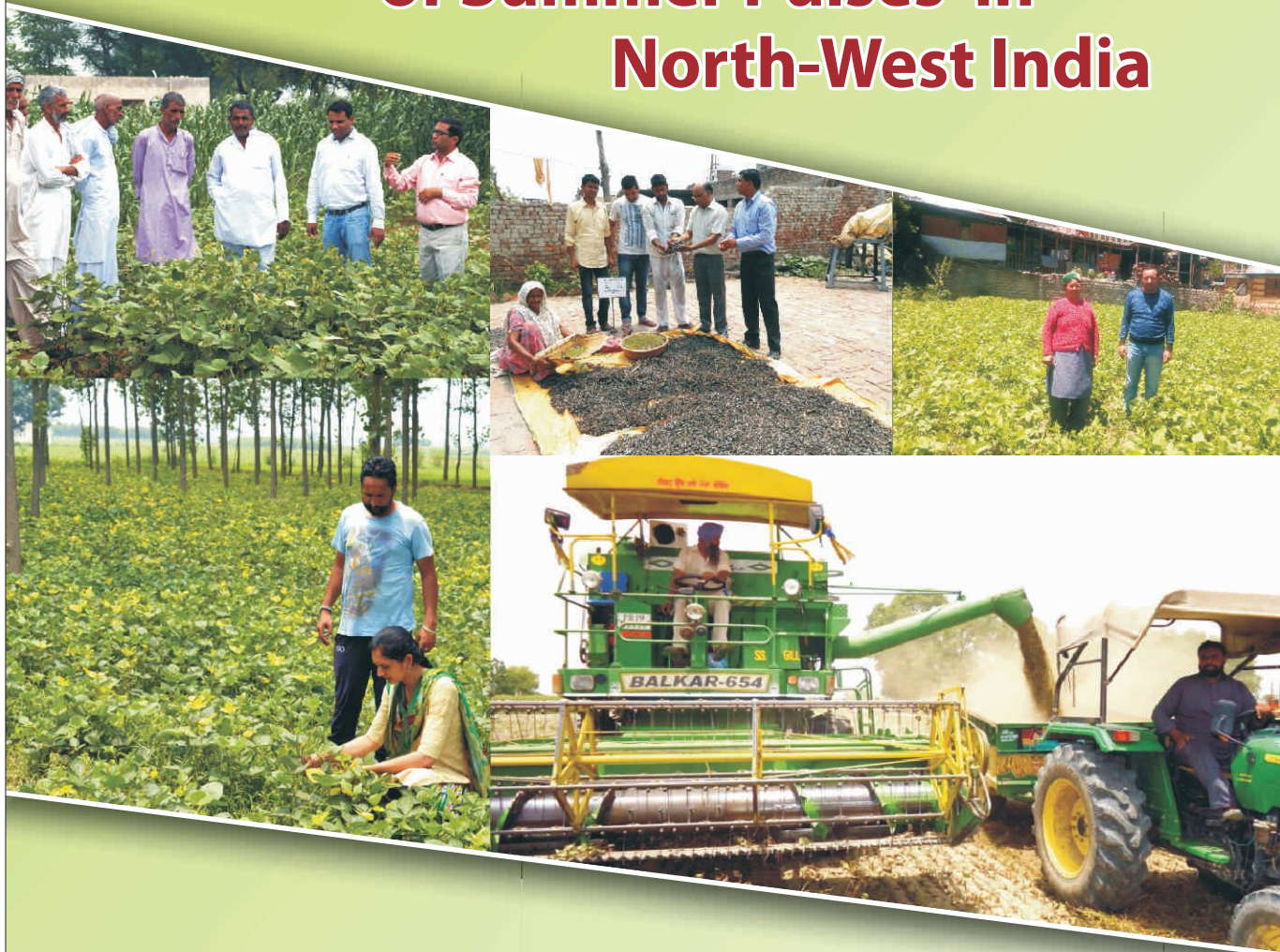


# Demonstrating Yield Potential of Summer Pulses in North-West India



Sponsored by  
**National Food Security Mission (NFSM)**  
**Department of Agriculture Cooperation &  
Farmers Welfare (DAC&FW)**



**ICAR- Agricultural Technology Application Research Institute,  
Zone-1, PAU Campus, Ludhiana - 141004, Punjab**



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## Preface



Summer pulses play an important role in the sustainability of agriculture in northern India. Green gram, particularly in northern India, occupies considerable area during summer season because of irrigation potential. Researches on development of early maturing varieties and Yellow Mosaic Disease resistance have furthered the area under cultivation of summer mung bean. Its particular significance for diversifying existing rice-wheat system has proven crucial for the future of agriculture in North West India. Nontraditional niches have been steadily developing in the region.

Looking at the diminishing quality of soil and crop diversification and increased imports of pulses, “Cluster Frontline Demonstrations on Pulses” project under National Food Security Mission (NFSM) of Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW) has given an opportunity to revive the status of pulses in the region. Krishi Vigyan Kendras (KVKs) of Punjab, Haryana and Himachal Pradesh have been in the forefront in popularizing cultivation of pulses with improved package of practices and latest technologies for realizing better yield and profit.

I would like to extend my sincere thanks to Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW) for funding the project. I thank Dr. T. Mohapatra, Secretary, DARE and DG, ICAR for his dynamic leadership and worthy guidance to the institute in performing its duties. I am grateful to Dr. A. K. Singh, DDG (Extension), ICAR and Dr. V. P. Chahal, ADG (Extension),

ICAR for their encouragement and diligent support in implementing the project. I would also like to thank the Programme Coordinators of KVKs and farmers for successful implementation of the project. I also appreciate all the Vice-chancellors and Directors of Extension Education from the State Agricultural Universities and Institutes of Zone-I for their valuable support and cooperation.

I congratulate the project team at ICAR-ATARI, Ludhiana and other colleagues of the institute who enthusiastically participated and successfully implemented the project.

Rajbir Singh

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## Acronyms

ATARI	Agricultural Technology Application Research Institute
BBF	Broad Bed and Furrows
CCSHAU	Chaudhary Charan Singh Haryana Agricultural University
CSKHPKV	Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishvavidyalaya
DAC&FW	Department of Agriculture, Cooperation & Farmers Welfare
DAP	Di ammonium Phosphate
DWD	Directorate of Wheat Development
FAO	Food and Agriculture Organization
FLD	Frontline Demonstration
GADVASU	Guru Angad Dev Veterinary and Animal Sciences University
ICAR	Indian Council of Agricultural Research
IIPR	Indian Institute of Pulses Research
IPM	Integrated Pest management
KVK	Krishi Vigyan Kendra
MSP	Minimum Support Price
NFSM	National Food Security Mission
NGO	Non-governmental Organization
NPDP	National Pulses Development Project
NWPZ	North Western Plain Zone
PAU	Punjab Agricultural University
PC	Programme Coordinator
PSB	Phosphorus Solubilizing Bacteria
SKUAST	Sher-e-Kashmir University of Agricultural Sciences and Technology
SRF	Senior Research Fellow
WHO	World Health Organization
YSPUH&F	Dr. Yashwant Singh Parmar University of Horticulture and Forestry



## कार्यकारी सारांश

नवीनतम उत्पादन प्रौद्योगिकी का प्रदर्शन कर दालों की उत्पादकता में सुधार लाने के उद्देश्य से राष्ट्रीय खाद्य सुरक्षा मिशन के तहत कृषि, सहकारिता एवं किसान कल्याण विभाग द्वारा “Cluster Frontline Demonstrations on Rabi Pulses 2015&16” नामक परियोजना शुरू की गयी। यह परियोजना वर्ष 2016 -17 में “Cluster Frontline Demonstrations on Pulses 2016 -17” शीर्षक के साथ जारी रही। परियोजना के तहत, कृषि विज्ञान केंद्रों को समूहों में अग्रिमपंक्ति प्रदर्शन करने के लिए रु. 3000 प्रति एकड़ की राशी प्रदान की गयी। कृषि विज्ञान केंद्रोंने दालों की खेती को लोकप्रिय बनाने और किसानों को नई सुधारित प्रौद्योगिकियों की प्रभावशीलता के बारे में बताने के लिए दलहन उत्पादन की विविध तकनीकों का प्रदर्शन किया। जिसमें, बेहतर किस्मे, बीज उपचार, सीधे पंक्ति में बुवाई, अंतरफसल प्रणाली, एकीकृत कीट प्रबंधन इत्यादि शामिल थी। प्रदर्शन के साथ-साथ, कृषि विज्ञान केंद्रोंने विभिन्न विस्तार गतिविधियों जैसे कि किसानों-वैज्ञानिकों के बीच बातचीत, प्रक्षेत्र दिवस, किसान गोष्ठी, विधि प्रदर्शन, प्रशिक्षण आदि का भी आयोजन किया। इन प्रदर्शनों की निगरानी गेहूँ विकास निदेशालय, गाजियाबाद, विस्तार शिक्षा निदेशालय, पंजाब कृषि विश्वविद्यालय, लुधियाना एवं कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, लुधियाना से सदस्यों द्वारा की गयी।

साल 2015-16 के ग्रीष्म ऋतु के दौरान, हरियाणा, पंजाब और हिमाचल प्रदेश के 30 कृषि विज्ञान केंद्रों द्वारा 818.15 हेक्टेयर क्षेत्र में कुल 2027 प्रदर्शन आयोजित किए गए। नतीजतन, इन प्रदर्शनों में स्थानीय पद्धति की तुलना में पंजाब, हरियाणा और हिमाचल प्रदेश राज्यों में क्रमशः 21.64, 26.50 तथा 64.69 प्रतिशत अधिक उपज दर्ज की गई। पंजाब में मुंग की SML-668 किस्म 443.35 हेक्टेयर के क्षेत्र में 1082 स्थानों पर प्रदर्शित की गई थी, जिसमें स्थानीय पद्धति की तुलना में 21.64 प्रतिशत अधिक औसत उपज दर्ज की है। इसी तरह, हरियाणा में मुंग की SML-668 और MH-421 किस्में 354.80 हेक्टेयर क्षेत्र में प्रदर्शित की गयी, जिसमें स्थानीय पद्धति की तुलना में 26.50 प्रतिशत अधिक औसत उपज दर्ज हुई। हिमाचल प्रदेश में मुंग की SML-668 किस्म की प्रदर्शनियों में स्थानीय पद्धति के मुकाबले 64.69 फीसदी अधिक उपज दर्ज की गयी।

वर्ष 2016-17 के दौरान ग्रीष्मकालीन दालों की खेती पर कुल 1805 प्रदर्शन 751.55 हेक्टेयर क्षेत्र में आयोजित किए गए। पंजाब राज्य में 18 कृषि विज्ञान केंद्रों द्वारा कुल 443.6 हेक्टेयर क्षेत्र में मुंग तथा उरड़ की जुताई पर प्रदर्शन लगाये गए, जिनमें स्थानीय पद्धति की तुलना में क्रमशः 23.87 प्रतिशत और 18.18 प्रतिशत अधिक उपज दर्ज हुई। इसी तरह, हरियाणा के 13 कृषि विज्ञान केंद्रों ने 310 हेक्टेयर क्षेत्र में SML-668 और

MH-421 किस्मों पर 710 प्रदर्शन किए जिसमें 30.9 प्रतिशत अधिक उपज दर्ज की गई। हिमाचल प्रदेश में उना जिले में मुंग उत्पादन पर 10 हेक्टेयर क्षेत्र में 50 प्रदर्शन आयोजित किए जहाँ 10.3 प्रतिशत अधिक उपज दर्ज हुई। इसी तरह, किन्नौर में 4.45 हेक्टेयर क्षेत्र में राजमा पर 25 प्रदर्शनों का आयोजन हुआ जिसमें स्थानीय पद्धति की तुलना में 68.3 प्रतिशत उच्च उपज देखी गई। कृषि विज्ञान केंद्र, जम्मू द्वारा आयोजित मुंग की प्रदर्शनियों में 3.5 हेक्टेयर क्षेत्र में 26.5 प्रतिशत अधिक उपज दर्ज की गई।

## Executive Summary

The project “Cluster Frontline Demonstrations on Rabi Pulses 2015-16” was started by the Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW) under National Food Security Mission (NFSM) with an aim of improving the productivity of pulses by demonstrating latest production technologies through frontline demonstrations (FLDs) in the farmer's field. The project continued in 2016-17 with title “Cluster Frontline Demonstrations on Pulses 2016-17”. Under the project, Rs. 3000/acre was provided to the Krishi Vigyan Kendras for conducting FLDs in clusters. KVKs demonstrate all the recommended latest technologies like improved varieties, seed treatment, line sowing, different intercropping systems, integrated pest management (IPM) etc. in the farmers' fields to popularize pulses cultivation and to convince farmers about the effectiveness of new improved technologies. KVKs, along with demonstrations, also organize different extension activities like farmers-scientists interactions, field days, method demonstrations on improved scientific practices, kisan goshtis, trainings etc. Monitoring visits were organized by the teams of members from Directorate of Wheat Development, Ghaziabad; ICAR-ATARI, Ludhiana; and, DEE offices of SAUs.

During summer 2015-16, total 2027 demonstrations were conducted on 818.15 ha area by 30 Krishi Vigyan Kendras of Haryana, Punjab and Himachal Pradesh. As a result, 21.64 per cent, 26.50 per cent and 64.69 per cent higher yields were recorded in demonstrations in the states of Punjab, Haryana and Himachal Pradesh respectively as compared to the local checks. In Punjab, cultivation of summer green gram variety SML-668 was demonstrated by the 17 KVKs on an area of 443.35 ha through 1082 FLDs, which have recorded 21.64 per cent higher average yield over that of the local check. Similarly, in Haryana, total 823 FLDs on cultivation of summer

green gram varieties SML-668 and MH-421 were conducted by 11 KVKs of Haryana on an area of 354.80 ha. As a result, 26.50 per cent higher demonstration yield was recorded over that of the local check. Likewise, in Himachal Pradesh, cultivation of SML-668 variety of summer moong was demonstrated at farmers' field; which recorded 64.69 per cent higher yield over that of the local check.

Total 1805 demonstrations on cultivation of summer pulses were conducted on an area of 751.55 ha during 2016-17. In the state of Punjab, total 443.6 ha area was covered under demonstrations on green gram and black gram by 18 KVKs. These demonstrations on cultivation of green gram and black gram recorded 23.87 percent and 18.18 percent higher yields over that of the local checks respectively. Similarly; 13 KVKs of Haryana conducted 710 demonstrations on SML-668 and MH-421 varieties of green gram on an area of 310 ha. When compared to the yield of local check, demonstrations recorded 30.9 per cent average higher yield. Likewise, KVK, Una in Himachal Pradesh conducted 50 demonstrations on 10 ha area on green gram while KVK, Kinnaur conducted 25FLDs on rajmash on 4.45 ha area; which have observed 10.3 per cent and 68.3 per cent higher yields as compared to the local checks. Further; KVK, Jammu covered 3.5 ha area under demonstrations on summer green gram, which recorded 26.5 per cent higher yield.

## Introduction

Summer pulses are very important for improving soil health, providing additional income to farmers and crop diversification in northern states of India. Bringing considerable area under pulses cultivation during summer season has been possible because of increased irrigation facilities, remunerative pricing policy and availability of short duration varieties. Growing crops like summer green gram can certainly lead to increase in house-hold income of farmers and help in combating malnutrition and sustaining agricultural production.

Krishi Vigyan Kendras (KVKs) of the states of Zone-I under Agricultural Technology Application Research Institute (ICAR-ATARI), Ludhiana have been conducting frontline demonstrations (FLDs) on cultivation of summer pulses under the project “Cluster Frontline Demonstrations on Pulses” funded under National Food Security Mission (NFSM) of Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW). The aim of the project is to meet the domestic demand of pulses as well as to improve the productivity and profitability at the farmers' fields by demonstrating latest improved production technologies. Moreover, various extension activities like method demonstrations, farmers-scientists inter-face, *kisan goshti*, trainings, field day etc. are also conducted ensuring participation from the farmers and local extension personnel.

Generally, all the recommended cultivation practices are demonstrated in the field; whereas, few technologies are specifically emphasized which are as follows:

### **Seed treatment with Bio-fertilizers**

Farmers mostly rely on chemical fertilizers to meet the plant nutrient demands. Bio-fertilizers are the formulations containing microorganisms (i.e. bacteria and fungi), when applied on the surface of the seeds help to increase the availability of nutrients in the soil and also improve the quality and health of the soil. Bio-fertilizers enrich the soil with nutrients mainly by the processes of

biological nitrogen fixation (BNF), phosphate and potassium solubilization or mineralization, production of plant growth regulating substances and release of antibiotics in the soil. In summer green gram, one packet of [ $@500\text{g/ha}$ ] of *Rhizobium* is used for seed treatment. In Punjab dual inoculations of *Rhizobium* and *Rhizobacterium* is demonstrated to reap higher yield of summer green gram.



**Seed treatment with biofertilizer in summer green gram**

### **Line sowing**

Broadcasting of summer green gram is a common method of sowing. Over the broadcasting method, higher yield of summer moong can be obtained from line sowing method. In line sowing method, seeds are placed at proper & uniform depths which make the intercultural operations easy by maintaining uniform row to row spacing. In Punjab and Haryana, line sowing method was demonstrated to raise the crop due to availability of good machinery.



**Line sowing of summer moong in Jind and Muktsar Sahib**



### **Intercropping of summer green gram with sugarcane**

Intercropping provides an additional income to the farmers as well as sustains the farming system. The intercropping of summer moong enriches the soil with nitrogen by the process of biological nitrogen fixation (BNF). Thus, intercropping with pulses helps to reduce the extra burden of nitrogen supply to the succeeding crop.



**Intercropping of summer moong with sugarcane in Hoshiarpur**

### **Agro-forestry based system**

For encouraging diversification, field crops can also be grown in agro-forestry based system. This type of intercropping system not only provides additional income through intensification but also provides risk cover to the farmers with regular income. Over other cropping systems, agro-forestry based system provides not only economical viability but also provides ecological balance.



**Summer green gram in Poplar based agro-forestry system in Mohali**

## Summer 2015-16

During summer 2015-16, total 2027 demonstrations were conducted on 818.15 ha area by 30 Krishi Vigyan Kendras of Haryana, Punjab and Himachal Pradesh. Rs. 3000 per acre were provided to the respective KVKs through their host institutes while conducting demonstrations for providing seeds and other basic inputs.

Technologies like improved varieties, seed treatment, microbial inoculation, line sowing, different intercropping systems, integrated pest management (IPM) etc. were effectively demonstrated in the farmer's field. Resultantly, as compared to the local check, 21.64 per cent, 26.50 per cent and 64.69 per cent higher yields were recorded in demonstrations in the states of Punjab, Haryana and Himachal Pradesh respectively.

### PUNJAB

In the state of Punjab, cultivation of summer green gram variety SML-668 was demonstrated by the 17 KVKs on an area of 443.35 ha through 1082 FLDs, which have recorded 21.64 per cent higher average yield over that of the local check. Major technologies demonstrated at the farmer's field apart from improved variety were seed treatment with Chloropyriphos and Bavistin, and microbial inoculants and weed management.



**KVK scientist's visit to FLDs on Summer Green Gram**



### **PB-I (Sub-mountain undulating zone)**

Cultivation of summer green gram with improved technologies was demonstrated in Garhshankar, Mahilpur, Hoshiarpur-I, Hoshiarpur-II, Bhunga and Mukerian blocks of Hoshiarpur district. The farmers were encouraged to follow the package of practices recommended by PAU, Ludhiana. Thus, seeds were treated with Captain@ 3 gm/kg of seed and *Rhizobium* @20gm/kg of seed. Similarly, an application of DAP@ 87.5 kg/ha at the time of sowing and pre-emergence application of Pendimethalin 30EC was followed. As a result, 8.43 per cent higher yield was recorded over that of the local check. Similarly, in Gurdaspur district cultivation of SML-668 variety of summer green gram was demonstrated in Kalanaur, Batala, Dhariwal, Sri Hargobindpur, Kahnuwan and Qadian blocks by following the recommended package of practices of PAU, Ludhiana. Thus, 9.95 per cent higher yield was recorded in the demonstrated fields over that of the local check.



**Field day on Summer Green Gram**



**Manual weeding in progress**

### **PB-II (Undulating Plain Zone)**

In Nawanshahr district Saroya, Balachour, Aur, Nawanshahr, Garhshankar and Banga blocks were selected to demonstrate cultivation of SML-668 variety of summer green gram. In addition to recommended package of practices, Triazophos 40 EC@600 ml/acre was used to control white fly. After following such practices 23.18 per cent higher yield was recorded in the demonstrations compared to the local check. Similarly, recommended package of practices were

followed to conduct the FLDs on SML-668 in Morinda, Ropar, Chamkaur Sahib and Balachaur blocks of Ropar district; and in Majri and Kharar blocks of Mohali district. Over the local check, 25.09 per cent and 23.88 per cent higher demonstration yields were recorded in Ropar and Mohali districts respectively.

### **PB-III (Central plain zone)**

Demonstrations on cultivation of summer green gram were laid in Ajnala, Majitha, Verka, Tarsikka, Harsha Chinna, Attari, Chogawan, Jandiala and Chogawan blocks of Amritsar district following all the recommended practices. The crop was harvested with combined harvester, which has reported increase in the demonstration yield by 16.36 per cent over that of the local check. Likewise, Sidwan Bet, Sudhar, Ludhiana-II, Machhiwara and Samrala blocks of Ludhiana district were selected to conduct the FLDs on SML-668 where increase in the yield by 5.28 per cent was observed over that of the local check.



**Scientists interacting with farmers**



**Mechanized harvesting**

Further, as compared to the local check, 30.91 per cent higher yield was recorded from FLDs on summer moong laid in Patti, Khadoor Sahib, Naushara Pannuan, Gandiwind and Cohala Sahib blocks of Tarn Taran district. The increased yield can be significantly attributed to the seed treatment with *Rhizobium* and application of Chlorpyrifos 20 EC@3.75 L/ha and Triazophos 40 EC@1500 ml/ha for the management of tobacco caterpillar and whitefly.

Demonstrations were also conducted in Nadala, Sultanpur Lodhi and Dhillwan

blocks of Kapurthala; and Divya Gram, Batura, Bhullar, Dalla, Bhallowal, Sharakpur, Nurmahal, Kaimwal, Kot Badal Khan, Jaffarwal, Nangal, Kandola blocks of Jalandhar. Over the local check, 63.85 and 24.64 per cent higher yields were recorded in Kapurthala and Jalandhar districts respectively. The increment in yield might be due to following the recommended cultivation practices. Similarly, in Patiala, 6.78 per cent higher yield was recorded from the FLDs of summer green gram laid in Nabha, Samana, Rajpura and Patran blocks.

#### **PB-IV (Western plain zone)**

Demonstrations in Kotkapura and Faridkot recorded 7.29 per cent higher yield as compared to the local check due to following recommended practices like drill sowing, application of SSP@100 kg/acre and Urea@11 kg/acre for nutrient management and Trizophos @600 ml/acre for controlling Thrips. In Ghal Khurd, Ferozepur and Makhu blocks of Ferozepur 17.26 per cent higher yield was recorded in the FLDs of summer green gram variety SML-668 after following recommended package of practices.

#### **PB-V (Plain zone)**

Demonstrations on cultivation of summer green gram were laid in Sangat and Bathinda blocks of Bathinda; and Nihal Singh Wala, Baghapurana, Moga I & Moga II blocks of Moga district. Recommended package of practices were followed to conduct the FLDs, as a result 13.48 per cent and 23.00 per cent higher



**Monitoring of FLDs on Summer Green Gram**

**Table: Performance of FLDs on summer green gram in Punjab**

Zone	KVK	Variety	FLDs (No.)	Area (ha)	Average yield (q/ha)		% increase
					Demo	Local check	
PB -I	Hoshiarpur	SML-668	26	10.00	7.59	7.00	8.43
	Gurdaspur	SML-668	25	10.00	11.60	10.55	9.95
PB -II	Nawanshahar	SML-668	72	28.80	10.47	8.50	23.18
	Ropar	SML-668	59	29.75	6.88	5.5	25.09
	Mohali	SML-668	42	10.40	10.22	8.25	23.88
PB -III	Amritsar	SML-668	80	32.00	10.24	8.80	16.36
	Ludhiana	SML-668	81	40.00	12.37	11.75	5.28
	Tarn Taran	SML-668	80	32.00	9.36	7.15	30.91
	Kapurthala	SML-668	50	32.00	10.65	6.50	63.85
	Jalandhar	SML-668	38	16.00	7.79	6.25	24.64
	Patiala	SML-668	72	24.00	12.6	11.8	6.78
PB -IV	Faridkot	SML-668	17	6.65	10.30	9.60	7.29
	Ferozepur	SML-668	100	40.00	10.26	8.75	17.26
PB -V	Bathinda	SML-668	42	11.75	10.10	8.90	13.48
	Moga	SML-668	100	40.00	12.30	10.00	23.00
	Barnala	SML-668	98	40.00	7.92	4.99	58.72
	Muktsar	SML-668	100	40.00	8.40	7.20	16.67
	<b>Total/Average</b>		<b>1082</b>	<b>443.35</b>	<b>10.01</b>	<b>8.23</b>	<b>21.64</b>

demonstration yields were recorded over that of the local checks in Bathinda and Moga respectively. Similarly, in Gidderbaha, Muktsar, Lambi and Malout blocks of Muktsar and Barnala, Harigarh, Handiaya, Kothe Chung and Khuddi Khurd blocks of Barnala were selected to conduct FLDs; as compared to the local check, respectively 16.67 per cent and 58.72 per cent higher yields were recorded from districts of Muktsar and Barnala.



## HARYANA

Total 823 FLDs on cultivation of summer green gram varieties SML-668 and MH-421 were conducted by 11 KVKs of Haryana on an area of 354.80 ha. The major technologies demonstrated in the farmer's field were integrated crop management, seed treatment with Chloropyriphos and *Rhizobium*, etc. As a result, 26.50 per cent higher demonstration yield was recorded over that of the local check.



**KVK experts and farmers analyzing crop conditions**

### HR-I (Eastern zone)

In Shahzadpur, Naraingarh, Barara, Ambala-I and Sadhaura blocks of Ambala district, cultivation of green gram with MH-421 variety was demonstrated. The recommended package of practices included drill sowing, application of urea @15 kg ha<sup>-1</sup>, SSP @ 100 kg ha<sup>-1</sup>, Zypsum @100 kg ha<sup>-1</sup> and Zinc sulphate @4 kg ha<sup>-1</sup> at the time of sowing were followed. Hand hoeing was done to control the weeds like *Cyprus rotundus*, *Cynodon dactylon* followed by spray of pre-emergence herbicide Stomp @2.5 l/ha and spray of Dichlonovas @ 200 ml ha<sup>-1</sup> for the control of Bihar hairy caterpillar (*Diacrisia obliqua*). Adoption of these improved practices resulted in increase the demonstration yield by 28.14 per cent over that of the local check.



### **KVK experts and farmers analyzing crop harvest**

Demonstrations on cultivation of variety MH-421 were laid in Rajound, Kalayat, Siwan, Pundri blocks of Kaithal district. The line sowing of the crop was done after seed treatment with Rhizotica and Phosphotica biofertilizers, which resulted in increase the yield by 28.80 per cent over the yield of the local check. After harvesting, crop straw was used for green manuring.

Similarly, summer moong variety SML-668 was demonstrated in Nilokheri, Nissing, Gharaunda and Assandh blocks of Karnal; and Thanesar, Shahabad, Pehowa, Ladwa and Babain blocks of Kurukshetra district by following the recommended package of practices. As a result, 47.60 per cent and 51.53 per cent higher yields were recorded in Karnal and Kurukshetra respectively over that of the local checks.

In Lakhan, Majra, Meham, Sampla, Ladhot blocks of Rohtak; and, Radaur, Jagadhri and Mustafabad blocks of Yamunanagar summer moong variety MH-421 was demonstrated. As compared to the yield of local check, 39.33 per cent & 26.98 per cent higher yield was recorded in Rohtak and Yamunanagar respectively.

### **HR-II (Western zone)**

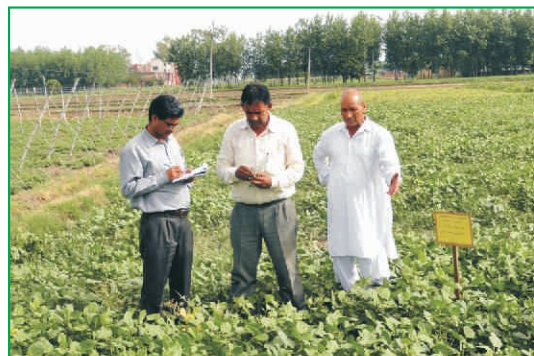
In Hisar, FLDs on MH-421 variety of summer moong was conducted in Hisar-I, Hisar-II, Uklana, Agroha and Barwala blocks. As compared to the yield of local check, 4.40 per cent higher yield was recorded from demonstrations. Insufficient

**Table: Performance of FLDs on summer green gram in Haryana**

Zone	KVK	Variety	FLDs (No.)	Area (ha)	Average yield (q/ha)		% increase
					Demo	Local check	
HR -I	Ambala	MH -421	118	46.80	8.97	7.00	28.14
	Kaithal	MH -421	53	20.00	9.66	7.50	28.80
	Karnal	SML-668	100	40.00	3.69	2.50	47.60
	Kurukshetra	SML-668	95	38.00	12.88	8.50	51.53
	Rohtak	MH -421	50	20.00	4.18	3.00	39.33
	Yamunanagar	MH -421	34	20.00	8.00	6.30	26.98
HR -II	Hisar	MH -421	75	30.00	2.61	2.5	4.40
	Gurgaon	SML-668	84	40.00	7.02	6.85	2.48
	Fatehabad	MH -421	50	20.00	7.80	7.80	0.00
	Jind	MH -421	100	40.00	4.12	3.20	28.75
	Sirsa	MH -421	64	40.00	9.53	7.50	27.07
<b>Total/Average</b>			<b>823</b>	<b>354.80</b>	<b>7.20</b>	<b>5.69</b>	<b>26.50</b>

soil moisture at the time of sowing had delayed sowing of the crop affecting final yield. Moreover, in Hisar district, damage by bluebulls and stray cattles during crop growth period was reported which lead to heavy loss to the crop resulting in very poor yield.

Similarly, cultivation of SML-668 was demonstrated in Pataudi, Farrukhnagar, Gurgaon blocks of Gurgaon district. Recommended package of practices were



**Monitoring of FLDs in Ambala and Yamunanagar districts**





**Monitoring visits in Gurgaon and Kurukshetra districts**

followed to conduct the FLDs which resulted in increase the yield by 2.48 per cent over that of the local check. Near about 20-25 percent crop was damaged due to heavy rainfall and hails storms during the month of May 2016 which has affected the yield.

Likewise, Bhattu Kalan, Ratia and Bhuna blocks of Fatehabad were selected to conduct the FLDs on cultivation of summer moong variety MH-42, but no increment in yield was reported in demonstrations as compared to the local check. Whereas; 28.75 & 27.07 per cent higher demonstration yield was recorded in Jind and Sirsa respectively as compared to the local checks which were conducted in Alewa, Jind, Julana, Narwana, Pillu Khera and Uchana blocks of Jind and Sirsa and Bada Gudha blocks of Sirsa.

## **HIMACHAL PRADESH**

Demonstrations on summer pulses were conducted only in the district of Una, as the district has more of climatic similarity with plains rather than other hilly district of Himachal Pradesh.

### **HP-I (Mid-Hill Sub-Humid Zone)**

Amb, Una, Gagret and Haroli blocks of Una district were selected to demonstrate cultivation of SML-668 variety of summer moong. Line sowing method was followed to raise the crop after treating with phosphorus solubilizing bacteria (PSB). The NPK fertilizers were applied in the ratio of 12:32:16 kg/ha as a



basal dose and pre-emergence herbicide Pendimethalin 30EC@2.5 l/ha. Over that of the local check, 64.69 per cent higher yield was recorded from the demonstrations conducted at farmers' field.

**Table: Performance of FLDs of summer green gram in Himachal Pradesh**

Zone	KVK	Variety	FLDs (No.)	Area (ha)	Average yield (q/ha)		% increase
					Demo	Local check	
HP -I	Una	SML -668	122	20.00	11.94	7.25	64.69
Total/Average			122	20.00	11.94	7.25	64.69

### Visits of Director ATARI to FLDs



## Success stories

### 1) Sh. Chajju Ram S/o Sh. Banwari Lal

Sh. Chajju Ram is a resident of Pur village of Bawani khera block in Bhiwani district of Haryana. He owns 5 ha land and grows pearl millet, mustard, cotton, wheat and green gram crops. He had sown two acres of mung bean (MH-421) during summer 2016. His field is characterized by light textured soils with low fertility status, high infiltration rate and low water holding capacity.



He performed seed treatment with biofertilizers and followed other recommended package of practices as advised by KVK Bhiwani while cultivation. The plot was resistant to yellow mosaic and the impact was reflected on his yield, as he has been able to obtain 15q/ha yield. He sold the mung bean @ Rs. 4600/q and he got total return of Rs. 55,200/-. The whole village is so impressed with the demonstrated variety MH-421 that they have planned to adopt this variety in future in their fields.

### 2) Sh. Rajesh Singh S/o Sh. Dalip Singh

Sh. Rajesh Singh is a resident of Langra village of Pataudi block in Gurgaon district of Haryana. He is a progressive farmer who cultivates crops like wheat, barley, pearl-millet, paddy, vegetables, mustard, chick pea and green gram. He is very active in using bio-fertilizers viz. *Trichoderma*, *Rhizobium* and PSB. Being a progressive farmer, he is also very concerned about the indiscriminate use of chemical pesticides and its harmful effects to human health and environment. Moreover, he has used 4-5 Pheromone traps and sprayed NPV for insect pest management. Sh. Rajesh Singh is now able to control the insect-pests in the green gram that has minimized the cost of cultivation because of the use of bio pesticides. As a result, he obtained an yield of 7.50q/ha with the cost of cultivation of Rs.13850/-. After selling the farm produce at average rate of Rs.6200/q, he earned Rs. 32650/ha as net income with the BC ratio of 1:3.56.

Sh. Rajesh Singh has been able to cultivate green gram with the use of bio fertilizer and bio pesticides successfully. He has sold 1/3 of produced green gram as seed to the fellow farmers and rest 2/3 of harvested green gram has been kept for his domestic use.

## Summer 2016-17

Total 1805 demonstrations on cultivation of summer pulses were conducted on an area of 751.55 ha during 2016-17. In the state of Punjab, total 443.6 ha area was covered under demonstrations on green gram and black gram by 18 KVKs. Similarly; 13 KVKs of Haryana conducted 710 demonstrations on SML-668 and MH-421 varieties of green gram on an area of 310 ha. KVK, Una in Himachal Pradesh conducted 50 demonstrations on 10 ha area on green gram while KVK, Kinnaur conducted 25FLDs on rajmash on 4.45 ha area. Likewise; KVK, Jammu covered 3.5 ha area under demonstrations on summer green gram. Major technologies demonstrated at the farmer's field were improved varieties, seed treatment with Chloropyriphos, Bavistin and microbial inoculants (*Rhizobium* and *Rhizobactrium*), weed management and other recommended package of practices.

### PUNJAB

In Punjab, 925 demonstrations were conducted on cultivation of summer green gram varieties SML-668 and SML-832 on 406 ha area while black gram (variety Mash- 1008) was demonstrated on 37.6 ha on 97 farmers' fields. Maximum average increment in the yield of summer moong, compared to the yield of local check, was obtained in Barnala (69.4%) while the average lowest yield increase was recorded in Bathinda (5.1%). Similarly; higher average



Weeding in progress in FLDs of Hoshiarpur



Field day on sugarcane intercropped with blackgram in Ropar



increase in the black gram yield was recorded in Ropar (23.4 %) over that of the Gurdaspur district (13.5 %).

The recommended time of sowing for summer green gram varieties SML 668 and SML 832 in the state of Punjab is from 20 March to 10 April. The recommended seed rate for summer moong is 15 kg/acre of SML 668 and 12 kg/acre of SML 832 with treatment of Captan or Thiram @3 gm/kg of seed and inoculation with

**Table: Performance of demonstrations during summer 2016-17 in Punjab**

Zone	KVK	Crop	Variety	Area (ha)	FLDs (No.)	Average yield (q/ha)		Yield increase (%)
						Local check	Demo	
PB-I	Hoshiarpur	Green gram	SML-668	6	15	7.2	8.8	22.2
	Gurdaspur	Black gram	Mash-1008	17.6	50	9.9	11.3	13.5
PB-II	Ropar	Black gram	Mash-1008	20	47	7.7	9.5	23.4
PB-III	Amritsar	Green gram	SML-832	20	51	8.7	10.5	20.7
	Ludhiana	Green gram	SML-668	30	36	11.3	14.4	27.4
	Tarn Taran	Green gram	SML-668	60	150	8.8	11.7	33.0
	Kapurthala	Green gram	SML-668	20	26	4.0	4.8	20.0
	Fatehgarh Sahib	Green gram	SML-832	20	60	7.2	8.5	18.1
	Jalandhar	Green gram	SML-668	10	25	10.1	11.1	9.5
	Patiala	Green gram	SML-832	20	50	11.0	12	8.8
PB-IV	Faridkot	Green gram	SML-832	20	53	7.2	8.4	16.7
	Ferozepur	Green gram	SML-832	50	125	8.7	10.2	17.1
PB-V	Bathinda	Green gram	SML-668	30	48	9.8	10.3	5.1
	Moga	Green gram	SML-668	40	100	8.6	13.6	58.4
	Sangrur	Green gram	SML-668	20	36	7.56	10.4	38.0
	Muktsar	Green gram	SML-668 SML-832	20	50	6.63	7.8	17.6
	Barnala	Green gram	SML-668	20	50	6.9	11.8	69.4
	Mansa	Green gram	SML-668	20	50	7.6	8.4	10.5
<b>Total</b>		<b>Green gram</b>		<b>406</b>	<b>925</b>	<b>8.21</b>	<b>10.17</b>	<b>23.87</b>
		<b>Black gram</b>		<b>37.6</b>	<b>97</b>	<b>8.8</b>	<b>10.4</b>	<b>18.18</b>



**KVK Scientists visiting FLDs in  
Tarn Taran**



**Hand picking of pods in progress  
in Fatehgarh Sahib**

*Rhizobium* (LSMR-1) and *Rhizobactrium* (RB-3) cultures. The crop is sown with row-to-row distance of 22.5cm and plant-to-plant distance of about 7 cm. Sowing summer moong on raised beds with spacing of 67.5 cm is reported to increase the yield by 10 per cent and save irrigation water by 20-30 per cent. Application of 5 kg Urea (46% N) and 100 kg Single Superphosphate (16% P<sub>2</sub>O<sub>5</sub>) per acre is recommended for nutrient management. Weed control at proper time and with appropriate method is very essential to get higher yields. First hand-weeding is performed at 4 weeks after sowing and second hand-weeding at 6 weeks after sowing. As an alternative, a dose of 1 lt/acre Stomp 30 EC (pendimethalin) can be sprayed as pre-emergence herbicide immediately after sowing or 600 ml per acre Basalin 45 EC (Fluchloralin) as pre-sowing herbicide can be applied for effective weed management. Depending upon the weather conditions, 4-5 irrigations can be applied and last irrigation is applied 55 days before harvesting the crop. The right time for harvesting crop is when about 80 per cent pods are matured.

Black gram (summer mash) improved varieties Mash-1008 and Mash-218 are recommended for cultivation in Punjab. The seed @ 20 kg seed per acre is sown between 15 March to 1<sup>st</sup> week of April at 22.5 cm row-to-row spacing. For effective weed control, a hoeing can be performed one month after sowing or Stomp 30 EC (pendimethalin) @ 600 ml per acre can be applied. Similarly; one hoeing at 25 days after sowing or spray of Stomp 30 EC @ 1 litre per acre can be carried out. Moreover; for nutrient management, application of 5 kg of N (11 kg of Urea) and 10

kg of  $P_2O_5$  (60 kg of Single Superphosphate) per acre at the time of sowing is recommended. Harvesting of the crop is done when the pods are 80 per cent matured.

Plant protection measures for summer green gram and black gram are similar. Thrips (*Megalurothrips distalis*) can be controlled by application of Triazophos 40 EC @ 600 ml or Rogor 30 EC @ 100 ml or Malathion 50 EC @ 100 ml or Metasystox 25 EC @ 120 ml at bud initiation stage. To control pod borer, spraying of Spinosad 45 EC @ 60 ml or Indoxacarb 14.5 SC @ 200ml or Acephate 75 SP @ 800 g per acre is recommended. For the management of tobacco caterpillar, Novaluron 10 EC @ 150 ml or Acephate 75 WP @ 800 gram or Chloropyriphas 20 EC @ 1.5 litre per acre is applied and if not controlled then its repetition immediately after 10 days is recommended. For controlling the Moong Yellow Mosaic Virus (MYMV), use of resistant variety and roughing is done. Thiamethoxam 25 WG @ 40 g or Triazophos 40 EC @ 600 ml per acre is recommended for white fly control.



**KVK Scientists interacting with farmers in Bathinda and Sangrur**

### **PB-I (Sub-mountain undulating zone)**

PAU, Ludhiana recommended package of practice for cultivation of summer green gram were followed to conduct the demonstrations on SML-668 variety in Garhshankar, Mahilpur and Hoshiarpur-II blocks of Hoshiarpur district. Farmers were provided inputs like seed, biofertilizers, fungicide Captain 50 WP and Pendimethalin 30 EC. As a result, the average yield obtained from the demonstrations was 8.8q/ha which was 22.2 per cent higher than that of the local check. In Gurdaspur district, improved variety Mash-1008 of black gram was

demonstrated in Kalanaur, Batala, Dhariwal and Kahnuwan blocks. Demonstrations registered average yield of 11.3q/ha which was 13.5 per cent higher than the yield of local check.

### **PB-II (Undulating Plain Zone)**

In Ropar district; Chamkaur Sahib, Morinda and Ropar blocks were selected to demonstrate cultivation of Mash-1008 variety of black gram. Following the recommended package of practices in demonstration fields resulted in average yield of 9.5q/ha with 23.4 per cent higher yield compared to that of the local check.

### **PB-III (Central plain zone)**

In this zone; demonstrations on summer green gram were conducted in Amritsar, Ludhiana, Tarn Taran, Kapurthala, Fatehgarh sahib, Jalandhar and Patiala districts. Ajnala, Majitha, Verka, Tarsikka, Harsha Chinna and Attari blocks of Amritsar were selected for demonstrating cultivation summer moong variety SML-832. Seed, biofertilizers, Stomp and Acephate were provided to the farmers as inputs. Practicing recommended improved technologies resulted in average yield of 10.5q/ha, which was found to be 20.7 per cent higher than that of the local check. Similarly; in Ludhiana district, Khanna, Jagraon, Sidwan Bet, Machhiwara and Samrala blocks were selected to conduct the FLDs on summer moong variety SML-668. It has fetched the demonstrating farmers an average yield of 14.4q/ha which can be said to be increased by 27.4 per cent in comparison to that of the local check. PAU, Ludhiana recommended package of practice were followed while conducting the FLDs and seeds, Acephate and Triazophos were provided to the



**Demonstration fields in Barnala and Moga districts**



farmers as inputs. Likewise; 33.0 per cent higher yield was recorded, as compared to local check, from the FLDs of summer moong variety SML-668 conducted in Khadoor Sahib, Patti, Naushara Pannuan, Bikhiwind, Gandiwind and Cohala Sahib blocks of Tarn Taran. The recorded average yield of 11.7q/ha can be attributed to following the recommended improved package of practice. Moreover; along with seeds, *Rhizobium* and Chlorpyrifos 20 EC were also provided to the farmers as inputs.

In Sultanpur Lodhi and Kapurthala blocks of Kapurthala district, summer moong variety SML-668 was demonstrated; and with an average yield of 4.8q/ha, the yield increase of 20.0 per cent was observed over that of the local check. Interestingly; some of the demonstrations were conducted by sowing the green gram seeds with happy seeder in wheat residue. Similarly; in Sirhind, Bassi Pathana, Sirhind, and Khera blocks of Fatehgarh Sahib SML-832 variety of green gram was demonstrated and an increase in the average yield of 18.1 per cent was recorded over the local check. Demonstrations in Jalandhar district in the blocks of Nurmahal, Shahkot and Nakodar recorded average yield of 11.1q/ha which was found to be 9.5 per cent higher than that of the local check. Farmers were provided with seeds, Rogor and consortium biofertilizer as the inputs and thus the increment in yield can be credited to following the recommended package of practices. In Patiala, 8.8 per cent higher yield was recorded from FLDs of summer moong laid in Nabha, Patiala and Rajpura blocks as compared to the local check; whereas the average yield obtained from the demonstrations was 12q/ha.

#### **PB-IV (Western plain zone)**

In western plain zone of Punjab, KVKs of Faridkot and Ferozepur conducted demonstrations of SML-832 variety of summer black gram. In Faridkot, Kotkapura and Faridkot blocks were selected to lay demonstration where the recommended package of practices were followed and 16.7 per cent higher yield was recorded over the local check. Seeds, Trizophos, biofertilizers and Acephate were provided to the farmers as inputs. Similarly; in Ghal Khurd and Ferozepur blocks of Ferozepur district, the demonstrations resulted in average yield of 10.25q/ha which is 17.1 per cent higher than that of the local check.



### **PB-V (Plain zone)**

Districts of Bathinda, Moga, Sangrur, Muktsar, Barnala and Mansa of the plain zone of Punjab conducted demonstrations on cultivation of summer green gram. In Rampura Phul and Bathinda blocks of Bathinda, SML-668 variety of summer moong was demonstrated and the farmer beneficiaries were given seeds and *Rhizobium* culture. Following recommend practices resulted in average yield of 10.25q/ha which was found to be 5.1 per cent higher as compared to the local check yield. Similarly; Nihal Singh Wala, Moga I and Moga II blocks of Moga district; Sunam, Dhuri and Sangrur block of Sangrur; Gidderbaha, Muktsar, Lambi and Malout blocks of Muktsar; Barnala, Harigarh, Handiaya, Kothe Chung and Khuddi Khurd blocks of Barnala and Mansa block of Mansa district were selected by the respective KVKs to conduct FLDs on pulses. In Moga, yield increase of 58.4 per cent was recorded with an average demonstrational yield of 13.66 q/ha. Likewise; in Sangrur and Muktsar districts, yield increase of 38.0 per cent and 17.6 per cent respectively were recorded. Barnala district recorded highest yield increase of 69.4 per cent over local check with an average yield of 11.84q/ha. Demonstrations in Mansa recorded an average yield of 8.4q/ha which was 10.5 per cent higher than the local check.

### **HARYANA**

Total 674 demonstration on green gram varieties MH-421 and SML-668, were conducted on 290 ha area by the KVK of Haryana. Average 30.9 higher yield was recorded over the local check from demonstrations. As compared to the check, maximum average increment in the yield was recorded in Hisar (79.1%) while the lowest yield increase was recorded in Jind (12.5%).

### **HR-I (Eastern zone)**

The eastern zone of Haryana includes districts of Ambala, Kaithal, Panipat, Sonipat, Karnal, Kurukshetra, Rohtak and Yamunanagar. In Ambala, demonstrations were conducted in Shaha, Naraingarh, Barara and Ambala-II blocks on improved variety of summer green gram SML-832. Farm inputs like seed, Zinc sulphate, *Rhizobium*, PSB and Stomp were provided to the farmers for conducting demonstrations. Intercropping of sugarcane with mung bean was also



Farmer-KVK Scientist interactions in FLD fields in Ambala and Sonipat

demonstrated in some of the FLDs. Following scientific practices of cultivation resulted in increase the yield by 37.3 per cent over the local check. In Kaithal district, As compared to the local check, 27.8 per cent higher yield was recorded from the FLDs of summer moong variety MH-421 from Pundri, Kalayat, Kaithal and Rajound blocks; where *Rhizobium*, PSB and seed were provided as an input to the farmers.

Moong variety MH-421, Azotobacter, PSB, Zinc sulphate and Pendimethlin were provided to the beneficiaries in Ishrana, Matlauda, Bapoli and Samalkha blocks of Panipat. Following recommended production package for summer moong resulted in increase the higher yield of demonstrations by 20.4 per cent when compared to the local check. Sonipat, Kharkhoda and Rai blocks of Sonipat were selected to conduct the demonstrations on MH-421 variety of summer moong. Following complete package of recommended practices of CCSHAU, Hisar resulted in increase in the demonstrational yield by 20.0 per cent than that of the local check.

Summer moong variety MH-421 was demonstrated in Indri, Nilokheri, Nissing, Gharaunda and Assandh blocks of Karnal; and Pipli, Thanesar, Pehowa, and Ladwa blocks of Kurukshetra district by following the recommended package of practices. As a result; 26.7 and 29.4 per cent higher yield was recorded from the demonstrations of Karnal and Kurukshetra districts respectively. In Karnal, MH-421 variety was inoculated with biofertilizer (*Rhizobium* + PSB) and basal dose of  $P_2O_5@40-60$  kg/ha and Zinc Sulphate@20 kg/ha was applied. However; in

Kurukshetra, high yielding variety MH-421 was inoculated with *Rhizobium* culture.

In Lakhanmajra and Sampla blocks of Rohtak and Radaur, Jagadhri and Mustafabad blocks of Yamunanagar summer moong variety MH-421 was demonstrated. As compared to that of the local check, 62.7 and 23.1 per cent higher yield was recorded in the demonstrational fields of Rohtak and Yamunanagar districts respectively. Seeds of high yielding variety MH-421 along with *Rhizobium* culture were provided as inputs in Rohtak; whereas, Phosphitika, ZnSO<sub>4</sub>@12.5 kg/ha, Stomp@2.5 lt/ha were provided as inputs in Yamunanagar.

#### HR-II (Western zone)

In Hisar, CFLDs on MH-421 variety of summer moong were conducted in Hisar-I, Hisar-II, Uklana, Adampur and Hansi blocks. As compared to that of the local check, 79.1 per cent higher yield was recorded from the demonstrations. Recommended agronomic practices and plant protection measures were followed to conduct the FLDs.

**Table: Performance of FLDs of summer green gram in Haryana during 2016-17**

Zone	KVK	Variety	Area (ha)	CFLDs (No.)	Average yield (q/ha)		Yield increase (%)
					Local Check	Demo	
HR -I	Ambala	SML -832	20	41	6	8.24	37.3
	Kaithal	MH - 421	20	50	10.55	13.48	27.8
	Panipat	MH -421	20	50	5.4	6.5	20.4
	Sonipat	MH -421	50	98	8.75	10.5	20.0
	Karnal	MH -421	20	52	3	3.8	26.7
	Kurukshetra	MH -421	30	75	8.5	11	29.4
	Rohtak	MH -421	30	75	1.5	2.44	62.7
	Yamunanagar	MH -421	30	75	6.5	8	23.1
HR -II	Hisar	SML-668	20	50	3.2	5.73	79.1
	Rewari	MH -421	10	25	6.8	7.75	14.0
	Jind	SML-668	20	50	3.2	3.6	12.5
	Sirsa	MH-318	20	33	4	4.7	17.5
<b>Total/Average</b>			<b>290</b>	<b>674</b>	<b>5.6</b>	<b>7.1</b>	<b>30.9</b>

Similarly; in the Rewari district, as compared to that of the local check, 14.0 per cent higher yield was recorded from Khol block from MH-421 variety of summer moong. This increment in yield can be attributed to following the complete package of recommended practices of cultivating summer moong. SML-668 variety of summer moong and seed treatment with Carbendazim@2gm/kg seed were demonstrated in Alewa, Jind, Julana, Narwana, Pillu Khera and Uchana blocks of Jind. As a result; 12.5 per cent higher yield was recorded from the demonstrations. Likewise; as compared to the local check, 17.5 per cent higher yield was recorded from the demonstrational fields of Sirsa and Rania blocks of Sirsa; where, summer moong variety MH-318, Zinc Sulphate and *Rhizobium* were distributed to the farmers for conducting demonstrations.



Field Day on summer green gram in Kuruksehtra and Panipat

## HIMACHAL PRADESH

In Una district, improved crop variety and seed treatment with *Rhizobium* were followed to conduct the demonstrations in Amb, Una, Gagret and Haroli blocks. As compared to the local check, 10.3 per cent higher yield was recorded from the demonstrations. *Rhizobium* culture and seed were provided as an input to the farmers. Similarly; Baspa, Jwala, Triloki and Kailash varieties of rajmash were demonstrated in Pooch block of Kinnaur. Line sowing with recommended seed rate resulted in increase the demonstrational yield by 68.3 per cent over that of the local check.



**Table: Performance of summer season demonstrations on pulses in Himachal Pradesh and Jammu & Kashmir**

States	KVK	Crop	Variety	Area (ha)	FLDs (No.)	Average yield (q/ha)		Yield increase (%)
						Local Check	Demo	
H.P.	Una	Green gram	SML-668	10	50	6.8	7.5	10.3
	Kinnaur	Rajmash	Baspa, Jwala, Triloki, Kailash	4.45	25	12.2	20.5	68.3
J.K.	Jammu	Black gram	Uttara, PU-31	3.5	34	4.9	6.2	26.5



**Demonstrations conducted in Kinnaur district**

## **JAMMU & KASHMIR**

The seeds of Uttara and PU-31 varieties of black gram, pheromone traps and DAP were provided to the farmers in RS Pura block of Jammu. Along with improved variety, Integrated Pest Management measures and Integrated Nutrient Management were demonstrated while laying demonstrations under the FLDs on Pulses project; which resulted in 26.5 per cent higher yield over that of the local check.



**Demonstration fields in Jammu district**

## Success stories

### Paradigm Shift in the Cropping System of Lakhewali Village

Farmers in the Lakhewali village in Moalut block of Muktsar district of Punjab follow the cropping system Paddy-Potato-Maize fodder; in which they earn good income from paddy and potato crop but very less from maize fodder due to large supply and less demand of fodder for animals in the area.



When Cluster Front line Demonstration on Pulses project was introduced, scientist from Krishi Vigyan Kendra, Muktsar approached the potato growing farmers namely Sh. Ramandeep Singh, Sh. Ravinder Singh and Sh. Varinder Singh of Lakhewali. KVK Scientists advised them to grow summer green gram crop after harvesting potato crop, for earning higher profits compared to the existing cropping system. As land holding of the farmers in the village is high, they were ready to experiment with some new technology with considerable risk. They used to get technical support from KVK experts, which helped them to save cost and improve quality of their produce. Moreover; since the area is slightly saline in nature, KVK scientists confidently advised them to grow pulses with an additional motive of improving soil health.

In 2016-17, demonstrations on summer green gram crop were conducted in the village and farmers obtained an average yield of 10.1 q/ha. . Farmer earned Rs. 35000/- to Rs. 40000/- per ha net income by this selling crop. As both summer moong varieties SML 668 and SML 832 take 65-70 days to maturity, the field is empty before the right time for sowing the next paddy crop. Farmers were very happy with the results and other farmers also started growing summer green gram in the village. The major cropping pattern in the area is shifting from paddy-potato-maize to paddy-potato-summer green gram, there by convincing farmers to grow pulses. In coming future, more and more farmers are expected to cultivate summer green gram after harvesting potato.

## Success stories

### S. Sandeep Singh of Village Bhadalwad

S. Sandeep Singh is a progressive farmer and Mechanical Engineer of District Sangrur. But after completing his studies instead of running after job, he decided to involve himself in farming and started helping his father S. Harwinder Singh. He observed that most of the farmers in the region are following



monoculture of rice-wheat which leads to poor soil health and stagnation in yield. KVK, Sangrur provided him the complete guidance regarding package of practices of pulses especially summer moong. The crop can be incorporated in situ after harvesting of pods that would help in maintaining good soil health. He has also got his soil sample tested from Soil and Water testing Laboratory of KVK, Sangrur. The centre gave one frontline demonstration to him and provided the inputs like seed, *rhizobium*, fungicide, weedicide and pesticides. He made regular contact with the KVK during the entire crop period. He has good expertise in using electronic media such as whatapp, etc.

Regular monitoring was conducted by KVK at the FLD plot for proper management of crop and survey of insect-pests. After successful harvesting of summer moong he obtained a yield of 16.25 q/ha (44.4 % higher than local check) and sold the produce @ Rs. 4500/- per quintal. In this way, he obtained a gross income of Rs. 73,125/- per hectare. The total cost of cultivation, transportation and marketing of summer moong was calculated as Rs. 24,494/- per hectare. Thus, he earned a net profit of Rs. 48,361/- from one hectare with benefit-cost ratio of 2.99. In order to make aware the farmers of surrounding villages about successful cultivation of summer moong, a field day was organized by the KVK wherein the team of KVK experts deliberated on successful cultivation and marketing of summer moong and its role towards improving the soil health. Overall, S. Sandeep Singh was highly satisfied with the cultivation of summer moong and expressed his willingness to increase the area under summer moong during upcoming years.



# Literature developed under the project

शोधकी प्रसार बुलेटिन नं. 35

## मूँग की वैज्ञानिक खेती

**डॉ. सत्यजित चौधरी**  
विभाग: वायु विज्ञान (अम्बाला विभाग)

**डॉ. विजयलक्ष्मी सिंह**  
विभाग: वायु विज्ञान (राजधाम विभाग)

**डॉ. सुनील कुमार**  
विभाग: वायु विज्ञान (कृषि अतिथिकेंद्र)

**डॉ. जयप्रकाश सिंह**  
विभाग: वायु विज्ञान

**कृषि विज्ञान केंद्र, तेरवा (अम्बाला)**

**वैधानिक प्रसार के लिए मुख्य सुझाव :**

- मिचलिंग करते समय खेत में नहीं खींचना करना चाहिए।
- इसका उचित विचारों का प्रयोग करें।
- मिचलिंग की अवधि में 50-60 दिनों की अवधि में डिट्टी का खर्च है।
- मिचलिंग की अवधि में 20-25 दिनों में डिट्टी का खर्च है।
- मिचलिंग की अवधि में 25-30 दिनों में डिट्टी का खर्च है।
- मिचलिंग की अवधि में 30-35 दिनों में डिट्टी का खर्च है।
- मिचलिंग की अवधि में 35-40 दिनों में डिट्टी का खर्च है।

**प्रकाशक : सरदीय सप्तमक,**  
**कृषि विज्ञान केंद्र, तेरवा-अम्बाला, 133 104 (हरियाणा)**  
फोन नं. 0173-283352  
ई.मेल : krcambala@gmail.com, krcambala@gmail.com  
वेब साइट : www.krcambala.org.in

### दलहन फसलों की नई तकनीक

**किसान भाईयों के लिए अतिआवश्यक सूचना :**

**बीजोपचार उपमाहजरे बीज**  
कोई भी बीज को सुरक्षित रखने।

कृषि विज्ञान केंद्र में नई बीजों का प्रयोग करने की सही जानकारी उपलब्ध है।

**नई तकनीक**

**कृषि विज्ञान केंद्र में नई बीजों का प्रयोग करने की सही जानकारी उपलब्ध है।**

**संज्ञक सूची - कृषि विज्ञान केंद्र, तेरवा (अम्बाला)**

1. डॉ. जयप्रकाश सिंह (कृषि अतिथिकेंद्र) 8414 12081
2. डॉ. सुनील कुमार (कृषि अतिथिकेंद्र) 8996 43677
3. डॉ. सुनील कुमार (कृषि अतिथिकेंद्र) 8419 33992
4. डॉ. विजयलक्ष्मी सिंह (कृषि अतिथिकेंद्र) 8992 23343
5. डॉ. जयप्रकाश सिंह (कृषि अतिथिकेंद्र) 8996 43677
6. डॉ. जयप्रकाश सिंह (कृषि अतिथिकेंद्र) 8285 54004
7. डॉ. जयप्रकाश सिंह (कृषि अतिथिकेंद्र) 8992 23343
8. डॉ. जयप्रकाश सिंह (कृषि अतिथिकेंद्र) 8417 93149
9. डॉ. जयप्रकाश सिंह (कृषि अतिथिकेंद्र) 8414 12081

### मूँग की नई तकनीक लड़ी विचारना

**डॉ. जयप्रकाश सिंह**  
**डॉ. सुनील कुमार**  
**डॉ. विजयलक्ष्मी सिंह**

कृषि विज्ञान केंद्र, तेरवा-अम्बाला, हरियाणा (अम्बाला)  
संज्ञक सूची - कृषि विज्ञान केंद्र, तेरवा (अम्बाला)



## Administrative Approval of CFLD Pulses 2015-16

**F.No. CPS 3-3/2015-NFSM**  
**Government of India**  
**Ministry of Agriculture and Farmers Welfare**  
**Department of Agriculture, Cooperation and Farmers Welfare**  
**(NFSM-Cell)**

Krishi Bhawan, New Delhi,  
Dated: 09.09.2015

To,  
Deputy Director General ( Agri. Extn.)  
ICAR, Division of Agriculture Extension  
Krishi Anusandhan Bhavan,  
Pusa, New Delhi-110012

**Sub:** Administrative Approval of ICAR Project entitled **“Cluster Frontline Demonstrations of Rabi Pulses- 2015-16”** funded under NFSM-reg.

Sir,  
I am directed to refer to your D.O. No. 10-33/2015-AE-II dated 26<sup>th</sup> August, 2015 and to convey that the competent authority of this Department has approved the Project entitled “Cluster Frontline Demonstrations of Rabi Pulses- 2015-16” funding under NFSM under Centrally Sponsored Scheme of National Food Security Mission (NFSM) for the financial year 2015-16 with a total outlay of **Rs. 1198.94604 Lakhs (Rupees eleven hundred ninety eight lakh and ninety four thousand six hundred four only)** .

2. The component/ ATARI, Zone-wise budget approved is as under:-

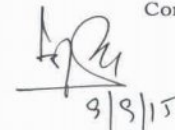
Implementing agency	No. of KVKs	No. of FLDs (Area in ha)	Budget (Rs. In lakhs)	*Contractual staff (Rs. In lakhs)	Zonal workshop-cum training	Group meeting	Miscellaneous expenditure	(Rs. In lakhs)	
								Total	
ATARI, Zone-I, Ludhiana	51	1651	123.825	3.402	1.0	0.50	0.40188	129.12888	
ATARI, Zone-II, Kolkata	234	4486	336.450	3.598	1.0	0.50	0.40188	341.94988	
ATARI, Zone-III, Umiam Meghalaya	116	1254	94.050	3.206	1.0	0.50	0.40188	99.15788	
ATARI, Zone-IV, Kanpur	129	2704	202.800	5.950	1.0	0.50	0.40188	210.65188	
ATARI, Zone-V, Hyderabad	69	1092	81.900	3.598	1.0	0.50	0.40188	87.39988	
ATARI, Zone-VI Jodhpur	59	1130	84.750	3.402	1.0	0.50	0.40188	90.05388	
ATARI, Zone-VII Jabalpur	68	2392	179.400.	3.402	1.0	0.50	0.40188	184.70388	
ATARI, Zone-VIII, Bengaluru	61	672	50.400	3.598	1.0	0.50	0.40188	55.89988	
<b>Total</b>		<b>15381</b>	<b>1153.575</b>	<b>30.156</b>	<b>8.0</b>	<b>4.0</b>	<b>3.21504</b>	<b>1198.94604</b>	

\* Contractual staff including one SRF and one data for each ATARI and one SRF for ICAR headquarter. One workshop cum training and one group meeting for each ATARI.

3. The above project has been approved with the following conditions:

- The demonstrations of each pulse crop should be organized in cluster approach (at least 10 ha. for each cluster)

Contd..2/-

  
9/9/15

## Administrative Approval of CFLD Pulses 2016-17

**F.No. CPS 18-3/2016-NFSM**  
**Government of India**  
**Ministry of Agriculture and Farmers Welfare**  
**Department of Agriculture, Cooperation and Farmers Welfare**  
**(NFSM-Cell)**

Krishi Bhawan, New Delhi,  
Dated: 11.05.2016

To,  
Assistant Director General (Agri. Extn.)  
ICAR, Division of Agriculture Extension  
Krishi Anusandhan Bhavan,  
Pusa, New Delhi-110012

**Sub:** Project on "Cluster Frontline Demonstrations on Pulses during 2016-17" funding under NFSM-Pulses-reg.

Sir,  
I am directed to refer to your D.O. No. 10-35/2015-AE-II dated 2<sup>nd</sup> May, 2016 and to convey that the competent authority of this Department has approved the Project entitled "Cluster Frontline Demonstrations on Pulses during 2016-17" funding under NFSM under Centrally Sponsored Scheme of National Food Security Mission (NFSM) for the financial year 2016-17 with a total outlay of **Rs. 2529.10 Lakhs (Rupees two thousand, five hundred twenty nine lakh and ten thousand only)**

2. The component/ATARI, Zone-wise budget approved is as under:-

Implementing agency/ Zone	No. Of KVK	No. Of FLDs (Area in ha)	Budget (in Rs.)	*Contractual Staff (in Rs.)			Zonal Workshop cum Training	Organiza tion of Group Meetings	Misc. exp.	Total (in Rs.)
				SRF	DEO	Technology Agent at KVKs				
ATARI, Zone I, Ludhiana	49	1480	11100000	360000	180000	480000	100000	100000	40000	12360000
ATARI, Zone - II, Kolkata	81	6850	49875000	390000	180000	3840000	100000	100000	40000	54525000
ATARI, Zone- III, Meghalaya	44	2490	18675000	330000	180000	1440000	100000	100000	40000	20865000
ATARI, Zone- IV, Kanpur	76	4540	34050000	750000	180000	2040000	100000	100000	80000	37300000
ATARI, Zone- V, Hyderabad	74	4030	30225000	390000	180000	900000	100000	100000	40000	31935000
ATARI, Zone- VI, Jodhpur	57	2940	22050000	360000	180000	1200000	100000	100000	40000	24030000
ATARI, Zone- VII, Jabalpur	92	7310	54825000	360000	180000	3660000	100000	100000	40000	59265000
ATARI, Zone- VIII, Bengaluru	61	1560	11700000	390000	180000	120000	100000	100000	40000	12630000
<b>Total</b>	<b>534</b>	<b>31000</b>	<b>232500000</b>	<b>3330000</b>	<b>1440000</b>	<b>13680000</b>	<b>800000</b>	<b>800000</b>	<b>360000</b>	<b>252910000</b>

\* Contractual staff including one SRF and one data for each ATARI and one SRF for ICAR headquarter.  
One workshop-cum-training and two group meetings for each ATARI.

Contd..2/-

*[Signature]*  
11/5/16

3. The above project has been approved with the following conditions:
- The demonstrations of each pulse crop should be organized in cluster approach (at least 10 ha. for each cluster).
  - ICAR should provide seed as one of critical inputs to farmers for organization of demonstration.
  - The varieties of pulse crops to be included in the demonstrations should not be older than 10 years.
  - More focus should be given to organize demonstration of pulses in rice fallow areas in eastern India.
  - 10% of FLD fund earmarked (Rs. 7500/ha) is allowed to utilized for monitoring, distribution of literature and organization of field day.
  - Chemical fertilizers are not allowed as input under FLD. However payment of various operations/ services and inputs (seed, bio-fertilizers, soil ameliorants, micro-nutrients etc.) are allowed. Farmers have to apply recommended dose of chemical fertilizers to attain potential yield.
  - The scientists from KVK will conduct visit to the demonstrations site to resolve problem on spot.
  - Each KVK will furnish cafeteria of interventions for each crop to be undertaken at the demonstration site.
  - For individual farmer, FLDs should not exceed than 0.80ha.
  - The qualification and salary of Senior Research Fellow and Data Entry Operator is admissible as per the approved norms of the ICAR/University.
  - One SRF is allowed at ICAR, headquarter, New Delhi.
  - Travelling Allowance and Daily Allowance is admissible as per norms of Govt. of India.
  - The organizational of workshop cum training and group meetings should be organized as per norms of ICAR.
  - The list of beneficiary-farmers should be maintained at each ATARI level.
  - The contribution of individual intervention should also be documented.
  - KVKs which shall conduct FLDs in 100 ha or more area during both the cropping season of a year is allowed to hire PTA for 12 months and KVK which shall conduct FLDs in at least 50 ha or more area either in Kharif, Rabi and summer season is allowed PTA for six months.
  - Each KVK should try to choose interior areas; farmers have generally been deprived of demonstrations conducted by extension agencies.
  - KVK should focus on use of micro-nutrients, soil ameliorants and IPM practices.
  - Farmers should be trained for seed production, primary processing etc.
  - Each ATARI designated for a particular zone will prepare a detailed report on the demonstrations of pulses and a final report will be submitted by Department of Agricultural Extension-ICAR, New Delhi.

(Dr. D. P. Malik)

Additional Commissioner (Crops)

**Copy to:**

1. Director General, ICAR, Krishi Bhawan, New Delhi
2. Deputy Director General (CS), Krishi Bhawan, New Delhi
3. Deputy Director General, Division of Agriculture Extension, ICAR, New Delhi.

Contd..3/-



4. Director, Agricultural Technology Application Research Institute Zone-I, Ludhiana, Punjab.
5. Agricultural Technology Application Research Institute, Zone-II, Kolkata, West Bengal.
6. Director, Agricultural Technology Application Research Zone-III Umiam (Barapani) Meghalaya.
7. Director, Agricultural Technology Application Research Institute Zone-IV, Kanpur, Uttar Pradesh.
8. Agricultural Technology Application Research Institute, Zone-V, Hyderabad, Andhra Pradesh.
9. Director, Agricultural Technology Application Research Institute, Zone-VI, Jodhpur, Rajasthan.
10. Director, Agricultural Technology Application Research Institute Zone-VII, Jabalpur, Madhya Pradesh.
11. Director, Agricultural Technology Application Research Institute Zone-VIII, Bengaluru, Karnataka.
12. Director of Agriculture, Government of Assam, Arunachal Pradesh, Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jharkhand, J&K, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Meghalaya, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Telangana, Tripura, Uttar Pradesh, Uttarakhand and West Bengal.
13. Director, Crops Development Directorate, DWD-Ghaziabad, DJD-Kolkata, DSD-Lucknow, DOD- Hyderabad, DMD-Jaipur, DPD-Bhopal, DCD-Nagpur and DRD Patna.

**Copy also to:-**

1. Under Secretary (Finance), DAC&FW, Krishi Bhavan, New Delhi.
2. Under Secretary (CA-V), DAC&FW, Krishi Bhavan, New Delhi.
3. Sr. PPS to Secretary (AC&FW), Krishi Bhavan, New Delhi.
4. Sr. PS to Agriculture Commissioner, DAC&FW, Krishi Bhavan, New Delhi.
5. PS to JS (Crops), DAC&FW, Krishi Bhavan, New Delhi.
6. PS to Director (Crops), DAC&FW, Krishi Bhavan, New Delhi.
7. PS to Additional Commissioner (Crops), Krishi Bhavan, New Delhi.
8. Deputy Commissioner (Crops)/Consultants, NFSM/AD/STA (Crops), Krishi Bhavan, New Delhi.
9. Programmer NFSM.

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Handwritten signature and date: 01/5/16

## Annexure III

### State-wise and crop-wise details of FLDs conducted

2015-16

State	Crop	KVKs (No.)	FLDs (No.)	Area (ha)
Punjab	Green gram	17	1082	443.35
Haryana	Green gram	11	823	354.80
Himachal Pradesh	Green gram	1	122	20.00
<b>Total</b>		<b>29</b>	<b>2027</b>	<b>818.15</b>

2016-17

State	KVKs (no.)	Green gram		Black gram		Rajmash		Total	
		FLDs (No.)	Area (ha)	FLDs (No.)	Area (ha)	FLDs (No.)	Area (ha)	FLDs (No.)	Area (ha)
Punjab	18	925	406	97	37.6	-	-	1022	443.6
Haryana	13	674	290	-	-	-	-	674	290
Himachal Pradesh	2	50	10	-	-	25	4.45	75	14.45
Jammu and Kashmir	1	-	-	34	3.5	-	-	34	3.5
<b>Total</b>	<b>34</b>	<b>1649</b>	<b>706</b>	<b>131</b>	<b>41.1</b>	<b>25</b>	<b>4.45</b>	<b>1805</b>	<b>751.55</b>

## Annexure IV

## Statement of Expenditure under CFLD Pulses during Summer 2015-16

S. No.	Name of the KVK	Name of crop	Budget (in Rs.)	Expenditure (in Rs.)	Unspent Balance (in Rs.)
1	Ludhiana	Greengram	300000	299221	779
2	Moga	Greengram	300000	300000	0
3	Muktsar	Greengram	300000	300000	0
4	Ferozepur	Greengram	300000	300000	0
5	Faridkot	Greengram	48000	48000	0
6	Amritsar	Greengram	240000	240000	0
7	Bathinda	Greengram	90000	90000	0
8	Patiala	Greengram	237000	237000	0
9	Nawanshahar	Greengram	216000	216000	0
10	Ropar	Greengram	222000	222000	0
11	Kapurthala	Greengram	240000	240000	0
12	Hoshiarpur	Greengram	75000	75000	0
13	Gurdaspur	Greengram	75000	80700	-5700
14	Jalandhar	Greengram	120000	120000	0
<b>PAU, Ludhiana Total (A)</b>			<b>2763000</b>	<b>2767921</b>	<b>- 4921</b>
15	Barnala	Greengram	300000	196504	103496
16	TaranTaran	Greengram	216000	216000	0
17	Mohali	Greengram	70200	70200	0
<b>GADVASU, Ludhiana Total(B)</b>			<b>586200</b>	<b>482704</b>	<b>103496</b>
18	Jind	Greengram	300000	104000	196000
19	Sirsa	Greengram	300000	192100	107900
20	Yamunanagar	Greengram	150000	100000	50000
21	Kaithal	Greengram	150000	79000	71000
22	Kurushetra	Greengram	60000	0	60000
23	Kurushetra	Greengram	225000	117950	107050
24	Hisar	Greengram	225000	156000	69000
25	Fatehabad	Greengram	150000	70375	79625
26	Rohtak	Greengram	150000	61500	88500
<b>CCSHAU, Hisar Total ( C)</b>			<b>1710000</b>	<b>880925</b>	<b>829075</b>
27	Ambala	Greengram	351000	232029	118971
<b>SCHE, Ambala, Total(D)</b>			<b>351000</b>	<b>232029</b>	<b>118971</b>
28	Gurgaon	Greengram	300000	130264	169736
<b>ICAR-IARI, New Delhi Total (E)</b>			<b>300000</b>	<b>130264</b>	<b>169736</b>
29	Karnal	Greengram	300000	123000	177000
<b>ICAR-NDRI, Karnal Total (F)</b>			<b>300000</b>	<b>123000</b>	<b>177000</b>
30	Una	Greengram	150000	41779	108221
<b>CSKHPKV, Palampur Total (H)</b>			<b>150000</b>	<b>41779</b>	<b>108221</b>
<b>Grand Total (A+B+C+D+E+F+G+H)</b>			<b>6160200</b>	<b>4658622</b>	<b>1501578</b>



## Annexure V

## Statement of Expenditure under CFLD Pulses during Summer 2016-17

Sr. NO.	KVK	Crop/PTA	Opening Balance as on 1.04.2016	Release during 2016-17	Total Release (OB + Release)	Expenditure as per AUC	Unspent Balance
1	Mansa	Green gram	0	142500	142500	141120	1380
2	Amritsar	Black gram	0	142500	142500	142450	50
3	Faridkot	Green gram	0	142500	142500	142500	0
4	Fatehgarh sahib	Green gram	0	142500	142500	142472	28
5	Ferozepur	Green gram	0	356250	356250	356250	0
	Ferozepur	PTA	0	40000	40000	34194	5806
6	Gurdaspur	Black gram	0	142500	142500	142500	0
7	Hoshiarpur	Green gram	0	42750	42750	42725	25
8	Patiala	Green gram	0	142500	142500	142500	0
9	Sangrur	Green gram	0	142500	142500	142500	0
10	Bathinda	Green gram	0	213750	213750	212575	1175
	Bathinda	PTA	0	40000	40000	33871	6129
11	Kapurthala	Green gram	92	142408	142500	142500	0
12	Jalandhar	Green gram	787	70463	71250	71250	0
13	Ludhiana	Green gram	779	212971	213750	213725	25
15	Moga	Green gram	0	285000	285000	283840	1160
16	Muktsar	Green gram	0	142500	142500	142500	0
17	Ropar	Black gram	95	142405	142500	142455	45
	<b>PAU, Ludhiana</b>		<b>1753</b>	<b>2685997</b>	<b>2687750</b>	<b>2671927</b>	<b>15823</b>
18	Barnala	Green gram	103496	39004	142500	142421	79
19	Tarantaran	Green gram	0	427500	427500	427500	0
	<b>GADVASU, Ludhiana</b>		<b>103496</b>	<b>466504</b>	<b>570000</b>	<b>569921</b>	<b>79</b>
20	Kinnaur	Rajmash	0	71250	71250	71250	0
	<b>Dr. YSPUH&amp;F, Solan</b>		<b>0</b>	<b>71250</b>	<b>71250</b>	<b>71250</b>	<b>0</b>
21	Jammu	Green gram	0	24937	24937	22999	1938
	<b>SKUAST-Jammu</b>		<b>0</b>	<b>24937</b>	<b>24937</b>	<b>22999</b>	<b>1938</b>
22	Ambala	Green gram	0	142500	142500	139080	3420
	Ambala	PTA	0	50000	50000	47667	2333
	<b>SCHE, Ambala</b>		<b>0</b>	<b>192500</b>	<b>192500</b>	<b>186747</b>	<b>5753</b>
23	Rewari	Green gram	53189	18061	71250	59616	11634
	<b>SBBA, Rewari</b>		<b>53189</b>	<b>18061</b>	<b>71250</b>	<b>59616</b>	<b>11634</b>
24	Bhiwani	Green gram	0	142500	142500	0	142500
	Bhiwani	PTA	0	40000	40000	34489	5511
25	Hisar	Green gram	69000	73500	142500	142500	0
26	Yamunanagar	Green gram	50000	163750	213750	67665	146085
27	Fatehabad	Green gram	167435	0	167435	0	167435
28	Jind	Green gram	196000	0	196000	50000	146000
29	Kaithal	Green gram	71000	71500	142500	59000	83500
30	Kurukshetra	Green gram	303050	0	303050	86250	216800
31	Panipat	Green gram	0	142500	142500	80250	62250
32	Rohtak	Green gram	88500	125250	213750	86250	127500
33	Sirsa	Green gram	107900	34600	142500	134550	7950
34	Sonipat	Green gram	0	356250	356250	236375	119875
	<b>CCSHAU, Hisar</b>		<b>1052885</b>	<b>1149850</b>	<b>2202735</b>	<b>977329</b>	<b>1225406</b>
35	Gurgaon	Greengram	169736	0	169736	93370	76366
	<b>ICAR-IARI, New Delhi</b>		<b>169736</b>	<b>0</b>	<b>169736</b>	<b>93370</b>	<b>76366</b>
	<b>Grand Total</b>		<b>1381059</b>	<b>4609099</b>	<b>5990158</b>	<b>4653159</b>	<b>1336999</b>

## Annexure VI

### ICAR-ATARI, Ludhiana Project Team

	2015-16	2016-17
Nodal Officer/ PI	Preeti Mamgai	Ashish Santosh Murai
Co-Nodal Officer / Co-PI	Ashish Santosh Murai	Preeti Mamgai
Senior Research Fellow	Narinder Singh	Narinder Singh
Data Entry Operator	Daljeet Kaur	Daljeet Kaur

## Annexure VII

### CONTRIBUTORS IN PROJECT “CFLD on Rabi PULSES 2015-16”

KVK/District	Programme Coordinator	Project in-charge
<b>Punjab</b>		
Amritsar	Dr. Bhupinder Singh Dhillon	Dr. Jagmohan Singh
Barnala	Dr. Prahalad Singh Tanwar	Dr. Suryender Singh
Bathinda	Dr. Jagdish Grover	Dr. Gurmeet Singh Dhillon
Faridkot	Dr. NS Gill	Dr. Sukhwinder Singh, Dr. Gurdarshan Singh and Dr. Rakesh Kumar
Ferozepur	Dr. Gurjant Singh Aulakh	Dr. Yuvraj Singh Pandha
Gurdaspur	Dr. (Mrs.) Parminder Kaur	Dr. Satwinderjit Kaur
Hoshiarpur	Dr. Inderjit Singh Hundal	Dr. Maninder Singh Bons
Ludhiana	Dr. S.C. Sharma	Dr. Devinder Tiwari
Jalandhar	Dr. Kuldip Singh	Dr. Pawan Kumar
Kapurthala	Dr. Manoj Sharma	Gobinder Singh
Moga	Dr. Navdeep Singh Gill	Dr. Amanpreet Kaur
Muktsar	Dr. Nirmaljit Singh Dhaliwal	Dr. Balkaran Singh Sandhu
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Nawanshehr	Dr. Jugraj Singh	Dr. Navjot Singh, Dr. Manpreet Singh
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<b>Haryana</b>		
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Rohtak	Dr. Meena Siwach	Dr. Rajesh Kumar
Kaithal	Dr. Hariom	Dr. Jasbir Singh
Kurukshetra	Dr. P. Bhatnagar	Dr. Parminder Singh, Dr. J.N. Bhatia
Karnal	Dr. Dalip K Gosain	Dr. Mohar Singh
Hisar	Dr. Sunil Kumar Dhanda	Dr. Pawan Kumar, and Dr. Narendra Kumar
Gurgaon	Dr. Anjani Kumar	Dr. Ram Sevak
Yamunanagar	Dr. BR Kamboj	Dr. BR Kamboj
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<b>Himachal Pradesh</b>		
Una	Dr. AR Khan	Dr. Sanjay Kumar Sharma

## Annexure VIII

# CONTRIBUTORS IN PROJECT “CFLD PULSES 2016-17”

KVK/District	Programme Coordinator	Project in-charge
<b>Punjab</b>		
Amritsar	Dr. Bhupinder Singh Dhillon	Dr. Jagmohan singh
Barnala	Dr. Prahalad Singh Tanwar	Dr. Suryender Singh
Bathinda	Dr. Jitender Singh Brar	Dr. Gurmeet Singh Dhillon
Faridkot	Dr. Jagdish Grover	Dr. Sukhwinder Singh, Dr. Gurdarshan Singh and Dr. Rakesh Kumar
Ferozepur	Dr. Gurjant Singh Aulakh	Dr Yuvraj Singh Pandha
Fatehgarh Sahib	Dr. Vipam Kumar Rampal	Mrs. Reet Verma, Dr. Arvind Preet Kaur
Gurdaspur	Dr. (Mrs.) Parminder Kaur	Dr. Satwinderjit Kaur
Hoshiarpur	Dr. Maninder Singh Bons	Er. Ajaib Singh, Dr. Dhram Parka
Ludhiana	Dr. S.C. Sharma	Dr. Devinder Tiwari
Jalandhar	Dr. Kuldip Singh	Dr. Pawan Kumar
Kapurthala	Dr. Manoj Sharma	Gobinder Singh
Moga	Dr. Navdeep Singh Gill	Dr. Arshdeep Kaur
Muktsar	Dr. Nirmaljit Singh Dhaliwal	Dr. Balkaran Singh Sandhu
Mansa	Dr. GPS Sodhi	Dr. Gurdeep Singh
Patiala	Dr. Jasvinder Singh	Dr. Rachna Singla
Ropar	Dr. Vipam Kumar Rampal	Dr. Opinder Singh
Sangrur	Dr. Mandeep Singh	Sh. Ashok Kumar
Tarn Taran	Dr. Balwinder Kumar	Dr. Navjot Singh
<b>Haryana</b>		
Ambala	Dr. Upasana Singh	Dr. Rakesh Choudhary
Rohtak	Dr. Meena Siwach	Dr. Rajesh Kumar
Kaithal	Dr. RC Verma	Dr. Jasbir Singh
Kurukshetra	Dr. Hari Om	Dr. J.N. Bhatia
Karnal	Dr. Dalip K Gosain	Dr. Mohar Singh
Hisar	Dr. Sunil Kumar Dhanda	Dr. Pawan Kumar
Yamunanagar	Dr. BR Kamboj	Dr. BR Kamboj
Jind	Dr. YP Malik	Dr. Rameshwer
Sirsa	Dr. L.S. Beniwal	Dr. L.S. Beniwal
Sonipat	Dr. Anil Kumar Rathee	Dr. Jogender Singh
Panipat	Dr. Rajbir Garg	Dr. Satpal Singh
Rewari	Dr. Kapur Singh	Dr. Vishavjeet Singh
<b>Himachal Pradesh</b>		
Una	Dr. AR Khan	Dr. Sanjay Kumar Sharma
Kinnaur	Dr. Pankaj Gupta	Dr. Rajeev Kumar
Jammu	Dr. Vikas Tandon	Dr. Rakesh Sharma

## Details of varieties of pulses used for conducting FLDs on Summer season

Crop	Variety	Variety releasing organization	Year of release	Areas of adaptation state/ zone	Potential yield (q/ha)	Days to maturity	Remarks
Green gram	SML 668	PAU, Ludhiana	2002	Punjab	11-25	60	Tolerant to MYMV
	SML 832	PAU, Ludhiana	2010	Punjab	11-50	61	Tolerant to MYMV and thrips
	MH 421	CCSHAU, Hisar	2012	North West Plain Zone	12	60	Resistant to MYMV
	MH 318	CCSHAU, Hisar	2016	Haryana	10-14	60-65	Resistant to MYMV, well under rice-wheat rotation
Black gram	Mash 1008	PAU, Ludhiana	2004	Punjab	11-25	72	Early, Resistant to MYMV & leaf Crinkle virus
	Pant Urd 31	Central	2008	UP, Tripura, Rajasthan, Odisha, CG, Bihar, AP, Uttarakhnad	15	75-80	Resistant to YMV
	IPU-94-1 (Ultra)	IIPR, Kanpur	1999	Punjab, Haryana, West UP, North Rajasthan, Gujrat, Bihar, WB	11-12	85	Resistant to YMV, Kharif season
Rajmash	Baspa (KRC 8)	CSKHPKV, Palampur	1994	High hills of H.P.	20-25	110-120	Resistant to anthracnose seeds deep pink dotted
	Jwala (HPR 12)	CSKHPKV, Palampur	1980	Mid hills & above of HP	12-14	75-80	Early maturity seeds dark red colour
	Kailash (SRC 74)	CSKHPKV, Palampur	2003	Kinnaur district	26-28	120-125	High yielding late maturity variety
	Triloki (K 198)	CSKHPKV, Palampur	1996	High hills of H.P.	25-27	98-100	Resistant to bacterial wilt, angular leaf spot and anthracnose disease





