Indian Journal of Extension Education
Vol. 54, No. 3, 2018 (150-153)

Impact of Front Line Demonstration on Yield and Profitablitiy of Chickpea *(Cicer arietinum Linn)* in Banswara district of Rajasthan

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ABSTRACT

Chickpea (Cicer arietinum Linn) is the major pulse crop used in the diet of vegetarian in India and it is a good source of protein. Front line demonstration were conducted at 119 farmers field under 47.6 ha in 16 villages, to demonstrate production potential and economic benefits of improved technologies consisting suitable varieties (PC-1) with seed rate of 75 kg / ha, line sowing with spacing of 30 cm (R-R) and 20 cm (P-P), seed treatment, balanced dose of fertilizer, weed management and plant protection measures. The demonstrations were carried out at Banswara district of Rajasthan during rabi 2013-14 to 2015-16. The improved technologies recorded mean yield of 12.37 q/ha which was 53.42 per cent higher than that obtained with farmers practice of 8.05 q/ha. Improved technologies gave higher mean net return of ` 18016 / ha with a benefit cost ratio of 1.79 as compared to local practice ( ` 5932 / ha, benefit cost ratio 1.29)

Key words: Chickpea, demonstration, FLD programme, productivity

INTRODUCTION

Chickpea *(Cicer arietinum Linn.)* is a major winter pulse crop grown in India. It is a good source of protein, carbohydrate, fat, minerals and vitamins. It is an excellent animal feed. Madhya Pradesh, Uttar Pradesh, Rajasthan, Maharashtra, Gujarat, Andhra Pradesh and Karnataka are the major chickpea growing states sharing over 95 per cent area. Among the pulses, chickpea occupies 33.06 per cent of area with 43.53 percent of annual production in India during 2015-16 (Anonymous, 2016). Chickpea is the pre dominant crop among pulses in Rajasthan occupying 1547 thousand ha area with 1409 thousand tonnes production. Area, production and productivity of chickpea in Banswara district is 11925 ha, 1304.5 metric tonnes and 1094 kg ha-1, respectively.

During the last five decades, chickpea has registered significant increase in production, which is primarily due to introduction of high yielding and disease resistant varieties and adoption of improved production technologies. Even though, pulses production increased significantly during the last decade but continuing the faster growth is a bigger challenge for researchers, extension agencies and policy makers to fulfill the domestic demand. The existing technology has the potential of doubling production without increasing area under chickpea as well as existing yield gap among all zones is largest in the Northers zones can be filled by farmers adoption of the recommended package of practices (Reddy *et al.*, 2007). Keeping this in view, front line demonstrations of chickpea were conducted to demonstrate productivity potential and economic benefit of improved technologies under real farmers conditions.

METHODOLOGY

Front line demonstrations were conducted by Krishi Vigyan Kendra, Banswara on 119 farmers fields during the period from 2013-14 to 2015-16 in 16 villages viz Dalia, Torna, Dhanakshari, Richhdapada, Badliya, Chekla, Chhayna, Jher, Goyka Baria, Vakakhunta, Roopgarh, Bhompada, Amarthun, Khadiyo Ka Pada, Kuwaniya and Lambapada of Banswara district. Soils of the study area are mostly medium red loamy soil in texture with low nitrogen, medium phosphorus and high in available potassium. The component demonstration of front line technology in chickpea was comprised i.e. improved variety PC-1, proper tillage, proper seed rate and sowing method, balance dose of fertilizer (20 kg N + 40 kg P2O5 / ha), seed inoculation with Rhizobium and PSB inoculation @ 10 g / kg seed, proper irrigation, weed management and plant protection measures (table – 1). Total 47.6 ha was covered in three consecutive years. In

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the demonstration one control plot was also kept where farmers practices were carried out. Before conducting the demonstration, training to the farmers of respective villages were imparted with respect to envisaged technological interventions. Site selection, farmers selection, layout of demonstration, farmers participations etc. were considered as suggested by Choudhary (1999). The FLD was conducted to study the technology gap between potential yield and demonstrated yield, extension gap between demonstrated yield and yield under existing practice and technology index. The yield data were collected from both demonstration and farmers practice by random crop cutting method and analyzed by using simple statistical tools. The technology gap, extension gap and technology index (Samui *et al*, 2000) were calculated by using following formula as given below:

$$\text{Per cent increase yield} = \frac{\text{Demonstration Yield} - \text{Farmer Practice Yield}}{\text{Farmer Practice Yield}} \times 100$$

Technology gap = Potential Yield – Demonstration Yield

Extension gap = Demonstration Yield – Farmer Practice Yield

$$\text{Technology Index} = \frac{\text{Potential Yield} - \text{Demonstration Yield}}{\text{Potential Yield}} \times 100$$

RESULTS AND DISCUSSION

The gap between the existing and recommended technologies of chickpea in Banswara district is presented in table – 1. Full gap was observed in case of HYVs, seed inoculation, fertilizer dose and weed management where as, partial gap was observed in land preparation, seed rate, spacing, irrigation and plant protection measures which definitely was the reason of not achieving potential yield. Farmers were not aware about recommended technologies. In general, farmers used local or old age varieties instead of recommended high yielding resistant varieties. Unavailability of seed in time and lack of awareness were the main reasons.

Table 1: Difference between technological intervention and farmers practices under front line demonstration on chickpea

Particulars	Technological Intervention	Farmers Practice	Gap
Variety	PC-1	Local and old	Full
Land preparation	Two ploughing after Palewa	Two ploughing	Partial
Seed rate	75 kg / ha	100 kg / ha	Partial
Seed inoculation	Rhizobium and PSB culture @ 10 g / kg seed	No seed inoculation	Full
Sowing method	R X R spacing – 30 cm	R X R spacing – 20-25 cm	Partial
Fertilizer dose	20 kg N + 40 kg P_2O_5 / ha	No use	Full
Weed management	Two mechanical weeding	No weeding	Full
Irrigation	Two irrigation at time of branching and pod formation	one irrigation	Partial
Plant protection	Need based insecticide spray Use of correct dose and time of insecticide	Application of insecticide without knowledge Use of increased dose	Partial

During three years of FLD results obtained are presented in table – 2. The data in table – 2 revealed that an average yield was recorded 12.37 q/ha under demonstrated plots as compare to farmers practice 8.05 q/ha. The highest yield 13.40 q/ha was found in demonstrated plot during 2015-16. This results clearly indicated that the higher average grain yield in demonstration plots over the years compare to farmers practice due to to knowledge and adoption of full package of practices *i.e.* suitable variety PC-1, timely sowing, seed treatment, use of balance dose of fertilizer, timely weeding management and need based plant protection. The average yield of chickpea increased 53.42 per cent. The yield of chickpea could be increased over the yield obtained under farmers practice (use of old variety, untimely sowing, no use of balanced dose of fertilizer, no plant protection measures) of chickpea cultivation. The above findings are in similarity with the findings of Singh (2002). The technology gap is the gap in the demonstration yield over potential yield were 3.00, 1.29 and 0.60 q/ha during 2013-14, 2014-15 and 2015-16, respectively. On an average the technology gap under three years FLD programme was 1.63 q/ha. The technology gap observed may be attributed to dissimilarity in the soil fertility status, agricultural practices and local climatic situation. The extension gap of 3.56, 4.39 and 5.01 q/ha were observed during 2013-14, 2014-15 and 2015-16, respectively. On an average extension gap of 4.32 q/ha was observed . This emphasized the need to educate the farmers' through various means more adoption of improved high yielding varieties and newly improved agricultural technologies to bridge the wider extension gap. More and more use of new high yielding varieties by the farmers will subsequently change this alarming trend of galloping extension gap. The new technologies will eventually lead to the farmers to discontinue of old varieties with new technologies . This high extension gap requires urgent attention from planners, scientists, extension personnel and development departments. The technology index varied from 4.29 to 21.43 per cent (table – 2). On an average technology index was observed 11.64 per cent, which shows the efficiency of good performance to technical interventions. This will accelerate the yield performance of chickpea.

Table 2: Productivity, extension gap, technology gap and technology index of chickpea grown under FLD and existing package of practices

Year	Area (ha)	No. of Demonstration	Variety	Average Yield (q/ha)			% Increase in yield over farmers practice	Extension gap (q/ha)	Technology gap (q/ha)	Technology index
				Potential	Demonstration	Farmers Practice				
2013-14	20	50	PC-1	14	11.00	7.44	47.78	3.56	3.00	21.43
2014-15	14.8	37	PC-1	14	12.71	8.32	52.76	4.39	1.29	9.21
2015-16	12.8	32	PC-1	14	13.40	8.39	59.71	5.01	0.60	4.29
Total Average	47.6	119	-	-	12.37	8.05	53.42	4.32	1.63	11.64

The economic viability of improved technologies over farmers' practice were calculated depending on prevailing prices of inputs and output costs (table 3). It was found that cost of cultivation of chickpea varied from `16925 to ` 28500 / ha with an average of ` 22415 / ha of demonstration as against variation in cost of cultivation from `15500 to ` 25500 / ha with an average of ` 20267 / ha in farmers practice. Cultivation of chickpea under demonstration gave higher net return ranged from ` 12775 to ` 22420 / ha with a mean value of ` 18016 / ha as compared to farmers practice which recorded ` 4588 to ` 6824 / ha with a mean of ` 5932 / ha. The higher benefit cost ratio 1.75, 1.86 and 1.78 were found under demonstration compared to 1.29, 1.34 and 1.25 under farmers practice and the corresponding seasons. This may be due to higher yields obtained under demonstration compared to farmer practice. Similar results has earlier being reported on chickpea by Tomar (2010) and Mokidue *et. al.*, (2011).

Table 3. Profitability of chickpea through front line demonstration

Year	Average Cost of Cultivation (` / ha)		Average Gross Return (` / ha)		Average Net Return (` / ha)		Benefit Cost Ratio	
	Demonstration	Farmers practice	Demonstration	Farmers practice	Demonstration	Farmers practice	Demonstration	Farmers practice
2013-14	16925	15500	29700	20088	12775	4588	1.75	1.29
2014-15	21820	19800	40672	26624	18852	6824	1.86	1.34
2015-16	28500	25500	50920	31882	22420	6382	1.78	1.25
Average	22415	20267	40431	26198	18016	5932	1.79	1.29

Note: Cost of grain yield has been estimated at prevailing market price *i.e.* ` 2700, 3200 and 3800 / quintal during 2013-14, 2014-15 and 2015-16, respectively.

CONCLUSION

The result of front line demonstration on the package of practices brough out that by its adoption, the farmers can realize higher yields and net profit in chickpea cultivation. These practices may be popularized in this area by extension agencies to bridge the higher extension gap. The use of new production technologies will substantially augment the income as well as the livelihood of local population.

Paper received on : December 26, 2017
Accepted on : January 06, 2018

REFERENCES

Anonymous 2016. Agricultural Statitics at a glance 2016. Published by Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare. pp. 108, 110

Choudhary, B.N. 1999. Krishi Vigyan Kendra – A guide for KVK Managers. Publication, Division of Agricultural Extension, ICAR, 73-78.

Mokidue, L, Mohanty, A. K. and Sanjay K. 2011. Correlating growth, yield and adoption of urdbean

technologies. Indian Journal of Extension Education 11 (2): 20-24

Reddy, A.A., Mature, V.C., Yadav, M and Yadav, S.S. 2007. Profitability in chickpea cultivation. Pages 292-321. In : The Chickpea Breeding and Management (Yadav. SS, B. Redden, W. Chen and B. Sharma eds). Wallingford, Oxon. UK : CAB International

Samui, S.K., Maitra, S., Roy, D.K., Mondal, A.K. and Saha, D 2000. Evalution on front line demonstration on groundnut (Arachis hypogea L.). Journal of Indian Society of Coastal Agriculture Research, 18 : 180-183

Singh, PK 2002. Impact of participation in planning on adoption of new technology through FLD. MANAGE Extension Research Review, July – Dec. 45-48

Tomar RKS. 2010. Maximization of productivity for chickpea (Cicer arietinum Linn.) through improved technologies in farmer's fields. Indian Journal of Natural Products and Resources 1 (4): 515-517