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Impact of Cluster Front Line Demonstrations on performance of Chickpea Crop in Western Rajasthan

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Abstract

The cluster frontline demonstrations (CFLDs) on chickpea was conducted by *Krishi Vigyan Kendra, Maulasar* at Nawan and Makrana tehsil of Nagaur district during the *Rabi* season of 2018-19 to 2020-21. The results revealed that improved varieties, seed and soil treatment, nutrient and weed management and plant protection measures recorded average higher yield (1.77 t/ha) as compared to local check (1.39 t/ha). The same was found in case of net returns, which was Rs. 67183/ha for demonstrated plot and Rs.50470/ha for local check, respectively. Benefits cost ratio was recorded to be higher under demonstration (3.20) against local check (2.79) during the years of experimentation. It can be concluded that the pulses production could be enhanced by encouraging the farmers through adoption of recommended technologies which were followed in the CFLDs.

Key words: CFLDs, Chickpea, Local check, Production, Yield.

Introduction

Chickpea (*Cicer arietinum* L.) is one of the most important pulse for human diet. Madhya Pradesh, Uttar Pradesh, Rajasthan, Maharashtra, Gujarat, A.P. and Karnataka are the major chickpea producing states sharing over 95 per cent area. In Rajasthan it is cultivated in area of 2113139 ha with a total production of 2.3 mt and average productivity of 1.09 t/ha (Commissionerate of agriculture, Rajasthan-Jaipur, 2020-21). Chickpea is a good source of protein (20-22%) and rich in carbohydrates (60%), dietary fiber, minerals and vitamins (Williams and Singh, 1987; Jukanti *et al.* 2012). Legumes are typically low in fat content, no cholesterol and are high in folate, potassium, iron and magnesium. Legumes are an important component of crop rotations. They require less fertilizer than other crops and they are a low carbon source of protein. They have a direct positive impact on soil quality because they help in feeding soil microbes which help in improving soil health. The project CFLD on *Rabi* pulses 2018-19, 2019-20 and 2020-21 uner NFSM was implemented by KVK Maulasar of Zone-II with main objective to boost the production and productivity of pulse through CFLDs with latest and specific technologies.

Keeping the above point in view, cluster frontline demonstrations on chickpea by using the improved practices was conducted with the objective to demonstrate newly released crop production technologies and its management practices in the farmers' field under different farming situations and at different agroclimatic regions under the supervision of agricultural scientists. The newly and innovative technology having higher production potential under the specific cropping

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system can be popularized through cluster front line demonstration programme.

Materials and Methods

The present study was carried out in Nagaur district which is located on the North-western part of Rajasthan state and lies at 27°20'N latitude and 73°74' E longitude with an altitude of 302 m above the mean sea level. Cluster frontline demonstrations of chickpea were conducted during *Rabi*, 2018-19, 2019-20 and 2020-21 in Nawan and Makrana block of the district. Varieties GNG-1958, RSG-974 and GNG-2144 of chickpea were demonstrated (In this study, total 150 farmers were selected from aforesaid blocks). Soils in the demonstrated area were sandy loam texture with pH ranges between 7.5 to 8.4 and EC 0.22 to 0.71. Before conducting the CFLD programme, farmers were identified during group meeting. All the technological intervention was taken as per prescribed packages and practices for improved variety of chickpea crop (Table 1). The grain yield, gap analysis, cost of cultivation, gross returns, net returns and additional return parameters were recorded (Table 2 and 3). Assessment of gap in adoption of recommended technology before laying out the CFLD's through personal discussion with selected farmers. The training was organized about detailed technological intervention with improved packages and practices for successful chickpea cultivation. Scientists visited regularly and demonstrated farmer's fields. The feedback information from the farmers was also recorded for further improvement in research and extension programmes. The extension activities *i.e.* training, scientists visits and field days were organized at the demonstrated sites. The basic information were recorded from the farmers field and analyzed to comparative performance of cluster frontline demonstrations and farmers practice. Different parameters were calculated to find out extension and technology gaps (Yadav *et al.*, 2004).

Extension gap = Demonstrated yield- Farmer's practice yield

Technology gap= Potential yield- Demonstration yield

Additional return= Demonstration return-Farmer's practice return

$$\text{Technology index} = \frac{\text{Potential yield-Demonstration yield}}{\text{Potential yield}} \times 100$$

Results and Discussions

Grain Yield

The results (Table 2) revealed that average grain yield of chickpea under cluster frontline demonstrations were 1.89, 1.90 & 1.53 t/ha as compare to 1.41, 1.45 & 1.32 t/ha recorded in farmer's practice and average yield increase of 34.04, 31.10 & 15.91 per cent during 2018-19, 2019-20 and 2020-21, respectively. The above findings were accor-

Table 1. Detail of package and practices for chickpea cultivation.

S. No.	Technological intervention	Farmer's practice	Recommended Practice (Joint Directorate, 2016-17)
1.	Variety	GNG-1581, RSG-973, RSG-974	GNG-1581, GNG-1958, GNG-2144, GNG-2171, RSG-974
2.	Seed treatment	Carbendazim 50 WP @ 2g/kg	Carbendazim 50 WP @ 2g/kg seed & *Rhizobium* and PSB culture 5-10 ml/kg seed
3.	Soil treatment	No Application	*Trichodermaviride* 2.5 kg/ha with 100 kg FYM
4.	Spacing	Un uniform plant population	30 x 10 cm
5.	Time of Sowing	25-30 October	15-30 October
6.	Nutrient management	Imbalance use of fertilizers and 50 kg DAP at sowing.	Balance fertilization:-20 kg N, 40 kg P_2O_5& 20 kg S/ha at sowing time. Spray of 2% NPK (18:18:18) at flowering time
7.	Weed management	Hand weeding	Pendimethalin 30% 750 g a.i./ha at 20-25 DAS
8.	Plant protection measures	Use of Monocrotophos 1 litre/ha and carbendazim 0.1%	Spray of Indoxacarb @ 0.5 ml or Emamectin benzoate 0.5 g/litre for pod borer and one spray of Tebuconazol 1ml/litre of water for root rot control

dance with Khedkar *et al*., (2017), Lakshmi *et al*., (2017) and Rachhoya *et al*., (2018).

Extension gap, technology gap and technology index

The lower the value of technology index, more is the feasibility of the technology. The extension gap 0.48, 0.45 & 0.21 t/ha, technology gap 1.11, 0.89 & 0.97 t/ha and technology index 78.72, 62.00 & 73.48 was recorded (Table 2) during 2018-19, 2019-20 and 2020-21, respectively. The extension gap should be assigned to adoption of improved dissemination process in recommended practices which outcome in higher grain yield than the farmer's practice. The similarly observations were also obtained in chickpea crop by Lakshmi *et al*., (2017) and Rachhoya *et al*., (2018). The higher grain yield was attributed to higher potential with improved variety, seed & soil treatment, timely sowing, nutrient management, weed management, insect-pest and disease management in accordance of scientific package and practices.

Economics analysis

The economic analysis of results revealed that the chickpea recorded higher net returns and B:C ratio from demonstrated plot were 66871, 74138 & 60539 Rs/ha and 3.20, 3.43 & 2.96 as compared to 46113, 53638 & 51660 Rs/ha and 2.65, 2.91 & 2.79 in local check, respectively during 2018-19, 2019-20 and 2020-21. The higher net returns and B:C ratio in green gram demonstration might be due to the higher grain yield and better pricing of the produce in the market. These results are in accordance with the findings of Khedkar *et al*., (2017), Lakshmi *et al*., (2017) and Rachhoya *et al*., (2018). The results suggest that higher profitability and economic viability of chickpea in consecutive blocks of Nawan, Maulasar & Makrana in Nagaur

We can therefore draw the conclusion that improved production technology significantly raised the yield (27 %) and net returns (33 %) of the chickpea crop. The increase production above the farmer's practise encouraged other farmers to adopt the better package of pulse farming practises.

Table 2. Yield performance, technology gap, extension gap and technology index of chickpea under Farmers' Practice and Cluster Front Line Demonstration.

Year	Crop	Variety	No. of Demonstrations	CFLD Area (ha)	Potential of variety	Yield (t/ha)		% increased yield over local check	Technology gap (t/ha)	Extension gap (t/ha)	Technology Index (%)
						Demonstrated plot	Local Check plot				
2018-19	Chickpea	GNG-1958	75	30	3000	1890	1410	34.0	1110	480	78.7
2019-20	Chickpea	RSG-974	50	20	2800	1901	1450	31.1	899	451	62.0
2020-21	Chickpea	GNG-2144	25	10	2500	1530	1320	15.9	970	210	73.5
Average				1774	1393	27.0	993	380	71.4		

Table 3. Economics of chickpea under Cluster frontline demonstrations.

Year	Cost of cultivation (Rs/ha)		Gross return (Rs/ha)		Net Returns (Rs/ha)		Additional Returns (Rs/ha)	B : C Ratio	
	Demonstrated plot	Local Check plot	Demonstrated plot	Local Check plot	Demonstrated plot	Local Check plot		Demonstrated plot	Local Check plot
2018-19	30355	27933	97227	74046	66871	46113	20759	3.20	2.65
2019-20	30542	28050	104680	81688	74138	53638	20500	3.43	2.91
2020-21	30844	28800	91383	80460	60539	51660	8879	2.96	2.79
Average	30580	28261	97763	78731	67183	50470	16713	3.20	2.79

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