Role of Frontline Demonstration on Chick Pea for Enhancing the Production in District Ramgarh of Jharkhand

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ABSTRACT

*Chickpea ias the most important crop for rabi season in Jharkhand. Farmers cultivated this crop for green pod and pulse grain. The cluster front line demonstration were conducted by Krishi Vigyan Kendra Ramgarh to fulfill the domestic demand and to boost the production and productivity 150 cluster frontline demonstration (CFLDs) on pulse in Chick pea were conducted at 326 farmer's field by Krishi Vigyan Kendra, Ramgarh from 2015-2019 in 60 ha areas. The district productivity (972 kg/ha) is at par with average national productivity 9744kg/ha, although state average1174.0kg/ha is higher than national productivity. The results of CFLDs show a greater impact on farming community due to significant increase in crop yield greater than farmer practice. The results revealed that improved variety of Vijay/ BG-372 and KPG-59 + (*Trichoderma viridi *5g/Kg +* Rhizobium *10g/kg) + Lime at the time of field preparation @ 250kg/ha with Pheromone trap 10 no./ha and NPV 250ml /ha with need based Pest management, foliar spray of B-20 during flowering time recorded average (three year) highest yield 12.70 q/ha as compared to farmer's practice i.e. 7.92 q/ha. The same trend was found in case of gross and net monetary returns which was Rs 52275 Rs.25925. and under farmer's practice it was Rs 37812.5 and Rs. 14737.5 respectively. Benefit cost ratio for demonstration and farmer's practice was 1.67 and 1.43 respectively. By incorporating proven technologies of chick pea, yield potential and net income can be enhanced to a great extent with increase in the income level of the farming community of the district.*

***Key words**: Extension gap; Technology transfer; Yield; Cluster front line demonstrations; Technology index;*

The pulses are grown across the country. Chickpea is grown by 22 states and 02 UTs of D & N Haveli and Delhi. Chick pea is a important pulse crop covering an area of 9.26 million ha and producing 9.37 million tones with national average yield 974kg/ha. In Jharkhand it cultivated in 0.02 million ha with 0.024 million tone production and the state average yield is 1174kg/ha which is above than national average. In our country Pulses crop cultivated in 34.99 million ha area (33.97% of world area), total production is 23.24 million tone (22.32% of world production) with national average yield 664 kg/ha (1030 kg/ha world average) during the 2016-17 (Directorate of Economics & statistics 2017). Six states namely Madhya Pradesh, Rajsthan, Maharastra, Karnataka, Andhra Pradesh and Uttar Pradesh contribute more than 90% in production in the country. Chickpea is an important rabi crop mainly sown in September- November and harvested in February. Crop duration is 90-120 d depending on the variety. It is best suited to areas having low to moderate rainfall and a mild cold weather. The state Jharkhand is dominating by Mono-cropping area only paddy crop cultivated in 70 per cent mid land and low land area. After harvesting the paddy there is not cultivating any crop. But Chick crop can be grown by using conservation agriculture in low land area which may give boon to the farmers as rabi season most important crop for fulfill the demand of protein in food. The field demonstrations conducted

under the close supervision of scientists of the National Agriculture Research System (NARS) is called Front-Line Demonstrations (FLD) because the technologies are demonstrated for the first time by the scientists themselves before being fed into the main extension system of the State Department of Agriculture. The main objective of Front-Line Demonstrations is to demonstrate newly released crop production and protection technologies and their management practices at the farmers' field under different agro-climatic regions and farming situations. While demonstrating the technologies in the farmers' field, the scientist are required to study the factors contributing higher crop production, field constraints of production and thereby generate production data and feedback information. Indian government imports large quantity of pulses to fulfill domestic requirement of pulses. In this regard, to sustain this production and consumption system, the Department of Agriculture, Cooperation and Farmers Welfare had sanctioned the project "Cluster Frontline Demonstrations on Rabi Pulses 2015-16'' to ICAR-ATARI, Patna through National Food Security Mission. This project was implemented by Krishi Vigyan Kendra, Ramgarh (Jharkhand) of Zone-IV with main objective to boost the production and productivity of pulses through CFLDs with latest and specific technologies.

METHODOLOGY

The following objective of the Cluster Frontline Demonstration viz: Improved crop production technologies, popularize the newly notified and improved varieties/technologies for varietal diversification and efficient management of resources. The present investigation of CFLDs was conducted during Rabi season 2015-19 by the KVK Ramgarh, Jharkhand (ICAR Research Complex for Eastern Region, Patna). For conducting FLDs, farmers were identified/ selected following the survey suggested by *Choudhary (1999)*. The demonstrations were conducted in farmer's field of 6 different villages from 2015-19, of Ramgarh district in Eastern Plateau and Hills Region (VII). The area was selected as rice fallow land which was laying fellow called rice fallow area. Total 326 farmers were selected in 60 ha area with 150 demonstration @0.4 acre. The selected farmers followed the full package of practices like soil testing, improved variety of Vijay/ BG-372 and KPG-59 + (*Trichoderma viridi* 5g/Kg + *Rhizobium* 10g/kg) + Lime at the time of field preparation @ 250kg/ ha with Pheromone trap 10 no./ha and NPV 250ml / ha with need based Pest management, foliar spray of B-20 during flowering time. Visit of farmers and the extension functionaries was organized at demonstration plots to disseminate the message at large scale. The beneficiaries under the program were facilitated by KVK scientists in performing field operations like sowing, spraying, weeding, harvesting etc during the course of training and visits. The traditional practices were maintained in case of local checks. The data were collected from both CFLD plots as well as control plots and finally the extension gap, technology gap, technology index along with the benefit cost ratio were worked out (*Samui et al., 2000*) as given below.

Technology gap= Potential yield - Demonstration yield

Extension gap= Demonstration yield - Farmer's yield

$$\text{Tech. index} = \frac{\text{Potential yield} - \text{Demo. yield}}{\text{Potential yield}} \times 100$$

RESULTS AND DISCUSSION

Cluster frontline demonstration on chickpea were conducted by using improved variety in 60 ha area at 326 farmers field in 6 villages in 0.4 ha demonstration model during 3 year from 2015-19. The gap between the farmers practice and recommended technologies of Chick pea (Vijay/ BG-372 and KPG-59) in district Ramgarh is presented in Table 1. Full gap was observed in case of use of improved variety, sowing method, seed treatment, plant protection, weed management and partial gap was observed in fertilizer dose, which definitely was the reason of not achieving potential yield. Farmers were not aware about recommended crop management technologies. Farmers in general used local or old-age varieties instead of the recommended high yielding resistant varieties. Unavailability of seed in time and lack of awareness were the main reasons. Details of technology are given in Table 2. Which shown the proven technology gas greater impact on yield and create awareness. The analysis depicted in Table 3 showed the average yield of Chick pea varieties (Vijay/ BG-372 and KPG-59) were 12.7 q/ha during 2015- 19 under demonstrated technology however, under farmer's practices the average yield were 7.92 q/ha during respective years. The results clearly indicate that the higher average yield in demonstration plots over farmers

Table 1. Improved production technology and farmers practices chickpea rice fellow area in mid land

Particulars Farming situation	Demonstration on Chickpea	Farmers practices	Tech. Gap (%)
Variety	Vijay, BG-372, KPG-59	L Local(Pehalwan)	100
Method of sowing	Line sowing	Broad casting	50
Time of sowing	Mid October to Mid November	November	50
Seed rate In kg/ha	75 kg/ha	100 kg/ha	50
Fertilizer / vermin- compost	20:50:20	10:20:00	100
Use of bio fertilizer	Rhizobium culture	Nil	100
Seed treatment	Biofertilizer and Trichoderma	No Seed treatment	100
Plant protection	Integrated pest management	Indiscriminate application	100
Interculture	Use weedicide Pendamethalin at pre emergence stage	Nil	100

Table 2. Details of Need Based Input Given on CFLD of chickpea

Year	No. (demos.)	Variety	Techn. demo.	Need based input
2015-16	50	Vijay, KPG-59 BG-372,	Improved variety, INM &IPM	Improved seed, seed treatment with *Rhizobium* and *Trcichoderma* + Lime at the time f field preparation and need based Pest management, foliar spray of B-20 during flowering time
2016-17	50	Vijay, KPG-59, BG-372	Improved variety, INM &IPM	Improved seed, seed treatment with *Rhizobium* and *Trcichoderma* + Lime at the time of field preparation and need based Pest management, foliar spray of B-20 during flowering time
2017-18	25	Vijay, BG-372, KPG-59	Improved variety, INM &IPM	Improved seed, seed treatment with *Rhizobium* and *Trcichoderma* + Lime at the time f field preparation and need based Pest management, foliar spray of B-20 during flowering time
2018-19	25	Vijay, BG-372, KPG-59	Improved variety, INM &IPM	Improved seed, seed treatment with *Rhizobium* and *Trcichoderma* + Lime at the time of field preparation and need based Pest management, foliar spray of B-20 during flowering time

Table 3. Productivity, technology gap, extension gap, technology index and benefit-cost ratio of chick pea grown under FLDs and existing package of practices

Year	Area (ha)	No. of farmer	Seed yield (Q/ha) Potential	CFLD	FP	% increase over control	Tech. gap (Q/ha)	Extn. gap (Q/ha)	Tech. gap (%)	B:C ratio
2015-16	20	72	20.0	12.8	7.8	39.06	7.2	5.0	36.0	2.11
2016-17	20	67	20.0	11.5	7.1	38.26	9.5	4.4	47.5	1.43
2017-18	10	42	20.0	12.9	8.2	36.43	7.1	4.7	35.5	1.67
2018-19	10	45	20.0	13.6	8.6	36.76	6.4	5.0	32.0	1.5
Total	60.00	326	20.0	12.7	7.92	37.62	7.55	4.77	37.75	1.67

plots were due to knowledge and adoption of full package and practices it increase up to 37.62 per cent as compared to local check. The above findings were in agreement with the findings of *Singh et al. (2014)* and *Tomar (2010)*. The higher yield of chickpea under improved technology was due to use of high yielding varieties, integrated nutrients management and integrated pest management. Similarly, yield enhancement in different crops in cluster front line demonstrations were documented by *Hiremath et al., (2007); Mishra et al., (2009); Kumar e. al., (2010); Surywanshi and Prakash (1993); Dhaka et al., (2010)* and *Dhaka et al., (2015)*. The decreasing trend in % increasing over control is indicating the suitability and adoptability of improved variety and technology. Yield of the front line demonstration and potential yield of the crop was compared to estimate the yield gaps which were further categorized into technology and extension gap. The technology gap in the demonstration yield against potential yield which ranged from 6.41 q/

Tale 4. Effect of Frontline Demonstrations on Yield and Economics of chick pea under cluster front line Demonstrations

Year	Farmer's Existing plot				Demonstration plot			
	Gross Cost (Rs/ha)	Gross return(Rs/ha)	Net Return (Rs/ha)	B:C ratio	Gross Cost (Rs/ha)	Gross return(Rs/ha)	Net Return (Rs/ha)	B:C ratio
2015-16	22500.00	30600.00	8100.00	1.36	24700.00	52200.00	27500.00	2.11
2016-17	22500.00	46150.00	23650.00	1.05	28800.00	70200.00	41400.00	1.43
2017-18	23500.00	37200.0	13700.00	1.58	25800.00	43200.00	17400.00	1.67
2018-19	23800.00	37300.00	13500.00	1.76	26100.00	43500.00	17400.00	1.5
Av. total	23075.00	37812.5	14737.5	1.43	26350	52275	25925	1.67

ha to 9.5 q/ha. Which reflects the farmer's cooperation in carrying out demonstrations with encouraging results in subsequent years? Similar finding was recorded by *Katare et al. (2011)* and *Sharma and Sharma (2004)* in oil seeds. The technology gap observed may be attributing to the dissimilarity in soil fertility status, timely sowing and weather conditions. Similar finding were recorded by *Mitra and Samajdar (2010)*. The extension gap means the difference between demonstration plot yield and farmers yield. The average extension gap was recorded 4047/ha during 2015-2019. Which emphasized the need to educate the farmers through various extension methods which was used during the demonstration? The technology index indicates the feasibility of the evolved technology in the farmer's field. Lower the value of technology index, higher is the feasibility of the improved technology. It varied from 32.0 to 47.5 per cent and average technology index of period is 37.75 per cent which showed the efficacy of good performance of technical interventions. This will accelerate the adoption of demonstrated technical interventions to increase the yield performance of chickpea. The analysis of economic return in Table 4 is revealed that the cost involved in the adoption improved technology in chickpea varied and was more profitable. As per the results in table clearly showed higher benefit cost ratio of recommended practices than control plot in all the years of study. The Average Cost is Rs 52275 /ha and net profit is Rs. 25925/ha and B:C ratio is 1.67 in cluster demonstration, respectively as compared with farmers practices is average cost is Rs.37812.5/h and net return is Rs 14737.5/ha and B:C ratio is 1.43. Hence, favorable benefit cost ratios proved the economic viability of the interventions and convinced the farmers on the utility of interventions. The above findings were in agreement with the findings of *Singh et al. (2014), Tomar (2010)* and *Raghav et.al.(2020)*.

CONCLUSION

Cluster frontline demonstration on chickpea was conducted in 6 village in Ramgarh district and result concluded that increase average yield 12.70q/ha in demonstration plot as compared to 7.92q/ha in control plot. There was 37.62 per cent increase in yield observed in demonstration plot over farmers practice. It was observed that potential yield can be achieved by imparting scientific knowledge to the farmers, providing the quality need based inputs and proper application of inputs. Horizontal spread of improved technologies may be achieved by the successful implementation of frontline demonstration and various extensions activities like training program, field day, exposure visit organized in CFLDs program in the farmer's fields. For wide dissemination of technologies recommended by SAUs and other research institute, more number of FLDs should be conducted.

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