpura, Shahpura
17.	Chittiragarh	Chittiragarh, Nimbahera, Pratapgarh, Begu, Bhadsora, Kapasan, Badiasadri
18.	Tonk	Tonk,Uniyara, Devli, Malpura, Todaraisingh.
19.	Churu	Churu, Sudalpur, Saradarsahar, Sujangarh, Taranagar
20.	Jaisalmer	Pokhran, Ramgarh, Mohangarh, Nachana
21.	Rajasmand	Kakroli
22.	Udaipur	Fatehnagar
23.	Jalore	Bhimmal, Raniwada, Ahore, Jalore, Sanchore
24.	Jodhpur	Bhopalgarh, Bilara
25.	Pali	Jaitaran, Raipur, Rani, Sojairod, Sumerpur
26.	Sirohi	Swaroopganj
27.	Bikaner	Bikaner, Khajuwala, Bajju
28.	Sriganganagar	Sriganganagar, Suratgarh, Gajsinghpur, Raisingnagar, Vijaynagar, Gharsana, Anupgarh
29.	Hanumangarh	Hanumangarh Jh., Hanumangarh, TWN., Pilibanga, Goluwala, Rawatsar, Nohar
<b>Haryana (Gram)</b>		
1.	Hisar	Hisar, Adampur, Hansi
2.	Sirsa	Sirsa, Dabwali, Ellenabad, Kalanwali
3.	Bhiwani	Bhiwani, Charkhi, Dadri, Loharu, Siwani
4.	Mohindergarh	Narnaul, Ateli, Kanina
<b>Madhya Pradesh (Gram)</b>		
1.	Bhopal	Bhopal, Berasia
2.	Vidisha	Vidisha, Ganjbasoda, Sironj, Gulabganj, Kurwai, Lateri, Nataeran
3.	Sehore	Sehore, Ashta, Nasrullaganj, Ichhwar, Rehti, Shampur
4.	Raisen	Raisen, Obaidullaganj, Begumganj, Bareli, Gairatganj, Udaipura, Mandideep, Sa;amatpur
5.	Hoshangabad	Hoshangabad, Itarsi, Piparia, Banapura, Babai
6.	Harda	Harda, Timarni, Khirkiya
7.	Rajgarh	Baiaora, Pachore, Chapiheda, Jirapur, Kurwar, Suthaliya, Khujnew, Khilchipur, Sarangpur, Narsingharh
8.	Betul	Betul, Multai, Bhainsdehi
9.	Indore	Sanyogitaganj, Indore, Manglia, Depalpur, Gautampura, Sanwer, Betma, Laxmiganj, Mhow, Manpur
10.	Dhar	Dhar, Dhamnod, Banawar, Kukshi, Rajgarh, Manawar, Gandhwani
11.	Khandwa	Khandwa, Harsood Khalwa, Burhnpur
12.	Jhabua	Jhabua, Thandla, Pettawad, Alirajpur, Jobat

**Annexure 29: State / district wise major procurement centres of Gram and Masur on MSP under PSS (Continued).**

S.No.	District	Centre
<b>Madhya Pradesh (Gram)</b>		
13	Ujjain	Ujjain, Barnagar, Khachroad, Nagda, Mahidpur, Tarana
14	Dewas	Dewas, Hatpipaliya, Khategaon, Kannjod, Sonkatch, Lorhada, Bagli
15	Ratlam	Ratlam, Jaora, A lot, Sailana, Tal
16	Mandsaur	Mandsaur, Shamgarh, Sitamau, Bhanpura, Jawad, Subashra
17	Neemuch	Neemuch, Manasa, Pipaliyamandi, Simoli
18	Shajapur	Shajapur, Akodia, Agar, Berchha, Badod, Kalapipal, Momnbadodiya, Nalkheda, Shajapur, Susner, Maxizokar, Soyatkala, Kanad
19	Sagar	Sagar, Khurai, Banda, Bina
20	Damoh	Damoh, Hatta, Pathriya
21	Panna	Ajaygarh, Devendranagar, Panna
22	Tikamgarh	Tikamgarh, Jatara, Niwadi
23	Chhatarpur	Harpalpur, Chhatarpur, Badamallehara, Rajnagar, Ishangar, Loundi
24	Jabalpur	Jabalpur, Majholi, Sihora, Shahpura
25	Narsinghpur	Narsinghpur, Gadarwara, Kareli, Gotegaon, Tendukheda
26	Chhindwara	Chhindwara, Chourai, Pandurna, Sousar
27	Katni	Katni, Salimanabad
28	Seoni	Seoni, Barghat, Chapra, Ghansaur, Lakhnadon, Kevlari, Gangerua
29	Gwalior	Gwalior, Dabra, Bhandar
30	Bhind	Bhind, Gohad, Lahar, Alampur, Mehgaon
31	Ashoknagar	Ashoknagar, Munbgawali, Chanderi, Piprai, Ishagarh
32	Shivpuri	Shivpuri, Badarwas, Karera, Kolaras, Kohri, Pichhor, Khaniadhana
33	Guna	Guna, Kumbhraj, Aron, Binaganj, Raghogarh, Maksudangarh
34	Datia	Datia, Sewda
35	Seopurkalan	Vijaypur, Karahal, Baroda, Seopurkalan
36	Rewa	Rewa, Hanumana, Bekunthpur, Chakghat
37	Satna	Satna, Nagod, Haihar, Amarpatan, Ramnagar
38	Sidhi	Sidhi, Bedan
<b>Uttar Pradesh (Gram)</b>		
1.	Etawah	Bhartahana, Etawah
2.	Kanpur Nagar	Shivrajpur, Bilahore, Kalyanpur
3.	Sitapur	Sitapur, Mohamoodabad
4.	Lakhimpur	Lakhimpur, Khiri
5.	Kanpur Dehat	Rural, Pukhraya
6.	Fatehpur	Bindki, Fatehpur
7.	Allahabad	Allahabad, Thumsi, Naini
8.	Koshambi	Sirathu
9.	Jhansi	Chirgaon, Mauranipur, Jhansi, Badagaon
10.	Lalitpur	Lalitpur, Mahrauli
11.	Jallaun	Orai, Kalpi, Konch, Jallaun
12.	Auraiya	Auraiya, Dibiyapur
13.	Hamirpur	Rath, Hamirpur
14.	Banda	Atarra, Banda, Beberu
15.	Mirzapur	Mirzapur, Chopan

**Annexure 29: State / district wise major procurement centres of Gram and Masur on MSP under PSS (Continued).**

S.No.	District	Centre	
<b>Uttar Pradesh (Gram)</b>			
16.	Sonbhadra	Chunar, Sonbhadra	
17.	Hardoi	Sandila, Balamau, Hardoi ,Madhoganj	
18.	Bareilly	Auraiya, Bareilly	
19.	Bahraich	Risiya, Bahraich	
20.	Sultanpur	Zafarganj, Fursatganj	
21.	Badaun	Badaun, Ujhani, Wazirganj, Bahrara	
22.	Chitrakoot	Chitrakoot, Karni	
23.	Mahoba	Mahoba	
<b>Punjab (Gram)</b>			
1.	Batinda	Batinda, Rampuraphul, Raman	
2.	Ferozepur	Abohar, Fazilka, Zeera	
3.	Mansa	Mansa, Sirdulagarh, Bhudlada	
<b>Bihar (Gram)</b>			
1.	Patna	Patna	
2.	Bhojpur	Bhojpur	
3.	Buxar	Buxar	
4.	Jehanabad	Jehanabad	
5.	Purnea	Purnea	
6.	Sitamarhi	Sitamarhi	
<b>Gujarat (Gram)</b>			
S.No.	District and Centres	S.No.	District and Centres
1.	Rajkot	9.	Borsad
2.	Gondal	10.	Talod
3.	Junagarh	11.	Dahod
4.	Kalavad	12.	Modasa
5.	Amreli	13.	Himatnagar
6.	Surat	14.	Borsad
7.	Jamnagar	15.	Tarapur
8.	Anand		
<b>Maharashtra (Gram)</b>			
1.	Akola	Akola, Washim, Karanja, Akot, Risod, Murtizapur, Manglurpir	
2.	Amravati	Amravati Anjangaon, Achalpur, Dhamangaon	
3.	Wardha	Wardha, Hinganghat, Arvi	
4.	Yavatmal	Pusad, Darwa, Digras	
5.	Buldana	Mehekhar, Chikli, Malkapur, Khamgaon, Lonar	
6.	Nagpur	Nagpur, Katol, Savner	
7.	Osmanbad	Osmanbad, Kallam	
8.	Pharbhni	Pharbhni, Hingoli	
9.	Nanded	Nanded, Degloor, Loha	
10.	Latur	Latur, Udgir, Ahmedpur	

**Annexure 29: State / district wise major procurement centres of Gram and Masur on MSP under PSS (Continued).**

<b>Karnataka (Gram)</b>			
S.No.	District & Centres	S.No.	District & Centres
1.	Chincholi	8.	Chitapur
2.	Gulbarga	9.	Bhalki
3.	Dharwad	10.	Mysore
4.	Bidar	11.	Shahpura
5.	Bijapur	12.	Raichur
6.	Hubli	13.	Yadgir
7.	Selam		
<b>Andhra Pradesh (Gram)</b>			
1	Tandur		
2.	Ongole		
3.	Vikarabad		
<b>Chhattisgarh (Gram)</b>			
1	Kawardha		
2.	Rajnadgaon		
3.	Durg		
4.	Bemetara		
5.	Kharsia		
6.	Mungeli		
7.	Bhatapara		
8.	Kurud		
9.	Mahasmud		
10.	Dhamtari		
<b>Uttar Pradesh (Masur)</b>			
1.	Etawah	Bhartahana, Etawah	
2.	Kanpur Nagar	Shivrajpur, Bilahore, Kalayanpur	
3.	Sitapur	Sitapur, Mohamoodabad	
4.	Lakhimpur	Lakhimpur, Khiri	
5.	Kanpur Dehat	Rura, Pukhraya	
6.	Fatehpur	Bindki, Fatehpur	
7.	Allahabad	Allahabad, Thumsi, Naini	
8.	Koshambi	Sirathu	
9.	Jhansi	Chirgaon, Mauranipur, Jhansi, Badagaon	
10.	Lalitpur	Lalitpur, Mahrauli	
11.	Jallaun	Orai, Kalpi, Konch, Jallaun	
12.	Auraiya	Auraiya, Dibiyapur	
<b>Uttar Pradesh (Masur)</b>			
13.	Hamirpur	Rath, Hamirpur	
14.	Banda	Atarra, Banda, Beberu	
15.	Mirzapur	Mirzapur, Chopan	
16.	Sonbhadra	Chunar, Sonbhadra	
17.	Hardoi	Sandila, Balamau, Hardoi, Madhoganj	
18.	Bareilly	Auraiya, Bareilly	

**Annexure 29: State / district wise major procurement centres of Masur on MSP under PSS.**

19.	Bahraich	Risiya, Bahraich
20.	Sultanpur	Zafarganj, Fursatganj
21.	Badaun	Badaun, Ujhani, Wazirganj, Bahrala
22.	Chitrakoot	Chitrakoot, Karni
23.	Mahoba	Mahoba
<b>Assam (Masur)</b>		
S.No.	District & Centres	
1.	Barpeta	
2.	Kharuptia	
3.	Dhubri	
4.	Nagaon	
5.	Nalbari	
6.	Diphu	
7.	Tezpur	
<b>West Bengal (Masur)</b>		
S.No.	District	Centre
1.	Kaliyaganj	Nakashipura
2.	Kushmandi	Tehatta
3.	Gangarampur	Suri
4.	Hilly	Sainthia
5.	Tapan	Nalhati
6.	Balurghat	Gushkara
7.	Karandighi	Kalna
8.	Gajal	Purbasthali
9.	Chanchol	Bangaon
10.	Samsi	Habra
11.	Harishandrapur	Chandpara
12.	Lalgola	Swarupnagar
13.	Dhuliyani Jalangi	Arambag
14.	Plassi	Goghat
15.	Chapra	Haringhata
<b>Chhattisgarh (Masur)</b>		
S.No.	District & Centres	
1	Kawardha	
2.	Rajandgaon	
3.	Durg	
4.	Bemetara	
5.	Kharsia	
6.	Mungeli	
7.	Bhitapara	
8.	Mahasmud	
9.	Dhamtari	
10.	Kurud	

**Annexure 30: Arrivals and prices of pulses in domestic markets.**

Date	Commodity & No. of Market centre	Arrival of pulses (Qty in tones)	Price (Rs. per quintal)			
			Ave. modal		Pre. average Modal	
			Min.	Max.	Min.	Max.
11.01.13	Alasande gram (3), Arhar (15), Avare Dal (1), Beans (8), Bengal gram Dal (7), Bengal gram (22), Big gram (3), Black gram Dal (5), Black gram (17), Chennangi Dal (1), Cowpea (2), Green gram Dal (4), Green gram (17), Green peas (6), Horsegram (10), Lentil (4), Masur Dal (5), Moth (6), Other Pulses (1), Peas dry (7), Redgram (6), Tur Dal (7) and Varagu (2).	1,39,496	3849	5864	3986	6137
04.03.13	Alasande gram (1), Arhar (18), Avare (2), Avare Dal (1), Beans (7), Bengal gram Dal (3), Bengal gram (36), Big gram (7), Black gram Dal (4), Black gram (27), Chennangidal (1), Cowpea (5), Green gram Dal (5), Green gram (23), Green peas (6), Horsegram (8), Karamani (3), Lentil (6), Masur Dal (6), Moth (6), Other Pulses (3), Peas dry (6), Redgram (11) and Tur Dal (5).	3,14,568	3585	5263	3605	5276
22.03.13	Arhar (19), Bean (1), Bengal gram Dal (6), Bengal gram (37), Big gram (7), Black gram Dal (7), Black gram (24), Cowpea (1), Green gram Dal (3), Green gram (23), Green peas (11), Horsegram (9), Karamani (2), Lak (2), Lentil (8), Masur dal (11), Matakhi (1), Moth (6), Other pulses (2), Peas dry (18), Redgram (13) and Tur Dal (7).	2,76,355	3389	5243	3452	5253
15.04.13	Alasande gram (1), Arhar (Tur) (17), Avare Dal (1), Beans (5), Bengal gram (36), Big gram (3), Black gram (24), Chennangidal (1), Cowpea (Lobia) (5), Green gram Dal (2), Green gram (16), Green peas (2), Horsegram (9), Karamani (1), Lak (1), Lentil (5), Peas dry (6) and Redgram (9).	2,98,741	3555	5283	3644	5175
22.04.13	Alasande gram (1), Arhar (Tur) (12), Avare Dal (1), Beans (4), Bengal gram (28), Big gram (5), Black gram (20), Chennangidal (1), Cowpea (Lobia) (2), Green gram Dal (4), Green gram (20), Green peas (4), Horsegram (2), Lentil (1), Masur Dal (6), Moth Dal (3) and Redgram (7).	2,04,826	4035	5548	3717	5585

Figure in parenthesis is nos. of market centres

**Annexure: 31: Pulse commodity wise main domestic markets.**

<b>Pulse commodity</b>	<b>Domestic market</b>
Alasande Gram	Priya Pattana (Kar) & Bangalore (Kar)
Arhar (Tur)	Bidar (Kar), Gulbarga (Kar), Raichur (Kar), Yadgir (Kar), Bhalki (Kar), Ralikot (Kar), Dahod (Guj), Sedam (Kar), Bhiloda (Guj), Agra (UP), Junagadh (Guj), Khair (UP), Aligarh (UP), Nalbari (ASM), Kalpi (UP), Khairagarh (UP), Khargone (UP), Modasa (Tintoi)(Guj), Muzzafarnagar (UP), Modasa (Guj), Chalisgaon (Mah), Jahanabad (UP), Amreli (Guj) & Savarkantha (Guj)
Avare	Bangalore (Kar)
Beans	Binny Mill (F&V), Bangalore (Kar), Jamnagar (Guj), Mysore (Bandipalya) (Kar), Junagadh (Guj), Gowribidanoor(Kar), Kanakapura(Kar) & Ramanagara(Kar)
Bengalgram Dal	Bangalore (Kar), P.O.Uparhali Guwahati (ASM), Gangapur City(Raj), Hassanpur(Kar) & Nilbari(ASM).
Bengalgram (Gram)	Raichur(Kar), Gulbarga(Kar),Gadag(Kar), Bidar(Kar), Talikot(Kar), Sedam(Kar), Bangalore(Kar), Bareilly(UP), Aligarh(UP), P.O.Uparhali Guwahati (ASM), Bhalki(Kar), Khajuwala (Raj), alur (AP), Bijapur (Kar), Yadgir(Kar), Baberu (UP), Ballia (UP), Muradabad (UP), Dahod (Guj), Kottayam (Ker), Nalbari (ASM), Kalpi (UP), Naryanpet (AP), Bikaner (Grain)(Raj), Raisingh Nagar (Raj), Divai(UP), Rampur (UP), Farukhabad (UP), Jahanabad (UP), Hubli (Amaragol) (Kar), Alleppey (Ker), Goluwala (Raj), Khair (UP) & Chandoli (UP).
Big gram	Jamnagar (Guj), Agra (UP), Amreli (Guj), Alleppey (Ker) & Savarkundla (Guj).
Black Gram Dal	Bangalore (Kar), Hassanpur (Kar), Kolar (Kar) & Kalpi (UP).
Blackgram (Urdbeans)	Jamnagar (Guj), Dahod (Guj), Kota (Raj), Bhalki (Kar), Bidar (Kar), Baran (Raj), Kalpi (UP), Jam Jodhpur (Guj), Taloda (Guj), Gulbarga (Kar), Bhiloda (Guj), Kottayam (Ker), Junagadh (Guj), Bhilwara (Raj), Sohela (Ori), Kallakurichi (TN), Muradabad (UP), Visnagar (Guj), Alleppey (Ker), Jaleswar (Ori), Mandsaur (MP), Thattanchavady (Pud) & Morbi (Guj).
Chennangidal	Bangalore (Kar).
Cowpea (Lobia)(Asparagus)	Kadiri (Guj), Kota (Raj), Suryapeta (AP), Koppal (Kar) & Karimnagar (AP).
Greengram Dal	Bangalore (Kar), P.O. Uparhali Guwahati (ASM) & Nalbari (ASM).
Greengram (Moong)	Bhinmal (Raj), Bangalore (Kar), Khair (UP), Jamnagar (Guj), P.O. Uparhali Guwahati (ASM), Sumerpur (Raj), Bidar (kar), Goluwala (Raj), Bharwar (Kar), Bhalki (Kar), Sohela (Ori), Kottayam (Ker), Suryapeta (AP), Bijapur (Kar), Balotra (Raj), Jam Jodhpur (Guj), Sri Karanpur (Raj), Aligarh (UP), Alleppey (Ker), Jaleswar (Ori), Junagadh (Guj), Fatehpur (UP), Kadiri (Guj), Muradabad (UP), Barmer (Raj), Hanumangarh (Raj), Gulbarga (Kar), Raisingh Nagar (Raj) & Dhoraji (Guj).
Greenpeas	Agra (UP), P.O. Uparhali Guwahati (ASM), Bangalore (Kar), Fatehabad (Har), Jaspur (UC) (Utr), Alleppey (Ker), Bhatapara (Cht) & Uklana (Har).
Horsegram	Gorakhpur (UP), Gundlupet (Kar), Bangalore (kar), Padmapur (Ori), Etawah (UP), Palitana (Guj), Koppal (Kar), Achalda (UP) & Junagadh (Guj).
Lak	Bhatapara (Cht).
Lentil (Masur)	Dindori (MP), Baberu (UP), Kalpi (UP), Hanumangarh (Raj) & Mandsaur (MP).
Masur Dal	P.O. Uparhali Guwahati (ASM), Nalbari (ASM), Purulia (WB) & Lakhimpur (UP).
Moth	Kadiri (Guj), Lunkaransar (Raj), Barmer (Raj), Rapar (Guj), Jodhpur (Grain)(Raj), Becharaji (Guj), Balotra (Raj) & Jamnagar (Guj).
Other Pulses	Itarsi (MP).
Peas (Dry)	Gorakhpur (UP), Agra (UP), Aligarh (UP), Bareilly (UP), Kalpi (UP), Basti (UP), Khair (UP) & Muradabad (UP).
Red Gram	Suryapeta (AP), Narayanpet (AP), Badepalli (AP), Kota (Raj), Gadwal (AP), Baberu (UP), Bhatapara (Cht), Itarsi (MP), Gazipur (UP), Alleppey(Ker), Khairagarh (UP) & Mahabuhnagar (AP).
Tur Dal	Bangalore (Kar), P.O. Uparhali Guwahati (ASM), Ranchi (Jha), Kalpi (UP) & Bareilly (UP).

**Annexure 32: Credit flow and crop insurance of pulses.**

State	Credit flow (crop loan)		Crop Insurance		
	No. of farmers covered	Amount (Rs.in lakh )	No. of farmers covered	Total Premium (Rs.in lakh)	Compensation paid to the farmers (Rs.in lakh)
<b>Bihar (2010-11)</b>	818889	Rs. 493696	432248	Rs. 102474	Rs. 18935
<b>Tamil Nadu (2011-12)</b>	Not furnished by SLBC	Rs. 17794 have been disbursed against the target of Rs. 12676 as crop loan by the Commercial Bank and Regional Rural Banks for Pulse Crops.	848391	Rs. 2770.52 (state share of premium disbursed during 2011-12 for all crops.)	Rs. 659.99 ( state share of compensation claims of Rs. 1.75 lakh have been disbursed to farmers for pulse crops out of Rs. 659.99 )
	915674	Rs. 328042 have been disbursed towards crop loan and Jewel loan by the Co-operative Bank for all crops.			



## Annexure 33: Pattern of financial assistance under Centrally Sponsored Schemes (Continued).

## A. NFSM-Pulses &amp; MMA- Pulses

Components	Pattern of Assistance	NFSM-Pulses	MMA-Pulses (90:10)	Additional area coverage of Pulses Rabi/ Summer under NFSM-Pulses 2012-13
Production of Breeder Seed	Rs 2.0 crores/year on project basis	√	√	-
Purchase of Breeder Seed	Full cost as per uniform rate fixed by DAC.	*	√	-
Production of Foundation Seed	Rs.1000/- per quintal.	*	√	-
Production of Certified Seed	Rs.1000/- per quintal.	*	√	-
Distribution of Certified Seed	50% of the cost of certified seed of all pulses limited to Rs.1200/- per quintal, whichever is less.	-	√	√
Distribution of Certified Seed (a) For varieties less than 10 years (b) For varieties less than 10 years	Rs. 2200/- per quintal. Rs. 1200/- per quintal.	√ √	-	-
Distribution of Seed Minikit	Free of cost to the farmers through State Governments.	Under A3P	√	Under A3P
Strengthening of SSCA	Rs.25.00 lakh / State / Annum.	-	√	-
Frontline Demonstrations by ICAR/SAUs in a cluster of 10 ha each	Actual cost of the demonstration limited to Rs.5000/- per ha.	√	-	-
Cluster demonstration (100 ha each) on inter-cropping /improved varieties/farm implements like Ridge-Furrow markers/seed drills	Rs.5000/- per ha.	√	-	-
Integrated Nutrient Management (INM)	50% of the cost or Rs.1250/- per ha, whichever is less.	-	√	√
INM- Lime/ Gypsum/80% WG Sulphur	50% cost of the material plus transport cost limited to Rs.750/- per ha, whichever is less.	√	-	-
Micronutrients	50% of the cost or Rs.500 per ha, whichever is less.	√	-	-
Rhizobium culture /Phosphate Solubilizing Bacteria / Microrriza	50% of the cost of the chemicals or Rs.100/- per ha.	√	-	-
Integrated Pulses Management (IPM)	50% of the cost or Rs.750/- per ha, whichever is less.	√	√	√
Assistance for distribution of NPV	50% cost limited to Rs.250/- per ha.	√	-	-
Assistance for distribution PP Chemicals	50% cost of chemical or Rs.500/- per ha, whichever is less.	√	-	√
Assistance for Weedicide	50% cost of chemical or Rs.500/- per ha, whichever is less.	√	-	-
Purchase of Knapsack sprayer	50% of the cost limited to Rs.3,000/- per Machine whichever is less (Manual and power operated).	√	-	-
Distribution of Zero Till Seed Drill	Assistance @ 50% of the cost limited to Rs.15000/- per Machine, whichever is less.	√	-	-
Distribution of Multi-crop Planter	Assistance @ 50% of the cost limited to Rs.15000/- per Machine, whichever is less.	√	-	-
Distribution of Seed drill	Assistance @ 50% of the cost limited to Rs.15000/- per Machine, whichever is less.	√	-	-
Distribution of Zero Till Multi-crop Planter	Assistance @ 50% of the cost limited to Rs.15000/- per Machine, whichever is less.	√	-	-

\*- Being implemented by Seed Division, DAC, Krishi Bhavan, New Delhi from 2012-13.

## Annexure 33: Pattern of financial assistance under Centrally Sponsored Schemes (Continued).

## A. NFSM-Pulses &amp; MMA- Pulses (From 2001-02 to 2012-13)

Component	Pattern of Assistance	NFSM-Pulses	MMA-Pulses (90:10)	Additional area coverage of Pulses Rabi/ Summer under NFSM-Pulses 2012-13
Distribution of Rotavator	50% of the cost limited to Rs.30,000/- per Machine, whichever is less.	√	-	-
Laser Land Leveler	Rs.150,000/- per Machine for a group of 10 farmers	√	-	-
Distribution of Sprinkler Sets	50% of the cost of sprinkler set limited to Rs.7500/- per ha.	√	-	√
Incentive for Mobile Sprinkler rainguns	Rs.15000/- per raingun	√	-	-
Purchase of pump set	50 % cost or Rs.10000/- per pump set up to 10 HP to all pump sets irrespective of fuel being used.	√	-	-
Pipes for carrying water from source to the field	Rs.15000/- per farmer	√	-	√
Cropping System based trainings (Four Sessions i.e. one before Kharif, one each during Kharif & rabi Crops and one after rabi harvest)	Rs.3500/- per Session, Rs. 14000/- per training	√	-	-
Extension and Mass media campaign including best awards to best performing districts	Full Cost (Lump sum grant of Rs.50 lakh / state / year for extension, Training and Mass media campaign; Rs.1 lakh / Training for 50 farmers).	-	√	-
Awards for best performing district	Rs. 5.0 lakh every two years.	√	-	-
Project Management Team & other Miscellaneous Expenses at District level	Rs. 4.47 lakh per district per year.	√	-	-
Project Management Team & other Miscellaneous Expenses at State level	Rs. 6.28 lakh per State per year	√	-	-
Miscellaneous Expenses to state for other districts (Districts)	Rs. 1.00 lakh per district per year.	√	-	-

of ISOPOM)				
Project Management Team at National level	Rs. 88.40 lakh per year.	√	-	-

**B. Accelerated Pulses Production Programme (A3P)**

Sl.No.	Item	Provision for one ha Quantity	Crop-wise cost/unit/ha in Rs.				
			Pigeonpea	Urdbean	Moongbean	Chickpea	Lentil
1.	Seed Minikit	@ 0.20% area/ha (Pigeonpea, Urdbean & Moongbean @ 4Kg, Lentil @ 8 Kg and Gram @ 16 Kg/ha)	400*	400*	440*	800*	480*
2.	Gypsum	250 Kg	1200	1200	1200	1200	1200
3.	Micro Nutrient (Zinc Sulphate, Borax, Ferrus Sulphate)	25 Kg	1000	1000	1000	1000	1000
4.	Rhizobium Culture	Three packets of 200 gm each=600 gm	75	75	75	75	75
5.	PSB culture	Three packets of 200 gm each=600 gm	75	75	75	75	75
6.	Urea (for foliar spray)	10 Kg	60	60	60	60	60
7.	Fungicide for seed treatment	Thirum 2 gm + 1 gm Carbendazim/Kg of seed	200	200	200	200	200
8.	Insecticide/Fungicides/Bioagents (NPV) & Bio-pesticides	Need based chemicals, Bioagents (NPV), Bio pesticides, fungicides and Insecticides, Pheromone traps & Lure fit in IPM Recommendations of the crop	1450	900	860	1280	1000
9.	Weedicides	2.5 liters	740	740	740	740	740
10.	e-pest surveillance	Separate programme	200	150	150	170	170
	G.Total		5400	4800	4800	5600	5000

\*- Pigeonpea & Urdbean @ Rs. 100/Kg, Moongbean @ Rs.110/Kg, Gram @ Rs.50/Kg, Lentil @ Rs. 60/Kg

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**Annexure 33: Pattern of financial assistance under Centrally Sponsored Schemes**

**C. Special initiatives for Pulses & Oilseeds in dryland areas**

Component	Pattern of Assistance per unit (custom hiring)
Tractor	@ Rs. 400000/-
Ridge & Furrow planter	@ Rs. 30000/-
Rotavator	@ Rs. 60000/-
Revolving fund	@ Rs. 10000/-

**D. Special Plan to achieve 19+ million tonnes of Pulses production during Kharif 2012-13**

Sl.No	Components	Pattern of Assistance (Rs. per ha)
1.	Intercropping with Cotton	600
2.	Intercropping with Oilseeds	600
3.	Intercropping with Maize/Sorghum/Pearl Millet	A.P. (Rs.750/ha), Bihar (1400), M.P. (11671), Gujarat (1464), Karnataka (1200) and Rajasthan (1400)
4.	In-situ moisture conservation (Ridge & Furrow)	1000
5.	Critical inputs/plant growth regulator/nutrient mixtures	350

**E. Integrated Development of 60000 Pulses villages in rainfed areas**

Sl. No.	Components	Pattern of Assistance
1.	Old Ponds lining	Rs. 20000/- per pond
2.	Construction of new pond with lining	Rs. 100000/- per pond
3.	Demonstration on the pattern of A3P	#
4.	Support to SFAC	Rs. 27.00 Crores to 07 states ( A.P., Gujarat, Karnataka, M.P, Maharashtra, Rajasthan and U.P.)
5.	National level (Monitoring)	Rs. 3.00 Crores.

# Accelerated Pulses Production Programme (A3P) under Integrated Development of 60000 Pulses villages in rainfed areas

Sl.No.	Item	Provision for one ha Quantity	Crop-wise cost/unit/ha in Rs.							
			Pigeon pea	Urdbean	Moongbean	Chickpea	Lentil	Moth	Pea	Rajmas h
1.	Seed Minikit	@ 0.20% area /ha (Pigeonpea, Urdbean & Moongbean & Moth @ 4Kg, Lentil @ 8 Kg and Gram, Rajmash and pea @ 16 Kg/ha)	400*	400*	440*	800*	480*	440*	800*	1000*
2.	Gypsum	250 Kg	1200	1200	1200	1200	1200	1200	1200	1200
3.	Micro Nutrient (Zinc Sulphate, Borax, Ferrus Sulphate)	25 Kg	1000	1000	1000	1000	1000	1000	1000	1000
4.	Rhizobium Culture	Three packets of 200 gm each=600 gm	75	75	75	75	75	75	75	75
5.	PSB culture	Three packets of 200 gm each=600 gm	60	60	60	60	60	60	60	60
6.	Urea (for foliar spray)	10 Kg	200	200	200	200	200	200	200	200
7.	Fungicide for seed treatment	Thirum 2 gm + 1 gm Carbendazim/Kg of seed	200	200	200	200	200	200	200	200
8.	Insecticide/Fungicides/Bioagents (NPV) & Bio-pesticides	Need based chemicals, Bioagents (NPV), Bio pesticides, fungicides and Insecticides, Pheromone traps & Lure fit in IPM Recommendations of the crop	1450	900	860	1280	1000	860	1280	880
9.	Weedicides	2.5 liters	740	740	740	740	740	740	740	740
10.	e-pest surveillance	Separate programme	200	150	150	170	170	150	170	170
	G.Total		5400	4800	4800	5600	5000	1800	5600	5400

\*- Pigeonpea & Urdbean @ Rs. 100/Kg, Moongbean & Moth @ Rs.110/Kg, Gram & pea @ Rs.50/Kg, Lentil @ Rs. 60/Kg, Rajmash @ Rs. 62.5/Kg.



**(1) Pigeonpea**



**(2) Mothbean**



**(3) Sem (Avaré)**



**(4) Ricebean**

**Figure 1: Photographs of pulses produced in India during Kharif season.**

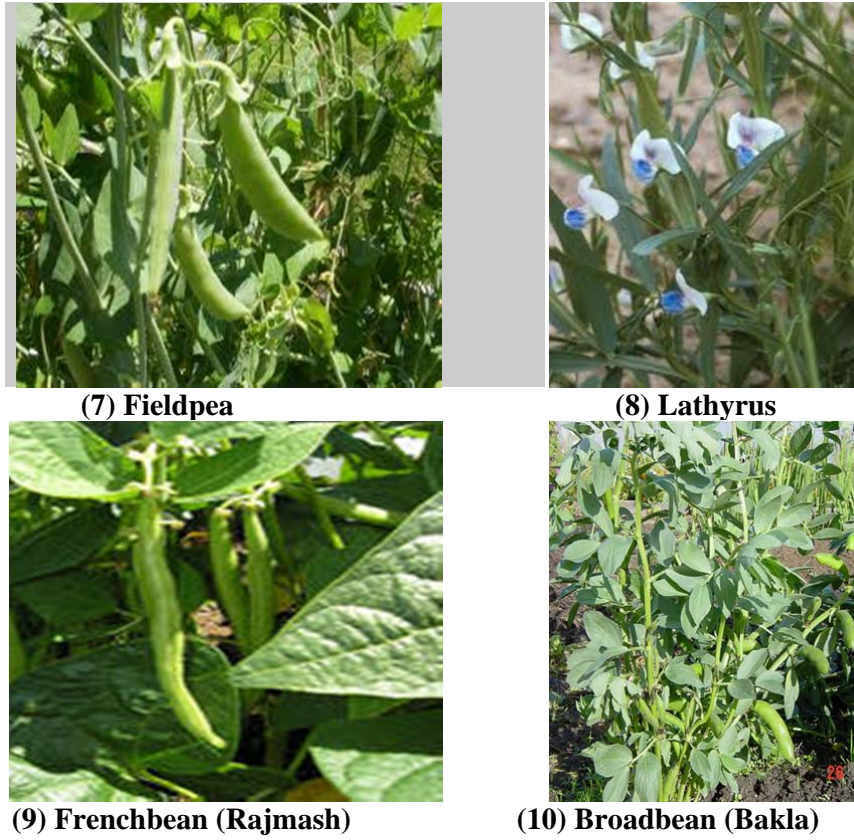


**(5) Chickpea**



**(6) Lentil**

**Figure 2: Photographs of pulses produced in India during Rabi season.**



**Figure 2: Photographs of pulses produced in India during Rabi season.**



**(11) Horsegram**

**Figure 3: Photographs of pulses produced in India during Kharif & Rabi seasons.**



**(12) Urdbean**



**(13) Moongbean**



**(14) Cowpea**

**Figure 4: Photographs of pulses produced in India during Kharif, Rabi & Zaid (summer) seasons.**



**Pigeonpea + Sorghum**



**Pigeonpea + Maize**

**Figure 5: Photographs of pulses crops grown as inter crop.**



**Pigeonpea + Soybean**



**Rice + Pigeonpea**



**Blackgram + Sugarcane**



**Cotton + Greengram**



**Chickpea + Mustard**



**Chickpea + Sunflower**



**Chickpea + Linseed**



**Rajmash + Greengram + Kulthi**

**Figure 5: Photographs of pulses crops grown as inter crop.**



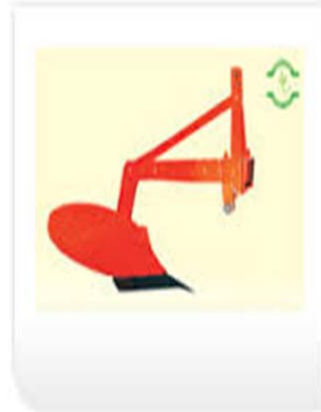
**Ploughing by Deshi Plough**



**Harrowing by wooden harrow**



**Ploughing by Tractor drawn MB plough**



**Tractor drawn plough**



**Disc harrow**



**Bakhar**

**Figure 6: Photographs of primary and secondary tillage operation for pulses.**



**Cultivator**



**Rotavator**



**Laser Land Level**



**Seed treatment**

**Figure 7: Photographs of primary and secondary tillage operation and seed treatment of pulses.**



**Ridge and Furrow**



**Line sowing**



**Sowing by broadcasting**



**Sowing by bullock**

**Figure 8: Photographs of seeding & planting of pulses (Equipment powered by human and animal).**





**Sowing by dibbling method**



**sowing by tractor drawn seed drill**



**Seed cum-fertilizer seed drill**



**Zero till seed drill**



**Seed drill**



**Multicrop planter**

**Figure 8: Photographs of seeding & planting of pulses (Equipment Powered by human, animal, power tiller and tractor).**



**Irrigation by ridge and furrow method**



**Irrigation by flood method**



**Irrigation by sprinkler**



**Irrigation by raingun**

**Figure 9: Photographs of irrigation methods and equipment applicable in pulse production.**



**Harvesting of pigeonpea**



**Pigeonpea threshing by beating**



**Urdbean and moongbean threshing by beating**



**Multicrop thresher**



**Dal mil**



**Pulses processing plant**

**Figure 10: Photographs of post harvest operations and equipment used in pulse processing.**

**i) Insect pests**



**Jassid**



**Pea aphids**



**Arhar -Podborer**



**Gram pod-borer**



**Maruca (Adult)**



**Tur- pod -fly**



**Cut worm**

**ii. Diseases**



**Fuzarium wilt of pigeonpea**



**Phytophthora blight of pigeonpea**

**Figure 11: Photographs of major pests affecting pulse Crops during production.**



**Infection of YMV in greengram    Infection of wilt in Chickpea**



**Infection of Wilt in Lentil    Infection of Powdery mildew in fieldpea**  
**iii) Weeds**



***Digra arvensis* (Lahsuva)    *Panicum crusgalli* (Sava or water grass)**



**Doobgrass**

**Moutha**

**Figure 11: Photographs of major pests affecting pulse Crops during production.**

**iii) Weeds**



**Bathua**



**Khartua**



**Hiran khuri**



**Krishn nil**



**Pyaji**



*Saccharum spontaneum*



*Boerhavia diffusa* (Patharchata)

**Figure 11: Photographs of major pests affecting pulse crops during production**

**iv) Storage pests**



**Khapra beetle**



**Pulse beetle**



**Rice moth (Larvae)**



**Cowpea weevil or bruchid**



**Lesser Grain Borer**



**Rat**

**Figure 12: Photographs of pests affecting pulses during storage.**

## EXPLANATION TO ABBREVIATION

<b>AHDF</b>	Animal Husbandry, Dairying and Fisheries
<b>AP</b>	Andhra Pradesh
<b>Avg.</b>	Average
<b>A3P</b>	Accelerated Pulse Production Programme
<b>Bt</b>	Bacillus Thuringiensis
<b>CACP</b>	Commission for Agriculture Cost and Prices
<b>CSS</b>	Centrally Sponsored Scheme
<b>CDDs</b>	Crop Development Directorates
<b>CVRC</b>	Central Varietal Release Committee
<b>CZ</b>	Central Zone
<b>CWC</b>	Central Warehousing Corporation
<b>CLS</b>	Cercospora Leaf Spot
<b>DAC</b>	Department of Agriculture and Cooperation
<b>DAS</b>	Days After Sowing
<b>FAQ</b>	Fair average Quality
<b>FAO</b>	Food and Agriculture Organization
<b>FCI</b>	Food Cooperation of India
<b>FLDs</b>	Front Line Demonstrations
<b>FYM</b>	Farm Yard Manure
<b>GOI</b>	Government of India
<b>Govt.</b>	Government
<b>HP</b>	Himachal Pradesh
<b>INM</b>	Integrated Nutrient Management
<b>IPM</b>	Integrated Pest Management
<b>IIPR</b>	Indian Institute of Pulses Research
<b>IFFCO</b>	Indian Farmers Fertilizer Cooperative Limited
<b>ICRISAT</b>	International Crop Research Institute for Semi Arid Tropic



<b>ICARDA</b>	International Centre for Agricultural Research in Dry Land Areas
<b>ICAR</b>	Indian Council of Agricultural Research
<b>IARI</b>	Indian Agricultural Research Institute
<b>i.e</b>	That is
<b>J &amp; K</b>	Jammu and Kashmir
<b>KVKs</b>	Krishi Vigyan Kendra
<b>KCCS</b>	Kisan Credit Card Scheme
<b>KRIBHCO</b>	Krishak Bharti Cooperative Limited
<b>KCL</b>	Potassium Chloride
<b>Kg/ha</b>	Kilogram per Hectare
<b>MSP</b>	Minimum Support Price
<b>MP</b>	Madhya Pradesh
<b>MS</b>	Maharashtra
<b>MMA</b>	Macro Management of Agriculture
<b>MTs</b>	Million Tonnes
<b>Mod.</b>	Moderately
<b>N</b>	Nitrogen
<b>NCIPM</b>	National Centre for Integrated Pest Management
<b>NFSM</b>	National Food Security Mission
<b>NEPZ</b>	North Eastern Plane Zone
<b>NWPZ</b>	North Western Plane Zone
<b>NSC</b>	National Seeds Cooperation
<b>NAFED</b>	National Agricultural Cooperative Federation of India Limited
<b>NA</b>	Not Available
<b>NHZ</b>	North Hilly Zone
<b>NPV 500 LE</b>	Nuclear Polyhedralosis Virus 500 Larval Equivalent

Contd.../-

## EXPLANATION TO ABBREVIATION

<b>NSKE</b>	Neem Seed Kernel Extract
<b>ODAP</b>	B-N-Oxaly-L, B-diaminopropionic Acid
<b>PSS</b>	Price Support Scheme
<b>PSB</b>	Phosphate Solubilizing Bacteria
<b>P</b>	Phosphorous
<b>PFA</b>	Prevention of Food Adulteration Act
<b>Qtls</b>	Quintals
<b>Q</b>	Quintal
<b>Res.</b>	Resistant
<b>RKVY</b>	Rashtriya Krishi Vikas Yojana
<b>SFAC</b>	Small Farmers' Agribusiness Consortium
<b>SFCI</b>	State Farms Cooperation of India
<b>SZ</b>	South Zone
<b>SRR</b>	Seed Replacement Rate
<b>SAUs</b>	State Agricultural Universities
<b>SVRC</b>	State Varietal Release Committee
<b>SWC</b>	State Warehousing Corporation
<b>SMD</b>	Sterility Mosaic Disease
<b>TN</b>	Tamil Nadu
<b>Tol.</b>	Tolerant
<b>UTs</b>	Union Territory
<b>UP</b>	Uttar Pradesh
<b>UK</b>	United Kingdom
<b>VAM</b>	Vesicular Arbuscular Mycorrhiza
<b>WB</b>	West Bengal
<b>YMV</b>	Yellow Mosaic Virus
<b>K+R</b>	Kharif + Rabi
<b>K</b>	Kharif
<b>R</b>	Rabi
<b>S</b>	Summer

<b>BC</b>	Broadcasting
<b>LS</b>	Line Sowing
<b>RxR</b>	Row x Row
<b>PxP</b>	Plant x Plant
<b>R</b>	Requirement
<b>A</b>	Availability
<b>APY</b>	Area, Production and Yield
<b>cm</b>	Centimetre
<b>mg</b>	Milligrams
<b>ml</b>	Millilitre
<b>lit.</b>	Litre
<b>@</b>	at the rate
<b>a.i.</b>	Active ingredient
<b>Kg</b>	Kilograms
<b>g</b>	Gram
<b>Rs.</b>	Rupees
<b>%</b>	Percent