AN ACCOUNT OF PULSES DEVELOPMENT INCLUDING SPRING/SUMMER PULSES

GOVERNMENT OF INDIA
DEPARTMENT OF AGRICULTURAL, CO-OPERATION & FARMERS WELFARE

1.0 Background

Pulses are important source of protein, its ability to fix nitrogen, profuse and deep root system, restoration of soil fertility makes it as integral part of sustainable agriculture particularly in dry land areas. It can be grown in all three seasons i.e. Kharif, Rabi and Spring/summer. The crops grown in spring/summer are urdbean, mungbean, cowpea etc.

The reporting of area, production and yield, separately for summer season has never been under report /statistical compilation by the Directorate of Economics and Statistics of Ministry of Agriculture and Farmers Welfare. However, since 2013-2014, Directorate of Pulses Development, Bhopal is monitoring the status of spring /summer pulses in the country .As on the date of writing of the proceedings ,the overall coverage of pulses ,especially the mungbean and urdbean, is given in Table 1.

Table 1. : Area coverage during summer (2014 to 2016)

States	Area covered (lakh ha)		
	2013-14	2014-15	2015-16
Andhra Pradesh	1.53	0.44	0.26
Assam	0.10	0.19	
Bihar	1.00	2.58	0.73
Gujarat	0.56	0,51	0.43
Haryana	0.44	0.17	0.06
Karnataka	0.13	0.15	0.19
Madhya Pradesh	2.24	1.69	1.67
Punjab	0.43	0.65	0.32
Tamil Nadu	1.83	1.73	2.38
Telangana	0.05	0.13	0.04
Uttar Pradesh	1.16	2.04	1.56
West Bengal	0.40	0.39	0.52
Total	**9.88**	**10.67**	**8.33**

1.2 Global Scenario: Total Pulses

Globally pulses are grown in an area of 807.54 lakh ha with production of 730 lakh tonnes at productivity level of 892 kg/ha, India ranks first in respect of area and production with global share of 35% area and 25 % production. At the productivity front, India ranks at IXth position. The top 10 countries in respect of area, production and yield is given in Table.

Table 2: Global scenario

Country	Area (LAKH HA)		Country	Production (LAKH TONS)		Country	YIELD (kg/ha)
	Area	% to world		Production	% to world		
India	281.7	35	India	183.11	25	USA	1920
Niger	48.41	6	Canada	61.05	8	China	1498
Myanmar	38.88	5	Myanmar	54.37	7	Russian fed.	1395
Nigeria	33.3	4	China	44.73	6	Myanmar	1369
China	28.845	4	Brazil	29.46	4	Australia	1310
Brazil	28.55	4	Australia	27.04	4	Brazil	971
Canada	24.22	3	Nigeria	25.6	4	Nigeria	806
Australia	19.18	2	USA	22.33	3	Canada	648
Russian federation	17.01	2	Russian federation	20.84	3	India	638
Pakistan	14.80	2	Niger	13.63	2	Niger	305
Others	272.65	33	Others	247.91	34		
World	807.54			730.07		892	

7.09 53 0.96002 13.8 (Source: ref*283.7998 13.877e5503 49.39 0.9.39 0.47998B861 13.8 reW* n 0.48001 ref*r ref*1 g78.504 529.3

2.2 Pulses Import and Export

Table 8: Availability status of pulses production, import and export

Year	Production (lakh tons)	Import (lakh tons)	Export (lakh tons)	Total availability (lakh tons)
2006-07	141.98	22.71	2.51	167.19
2007-08	147.62	28.35	1.64	177.61
2008-09	145.66	24.74	1.36	171.76
2009-10	146.62	35.10	1.00	182.72
2010-11	182.41	26.99	2.08	211.48
2011-12	170.89	33.65	1.74	206.28
2012-13	183.43	38.39	2.02	223.84
2013-14	192.53	30.49	3.43	226.45

2.3 Long term solution to fulfill the demand for pulses lies in increasing pulses production in the country. The total availability of edible pulses, including production, import and some exports, has been 22 million tons (ave. 2012-13 to 2014-15) as per Ministry of Commerce and Ministry of Agriculture, Govt. of India. The production gap of 3.8 million tons culminated into import of 4 million tons of pulses from Myanmar, Tanzania, Republic Australia, Russia, USA, Canada, Ukraine, Uzbekistan etc.

2.4 The cropping system approach to inculcate pulses under, new niches- such as chickpea in rice fallows; pigeon pea in rice-wheat cropping systems, rice bunds and at high altitude /uplands; spring/summer pulses and inter-cropping etc, may be the areas expansion strategy. To exploit the existing yield potentials with aggressive ToT and location specific agronomic modules, as under, need to be initiated:

3.0: Challenges

3.1. **Varietal diversification**-The state-wise/crop-wise prevalent and recommended varieties are given in **Table 9**.

Table 9: State-wise/crop-wise prevalent and recommended varieties

State	Crop	Prevalent Varieties	Recommended Varieties (ICAR/SAUs)
Madhya Pradesh	Pigeonpea	TJT 501, ICPL 87119, Non-descript	TJT-501, ICPL 87119, ICPL 88039, JA 4
	Urdbean	T-9, HFP8909, IPU-94-1, Non-descript	KU-96-3, PU 30, MASH 338
	Moongbean	HUM-1, HUM-12 .Non-descript	HUM 1 JM 721, TARM 1, HUM 6
	Chickpea	JG 11, JG 16, JG 130, JAKI 9218	JG-130, JG-322, JG 63
	Lentil	JL 1, Mallika, DPL 62, IPL 81	JL1, K-75, IPL 406
	Peas	Arkel, Azad-1	KPMR-400, IM 9101 (Subhra), Rachna
Maharashtra	Pigeonpea	ICPL-87119, ICPL-8863, BSMR-736, Vipula	ICPL-87119, ICPL-8863, BDN-708, BDN-711
	Urdbean	TAU-1	BDU-1, TPU-4, TAU-1
	Moongbean	Kopargaon-1, Utkarsha	BPMR-145, BM-4, 2002-01, Vaibav
	Chickpea	Chaffa, Agnirekha	BDN-9-3, PKV-2, 5, 4-1, JAKI-9218
	Other Kharif	-	Seena, Maan (Kulthi)

	Pulses		
	Other Rabi Pulses	Ratna local(Khesari), Parvati (Cowpea)	Ratna (Khesari), PusaKomal (Cowpea)
Rajasthan	Pigeonpea	ICPL-151, ICPL-87, Gwalior-3	ICPL-151, ICPL-87, Gwalior-3, UPAS 120
	Urdbean	T-9, Pant U 19	T-9, RBU 38, Pant U 19
	Moongbean	K-851, RMG-62, RMG-268	K-851, RMG-62, RMG-268
	Chickpea	Dahod Yellow, RSG 888	RSG 902, GNG 1581, Pratap Raj Chana, RSG 991,
Uttar Pradesh	Pigeonpea	Rajeev Lochan, PAU-881, VL Arhar-1, Pusa-992, MalviyaChamatkar (MAL-13)	NDA-2, Pusa-992, MAL-13, PAU-881, NDA-88-2, KA-32-1, K91-25
	Urdbean	Pant Urd-31 & 40, LAM-709, Azad Urd-3	NUL-7, Vallabh Urd-1, Azad urd-1, Uttra, Shekhar-2, 3
	Moongbean	IPM-02-3, Pant Mung-6, TM-96-2, Meha	KM-2195, MH-421, HUM-16, Pant Mung-4, Pusa-9531, Pusa Vishal
	Chickpea	RVG-101, 210, PKV Kabuli-4,RSG-991, Pusa-1103, HK-94-124	GNG-1969, GNG-1958, WGG-3, HK-2, RSG-963, WCG-10, JGK-1, RSG-88
	Lentil	Pant Lentil-7, PL-02, HUL-57, VL-507	KLB-303, KLB-320, PL-8, HUL-57, IPL-406, Pant Lentil-4 ,DPL-15
	Peas	Sapna, VL Matar-47, VP-101	VP101, Pant P 13, IPF-5-19, SKNP 04-09
Andhra Pradesh	Pigeonpea	LRG-41, PRG-158 & ICPH-2740	LRG-41, PRG-158
	Urdbean	PU-31, LAM, TM-76-2	PU-31, LBG-752 & TM-76-2
	Moongbean	LGG-460, TM-96-2	LGG-460, TM-96-2
	Chickpea	JG-11, JAKI-9218 & PBH-4	JG-11, JAKI-9218 & PBH-4
Karnataka	Pigeonpea	BRG-1, BRG-2	ICP 8863 (Maruthi), ICPL 87119 (Asha), ICPL 87 (Pragathi)
	Urdbean	TAU-1, T-9	Kargane-3, T-9, LBG-625
	Moongbean		PS-16, Pusabaisaki
	Chickpea	Annigeri-1, JG-11	Annigeri-1, JG-11, KAK-2, Vishal
	Kulthi	Hebbal Local	KBH-1, PHG-9
Gujarat	Pigeonpea	Gujarat Tur-100, Gujarat Vegetable Tur-1	BDN-2
	Urdbean	TPU-4, Gujarat Urd-1	T-9
	Moongbean	Gujarat Mung-3, CO-4	GM-4, K-851
	Chickpea	GG-1, Chaffa, Dahod Yellow, ICCC-4, Gujarat Junagarh Gram-3	Gujarat Gram-4

3.2: Pest Outbreaks–

The loss caused due to insect pest varies from crop to crop, in pigeonpea losses reported up to 60% whereas in chickpea it is upto 90%. The details of pest, % damage and affected are enlisted below:

PIGEONPEA PEST	DAMAGE (Per cent)	AFFECTED STATES	
		MODERATE DAMAGE	HIGH DAMAGE
Pod borer complex	40-60	U P, Bihar, W B, Jharkhand	M S, Guj, KN, A P, T N
Pod fly complex	10-50	U P, Bihar, Jhark, Pun, Hary,	U P, Bihar, Jharkhand, W B
Wilt	10-1	UP, Bihar, Jhar. Guj, T N, WB	M S, KN, AP, MP
Phytopathora Blight	5-10	M S, W B	U P
SMV	10-15	Gujarat, A P	U P, Bihar, M.S., KN, T N
Root knot		M.P.	U P, Bihar, Gujarat
Cyst Nematode		M.S.	M S, A P, T N
CHICKPEA PEST			
Pod borer complex	10-90	Madhya Pradesh, Karnataka, Rajasthan, Maharashtra, Andhra Pradesh, Gujarat, Telanagana	
Wilt /Root rot	20-25		
Cut worm	5-30		
Termites	5-15		
Semilooper	0-10		

3.3 Yield Gap:

The Front Line Demonstrations, one of the component of NFSM implemented through ICAR/SAUs/KVKs shows the yield gap > 37% compare to state yield. The crop-wise/state-wise FLD and state yield is given in **Table 10**.

Table 10: Crop-wise/state-wise FLD and state yield

Crop/State	YIELD (kg/ha)			
	FLD	State Average	GAP	
			Actual	%
Pigeonpea (Short Duration)				
Maharashtra	890	766	124	16.19
Madhya Pradesh	1159	632	527	83.39
Gujarat	1427	1008	419	41.57
Haryana	1463	1094	369	33.73
Karnataka	**No FLDs has been conducted in the states**			
Uttar Pradesh				
Andhra Pradesh				
Average	**1142**	**833**	**309**	**37.10**
Pigeonpea (Medium Duration)				
Maharashtra	1404	766	638	83.29
Karnataka	1484	555	929	167.39
Madhya Pradesh	1198	632	566	89.56

Gujarat	2444	1008	1436	142.46
Andhra Pradesh	1329	449	880	195.99
Chhattisgarh	1276	497	779	156.81
Jharkhand	1566	771	795	103.11
Tamil Nadu	764	724	40	5.57
Uttar Pradesh	**No FLDs has been conducted in the state**			
Average	**1433**	**675**	**758**	**112.25**
Pigeonpea (Long Duration)				
Bihar	2123	1301	822	63.18
Jharkhand	1235	771	464	60.18
Uttar Pradesh	1724	884	840	95.02
Average	**1694**	**985**	**709**	**71.92**
Moong (Kharif)				
Rajasthan	912	411	501	121.90
Madhya Pradesh	**No FLDs has been conducted**			
Maharashtra	660	496	164	33.06
Gujarat	868	460	408	88.70
Telangana	**No FLDs has been conducted**			
Karnataka	684	199	485	243.72
Odisha	700	219	481	219.63
Jharkhand	850	550	300	54.55
Uttar Pradesh	625	487	138	28.34
Average	**786**	**453**	**333**	**73.61**
Moong (Rabi)				
Andhra Pradesh	841	425	416	97.88
Karnataka	735	304	431	141.78
Tamil Nadu	766	303	463	152.81
Average	**781**	**344**	**437**	**126.94**
Moong (Rice Fallows)				
Andhra Pradesh	814	425	389	91.53
Karnataka	962	304	658	216.45
Average	**888**	**365**	**524**	**143.62**
Urdbean (Kharif)				
Madhya Pradesh	No FLDs has been conducted			
Uttar Pradesh	856	551	305	55.35
Rajasthan	818	478	340	71.13
Maharashtra	590	534	56	10.49
Jharkhand	883	660	223	33.74
West Bengal	1164	680	484	71.18
Gujarat	710	651	59	9.06
Andhra Pradesh	856	481	375	77.96
Chhattisgarh	700	292	408	139.73
Karnataka	762	298	464	155.70
Odisha	669	290	379	130.69
Average	**830**	**494**	**336**	**68.08**

Urdbean (Rabi))				
Andhra Pradesh	1310	623	687	110.27
Karnataka	755	438	317	72.37
Tamil Nadu	838	356	482	135.39
Average	**968**	**472**	**495**	**104.87**
Urdbean (Rice fallows)				
Andhra Pradesh	637	623	14	2.25
Karnataka	967	438	529	120.78
Average	**802**	**531**	**272**	**51.18**
Chickpea				
Madhya Pradesh	1683	951	732	76.92
Rajasthan	1714	721	993	137.73
Karnataka	1130	601	529	88.02
Maharashtra	1500	816	684	83.85
Andhra Pradesh	1840	1271	569	44.75
Uttar Pradesh	1821	942	879	93.31
Chhattisgarh	1027	908	119	13.11
Jharkhand	1326	981	345	35.13
Gujarat	1984	1050	934	88.98
Bihar	1470	1072	398	37.13
Average	**1341**	**867**	**474**	**54.68**
Lentil				
Uttar Pradesh	1523	799	724	90.61
Madhya Pradesh	932	424	508	119.72
Bihar	1591	878	713	81.21
West Bengal	1406	791	615	77.75
Rajasthan	1285	917	368	40.13
Chhattisgarh	652	322	330	102.48
Jharkhand	1103	769	334	43.43
Punjab	1133	673	460	68.35
Average	**1044**	**655**	**389**	**59.43**

3.4 Seed Replacement Rate (SRR)

The SRR in pulses is ranging from 20% in gram to 34 % in urd which is lower as compared to other crops.

Crop	**SRR (%) (2011-12)**
Gram	19.35
Urd	34.41
Moong	30.29
Arhar	22.16
Lentil	22.00

Source: Seed net, Seed Division, Min. of Agri. & FW, New Delhi

4.0 Government efforts for increase the production of Pulses

To increase the production and productivity of Pulse, the government is implementing the NFSM-Pulses schemes in 29 states of the country. During 2015-16, a total Rs. 1553.56 lakh has been allocated to the states including additional allocation of Rs. 311.23 lakh. The government also increase the MSP for pulses this year with additional bonus. The comparative prices (MSP) from 2011-12 to 2015-16 is given in **Table 11**.

Table 11: MSP of Pulses(Rs /Qtl.)

Pulses/Year	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16***
Tur	3200	3850	4300	4350	4625
Gram	2800	3000	3100	3175	3500
Moong	3500	4400	4500	4600	4850
Urad	3300	4300	4300	4350	4625
Lentil	2800	2900	2950	3075	3400

*Additional bonus Rs 200/quintal each in Tur, Urd and Moong and Rs75/quintal each in Gram & Lentil

5.0 State-wise Status/Scenario: Spring/Summer Pulses

State	**Status**
Tamil Nadu	➢ Potential area about 3.37 Lakh ha (Urdbean 1.96, Mungbean-1.37, Horsegram 0.04 Lakh ha). ➢ Major potential area - New Delta Region & Kaveri Delta. ➢ Spring/late rabi, December - Margazhi – Thai pattam. ➢ Varieties grown - LBG-487, PDM-139, IPM-2-14,Vamban-4 ➢ Additional Allocation for Rabi/Summer (2015-16) Rs. 306.79 Lakh
Bihar	➢ Potential area about 6.35 Lakh ha : Crop- Mungbean ➢ Potential districts- Saharsa (3.45 Lha), Supol (0.36 Lha), Madhubani (0.28 Lha), Muzaffarpur (0.47 Lha) etc. ➢ Sowing time – March ➢ Varieties grown SML-668, PDM-139 ➢ Additional Allocation for Rabi/Summer 2015-16-Rs. 600 Lakh. ➢ Earlier Initiatives taken by state "Garma Camp under Harikhad Yojna"– (800 Qtls seed/block @Rs.25/-kg subsidy distributed in summer potential districts).
Punjab	➢ Potential area about 1.00 Lakh ha. ➢ Major potential districts: Moga (5506 ha), Muktsar (5089 ha), Ludhiana (4763 ha), Sangrur (4579 ha), Ferozpur (4425 ha), Tarantaran (4020 ha), Mansa (3976 ha), Bathinda (3535 ha), Patiala (3061ha), Nava Shahar (2829 ha), Barnala (2450 ha), Amritsar (2515 ha), Hoshiarpur (2315 ha), Others (0.63 ha). ➢ Varieties grown – SML-668, PDM-139 ➢ Additional Allocation (Rabi/Summer 2015-16) Rs.50.00 Lakh. ➢ Average yield - 879 kg/ha

Haryana	➢ Potential area – Approx 1 Lakh ha ➢ Major potential districts: Palwal (16000 ha), Kaithal (8000 ha), Fatehabad (6000 ha), Sonipat 5000 ha), Pantipat (5000 ha), Jind (5000 ha), Mahindergarh (5000 ha), Karnal (4000 ha), Ambala (4000 ha), Yamuna Nagar (4000 ha), Others 21000 ha. ➢ Varieties grown - SML-668, PDM-139. ➢ Additional Allocation (Rabi/Summer 2015-16) Rs.199.99 Lakh. ➢ Average yield - 780 kg/ha
Madhya Pradesh	➢ Potential area – App. 03 lakh ha (Mungbean 2.25 Urdbean 0.75 lakh ha). ➢ Major potential districts:Hoshangabad (89850 ha), Bhopal (32951 ha), Rewa (7000 ha), Morena (5200 ha), Gwalior (6082 ha), Sagar (7950 ha), Jabalpur (51855 ha), Ujjain (11900 ha), Indore (10743 ha), Shahdol (980 ha). ➢ Sowing time - March to April ➢ Varieties Grown- PDM-139, HUM-1, HUM-16 ➢ Additional Allocation (Rabi/Summer 2015-16) 5750 Lakh. ➢ Average yield -1100 kg/ha
Jharkhand	➢ Potential area about 0.05 Lakh ha ➢ Major potential districts are Garhwa (500 ha), Chatra (500 ha), Ramgarh (500 ha), Godda (500 ha), Jamtara (500 ha), Deoghar (500 ha). ➢ Varieties grown - SML-668, PDM-139. ➢ Additional Allocation for Rabi/Summer 2015-16- Rs.300.00 Lakh. ➢ Average yield of summer pulses in the state about 675 kg/ha
Karnataka	➢ Potential area - Approx 0.25 Lakh ha (Mungbean- 0.04, Urdbean- 0.03, Cowpea-0.13 lakh ha). ➢ Sowing Period – February 2nd week. ➢ Varieties grown - LBG-487, PDM-139, IPM-2-14,Vamban-4 ➢ Additional Allocation (Rabi/Summer 2015-16) 650 Lakh. ➢ Average yield - 300 kg/ha
Uttar Pradesh	➢ Potential area - Approx 1.00 Lakh ha (Mungbean - 0.6+ Urdbean- 0.4 Lakh ha). ➢ Additional Allocation (Rabi/Summer) 2000 Lakh. ➢ Average yield - 600 kg/ha
West Bengal	➢ Potential area – Approx 0.30 Lakh ha. ➢ Major potential districts: South 24-Parganas (14367 ha), Nadia (1474 ha), Uttar Dinajpur (1107 ha), Howrah (1064 ha), Birbhum (1030 ha), Paschim Medinipur (664 ha). ➢ Additional Allocation (Rabi/Summer 2015-16) 250 Lakh. ➢ Average yield - 679 kg/ha
Gujarat	Potential area - Approx 0.6 Lakh ha (Mungbean- 0.55 + Urdbean-0.05 lakh ha). ➢ Major potential districts: Sabarkantha (8700 ha), Surat (5600 ha), Junagarh (4400 ha), Jamnagar (4200 ha), Panchmahal (3900 ha), Tapi (3600 ha), Banaskantha (3100 ha), Porbandar (2900 ha), Vadodara (2900 ha), Dahod (2500 ha), Baharuch (2000 ha). ➢ Varieties grown – Mungbean : GM-4, K 85 & Urdbean: Gujarat-1, T-9. ➢ Average yield - Mungbean- 550 & Urdbean-660 kg/ha.
Telangana	➢ Potential area - Approx 0.20 Lakh ha ➢ Major Crop – Mungbean ➢ Major potential districts: hammam (6245 ha), Karimnagar (5573 ha), Warangal (3503 ha), Adilabad (1819 ha), Nizamabad (1781 ha), Mahabubnagar (112 ha). ➢ Additional Allocation (Rabi/Summer 2015-16- Rs.1294.5 Lakh ➢ Average yield - 450 kg/ha

6.0 Constraints in Pulses Cultivation including Summer Moong/urd

6.1 Constraints

6.1.1 **Climatic factor:** Major area of pulses under *rainfed* condition therefore their productivity is dependent on amount and distribution of rainfall. Rainfall intensity and distribution leads to vulnerability of *kharif* pulses to water stagnation (oxygen stress) and *rabi* pulses subjected to water deficit. Extreme weather conditions such as sudden shifting of temperatures i.e. low and high temperature beyond threshold level of tolerance cause flower abortion and hasten the reproductive period and lower grain yield Occurrence of mid-season cold waves and terminal heat during winter season has also been causing losses to crop productivity of rabi pulses in many regions. High temperature adversely affects productivity of winter pulses

6.1.2 Edaphic factor: Pulses are most sensitive to water logging condition, in black cotton soil in *kharif* season water logging situation results in poor aeration and failure of crop.

6.2 **Insects and diseases:** Chickpea productivity mainly governed by pod borers (*Helicoverpaarmigera*), fusarium wilt, root rots, and ascochyta blight. The major constraints to productivity in pigeonpea are biotic stresses such as pod borer, pod fly, Fusarium wilt, and sterility mosaic disease. Similarly, pod borer, aphids, cutworm, powdery mildew, rust and wilt are the major pests and diseases affecting lentil production.

6.3 **Lower productivity:** As compared to cereals, pulses have low yield potential, beside this the farmers also allocate low fertile area for pulses cultivation and do not give proper nutrition to crop resulting in non-expression of their potential ultimately lower productivity.

6.4 **Irrigation availability:** Mainly grown in *rainfed* area, especially in *rabi* season, the yield is limited by scarcity water. Farmers insure on winter rainfall but the last decade the Variability in climatic conditions such as high temperature and rainfall(intensity and amount) in winter season drastically affected pulses yield. We cannot avoid climatic condition but availing irrigation facility to pulses at their critical period of irrigation surly increase pulses production.

6.5 **Poor Seed Replacement:** Availability of good quality seeds and high seed replacement rate form the basis of higher productivity. Unfortunately, poor seed replacement rate in pulses is one of the major issues related to low yield.

6.6 **Varietal release profile-notification during last 10 years (2006 to 2015)**

Crop	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Arhar	2	6	4	3	-	1	2	3	2	1	24
Urd	2	-	4	4	4	3	3	1	3	1	25
Moong	3	2	2	4	4	3	3	1	2	-	24
Gram	7	11	5	3	7	1	6	5	2	2	49
Lentil	3	2	1	3	4	2	1	1	1	-	18
Peas	3	3	5	1	2	3	1	-	2	-	20

6.7 **Limited -varietal choice during last 10 years (2006 to 2015)**

State/Crop	Arhar	Urd	Moong	Chickpea	Lentil	Peas
Maharashtra	7	3	2	10	1	2
Rajasthan	-	5	4	16	2	4
A.P.	6	8	3	1	-	-
Karnataka	5	5	4	3	-	-
Gujarat	4	1	-	7	-	-
Odisha	2	6	2	1	-	-
M.P.	4	2	-	18	1	2
U.P.	2	7	4	7	6	10
Bihar	2	2	1	1	1	3
Tamil Nadu	2	8	3	1	-	-

7.0 Possible Niches for Summer Mungbean in Indo-Gangetic Plains

Cropping system	Possible niches
Maize-Potato/ Mustard - Mungbean	Punjab, Haryana, Western Uttar Pradesh
Spring sugarcane + Mungbean	Eastern Uttar Pradesh, Bihar
Rice- Wheat- Mungbean	Punjab, Haryana, Western Uttar Pradesh
Maize-Rajmash-Mungbean	Eastern Uttar Pradesh, Bihar

8.0 Strategies for Production and Productivity Enhancement of Pulses

8.1 Area Expansion

- Cultivation of pulses in summer season.
- Intercropping of pulses with commercial crops-sugarcane.
- Efficient utilization of moisture available in rice fallow for pulses.

8.2 Productivity enhancement

- Availability of quality seeds of pulses.
- Buy back of produce of cluster demonstration and contract with seed agencies.
- Arrangement of bio-fertilizers - seed treating drums.
- Promote use of vermi-compost (livestock waste).
- Use of lime/paper mud in acidic soil.
- Promote use of Plant Protection Chemicals.
- Foliar spray of nutrients (Urea).
- Post harvest management (cleaning, drying, grading etc.)-spiral grader.
- Primary processing unit-small dal mills.

9.0 Government Initiatives for Enhancing Pulses Production

- More than 50 % allocation for NFSM-Pulses.
- At least 30 % of cluster demonstration of rice under NFSM and BGREI- cropping system approach to increase area under pulses particularly rice fallows.
- Inclusion of planting of pigeon pea on rice bunds in cafeteria of cluster demonstration of rice (194 districts of 25 states under NFSM and 118 districts of 7 states under BGREI).
- Pulses as intercrop with cereals, oilseeds and commercial crops.
- Involvement of ICAR/SAU/CGIAR institutes to address various researchable issues.

- FLDs of pulses –IIPR through its AICRP centres.
- Involvement of KVKs for cluster frontline demonstrations –to create awareness and seed of newer varieties.
- Formation of Farmer-Producer Organization (FPO)-SFAC.
- Primary processing of pulses- Mini Dal Mills.

9.1 Development Projects Funded Under NFSM for Green Gram

Title of project	**Duration**	**Project Outlay (Rs.in Lakh)**	**implementing institute**
Quality Seed Production for Higher Productivity of pulses through farmers participatory programme in Shiwalik foothills of Jammu region	3 years (2014-15 to 2016-17)	51.60	Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu, Chatha, Jammu
Development of suitable technology for increasing the productivity of pulses crops in rice fallows	3 Years (2014-15 to 2016-17)	80.37 l	Odisha University of Agriculture & Technology, Bhubaneshwar
Enhancing mothbean and mungbean productivity through high yielding varieties, nutrient management and IPM Practices in western Rajasthan	3 Years (2014-15 to 2016-17)	49.38 lakhs	S K Rajasthan Agricultural University, Bikaner, Rajasthan

9.2 Value Chain Integration of Small Producers

Activities to be covered	**Incentive to**	**Implementing agencies**	**Cost norms**
Establishment of Dal mills	❖ Farmer ❖ Farmers group ❖ Registered FPO	SFAC Similar organizations at Centre/State level	Rs. 10.00 lakhs, or 30% of the total cost, whichever is lower, as one time support
Branding and marketing of milled pulses	❖Registered FPO	SFAC Similar organizations at Centre/State level	@Rs.5.00 lakh per FPO, for one time support only
Marketing support (local)	❖ un-registered farmer groups ❖ SHGs ❖ SHG federation	SFAC Similar organizations at Centre/State level	Rs.2.00 lakh per group of 15 farmers for one time support only
Set up and equip. procurement centres to grade and processing	❖Registered FPOs	SFAC Similar organizations at Centre/State level	Rs.5.00 lakh per FPO for one time support only
Forming and strengthening of Farmer Producer Organizations (FPOs) may offer collective strength Seed production and seed procurement, Access to credit and improved technologies Reduction in transaction costs, Facilitation value addition, Tapping high value markets			

10.0 Central Initiatives under NFSM-Pulses 2016-17

Initiative	**Agency /institutes**
Creation of seed hubs	• 150 (ICAR/SAUs and KVKs) • Total seed to be Produce - 1.50 lakh qtls (1000x150) • Allocation - Rs. 75 crore
Cluster frontline demonstrations of pulses	• Krishi Vigyan Kendras (KVKs) • Allocation - Rs. 75 crore
Strengthening of production units of bio-fertilizers and bio-control	SAUs

Initiative	Agency /institutes
Enhancement of breeder seed production	• Strengthening of infrastructure at ICAR/SAUs • Allocation: Rs. 10 Crore
Incentive for seed production	• State and National Seed agencies • @ Rs. 25 /- per kg for new varieties • Allocation of Rs. 200 crore
Seed Minikits Programme	• Allocation: Rs. 150 Crore
Buffer Stock of Pulses	• Allocation: Rs. 1100 Crore
FLD- IIPR, KANPUR	• Allocation: Rs. 0.98 Crore
NFSM-PULSES	• RS. 1100 Crore

11.0 Opportunities: Potential to be harnessed

- To exploit yield potential; between FLD and State/National average yields.
- Wide gap in production versus demand.
- Adaptability in different agro-climatic conditions, to suit stressed regions.
- Thriving well as inter-crop under normal/wider spacing crops in mono-cropped *rainfed* regions.
- Utera cultivation in predominate rice based cropping system with short duration pulses varieties.
- To restore soil health/fertility through atmospheric nitrogen and biomass.