Proceedings of the National Workshop

Promotion of Pulses for Sustainable Production System, Doubling Farmers' Income and Nutritional Security

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Recommendations

Proceeding of the National Workshop on "Promotion of Pulses for Sustainable Production System, Doubling Farmers' Income & Nutritional Security" Jointly organized by Directorate of Pulses Development and RLBCAU at Jhansi on 25th October, 2019.

Hon'ble Union Minister Sri Narendra Singh Tomar, Ministry of Agriculture & Farmers Welfare & Ministry of Rural Development and Panchayati Raj, Govt. of India inaugurated National Workshop "*Promotion of pulses for sustainable production system, doubling farmers' income and nutritional security*" on 25th October 2019 in the Auditorium of ICAR-Indian Grassland and Fodder Research Institute, Jhansi. Hon'ble Member of Parliament Sri Anurag Sharma, Jhansi- Lalitpur Parliamentary Constituency; Hon'ble Secretary (DARE) and Director General (ICAR), Dr. Trilochan Mohapatra; Hon'ble Chancellor of RLBCAU, Dr. Panjab Singh, Former Secretary (DARE) and Former Director General (ICAR); Respected Members of Legislative Assembly (Sri Ravi Sharma and Sri Jawahar Singh Rajput); Hon'ble Vice Chancellor, RLBCAU Dr. Arvind Kumar; Director, Directorate of Pulses Development, Govt. of India Dr. A.K. Tewari and Dr. S.K. Chaturvedi, Dean (Agriculture) and Organizing Secretary, RLBCAU shared their view. Dr. S.K. Rao, Vice Chancellor (RVRSKVV, Gwalior), Dr. V.S. Tomar, Former Vice Chancellor (RVSKVV & JNKVV) and Dr. Soraj Singh, Director (Agriculture), U.P. Govt. was among the dignitaries who shared their views on promotion of pulses sector.

Presentations were made by the speakers belonging to ICAR Institutes (ICAR-IIPR, Kanpur; ICAR-ATARI, Kanpur ; ICAR-CIAE, Bhopal; ICAR-CIPHET, Ludhiana; and ICAR-ATARI, Jodhpur; , and by the officials of various State Departments (Uttar Pradesh, Madhya Pradesh, Rajasthan, Telangana, Andhra Pradesh, Kerala, Tamil Nadu, Odisha, Bihar, Chhattisgarh, Gujarat, Maharashtra). Representatives from National Seed Corporation (NSC), ICRISAT, ICARDA, and AgriBazaar also delivered lecture during workshop. The quality seeds of pulses were provided to the ten farmers by Hon'ble Union Minister.

Following major recommendations emerged during one day National Workshop:

1. Ample scope exists to improve production and productivity of pulses to meet future domestic demand as demonstrated by cluster frontline demonstrations (CFLDs) and frontline demonstrations (FLDs).
2. A large number of high yielding varieties of pulses have been developed along with matching integrated crop production technologies by ICAR, agricultural universities (SAUs) and international organizations like ICRISAT and ICARDA. These have potential to boost pulses production and productivity.
3. Micro level planning is required to infuse technologies for further boosting production and productivity in targeted areas.
4. Seed production and availability at farmers doorstep is still need focus.
5. The commendable job has been done through DAC&FW supported Seed-Hubs in ensuring development of trained human resources, creating awareness about new varieties and ensuring quality seed availability of such varieties.

6. The need was felt to extend production and distribution subsidy to the Seed-Hubs so that quality produced under seed-hubs can be sold out at the same price as of other agencies like NSC and State Seed Corporations (SSCs).
7. Seed-Hubs need to develop MoUs with NSC for feeding seeds in minikits programme.
8. Micro-irrigation and water harvesting can bring sea changes in Bundelkhand regions. The bricks/concrete lining of canals is likely to ensure water supply to the tail end farms/fields. This will also save wastage of precious water to a large extent.
9. The problem of stray cattle needs immediate attention at the Govt. level and need was felt to develop a long term plan.
10. Value addition and post harvest management can help in branding of pulses being produced in Bundelkhand region.
11. The Universities and state departments should have strong linkages for promotion of agriculture and allied sectors.
12. It was suggested that a joint mega R&D project should be submitted by RLBCAU for the holistic development of the Bundelkhand region of the Uttar Pradesh and Madhya Pradesh. This proposal should have Krishi Vigyan Kendra (KVKs), State Agricultural Universities of the region, Seed Corporations and State Department of Agriculture on board. This will help in increasing productivity of pulses in Bundelkhand region to the level of national/global average.
13. To reduce cost of cultivation and enhance farmers' income there is need to promote farm mechanization and develop new varieties of pulses for their amenability to combine/machine harvesting.
14. Market support should be strengthened so that farmers can get remunerative price for the pulses.
15. The emphasis was also laid for encouraging public-private-people partnerships.

Pulses: Success Story and Way Forward

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Introduction

Governemnt of India is committed to ensure food and nutritional security to the ever growing population of the country, hence formulated and implemented The Food Security Act 2013 (FSA-2013) that mandatorily envisages the right to nutritional security by ensuring access to adequate quantity of quality food at affordable prices to each individual. Pulses are important commodity group of food crops that can play a vital role to address national food and nutritional security and tackle environmental challenges. Pulses share to total foodgrain basket is around 9-10 *per cent* and critical and inexpensive source of plant-based proteins, vitamins, dietary fibre and minerals etc.. Pulses are a Smart Food as these are critical for food basket (dal-roti, dal-chawal), rich source of protein *i.e.* 20-25 *per cent* which is double the protein content of wheat and thrice that of rice and help in addressing obesity, diabetes malnutrition etc.

More than a dozen and half pulse crops are under cultivation in parts of the country under varying agro-climatic conditions and seasons. In India, these crops are generally produced in poor soils not suited to other crops, with a minimum use of resources and have a very low water footprint. They are vital constituent of cropping and consumption pattern. Of the total net sown area of 141.40 million hectares, 52 *per cent i.e.* 73.20 million hectares is rainfed. The pulses cultivation occupies major area under this ecology. The rainfed regions of the country supports 40% of human population and 2/3rd of live stock, further 90% of coarse cereals, 80% pulses, 74% oilseeds, 65% cotton and 48% rice is rainfed.

Pulses play a greater role in sustaining the economy of the rainfed areas in a variety of ways. Besides improving soil fertility and physical structure, pulses fit well in mixed/intercropping systems, crop rotation and dry farming, provide green vegetable (pods/beans) and nutritious fodder for cattle as well thereby contributing to a more sustainable food system. Cultivation of pulses builds-up a mechanism to fix atmospheric nitrogen to N-compounds in their root nodules and tend to fix 72 to 350 kg N per ha per year, thereby meeting their own nitrogen requirements to a great extent. The cultivation of the pulses under irrigation is only about 20% of their cropped area; remaining 80% are grown under *rainfed* conditions. Chickpea has maxiumum area under irrigation (35%) among all pulses. In addition to their nutritive value, by virtue of broad genetic diversity in food legumes and climate resilience to sustain well in adverse weather situations, the government of India has, undertaken various measures to tackle the issue of domestic supply constraints of pulses on one hand and addressing the issues of calamity prone rainfed areas farmers to double their income by 2022.

Pulses are grown in all three seasons. The three crop seasons for the commodity are:

i. *Kharif* : Arhar/Tur (pigeonpea), Urid/Blackgram (urdbean)), Moong/Greengram (mungbean), Lobia (cowpea), Kulthi (horsegram) and Moth (mothbean)

ii. *Rabi* : Gram (chickpea), Lentil (masoor), Pea (fieldpea), Lathyrus (Khesari or grasspea) and Rajma (rajmash);

iii. *Spring/Summer*: Urid/Blackgram (urdbean)), Moong/Greengram (mungbean), Lobia (cowpea)

Production Scenerio

2.1 Global Scenario

The total world acreage under pulses as recorded during 2017 is about 85.40 Mha with production at 87.40 Mt and productivity 1023 kg/ha. Pulses are grown by 198 countries. Beansdry was cultivated by 152 countries, which contributed about 37% area to total world area, Chickpea by 58 contributed about 15%, Peasdry by 98 contributed 9%, Pigeonpea by 23 contributed 7%, Lentil by 56 contributed by 7% and others 25%. The share to World production of Beans dry was about 31% followed by Peasdry 17%, Chickpea 15%, Lentil 8 % Pigeonpea 7%, and others 22%.

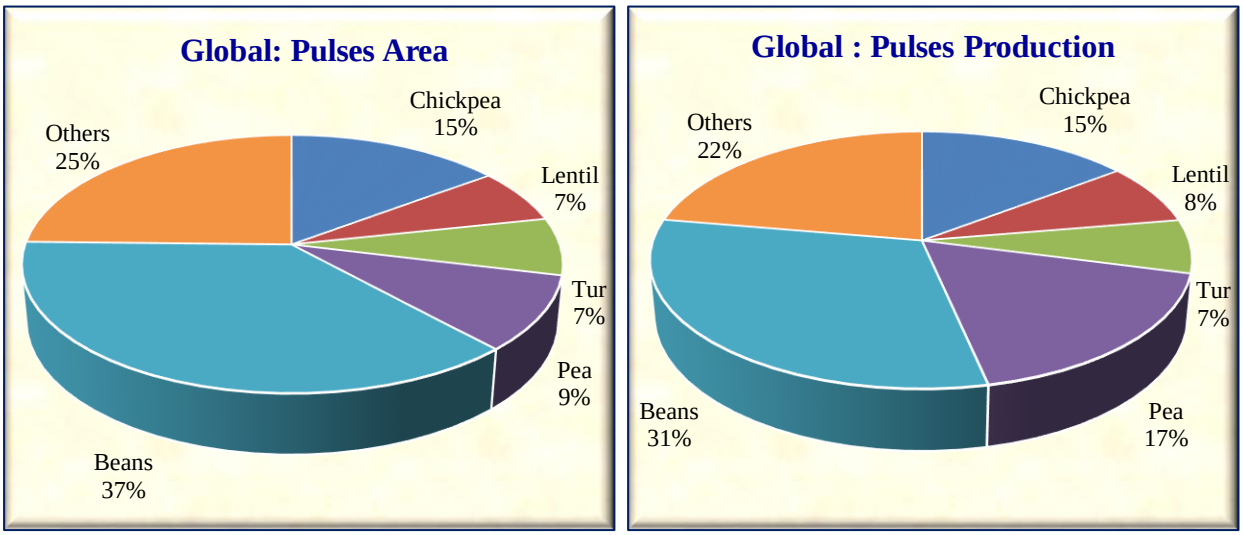

Fig-1: Crops' Contribution in Area & Production–Total Pulses

India ranked first in area and production with 36% and 23% respectively of world area and production. However, country's productivity at 853 kg/ha is far below the world average productivity of 1023 kg/ha.

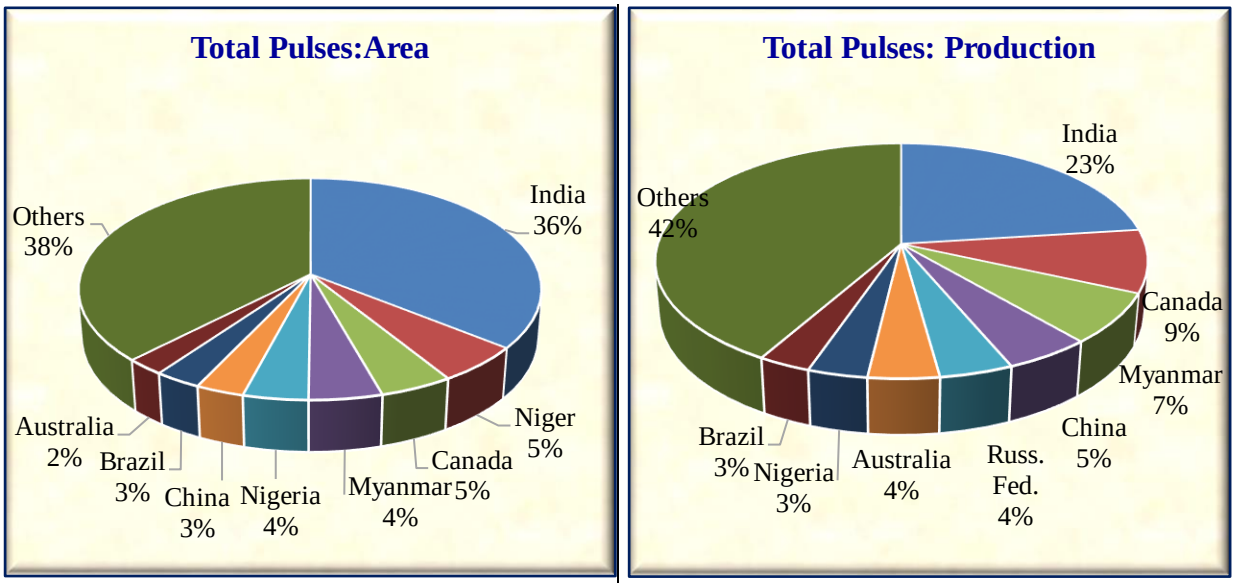

Fig-2: Countrys' Contribution in Area & Production–Total Pulses

Major Pulse Countries

Crops	> 70% Production Contribution
Total Pulses	India (23%), Canada (10%), Myanmar (8%), China (5%), Nigeria (4%), Russian Federation (4%), Ethiopia (3%), Brazil (3%), Australia (3%) .
Pigeonpea (Tur)	India (28%), Canada (10%), Myanmar (08%), China (5%), Nigeria (4%), Russian Federation (4%), Ethiopia (3%), Brazil (3%), Australia (3%) .
Chickpea (Gram)	India (72%), Australia (7%), Myanmar (4%), Pakistan (4%,), Turkey (4%), Ethiopia (4%), Russian Federation
Lentil	Canada (51%), India (19%), Turkey (6%), USA (4%), Nepal (4%), Australia (3%), Ethiopia (3%) , Bangladesh (3%)

Source: *FAO Statistics 2017*

2.2 National Scenario

2.2.1 Season and Crop Contribution - 2017-18

Under individual crop category gram with 45 *per cent* production share to total pulses is the highest contributor followed by tur/arhar (17 *per cent*), urd (>14%) and mung (8%). The crop-wise APY and *per cent* share to total pulses is given below *(Table-1).*

Compared to normal production, the production during 2017-18 is 35% higher in case of total pulses, 35% gram, 30% arhar, 68% urdbean, 25% mungbean and 50% higher lentil production.

Table -1: Crop contribution to total pulse production

{Area-lakh ha, Production-lakh tons, Yield-kg/ha}

Crop	2017-18			Contribution (%)	
	Area	Production	Yield	Area	Production
Gram	105.60	113.79	1078	35.42	44.77
Tur	44.38	42.90	967	14.89	16.88
Urd	52.79	34.92	662	17.7	13.7
Mung	42.42	20.23	477	14.23	7.96
Lentil	15.49	16.22	1047	5.20	6.38
Field Pea	8.25	9.93	1204	2.77	3.91
Other Kharif Pulses	18.85	8.31	441	6.32	3.27
Other Rabi Pulses	10.33	7.85	760	3.47	3.09
Total Kharif Pulses	**139.33**	**93.06**	**668**	**46.74**	**36.61**
Total Rabi Pulses	**158.80**	**161.10**	**1015**	**53.26**	**63.39**
Total	**298.13**	**254.16**	**853**		

Source: *DES, Ministry of Agri. & FW (DAC&FW),GoI;OKP– other kharif pulses, ORP – other rabi pulses*

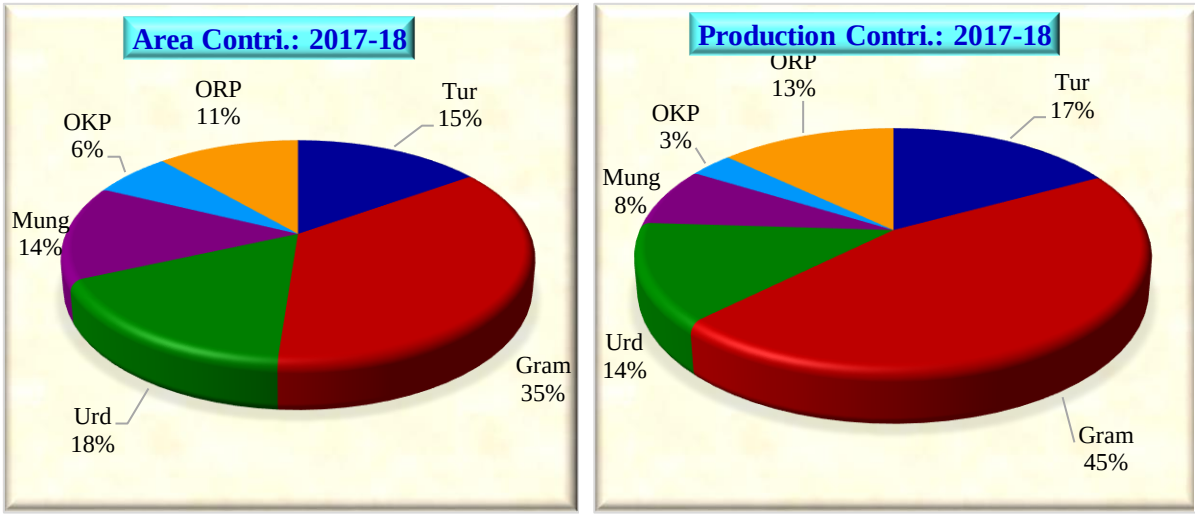

Fig-4: Crop contribution in total pulses area and production

2.2.2 Plan Performance

A visit to different plan periods records a slight growth in total production and productivity from VIIIth Plan 1992-97 with 7% & 9% respectively. The area remained almost stagnant, stabilized up-till Xth plan. However, the XIIth plan analysis shows that the increasing per cent change trend under area (+ 5%) and production (+18%) of total pulses over previous plan periods (COPP) is given at (Table-2).

Table 2: Plan-wise national scenario of total pulses

(Area-Mha, Production-MTonnes, Yield-kg/ha)

Plan	Area	% COPP	Prod.	% COPP	Productivity	% COPP
First Plan (1951-56)	21.09		10.04		476	
Second Plan (1956-61)	23.71	12.42	11.75	17.03	496	4.10
Third Plan (1961-66)	23.86	0.63	11.14	-5.19	467	-5.79
Fourth Plan (1969-74)	22.21	-6.92	10.90	-2.15	491	5.11
Fifth Plan (1974-79)	23.32	5.00	11.71	7.43	502	2.32
Sixth Plan (1980-85)	23.08	-1.03	11.77	0.51	510	1.56
Seventh Plan (1985-90)	23.08	0.00	12.55	6.63	544	6.63
Eighth Plan (1992-97)	22.47	-2.64	13.34	6.29	594	9.18
Ninth Plan (1997-02)	21.97	-2.23	13.15	-1.42	599	0.82
Tenth Plan (2002-07)	22.44	2.14	13.35	1.52	595	-0.61
Eleventh Plan (2007-2012)	23.97	6.80	15.85	18.73	662	11.19
Twelfth Plan (2012-2017)	25.28	5.46	18.84	18.86	745	12.53

Source: *DES, MoA&FW (DAC&FW), Govt. of India; % COPP is percentage change over previous plan.*

2.3 State's Scenario

In India, total pulse area and production during 2017-18 has been >298 lakh ha and 254 lakh tonnes, respectively. Out of the total area >74 lakh ha is confined to Madhya Pradesh alone, earning a prime status in pulse production commodity contributing a remarkable 25% of the country's pulse area with 32% production, thereby ranking first both in area and production followed by Rajasthan and Maharashtra with 13% each and Uttar Pradesh at 9%. More than 90% of total pulse production has been contributed by 10 states of Madhya Pradesh, Rajasthan, Maharashtra, Uttar Pradesh, Karnataka, Andhra Pradesh, Gujarat, Jharkhand, Tamil Nadu and Chhatisgarh (Table 3a-b).

Table 3a: States' contribution in area and production of total pulses

(Area-Lakh ha, Production-Lakh tons)

States	Area	% Contr.	States	Production	% Contr.
Madhya Pradesh	74.80	25.09	Madhya Pradesh	81.12	31.92
Rajasthan	53.30	17.88	Rajasthan	34.05	13.40
Maharashtra	42.09	14.12	Maharashtra	33.48	13.17
Karnataka	30.24	10.14	Uttar Pradesh	22.00	8.66
Uttar Pradesh	22.62	7.59	Karnataka	19.51	7.68
Andhra Pradesh	14.08	4.72	Andhra Pradesh	12.17	4.79
Gujarat	9.08	3.05	Gujarat	9.23	3.63
Tamil Nadu	8.25	2.77	Jharkhand	8.37	3.29
Jharkhand	7.93	2.66	Tamil Nadu	5.56	2.19
Chhattisgarh	7.89	2.65	Chhattisgarh	5.50	2.16
Others	27.86	9.34	Others	23.17	9.12
All India	**298.13**		**All India**	**254.16**	

Source: DES, Ministry of Agri. & FW (DAC&FW), Govt. of India

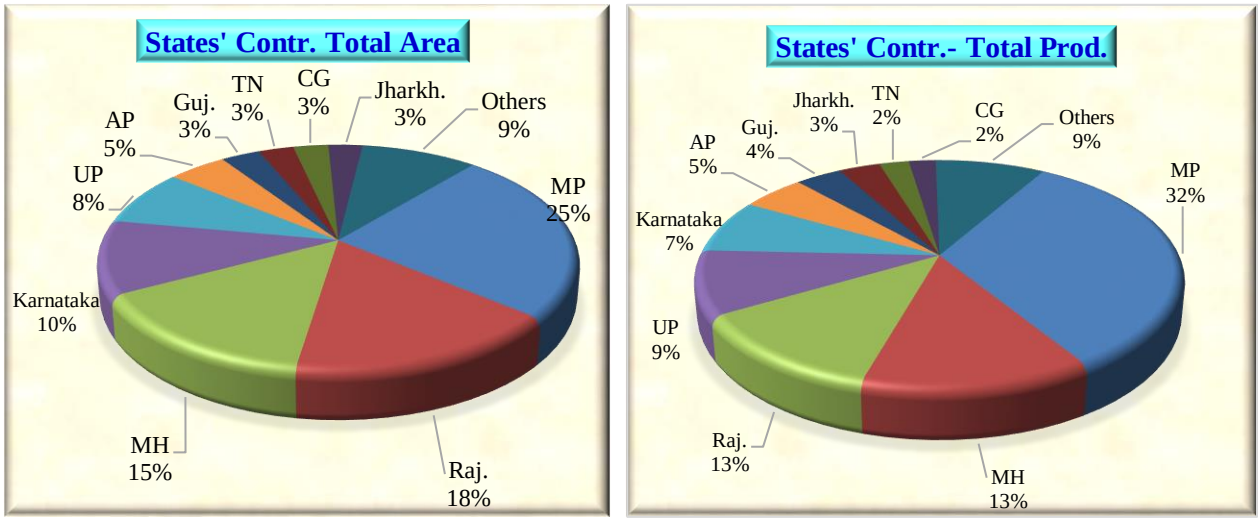

Fig-3: States' contribution in area and production of total pulses

Table 3b. Major pulses growing states of India (2017-18)

Crops	> 90% Production Contribution
Total Pulses	MP (32%), Raj (13%), MS (13%), UP (9%), Kar (7%), AP (5%), Gujarat (4%), Jharkhand (3%), TN/CG (2%) .
Kharif Pulses	MP (24%), Raj (18%), MS (16%), Kar (11%), UP (7%), Guj (6%), Jhar /Telanagana (each 4%), Odisha (3%), AP (2%).
Rabi Pulses	MP (37%), MS (12%), Raj (11%), UP (10%), AP (7%), Kar (5%), CG, Jhar/Guj (3%), Bihar (2%).
Pigeonpea (Tur)	MS (25%), MP (20%), Kar (18%) Guj/UP (8%), Telangana (6%), Jhar (5%), Odisha /AP (3%), TN (1%).
Chickpea (Gram)	MP (41%), MS (16%), Raj (15%), Kar (6%), AP /UP (5%), Gujarat/CG /Jharkhand (3%) Telangana (1%).
Urdbean	MP (38%), Raj (15%), AP (11%), UP (9%), TN (8%), MS (5%), Jharkhand (4%), Gujarat (3%), Karnataka/WB (2%)
Mungbean	Raj (37%), MP (13%), MS (8%), Karataka (6%), Bihar (5%), AP (5%), Odisha/TN/Gujarat (4%), Telangana (3%)
Lentil	MP (42%), UP (31%), WB (10%), Bihar (9%), Jharkhand (4%) , Rajasthan (2%), Assam (1%).
Pea*	UP (42%), MP (34%), Jharkhand (5%), HP (4%), Odisha /Assam (3%), Raj/Bihar/Manipur/WB (2 %).
Kulthi* (K+R)	Kar (34%), TN (20%) Jhar (8%), CG (8%), AP (7%) Odisha (7%), UK (6%), Bihar (4%), MP (3%), MS/WB/Tel (1%).
Lathyrus*	CG (66%), Bihar (17%), WB (14%), MP (2%), MS (1%)

Source: *DES, Ministry of Agri. & FW (DAC&FW), Govt. of India*

2.3.1 Plan Performance

During 12th Plan in India, total pulse area and production irrespective of Twelfth Plan were 252.78 lakh tonnes and 188.42 lakh tonnes, respectively. Out of the total area, 57.52 lakh ha is confined to Madhya Pradesh alone, earning a good pulse status and position contributing a remarkable 22.75% of the country's total area and a production of 52.46 lakh tonnes, thereby ranking first both in area and production followed by Rajasthan in area (39.89 lakh ha, 15.78% of the total area). While Rajasthan ranked third in production with 12.28% of the total pulse production and Maharashtra which ranked second (25.68 lakh tonnes or 13.63% of the total production); Uttar Pradesh was hardly placed at the forth rank in production (17.63 lakh tonnes or 9.36% of the total production).While Karnataka is on the forth rank in respect of area (25.74 lakh ha or 10.18%). The overall area, production and productivity increasing trend during the last three plan Period.

2.4 Potential Districts

The micro analysis at district level based on statistics of 2016-17 was also carried out and presented in Table 4a-b. The intra-state analysis revealed that Gulbarga district of Karnataka had the highest production with 3.45 per cent share to India followed by Latur of Maharshtra (2.86%) and Narsinghpur of Madhya Pradesh (1.90%). In respect of area coverage, District-wise area, production and yield of top ten districts of India in respect of production are presented below which contributed 15.29% and 20.01% of area and production of the country. The yield levels of potential district are also above the national average yield level except Vijayapur (Karnataka) and Nagur and Bikaner district of Rajasthan Out of ten potential districts four districts was belongs to Madhya Pradesh State during 2016-17 and rest of the other were two from Karnataka, Maharshtra and Rajsthan.

Table 4a: Top potential districts for total pulses

{Area- lakh ha, Production-Lakh Tonnes, Yield-kg/ha}

Districts	State	Area		Production		Yield	
		Area	% to India	Prod.	% to India	Yield	YI
Gulbarga	Karnataka	6.49	2.20	7.98	3.45	1230	157
Latur	MH	3.55	1.20	6.63	2.86	1867	238
Narsinghpur	MP	2.71	0.92	4.4	1.90	1622	206
Vijayapur	Karnataka	5.66	1.92	4.25	1.83	751	96
Nagaur	Raj.	7.04	2.39	4.21	1.82	598	76
Bikaner	Raj.	6.51	2.21	3.97	1.71	609	78
Yavatmal	MH	3.41	1.15	3.86	1.66	1133	144
Damoh	MP	3.2	1.08	3.8	1.64	1185	151
Sagar	MP	3.58	1.21	3.79	1.63	1060	135
Satna	MP	2.88	0.97	3.4	1.47	1183	151
Total Above		**45.03**	**15.29**	**46.29**	**20.01**	**1028**	**131**
All India		**294.47**		**231.31**		**786**	

Source: *State Department of Agriculture.*

Table 4b. Major pulses producing districts in India (2016-17)

Crops	Total contri.	> 90% Production Contribution
Total Pulses	20%	(**Madhya Pradesh -** Narsinghpur, Damoh, Sagar, Satna); (**Karnataka-** Gulbarga ,Vijyapur), (**Maharashtra--**Latur, Yavatmal), (**Rajasthan-** Bikaner, Nagaur)
Pigeonpea (Tur)	47%	(**Karnataka-** Gulbarga, Vijaypur); (**Maharashtra-** Latur, Yavatmal, Amravati, Nagpur, Akola, Osmanabad); (**Madhya Pradesh-**Narsinghpur); (**Gujarat-**Bharuch)
Gram	22%	(**Madhya Pradesh-** Sagar, Damoh, Satna, Vidisha, Narsinghpur, Raisen); (**Maharashtra-**Latur, Nanded), (**Karnataka-**Gulbarga) (**Rajasthan-** Bikaner)
Urdbean	24%	**Madhya Pradesh-**Tikamgarh, Lalitpur, Chhatarpur, Damoh, Mandsaur); (**A.P-**Krishna, Guntur, Kurnool); (**Rajasthan-**Bundi); (**Tamil Nadu-** Villupuram)
Mungbean	43%	(**Rajasthan-**Nagaur, Jodhpur, Pali, Ajmer, Jaipur, Churu, Ganaganagar, Tonk, Jalore); (**Odisha-**Ganjam)
Lentil	43%	**Madhya Pradesh-**Satna, Sagar, Narsinghpur, Raisen, Vidisha, Dindori, Rajgarh); (**Uttar Pradesh** -Bahraich, Jalun, Banda)
Pea*	80%	(**Uttar Pradesh-**Jalaun, Jhansi, Mahoba); (**Madhya Pradesh** -Jabalpur, Datia, Narsinghpur,Chhattarpur, Dindori)
Kulthi	35%	(**Odisha -** Bolangir, Sundargarh, Kalahandi, Keonjhar, Angul, Nuapada, Kandhamal, Ganjam, Cuttack); (**Jharkhand-**Simdega)

Mothbean * (2012-13)	09%	(**Gujarat**-Kutch, Banas Kantha, Ahmedabad, Patan, Surendra Nagar, Mehsana, Bhavnagar, Rajkot, Gandhi Nagar, Kheda)
Lathyrus*	54%	(**Chhattisgarh**-Mungeli, Bilaspur, Balod , Baloda bazar, Rajnandgaon, Dhamtari, Raipur, Janjgir);(**West Bengal**- Purba Medinipur); (**Bihar**-Patna)

3. Developmental programmes of pulses

3.1 NFSM-Pulses

National Food Security Mission was launched in 2007-08 to increase the production of rice, wheat and pulses by 10, 8 and 2 million tonnes, respectively by the end of 11th Plan through area expansion and productivity enhancement; restoring soil fertility and productivity; creating employment opportunities; and enhancing farm level economy. The Mission was continued during 12th Plan with new target of additional production of 25 million tonnes by the end of 12th Plan. Beyond 12th Plan (2017-18 to 2019-20), the programme has been decided to continue with new targets to achieve 13 million tonnes of additional foodgrains production including pulses- 3 million tonnes by 2019-20. The basic strategy of the Mission is to promote and extend improved technologies of package of practices of crops through various types of demonstrations (FLDs/Cluster) distribution of HYVs seeds, production of seeds, distribution of micro-nutrients/ soil ameliorants/ integrated nutrient management/integrated pest management, improved resource management tools/ machineries /implements, efficient water application devices along with capacity building of farmers and local initiatives; award for best performing districts etc. Beyond 12th Plan, NFSM- Pulses has been implemented in 638 districts covering 29 states of the country.

Table 5: All India NFSM-Pulses Progress (2015-16 to 2019-20)

(Rs. in Lakhs)

Year	Allocation (Admin Approval)	Revalidation	Release	Total Available Fund	Expenditure			% Utili. (CS)
					Total	Central Share	State share	
2015-16	98026.26	NA	43364.47	43364.47	51746.25	31238.95	20507.29	72
2016-17	179005.08	NA	58636.09	58636.09	86196.98	53079.21	33117.77	91
2017-18	163806.06	35640.09	42689.97	78330.06	86196.98	53079.21	33117.77	68
2018-19	143777.04	32854.71	41662.21	74516.92	85608.68	52627.04	32981.64	71
2019-20*	174309.79	40283.85	39516.82	79800.67	35567.40	22620.10	12947.30	28
Total	**758924.23**	**108778.65**	**225869.56**	**334648.21**	**345316.29**	**212644.51**	**132671.77**	**64**

*NA-Not Available 2019-20**-(Till Sept. 2019)

3.2 Special Focus on Pulses

(a) A programme on Additional Area coverage of Pulses: During Rabi/Summer 2018- 19, the programme has been implemented with an allocation of Rs.296.03 crores (GOI Share) to increase production of rabi/ summer pulses through area expansion of rabi Pigeonpea, Gram, Pea and Lentil and Greengram and Blackgram during summer. The additional allocation for implementation of the above said programme has been made to 15 states covered under NFSM pulses.

(b) Inter-cropping of Pulses with Sugarcane: During the year 2018-19, a new programme has been initiated under NFSM with the objective of increasing pulses production in the country i.e., "National Food Security Mission (NFSM) - Intercropping of Pulses with Sugarcane" in 12 States and 3 Central Agencies involved in training & demonstrations namely ICAR-Indian Institute of Sugarcane Research, Lucknow, Department of Sugarcane Development, Lucknow and ICAR-Sugarcane Breeding Institute, Coimbatore. The total allocation during 2018-19 is Rs. 5.55 crore (Central share).

(c) Targeted Rice Fallow Area (TRFA): During 2016-17, the TRFA was implemented in 15 districts of 6 states. During 2017-18, the scheme has been extended to 43 districts and 4000 village with a view to cover 12.00 lakh ha under pulses with support for cluster demonstrations; minikit distribution and training to the farmers etc. according to the report an area of 9.13 lakh ha were covered under pulses in rice fallows covering 43 districts and 3739 villages. The additional area coverage resulted a production of 9.04 lakh tonnes (Pulses:7.23 lakh tonnes and Oilseeds :1.81 lakh tonnes) as against the production target of 10.00 lakh tonnes.

During 2018-19, the area targeted to cover 18.65 lakh ha with an additional production of 13.50 Lakh Tonnes under pulses and oilseeds.

3.3 New Initiatives for Pulses

- Increase in number of districts from 468 of 16 States in the year 2012-13 to 638 districts of 29 states of the country in 2016-17 under revamped NFSM-Pulses.
- Increase in incentive to Central and State seed producing agencies for certified seed production from Rs. 25 per kg to Rs. 50 per kg;
- Increase in assistance for distribution of certified seeds of pulses to the farmers i.e. from Rs. 25 per kg to Rs. 50 per kg;
- Increase in the cost norms of Cluster demonstrations and cropping system based demonstrations from Rs. 7500 to Rs. 9000 per ha and from Rs. 12500 to Rs. 15000 per ha, respectively;
- Increase in Minimum Support Price (MSP) per quintal of arhar from Rs. 5450 to Rs. 5800, moong from Rs. 5575 to Rs. 7050, urid from 5400 to Rs. 5700, gram from Rs. 4400 to Rs. 4875; masoor from Rs. 4250 to Rs. 4800 during 2019-20;
- Procurement by Food Corporation of India/NAFED under price stabilization scheme (PSS) and PDPS for stabilization of crises and ensuring remunerative prices.
- Organizing Frontline Demonstrations at farmers' fields by Indian Council of Agricultural Research (ICAR) Institutes and State Agricultural Universities (SAUs). The distribution of seed minikits of pulses free of cost for popularization of newer varieties amongst the farmers was also undertaken;
- Created 150 seed hubs at ICAR institutes, SAUs and KVKs to ensure availability of seeds of pulses and human resource development; and increase in additional breeder seed production of pulses through twelve centres of ICAR and SAUs;
- Creation of buffer stock for pulses; and promotion of pulses in Targeted Rice Fallow (TRFA) in Eastern States;

4. Success Story of Pulses

4.1 A giant leap in production

- During 2017-18, pulses were cultivated in approx. 30 million ha (m ha) area and recorded the highest ever production of 25.42 million tonnes (m t) at a productivity level of 853 kg/ha. The exponential growth rate in production of pulses during last year was more than 9%.
- Major 10 states to contribute > 90 per cent pulse production have been Madhya Pradesh (> 8 Mt), Rajasthan (>3 m t), Maharashtra (>3 m t) Uttar Pradesh (>2 m t) Karnataka (2 Mt) and Andhra Pradesh (>1 m t) followed by Gujarat, Jharkhand, Tamil Nadu, and Chhattisgarh producing <1.0 m t each.
- Under individual crop category, Gram recorded a highest ever production of 11.38 m t at a record productivity level of 1078 kg/ha in an area of 10.56 m ha. Major 07 states to contribute >90 per cent in gram production have been Madhya Pradesh (4.60 m t), Maharashtra (1.78 m t), Rajasthan (1.67 m t), Karnataka (0.72 m t), Andhra Pradesh (0.59 m t)**,** Uttar Pradesh (0.58 m t) and Gujarat (0.37 m t).
- Tur (Arhar) remained at IInd position in total pulse production with 4.29 m t of production in an area of 4.44 m ha at a productivity level of 967 kg/ha, the ever highest yield. Major states to record the success have been Maharashtra (1.07 m t), Madhya Pradesh (0. 84 m t), Karnataka (0.77 m t), Gujarat (0.34 m t), Uttar Pradesh (0.33 m t), Telangana (0.26 m t) and Jharkhand (0.22 m t).
- Urd (Blackgram), the IIIrd important crop group, was cultivated in an area of 5.28 m ha (kharif + rabi) and recorded a production of 3.49 m t at a productivity level of 652 kg/ha. This was the *highest ever area, production and productivity* in this crop. Major contributing states have been Madhya Pradesh, Rajasthan, Andhra Pradesh, Uttar Pradesh, Tamil Nadu, Maharashtra, Jharkhand and Gujarat.
- Similarly, Mung (Greengram) was sown in an area of 4.24 m ha in (kharif + rabi) and recorded a production of 2.02 m t at yield level of 477 kg/ha. Rajasthan, Madhya Pradesh, Maharashtra, Karnataka, Bihar, Andhra Pradesh, Odisha, Tamil Nadu, Gujarat and Telangana have been the major states.
- Lentil also recorded an ever highest production of 1.62 m t in an area of 1.55 m ha at a productivity level of 1047 kg/ha, *the ever highest yield level*. Leading six lentil producing states have been Madhya Pradesh (0.68 m t), Uttar Pradesh (0.50 m t), West Bengal (0.15 Mt), Bihar (0.14 m t), Jharkhand (0.06 m t) and Rajasthan (0.03 m t).

4.2 Equilibrium Production and Demand

- As per the Report of the Working Group on Crop Husbandry, Demand & Supply Projection for XIIth Plan (2012-17) of NITI Aayog (erstwhile Planning Commission), the demand of pulses @ 3.09 *per cent* per annum growth during 2016-17 and 2017-18 has been worked out at 22.74 m t and 23.44 m t, respectively.
- It was for the first time since plan – interventions on pulses that the nation inscribed a success by achieving higher pulse production at 23.13 m t and 25.42 mt during 2016-17 and 2017-18, meet out the demand and country witnessed the self-sufficiency in pulses.

4.3 Significant growth with additional return

- During 2017-18, significant growth registered under total pulse production, both over the base year (2014-15) and the normal/XIIth Plan (2012-13 to 2016-17) at the level of 48 *per cent* and 35 *per cent*, respectively.
- Major increment recorded in kharif production *i.e.* 61 *per cent* mainly due to lion share contributed by urad (78 *per cent*) followed by tur (53 *per cent*) and mung (35 *per cent*).
- Rabi Pulses recorded a 41 *per cent* hike over the base year (2014-15) and mainly contributed by gram (55 *per cent*) and lentil (56 *per cent*).
- As a consequence of meticulous planning and strategy, the production increase was realized both by way of horizontal expansion *i.e.* pulses under new niches as well as the vertical expansion by bridging the yield gaps through aggressive technology transfer, capacity building, workshops/seminars and consultations with the stake-holders during the aforesaid period.
- A total pulse area was increased to about 27 *per cent* over the period. Under seasonal increase, it was 39 *per cent* during kharif followed by rabi 17 *per cent*. Under individual crop category, major increment in area has been recorded in urad (62 *per cent*) followed by Mung (40 *per cent*), gram (28 *per cent*) and tur (15 *per cent*).
- The total pulse productivity increase during the same period has been about 17 *per cent* over the base year (2014-15), comprising rabi and kharif increment at about 19 *per cent* and 16 *per cent* respectively.
- As regards the crop-wise yield performance during 2017-18 over the period, the highest yield increment have been recorded in lentil (49 *per cent*) followed by tur (33 *per cent*), gram (20 *per cent*) and urd (10 *per cent*) over the base year (2014-15).
- The change over under Area Expansion (horizontal expansion) and production growth over normal and base year are indicated under Table 6 & 7.
- The overall pulse change over per ha yield (vertical expansion) and consequently the per unit additional return to farmer to increase their income is about Rs. 6487 per ha and Rs. 5308 per ha over the base year and normal respectively. The crop-wise details indicated under Table 8.

Table 6 : Horizontal expansion of pulses

Crop	Season	Area (million ha)			Change over (+/-)	
		Normal*	2014-15	2017-18	Normal	2014-15
Tur	Kharif	4.19	3.85	4.44	0.25	0.59
Urd	Kharif	2.70	2.48	4.35	1.65	1.87
	Rabi	0.81	0.76	0.93	0.12	0.17
	Total	3.51	3.25	5.28	1.77	2.03
Mung	Kharif	2.49	2.02	3.26	0.77	1.24
	Rabi	0.96	0.99	0.98	0.02	-0.01
	Total	3.46	3.02	4.24	0.78	1.22
Gram	Rabi	8.95	8.25	10.56	1.61	2.31
Lentil	Rabi	1.39	1.47	1.55	0.16	0.08
Other Pulses	Kharif	1.81	1.63	1.89	0.08	0.26
	Rabi	1.97	3.55	1.86	-0.11	-1.69
	Total	3.78	5.19	3.74	-0.04	-1.45
Kharif Pulses		**11.19**	**10.00**	**13.93**	**2.74**	**3.93**
Rabi Pulses		**14.08**	**13.56**	**15.88**	**1.80**	**2.32**
Total Pulses		**25.28**	**23.55**	**29.81**	**4.53**	**6.26**

Source: *DES, Min. of AGri. & FW (DAC&FW), GoI, Normal*-Avg. 2012-13 to 2016-17.*

Table 7: Production performance of pulses over years

Crop	Production (Million Tonnes)			Change over (+/-)	
	Normal*	2014-15	2017-18	Normal*	2014-15
Tur	3.29	2.81	4.29	1.00	1.48
Urd	2.08	1.96	3.49	1.41	1.53
Mung	1.61	1.50	2.02	0.41	0.52
Gram	8.43	7.33	11.38	2.95	4.05
Lentil	1.08	1.04	1.62	0.54	0.58
Kh. Pulses	6.55	5.78	9.31	2.76	3.53
Rabi Pulses	12.29	11.42	16.11	3.82	4.69
Total Pulses	**18.84**	**17.20**	**25.42**	**6.58**	**8.22**

Source: *DES, Ministry of Agriculture &FW (DAC&FW), GoI* **;** *Normal*-Avg. 2012-13 to 2016-17.*

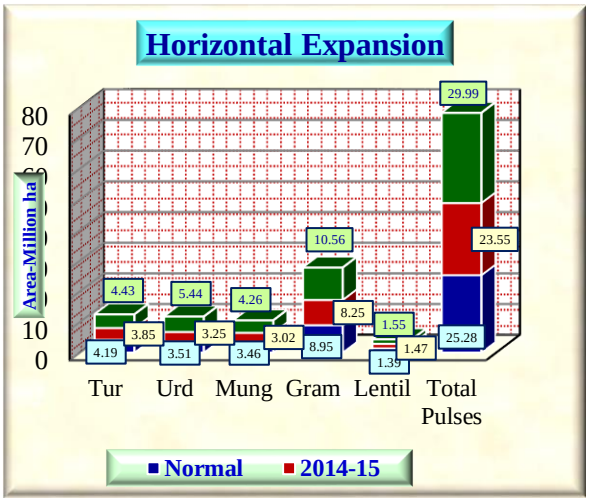

Fig.-I: Horizontal Expansion

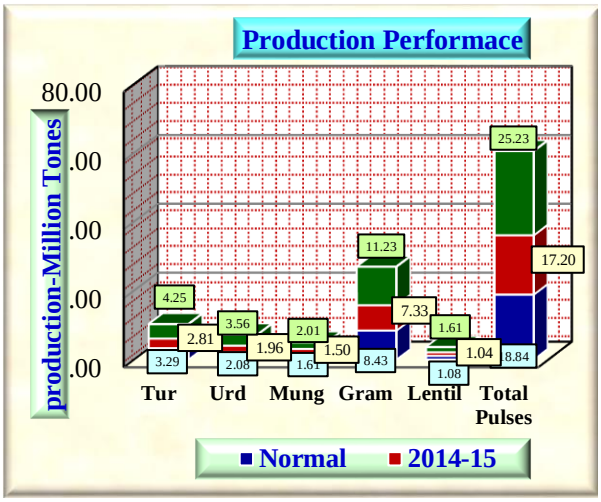

Fig.-II: Production Performance

Table 8 : Additional return through vertical expansion

(Yield-kg/ha, Additional Return –Rs./ha)

Crop	Yield			Yield Gap		Addition Return	
	Normal*	2014-15	2017-18	Normal*	2014-15	Normal	2014-15
Tur	785	729	967	182	238	9919	12971
Urd	593	604	662	69	58	3726	3132
Mung	466	498	477	11	-21	613	-1171
Gram	942	889	1078	136	189	5984	8316
Lentil	773	705	1047	274	342	11645	14535
Kh. Pulses	**585**	**578**	**668**	**83**	**90**		
Rabi Pulses	**873**	**843**	**1015**	**142**	**172**		
Total Pulses	**745**	**730**	**853**	**108**	**123**		

Source: *DES, Ministry of Agriculture &FW (DAC&FW), GoI* ; *Normal* Avg. 2012-13 to 2016-17.*

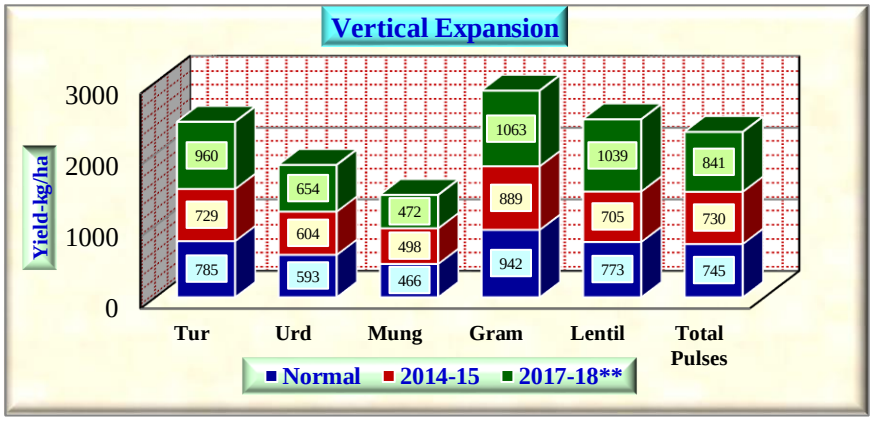

Fig.-III: Additional Return through Vertical Expansion

4.4 Pulses import declined

- With the increase in population, consumer awareness and affordability of middle /lower middle and other category citizens up to some degree, the demand of pulses has also increased overtime.

- Despite biggest producer, India is also the biggest importer and consumer (23-24 million tonnes) of pulses in the world.

- The year 2014-15 and 2015-16 were the adverse crop year owing to drought and erratic behavior of rainfall across the major pulse growing states.

- The government, however ensured the availability/supply as per demand by way of enhanced imports between 2014-15 to 2016-17 at about 5-6 million tonnes (Mt) per year in their buffer stock on one hand and swung in to action to combat the natural calamities through development programmes, risk management through PMFBY, PSS and PSF procurement etc., on the other.

- The CCEA has empowered the Committee headed by Food Secretary to review the export and import policy on pulses and consider measures such as quantitative restrictions, prior registration and changes in import duties depending on domestic production and demand, local and international prices and global trade volumes.

- Farmer-friendly policy measures have helped to reduce import of pulses. Import of pulses during 2017-18 and 2018-19 has declined by about 10 and 30 lakh tonnes from previous year's, resulting in saving of foreign exchange amounting to Rs 9,775 crore & 10473 crore respectively. It is expected that pulses production will be sustained in the country and our import dependence on pulses will come down substantially.

- To ensure that farmers get remunerative prices, the government has imposed import duty and put quantitative restrictions on the various varieties of pulses. Import duty on chickpea has been fixed at 60 *per cent*, while that for yellow pea is 50 *per cent*, lentil 30 *per cent* and tur 10 *per cent* on 21st Aug., 2017.

4.5 Export of pulses allowed

- Further, to safeguard farmers' interest, recently the Cabinet Committee on Economic Affairs (CCEA) has given its approval for removal of prohibition on export of all types of pulses to ensure that farmers have greater choice in marketing their produce and in getting better remuneration for their produce.
- The decision comes two months after the government lifted ban dated 15th September 2017 on export of tur, urad and moong dal, although shipments of these varieties were allowed only through permission from agriculture export promotion body APEDA. Export of organic pulses and kabuli chana is permitted in a limited quantity.
- Opening of exports of all types of pulses will help the farmers dispose of their products at remunerative prices and encourage them to expand the area of sowing.

4.6 Interventions which proved the trigger

- To ensure availability of location specific/recommended high yielding varieties and quality certified seeds at all levels, 150 pulses Seed-Hubs and strengthening of Infra-structure for Enhancing Breeder Seed Production (EBSP-12 Centres) programmes initiated from 2016-17 to 2018-19. The total fund flow for Seed-Hub and additional breeder seed production scheme of worth Rs. 245.39 crore has been ensured.

- Incentives for production of certified seeds and seed distribution of pulses were instrumental both in varietal replacement as well as area expansion.

- To ensure availability of quality bio-inputs-rhizobium culture/PSB, micro-nutrients, bio-intensive/bio-pesticides etc.

- To reduce cost of cultivation and timely operations in rainfed areas where > 80% pulses are grown, availability of implements like seed drills, zero-till seed machine/rotavator and ridge-maker etc., ensured through Resource Conservation Technology (RCT) components and Custom Hiring Centres (CHCs), especially in Bundelkhand region of Uttar Pradesh/Madhya Pradesh yielded the result.

- In view of favorable response of pulses to 1-2 critical irrigations, priority was given to pulses in tune Micro-irrigation scheme under Pradhan Mantri Krishi Sinchayee Yojna (PMKSY).

- For processing and value addition, domestic milling support provided through mini dal mills under *local initiative/flexi fund component* various states including Uttar Pradesh, Gujarat, and Maharashtra.

- To ensure effective transfer of technology, Cropping System Based Trainings (CSBTs) were provided to extension workers. Quality cluster demonstrations, both on sole crop and CSBTs were organized which helped in bridging the yield gaps.

- Strong Interface mechanism between State Department of Agriculture and State Agricultural Universities (SAUs), ICAR and Krishi Vigyan Kendras (KVKs) were developed through seminars/ workshops/Annual Group Meetings of ICAR etc.

- Dissemination of information through Literature on Pulses (bulletin/leaflet and articles) in both languages by print media as well as digital *(dpd.gov.in/Farmers portal/mKisan Portal)* including advisories on pulses on monthly basis by the Department including Directorate of Pulses Development, Bhopal.

- In 2015-16, All XI – ATARI's/578 KVKs were involved in conducting of Cluster Front Line Demonstrations (CFLDs) of pulses with need based thematic areas on farmers' field.

- In 2016-17 Seed minikits programme of newer varieties of pulses was initiated to popularize improved varieties of pulses. An amount of Rs. 2.14 crore has so far been utilized.

- Applied and Action-Research Projects to ICRISAT, ICARDA, ICAR/SAUs to address biotic and abiotic stress/assessment and providing varieties /recommendations.

- It is learnt that the success is likely to remain sustainable owing to 100 per cent implementation of Direct Benefit Transfer Mode (DBT) under Crops Development Programme (NFSM-Pulses). A large section of farmers/pulse growers are happy with the DBT and the assistance provided is being utilized in real sense.

- During the last 03 years of programme implementation i.e. 2016-17 to 2018-19 there has been substantially growth in production and productivity of pulses with the support and extension work taken-up by both central and state government. The results indicated that the programme is suitable and could be highly viable economic programme for the benefits of farmers as well as country.

1. WAY FORWARD-2030

- The current population (2018) of the country is 1.36 billion which is expected to be 1.51billon by 2030. To feed 1.51 billion population, the projected demand of pulses by 2030 is likely to be 35 million tons as per the behaviouristic approach (consumption – 28.70 Mt + seed post harvest losses-5.72 Mt). This necessitates an annual growth rate of 3.57 *per cent*.

- India is almost self-sufficient, pulse production during 2017-18. However, by 2030 for meeting out the 35 Mt requirement of pulses the existing (2017-18) productivity of 835 kg/ ha shall have to be raised to 1030 kg/ha in addition to bring additional coverage of pulses in a area of 5-6 Mha over the existing normal area. The per annum average growth in area and productivity shall have to be ensured at 1.7 per cent and 1.95 per cent respectively.

- To meet the projected requirement and sustain the balanced production in pulses, the existing actual yield gaps of 439 kg/ha or 65 *per cent* under total pulses shall have to be a bridged.

- Eradicating hunger and malnutrition is one of the great challenges of our time. 1/3rd suffer from malnutrition. As the 17 global goals of the world Food Programme 2015, Goal-2-Zero Hunger-pledges to end hunger, achieve food security, improve nutrition and promote sustainable agriculture.

- In order to sustain the growth of pulses at various levels i.e. among the states, districts, within districts and to bridge the yield gap between FLDs and farmers' practice, DAC&FW has envisioned a road map with two pronged strategy:

i) **Horizontal Expansion** through bringing additional area under pulses, and diversification of rice-wheat system in Indo-gangetic plains (IGP) popularization of short duration varieties of Pulses; promoting urdbean/mungbean cultivation in rice fallow in peninsular India and chickpea lentil in NEPZ and Chhattisgarh; promotion of pulses in intercropping; pre-rabi chickpea with mustard/linseed; pigeonpea with groundnut/soybean/millets, etc.

ii) **Vertical Expansion** through increasing productivity and bridging the yield gaps; development of high yielding short duration varieties having multiple and multiracial resistance to diseases; new and efficient plant types; input use efficient genotypes;

exploitation of hybrid vigour in pigeonpea;popularization of improved crop management practices and bridging yield gaps.

iii) **Reducing post harvest losses** through refinement and popularization of harvesters, threshers and graders; development of stored grain pest resistant varieties; popularisation low cost safe storage bins/structures/ processing units; strengthening of FPOs.

iv) **Ensuring attractive price to producers**: Announcement of MSP well in advance; assured procurement and creation of procurement centres in production zones; development of organized markets for pulses; linking farmers with FPOs, aggregations and e-NAM (markets); promotion of export of pulses like lentil and kabuli chickpea and arid legumes; production of value added products and use of by-products; branding of produce and promotion of organic pulse production.

v) **Ensuring timely availability of critical inputs and advisory:** Ensuring timely availability of quality bio-pesticides; creation and maintain/sustain of production units of quality bio-fertilizers and bio-pesticides; fortification of fertilizers with specific nutrients like S, Fe, Zn, B etc.,; popularization of sprinklers and micro irrigation techniques in rainfed areas; establishment of single window input supply centres for cluster of villages; advanced forewarning and forecasting systems for pest and disease outbreaks.

vi) **Efficient transfer of technology:** Organizing farmers training in KVKs, exposure visits & close interaction with research organizations, SDAs and private agencies; initiatives for seed production to exploit the high demand for improved varieties of pulses as well as branding of local germplasm ex. Baigani Arhar in tribal belts of MP; exploiting the led commercial pulse processing units at village level etc.

5.1 Convergence approach of programme implementation

- The various initiatives taken by the government between 2015-16 to 2017-18 under all CSS/CS on crop and agricultural development shall have to be converged. The infrastructure created on water resources, CHCs, seed hubs and EBSPs, and the capacity buildings of famers. FPOs, SHGs and extension workers would be needed to fully utilize in favour of the growth of the pulse sector.
- Formulated the strategy by delineating the districts of the country into four categories : i) High area high productivity districts (HAHP) ii) High area low productivity districts (HALP) iii) Low area high productivity districts (LAHP) iv) Low area low productivity districts (LALP).
- The Government has resolved to make strategic interventions in all four category districts involving the approach of horizontal and vertical expansion, inclusion of traditional wisdom as well as recent improved technologies.

Impact of Cluster Frontline Demonstrations of Pulses (CFLD-P) in India: A Mid-term Evaluation Analysis

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Introduction

The virtue of high protein content, which is almost double than that of cereals, makes the pulses to occupy unique position on the global agriculture. India grows the largest varieties of pulses in the world sharing about 38% of the area and 33 % of the production followed by other countries like Canada, China, Myanmar and Brazil. In India, it is also considered as "A poor man's meat" as pulses is the cheapest and concentrated source of dietary amino acids and protein demand of vegetarian population is fulfilled through pulses for large populace. Pulse crops are considered as the wonderful gift of nature as they have an ability to fix the atmospheric nitrogen (N_2), thereby helping in N cycling within the ecosystem. The major pulses producing states in India are Madhya Pradesh, Maharashtra, Uttar Pradesh, Rajasthan, Andhra Pradesh, Karnataka, Gujarat, Chhattisgarh and Bihar which produce chickpea, pigeon pea, green gram, black gram, lentil and field pea. Though pulses are cultivated in India over a very large area and have been a traditional crop, there has been a fluctuating tendency in area, production and productivity of pulses from time to time. A study by Kumar (1998) projected pulses demand to be 30.9 million tonnes (m t), while Mittal (2006) projected the same requirements to the tune of 42.5 million tonnes (m t) by 2020. ICAR-Indian Institute of Pulses Research (IIPR, 2011) in its vision 2030 projected pulses demands to be 32 million tonnes (m t) by the year 2030. According to Mittal (2006), the required growth in domestic production (supply) of pulses is 6.51% per annum, while IIPR estimated the required growth rate in production to be 4.2% per annum (IIPR 2011) to meet the growing demand. Both the estimates indicate that in order to bridge the gap between pulses demand and supply, its production ought to grow at the rate between 4-6% per annum. However, the current growth rate is only 3.35% per annum (Reddy et al.,2013). The major crisis in this pathway is the very high level of different yield gaps in pulses. A yield gap is the difference between observed crop yields and those of attainable in a given region. The term yield gap has been a widely used analytical term in the literature since the last past few decades. Yield gaps are estimated by the difference between potential yield and average farmers' yields over some specified spatial and temporal scale of interest. There are several factors responsible for extremely low pulses productivity and high yield gap. They are mostly related to inputs and their efficient management (Ali *et al.* 2012 and Reddy, 2009, Singh *et al.*, 2012a). Besides, Poor soil and agro-climatic conditions not only compel late sowing of legumes, leads to reduced length of growing period but also necessitate to sustain cold injuries at early vegetative phase which freeze all biological activities for prolonged period. A sudden rises in temperature after that, not only induces forced maturity but simultaneously invites several biotic stress viz., diseases and insects pests (Ali *et al.*, 2012; Reddy, 2009 and Singh and Singh, 2008). Traditionally *rabi* pulses sowing are delayed up to last week of November in the eastern region and some time under extreme circumstances it goes up to the first fortnight of December. However, optimum sowing time of lentil is first fortnight of October

(Ramakrishna *et al.,* 2000). Few winter legumes including lentil are also grown as a *paira* crop in the eastern India, which helps in timely planting of the crop even before, the paddy has been harvested (Singh and Singh, 1995). Consequent upon delayed planting, early encounter with severe cold, growth and development of lentil crop gets hampered for a considerable period. Subsequently plants get comparatively less time to complete their lifecycle which, by and large forces maturity (Ramakrishna *et al.,* 2000). For stance, in Eastern India, normal sown lentil is a medium duration (130-150 days) crop, while under late sown conditions it is forced to complete its life cycle in 105±5 days (Joshi, 1998; Ramakrishna *et al.,* 2000; Reddy, 2009; and Singh *et al.,* 2012a).

Limiting factors in pulses production

Thus, improper sowing time, low seed rate, defective sowing method, insufficient irrigation, inadequate intercultural, sowing under *utera* without proper management are major agronomic constraints (Ramakrishna *et al.,* 2000 and Reddy, 2009). An earlier study revealed that area under pulses in mostly predetermined, but as the irrigated area increases, pulses are relocated to rainfed areas and their area is replaced by cereals or some cash crop (Singh *et al.,* 1995). In India, the irrigated area under pulses was only 12 per cent, while under wheat and paddy; it was more than 60 per cent of the total area (Reddy and Reddy, 2010).

Timely availability of quality chemical fertilizers continues to be a problem in many pulses growing area. Inadequate availability of gypsum or pyrites as a cheap source of sulphur remains a serious impediment in many states/regions, lower nutrient requirements and lesser response in pulses and lesser effectiveness in quality of plant protection chemical (Singh *et al* ., 2012c, Singh *et al*., 2013d, Singh *et al*., 2013e). Lack of high yielding varieties, low harvest index, high susceptibility to diseases and insect pests, flower drops, lack of short duration varieties, intermediate growth habits, poor response to inputs and Instabilities in performances are the few of the varietal constraints needs immediate attention (Singh *et al*., 2013e and Ramakrishna *et al*., 2000). Legumes are in general pest free crop under normal condition if proper crop rotation is follows. However Pod borer, Aphids and Wilt *(Fusarium lentis)* are major insects and disease pests (Singh *et al*., 2013b and Singh *et al*., 2013g). Production technology for a legumes crop are not according to soil type/region specific (Singh *et al*., 2012a) equally applicable for tillage and seeding device/gadgets.

Initiatives for pulses development in India

Plan interventions in the pulses sector were brought by the Govt. Of India, Department of Agriculture & Cooperation since Fourth Five year Plan with more focused approach since VI Plan onwards as the "Pulses Development Scheme" a Centrally Sponsored Scheme, was initiated from the IV Plan (1969-70 to 1973-74). The focused area was the introduction of production technologies and improved varieties amongst the farmers. During seventh plan (1985-90), it was conceived to have a National Pulses Development Project (NPDP), merging all the earlier centrally sponsored schemes on pulses. To further supplement the efforts under NPDP, a "Special Food Grain Production Programme (SFPP) on Pulses" was also implemented during 1988-89 on a100% Central assistant basis. In other efforts, pulse development programmes (PDP) were brought to the ambit of the Mission called Technology Mission on Oilseeds and Pulses (TMOP) in August 1990. Thereafter, Oilpalm (1992-93) and Maize (May, 1995) also became the part of it, renaming the TMO as Technology Mission on Oilseeds, Pulses and Maize (TMOP&M). From April 2004 to March 2010, on the advice of

the Planning Commission, "Integrated Schemes of Oilseeds, Pulses, Oilpalm and Maize (ISOPOM)" has been under implementation by merging four ongoing schemes of NPDP, OPP, OPDP and AMDP. Recently, NFSM-Pulses (2007-08) initiated from 2007-08 (*Rabi*), as a Centrally Sponsored Scheme on" National Food Security Mission was launched. It was resolved to enhance the production of rice, wheat and pulses by 10, 8 and 2 million tonnes, respectively by the end of XI Plan. The implementation of the NFSM scheme is continued during XII Plan. Further, to accelerate the pulses production, a centrally sponsored Accelerated Pulses Production Programme (A3P) (2010-11 to 2013-14)-was initiated with cluster demonstration approach.

From 2014-15, the Pulses development scheme under NFSM is under implementation in 24 states viz. Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Tamil Nadu, Telangana, Tripura, Uttar Pradesh and West Bengal with additional production target of 4 Million tonnes by the end of XII Plan (2016-17). A great deal of progress has been made recently in developing better methodologies for analyzing yield gaps, mapping these gaps for major crops at the global and regional scales, and studying the diverse contexts. But much remains to be done before we can gain a sufficient understanding of yield gaps and instability in smallholder agriculture to permit the application of this knowledge on a large scale through concrete actions in farmers' fields. A further complication is that the yields farmers actually obtain vary greatly over time and space, and reliable, long-term yield data are scarce. With the above objective in view the Government of India has initiated Cluster Front Line Demonstrations (CFLD) on Pulses during *Rabi* 2015-16 under National Food Security Mission (NFSM). According the ICAR –Division of Agricultural Extension planned to organize Cluster FLDs on Pulses during *Rabi* 2015-16 through *Krishi Vigyan Kendras* (KVKs) in the country. This paper aims at analyzing the large scale data emanated from CFLD pulses across various states of India covering the pulse crops of all three seasons for making a mid-term evaluation of the project and also for deriving the policy centered implications.

Data frame and analysis

The present study is basically the analysis of large scale data generated through the CFLD on pulses across various major pulses growing states covered by the ICAR-ATARIs of Kanpur (Uttar Pradesh), Jodhpur (Rajasthan), Pune (Maharshtra), Jabalpur (Madhya Pradesh), Kolkota (West Bengal), Guwahati (Assam), Hyderabad (Andhra Pradesh), Bangaluru (Karnataka) and Patna (Bihar). The major pulse crops covered for the present analysis represent all three seasons namely *Kharif* (pigeon pea, black gram and green gram), *Rabi* (chickpea, lentil and field pea) and summer (green gram). The average performance data of CFLD were obtained for the above states for all the crops representing various growing seasons during the cropping seasons of 2016-17 and 2017-18. Thus, CFLD data were analyzed from across minimum of 13 states (green gram) and maximum of 19 states (black gram). The cross sectional with-without (treatment-control) design was followed as it was the mid-term evaluation and hence, the issue of confounding variables was nullified. The major variables analyzed were average yield obtained from the control (without) plots and demonstrations (treatment) plots. These yields were computed for yield advantages and also compared with the reported district level, state level, National level yields and also the

potential yields of the respective crops in the given states (procured from secondary sources for the year 2017-18). Accordingly the yield gaps, yield advantages and yield gap minimized (absolute as well as per cent) at various level were analyzed (Dubey *et al*, 2018) for all the crops across the seasons. The major variables taken for the study are defined as below along with their empirical measurements.

Yield gap: Yield gap was the extent to which there was a difference in reported yields of pulses at different level with respect to its potential yield. It was calculated with respect to the potential yield of pulses in comparison to district yield, state yield and farmers' existing yield. The yield gap was ascertained in terms of both absolute yield gap (q/ha) and in percent terms using following formula separately at district level, state level and farmers' level reported yield.

$$\text{Yield gap (\%)} = \sum_{i=1}^{n} (P_{yi} - R_{yi})_{D,S,F} / P_{yi}$$

where, P_{yi} is the potential yield of i_{th} farmer and R_{yi} the reported yield for the i_{th} farmer against the district (D), state (S) and farmer (F) yield.

Yield advantage: Yield advantage was the extent of gain in the reported yield of pulses at district level, state level and farmers' level as against the average yield obtained in the demonstrations.

$$\text{Yield advantage (\%)} = \sum_{i=1}^{n} (D_{yi} - R_{yi})_{D,S,F} / D_{yi}$$

where, D_{yi} is the demonstration yield of i_{th} farmer and R_{yi} the reported yield for the i_{th} farmer against the district (D), state (S) and farmer (F) yield.

Yield gap minimized (YGM): It is extent to which the yield gap has been reduced due to yield advantages accrued by CFLD activities.

$$YGM = \{[\sum_{i=1}^{n}(D_{y_i}-R_{y_i})_{D,S,F}/Dy_i] - [\sum_{i=1}^{n}(P_{y_i}-R_{y_i})_{D,S,F}/P_{y_i}]\}_{(D,F,P)}$$

$$= (\text{Yield advantages obtained} - \text{Yield gap estimated})_{D,F,P}$$

where, P_{yi} is the potential yield and D, F, P are the district level, farmers' level and potential level yield gap and yield advantages in absolute and percent terms respectively.

In further analysis, *Sustainable Yield Index (SYI)* was computed (Singh et al., 1990) to see the relative stability of the performance of various crops.

$$SYI = \frac{\bar{Y}_t - \sigma}{Y_{max}}$$

where,

SYI = Sustainable Yield Index
Y_t = Estimated average yield of a crop over years

σ = Estimated Standard deviation
Y_{max} = Observed maximum yield of the crop in that year

Based on the Analysis and assessment of the quality produce obtained from CFLD, its anticipated level of spread was estimated and proportion of the quality seed availability for the total cultivable area of selected pulses were computed to ascertain the *diffusion effect* of the quality produce generated through the CFLD. Further, the *nutritional advantages* were computed as the total availability of important nutrients like protein, carbohydrate, minerals and energy derived from the unit availability of these nutrients in different pulses multiplied by the actual quantity of the surplus pulses generated under CFLD. The data were subjected to both descriptive and inferential statistics. The descriptive statistics utilized were average, percent and range. The inferential statistics were Coefficient of Variation (CV) to draw the meaningful implications. The analyzed data were presented in tabular as well graphical form.

Evaluation Results

Pulses yield across the states and seasons: On an average, the annual coverage of CFLD across all the selected states (19) was 31949 ha where 64 different varieties of pulse crops of all the three seasons were used. It was evident from the analysis that average demonstration yield was highest for field pea (17 q/ha) followed by chickpea (15.45 q/ha), pigeonpea (14.23 q/ha), summer green gram (9.45 q/ha), *kharif* green gram (9.34 q/ha), lentil (8.67 q/ha) and black gram (8.50 q/ha) from their respective area of 1890 ha, 8376 ha, 5556 ha, 3624 ha, 2689 ha, 3747 ha and 6067 ha across the different states of India. It is interesting to observe that there was maximum variation in the reported state level yield of summer green gram (CV = 34%) and lowest for black gram (CV = 14%) which reflects the greater diversity of old and new varieties across various states for green gram as compared to the black gram. Likewise, the farmers' yield (CV = 30%) and the demonstration yield (CV = 32%) also showed greater variation in case of chickpea. This could be attributed to the fact that few farmers may be using the high yielding chickpea varieties as compared to majority resorting to the old varieties. In other words, the seed replacement rate among the farmers may be less. However, greater variation in the demonstration yield of chickpea across the states also may be because of the unevenness in the management practices being done by the chickpea growers. There were other pulse crops namely field pea, *kharif* black gram and pigeon pea which showed relatively more stability (CV < 20%) in the demonstration yield and also in the farmers' yield.

Yield gap scenario: The yield gap analysis was done for the reported state yield, national yield and check yield (farmers' yield) as compared to the potential yield of the particular pulse crop for every season. The yield gap has been computed both in terms of quantitative magnitude and on per cent basis. The maximum yield gap was observed for lentil with respect to national yield level (14.50 q/ha) followed by field pea (15.59 q/ha) and chickpea (11.57 q/ha). The *kharif* pulses showed lesser yield gap at all level. Per cent yield gap also showed similar trends. With reference to the *kharif* pulses, the variation in the yield gap for check yield and state yield was quite high for pigeon pea and black gram (35% and 37%) and for *kharif* green gram (45% and 32%). Lowest variation of these two yield gap was noted for *rabi* lentil (10.5%, 9%) and field pea (12% and 18%).

Yield advantages: The main essence of CFLD-P was to harness the production potential of the improved pulses varieties and technologies. Hence, it was imminent to ascertain the yield advantages obtained for respective crops and also to analyze the comparative advantages against the state yield, national yield, check yield and potential yield for the selected pulse crops. The sustainable yield index (SYI) which is the index of the deviation of the average yield over the maximum obtained yield of the given pulse crop in a year was also computed. There was highest yield advantage from the improved pulses varieties over the reported state yield (39.25-190.47%), national yield (35.65-109.59%) and the check yield (31.63-51.36%). However, over the potential yield the advantages were still in negative terms for *rabi* pulses (-38.83 to -15.04%) and to the lesser extent for the *kharif* pulses (20-36 – 23.04%). This indicate that there is still the vast potential to exploit the production potential of the improved pulses varieties and this can my achieved by adopting the proper management practices and efficient use of the production factors. It is further clear from the same table that *rabi* (13.25-15.54 q/ha) pulses varieties gave higher demonstrational yield over the *kharif* (9.35-14.23 q/ha) and summer (6.85 to 12.30 q/ha). However, the yield advantages accrued were in reverse order for all the fore comparison level. This indicates relatively better prevailing yield (check yield) for *rabi* pulses than *kharif* pulses in India. Because this trend only, the SYI was higher for the *kharif* and summer pulses over *rabi* crops. The findings have emanated the implications for ensuring greater seed replacement rate for the *kharif* pulses so that in the times to come the farmers' yield may reach upto a better level. Another interesting trends noticed was that all three *kharif* pulses namely pigeon pea, black gram and green gram and summer green gram also registered a considerable higher yield advantages of 23.04, 21.57 and 20.36 per cent and 22.50 per cent respectively over the potential yields of the demonstrated varieties of these respective crops. This indicates probably there was better use of resources (both natural and technological) in *kharif* and summer seasons as compared to *rabi* season.

The Coefficient of variation (CV) was observed highest for chickpea with respect to check yield (31.35 %) and demonstration yield (32.5%) and lowest for *kharif* black gram for all kinds of yield (17.7 to 24.37%). Very high CV across the states for chickpea demonstration yield may reflect the lesser suitability of the demonstrated varieties/technologies and thereby higher yield instability across the state. Only two crops namely *kharif* black gram (CV: 14.37%) and *kharif* green gram (CV: 7.6%0 showed least variability in the demonstration yield of these two crops. Findings indicate that *kharif* pulses varieties and technology were more stable in their performance as compared to *rabi* and summer pulses.

Yield gap minimized: As discussed above, the yield gap was more for the *kharif* pulses and also the yield advantages from the improved varieties were more for the *khaif* pulses, the gap minimized, therefore for all the pulses followed the suite. The results reveal that maximum yield gap minimized were with reference to the state level (35.91-85.30%) and national level (35.86- 79.30%) yield for the pulse crops of all three seasons. With reference to the farmers' level yield gap, the minimization was highest for green gram (79.96%) with very high SD (32.66), followed by chickpea (68.75% with SD of 89.71), black gram (64.19%, SD = 32.88), green gram (56.49%, SD =28.63) and lowest gap minimized for field pea (37.43%, SD=8.05). It was also interesting to note the variation in the yield gap minimized due to CFLD was maximum for black gram and chickpea at national level data (65% approx) which indicate variation in the yield advantages incurred in these crops across the states. This may

be also because of the reason that the states selected for analysis under both the crops may have varying level of space for the given crops in the cropping systems. The minimum variation in extent of yield gap minimized was recorded for field pea (10-25%) and green gram (15-40%) for all three levels as depicted in the same graph.

Spread of quality produce of pulses: Since the CFLDs were conducted on large area across several states using the improved varieties and technologies, we estimated the actual physical quantity of quality produce obtained through those demonstrations computed by considering the average yield advantages for each crop multiplied by the total area covered for that crop. Further, it was also estimated the likely area to be covered if only 25 per cent of the total produce would have been used as the quality seed for the next cropping season. Considering again the average yield level, the total expected production has been worked out and for the second year cropping season, only 15 per cent of the obtained produces were considered to be used for sowing and accordingly the expected area likely to be covered were worked out. And finally, the overall impact of CFLD produce to be used in country was proportioned to the actual total area under the respective crop to arrive at the minimum possible coverage of area under quality seed of pulses. Total 31951 ha areas were covered under the CFLD of various pulses in the three growing seasons for the years under investigation. On an average, the average demonstration yield for all pulses were 11.83 q/ha which generated the quality produce to the extent of 3.849 lakh quintals. The maximum share of the produce obtained was for chickpea (1.302 lakh q) followed by pigeon pea (0.791 lakh q), black gram (0.516 lakh q) and summer green gram (0.342 lakh q). When the anticipated diffusion effect of the quality produces were estimated, it was worked out that in the second generation, the share of quality produce for all the pulses crops may had the coverage of about 12.13 % of total area under of pulses in India (Table 6). If we break it up for crop wise, pigeon pea had highest share of 40.18 per cent may be because of lesser seed rate of it followed by black gram (12.68% share) and lentil (14.19%). Chickpea despite having good yield advantages, it's likely share of coverage was least (1.14%) may because of the higher seed rate as compared to other pulse crops.

Performance of economic indicators: In further analysis, the effect of CFLD-P was ascertained from the secondary data reported by different agencies on the indicators of total pulses production, import, export and availability. For making the comparison, the baseline data for the average figure of above indicators for the period 2005-06 to 2009-10 was taken and compared with the average figure for the same indicators for the period 2012-13 to 2017-18. Accordingly the average annual growth rate (AAGR) for the both the periods were worked out and the difference was seen. It was disclosed that there was increases in the growth rate of all the indicators during the period when CFLD-P and other programmes promoting the pulses production in India was initiated. Objectively, the AAGR for pulses production increased upto 7.44% as compared to the base year (2.34%). Likewise, the AAGR for the import was reduced to 15.30% during this period compared to base years (21.96%) and the export rate increased to 1.07% as compared to negative growth rate. Further, the availability of pulses has increased with increased with AAGR of 8.54% as compared to the 2005-2010 (5.54%).

Nutritional advantages: Based on the total surplus pulses generated through CFLD programme, the nutrition backup was computed keeping in mind the standard nutritional

constituents of the pulses like protein, minerals, carbohydrate and energy. The results further indicated that the gross energy generated was to the extent of 104400 lakh K cal followed by 333.06 tonnes of proteins, 235.33 tonnes of carbohydrate and 55.53 tonnes of minerals were generated by the surplus pulses availability across the country under CFLD programme. Pulses wise, if computed, pigeon pea generated highest quantity of protein (94.17 tonnes) and minerals (14.78 tonnes), filed pea gave highest amount of carbohydrates (77.23 tonnes) and energy (43057.76 lakh K cal). Thus, the surplus availability of various pulses gave sound backup of the crucial nutrients ensuring thereby a greater nutritional advantage in the country.

Conclusions: Firstly, the scale at which these CFLDs are being conducted is sufficed for discerning the tangible impact. As a result, the average yield gain is quite encouraging and in some cases passing even the potential yields. Secondly, the cross sectional variation in the reported yield, yield gap and yield advantages across the states implicate for evolving the pulses varieties and technologies which are more unique to the given state or region. Probably, this may be the reason behind greater variation even in the sustainable yield index (SYI). Thus, the researchable agenda for the pulses variety improvement programme is emanated. Thirdly, the focused and mission mode approach for enhancing pulses production in India not only enhanced the total pulses production and per capita pulses availability, the pulses import declined significantly over the years and simultaneously increased the pulses export to some extent. And finally, the estimated gross nutritional advantages generated through these demonstrations added to the nutrition spectrum of Indian populace. Paper also assume significance of establishing mid- term evaluation as the methodological tool for assessing the development programme for its efficacious execution using the indicators and analytical framework as discussed in the paper.

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Detailed Proceeding of the National Workshop on "Promotion of Pulses for Sustainable Production System, Doubling Farmers' Income & Nutritional Security" Jointly organized by Directorate of Pulses Development and RLBCAU at Jhansi on 25th October, 2019

A one day National workshop on *"Promotion of Pulses for Sustainable Production System, Doubling Farmers' Income & Nutritional Security"* was organized by Directorate of Pulses Development, Bhopal, Govt. of India, Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW) in collaboration with RLBCAU, Jhansi on 25.10.2019 at ICAR-IGFRI Auditorium, Jhansi.

- Shri Narendra Singh Tomar, Hon'ble Union Minister, Ministry of Agriculture & Farmers Welfare & Ministry of Rural Development and Panchayati Raj, Govt. of India, inaugurated the workshop as Chief Guest of this national event.

- The workshop was attended by the representatives of different organizations, ICAR institutes, ATARIs/KVKs/SAUs, major pulses producing states, NSC/SSC/seed producing agencies, FPOs, NGOs, progressive farmers and also by public representatives of Jhansi (Member of Parliament-Jhansi and Lalitpur, Members of Legislative Assembly (MLAs), Panchayat representatives, farmers, press and media etc. *See List of Participants in Annexure-I.*

- An exhibition with various displays/theme was also arranged to benefit the farmers/delegates.

- Hon'ble Union Agri. & FW and RD & Panchayati Raj Minister inaugurated the exhibition.

1.0 Inaugural Session

1.1 Hon'ble Union Minister Shri Narendra Singh Tomar, Ministry of Agriculture & Farmers Welfare & Ministry of Rural Development and Panchayati Raj, Govt. of India inaugurated National Workshop with the lightening of the lamp along with the dignitaries. Hon'ble Member of Parliament Shri Anurag Sharma (Jhansi- Lalitpur Parliamentary Constituency); Respected Members of Legislative Assembly (Shri Ravi Sharma, Jhansi Sadar Assembly Constituency and Shri Jawahar Singh Rajput, Garotha Assembly Constituency); Secretary (DARE) and Director General (ICAR), Dr. Trilochan Mohapatra; Chancellor of RLBCAU, Dr. Panjab Singh, Former Secretary (DARE) and Former Director General (ICAR); Vice Chancellor, RLBCAU Dr. Arvind Kumar; Dr. A. K. Tiwari, Director, Directorate of Pulses Development, GoI and Dr. S.K. Chaturvedi, Dean, College of Agriculture and Organizing Secretary, RLBCAU, Jhansi shared the dais. After lightening of lamp and chanting of Vande Matram National Song, the workshop was declared open for discussion.

- The inaugural session started with a welcome address and brief about the National Workshop by Dr. S.K. Chaturvedi, Dean, College of Agriculture, RLBCA and Organizing Secretary of the National Workshop.

- In his inaugural address, Hon'ble Union Agriculture Minister opined that the present government's priorities are farmers centric and agriculture centric and Prime Minister has realized their issues and needs. Accordingly, Pradhan Mantri Fasal Bima Yojna (PMFBY) re-established in 2015 and is undergoing continuous improvements as per needs.

- Based on Swaminathan Report, minimum support price of crops have been enhanced by 1.5 times. Rs. 6000/- per year per farmer is being provided under PM Kisan Yojna and steps have been taken for Doubling Farmers' Income by 2022-23.

- The Minister emphasised to adopt short duration crop, low budget/zero budget agriculture.

- The Hon'ble Union Minister desired that about 5 lakhs farmers of 14 districts of Bundelkhand of two states of Madhya Pradesh and Uttar Pradesh should be linked with Rani Lakshmi Bai Central Agricultural University (RLBCAU). The representatives of the Government including involving the efforts of MP/MLAs/ Public representative. The soil and climate of Bundelkhand region is favourable for pulse cultivation and also plays an important role in pulse production in the State/Country. The region is rainfed, however, potential exist to fulfil the country's requirement of pulses, if exploited successfully. He stressed that the common farmers should be in contact with Agriculture University/ KVKs/ State/authorities of the State Department of Agriculture, with lead role to be played by RLBCAU so that, pulses/oilseeds production can be enhanced by using improved production and protection technologies and Bundelkhand could be as recognized as pulse hub National as well Global.

- The Hon'ble Minister opined that, we are fortunate to work in agriculture sector and appealed all the participants to work for the benefit of farmers in an exemplary manner which could satisfy our own inner soul.

- The quality seed minikits of pulses were also provided to the farmers by the Hon'ble Union Minister.

1.2 Shri Anurag Sharma, Member of Parliament, Jhansi- Lalitpur Parliamentary Constituency; and MLA Shri Ravi Sharma and Shri Jawahar Singh Rajput also stated that the *value addition and post harvest management* can help in branding of pulses being produced in Bundelkhand region.

- The problem of stray cattle needs immediate attention at the Govt. level.

- Agricultural Universities/KVKs and state department should have *strong linkages* for promotion of agriculture and allied sectors.

- To reduce the cost of cultivation and enhance farmers' income there is need to *promote farm mechanization* and *develop new varieties of pulses for their amenability* to combine/machine harvesting. Market support should be strengthened so that farmers can get remunerative price for the pulses.

1.3 Dr. Trilochan Mohapatra; Secretary (DARE) and Director General (ICAR) stated that India is having largest area, production as well as consumption of pulses. A large number of high yielding varieties of pulses have been developed along with matching integrated crop production technologies by ICAR, Agricultural Universities (AUs) and international organizations like ICRISAT and ICARDA. These have potential to boost pulses production and productivity. He pointed out that the various researches in pulses sectors are carried during the years which supplemented in the pulses production to make India ever highest production in the pulses. *Seed production and availability at farmers doorstep is still need focus.*

1.4 Dr. Panjab Singh, Chancellor & Former Secretary (DARE) and Director General (ICAR) opined the commendable job/initiatives of DAC&FW in supported Seed-Hubs under NFSM and in ensuring development of trained human resources, creating awareness about new varieties and ensuring quality seed availability of such varieties.

- The need was felt to extend production and distribution subsidy to the Seed-hubs so that quality produced under seed-hubs can be sold out at the same price as of other agencies like NSC and State Seed Corporations (SSCs). Seed-Hubs also need MoUs with NSC/SSCs/State for ensure quality seeds at farmers' doorstep through seed minikits/ FLD/CFLDs/Cluster demonstration/Seed distribution etc.

1.5 Dr. Arvind Kumar, Vice Chancellor, RLBCAU in his welcome remarks requested for the joint mega R&D project for the holistic development of the Bundelkhand region of Uttar

Pradesh and Madhya Pradesh. This proposal should have Krishi Vigyan Kendra (KVKs), State Agricultural Universities of the region, Seed Corporations and State Department of Agriculture. This will help in increasing productivity of pulses in Bundelkhand region to the level of national/global average.

1.6 Dr. A.K. Tiwari, Director, Directorate of Pulses Development, Government of India, Bhopal (MP) presented a vote of thanks especially to the Hon'ble Union Agri. Minister for having accepted invitation and sparing time and Secretary & J.S. (Crops), DAC&FW for their sustained support in facilitating the event. He thanked all the participating states/agencies to their sincere presence despite Diwali festive season. He expressed his thanks to the Director, IGFRI for their venue/facilities and the VC, Dean and Registrar, RLBCAU for hosting the event.

On this occasion, one pulses book purely in hindi language ***"Hkkjr esa nygu % iqujkoyksdu ,oa lEHkkouk,a &2019*** authored by Dr. A. K. Tiwari and A. K. Shivhare, Director & Asstt. Director, Directorate of Pulses Development, GoI, Bhopal was also released by Hon'ble Union Minister for Agriculture and Farmers' Welfare. The other three publications of RLBCAU have also been released during the inaugural event.

2.0 Technical Sessions

Dr. A.K. Tiwari, Director, Govt. of India, Directorate of Pulses Development, Bhopal welcomed the participants and briefly outlined the objectives of the workshop. Presentations were made by the speakers belonging to ICAR Institutes (ICAR-IIPR, Kanpur; ICAR-ATARI, Kanpur; ICAR-CIAE, Bhopal; ICAR-CIPHET, Ludhiana; and ICAR-ATARI, Jodhpur; and by the officials of various State Departments (Uttar Pradesh, Madhya Pradesh, Rajasthan, Telangana, Andhra Pradesh, Karnataka, Tamil Nadu, Telangana, Bihar, Chhattisgarh, Gujarat, Maharashtra). Representatives from National Seed Corporation (NSC), ICRISAT, ICARDA, and Agri-bazaar also delivered lectures during workshop. The recommendations of the workshop were presented during plenary session by Dr. S.K. Chaturvedi, Dean (Agriculture), RLBCAU and Organizing Secretary of the National Workshop. Dr. Panjab Singh, Former Secretary (DARE) and Director General (ICAR) and Chancellor of the RLBCAU was the chairman and Dr. N.P. Singh, Director, ICAR-IIPR was Co-chairman of the last session.

2.1 Technical Session-I :Status and Good Agricultural Practice in Pulses

Chairman: Dr. S. K. Rao, VC, RVSKVV, Gwalior
Co-chairman: Dr. A. R. Sharma, Director Research, RLBCAU, Jhansi
Reporters: Dr. A. L. Waghmare, Joint Director, DSD, Lucknow
Dr. Yogeshwar Singh, Prof., RLBCAU, Jhansi

In this session, two lead lectures "Pulses success story and way forward" delivered by Dr. A. K. Tiwari, Director, DPD, Bhopal and "HYV of pulses impact and progress of EBEP and seed hubs scheme" by Dr. N.P. Singh, Director, IIPR, Kanpur followed by presentations from State Agriculture Departments viz. Uttar Pradesh, Maharashtra, Rajasthan, Karnataka, Telangana, A.P., Tamil Nadu, Madhya Pradesh and Gujarat.

2.2 Dr. A. K. Tiwari, Director, DPD, in his presentation briefed the status of area, production and productivity of pulses in India as well as in the World. He pointed on the decline in growth in the acreage of pulses in some of the states like Karnataka, Uttar Pradesh and Chhattisgarh as compared to pre-NFSM period, however, the production and productivity has increased. He narrated the initiatives taken by the government for increasing the production in past years and allocation made during current year. He expressed happiness,

through his presentation on the decline in import of pulses to the tune of 3 million tonnes in recent years and better rabi prospects during current year 2019-20 as the water level in the reservoirs of the major irrigation projects are in very good condition.

- The National Food Security Mission (NFSM) interventions brought 29 per cent increase in area coverage, 79 per cent higher production with 39 per cent yield enhancement during 2017-18, over pre-NFSM period.
- Dr. Tiwari highlighted that existing yield gap between National Average and CFLD under total pulses at 32 per cent (Pigeonpea-63%, Chickpea-48%, Urdbean-47%, Mung-74%, lentil-21%) is an excellent opportunity to be exploited by the states to fulfil the demand of pulses and also to sustain the self sufficiency exhibited during 2017-18 with the harvest of 25.42 Million tonnes of production. The consumption demand during 2017-18 was 23.44 Million tonnes.
- The policy initiatives at Govt. of India level towards favourable terms of trade could be instrumental in declined import at one million tonne from 2016-17 to 2017-18 and about 3 million tonnes from 2017-18 to 2018-19.
- Enhanced NFSM-Pulses allocation for 2019-20 at 1735.97 Crores (Cr), special action plan for low productivity districts at 111.75 Crores, (4 states-Chhattisgarh, Rajasthan, Jharkhand and Odisha); Targeting Rice Fallow Area (TRFA) allocation for 11 states (Assam, BR, CG, JH, Odisha, Madhya Pradesh, Maharashtra, Tamil Nadu, Karnataka, Gujarat and West Bengal) at 359.61 Crores and strengthening of seed infrastructure at Panchayat level (491 units @ Rs 60 lakhs/unit of 500 MT capacity) with 100 per cent grant at 294.60 Crores etc. are the other major initiatives.
- Enhanced minimum support price (MSP) over 2014-15 by 33% of pigeonpea (Rs.5800/qtl.), 54% of chickpea (Rs.4875/qtl.), 53% of mungbean (Rs. 7050/qtl), 31% of urdbean (Rs. 5700/qtl) and 56% in lentil (Rs.4800/qtl) was one of the major initiatives that contributed towards achieving all time high production (25.42 m t) of pulses during 2017-18 in India.
- Dr. Tiwari appraised the procurement and discounted pulses scheme under PM-AASHA (Pradhan Mantri Annadata Aay Sarakshan Yojana) and NAFED.
- He was optimistic of achieving 26.30 million tonnes of pulses production target during 2019-20.

2.3 Dr. N. P. Singh, Director, IIPR, Kanpur presented the impact of high yielding varieties of pulses and progress made under two NFSM supported schemes viz., "Creation of seed hubs for increasing indigenous production of pulses in India" and "Additional Breeder Seed Production" (ABSP) scheme. He pointed on the stagnation of pulses in past years up to 2010 and quantum Jump in production by 10 million tonnes in recent past, attributed to the government policies viz. introduction of HYVs in cultivation, increase in seed replacement rate (SRR), variety replacement rate (VRR), minimum support price (MSP), and procurement at remunerative MSP by the government agencies, etc. He further emphasized on need to bridge the yield gap between the demonstrations and the farmers practice, promote field pea in northern states by replacing the wheat area where its yield is low.

- Dr. Singh highlighted the silver timing i.e. states with impressive growth in different pulses like chickpea in Madhya Pradesh, mungbean in Rajasthan, pigeonpea in Maharashtra and credited it to the varieties brought.

- He gave an account of varieties developed with special traits and attributes like short duration, extra large seeded kabuli, Heat tolerant, drought tolerant, wilt resistant, ascochyta blight tolerant, machine harvestable etc.

- Promising newly released high yielding varieties having desirable traits, quality seed production status, seed hubs progress and ABSP status etc. was also highlighted by Dr. Singh.

- Prof. S.K. Rao, Vice Chancellor (RVSKVV, Gwalior), Dr. V.S. Tomar, Former Vice Chancellor (RVSKVV and JNKVV) and Dr. Soraj Singh, Director (Agriculture), Government of Uttar Pradesh were among the dignitaries who shared their views on promotion of pulses in India, particularly in Uttar Pradesh and Madhya Pradesh.

- The Director/Deputy Director/Representatives of states viz. Uttar Pradesh, Maharashtra, Rajasthan, Karnataka, Telangana, Andhra Pradesh, Tamil Nadu, Madhya Pradesh and Gujarat presented the impact of NFSM pulses and good agriculture practices in pulses. The state wise issues and future strategies for increase in the pulses production are summarised in present proceedings.

State wise issues and strategies

The state wise issues were presented by the representatives of the 9 states viz., Uttar Pradesh, Maharashtra, Madhya Pradesh, Rajasthan, Karnataka, Telangana, Andhra Pradesh, Gujarat and Tamil Nadu and discussed during workshop.

2.4 Uttar Pradesh

- In Uttar Pradesh more than a dozen pulses are grown in various seasons as sole or intercrops. Huge area under pulses exists in Uttar Pradesh and Bundelkhand region alone has vast potential to produce pulses, particularly rabi pulses (chickpea, lentil and fieldpea).
- The representative from the state raised the issue of short duration varieties of pigeonpea that can replace old variety UPAS 120 (short duration variety) so that more area can be added under pigeonpea-wheat rotation under irrigated conditions.
- Enhancing varietal age limit of major varieties under NFSM programme so that sufficient quantity of quality seed can be made available to the growers of popular varieties;
- Providing more number of minikits for rabi pulses was also highlighted for promotion of chickpea and pea in eastern Uttar Pradesh and Bundelkhand region;
- Need for development of insect-pest and diseases resistant varieties of urdbean and pigeonpea was also highlighted.
- Fencing provision to tackle the alarming situation of blue bull and stray animals has to be made under centrally sponsored scheme.
- The state has also informed that 10 Dal mills (Pulse Mill) have been established during 2018-19 and there is target to establish 200 Dal mills soon.
- Considering the demand and scope, organic pulses production was taken in 2800 ha area during 2019-20.

2.5 Maharashtra

2.5.1 The state presented various issues and strategies for enhancing productivity of major pulse crops targeting both, irrigated and rainfed areas. Potential area expansion under pulses has been delineated up to 6 lakhs ha of which about 3 lakhs ha (rice fallow) is proposed under TRFA.

- Out of normal cotton area in the state (42 lakhs ha) about 2.10 lakhs has (5%) is usually harvested early as an important strategy for the management of pink boll worm in cotton. This facilitates cultivation of late sown chickpea in the region. The state needs suitable chickpea varieties for late sown condition which can produce additional 2.0 lakhs tonne of chickpea annually.
- Similarly, intercropping of chickpea with sugarcane has potential in about 0.91 lakh ha area during rabi which is 10% of the total sugarcane area (9.05 lakhs ha) of the state. Development of tall and erect varieties will be required to fetch additional area as intercrop with sugarcane. Such varieties will also be suitable for machine harvesting when sown as sole crop.
- New varietal requirement under urdbean, lathyrus, and pigeonpea (medium duration: 140-150 days).
- State also proposed to take secondary pulses like moth bean with pearlmillet.
- Proposed strategies like seeding of pigeonpea on broad bed furrow (BBF), zero till seed drill, paddy bund, integrated pest management, protective irrigation through sprinkler/drip, post harvest value addition by mini Dal Mill, storage, market linkage (buyers through SMART) and organic pulses production through PKVY scheme were suggested to promote, and enhance production and productivity of pulses in the state of Maharashtra.
- Adopting improved practices of cultivation following recommendations made by the SAU's and validated through KVKs and other frontline extension programmes.
- Increasing the availability and use of recommended varieties to improve VRR and SRR was highlighted.
- Rajmash have exhibited potential in few pockets of Maharashtra state, hence can be promoted. Intercropping of Mungbean/Urdbean+Cotton was also proposed to improve system's productivity.
- Following cropping system approach, the long term strategy for the management of biotic stresses particularly diseases and insect pests needs to be developed and implemented.
- The state has established 219 mini Dal Mills, 149 godowns, 28 seed processing units (SPUs) under NFSM-Pulses from 2014-15 to 2018-19.

Varietal profile of the state has been presented below:

Season/Crop	Varieties under cultivation)	Leading Varieties	Top 10 Districts
A. Kharif			
Arhar (Pigeonpea)	BDN 716, PKV TAT 9629 (TARA), BDN 711, BDN 708 (Amol), Vipula, BSMR 853, BSMR 736, ICP 8863, ICPL 87119	BSMR 736,, BDN 711, PKV TAT-9629 (TARA), ICP 8863	Yavatmal, Latur, Amravati, Osmanabad, Wardha, Nanded, Beed, Buldhana, Parbhani, Nagpur
Moong (Mungbean)	Utkarsha , BM 2003-2, PKV-AKM 4, BM 2002-1, Kopargaon	Utkarsha, BM-2003-2, BM-2002-1	Jalna, Parbhani, Amravati, Jalgaon, Akola, Nanded, Buldhana, Hingoli, Washim, Ahmednagar
Urid/Mash (Urdbean)	AKU 10-1, AKU 15, TAU 1	TAU 1, AKU 10-1, AKU 15	Nanded, Jalgaon, Osmanabad, Buldhana, Jalna, Beed, Washim, Parbhani, Nandurbar, Akola
B. Rabi			
Chickpea (Gram)	Phule Vikarm, RVG 202, RVG 203, Kripa,	JAKI 9218, RVG 203, Digvijay, Vijay	Ahmednagar, Amravati, Akola, Lapigeonpea,

	Digvijay, JAKI 9218, Virat, KAK 2, Vishal, Vijay		Osmanabad, Hingoli, Yavatmal, Beed, Nagpur, Washim
Lathyrus (Khesari)	Ratan, Prateek, Mahateora	Ratan, Prateek Mahateora	Gondia, Chandrapur, Bhandara, Gadchiroli

2.6 Madhya Pradesh

➢ Demonstrations of improved technologies of pulses production under NFSM, ensuring availability of improved and new varieties/seeds; use of culture and PSB in pulse production; distribution of sprinkler, drip and pipe line for efficient use of water; promotion of use of improved agricultural implements for farming and technical trainings and exposure visits etc., is the proposed strategy.

2.7 Rajasthan

- Small and fragmented land holding which leads to poor adoption of latest technologies especially farm mechanization. The productivity of pulse crops is further constrained due to cultivation in problematic soils. Efforts are required to develop varieties tolerating salinity/alkalinity.
- State highlighted that there are 12 districts where pulses productivity is very low to low and that can be improved substantially if suitable strategies are adopted. Some of these strategies suggested were:

Low Productivity Districts	Reasons of Lower Productivity	Strategies for Enhancing Yield
Nagaur Bikaner Churu Jaisalmer Hanumangarh Jodhpur Barmer Jalore Pali Sirohi Bhilwara Rajsamand	• Most of the cultivated area in various crops in kharif & Rabi is under rain-fed condition. • Stress at critical stages, Three years out of five years is drought years in Rajasthan. • Cultivation on poor lands. • Lack of adequate availability of improved Seed • Agronomical constraints – Farmers give less emphasis on seed treatment with bio-fertilizers, use of chemical fertilizers/micronutrients, weed and pest control due to uncertainty in the rainfall	• Promotion of construction of 7500 Farm Ponds for life saving irrigation at critical stages. • Dissemination of improved technologies through Demonstrations. • Seed Production Plan of chickpea, moth and mungbean crop under Mukhya Mantri Beej Swalamban Yojana (MMBSY). • Advocating Intercropping farming during different capacity building departmental programmes for farmers. • Timely availability of certified quality seed through dealers' network of State Seed Producing Agency.

- During kharif season mungbean has sizable area in the state. Therefore, issue of diseases and insect pests was highlighted. Popularization of traditional varieties and conservation of their germplasm (mungbean: SML 668 and RMG 344) was highlighted. The mungbean varieties developed by the ICAR-IIPR and CCSHAU have shown promise, hence being promoted. State's suggestions for best implementations of developmental schemes were (i) cluster approach for real time advisory based on remote sensing technology; scaling up of intercropping of pulses scheme; micro irrigation in Canal Command area to cover additional area under irrigation; special focus on low productivity area and increase in area during spring/summer season; promotion of farmer-producer organizations (FPOs) for storage, warehousing and value addition; and special drive for resource poor area by incentivizing for better agronomical practices.

- The emphasis was laid on popularisation of high yielding varieties in 10 most potential districts of Rajasthan. The need for inclusion of newly released varieties was also highlighted. The suggested crop specific varietal profile for 10 districts were also presented as under:

Season/Crop	Varieties Presently under cultivation)	Leading varieties	Top 10 Districts
A. Kharif			
Arhar (Pigeonpea)	Pant Arhar 291, Pusa 2001, TJT 501	Pant Arhar 291, Pusa 2001, TJT 501	Banswara, Udaipur, Dungarpur, Pratapgarh, Dholpur, Kauauli
Moong (mungbean)	IPM 02-03, MH 421, Pant M 5, IPM 02-14, IPM 410-03	IPM 02-03, MH 421, Pant M 5	Nagour, Jodhpur, Pali, Churu, Jalre, Jaipur, Ganganagar, Ajmer, Tonk, Barmer
Urid/Mash (Urdbean)	Pratap Urdbean 1, MASS 479, Pant U 31, Pant U 40	Pratap urdbean 1, MASH 479, Pant U 31	Bundi, Baran, Tonk, Bhilwara, Kota, Ajmer, Jhalawar, S. Madhopur, Chittorgarh, Dungarpur
Moth (Moth bean)	RMO 257, CAZRI, Moth 2	RMO 257, CAZRI. Moth 2	Bikaner, Varmer, Churu, Jodhpur, Nagour, Jaisalmer, Jalore
B. Rabi			
Gram (Chickpea)	GNG 1958, RVG 202, RVG 203, RSG 974	GNG 1958, RSG 974	Bikaner, Jaisalmer, Churu, Hanumangarh, Ajmer, Sikar. Jhunjhunu,Jaipur, Tonk, Ganganagar

2.8 Karnataka

- The State has 30.19 lakhs ha total area under pulses comprising kharif (16.02 lakhs) and rabi (14.17 lakhs ha) season mainly under pigeonpea, mungbean, urdbean and chickpea.
- Pulses production reduced due to drought like situations prevailed during past few years in the state.
- State has proposed to bring additional area under pulses through intercropping with cereals and oilseeds; pulses on rice fallow and on rice bunds.
- Best performing varieties under Minikits programme have been BRG 2 (pigeonpea), IPU 02-43 (Urdbean: kharif +Rabi), IPM 02-14 (Mungbean: kharif+Rabi), summer mungbean (MH 421). The quality seed production and distribution of these varieties will help in improving productivity and production of pulses in the state of Karnataka.
- Establishment of processing centres having sorter, Dal processer, pulveriser, weighing and packaging machines to facilitate custom hiring. The FPOs can play a proactive role in developing entrepreneurships linking subsidy to bank loans.
- Relaxation of the age limit for varieties being promoted under NFSM programme, providing better market linkage and ensuring stability in prices to safeguard farmers from frequent price fluctuations has been suggested by the state.
- Replicable models can be placed at KVK's / centre for excellence in each district.
- Cultivation of cowpea on bund of main field & as sole crop in summer in rice fallow area.
- Availability of new mungbean (BGS-9, DGGV-2, KKM-3 & IPM 2-14), urdbean (DBGV 5 and Dharwar Urid 1) and Cowpea (Dharwar C15 and KBC 2) varieties.

- State has requested to allow promotion of the traditional varieties of pigeonpea (TS 3R, BRG 2, BRG 5), mungbean (BGS 9), horse gram (GPM 06, PHJ 9) and cowpea (KBC 2, DC 15) as these varieties have farmers' preference.

2.9 Telangana

- Pulses are mainly grown during kharif and rabi season in Telangana state. State's total pulse area is 5.05 lakhs ha (kharif: 3.90 lakhs ha + rabi:1.15 lakhs ha).
- Establishment of mini dal mills as cottage industries or dal/flour mills as entrepreneurs have vast potential.
- New varieties promoted by Seed-Hubs shall be linked up with NFSM program through agencies for better spread of high yielding varieties at rapid rate.
- Selected old but promising varieties (>10 years old) need to be allowed under the NFSM programme as a special case such as ICPL 87119 of pigeonpea, MGG 295 of mungbean and Pant U 31 of urdbean.
- Success of use of sprinklers and combine harvesters has been noticed by one and all during summer season in case of mungbean crop. Such technologies need further promotion under NFSM.
- Promotion of farm mechanization, inclusion of ridge and furrow seed drill under subsidy needs to be allowed.
- Development of the short/medium duration varieties of pigeonpea having *Helicoverpa* resistance/tolerance and multiple diseases resistance (wilt, sterility mosaic disease); MYMV resistant mungbean and powdery mildew resistant urdbean need to be accelerated.
- National Level empanelment (centralized) for Farm Machinery including processing units to save delay, to ensure transparency and cost effectiveness in implementation was highlighted.
- The varieties included in Minikit programme should be state specific.
- Varieties having some level of determinate growth habit of mungbean (WGG 42) and urdbean (LBG-787) should be promoted for combine harvesting.

Varietal profile and top 10 districts for each crop were also presented as:

Season/ Crop	**Varieties under cultivation**	**Leading varieties**	**Top 10 Districts**
A. Kharif			
Arhar (Pigeonpea)	PRG 176, ICPL-87119,LRG 41, TDRG-4 (Hanuma)	PRG 176, ICPL 87119,	Vikarabad, Narayanpet,, Siddipet, Mancherial, Jangoan, Rangareddy, Jagityal, , Mahabubnagar, Nalgonda and Nagarkurnool
Moong/Green gram (Mungbean)	MGG 295, IPM 02-14, IPM 02-03, LGG 460	MGG 295	Khammam,Warangal (Rural), Nirmal, Nalgonda, Mahabubabad, Suryapet, Jagityal, Kamareddy, Mancherial and Siddipet

Urid/Blackgram (Urdbean)	IPU 02-43, PU-31	PU 31, IPU 02.43	Kamareddy, Sangareddy, Vikarabad, K. Asifabad, Mancherial, Siddipet, Medak, Warangal (Rural) and Jangaon Mahabubnagar.
B. Rabi			
Gram (Chickpea)	JG 11, NBeG 3	JG 11	J.Gadwal, Kamareddy, Adilabad, Sangareddy, Nirmal, Nizamabad, Vikarabad, Siddipet, Rangareddy, and K.Asifabad

2.10 Andhra Pradesh

- In Andhra Pradesh, the maximum area coverage under pulses is as rice fallow crops. There is ample scope for increase in area under chickpea and pigeonpea in the state.
- Adoption of various efficient Micro irrigation systems, one irrigation before flowering has been found rewarding in improving productivity of pulses.
- Intercultural practices like hoeing and weeding need to be promoted as these practices have shown vast potential. These small activities need to be linked with promotion of pulses cultivation under NFSM.
- Replacement of the existing all yellow mosaic virus (YMV) susceptible varieties of urdbean (black gram) with Pant U 31, TBG 104, GBG1, LBG 787 (HY) etc. will certainly help in improving output from these crops.
- Intercropping of pigeonpea (red gram) with urdbean (LRG 41 + PU-31) needs promotion to improve system's productivity.
- Suggestions for best implementations of developmental schemes were also made by the representative of the state. These were (i) assured sharing of information about suitable high yielding varieties/hybrids by ICAR-IIPR for multiplication and promotion of varieties/hybrids; establishment of market linkages for seed and grains; procurement at MSP; linkage with government marketing agencies, departments and private agencies (like e-Choupal) for promotion of pulses cultivation; and provision of support for micro irrigation to the crop to enhance the yield considerably.

Varietal profile and top 10 districts are given under:

Season/ Crop	**Varieties (Presently in cultivation)**	**Leading varieties**	**Top 10 Districts**
A. Kharif			
Arhar (Pigeonpea)	LRG 41, ICPL 85063, LRG 52, LRG 41, LRG 38, LRG 30, ICPL 87119, ICP 8863, ICPH 2740	LRG 41, ICPL 85063, ICPH 2740	**Production wise:** Krishna, Guntur, Prakasam, Kurnool, Srikakulam, Anantapur, Kadapa, Chittoor, East Godavari, West Godavari, Visakhapatnam, Nellore and Vizianagaram **Area wise:** Kurnool and Prakasam, Ananthapur, Krishna, Kadapa, Srikakulam, Chittoor, East Godavari, Vizianagaram, Nellore, Visakhapatnam and West Godavari
Urid/Blackgram (Urdbean)	Pant U 31, LBG 752, IPU 02-43	Pant U 31	
Moong/Green gram (Mungbean)	IPM 2-14, LGG 460, ML 267, LGG 407, LGG 450, IPM 2-14, WGG 42, TM 96-2	IPM 2-14, LGG 460, ML 267	
Horsegram (Kulthi)		Local varieties	
B. Rabi			
Gram (Chickpea)	JG 11, KAK 2	JG 11	

2.11 Tamil Nadu

- The pulses area in the state is about 8.30 lakhs ha that is mainly in kharif season. In pockets chickpea is grown during rabi season.
- State is making all efforts in popularising best performing varieties those were tested under Minikits program. These varieties are BRG-2 (pigeonpea), IPM 02-43 (urdbean), IPM 02-14 (mungbean), IPM 205-7/Virat (summer mungbean) and JAKI 92-18 (chickpea).
- Production subsidy may be allowed on varieties those are more than 10 years old but high yielding. These varieties may be phased out within next 1-2 years.
- Provision of subsidy may be extended to FIGs, NGOs for purchase of seed drill for line sowing of pulses.
- Cropping system based demonstrations and promotion of pulses cultivation on bunds need more allocation of funds for the state.
- Branding of pulses (black gram) under TOP (Tamil Nadu Organic Products) by RKVY Scheme has potential.

Varietal profile and top 10 districts are given under:

Season/Crop	Varieties (Presently under cultivation)	Leading varieties	Top 10 Districts
A. Kharif			
Arhar (Pigeonpea)	LRG 41, Co (RG)7, BRG 4, Co 8, VBN 3	LRG 41, Co (RG 7)	Vellore, Dharmapuri, Krishnagiri, Salem, Tiruvannamalai, Trichy, Erode, Karur & Madurai
Moong (Mungbean)	Co 8, VBN(Gg) 3, Co 7, Co GG(912)	Co 8 & VBN(Gg) 3	Salem, Namakkal, Madurai, Dharmapuri, Krishnagiri, &Vellore
Black gram (Urdbean)	VBN 6, VBN 5, ADT5, MDU1, ADT 3	VBN 6 & VBN 5	Tiruvannamalai, Villupuram, Dharmapuri, Vellore, Krishnagiri, Pudukottai, Thoothukudi, Salem, Thanjavur & Tiruvarur
B. Rabi			
Gram (Chickpea)	Co 3, Co 4	Co 3 &Co 4	Tiruppur, Dharmapuri, Coimbatore,Namakkal & Dindigul
Horse gram (Kulthi)	Paiyur 1, Paiyur 2, Co 1	Paiyur 2	Krishnagiri, Dharmapuri, Vellore, Tiruvannamalai, Salem, Karur, Dindigul, Tiruppur, Coimbatore
Moong (Mungbean)	Co 6, Co 8, VBN(Gg)2, VBN(Gg)3	Co 6, Co 8, VN (Gg)3	Thoothukudi, Tirunelveli, Viridhunagar, Tiruppur, Dindigul
Black gram (Urdbean)	VBN 3, VBN 4, VBN 5, VBN 6, ADT 3, ADT5	VBN3, VBN6, ADT 3	Villupuram, Tiruvannamalai, Cuddalore, Vellore, Kanchipuram, Thoothukudi,

			Thirunelveli, Ariyalur, Thanjavur, Tiruvarur,
Cowpea	Paiyur 1, Co 6, Co (CP) 7, VBN 1	Paiyur 1	Salem, Dhramapuri, Krishnagiri, Dindigul, Theni, Madurai, Coimbatore, Vellore & Tiruvannamalai
C. Summer/Spring			
Moong (Mungbean)	Co 6, VBN 3, ADT 3	Co 6,ADT 3	Thanjavur, Tiruvarur, Nagapattinam, Cuddalore, Villupuram, Tiruchirapalli, Perambalur, Thiruvallur, Kanchipuram
Black gram (Urdbean)	ADT 5	ADT 5	

2.12 Gujarat

- Cultivation of pulses in the state of Gujarat is in both, kharif and rabi season with some area in spring/summer season.
- Small and fragmented land holdings leads to poor adoption of latest technologies especially mechanization.
- Establishment of primary processing units at farm level was requested for support under NFSM.
- Varietal development is a continuous process. The early maturing varieties of rabi pulses holds promise in the state.
- Diversion of mixed cropping of pulses to sole cropping.
- Some of the varieties performed well under minikits programs hence needs to eb popularized. These were TJT-501 (pigeonpea), Sikha/IPM 410-3 and IPM 02-03 (mungbean) and GJG 3 (chickpea).

The state also presented the varietal profile and top 10 districts as:.

Season/ Crop	Varieties (Presently under cultivation)	Leading varieties	Top 10 Districts
A. Kharif			
Arhar	BDN 2, GJP 1,TJT 501, BDN 711, Vaishali, GT 103, GT 101	BDN 2, BDN 711, Vaishali, TJT 501	Bharuch, Vadodara, Narmada, Chotaudepur, Panchmahal, Dahod, Tapi, Sabarkantha, Arravalli, Surat
Moong	GAM 5 K 851, Meha, GBM 1, Gujarat M 4, Gujarat M 5	K 851, GAM 5	Kutch, Banaskantha, Patan, Mahesana, Gandhinagar, Amdavad, Surendranagar, Jamnagar, Amareli, Bharuch
Urdbean	T 9, Gujarat urdbean 1	T 9, Gujarat urdbean 1	Patan, Chhotaudepur, Mahesana, Sabarkantha, Jamnagar, Banaskantha, Dahod, Valsad, Arravalli, Dang
Moth	Moth Gujarat 1	GMO 1, GMO 2	Kutch, Amdavad, Bhavnagar,

(Mothbean)	(MG 1), GMO 1, GMO 2, Maru Bahar (RMO 435)		Mahesana, Bharuch, Surat, Tapi, Patan, Surendranagar, Morbi
B. Rabi			
Chickpea	Gujarat Chickpea 1, Gujarat Chickpea 2, Gujarat Chickpea 3, Gujarat Chickpea 5 GJG 3, GJG 6	GJG 3, Gujarat Chickpea 5	Mahisagar, Amdavad, Surendranagar, Porbandar, Dang, Patan, Junagadh, Mahisagar, Rajkot, Anand
C. Summer/Spring			
Moong	K 851, GM 5	K 851, GM 5	Gir-somnath, Junagadh, Bhavnagar, Dahod, Mahisagar, Surat, Tapi, Sabarkantha, Banaskantha, Bhavnagar
Urdbean	T 9, Gujarat urdbean 1	T 9, Gujarat urdbean 1	Junagadh, Gir, Somnath, Morbi, Kutch, Bhavnagar, Mahesana, Sabarkantha, Dahod, Bharuch, Chhota udepur

2.13 Technical Session-II: Mechanization, Post harvest management, Value Addition and Marketing

Chairman: Dr. V.S. Tomar, Ex. Vice Chancellor, JNKVV
Co-chairman: Dr. P.M. Gaur, ICRISAT
Reporters: Dr. Sumit Mishra, Joint Director, DRD, Patna
Dr P.P. Jambhulkar, Prof., RBLCAU, Jhansi

- First presentation was given by Dr. Nachiket Kotwaliwale, Head, Agro Produce Processing Division, ICAR-CIAE, Bhopal on the processing, mechanization and post harvest management for pulses value chain development. The quality of the machineries used in the agriculture must be as per the standards and there are so many Govt. institutions available in the country that test the machineries and issue quality licence to Agro machineries and CIAE is one of them. The major concern emerged were:
- Low Dal recovery emerged as major concern during milling process. Presently, the Dal recovery is very poor (65-75%) which could be improved up to 85-87% by adopting new machineries. It was emphasised that use of improved machineries should be promoted in targeted areas.
- Dr. Nachiket shared information about newly improved agriculture machineries for the seed bed preparation, sowing, planting, weeding, spraying, harvesting, threshing and post harvest machineries like cleaning/grading/drying machines.
- He has also given emphasis on the loss occurred during storage of pulses and reiterated that storage of whole pulse grain is difficult rather than after making the Dal (splitting). The control of losses from store grain pests during pulses storage is very important.
- The pulse's farmers were suggested to become Agro-entrepreneur after giving value addition to the farm produce. He also demanded to the Government to declare Pulses as the theme of "World Food Day".

The second presentation was given by Dr. M.L. Arora, Director (Commercial), National Seed Corporation (NSC) on the Status of Pulses seed production in the country. NSC has eight farms with total 22000 ha land on which seed production of 80 crops and 627 varieties are taken in the country. He also described various activities of NSC and the resources, network and infrastructure available with them. Dr. Arora informed that during 2019-20, the NSC has targeted 20.37 lakh quintal seed out of which 4.60 lakh quintals is kept for pulses. During 2019-20, the NSC also going to distribute 48000 seed minikits of various crops in the country. He also described the new areas like Fish seed and Animal feed where NSC is going to initiate new ventures.

The Third presentation was given by Dr. P.M. Gaur, ICRISAT on NFSM-Project outcomes at National level for chickpea and pigeon pea components. Dr. Gaur mentioned about improved cultivars and production technologies for achieving higher productivity of chickpea and pigeonpea. Quoting example, he said that the introduction of heat tolerance in chickpea variety JG 14 has helped the farmers tremendously in achieving higher production in eastern India (Jharkhand, Bihar, Odisha) including Chhattisgarh and eastern Madhya Pradesh as this variety is suitable for late sown conditions. Mechanical harvesting of pulses is another area where new entries like Dheera (NBeG 47), RVG 204, Shubhra, HC 5, Phule Vikram, BG 3062 and GBM 2 have shown encouraging results. Crops density of pulse crops has also played an important role so far as mechanical harvesting is concerned. Narrow spacing between lines and plants leads to erect crop growth and thus facilitate more harvest and make plants suitable for combine harvesting. Hybrid pigeonpea and super early (90-100 days) varieties of pigeonpea are the new areas of investigation as these can fit well under varying cropping systems.

The fourth presentation was given by Dr. Aqueel Rizvi, Scientist, ICARDA on NFSM-Projects' outcomes at National Level (lentil and lathyrus). He has emphasized the importance of pulses for human, animal and soil health and for ecological security and sustainable agriculture. Dr. Rizvi reiterated that the pulses are the balance mixture of protein, carbohydrate, lipids, minerals and vitamins. He has also elaborated various strategies for vertical and horizontal expansion of pulses, minimising the milling losses, lowering cost of cultivation and enhancing nutritional quality (Fe and Zn bio-fortified varieties of lentil i.e. Pusa Vaibhav, IPL 220, Moitree) for containing hidden hunger in human diet through the pulse crops. He also presented results of different projects done in various states.

The Fifth presentation was given by Sh. Shailendra Kumar, Manager (Pulses), NAFED (HO), New Delhi on Procurement of Pulses under PSS/PSF. He informed that NAFED is procuring pulses under Price Support system (PSS) at Minimum support price (MSP) through NAFED portal or State Govt. portal which keep records of procurement from registration of farmers to payment into his account. He suggested that the State Government should create a revolving fund for incidental expenses and should exempt *Mandi* tax and make arrangement of warehousing, gunny bags etc. The NAFED also procure pulses under Price Stabilizing Fund (PSF) on market price to create a buffer stock of pulses implemented by DoCA, MoCA, F&PD, GOI. Sh. Kumar presented the data of procurement of pulses under PSS and PSF during the last 5 years and the balance stock of pulses under PSS and PSF. He informed that the production and procurement of pulses has increased and the country has 20 lakh tonnes of buffer stock of pulses which helped in stabilizing price and reduce the import of pulses.

The Sixth presentation was given by Sri Atul Chhura, Agri-bazaar on Role of technology for sustaining pulses production system in India. He explained about the role Digital technologies for the benefit of farmers. He has shown various digital applications which can help farmers to take decision on the selection of crop to its marketing.

The Seventh presentation was given by Dr. D.M. Govinda Reddy, Dy. Agricultural Marketing Advisor, Directorate of Marketing Intelligence (DMI) on "New policies, marketing strategies, and export opportunities of agriculture produce including e-NAM". He explained various functions of DMI and how the organization do backend support to the farmers through rural godowns. The DMI also helped in creating Common Facilitation Centre (CFC) for value addition and easy market access. He also briefed about the e-NAM and how it helped in integrating markets across the country to increase competitiveness and leads to better price for the produce. Dr. Reddy gave insight of various tradable commodities and techniques and instruments used for quick quality assessment of various agriculture produce.

3.0 Plenary Session

Chairman : Dr. Punjab Singh, Ex-Secretary (DARE) & Ex-DG (ICAR)
Co-Chairman: Dr. N. P Singh, Director, ICAR-IIPR, Kanpur
Dr. A.K. Tiwari, Director, DPD, Bhopal
Convener: Dr. A. R. Sharma, Director Research, RLBCAU, Jhansi
Rapporteurs : Dr. K. Ponnusamy, Joint Director, DOD, Hyderabad
Shri Vipin Kumar, Assistant Director, DPD, Bhopal

At the outset Dr. A. R. Sharma, DRS, RLBCAU, Jhansi welcomed the participants and introduced the Chairman, Co-Chairman and other speakers of the session. Dr. S. K. Chaturvedi, Dean (Agriculture), RLBCAU and organizing secretary, National Workshop, Jhansi, in his remarks briefed the followings:

- The stakeholders from about 15 pulses producing states participated and provided valuable information on sustainable pulses production in the country.
- The recommendations emanated so far will be collected from the different stakeholders and shall be summarised and sent to Directorate of Pulses Development, Govt. of India.
- Bundelkhand region need to be categorically developed as Pulses and Oilseeds hubs in view of vast potential of these crops for which resources are also available in the region.
- Sustainable pulses production could be achieved through aggressive transfer of technology such as CFLD, new varieties through minikits distribution, water harvesting, micro-irrigation, increasing the water use efficiency by lining of canal especially in Madhya Pradesh and increase in cropping intensity, etc.
- Irrigation water is available in some parts of the Bundelkhand region which could be tapped for pulses and oilseeds production in the region.

3.1 Dr. A. K. Tiwari, Director, DPD, Bhopal in his remarks said that the term of 14th Finance commission is ending by March, 2020 and the 15th Finance Committee will submit its report by Nov. 2019, accordingly. A new pulses programme is stated to be formulated and launched thereafter with the major thrust on production, *post harvest and primary processing and value addition of pulses.* Providing moisture meters,

assaying equipments, grader/ cleaner etc., individual farmer are also under consideration in the scheme by the Government. The idea behind conducting this National Workshop is to gather/collate the information on impact and experiences of the NFSM since inception of the implementing states for utilising the same in formulating the new scheme. A standard proforma (template) has been circulated to all the implementing states to collect the scheme related information uniformly for utilising the same in drawing the new programme.

3.2 Dr. N. P Singh, Director, ICAR-IIPR, Kanpur in his remarks appreciated timely organization of the National Workshop and said that good information is shared among diverse people in this workshop. Dr. Singh suggested following points for further improving pulses production to meet future demand:

- Pulses itself is a success story with the achievement of self sufficiency in the recent years, as that of oilseeds in 1980s, and the accomplishment should continue in a sustainable manner.
- The districts of Bundelkhand region are having good potential for Pulses and Oilseed crops and need a separate action plan to tap the same.
- Further, develop a micro-level action plan as to Taluka and even at block level considering the local conditions and the availability of resources by ICAR-IIPR, SAUs and other institutions and entrust certain level of accountability.
- Focus must be given on post harvest management and primary processing as the progress made so far is little in these aspects.
- There is a concern on declining pulses production in Uttar Pradesh and northern India and availability of Canadian peas protein in Indian market could be a threat to domestic production.

3.3 Dr. Punjab Singh, Chancellor of RLBCU and Ex-Secretary (DARE) & Ex-DG (ICAR) & Chairman of the Session in his concluding remarks thanked all the participants for giving valuable suggestions during the course of deliberation. The summary speech stated the following:

- There was very good discussion and information shared with the stakeholders from ICAR-IIPR, SDAs, NSC, Processors, etc.
- India is the largest producer of pulses and importer also and India has added additional 10 million tonnes of pulses in last 10 years which is a great achievement in achieving the self sufficiency. 27 to 28 million tonnes of pulses is comfort enough to meet the Indian demand.
- There is a clear gap between FLDs yield and farmers practices yield which needs to be narrowed down with concerted effort.
- Sustaining the productivity is very important to keep the domestic supply with the judicious use of available resources like water.
- Greater variability is available in our germplasm to address the biotic and abiotic stresses. Short duration germplasm is a good opportunity to escape from terminal drought with good yield.
- Bundelkhand region is known for its green pea and chickpea and thrust should be given to promote these crops for doubling the farmers' income. 14 districts of Bundelkhand needs special action plan in consultation with all the stakeholders.
- District-wise action plan in tandem with available resources should be prepared and implemented strictly.

- Spreading the already existing technologies, post harvest management, primary processing and value addition will definitely contribute in doubling farmers' income.
- At least 10 to 20% of the rice fallow area may be tapped every year from about 10 million ha rice fallow available in the country.
- Seed Replacement Ratio (SRR) has to be improved to a fair level from the existing ratio.
- Local entrepreneurship should be promoted to create local employment and retain the rural population in the respective areas.
- International Chickpea Conference is planned next year to promote and popularize the crop further.
- Develop a good policy with improved monitoring mechanism by the Government.

4.0 Exhibition Organized

- Dr. Anil Kumar, Director Education, RLBCAU took lead to organize exhibition for the benefit of the participating stakeholders. Total of 08 exhibition/stalls have exhibited by the state/Central Govt. intuitions incl. ICAR/KVKs/NGOs on various agriculture and allied activities and schemes for farmers viz. RLBCAU, Jhansi; ICAR-IGFRI, Jhansi; ICAR-CAFRI, Jhansi; Department of Animal Husbandry,Jhansi; KVK-Bharari, Jhansi; Taragram-FPO, Jhansi; Vasudha Amrat Bundelkhand Natural Utpaadan, Jhansi; Bundelkhand Chamber of Commerce, Jhansi including Directorate of Pulses Development, Govt. of India, Bhopal.
- Directorate of Pulses Development, Govt. of India, Bhopal exhibits displayed were (i) Seed samples of improved HYVs /hybrids of various pulses viz. chickpea (RVKG 101, RVG 201, RVG 202, RVG 203, JGG-1, BGD 112, JAKI- 9218); mungbean (IPM-139, IPM 410-3, HUM-12, HUM 99-72); pigeonpea (JA-4, IPC 88039, Pusa 991, Pusa 992, JKM-189; TJT 501, ICPH 2740); soybean (JS 95-60, RVS 2001-4; urdbean (Shekhar-2, IPU 54-1, JU-86, JU-2) and lentil (RVL 11-6, RVL 15-4, RVL 15-5).
- The information about various schemes of DAC&FW, pattern of assistance, pictorial presentations on crops/varieties, graphical/ pictorial presentation on APY of oilseeds, pulses and wheat, details on RCT/Farm mechanization promoted under SMAM/NFSM etc., were displayed through posters at the site of the Exhibition.
- More than 100 crop-specific technical bulletins in vernacular language (Hindi/ English) on 12 pulses crops viz., (mungbean, urdbean, lobia, kulthi, arhar, guar, fieldpea, chickpea, lentil, rajmash, lathyrus, moth bean and summer mungbean) containing details of production technology and pattern of assistance under NFSM were also distributed among more than 100 visitors during the exhibition. The details of the literature distributed and a glimpse of the visitors are enclosed in the photo gallery.

5.0 Actionable points emerged

Based on deliberations, discussions following recommendation were emerged:

1 Delineation of exact area under the strategy of area expansion in pulses through intercropping, targeting rice fallow, planting pigeonpea on rice bund etc. Template based information/ strategy for promoting traditional varieties.

(Action: SDA)

2 Development of climate resilient pulses varieties, resistant to biotic and abiotic stresses, long duration and low lying area suited varieties particular in Kharif Urdbean & Mungbean to avoid crop loss due to heavy rains and coinciding rainfall & harvesting period.

(Action: ICAR-IIPR, Kanpur)

3 State-specific plan for each district/block for minimising the yield gap between demonstration and farmers practice through better dissemination of technologies available, varieties and suggestive strategy under existing NFSM scheme.

(Action: SDA)

4 Proper policy implementation to take benefit of water availability during ensuring Rabi season for increase the area and production of pulses, dove-tailing MIS with MIDH.

(Action: SDA)

5 Need to develop weed management practice especially for broad leaf (Post emergence herbicide).

(Action: ICAR)

6 Integrated Nutrient Management and water management through micro-irrigation need to be focused, by making SHC recommendation compulsory.

(Action: SDA)

7 Age relaxation for varieties and also permission for traditional best performing varieties under NFSM where the limited numbers of new varieties released are available (State & Crop specific).

(Action: DACFW, GoI)

8 The seed production in seed hubs linked up with NFSM programme.

(Action: DACFW, GoI)

9 Micro level planning is required to infuse technologies for further boosting production and productivity in targeted areas.

(Action: DACFW, GoI)

10 Seed production and availability at farmers doorstep is still need focus. Convergence of Beej Chickpea Yojna (SMSP) with NFSM at district level.

(Action: DACFW, GoI)

11 The commendable job has been done through DAC&FW supported Seed-hubs in ensuring development of trained human resources, creating awareness about new varieties and ensuring quality seed availability of such varieties. State-wise higher level training programmes under NFSM involving State seed-hubs nodal officer (DES/SAU) + DPD Bhopal + State Department.

(Action: DACFW, GoI)

12 The need was felt to extend production and distribution subsidy to the Seed-Hubs so that quality produced under seed-hubs can be sold out at the same price as of other agencies like NSC and State Seed Corporations (SSCs).

(Action: DACFW, GoI)

13 Seed-Hubs need to develop MoUs with NSC for feeding seeds in minikits programme.

(Action: DACFW, GoI/ICAR-IIPR)

14 The problem of stray cattle needs immediate attention at the Govt. level and need was felt to develop a long term plan providing community fencing under NFSM.

(Action: DACFW, GoI/SDA)

15 Value addition and post harvest management can help in branding of pulses being produced in Bundelkhand region and other parts of the country.

(Action: DACFW, GoI/ICAR-CIPHET)

16 It was suggested that a joint mega R&D project should be submitted by RLBCAU for the holistic development of the Bundelkhand region of the Uttar Pradesh and Madhya Pradesh. This proposal should have Krishi Vigyan Kendra (KVKs), State Agricultural Universities of the region, Seed Corporations and State Department of Agriculture on board. This will help in increasing productivity of pulses in Bundelkhand region to the level of national/global average.

(Action: RLBCAU/ICAR)

17 To reduce cost of cultivation and enhance farmers' income there is need to promote farm mechanization and develop new varieties of pulses for their amenability to combine/machine harvesting.

(Action: DACFW, GoI/ICAR-IIPR)

18 Market support should be strengthened so that farmers can get remunerative price for the pulses.

(Action: DACFW, GoI)

19 Construction of storage bins/small silos could be one post harvest technology (PHT) area for seasonal storage of food grain, so that if market price of agri. produce is lower farmers can store and can sell when prices are remunerative in the local market

(Action: All State Government)

20 Creating awareness and training for farmers on specific post harvest crop issues including protection of crop from terminal heat, climate resilient pulses variety, intercropping in sugarcane with pulses use of drip or sprinkler irrigation and accordingly, such activities can be planned and proposal can be submitted for implementation during current years by different SAUs involving CIPHET/ BARC/ CFTRI/ NIN.

(Action: DAC&KVKs/State Government)

21 Assistance for light weight, low cost graders/separators and suitable to small and marginal farmers need to be provided under NFSM. As due to lack of cleaned and graded produce, farmers do not get remunerative price of their produces.

(Action: All State Government)

22 Small *Dal* mills could be a primary processing unit and can be financed to farmers rather than to any company as part of PHT intervention.

(Action: All State Government)

23 More than 10 years old varieties of pulses seeds are being producing in seed-hubs, which have no utility and need to discourage.

(Action:DAC&FW/IIPR)

24 Consider more varieties in CFLDs programme for testing of varietal performance.

(Action:DAC&FW/ATARI)

25 A list of Geo-tagging of all the demonstrations (FLDs, CFLDs, Cluster Demo. & Seed Minikit Demo.) are to be made and a proper publicity should also be ensured with regard demonstrations.

(Action:ICAR-IIPR/ All State Government)

26 To work on turning seed-hubs into successful business centre. Minikit programme is to be integrated with seed-hub programme.

(Action: DAC& IIPR)

27 Focused efforts on cluster basis may be made to increasing the targeted area under TRFA and other programmes by adopting suitable varieties and other inputs recommended for the region /state.

(Action: All State Government)

28 All state should collect the package of practices for cultivation of pulses in Rice fallows areas from ICAR/ SAUs/ ICRISAT/ICARDA.

(Action: All State Government)

29 Quality seed may be made available for implementation of TRFA through MoUs with Central/ State Seed agency/ ICAR-Seed hubs.

(Action: All State Govt./ Central & State Seed agencies/ICAR-IIPR)

30 Need attention for provision of fencing at village entry level to tackle the problem of Blue bull / Stray animal during rabi/spring seasons.

(Action: All State Govt./DAC)

31 Need subsidy on Ridge Furrow Planter and other land configuration implements subsidy enhancement on mini *Dal* mill upto Rs.46000/- subsidy for grading/ pickings. Rs. 20000/- assistance linked with ICDP.

(Action: DAC&FW)

32 While allocating FLDs, targets only in terms of area (ha) may be allocated, not in terms of specific crops. Flexibility to KVKs must be given.

(Action: DAC&FW)

33 Efforts should be made to re-notify the popular variety i.e. summer mungbeanSML-668 so that it can be used in the project.

(Action: DAC&FW)

LIST OF PARTICIPANTS ***(Annexure-I)***

I. GOVERNMENT OF INDIA

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II. ICAR / SAUs / KVKs / CGIAR

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42.			
43.			

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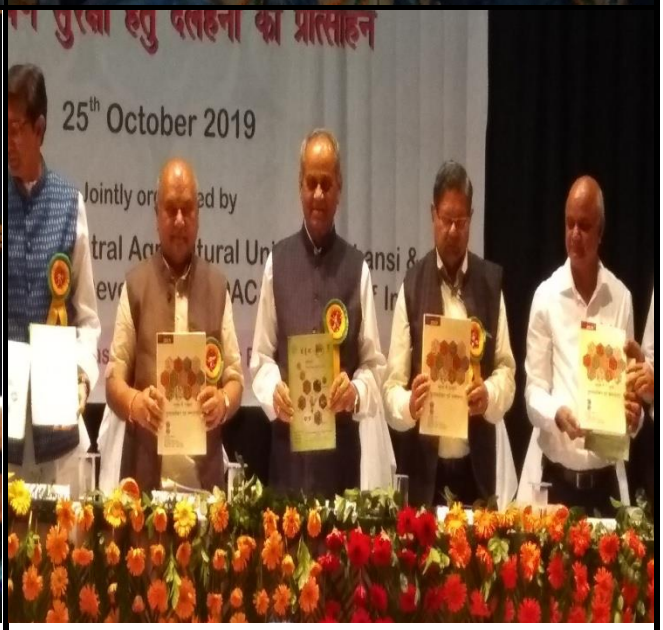
GLIMPSES
INAGURAL SESSION

Inaguaration by Hon'ble Union Minister of Agriculpigeonpeae & Farmers Welfare and Rural Develop. & Panchayati Raj

Addressing the Dias



Release of Pulses Book of Directorate of Pulses Development, GoI, Bhopal
Hkkjr esa nygu % iqujkoyksdu ,oa lEHkkouk,a & 2019

Adressed by Ho'ble Union Minister /Public representative of Jhansi MPs, MLAs and Vote of thanks by Director, DPD, Bhopal



Exhibition visited by Chief Guest and Dignitaries

LITERA PIGEONPEAE/BULLETINS DISTRIBUTED

दैनिक जागरण, झाँसी नगर संस्करण, 26 अक्टूबर, 2019

पादन की बजाय किसान की आय बढ़े : नरेन्द्र तोमर

ा में कृषि कॉलिज ालितपुर में शोध व स संस्थान खोला : अनुराग शर्मा

रानी लक्ष्मीबाई केन्द्रीय वविद्यालय के तत्वाधान दलहन व तिलहन को के लिए हुई राष्ट्रीय ा का शुभारम्भ केन्द्रीय सान कल्याण, ग्रामीण व पंचायतीराज मन्त्री ह तोमर ने किया। उन्होंने ज्ञानिक, किसानों व निधियों से मिलकर की आय दोगुनी करने के ी के आह्वान को पूरा आग्रह किया।

ण्ड स्थित सभागार में क्ष्मीबाई केन्द्रीय कृषि ालय व भारत सरकार शालय ऑफ पल्सेज पेण्ट के संयुक्त न में आयोजित राष्ट्रीय ा को सम्बोधित करते य कृषि मन्त्री ने कहा कि की आमदनी बढ़ाने के ादन की बजाय आय र विचार करना होगा। ो बड़े बाज़ारों में बेचने के रे देशों में निर्यात कराने योजना बनानी होगी। ा उत्पादन बढ़ाने के लिए ाज्यों के प्रतिनिधियों के मर्श से किसानों की ाने में मदद मिली है। धियों को भी कृषि शोध के परिणामों को किसानों ाना चाहिए। उन्होंने कहा सरकार के समय बगैर

बुन्देलखण्ड में दलहन बढ़ाने के लिए कृषि वैज्ञानिक व किसानों को मिलकर काम करने की ज़रूरत

झाँसी : कार्यशाला का शुभारम्भ करते केन्द्रीय कृषि मन्त्री, साथ में उपस्थित सांसद, विधायक व कुलपति।

काँटा लगाए फ़सलों की ख़रीद हो जाती थी और किसानों को पता नहीं चलता था, लेकिन अब उत्तर प्रदेश में भाजपा सरकार के समय किसानों की फ़सल खरीदी जा रही है। केन्द्रीय कृषि मन्त्री ने कहा कि मध्यप्रदेश व उत्तर प्रदेश के बुन्देलखण्ड के सभी ज़िलों ने दलहन बढ़ाने के लिए झाँसी में सीड हब बनाने का काम किया है।

कार्यशाला को सम्बोधित करते हुए सांसद अनुराग शर्मा ने कहा कि बुन्देलखण्ड में फ़सल का उत्पादन देश के दूसरे हिस्सों से 25 फीसदी कम है। पानी व मौसम आधारित कृषि व बुन्देलखण्ड की ज़मीन को देखते हुए प्रधानमन्त्री की किसानों की आय दोगुनी करने में कई दिक्कतें हैं। बुन्देलखण्ड में चना व मटर का सबसे अधिक उत्पादन होता है, और इसके लिए प्रसंस्करण व बाज़ार की उपलब्धता की समस्या का समाधान करना होगा। उन्होंने दतिया में कृषि कॉलिज तथा ललितपुर में शोध व विकास संस्थान खोलने की माँग भी की। विधायक रवि शर्मा ने कहा कि पहली बार बुन्देलखण्ड को समझने वाले केन्द्रीय कृषि मन्त्री देश को मिले हैं, जिससे इस क्षेत्र के किसानों को लाभ होगा। विधायक गरौठा जवाहर लाल राजपूत ने कहा कि केन्द्र सरकार ने मटर का समर्थन मूल्य घोषित नहीं किया, जिससे किसानों को उत्पादन का लाभ नहीं मिल पा रहा। भारतीय कृषि शिक्षा व अनुसन्धान विभाग के सचिव/महानिदेशक भारतीय कृषि अनुसन्धान परिषद डॉ. त्रिलोचन महापात्र ने कहा कि फ़सल उत्पादन बढ़ाने के लिए देश में 150 सीड हब बनाए गए हैं, जिसमें दलहन व तिलहन का सीड हब बुन्देलखण्ड में बनाया गया है। प्रदेश में 60 फीसदी चने का उत्पादन अकेले बुन्देलखण्ड में होता है। इस उत्पादन पर ध्यान देने की ज़रूरत है। कुलाधिपति डॉ. पंजाब सिंह ने कहा कि केन्द्रीय कृषि विश्वविद्यालय से यहाँ के किसानों को लाभ मिलेगा। भारतीय चरागाह व चारा अनुसन्धान केन्द्र के निदेशक डॉ. विजय यादव ने ग्रासलैण्ड के कार्यों की जानकारी दी। इसके पहले कुलपति प्रो. अरविन्द कुमार व अधिष्ठाता कृषि संकाय डॉ. एसके चतुर्वेदी ने अतिथियों का स्वागत किया।

'सतत उत्पादन प्रणाली, किसानों की आय दोगुनी तथा पोषण सुरक्षा के लिए दलहन' की राष्ट्रीय कार्यशाला सम्पन्न

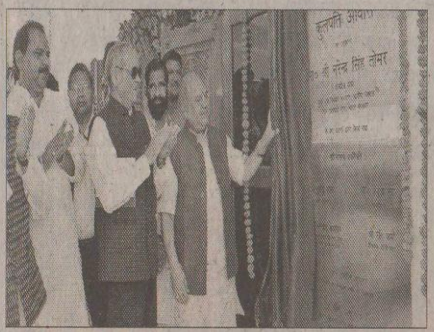
इस अवसर पर निदेशक दलहन विकास निदेशालय भोपाल डॉ. एके तिवारी, राजमाता विजयाराजे सिन्धिया कृषि विश्वविद्यालय के कुलपति डॉ. एसके राव, जबलपुर विश्वविद्यालय के पूर्व कुलपति डॉ. बीएस तोमर, बुन्देलखण्ड विश्वविद्यालय के कुलपति प्रो. जेवी वैशम्पायन, निदेशकर दलहन संस्थान (कानपुर) डॉ. एनके सिंह, निदेशक कृषि उत्तर प्रदेश डॉ. स्वराज सिंह के साथ विभिन्न राज्यों के कृषि शोध संस्थान के निदेशक उपस्थित रहे। इस दौरान केन्द्रीय कृषि मन्त्री ने किसानों को तिलहन व दलहन के बीजों का निःशुल्क वितरण किया। उद्यान विभाग के अधिष्ठाता डॉ. एके पाण्डेय ने पौधारोपण कराया। इस अवसर पर पूर्व मन्त्री रविन्द्र शुक्ला, अरिदमन सिंह, भाजपा के ज़िलाध्यक्ष जमुना कुशवाहा, निदेशक शिक्षा डॉ. अनिल कुमार, कुलसचिव डॉ. मुकेश श्रीवास्तव आदि उपस्थित रहे। डॉ. अर्तिका सिंह ने संचालन व डॉ. एआर शर्मा ने आभार व्यक्त किया। इसके पहले केन्द्रीय कृषि मन्त्री ने कुलपति व महिला छात्रावास का लोकार्पण किया। साथ ही केन्द्रीय कृषि विश्वविद्यालय के भवन के निर्माण का कार्य का निरीक्षण किया।

अमर उजाला, झांसी संस्करण, 26 अक्टूबर, 2019

दलहन के लिए अनुकूल है बुंदेलखंड की माटी: नरेंद्र सिंह

केंद्रीय कृषि मंत्री ने वैज्ञानिकों के कार्यों को सराहा, राष्ट्रीय कार्यशाला में बतौर मुख्य अतिथि थे मौजूद, कृषि विश्वविद्यालय में 17 राज्यों के विद्यार्थी अध्ययनरत

अमर उजाला ब्यूरो



केंद्रीय कृषि विश्वविद्यालय परिसर में कुलपति आवास का उद्घाटन करते केंद्रीय मंत्री नरेंद्र सिंह तोमर साथ में कुलपति प्रोफेसर अरविंद कुमार।

झांसी। केंद्रीय कृषि एवं किसान कल्याण मंत्री नरेंद्र सिंह तोमर ने कहा कि बुंदेलखंड की माटी दलहन के लिए अनुकूल है। जिस बुंदेलखंड को अभी तक पिछड़ा एवं कम पानी वाला क्षेत्र बताया जाता था, वहीं बुंदेलखंड क्षेत्र दलहन उत्पादन में क्रांति लाकर पूरे देश में जाना जाएगा। शुक्रवार को यह बात उन्होंने रानी लक्ष्मीबाई केंद्रीय कृषि विश्वविद्यालय परिसर में रानी लक्ष्मीबाई केंद्रीय कृषि विश्वविद्यालय एवं दलहन विकास निदेशालय भारत सरकार के संयुक्त तत्वावधान में आयोजित राष्ट्रीय कार्यशाला में कही।

कार्यशाला का उद्देश्य किसानों की आय दोगुनी तथा पोषण सुरक्षा के लिए दलहन एवं तिलहन के उत्पादकता कैसे बढ़ाएं? था। कार्यक्रम में बतौर मुख्य अतिथि उन्होंने कहा कि बुंदेलखंड की संपूर्ण खेती उपजाऊ और खाद्यान्न क्षेत्र में बढ़ोतरी हो सके, इसके लिए कृषि वैज्ञानिकों को अहम भूमिका निभानी होगी। उन्होंने कहा कि डॉ. स्वामीनाथन रिपोर्ट में न्यूनतम समर्थन मूल्य बढ़ाने की बात कही गई है।

उन्होंने कृषि विश्वविद्यालय के वैज्ञानिकों द्वारा चना पर आधारित तकनीकी बुलेटिन तथा कृषि जीवन के द्वितीय संस्करण का विमोचन किया।

इस मौके पर कृषि शिक्षा एवं अनुसंधान विभाग के महानिदेशक डॉ. त्रिलोचन महापात्रा ने कहा कि यह विश्वविद्यालय कृषि क्षेत्र में अपना योगदान दे रहा है और देता रहेगा। कुलाधिपति डॉ. पंजाब सिंह ने कहा कि यह विश्वविद्यालय अद्वितीय साबित होगा। कुलपति प्रोफेसर अरविंद कुमार ने कहा कि बुंदेलखंड में दलहन व तिलहन का उत्पादन बढ़ाने के लिए विश्वविद्यालय लगातार काम कर रहा है। विश्वविद्यालय में राष्ट्रीय स्तर की परीक्षा पास करने वाले छात्र- छात्राएं अध्ययन कर रहे हैं। वर्तमान में देश के राज्यों के विद्यार्थियों ने प्रवेश लिया है। सदर विधायक रवि शर्मा ने कहा कि यह कार्यशाला किसानों के लिए वरदान साबित होगी। दलहन क्षेत्र में निश्चित ही किसान आगे बढ़ेंगे। विधायक जवाहर लाल राजपूत ने कहा कि मटर का समर्थन मूल्य किसानों को मिलना चाहिए। प्रारंभ में स्वागत भाषण अधिष्ठाता डॉ. एसके चतुर्वेदी ने प्रस्तुत किया।

दलहन विकास निदेशालय भोपाल के निदेशक डॉ. एके तिवारी, राजमाता विजयाराजे सिंधिया के कुलपति डॉ. एसके राव, जबलपुर विश्वविद्यालय के पूर्व कुलपति डॉ. बीएस तोमर, डॉ. जेवी वैशंपायन, दलहन संस्थान कानपुर के निदेशक डॉ. एनके सिंह, डॉ. विजय यादव, डॉ. स्वराज सिंह मौजूद रहे। संचालन डॉ. अर्तिका सिंह, आभार डॉ. एके तिवारी व डॉ. एआर शर्मा ने व्यक्त किया।

महिला छात्रावास का किया उद्घाटन

केंद्रीय कृषि मंत्री नरेंद्र सिंह तोमर ने विश्वविद्यालय परिसर में नवनिर्मित महिला मनु छात्रावास और कुलपति आवास का उद्घाटन किया। छात्रावास में 180 छात्राओं के रुकने ही व्यवस्था की गई है। साथ ही नवनिर्मित ऐकेडमिक बिल्डिंग का अवलोकन किया।

किसानों ने देखी प्रदर्शनी

कार्यक्रम स्थल पर किसानों ने रानी लक्ष्मीबाई केंद्रीय विश्वविद्यालय, पशुपालन विभाग, कृषि विज्ञान केंद्र, भरारी, तारागाम, कृषि वानिकी अनुसंधान, वसुधा अमृत बुंदेलखंड नेचुरल उत्पादन, दलहन विकास निदेशालय, भोपाल एवं बुंदेलखंड चैंबर आफ कॉमर्स द्वारा लगाई गई प्रदर्शनी को देखा।

कृषि एवं ग्रामीण विकास का लोकप्रिय साप्ताहिक

कृषक दुनिया

संस्थापित 7 मई 1975

प्रेरणा स्रोतः स्व. डॉ. विजय रामचन्द्र श्रीवास्तव संस्थापकः स्व. श्री रामचन्द्र श्रीवास्तव

आर.एन.आई. नं. 28361/75, पी.आर. नं. MP/BPL/2018-20 मध्यप्रदेश और छत्तीसगढ़ से प्रकाशित

वर्ष-45 ◆ अंक-30 ◆ प्रति सोमवार भोपाल से प्रकाशित ◆ 4 नवम्बर से 10 नवम्बर 2019 ◆ मूल्य 2.50

खरीफ-2019 में पंजीयन अब 6 नवम्बर तक

भोपाल, मंगलवार, 29 अक्टूबर 2019। राज्य शासन द्वारा खरीफ-2019 में ई-उपार्जन पोर्टल पर पंजीयन की अंतिम तारीख 30 अक्टूबर को बढ़ाकर अब 6 नवम्बर कर दिया गया है। मक्का, सोयाबीन, मूँग, उड़द, अरहर, मूँगफली, कपास, तिल और रामतिल उत्पादक किसानों की सुविधा को ध्यान में रखकर यह निर्णय लिया गया है। किसान कल्याण एवं कृषि विकास विभाग द्वारा इस संबंध में समस्त जिला कलेक्टर्स को भी दिशा-निर्देश जारी किये गये हैं।

केन्द्र सरकार की प्राथमिकताओं में किसान और कृषि हैंः कृषि मंत्री

झाँसी। प्रधानमंत्री नरेन्द्र मोदी के नेतृत्व वाली केन्द्र सरकार की प्राथमिकताओं में किसान और कृषि हैं। केन्द्रीय किसान कल्याण तथा कृषि मंत्री नरेन्द्र सिंह तोमर ने शुक्रवार, 25 अक्टूबर 2019 को रानी लक्ष्मीबाई केन्द्रीय कृषि विश्वविद्यालय, झांसी (उत्तर प्रदेश) में दलहन पर आयोजित एक दिवसीय राष्ट्रीय कार्यशाला के दौरान मुख्य अतिथि की आसंदी से यह विचार व्यक्त किए। कार्यशाला का आयोजन दलहन विकास निदेशालय, कृषि सहकारिता एवं किसान कल्याण विभाग, भारत सरकार, भोपाल (म.प्र.) तथा रानी लक्ष्मी बाई केंद्रीय कृषि विश्वविद्यालय झाँसी (उ.प्र.) द्वारा संयुक्त रूप से किया गया था।

इस अवसर पर डॉ. त्रिलोचन महापात्र, महानिदेशक (भा.कृ.अनु.प.) एवं सचिव (कृषि अनुसंधान एवं शिक्षा विभाग); रानी लक्ष्मी बाई केंद्रीय कृषि विश्वविद्यालय झाँसी (उ.प्र.) के कुलाधिपति, नेशनल एकेडमी ऑफ एग्रीकल्चर साईंसेस के अध्यक्ष व वाराणसी हिन्दू विश्वविद्यालय के पूर्व कुलपति डॉ. पंजाब सिंह, दलहन विकास निदेशालय के निदेशक डॉ. ए.के. तिवारी और रानी लक्ष्मी बाई केंद्रीय कृषि विश्वविद्यालय झाँसी (उ.प्र.) के कुलपति प्रो. अरविंद कुमार भी उपस्थित थे।

''सतत उत्पादन प्रणाली, किसानों की आय दोगुनी करने एवं पोषण सुरक्षा हेतु दलहनों का प्रोत्साहन'' विषय पर आयोजित इस एक दिवसीय कार्यशाला में कृषि मंत्री श्री तोमर ने कहा कि दलहन के क्षेत्र में हमारे किसानों और वैज्ञानिकों ने बेहतर काम किया है और आज हम इस क्षेत्र में बेहतर स्थिति में हैं लेकिन यह स्थिति बनी रहे इसके लिए लगातार कार्य करते रहना जरूरी है।

उन्होंने कहा कि किसानों की आय कैसे दोगुनी हो इस पर केन्द्र सरकार पूरी गंभीरता से काम कर रही है। प्रधानमंत्री नरेन्द्र मोदी ने प्रधानमंत्री फसल बीमा योजना को लागू किया जो किसानों के लिए लाभकारी सिद्ध हो रही है। इस योजना की खामियों को भी दूर कर दिया गया है। श्री तोमर ने कहा कि किसानों की आर्थिक स्थिति को सुदृढ़ करने के लिए केन्द्र की मोदी सरकार ने किसानों को प्रतिवर्ष 6,000 देने की योजना की प्रधानमंत्री किसान मानधन योजना प्रारम्भ की है।

कार्यशाला में देशभर से डेढ़ सौ से अधिक कृषि वैज्ञानिकों और शोधार्थियों ने भाग लिया। इस अवसर पर अतिथियों द्वारा चने के रोग और उसके निदान तथा चना उत्पादन संबंधी पुस्तकों का भी विमोचन किया। श्री तोमर ने रानी लक्ष्मी बाई केंद्रीय कृषि विश्वविद्यालय झाँसी (उ.प्र.) में महिला छात्रावास का भी उद्घाटन किया।

Krishak Duniya 4th to 10th Nov., 2019

किसानों की आय बढ़ाने में दलहनी फसलों की महत्वपूर्ण भूमिका

झांसी। देश में वर्ष 2017–18 में रिकार्ड दलहन उत्पादन हुआ। विदेशी मुद्रा की बचत हुई है चालू वर्ष में जलाशयों में जल स्तर अच्छी स्थिति में होने से रबी में अच्छे उत्पादन की आशा है। धान पड़त क्षेत्र और धान मेंड़ पर अरहर की बुवाई से दलहन का रकबा बढ़ाया जा सकता है। दलहनी फसलों के विपुल उत्पादन से किसानों की आय में वृद्धि होगी। इन्ही साकारत्मक बिंदुओं पर केंद्रित रही दलहन विकास निदेशालय द्वारा झांसी में 25 अक्टूबर को आयोजित राष्ट्रीय कार्यशाला। इसकी विशेष रिपोर्ट डॉ. ए.के. तिवारी निदेशक, दलहन विकास निदेशालय ने कृषक जगत के पाठकों के लिए प्रस्तुत की है।

कार्यशाला का शुभारंभ केंद्रीय कृषि एवं किसान कल्याण, ग्रामीण विकास एवं पंचायती राज मंत्री श्री नरेंद्र सिंह तोमर द्वारा किया गया। कृषि मंत्री द्वारा राजभाषा में दलहन विकास निदेशालय, द्वारा संकलित पुस्तक ''भारत में दलहन : पुनरावलोकन एवं संभावनाएं'' का विमोचन किया गया।

कार्यशाला में देश के प्रमुख दलहन उत्पादक राज्यों यथा उ.प्र., म.प्र., राजस्थान, महाराष्ट्र, गुजरात, आंध्रप्रदेश, पश्चिम बंगाल, तेलंगाना, तमिलनाडु, बिहार, छत्तीसगढ़, कर्नाटका, झारखंड, उड़ीसा ने भागीदारी की। कार्यशाला में कृषि, सहकारिता एवं किसान कल्याण विभाग, फसल अनुभाग के फसल विकास निदेशालयों इक्रीसेट, इकार्डा भारतीय दलहन अनुसंधान संस्थान के निदेशक, भा.कृ.अनु.प., अटारी सीड एजेंसियों आदि के प्रतिनिधियों, म.प्र. एवं उत्तरप्रदेश के बुंदेलखंड संभाग के सभी 14 जिलों के कृषि विभाग के प्रतिनिधियों एवं कृषि विज्ञान केंद्रों के वैज्ञानिक उपस्थित रहें। साथ ही निजी क्षेत्र की कृषि कंपनियों के प्रतिनिधियों समेत 300 प्रतिभागियों ने भाग लिया।

केंद्रीय कृषि मंत्री श्री नरेंद्र सिंह तोमर ने उद्घाटन समारोह में कहा कि अब किसानों की आय को दोगुना करने हेतु विभिन्न कदम उठाये जा रहे है। इसके लिये कम समय तैयार होने वाली फसल, कम बजट/जीरो बजट खेती अपनाने की आवश्यकता है। बुंदेलखंड के सभी 14 जिलें म.प्र. और उ.प्र. के दलहन क्षेत्र के लिए अनुकूल है तथा इनका देश/प्रदेश में दलहन उत्पादन में प्रमुख योगदान है। जबकि यह वर्षा आधारित क्षेत्र है। आम किसानों की पंहुच कृषि विश्वविद्यालयों, कृषि विज्ञान केंद्रों, राज्य जिला कृषि विभागों तक आवश्यक है ताकि दलहन, तिलहन उन्नत उत्पादन तकनीक का उपयोग कर किसान निहित क्षमता का उपयोग करते हुए दलहन/तिलहन उत्पादन बढ़ा सकें एवं बुंदेलखंड देश एवं विश्व में अपनी पहचान बना सके।

डॉ. महापात्रा

भा. कृ. अनु. परिषद के महा निदेशक डॉ. त्रिलोचन महापात्रा ने बताया कि फसल उत्पादन बढ़ाने के लिए अच्छे बीजों की सुगम उपलब्धता हेतु देश में दलहन के 150 सीड हब स्थापित किए गए हैं।

कार्यशाला में डॉ. पंजाब सिंह, पूर्व कुलपति, रानी लक्ष्मीबाई केंद्रीय कृषि विश्वविद्यालय, झांसी डॉ. एस.के. राव, कुलपति, राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय, ग्वालियर, डॉ. वी.एस. तोमर, पूर्व कुलपति जवाहर लाल नेहरू कृषि विश्वविद्यालय, जबलपुर एवं राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय, ग्वालियर, प्रो.जे.वी. वैशम्पायन, कुलपति, बुंदेलखण्ड विश्वविद्यालय, डॉ. (श्रीमती) ओम गुप्ता, निदेशक, कृषि विस्तार सेवायें, जवाहर लाल नेहरू कृषि विश्वविद्यालय, जबलपुर आदि ने दलहन उत्पादन एवं उत्पादकता द्वारा किसानों की आय दोगुनी करने हेतु विचार रखें।

प्रथम सत्र में डॉ. ए. के. तिवारी, निदेशक, दलहन विकास निदेशालय, भारत सरकार, भोपाल द्वारा राष्ट्रीय एवं अन्तर्राष्ट्रीय दलहन परिदृष्य, वर्तमान दलहन विकास कार्यक्रमों का क्रियान्वयन एवं भविष्य की रूपरेखा पर चर्चा की गयी। डॉ. तिवारी ने बताया कि वर्ष 2017–18 में देश में रिकार्ड दलहन उत्पादन 25.42 मिलियन टन रहा जिससे देश में 03 मिलियन टन दलहन आयात कम हुआ तथा विदेशी मुद्रा रू.9774.61 करोड़ की बचत की जा सकी। वर्तमान वर्ष में रबी मौसम में अच्छे उत्पादन की संभावना व्यक्त की है क्योंकि प्रमुख जलाशयों में जल स्तर अच्छी स्थिति में है।

डॉ. एन. पी. सिंह

डॉ. एन. पी. सिंह, निदेशक, भा.द.अनु.सं., कानपुर द्वारा दलहन की उच्च उत्पादन वाली किस्मों और सीड हब व अतिरिक्त प्रजनक बीज उत्पादन कार्यक्रम की प्रगति पर चर्चा की। उन्होनें उत्तर भारत के राज्यों में गेहूँ की जगह मटर/चना को बढ़ावा देने की बात कही क्योंकि इन क्षेत्रों में गेहूँ की उपज कम है। डॉ. ए. आर. शर्मा, निदेशक अनुसंधान सेवायें, रानी लक्ष्मीबाई केन्द्रीय कृषि विश्वविद्यालय, झांसी द्वारा आभार व्यक्त किया गया।

कार्यशाला की अनुशंसाएं

1. अंतवर्ती धान पड़त क्षेत्र व धान की मेड पर अरहर की बुवाई द्वारा दलहन का क्षेत्र विस्तार।

2. प्रदर्शन प्रक्षेत्र की उपज व किसान के खेत की उपज के अंतर को कम करना।

3. प्रमुख दलहन उत्पादक राज्यों द्वारा अपनायी जाने वाली उन्नत तकनीकों को स्थायी दालों के उत्पादन हेतु बहुमूल्य जानकारी को अपने-अपने राज्यों में लागू करने की अनुशंसा की।

4. उपलब्ध तकनीकी ज्ञान को किसानों तक पहुचाने हेतु अत्याधित प्रचार-प्रसार की आवश्यकता है।

5. स्थानीय आधार पर मूल्य संवर्धन उद्यमों की स्थापना कर रोजगार सृजित करना।

6. प्रक्षेत्र/प्रखण्डस्तर पर प्राथमिक प्रसंसस्करण/यंत्रिकरण/पी.एच.एम. सुविधाओं की स्थापना।

7. सीड हब केन्द्र, राज्य एवं एन.एस.सी./एस.एस.सी. के बीच समझौता ज्ञापन (एम.ओ.यू.), केन्द्रो के सतत् विकास एवं किसानों को गुणवत्तायुक्त बीज उपलब्धता हेतु अनुशंसित है।

8. बुंदेलखण्ड क्षेत्र को दलहन व तिलहन हब के रूप में विकसित किया जाना चाहिए क्योंकि इन फसलों के लिए बेहतर संभावना है।

9. बुंदेलखण्ड क्षेत्र की प्रमुख समस्या आवारा पशु, न्यूनतम सिंचाई सुविधायें एवं आधारभूत संरचना का अभाव, शासन स्तर पर समाधान आवश्यक है।

Krishak Jagat, Bhopal 25th Nov., 2019

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