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ROLE OF CLUSTER FRONTLINE DEMONSTRATION IN ENHANCEMENT OF CHICKPEA *(CICER ARIENTINUM)* PRODUCTION

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Abstract

The domestic requirement of pulse had been manifold of a Modern living standard which has been fulfilled through the imports that leads to imbalance the Indian economy. To fulfill the domestic demand and to boost the production and productivity cluster frontline demonstration (CFLDs) on pulse in chickpea were conducted at farmer's field by Krishi Vigyan Kendra, Damoh. These demonstrations were conducted in two Villages namely Jortala and Bandakpur during Rabi season of 2015-16 and 2016-17. The results of CFLDs shows a greater impact on farming community due to Significant increase in crop yield greater than farmer practice. The results revealed that improved seed of JG-63 + Seed treatment (*Trichoderma viridi* 5g/Kg + *Rhizobium* 10g/kg + PSB 10g/kg) + plant protection (need based) recorded average (two year) highest yield 15.4 q/ha as compared to farmer's practice i.e. 11.7 q/ha. The same trend was found in case of gross and net monetary returns, which was Rs. 59631/ and Rs. 36265/ha and under farmer's practice it was Rs. 45328/ and Rs. 26065/ha, respectively. Benefit cost ratio for demonstration and farmer's practice was 2.54 and 2.34, respectively. It can be concluded that the pulse production could be enhanced by encouraging the farmers through adoption of recommended technology which were followed in the CFLDs.

***Keywords*:** CFLDs, chickpea, Grain yield, Net monetary return.

Introduction

Chickpea (*Cicer arietium linn*) is a major *rabi* pulse crop grown in India. Among the pulses, chickpea occupies 30% of area with 38% of annual production in India. In Madhya Pradesh, chickpea occupying about an area of 73.3 lakh ha with the production of 79.7 lakh tones and productivity of 1082 kg/ha. Chickpea is mainly sown in October-November and harvested in March. Crop duration is 110-120 days depending on the varieties and management practices. It is best suited to areas having low to moderate rainfall and a mild cold weather. 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 pulse' to ICAR-ATARI Jabalpur through National food security mission. This project was implemented by Krishi Vigyan Kendra, Damoh of Zone IX with main objective to boost the production and productivity of pulse through CFLDs with latest and specific technologies.

Materials and Methods

The present investigation of CFLDs was conducted during *rabi* season of 2015-16 and 2016-17 by the KVK Damoh of Madhya Pradesh. Two villages namely Jortala and Bandakpur of Damoh district were selected for this project. Total fifty farmers were selected for the demonstration programme. Farmers were trained to follow the package and practices of chickpea cultivation as recommended by the State Agriculture universities and need based input material provided to the farmers (Table 1).

Each $CFLD_s$ plot was laid out on 0.4 ha area and adjacent 0.4 ha was considered as farmer's practice for comparison. The selected farmers followed the full package of practices like soil testing, seed treatment with biofertilizer, *Trichoderma viride,* weed and water management, pest management practices etc. In case of farmer's practice, the traditional practices were followed in existing variety like khajua (local) by the farmers. The yield data were collected (Pooled the two year 2015-16 and 2016-17) from both the demonstration and farmers practice by random crop cutting method and analyzed by using simple statistical tools. The technology gap, extension gap and technological index (samui *et al*. 2000) were calculated.

Technological gap=Potential yield-Demonstration yield.

Extension gap=Demonstration-Farmers yield

$$\text{Technology Index} = \frac{\text{Potential yield - Demo yield}}{\text{Potential yield}}$$

Results and Discussion

Cluster frontline demonstration on chickpea were conducted by using Variety Jawahar Gram-63 (JG- 63) in an area of 20ha at 50farmers field in Jortala and

Bandakpur village of Damoh district during study period it was observed that the demonstration trials have increased the yield over the farmer's practices (Table 2)

Yield : The results revealed that due to $CFLD_s$ on chickpea an average yield was recorded 15.4 q/ha under demonstration plots as compared farmers practice (11.7 q/ha). The results clearly indicate that the higher average seed yield in demonstration plots over farmers plots were due to knowledge and adoption of full package and practices i.e. appropriate varieties such as JG-63, timely sowing, seed treatment with biofertilizers and *Trichoderma*, use of balance dose of fertilizer, method and time of sowing with proper spacing, weed and water management, need based plant protection and grading of Seed. 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.

Technology GAP : The technology gap means the difference between potential yield and yield of demonstration plot. The average demonstration plot yield (Table-2) is 15.4 q/ha and average technology gap is 4.4q/ha. The technology gap reflects farmer's cooperation in carrying out such demonstration with encouraging results in both the year (2015-16 and 2016-17). The technology gap observed may be attributed to dissimilarity in the soil fertility status, crop production practices and local climatic situation.

Extension GAP : It means the difference between demonstration plot yield and farmers yield. Extension gap of 3.8 and 3.5q/ha during 2015-16 and 2016-17 (Table-2). On an average extension gap is 3.7q/ha which Emphasized the need to educate the farmers through various extension means i.e. front line demonstration for adoption to improve production and protection technology, to revert the trend of wide extension gap more and more use of latest production technology with high fielding varieties will subsequently change this alarming trend of galloping extension gap.

Technology Index : It indicates the feasibility of the evolved technology in the farmers field. Lower the value of technology index, higher is the feasibility of the improved technology. The technology index varied from 17.5 and 27 percent (Table 3). On an average technology index was observed 22.2% during the two years (2015-16 & 2016-17) CFLD programme, 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.

Economic Returns - Data in table 3 revealed that the cost involved in the adoption improved technology in chickpea varied and was more profitable. An average net return and B:C of demonstration field was Rs 36265/ha and 2.54, respectively as compared to farmers practice (Rs 26065/ha and 2.34). Similar finding were reported by Singh *et al.* (2014) and Tomar (2010).

Contraints Observed During CFLDs : The farmers yields were affected by various environmental and socio-economic factors like non availability of quality seed, unawareness in seed treatment and latest technology, use of recommended dosage of fertilizer, delayed sowing etc. High losses in yield observed due to heavy infestation of Pod borer and wilt.

Conclusion

Cluster frontline demonstration of pulse (Chickpea) conducted in two village in Damoh district and result conclude the average highest yield 15.4q/ha in demo. Plot followed by 11.7q/ha in farmers plot, means 31.3 % gain. It was observed that potential yield can be achieved by importing scientific knowledge to the farmers providing the quality need based input and proper application of inputs. Horizontal spread of improved technology may be achieved by the successful implementation of frontline demonstration and various extension activities in farmers yield. For wide dissemination of technologies recommended by SAUs and other research institute, more number of FLDs should be conducted.

Table 1 : Improved Production technology and Farmers Practices of Chickpea Under CFLD.

S.No.	Technology	Improved Practices	Farmer's Practice
1	Variety	JG-63	Khajua
2	Seed rate	75 kg/ha	100 kg/ha
3	Land preparation	Ploughing and Harrowing	Ploughing and Harrowing
4	Sowing Method	Line sowing	Line sowing
5	Fertilizer NPK kg/ha	20:50:20	10:20:00
6	Seed treatment	Biofertilizer and Trichoderma	No Seed treatment
7	Plant protection	Integrated pest management	Indiscriminate application
8	Grading the produce	Grading followed	Not followed

Table 2 : Performance of Chickpea (JG-63) under CFLDs

Year	No of Demo	Area (ha)	Yield q/ha			% Increase in yield	Technology gap (q/ha)	Extension gap (q/ha)
			Potential yield	Demo. yield	Farmers Practice			
2015-16	50	20	20	14.6	10.8	35.1	5.4	3.8
2016-17	50	20	20	16.2	12.7	27.5	3.5	3.5
Average	50	20	20	15.4	11.7	31.3	4.4	3.5
Total	100	40						

Table 3 : Economics of Chickpea (JG-63) under CFLDs

Year	Technology Index (%)	Gross Expenditure (Rs/ha)		Gross Return (Rs/ha)		Net Return (Rs/ha)		B:C	
		Demo	FP	Demo	FP	Demo	FP	Demo	FP
2015-16	27	22413	18715	55280	41040	33067	22325	2.47	2.19
2016-17	17.5	24319	19812	63782	49617	39463	29805	2.62	2.50
Average	22.2	23366	19263	59631	45328	36328	26065	2.54	2.34

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