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Annual Report 2017-18

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सत्यमेव जयते

Department of Agriculture Cooperation and Farmers Welfare
Ministry of Agriculture and Farmers Welfare
Government of India, New Delhi

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ICAR-Agricultural Technology Application Research Institute, Zone-II

भाकृअनुप–कृषि तकनीकी अनुप्रयोग संस्थान, क्षेत्र–II

(ISO 9001-2015)

Jodhpur-342 005, Rajasthan, India

जोधपुर 342 005, राजस्थान, भारत

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Message

India is the largest producer, consumer and importer of pulses in the world. Pulses are rich source of protein and occupy a unique place in the world by its high protein content, which is almost double than that of cereals. At the time when, government of India was striving to increase pulse production, ICAR has taken key initiative to enhance pulse production and productivity by conducting nationwide Cluster Front Line Demonstrations through a wide network of Krishi Vigyan Kendras. ICAR has implemented a collaborative project "Cluster Front Line Demonstrations on Pulses" since October 2015 under National Food Security Mission with the financial assistance of Department of Agriculture & Cooperation, Ministry of Agriculture & Farmers Welfare, GOI, New Delhi. Krishi Vigyan Kendras are facilitating farmers with quality seeds and proven technological packages. This initiative lays emphasis on major pulse crops, namely pigeon pea, green gram, black gram, moth bean, chickpea and lentil. Results of Cluster Front Line Demonstrations have been encouraging compared to existing practices. This gives us the hope to break yield plateau resulting in production of sufficient quantity of pulses to meet per capita availability of pulses for ensuring nutritional security and agro-ecological sustainability.

I am thankful to the Ministry of Agriculture and Farmers Welfare, GOI, New Delhi for funding to this project and for timely monitoring of the project by various institutions across the zone. I am also grateful to Dr. A.K. Singh, Deputy Director General and Dr V.P. Chahal, Assistant Director General for their able guidance for efficient implementation of the NFSM.

I complement scientists of ICAR-Agricultural Technology Application Research Institute, Zone-II, Jodhpur for implementing the project and coordinating with different stakeholders involved in pulse production. I am thankful to the nodal officers of NFSM from KVKs and Directors of ICAR institutes, Extension Education from various State Agricultural Universities of Rajasthan and Haryana for implementing this project in the right spirit for enhancing pulse production in Zone-II.

I am confident that concerted efforts and more emphasis will be given in a participatory mode in future by KVKs of this zone to achieve self-sufficiency in pulses in the county.

I hope this publication will be helpful for scientists, policy planners, extension workers, students and farmers.

(S.K. Singh)

Contents

Abbreviation

ATARI	Agricultural Technology Application Research Institute
BCR	Benefit Cost Ratio
CFLDs	Cluster Front Line Demonstrations
GOI	Government of India
ICAR	Indian Council of Agricultural Research
IPDM	Integrated Pest and Disease Management
SRR	Seed Replacement Rate
NFSM	National Food Security Mission
MSP	Minimum Support Price
INM	Integrated Nutrient Management
IWM	Integrated Weed Management
KVK	Krishi Vigyan Kendra
YVM	Yellow Vein Mosaic

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Executive Summary

India is the largest producer, consumer, importer and exporter of pulses. Pulses are important for the larger vegetarian population of the country. The mismatch between demand and supply has arrived the concern of different partners of development. As a result, detailed program was prepared by Division of Agricultural Extension, ICAR, New Delhi on Cluster Front Line Demonstrations under National Food Security Mission, Ministry of Agriculture & Farmers Welfare, GOI, New Delhi with an objective to demonstrate the production potential of major pulse crops (Green gram, black gram, pigeon pea, chickpea, lentil, field pea, etc.) in the major pulse growing states viz; Madhaya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, Andhra Pradesh, Karnataka, Gujarat, Odisha, Bihar, Tamilnadu & West Bengal. Analysis of district specific production constraints, preparation of technology modules for each district, knowledge and skill upgradation of nodal officers and extension workers, CFLDs and regular monitoring have been key components of this program. Under ICAR-ATARI, Zone-II, Jodhpur, 49 KVKs are actively involved to demonstrate proven technological packages of pulses for higher productivity and profitability. Initiatives in the form of a collaborative project "Cluster Front Line Demonstration on Pulses" was undertaken since October 2015 under National Food Security Mission with financial assistance of Department of Agriculture, Cooperation & Farmers Welfare, GOI, New Delhi.

Results of CFLDs has shown encouraging potentials. It will also help in breaking yield plateau to achieve production of sufficient quantity of pulses to meet per capita availability of pulses for ensuring nutritional security and agro-ecological sustainability.

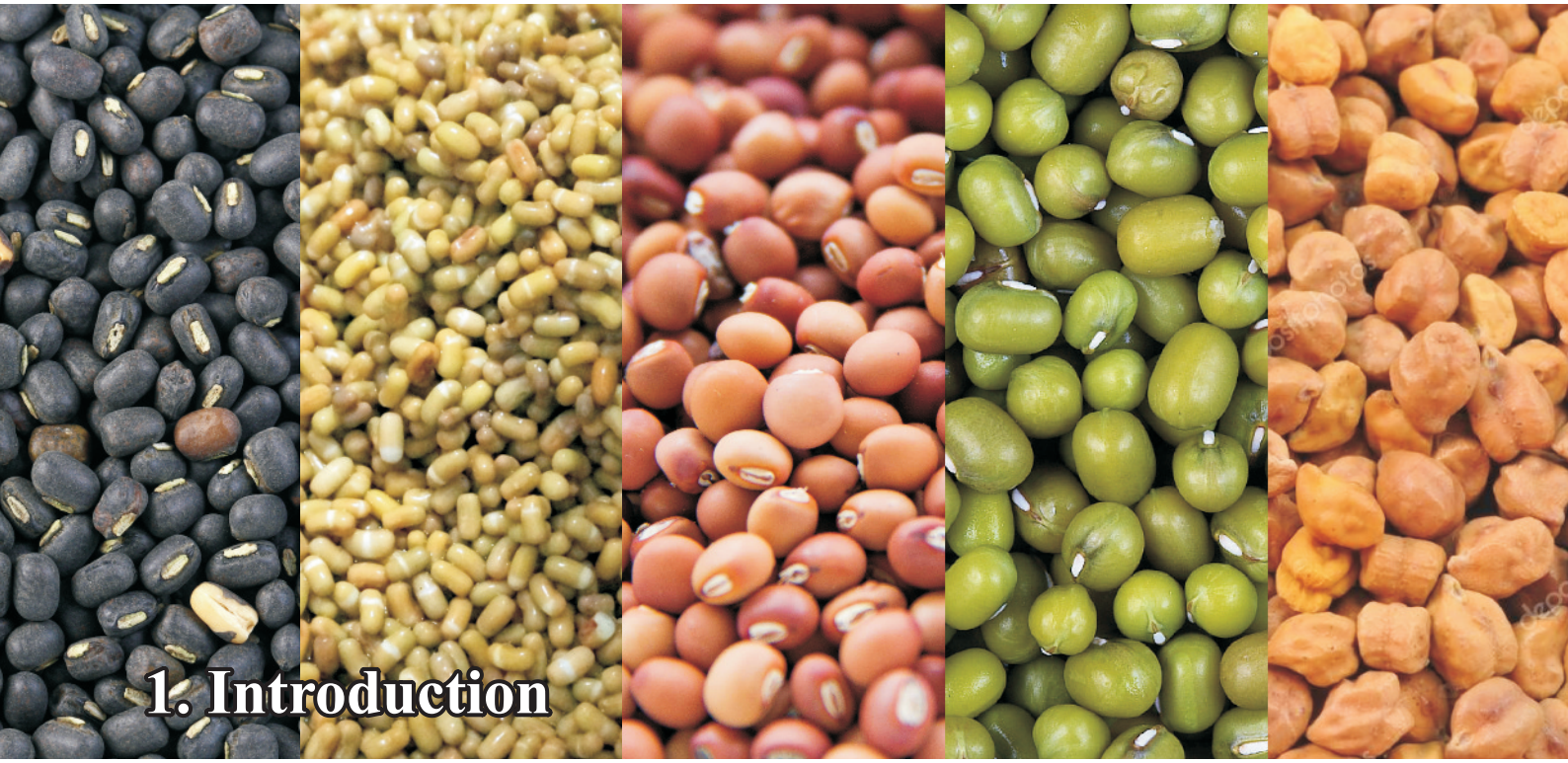
Total 49 KVKs including 34 KVKs from Rajasthan & 15 KVKs from Haryana weren actively involved in conductance of CFLDs. During 2017-18, a total of 8064 CFLDs were laid out in the 3439.60 ha area under different micro-farming situations of selected districts. In Rajasthan, 34 KVKs have been actively involved in conductance of CFLDs during Kharif, Rabi and Summer season. In Haryana,15 KVKs demonstrated production potentialities of pulses.

Results revealed that performance of Moth bean was highest in the Pali district of Rajasthan. The yield from the Pali district was observed as 6.60 q/ha. Highest yield of green gram was noticed by KVK, Bhiwani (10.34q/ha) in Haryana followed by KVK, Ajmer (10.27 q/ha) in Rajasthan. Performance of CFLDs on Black gram was highest in Jhalawar district (12.33 q/ha). Chickpea productivity was quite satisfactory during 2017-18. KVK, Chittorgarh (Rajasthan) experienced the yield of 24.38q/ha while Karnal district observed yield of 20.00 q/ha during Rabi 2017-18.

Selected farmers were mobilized at village to keep 20-25% produce as seed for large scale multiplication and farmers to farmers' diffusion. Most of them followed and kept seeds of green gram, black gram and chick pea which were used during Kharif-2017, Rabi 2017-18 and Summer 2018. Majority of KVKs have identified new villages for conductance of CFLDs. During Kharif 2018, mostly farmers used seeds of green gram of different varieties (GAM-5, IMP-02-03, MH-421, PDM-139) in 20850.00 ha. Black gram covered 8800.00 ha area under improved varieties during Kharif 2018 in selected district of Rajasthan & Haryana.

Farmers used improved varieties of Moth bean in 2740.00 ha area during Kharif 2018. More than 2000.00 ha area will be covered during Rabi 2018-19 under different improved varieties of Chickpea. Follow up studies have been conducted by a team of scientist of selected KVKs. Study revealed that, 70-80% farmers were fully followed the management of sucking pests in green gram and black gram during Kharif 2018. Post-emergence herbicide used by 56% farmers after 20-25 days of sowing of green gram and black gram. Due to less pre-population, farmers opined about no use of post emergence herbicide during Kharif 2018.

A total of 74 training in diverse fields were organised by KVKs of Rajasthan & Haryana state for skill development of 7065 farmers and farm women. Total 188 extension activities were organized by KVKs of Rajasthan while 65 activities were conducted by KVKs of Haryana covering 10232 and 3028 farmers/farm women, respectively. To keep updated on latest technologies, ICAR-ATARI, Zone-II, Jodhpur organized two days workshop-cum-training on pulse production technology for nodal officers of KVKs. Two days group meeting was also organized. CFLDs were frequently monitored by officials of ICAR, ATARI, Jodhpur, DMD, Jaipur, Indian Council of Agricultural Research and Ministry of Agriculture and Farmers Welfare, New Delhi.



1. Introduction

Pulses are playing a significant role in existing farm production systems by enriching soil health. Pulses are also providing food & nutritional security and ensuring agro-ecological sustainability to country's ever-growing population. Pulses are known as "*poor man's meat*" as they serve as cheapest and concentrated source of protein and amino acids to vegetarians and weaker sections of the society. Pulses prevent and help manage chronic diseases such as diabetes, coronary conditions and cancer. As a part of a healthy diet, high in fiber and fight against obesity. Pulses are an important source of plant-based protein for livestock. By products of pulses like leaves, pod coats and bran are fed to animals in the form of dry fodder. Pulses help in nitrogen cycling with their ability to fix the atmospheric nitrogen in the soil, thus help in improving soil health. Pulses are predominantly cultivated in rainfed areas of the country. In present scenario of pulses in the country, following points need to be emphasized.

- Raise awareness about the vital role of pulses in sustainable food production and healthy diets and their contribution to food security and nutrition;
- Promote the value and utilization of pulses throughout the food system, their benefits for soil fertility and climate change and for combating malnutrition;
- Encourage connections throughout the food chain to further global production of pulses, foster enhanced research, better utilize crop rotations and address the challenges in the trade of pulses.

Pulses are mainly produced in Asian countries and particularly in the Indian sub-continent. In India, pulses are grown under different agro-climatic conditions. India is the largest producer, importer and consumer of pulses, accounting for 25% of global production from 35% of global area under pulses. According to 3rd advance estimate, pulse production in India is 24.51 Million Tonnes during 2017-18

which is highest ever in the country (Table 1.1). India primarily produces bengal gram (chickpea), red gram (tur), lentil (masur), green gram (mung bean) and black gram (urad). India is the largest producer of chickpea (*Cicer arietinum* L.) and pigeon pea [(*Cajanus cajan* (L) Mill sp.] with 67.5 and 63.7% of share in global production, respectively. Chickpea contributes in India's export basket of pulses registering 64.10 and 62.64% (April to November, 2017) share in the total pulses export during 2016-17 and 2017-18, respectively. Peas (Matar) form a major share with 48.00 and 52.33% share in import of total pulses in India during 2016-17 and 2017-18, respectively. Despite of largest producer of pulses, the increasing demand-supply gap has been concerned to achieve nutritional security. It is predicted that the country would require 39 million tonnes of total pulses by 2050 and country need to produce at higher pace than the existing.

Table 1.1 Crop-wise Production of Pulses in India during 2014-15 to 2017-18

Pulses	2014-15		2015-16		2016-17*		2017-18**	
	Production (Thousand Tonnes)	% Share in total production	Production (Thousand Tonnes)	% Share in total production	Production (Thousand Tonnes)	% Share in total production	Production (Thousand Tonnes)	% Share in total production
Pigeon pea	2810.00	16.38	2560.00	15.65	4870.00	21.05	4180.00	17.05
Chickpea	7330.00	42.74	7060.00	43.18	9380.00	40.55	11160.00	45.53
Green gram	1500.00	8.74	1590.00	9.72	2170.00	9.32	1900.00	7.75
Black gram	1960.00	11.42	1950.00	11.92	2830.00	12.23	3280.00	13.38
Other Pulses	3550.00	26.69	3190.00	19.52	3880.00	16.77	3990.00	16.27
Total Pulses	**17150.00**		**16350.00**		**23130.00**		**24510.00**	

Source: Directorate of Economics and Statistics *Based on Final Advance Estimates for 2016-17.
**Based on 3rd Advance Estimates for 2017-18.

Pulses being predominantly rainfed crop are grown in constrained and limiting factor environment. Hence, increase in productivity had remained a major challenge for several decades. The productivity of pulses in India is less than half of the productivity levels in USA and Canada. The production of pulses is constrained by low and uncertain yields and returns which leads to least preference by farmers to grow pulses on irrigated and fertile land. To reduce the price volatility, government of India has increased Minimum Support Price (MSP) on pulses considerably over the years (Table 1.2).

Technological options in pulses are available with promise to raise the productivity levels. These recent technologies need to be demonstrated at farmers' fields in participatory mode to build their confidence in new technologies. Realizing the need to increase area under pulses cultivation and increase the production of pulses, Department of Agriculture and Cooperation, Ministry of Agrucultre & Farmers Welfare sanctioned project "Cluster Front Line Demonstrations on Pulses 2015-16" under

Table 1.2 Minimum Support Price of Pulses Crops from 2012-13 to 2018-19 (Rs./q)

Pulses	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Pigeon pea	3850	4300	4350	4625	5050	5450	5675
Chickpea	3000	3100	3175	3500	4000	4400	4620
Green gram	4400	4500	4600	4850	5225	5575	6975
Black gram	4300	4300	4350	4625	5000	5400	5600
Lentil	2900	2950	3075	3400	3950	4250	4475

Source: http://www.agricoop.nic.in

National Food Security Mission (NFSM) to Indian Council of Agricultural Research. ICAR-ATARI, Zone-II, Jodhpur is implementing this project through a network of KVKs of Rajasthan and Haryana States.

The project envisages to demonstrate production potential of new technologies and varieties of pulse crops at farmers' fields through KVKs to showcase the application of modern technologies to address the issues related to production of pulses in the country. This approach is appropriate in strengthening of forward and backward linkages in the larger interest of the farming community.

1.1 Mission objectives

- Increasing production of pulses through area expansion and productivity enhancement in a sustainable manner in the identified districts of the country; ensure food and fodder security-area expansion and productivity enhancement of food crops including dual purpose coarse cereals.
- Restoring soil fertility and productivity at the individual farm level
- Enhancing farm level economy (i.e. farm profits) to restore confidence amongst the farmers
- Increasing the Seed Replacement Rate (SRR) under pulses crop, and
- To increase self-sufficiency in nutrient by increasing pulses production with quality seed production of pulses.

1.2 Mission Strategy

To achieve the above objectives, the mission strategies are as follows:

- Focus on low productivity and high potential districts including cultivation of food grain crops in rain fed areas.
- Implementation of cropping system centric interventions in a mission mode approach through active engagement of all the stakeholders at various levels.
- Agro-climatic zone wise planning and cluster approach for crop productivity enhancement.
- Focus on pulse production through utilization of rice fallow, rice bunds and intercropping of pulses with coarse cereals, oilseeds and commercial crops (sugarcane, cotton and jute).

- Promotion and extension of improved technologies i.e. seed, integrated nutrient management (INM) including micronutrients, soil amendments, integrated pest management (IPM), input use efficiency and resource conservation technologies alongwith capacity building of the farmers/extension functionaries.

1.3 Guidelines for Conductance of CFLDs by KVKs

- KVKs need to organize Front Line Demonstrations in cluster mode to propagate newer technologies and good quality seeds to farmers.
- Older varieties/local varieties/farm produced seeds under CFLDs are not allowed.
- For the purpose of spreading and adoption of newer/proven technologies, display boards should be installed on the sites of CFLDs which should include the details such as total number of farmers, name of crop, village, name of varieties etc.
- Preparation of success stories by each KVK and sending to ATARI for necessary modifications.
- Ensure timely availability of inputs before sowing season and frequent visits of scientists in CFLDs sites.
- Ensure timely submission of physical and financial progress reports alongwith utilization certificate for quick release of funds.
- Demonstrations on each pulse crop should be organized in cluster approach (at least 10 ha. in each cluster).
- The high yielding varieties of pulse crops to be included in the demonstration should not be older than 10 years.
- Chemical fertilizers are not allowed as input under CFLDs. However, payment of various operations/services and inputs (seed, bio-fertilizers, soil ameliorants, micro-nutrients) are allowed. Farmers have to apply recommended dose of chemical fertilizers to attain potential yield.
- Scientists from KVK will conduct visits to the demonstrations site to resolve problem on the spot.
- Each KVK will furnish cafeteria of interventions for each crop to be undertaken at the demonstration site.
- For individual farmer, CFLDs should not exceed more than 0.8 ha.
- Each KVK should try to choose interior areas; where in farmers have been deprived of demonstrations conducted by extension agencies.
- KVK should focus on use of micro-nutrients, soil ameliorants and Integrated Pest Management (IPM) practices.
- Farmers should be trained for seed production, primary processing, etc.

1.4 Major constraints hindering the pulse production especially in reference to Rajasthan & Haryana

- Terminal droughts & heat stress in rabi pulses mainly in chickpea.
- Moisture and heat stress in Kharif pulses except south Haryana heavy rainfall zone.
- Erratic & untimely rainfall, high humidity & cloudy weather at flowering stages resulting in flowers drop.
- Weeds are great menace during Kharif season.
- Incidence of thrips at flowering and podding stage in green gram and black gram.
- Pod borer in chickpea and pigeon pea.
- Losses caused by disease infestation (wilt & rot).
- Non-availability of quality seeds of farmers preferred varieties.
- Nematode infestation in sandy loam soils especially in Rajasthan in chickpea.
- High vulnerability of pulse crops to both biotic (pests and diseases) and abiotic stresses (temperature extremes and aberrant rainfall driven by climate change).
- Pulses are largely grown in marginal lands under rain fed conditions without much input.
- Inadequate availability of labour saving technologies (varieties suitable for machine harvesting, herbicide resistance) for pulses.
- Pulses are prone to damage by storage pests.
- Pulses are mostly grown in rain fed condition; therefore, area and productivity are highly dependent on rainfall situation.
- Procurement as per MSP with in district.

2. Technologies Demonstrated at Farmers Fields during CFLDs

Demonstration of technologies invariably be based on emerging issues. The concerned ICAR institutes in consultation with SAUs and other stakeholders develop a comprehensive plan for organizing the demonstrations in cluster mode. There will be a committee under chairmanship of Director of Research of concerned State Agriculture University which will decide the technology to be demonstrated. Technology programme should take care of the availability of newly released varieties/hybrid, drought resistance varieties, method of sowing, IPM, Integrated Nutrient Management (INM), micro-irrigation, farm machines etc. to be demonstrated. The seed agencies and the manufacturers should also be taken on board for deciding CFLDs. Varieties which are within 10 years' period from date of notification/release/identification should only be included in the demonstration purpose and those varieties in border lines should be avoided. Performance of technology demonstrated under CFLDs on Pulses crops has been presented in table-2.1 (green gram-summer), 2.2 (moth bean-kharif), 2.3 (green gram-kharif), 2.4 (black gram-kharif), 2.5 (pigeon pea-kharif) and 2.6 (chick pea-rabi).

Training on seed treatment: KVK, Ajmer (Rajasthan)

Table 2.1 Technology demonstrated on Green gram during summer 2017

Crops	Varieties	Seed Treatment	Weed Management	Fertilizer Management	Insect pest and Disease
Green gram	IMP-02-03, IPM-99-125, GM-4, GAM-5	Termite-Chlorpyriphos 400ml/100 kg seed, Fipronil 5 SC 10.0 ml	Pre-plant incorporation (PPI): Alachlor or Fluchloralin @1.5 ml/ lit of water a.i. / ha. Pre-emergence (PE): Pendimethalin @ 1.0-1.5 a.i./ha in 500-600 litre of water. Post-emergence (PoE): Imazethapyr a.i. 10 SL @ 3.30 litre/ha 500-600 litre of water at 20-25 DAS	N: P: K: S* 20:40:20:20	Need based management of insect-pest and diseases

*Cost of chemical fertilizers has been invested by farmers themselves.

Table 2.2 Technology demonstrated on Moth bean during Kharif-2017-18

Crops	Varieties	Seed Treatment	Weed Management	Fertilizer Management	Insect Pest and Disease
Moth bean	CZM-2, RMO-257	Thiram 80% WP @ 2.0-3.0 g/kg seed. Trichoderma spp. (8-10 g/Kg seed) and Rhizobium spp. (one packet (200 g) for /10 kg seed), PSB cultures each @ 15-20 g/Kg seed. Termite- Chlorpyriphos 400ml/100 kg seed, Fipronil 5 SC 10.0 ml	Pre-emergence (PE): Pendimethalin @ 1.0-1.5 a.i. /ha Post emergence: Imazethapyr a.i. 10 SL@3.30 litre/ ha in 500-600 litre of water at 20-25 DAS	N: P: K: S* 20:40:20:20	Need based management of insect-pest and diseases

*Cost of chemical fertilizers has been invested by farmers themselves.

Table 2.3 Technology demonstrated on Green gram during Kharif-2017-18

Crops	Varieties	Seed Treatment	Weed Management	Fertilizer Management	Insect Pest & Disease
Green gram	GM-4, GAM-5 IPM-02-03, MH-421	Thiram @ 2.0-3.0 g, Carbendazim @1.0-2.0 g/Kg Seed. or Trichoderma spp. (one packet (200 g) for /10 kg seed) and Rhizobium spp., PSB cultures each @ 15-20 g/Kg seed. Termite: Chlorpyriphos 400ml/100 kg seed, Fipronil 5 SC 10.0 ml	Pre-emergence (PE): Pendimethalin @ 1.0-1.5 a.i./ha, in 500-800 lit. of water. Post emergence: Imazethapyr a.i. 10 SL@3.30 litre/ ha in 500-600 litre of water at 20-25 DAS	N: P: K: S* 20:40:20:20	Need based management of insect pest and diseases

*Cost of chemical fertilizers has been invested by farmers themselves.

Table 2.4 Technology demonstrated on Black gram during Kharif-2017-18

Crops	Varieties	Seed Treatment	Weed Management	Fertilizer Management	Insect Pest & Disease
Black gram	PU-31 & Azad-3	Carbendazim + Thiram (1+2 gm/kg seed); for seed born disease. or Trichoderma spp. seed) and Rhizobium spp. (one packet 200 g) for /10 kg seed), PSB cultures each @ 15-20 g/Kg seed for utilizing atmospheric N. (one packet 200 g) of culture for/10 kg seed) Termite- Chlorpyriphos 400ml/100 kg seed, Fipronil 5 SC 10.0 ml	Pre-emergence (PE): Pendimethalin @ 1.0-1.5 *a.i.*/ha in 500-600 liter of water. Post-emergence: Imazethapyr a.i. 10 SL@ 3.30 litre/ ha in 500-600 litre of water at 20-25 DAS	N: P: K: S* 20:40:20:20	Need based management of insect pest and diseases

*Cost of chemical fertilizers has been invested by farmers themselves.

Table 2.5 Technology demonstrated on Pigeon pea during Kharif-2017-18

Crops	Varieties	Seed Treatment	Weed Management	Fertilizer Management	Insect Pest & Disease
Pigeon pea	Pusa-991	Thiram 80 WP @ 2.0-3.0 g/kg Seed or Trichoderma spp. (one packet (200 g) for /10 kg seed) and Rhizobium spp., PSB	Pre-emergence (PE): Pendimethalin @ 1.0-1.5 a.i./ha in 500-600 litre of water. Post emergence: Imazethapyr a.i. 10 SL@ 3.30 litre/ ha in 500-600 litre of water at 20-25 DAS	N:P:K:S* 20:60:20:20	Need based management of insect pest and diseases

*Cost of chemical fertilizers has been invested by farmers themselves.

Table 2.6 Technology demonstrated on Chickpea during Rabi 2017-18

Crops	Varieties	Seed Treatment	Weed Management	Fertilizer Management	Insect Pest & Disease
Chickpea	CSJ-515 GNG-1581, GNG-1958, RSG-896, 974 & RSG-931	Thiram 3.0, Carbendazim 1.0-2.0, Carbendazim 1.0 + Thiram 2.0 g, Trichoderma viridae/T. harzenium 8.0-10.0 gm/kg seed Termite Chlorpyriphos400ml/100 kg seed, Fipronil 5 SC 10.0 ml	Alachlor or Fluchloralin @1.5 a.i./ ha (Pre-showing), Pendimethalin @ 1 kg a.i./ha (pre-mergence) Imazethapyr (a.i.) 10 SL @ 40-75gm/ha	Irrigated: N: P: K: S* 20:40:20:20 Unirrigated: N: P: K: S 20: 40:20:20	Need based IPM modules

*Cost of chemical fertilizers has been invested by farmers themselves.

3. Implementation of CFLDs

CFLDs is a unique approach to provide a direct interface between researcher and farmers. Since scientists are directly involved in planning, execution and monitoring of demonstrations for technologies developed by them, hence getting direct feedback on demonstrated technology on pulses and from farmers' field about pulses production. Feedback enables scientists to improve upon research programme accordingly. In CFLDs, Subject Matter Scientists provide technological inputs to extension scientists to organize demonstrations. Thus, CFLDs provide an opportunity to researchers and extension personnel for understanding the farmer's resources and requirement to fine tune and/or modify technologies for easy adaptability at farmers' fields. Front Line Demonstration is a form of applied research through Indian Council of Agricultural Research/State Agricultural University system on latest notified/released varieties along with full package of practices on selected farmers' fields with a view to demonstrate potentiality of technologies to participating farmers, neighbouring farmers and other agencies to analyse the production performance of technologies for scientific feedback. Under NFSM, CFLDs were demonstrated with following mentioned objectives.

- To demonstrate improved and proven production technologies of pulses on the farmers' fields under different farming situations.
- To popularize newly notified & improved varieties/technologies for varietal diversification and efficient management of resources.

- To bring synergy among planers, researchers, farmers and industry for parable interface through seminars/symposium on emerging themes of importance in field of pulses production for deciding strategies for development of pulses.

Keeping in view the mission objectives and strategies, ICAR-Agricultural Technology Application Research Institutes (ATARI), Jodhpur is implementing CFLDs on Pulses for showing production potential of usable & feasible technologies in Rajasthan and Haryana. The major focus was on specific technology modules (full Package of Practices) for each district including newly developed varieties, management technology including resource conservation, INM, Integrated Weed Management (IWM), Integrated Pest and Diseases Management (IPDM) and intercropping etc. The emphasis has been given to bridge the gap between existing and potential production of pulses through available technology options, meticulous planning of demonstrations and monitoring of crops by the KVKs at critical stages of ongoing CFLDs under scheme.

The collaborative project entitled "Cluster Frontline Demonstrations on Pulses Production Technology" is being implemented with the active involvement of Division of Agricultural Extension, ICAR, New Delhi through a network of 534 KVKs across the country since October 2015. Total 49 KVKs including 34 KVKs from Rajasthan and 15 KVKs from Haryana have been actively involved in conductance of CFLDs in Kharif, Rabi and Spring/Summer season during 2017-18. During 2017-18, total 8800 CFLDs on pulses were allocated for demonstration to harness production potentialities of the newly released varieties along with full package of practices in the 3520 ha area (Table-3.1). CFLDs were organized during Kharif-2017, Rabi-2017-18 and Summer-2018 in participatory mode. An area of 3439.60 ha was covered with active involvement of 8064 partner farmers under CFLDs. State and crop wise yield gap is presented in Table 3.2.

Table 3.1 Targets and achievement of CFLDs on Pulses under NFSM during 2017-18

State & Season	Sanctioned		Implemented	
	Demonstration	Area	Demonstration	Area
Rajasthan (Kharif 2017)	3300.00	1320.00	2787.00	1229.60
Haryana (Kharif 2017)	275.00	110.00	203.00	100.00
Rajasthan (Rabi 2017-18)	3450.00	1380.00	3469.00	1430.00
Haryana (Rabi 2017-18)	650.00	260.00	480.00	230.00
Rajasthan (Summer 2018)	250.00	100.00	250.00	100.00
Haryana (Summer 2018)	875.00	350.00	875.00	350.00
Total	**8800.00**	**3520.00**	**8064.00**	**3439.60**

Table 3.2 State & crop wise yield gap in CFLDs, farmer practice & state average yield (2017-18)

Name of State	Name of Crop	Demo yield (q/ha)	Farmers practise (q/ha)	State average yield (q/ha)	National average yield (q/ha)**	Yield gap between demo & farmers practise (q/ha)	Yield gap between demo & state avg. yield (q/ha)
(1)	(2)	(3)	(4)	(5)	(6)	(7)=(3-4)	(8)=(3-5)
Rajasthan	Green gram-Kharif	6.84	5.26	4.52	418.44	1.58	2.32
Haryana	Green gram-Kharif	9.20	6.15	6.99		3.05	2.21
Rajasthan	Moth bean	5.01	3.59*	3.00	-	1.42	2.01
Rajasthan	Black gram	8.34	6.25*	6.06	547.05	2.09	2.28
Rajasthan	Chickpea	18.10	13.79*	10.53	858.60	4.31	7.57
Haryana	Chickpea	17.31	12.50	8.45		4.81	8.86
Haryana	Lentil	10.72	8.11	8.70	791.61	2.61	2.02

Source: *http://www.agriculture.rajasthan.gov.in/content/agriculture/hi/Agriculture/statistics.html
**http://mospi.nic.in/statistical-year-book-india/2017/177

3.1 Performance of CFLDs on Moth bean during Kharif -2017 in Rajasthan

Moth bean is an important pulse crop of arid and semi-arid regions of India. Moth bean is a hot weather and drought resistant legume. The crop is generally grown in north western deserts regions of India especially in area where moong bean suffers from drought. Moth bean crop is extensively grown in Rajasthan. Moth bean demonstrations were laid out in 110 ha area at 265 farmers' field in five districts of Rajasthan state (Table-3.3). The average yield under demonstration was 5.01q/ha with net return of Rs.

Table 3.3 Performance of CFLDs on Moth bean during Kharif-2017-18 in Rajasthan

Agro-climatic Zone/ Climate	KVKs	Dist. Avg. (q/ha)	Variety Demonstrated	Area (ha)	No. of Demo	Average Yield (q/ha)		% increase	Net Return (Rs./ha)		BCR	
						Check	Demo		Check	Demo	Check	Demo
I a – Arid western plains zone	Jodhpur-I	3.68	CZM-2	30.00	75.00	4.30	5.13	19.30	3700	5790	1.40	1.60
	Barmer-I	0.85	RMO-435	20.00	50.00	2.50	5.21	108.4	3450	6785	1.32	1.59
			Total	**50.00**	**125.00**	-	-	-	-	-	-	-
			Average	-	-	**3.40**	**5.17**	**63.85**	**3575**	**6287**	**1.36**	**1.59**
II a – Transitional plain of inland drainage	Nagaur-I	3.93	CZM-2	20.00	50.00	2.83	3.00	6.01	-960	1156	0.90	1.11
II b - Transitional plain of Luni basin (Semiarid)	Pali	3.14	CZM-2	20.00	40.00	4.50	6.60	46.67	5525	8418	1.40	1.77
I c- Hyper arid and partially irrigated western plain (Arid)	Churu- I	3.68	RMO-257	20.00	50.00	3.82	5.11	33.77	5168	9529	1.63	2.03

6336/ha compared to local variety (3.59/ha). Under demonstration, a yield advantage of 42.83% has been reported. The performance of Moth bean is depicted in Fig-3.1.

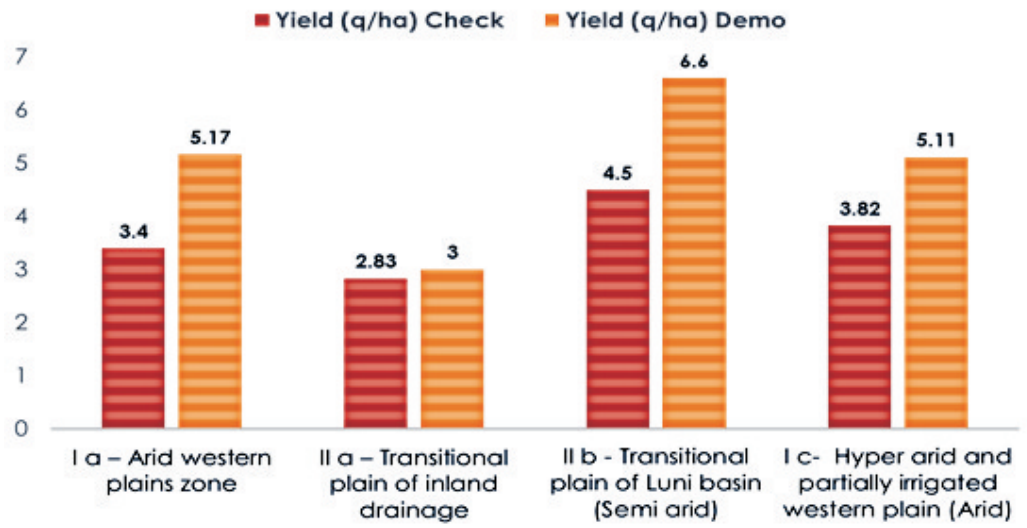


Fig-3.1 Agro climatic zone wise performance of Moth bean in Rajasthan during Kharif-2017.

Moth bean variety— CZM-2: KVK Nagaur-I (Rajasthan)

3.2 Performance of CFLDs on Green gram during Kharif-2017

Green gram is one of the important pulse crops in India. It is grown in approximately 3.50 million ha area in India and 1.10 million ha in Rajasthan. It is a drought resistant crop and suitable for dry land farming and predominantly used as an intercrop with other crops. Green gram supplies protein requirement of vegetarian population of the country. It is a protein rich staple food. It contains about 25 percent protein, which is almost three times that of cereals. It is consumed in the form of split pulse as well as whole pulse.

A total of 1694 CFLDs were laid out in 789.6 ha area in Rajasthan and Haryana states during Kharif 2017 (Table-3.4). Out of total CFLDs, 1516 demonstrations were conducted in 699.6 ha area of Rajasthan state while 90 ha area covered under 178 demonstrations in Haryana. Highest average yield was observed in Semiarid eastern plain (Semiarid) (III a) i.e., 7.88q/ha which involved Ajmer, Tonk & Jaipur-I district. In Rajasthan, maximum yield of 10.27q/ha was recorded by KVK, Ajmer under green gram package demonstration including improved variety IPM-02-03. The performance of green gram is depicted in Fig-3.2. Majority of farmers have followed application of Post emergence herbicide (Imazethapyr @50 g ai ha-1on 15-20 DAS in green gram. Management of sucking pests was done by all partner farmers under CFLDs of green gram. Farmers have committed to follow management of sucking pests in green gram during Kharif-2018.

Table 3.4 Performance of CFLDs on Green gram during Kharif-2017-18 in Rajasthan

Agro-climatic Zone/ Climate	KVKs	Dist. Avg. (q/ha)	Variety Demonstrated	Area (ha)	No. of Demo	Average Yield (q/ha)		% increase	Net Return (Rs./ha)		BCR	
						Check	Demo		Check	Demo	Check	Demo
I a -Arid western plains zone (Arid)	Barmer- I	1.21	GAM-5	30.00	43.00	4.30	6.89	60.23	17510	25181	2.38	2.90
	Jodhpur-I	3.96	IPM-02-03	30.00	75.00	5.25	6.33	20.57	16169	20890	2.23	2.45
			Total	**60.00**	**118.00**	-	-	-	-	-	-	-
			Average	-	-	**4.78**	**6.61**	**40.40**	**16839**	**23035**	**2.31**	**2.68**
I b – Irrigated north western plain zone	Hanumangarh-I	4.84	MH-421	20.00	50.00	6.16	7.70	25.00	20247	26732	2.44	2.65
			Total	**20.00**	**50.00**	-	-	-	-	-	-	-
			Average	-	-	**6.16**	**7.70**	**25.00**	**20247**	**26732**	**2.44**	**2.65**
I c- Hyper arid and partially irrigated western plain (Arid)	Bikaner- I	6.83	IPM-02-03	20.00	50.00	6.59	8.10	22.91	13178	18520	1.91	2.19
	Jaisalmer- I	3.55	IPM-02-03	40.00	50.00	4.80	6.40	33.33	15614	22104	2.45	2.69
	Churu- I	2.81	IPM-02-03	30.00	75.00	4.80	6.18	28.75	9592	16636	1.91	2.37
			Total	**90.00**	**175.00**	-	-	-	-	-	-	-
			Average	-	-	**5.40**	**6.89**	**28.33**	**12794**	**19086**	**2.09**	**2.42**
II a - Transitional plain of inland drainage (Semi arid)	Jhunjhunu	5.75	IPM-02-03	50.00	125.00	3.02	3.62	19.87	964	1274	1.08	1.09
	Sikar	8.35	IPM-02-03	20.00	50.00	5.50	6.59	19.82	11650	15105	1.78	1.89
	Nagaur-I	6.02	GM-4	31.60	79.00	2.41	3.14	30.29	-2029	889	0.84	1.07
			Total	**101.60**	**254.00**	-	-	-	-	-	-	-
			Average	-	-	**3.64**	**4.45**	**23.33**	**3528**	**5756**	**1.24**	**1.35**

Agro-climatic Zone/ Climate	KVKs	Dist. Avg. (q/ha)	Variety Demonstrated	Area (ha)	No. of Demo	Average Yield (q/ha)		% increase	Net Return (Rs./ha)		BCR	
						Check	Demo		Check	Demo	Check	Demo
II b - Transitional plain of Luni basin (Semi arid)	Pali	3.82	IPM-02-03	48.00	80.00	5.20	7.90	51.92	15195	22593	1.22	2.22
	Jalore	3.55	IPM-02-03	50.00	124.00	5.70	7.50	31.58	9750	21900	1.52	2.13
	Sirohi*	3.61	IPM-02-03	50.00	125.00							
			Total	**148.00**	**329.00**	-	-	-	-	-	-	-
			Average	-	-	**5.45**	**7.70**	**41.75**	**12472**	**22246**	**1.37**	**2.18**
III a - Semi arid eastern plain (Semi arid)	Ajmer	7.01	IPM-02-03	50.00	85.00	7.34	10.27	39.92	19915	32237	2.19	2.69
	Jaipur-I	6.81	IPM-02-03	50.00	125.00	4.85	5.91	21.86	8876	12191	1.84	2.06
	Tonk	7.19	IPM-02-03	40.00	65.00	5.45	7.45	36.70	18250	22675	2.19	2.24
			Total	**140.00**	**275.00**	-	-	-	-	-	-	-
			Average	-	-	**5.88**	**7.88**	**32.82**	**15680**	**22367**	**2.07**	**2.33**
III b - Flood prone eastern plain zone (Semi arid)	Karauli	5.00	IPM-02-03	20.00	50.00	7.20	10.00	38.89	23460	37590	2.65	2.95
	Alwar-I	5.00	SML-668	30.00	40.00	3.21	3.90	21.50	7646	12078	1.54	1.82
			Total	**50.00**	**90.00**	-	-	-	-	-	-	-
			Average	-	-	**5.21**	**6.95**	**30.19**	**15553**	**24834**	**2.10**	**2.39**
IV a - Sub humid southern plain & Aravalli hill zone	Rajsamand	4.95	IPM-02-03	30.00	75.00	6.65	8.12	22.11	10098	14703	1.59	1.83
	Bhilwara	5.35	IPM-02-03	30.00	75.00	5.20	6.91	32.88	10300	16390	1.98	2.46
			Total	**60.00**	**150.00**	-	-	-	-	-	-	-
			Average	-	-	**5.93**	**7.52**	**27.49**	**10199**	**15546**	**1.78**	**2.14**
V - Humid south eastern plain	Sawai Madhopur	4.96	IPM-02-03	30.00	75.00	5.39	7.22	33.95	13544	19652	2.27	2.70
			Total	**30.00**	**75.00**	-	-	-	-	-	-	-
			Average	-	-	**5.39**	**7.22**	**33.95**	**13544**	**19652**	**2.27**	**2.70**

* Crop failure due to heavy rainfall in Sirohi district.

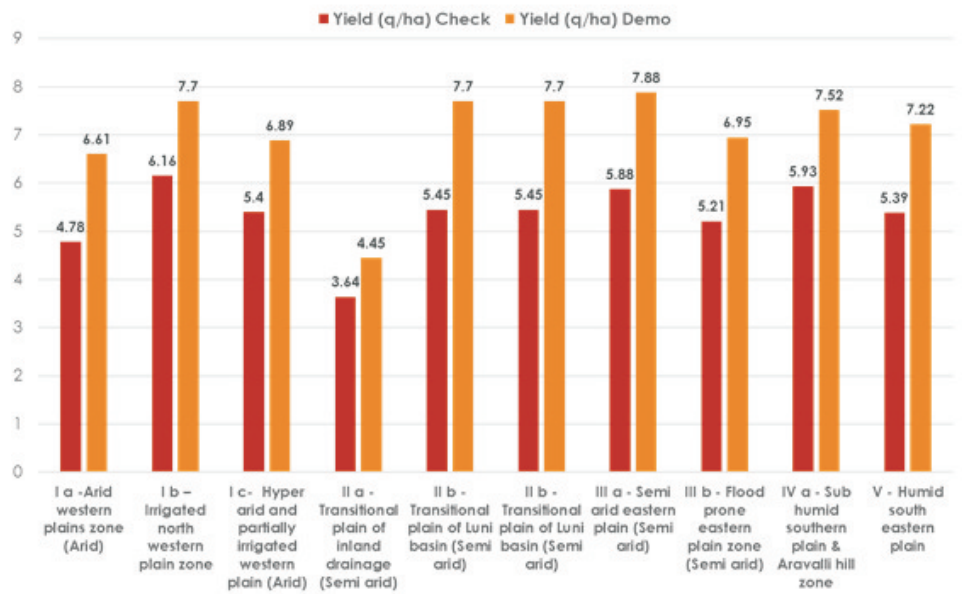


Fig-3.2 Agro climatic zone wise performance of Green gram in Rajasthan during Kharif-2017

Green gram variety-MH-421 at KVK Hanumangarh (Rajasthan)

IPM-02-03 - Green gram variety at KVK Tonk (Rajasthan)

Table 3.5 Performance of CFLDs on Green gram organized during Kharif-2017-18 in Haryana

KVKs	Dist. Avg. (q/ha)	Variety Demonstrated	Area (ha)	No. Of Demo	Average Yield (q/ha)		% increase	Net Return (Rs./ha)		BCR	
					Check	Demo		Check	Demo	Check	Demo
Mahendergarh	5.50	MH-421	40.00	100.00	6.70	8.07	20.44	16600	21560	1.98	2.14
Bhiwani	5.70	MH-421	50.00	78.00	5.60	10.34	84.64	9411	28887	1.35	2.02
		Total	**90.00**	**178.00**	-	-	-	-	-	-	-
		Average	-	-	**6.15**	**9.20**	**52.54**	**13005**	**25223**	**1.66**	**2.08**

3.3 Performance of CFLDs on Black gram during Kharif-2017

Black gram is mainly cultivated in Indian subcontinent. In India, Black gram is popular as "Urad dal" and it is highly prized pulse among all the pulses. Area under black gram is 4.10 million ha. Most suitable climate to cultivate black gram is 27-30° C with heavy rainfall. This crop prefers loamy soil which has high water holding capability. Black gram is grown normally in 90-120 days and it also enriches the soil with nitrogen (60 kg/ha) due to its nitrogen fixing ability. India is major producer and consumer country of black gram. Total 1006 demonstrations were conducted in 420.00 ha in Rajasthan to harness production potential of black gram under real farming situations. The highest average yield was observed in Humid south eastern plain (V) i.e., 10.48q/ha including Kota, Jhalawar, Baran, Bundi & Sawai Madhopur districts. In Rajasthan, maximum yield of 12.33q/ha was recorded by KVK, Jhalawar under package demonstration including improved variety PU-31of black gram. All partner farmers applied 100 kg DAP/ha at time of sowing of black gram during Kharif-2017. Farmers stored 20-25 percent produce as seed for multiplication during Kharif 2018 and Farmer to Farmer exchange of seed. The performance of Black gram is depicted in Fig-3.3. & Table 3.6.

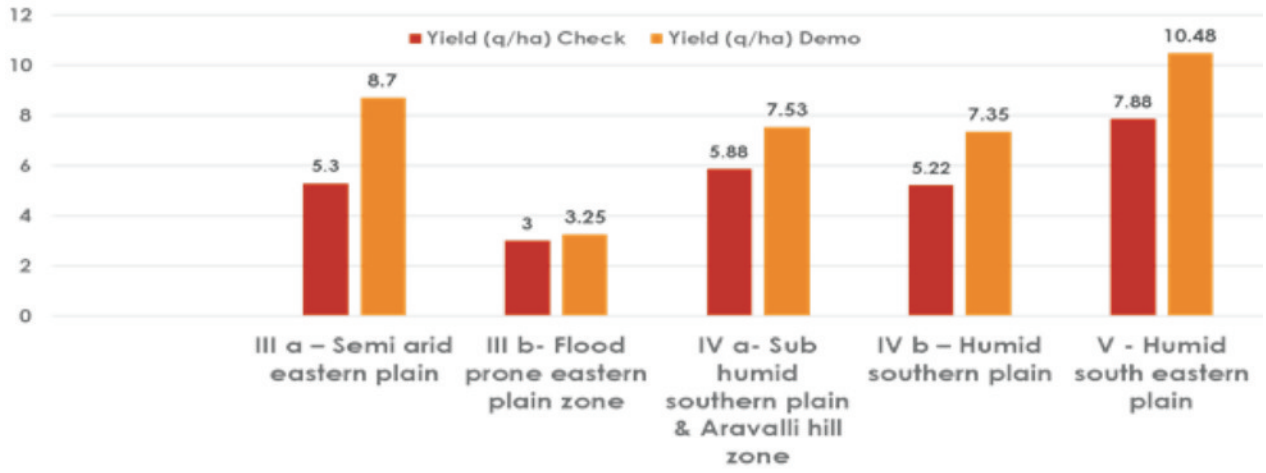


Fig. 3.3 Agro climatic zone wise performance of Black gram in Rajasthan during Kharif-2017

Table 3.6 Performance of CFLDs on Black gram organized during Kharif-2017-18 in Rajasthan

Agro-climatic Zone/ Climate	KVKs	Dist. Avg. (q/ha)	Variety Demonstrated	Area (ha)	No. Of Demo	Average Yield (q/ha)		% increase	Net Return (Rs./ha)		BCR	
						Check	Demo		Check	Demo	Check	Demo
III a – Semi arid eastern plain	Tonk	5.55	PU-31	30.00	53.00	5.30	8.70	64.15	20350	28350	2.23	2.45
			Total	**30.00**	**53.00**	-	-	-	-	-	-	-
			Average	-	-	**5.30**	**8.70**	**64.15**	**20350**	**28350**	**2.23**	**2.45**
III b- Flood prone eastern plain zone	Alwar-I	6.06	PU-31	30.00	47.00	3.00	3.25	8.33	5300	8750	1.41	1.61
			Total	**30.00**	**47.00**	-	-	-	-	-	-	-
			Average	-	-	**3.00**	**3.25**	**8.33**	**5300**	**8750**	**1.41**	**1.61**
IV a- Sub humid southern plain & Aravalli hill zone	Bhilwara	4.95	PU-31	30.00	75.00	6.00	7.70	28.33	7800	15950	1.85	2.07
	Rajsamand	6.41	PU-31	30.00	75.00	7.43	9.45	27.19	13153	19998	1.79	2.12
	Chittorgarh	3.18	PU-31	30.00	75.00	5.83	7.29	25.04	15962	21866	2.03	2.25
	Partapgarh	8.68	PU-31	30.00	75.00	6.20	7.90	27.42	12465	18355	1.92	2.24
	Udaipur	4.13	PU-31	30.00	72.00	3.96	5.31	34.09	1874	7314	1.10	1.40
			Total	**150.00**	**372.00**	-	-	-	-	-	-	-
			Average	-	-	**5.88**	**7.53**	**28.41**	**10250**	**16696**	**1.73**	**2.01**
IV b – Humid southern plain	Banswara	6.97	PU-31	30.00	75.00	5.65	7.21	27.61	6858	10656	1.51	1.70
	Dungarpur	7.38	Azad-3	20.00	59.00	4.80	7.50	56.25	18380	37351	2.43	3.76
			Total	**50.00**	**134.00**	-	-	-	-	-	-	-
			Average	-	-	**5.22**	**7.35**	**41.93**	**12619**	**24003**	**1.96**	**2.72**
V - Humid south eastern plain	Kota	8.27	PU-31	30.00	75.00	7.25	10.35	42.76	12670	20725	1.78	2.00
	Jhalawar	6.88	PU-31	30.00	75.00	10.08	12.33	22.32	12039	20723	1.54	1.98
	Baran	7.64	PU-31	50.00	125.00	9.20	11.41	24.02	27160	50935	1.21	1.56
	Bundi	6.26	PU-31	30.00	75.00	7.14	9.90	38.66	20006	32209	1.93	2.25
	Sawai Madhopur	7.19	PU-31	20.00	50.00	5.77	8.45	46.45	16192	23332	2.49	2.95
			Total	**160.00**	**400.00**	-	-	-	-	-	-	-
			Average	-	-	**7.88**	**10.48**	**34.84**	**17613**	**29584**	**1.78**	**2.14**

Overall performance of technological packages demonstrated in participatory mode under CFLDs of black gram has been found quite satisfactory. Analysis of above data of Table 3.6 indicates that clay loam & loam soils and good rainfall have been found suitable for harnessing potential yield of black gram. In Kota region similar situations are prevailing and farmers obtained Maximum yield of black gram in comparison to other zones of Rajasthan.

Black gram variety PU-31 at KVK Banswara (Rajasthan)

3.4 Performance of CFLDs on Pigeon pea during Kharif -2017 in Haryana

Pigeon pea scientifically known as Cajanus Cajan, and it belongs to the widespread family of pulses. In India, Pigeon Pea is more popular as Arhar or Red gram. On a normal basis flowering begins in 120 to 150 days and accordingly pigeon pea seeds mature in 250 days under rain fed situation. In fully irrigated farming situations, early pigeon pea (140-145 days) is grown and farmers follow Pigeon pea-Wheat crop rotation. In Haryana, water is available and sowing of pigeon pea was done in Ist fortnight of June, 2017 under demonstration in Gurugram district and harvesting was completed in Ist fortnight of November 2017. Early Pigeon pea demonstrations were laid out in 10 ha area at 25 farmer's fields in Gurugram to demonstrate superiority of technological packages over existing practices. Farmers fetched net return of Rs. 70798/ha with yield advantage of Rs. 17.35 q/ha. The performance of Pigeon pea shown in Table-3.7.

Table 3.7 Performance of CFLDs on Pigeon pea organized during Kharif-2017-18 in Haryana

KVKs	Variety Demonstrated	Area (ha)	No. Of Demo	Yield (q/ha)		% increase	Net Return (Rs./ha)		BCR	
				Check	Demo		Check	Demo	Check	Demo
Gurugram	Pusa-991	10.00	25.00	15.60	17.35	11.21	57560	70798	3.17	3.72

Pigeon pea variety Pusa-991 at KVK Gurugram (Haryana)

3.5 Performance of CFLDs on Chickpea during Rabi-2017-18 in Rajasthan

Chickpea is the most preferred pulse crop of Rabi season of Rajasthan state. Farmers are always eager to cultivate chickpea in almost all districts of Rajasthan. But terminal droughts affect area/coverage of chickpea. Technological packages were finalized in active participation of farmers to conduct CFLDs on chickpea during Rabi 2017-18. Farmers contributed 25 to 30 per cent cost of seeds of different varieties of chickpea. Maximum average yield (19.91q/ha) reported in Humid south eastern plain (V). Farmers have opined that they will continue apply of accepted technological packages in coming season. Yield of chickpea could be increased by simple use of quality seeds of farmers preferred variety(s) in different agro-ecological zones of Rajasthan (Table-3.8). Farmers viewed that GNG-1581 variety is compatible with existing farming situations. Farmers obtained net profit of Rs. 78814/- ha in Sub humid southern plain & Aravalli hill zone in Chittorgarh district. It was observed that productivity of chickpea was quite satisfactory during rabi 2017-18 as there was less attack of pod-borer in chickpea. Majority of farmers kept 20-25 percent produce as seed for next year multiplication and farmer to farmer exchange.

Agro-climatic zone wise analysis of performance of different technological packages under Cluster Front Line Demonstrations indicates that Humid South Eastern Plain Zone, Humid Souther plain zone and Sub humid southern plain & Aravalli hill zone are most suitable for chickpea cultivation to harness potential yield of chickpea. Average production of chickpea has been reported in the range of 18.00 to 24.30 q/ha in these regions. Farmers also obtained more than 19.00 q/ha yield in the irrigated situation of Sri Ganganagar (19.99 q) & Hanumangarh (19.06 q) district of Rajasthan.

Table 3.8 Agro climatic zone wise Performance of CFLDs on Chickpea organized during Rabi 2017-18 in Rajasthan

Agro-climatic Zone/ Climate	KVKs	Dist. Avg. (q/ha)	Variety Demonstrated	Area (ha)	No. of Demo	Average Yield (q/ha)		% increase	Net Return (Rs./ha)		BCR	
						Check	Demo		Check	Demo	Check	Demo
I a -Arid western plains zone (Arid)	Barmer- I	9.11	GNG-1581	50.00	63.00	9.37	14.67	56.56	18350	38609	1.80	2.49
	Jodhpur-I	9.42	GNG-1581	20.00	50.00	11.93	15.01	25.82	9110	30355	1.34	1.52
			Total	**70.00**	**113.00**	-	-	-	-	-	-	-
			Average	-	-	**10.65**	**14.84**	**41.19**	**13730**	**34482**	**1.57**	**2.00**
I b – Irrigated north western plain zone	Hanumangarh-I	6.79	GNG-1581	30.00	75.00	16.79	19.99	19.06	49888	61129	2.94	3.23
	Sriganganagar	9.89	GNG-1958	60.00	150.00	15.50	19.06	22.97	41992	61964	2.69	3.36
			Total	**90.00**	**225.00**	-	-	-	-	-	-	-
			Average	-	-	**16.15**	**19.53**	**21.01**	**45940**	**61546**	**2.82**	**3.29**
I c- Hyper arid and partially irrigated western plain (Arid)	Bikaner- I	8.54	GNG-1581	30.00	75.00	15.66	19.58	25.03	25310	39030	1.86	2.32
	Churu- I	3.47	GNG-1581	50.00	125.00	11.48	17.12	49.13	27396	46819	2.40	3.00
			Total	**80.00**	**200.00**	-	-	-	-	-	-	-
			Average	-	-	**13.57**	**18.35**	**37.08**	**26353**	**42924**	**2.13**	**2.66**
II a - Transitional plain of inland drainage (Semi arid)	Jhunjhunu	12.52	GNG-1581	50.00	125.00	8.50	13.75	61.76	28309	17200	1.45	1.53
	Sikar	10.19	GNG-1581	50.00	125.00	14.92	17.86	19.71	58084	58084	2.86	2.86
	Nagaur-I	8.29	GNG-1581	50.00	125.00	10.44	12.44	19.16	30136	37699	2.23	2.56
			Total	**150.00**	**375.00**	-	-	-	-	-	-	-
			Average	-	-	**11.29**	**14.68**	**33.54**	**38843**	**37661**	**2.18**	**2.32**
II b - Transitional plain of Luni basin (Semi arid)	Pali	13.40	RSG-974	50.00	117.00	12.90	15.94	23.60	24318	41140	1.75	2.42
	Jalore	11.70	GNG-1581	30.00	75.00	12.6	16.00	26.98	28400	42986	2.29	2.77
	Sirohi	7.30	GNG-1581	40.00	100.00	7.00	18.80	168.57	17000	43418	1.68	2.74
			Total	**120.00**	**292.00**	-	-	-	-	-	-	-
			Average	-	-	**10.83**	**16.91**	**73.05**	**23239**	**42514**	**1.91**	**2.64**
III a - Semi arid eastern plain (Semi arid)	Ajmer	8.39	GNG-1581	50.00	100.00	10.59	13.81	30.40	27809	39517	2.48	2.86
	Jaipur-I	10.49	RSG-974	50.00	113.00	14.11	18.18	28.81	39729	55555	2.78	3.27
	Tonk	9.84	CSJ-515	30.00	60.00	14.00	19.41	38.64	43350	62654	3.29	3.67
	Dausa	14.89	GNG-1581	100.00	250.00	16.79	20.20	20.31	30550	43598	1.91	2.38
			Total	**230.00**	**523.00**	-	-	-	-	-	-	-
			Average	-	-	**13.87**	**17.90**	**29.54**	**35359**	**50331**	**2.61**	**3.05**
III b - Flood prone eastern plain zone (Semi arid)	Karauli	15.53	GNG-1958	40.00	100.00	16.00	19.64	22.75	38700	52160	2.78	3.27
	Alwar-I	14.74	CSJ-515	50.00	67.00	16.00	18.30	14.38	68742	68742	4.25	4.56
	Bharatpur	11.76	RSG-895	40.00	100.00	11.18	14.18	26.83	38000	49500	2.46	2.76
	Dholpur	9.10	GNG-1958	50.00	125.00	18.00	21.45	19.17	54300	67680	3.18	3.53
			Total	**180.00**	**392.00**	-	-	-	-	-	-	-

Agro-climatic Zone/ Climate	KVKs	Dist. Avg. (q/ha)	Variety Demonstrated	Area (ha)	No. of Demo	Average Yield (q/ha)		% increase	Net Return (Rs./ha)		BCR	
						Check	Demo		Check	Demo	Check	Demo
			Average	**-**	**-**	**15.30**	**18.39**	**20.78**	**49935**	**59520**	**3.17**	**3.53**
IV a - Sub humid southern plain & Aravalli hill zone	Rajsamand	9.10	GNG-1581	40.00	100.00	15.10	18.78	24.37	43440	57177	2.89	3.25
	Bhilwara	11.21	GNG-1581	40.00	100.00	15.18	20.06	32.15	41992	61964	2.69	3.36
	Chittorgarh	15.14	RSG-974	40.00	100.00	19.22	24.38	26.85	61010	78814	3.59	3.77
	Udaipur	13.68	GNG-1581	50.00	98.00	12.68	16.75	32.10	26723	39213	2.15	2.46
	Pratapgarh	14.74	GNG-1581	40.00	100.00	13.07	17.68	35.27	23963	37012	2.17	2.60
			Total	**210.00**	**498.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
			Average	**-**	**-**	**15.05**	**19.53**	**30.15**	**39425**	**54836**	**2.70**	**3.09**
IV b – Humid southern plain	Banswara	10.94	GNG-1581	30.00	75.00	11.80	17.96	52.20	20080	42456	1.70	2.36
	Dungarpur	11.65	GNG-1581	50.00	246.00	13.90	18.50	33.09	21770	40115	1.81	2.37
			Total	80.00	321.00	**-**	**-**	**-**	**-**	**-**	**-**	**-**
			Average	**-**	**-**	12.85	18.23	42.65	20925	41285.5	1.75	2.37
V - Humid south eastern plain	Sawai Madhopur	18.02	GNG-1958	50.00	125.00	12.50	19.77	58.16	49498	67819	3.06	3.70
	Kota	17.02	GNG-1958	40.00	100.00	15.48	19.06	23.13	45666	60414	2.80	3.17
	Bundi	15.09	GNG-1958	40.00	80.00	17.29	20.65	19.43	46276	59616	2.55	2.91
	Jhalawar	12.91	GNG-1581	40.00	100.00	15.48	21.24	37.17	28586	47423	2.39	3.17
	Baran	17.73	GNG-1958	50.00	125.00	15.84	18.84	18.94	46246	58828	1.97	2.44
			Total	**220.00**	**530.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
			Average	**-**	**-**	**15.32**	**19.91**	**31.37**	**43254**	**58820**	**2.55**	**3.08**

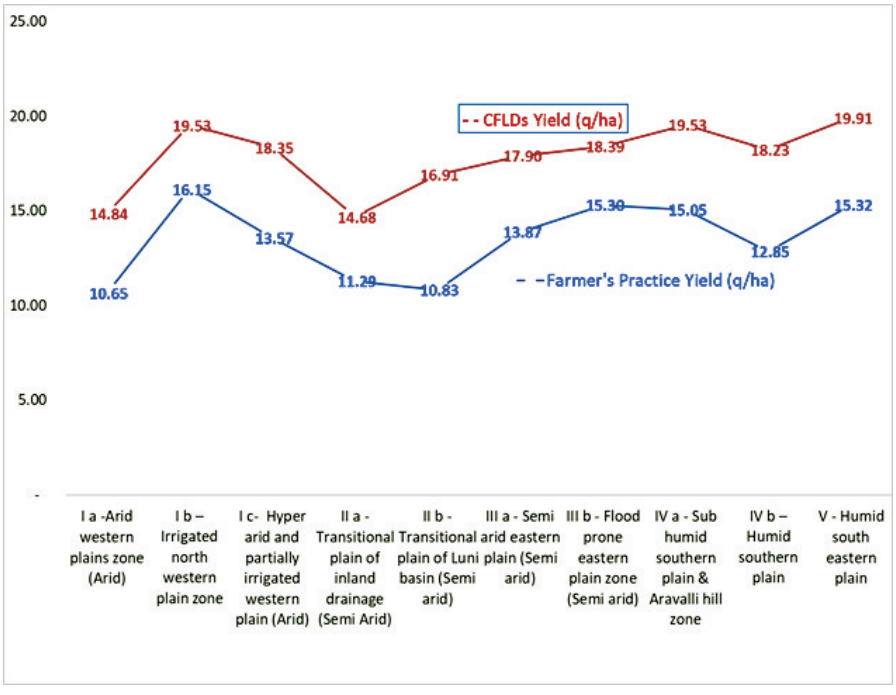


Fig.-3.4 Agro climatic zone wise performance of Chick pea in Rajasthan during Rabi 2017-18.

Field day on Chickpea variety RSG-974: KVK- Pali (Rajasthan)

Field day on Chickpea variety GNG-1581: KVK- Tonk (Rajasthan)

3.6 Performance of CFLDs on Chickpea during Rabi-2017-18 in Haryana

Total 422 CFLDs on chickpea were laid out in 200.00 ha area by 6 KVKs of Haryana during 2017-18. Integration of technological packages had shown superiority over local practices and farmers obtained average yield 20.00 q/ha in Karnal district under paddy-chickpea crop rotation. Majority of farmers kept 15-20 percent produce as seeds. The details are presented in Table 3.9.

Table 3.9 Performance of CFLDs on Chickpea during Rabi 2017-18 in Haryana

KVKs	Variety Demonstrated	Area (ha)	No. Of Demo	Average Yield (q/ha)		% Increase	Net Return (Rs./ha)		BCR	
				Check	Demo		Check	Demo	Check	Demo
Gurugram	RSG-931	40.00	96.00	13.30	14.94	12.33	33552	45234	1.02	1.03
Mahendergarh	GNG-1581	40.00	100.00	12.50	17.80	42.40	34825	44735	2.45	2.69
Ambala	CSJ-515	20.00	44.00	14.00	17.65	26.05	47600	62359	3.88	4.50
Bhiwani	CSJ 515	50.00	50.00	8.90	18.00	102.25	9727	23706	1.21	1.48
Hisar	CSJ 515	30.00	75.00	13.83	18.16	31.30	31738	47519	2.72	3.58
Karnal	HC-5	20.00	57.00	14.82	20.00	34.95	41496	60882	2.60	3.01
Total		**200.00**	**422.00**	-	-	-	-	-	-	-
Average		-	-	**12.89**	**17.76**	**41.55**	**33156**	**47406**	**2.31**	**2.72**

Chickpea variety CSJ-515: KVK-Hisar (Haryana)

3.7 Performance of CFLDs on Lentil during Rabi-2017-18 in Haryana

Lentil demonstrations were laid out by KVK Yamunanagar and Ambala of Haryana during 2017-18 in 30.00 ha at 58 farmers' fields. LL-931 variety along with technological packages was demonstrated at farmers' fields. Demonstration average yield was 10.73 q/ha and there was 31.70 percent increase over local practice. Farmers obtained Rs. 27523/ha average net profit under demonstrated technologies of lentil. The details are presented in Table 3.10 .

Table 3.10 Performance of CFLDs on Lentil during Rabi 2017-18 in Haryana

KVKs	Variety Demonstrated	Area (ha)	No. of Demo	Average Yield (q/ha)		% increase	Net Return (Rs./ha)		BCR	
				Check	Demo		Check	Demo	Check	Demo
Yamunanagar	LL-931	20.00	36.00	8.72	12.12	38.99	8175	20581	1.29	1.69
Ambala	LL-931	10.00	22.00	7.50	9.33	24.40	18375	34465	2.23	2.46
Total		**30.00**	**58.00**	-	-	-	-	-	-	-
Average		-	-	**8.11**	**10.73**	**31.70**	**13275**	**27523**	**1.76**	**2.08**

Lentil variety LL-931: KVK-Yamunanagar (Haryana)

4. Scenario and Disposal Pattern of Produce of Pulses

Role of seeds as an agricultural input technology cannot be underestimated. Seed is an indispensable input in any agricultural production system and its quality determines the overall grain yield and the market value of the final product. Hence, emphasis was given to mobilise the farmers to keep the seed for sowing in next season and distribute among peer group.

4.1 Disposal pattern of produce under CFLDs of Kharif-2017

Table 4.1 clearly depicts the disposal pattern of produce under CFLDs of Kharif 2017 especially Green gram, Black gram and Moth bean. Table reveled that four varieties of green gram i.e., GAM-5, IPM-02-03, MH-421 and PDM-139 are predominant at field level. IPM-02-03 variety occupied 11850 ha during Kharif 2018 followed by GAM-5 with 3870 ha area. PU-31 variety of Black gram spread in 7800 ha area followed by Azad Urd-3 (1000 ha) during kharif 2018. Table 4.1 shows that CZM-2 variety of Moth bean occupied 1580 ha area followed by RMO-435 and RMO-257.

4.2 Disposal pattern of produce under CFLDs of Rabi-2017-18

Table 4.2 shows the varieties sown during Rabi 2017-18. GNG-1581-a promising variety of chickpea occupied prominent place in zone-II with 8145 ha area. Variety GNG-1958 covered 2425 ha area followed by other varieties i.e., RSG-974, CSJ-515 and RSG-895.

To promote informal seed system, selected farmers have been mobilized at village level to keep 20-25% produce as seed for large scale multiplication and farmers to farmers' diffusion. Most of them followed and kept seeds of green gram, black gram, chick pea which were used during Kharif-2017, Rabi 2017-18 and Summer 2018.

Table 4.1 Disposal pattern of pulse produce under CFLDs of Kharif-2017

Sl. No.	Crop/Variety	Area (ha)	Total production (q)	Sold as grain (q)	Kept for own consumption	Used as seed during Khairf 2018 (q)	Area covered during Kharif 2018 (ha)
Green gram							
1	GAM-5	60.00	580.00	145.00	48.00	387.00	3870.00
2	IMP-02-03	3538.00	5165.00	2380.00	1600.00	1185.00	11850.00
3	MH-421	110.00	978.00	345.00	200.00	413.00	4130.00
4	PDM-139	30.00	270.00	150.00	20.00	100.00	1000.00
Black Gram							
1	PU-31	400.00	4150.00	2800.00	570.00	780.00	7800.00
2	Azad Urd-3	20.00	240.00	100.00	40.00	100.00	1000.00
Moth bean							
1	CZM-2	70.00	450.00	180.00	70.00	200.00	1580.00
2	RMO-257	20.00	140.00	50.00	30.00	60.00	490.00
3	RMO-435	20.00	148.00	48.00	40.00	80.00	670.00

Table 4.2 Disposal pattern of Pulse produce under CFLDs of Rabi 2017-18

Sl. No.	Crop/Variety	Area (ha)	Total production (q)	Sold as grain (q)	Kept for own consumption	Used as seed during Khairf 2018 (q)	Area covered during Kharif 2018 (ha)
Chickpea							
1	CSJ-515	80.00	1200.00	650.00	250.00	300.00	730.00
2	GNG-1581	840.00	12600.00	5300.00	1600.00	5700.00	8145.00
3	GNG-1958	330.00	5280.00	3000.00	1250.00	1670.00	2425.00
4	RSG-974	140.00	2248.00	1200.00	300.00	748.00	1068.00
5	RSG-895	40.00	630.00	230.00	150.00	350.00	500.00

5. Workshop & Group Meeting organized

A two day's Zonal Workshop-cum-Training Program on Production Technology of Pulse crops for 49 KVKs of Rajasthan & Haryana states was organized during 30-31st October, 2017 at ICAR-CAZRI, Jodhpur.

A two day's group meeting on pulses under National Food Security Mission for 33 KVKs of Rajasthan & Haryana states was organized during 22-23rd March, 2018 at ICAR-ATARI, Jodhpur.

6. Monitoring of CFLDs on Pulses during 2017-18

Monitoring is an important activity in extension programmes. The purpose of monitoring is to track implementation and outputs systematically, and measure the effectiveness of programmes. It helps determine exactly when a programme is on track and when changes may be needed. A number of officials visited in fields for monitoring and data generation from the stakeholders where CFLDs were conducted.

Table 6.1 Monitoring of CFLDs on Pulses by ATARI officials during 2017-18

Sl. No.	Date	Name of KVK	Name of Crop	Visited by
1.	27.06.2017	Churu-I	Moth bean, Green gram	Dr. S.K. Singh, Director, ATARI
2.	26.07.2017	Udaipur-I	Black gram	Dr. S.K. Singh, Director, ATARI
3.	01.08.2017	Bhiwani	Green gram	Dr. P.P. Rohilla, PS, ATARI
4.	28.08.2017	Jaisalmer-I	Green gram	Dr. S.K. Singh, Director, ATARI
5.	02.09.2017	Jaipur-I	Green gram	Dr. S.K. Singh, Director, ATARI
6.	06.09.2017	Bikaner-I	Green gram	Dr. M.S. Meena, PI
7.	04.10.2017	Kota	Black gram	Dr. S.K. Singh, Director, ATARI
8.	04.10.2017	Jhalawar	Black gram	Dr. P.P. Rohilla, PS, ATARI
9.	05.10.2017	Baran	Black gram	Dr. S.K. Singh, Director, ATARI
10.	06.10.2017	Bundi	Black gram	Dr. S.K. Singh, Director, ATARI
11.	13.10.2017	Ajmer	Green gram	Dr. S.K. Singh, Director, ATARI
12.	10.11.2017	Jaipur-I	Chickpea	Dr. M.S. Meena, PI
13.	02.11.2017	Banswara	Chickpea	Dr. M.S. Meena, PI
14.	13.11.2017	Gurugram	Pigeon pea	Dr. S.K. Singh, Director, ATARI
15.	14.11.2017	Ambala	Chickpea	Dr. P.P. Rohilla, PS, ATARI
16.	23.11.2017	Karauli	Chickpea	Dr. M.S. Meena, PI
17.	25.11.2017	Sawai Madhopur	Chickpea	Dr. M.S. Meena, PI
18.	28.11.2017	Sikar	Chickpea	Dr. S.K. Singh, Director, ATARI
19.	03.12.2017	Tonk	Chickpea	Dr. S.K. Singh, Director, ATARI

Sl. No.	Date	Name of KVK	Name of Crop	Visited by
20.	01.01.2018	Churu-I	Chickpea	Dr. P.P. Rohilla, PS, ATARI
21.	02.01.2018	Ajmer	Chickpea	Sh. Prabhat Singh, SRF
22.	03.01.2018	Sawai Madhopur	Chickpea	Sh. Ghanshyam Verma, SRF
23.	04.01.2018	Tonk	Chickpea	Sh. Ghanshyam Verma, SRF
24.	04.01.2018	Bhilwara	Chickpea	Sh. Prabhat Singh, SRF
25.	05.01.2018	Jaipur-I	Chickpea	Sh. Ghanshyam Verma, SRF
26.	05.01.2018	Chittorgarh	Chickpea	Sh. Prabhat Singh, SRF
27.	06.01.2018	Pratapgarh	Chickpea	Sh. Prabhat Singh, SRF
28.	19.01.2018	Udaipur	Chickpea	Dr. M.S. Meena, PI
29.	22.02.2018	Bharatpur	Chickpea	Dr. M.S. Meena, PI
30.	23.02.2018	Dausa	Chickpea	Dr. M.S. Meena, PI
31.	15.03.2018	Pali	Chickpea	Ghanshyam Verma, SRF
32.	19.03.2018	Udaipur	Chickpea	Dr. M.S. Meena, PI

Monitoring at KVK-Jalore (Rajasthan)

7. Documentation of Success Stories

Knowledge based farming in Rajasthan and Haryana has led to sustainable agriculture growth in recent times. A case study or success story creates visibility, credibility and clarity around the value and application of change management. Moreover, documentation of success stories is required for following reasons.

- Success stories create **Awareness**
- Success stories contribute to **Desire**
- Success stories make change management **Real**

7.1 Success story on moth bean

1.	**Name of KVK**	Pali
2.	**Name of partner farmer**	Shri Mangi Lal
3.	**Father's name**	Shri Kera Ram
4.	**Address of farmer**	V/p. Artia, Tehsil Rohat Distt. Pali
5.	**Mobile number**	9582142975

6. Technology demonstrated at Partner Farmers Fields

a)	Crop	Moth bean
b)	Variety	CZM-2
c)	Seed Rate	10 kg/ha
d)	Seed Treatment	Carbendazim 2 gm/kg seed
e)	Spacing (PxP & RxR) in cm	30x45 cm
f)	Irrigation Management	Rainfed
g)	Nutrient Management	60 kg DAP/ha
h)	Pest Management	Sucking pest Dimethoode 2ml/litere water
i)	Disease Management	YVMV (Dithen M 45 2ml /litre water)
j)	Weed Management	Manual
k)	Any other	Weed management with peg weeder and tractor cultivator in row

7. Extension activities

a) Two training programmes organized on 13th & 22nd July, 2017 in which 45 farmers participated.

b) Two field days were organized on 28th & 31st July, 2017 at partner farmer fields'.

c) Three Kisan Gosthi were also organized on 09th, 17th & 21st July, 2017.

8. Role of KVK

a) KVK Pali conducted one on campus training for farmers.

b) KVK Pali organized demonstrations with full package of practices.

9. Performance of CFLDs

Particulares		Yield (q/ha)
a)	Local variety	5.8
b)	Yield of CFLD	8.9
c)	Potential yield of variety*	10.8
d)	District average yield*	5.5
e)	State average yield*	6.5
f)	National average yield*	6.8

*Source: DOA, Govt. of Rajasthan, Jaipur

10. Performance in economic terms

Variety/Crop	B:C Ratio		Net Return (in Rs.)	
	Local	CFLDs	Local	CFLDs
CZM-2/Moth	1.2	2.3	12300	17400

11. Farmers' feedback

- CZM-2 variety of Moth bean is suitable for rainfed condition.
- More number of pod formation in low rainfall area.
- This variety has synchronization in maturity.

7.2 Success story on green gram

1.	**Name of KVK**	Ajmer
2.	**Name of partner farmer**	Sh. Nathu Lal
3.	**Father's name**	Sh. Nand Ram
4.	**Address of farmer**	Village Kumarikheda, Madhopura PS Sarwar, District Ajmer
5.	**Mobile number**	9950759188

6. Technology demonstrated at Partner Farmers Fields

a)	Crop	Green gram
b)	Variety	PM-5
c)	Seed Rate	16 kg/ha
d)	Seed Treatment	Carbendazim 1 gm/kg seed + NPK consortia @ 5 ml/kg seed
e)	Spacing (PxP & RxR) in cm	30 x 10 cm.
f)	Thinning	20 DAS
g)	Irrigation Management	Rainfed
h)	Nutrient Management	Basal application of 15 kg N & 35 Kg P_2O_5 sulphur @ 20 kg/ha
i)	Pest Management	Indoxacarb 14.7% sc for management of pod borer
j)	Disease Management	Carbendazim + Mancozeb for management of blight
k)	Weed Management	Imazethapyr 10% SL @ 40 gm ai/ha as early post emergence weedicide (20 DAS) and followed by manual weeding

7. Extension activities

a) One training programme organized on 19-20th June, 2017 in which 23 farmers participated.

b) One field day was organized on 05th Sept., 2017 at partner farmer fields.

c) One off campus training was organized on 12th July, 2018 in which 25 farmers participated.

8. Role of KVK

a) KVK Ajmer conducted one on campus training on improved cultivation practices of Kharif pulses in rainfed conditions.

b) KVK Ajmer convenienced the farmers for adopting the full package of practices.

c) KVK Ajmer organized a field day involving all the stakeholders.

9. Performance of CFLDs

Particulares		**Yield (q/ha)**
a)	Local variety	9.2
b)	Yield of CFLD	13.5
c)	Potential yield of variety	14.0
d)	District average yield	5.17 (2015-16)
e)	State average yield	4.38 (2015-16)
f)	National average yield	4.18 (2015-16)

10. Performance in economic terms

Variety/Crop	B:C Ratio		Net Return (in Rs.)	
	Local	CFLDs	Local	CFLDs
PM-5/Green gram	2.74	3.53	29215	48404

11. Farmers' feedback

- Variety is suitable for rainfed condition.
- Bold seeded variety.
- Variety is resistant against YVM.

7.3 Success story on black gram

1.	**Name of KVK**	Jhalawar
2.	**Name of partner farmer**	Sh. Bhairu Lal Lodha
3.	**Father's name**	Sh. Kanwar Lal Lodha
4.	**Address of farmer**	Vill.-Gadiyamer, Teh.- Asnawar
5.	**Mobile number**	8107635069

6. Technology demonstrated at Partner Farmers Fields

a)	Crop	Black gram
b)	Variety	PU-31
c)	Seed Rate	15 kg/ha
d)	Seed Treatment	Carbendazim 50 WP @ 2 gm/kg seed; for seed born disease. and Rhizobium spp. @ 10 ml/kg seed, PSB cultures each @ 10 ml/kg seed for utilizing atmospheric N.
e)	Spacing (PxP & RxR) in cm	30 x 10 cm
f)	Irrigation Management	Rainfed
g)	Nutrient Management	N: P_2O_5 (20:40) kg/ha
h)	Pest Management	Aphid, Jassid and Fly: Spray dimethoate @ 2.0 ml/l water
i)	Disease Management	Cercospora leaf spot: Carbendazim 50 WP @1.0 g/l
j)	Weed Management	Post emergence: Imazethapyr 10 SL @ 0.05 litre/ ha in 500-600 litre of water at 20-25 DAS
k)	Any other	Plant Protection measure- Sucking pest & Pod borer: Diamithoate 30 EC @1L/ha, Seed Treatment with Carbendazim 50WP @ 2g/kg seed

7. Extension activities

a) One training programme organized on 02nd Aug., 2017 in which 28 farmers participated.

b) Two field days were organized on11-12th Sept., 2017 at partner farmer fields' in which 137 farmers were participated.

c) One Kisan gosthi was organized on 23rd June, 2017 in which 56 farmers participated.

8. Role of KVK

a) KVK Jhalawar conducted one on-campus training on improved cultivation practices of Kharif pulses

b) KVK Jhalawar convenience the farmers for adopting full package of practices.

c) KVK Jhalawar organized a field day involving all the stakeholders.

9. Performance of CFLDs

Particulars		**Yield (q/ha)**
a)	Local variety	10.37
b)	Yield of CFLD	13.95
c)	Potential yield of variety*	22.00
d)	District average yield*	07.71
e)	State average yield*	06.24
f)	National average yield*	-

*Source: Crop wise fourth advance estimate of Area, Production and yield of various principal crops during 2017-18 by Commissionerate of Agriculture, Rajasthan, Jaipur.

10. Performance in economic terms

Variety/Crop	B:C Ratio		Net Return (in Rs.)	
	Local	CFLDs	Local	CFLDs
PU-31/Black gram	1.58	3.18	13026	26237

11. Farmers' feedback

- Variety PU-31 yielded higher than existing variety (T-9).
- Variety is resistant against YVM.

7.4 Success story on chickpea

1.	**Name of KVK**	Chittorgarh
2.	**Name of partner farmer**	Shri Deva Lal Dhakar
3.	**Father's name**	Shri Heera
4.	**Address of farmer**	Village- Kherpura, Tehsil-Begun, District- Chittorgarh
5.	**Mobile number**	9610705281

6. Technology demonstrated at Partner Farmers Fields

a)	Crop	Chickpea
b)	Variety	RSG-974
c)	Seed Rate	75 kg/ha
d)	Seed Treatment	Trichoderma (8gm/kg seed) and Biofertilizer culture with rhizoderma and PSB (600 gm for each culture)
e)	Spacing (PxP & RxR) in cm	30x5-7cm
f)	Nipping	35 days after sowing
g)	Irrigation Management	40 DAS & 65 DAS
h)	Nutrient Management	20 kg N+ 40 kg P_2O_5/ha
i)	Pest Management	Indoxacarb 350 ml/ha for management of Pod borer, installation of Pheromone Trap
j)	Weed Management	Hand hoeing at 25 DAS

7. Extension activities

a) One training programme organized on 09th Oct., 2017 at Kherpura in which 25 farmers participated.

b) One field day was organized on 22nd Feb., 2018 at partner farmer's field.

c) One Kisan Gosthi was organized on 05th Jan., 2018 in which 25 farmers participated.

8. Role of KVK

a) KVK Chittorgarh conducted one on-campus training and demonstrated seed treatment with tribiochoderma and bio fertilizer culture.

b) KVK Chittorgarh introduced chickpea variety RSG-974 first time in adopted villages and demonstrated this variety with full package of practices.

c) KVK Chittorgarh motivated to partner farmers for contribution of 20 kg seed.

9. Performance of CFLDs

Particulrs		**Yield (q/ha)**
a)	Local variety	20.26
b)	Yield of CFLD	27.44
c)	Potential yield of variety	28.00
d)	District average yield	11.99
e)	State average yield	8.15
f)	National average yield	9.88

10. Performance in economic terms

Variety/Crop	B:C Ratio		Net Return (in Rs.)	
	Local	CFLDs	Local	CFLDs
RSG-974/ Chickpea	3.73	4.24	65235	92278

11. Farmers' feedback

- Farmers preferred the variety because it is matured in 130-135 days.
- No incidence of wilt & root rot.
- Double seed/pods

8. Financial Sanction and Expenditure

The financial sanction for implementation of CFLDs on pulses and expenditure incurred in conductance of CFLDs and expenditure made during 2017-18 is depicted in table 8.1.

Table 8.1 Financial sanction and expenditure during 2017-18

S.No.	Particulars	Amount Sanction	Expenditure
1	CFLDs	26400000	24825051
2	Senior Research Fellow	360000	280000
3	Data Entry Operator	180000	180000
4	Pulse Technology Agent	2520000	1044237
5	Workshop	90000	63822
6	Group Meeting	50000	49527
7	Miscellaneous Expenditure	31000	31000
	Total	**29631000**	**26473637**

CFLDs implementing KVKs of Rajasthan & Haryana

SKRAU, Bikaner

1. Bikaner
2. Jhunjhunu
3. Jaisalmer-I
4. Sriganganagar

SKNAU, Jobner

1. Sikar
2. Bharatpur
3. Ajmer
4. Alwar-I
5. Dholpur
6. Dausa

AU, Jodhpur

1. Jalore
2. Naguar-I
3. Sirohi

AU, Kota

1. Sawai Madhopur
2. Karauli
3. Kota
4. Bundi
5. Jhalawar
6. Baran

MPUAT, Udaipur

1. Banswara
2. Bhilwara
3. Dungarpur
4. Chittorgarh
5. Rajsamand
6. Pratapgarh

NGOs of Rajasthan

1. Barmer-I
2. Udaipur
3. Churu-I
4. Jaipur-I
5. Tonk
6. Hanumangarh-I

DRMR, Bharatpur

1. Alwar-II

CAZRI, Jodhpur

1. Jodhpur-I
2. Pali

CCSHAU, HISAR

1. Yamunanagar
2. Kurukshetra
3. Panipat
4. Jind
5. Kaithal
6. Sonipat
7. Hisar
8. Rohtak
9. Sirsa
10. Mahendergarh
11. Bhiwani

IARI, New Delhi

1. Gurgaon

NDRI, Karnal

1. Karnal

NGOs of Haryana

1. Rewari
2. Ambala

हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

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ASCI
Agriculture Skill Council of India

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