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Research Article

IMPACT OF FRONT-LINE DEMONSTRATION OF CHICKPEA (*Cicer arietinum* L.) GROWN UNDER SEMI-ARID CONDITION

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Abstract: Front line demonstrations (FLD) were conducted by Krishi Vigyan Kendra, Sadalpur, Hisar to compare the gap between demonstrated field and farmer practices (FP) under irrigated semi arid condition of Haryana. It was found that yield of chickpea was higher in demonstration field as compared with farmer practices during 2018-19. The average yield of chickpea was recorded 19.5 q/ha where as in farmer practices it was observed 16.40q/ha. The average technology gap, extension gap and technology index was recorded6.50, 3.10 and 25.0percent during 2018-19 respectively. The cost benefit ratio (B:C) was obtained better in demonstrated field than farmer practices. The gap between demonstration field and farmer practices may be due to the farmers were not applied the latest technology in production of chickpea as mentioned in package of practices from seed treatment to final maturity of crop.

Keywords: *Chickpea, Front Line Demonstration (FLD), Farmer Practices (FP), Economic and Yield*

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Introduction

Chickpea (*Cicer arietinum* L) belongs to family Leguminosae is a major pulse crop grown in India. It is also known as Bengal gram, Gram, and Chana. India is the largest consumer as well as producer of chickpea in the world. It is cultivated as rainfed crop in India. Chickpea is a leguminous crop and has the capacity to fix the atmospheric nitrogen to the plants due to the presence of nitrogen fixing bacteria in their root nodules and enhance the soil fertility by adding organic matter and contributes significantly to increase the crop yield of subsequent crop [1] chickpea is one of the oldest crops that have been cultivated for more than eight thousand years [2]. Chickpea covers more than 40 percent of the total pulses production area in India. The daily consumption requirement of pulses for man and women is 60g/day and 55g/day respectively as per pulse Recommended Dietary Allowances but its per capita consumption is only 42g/day in India. It is a good source of protein, carbohydrate and fat and also contains calcium, Phosphorus, iron [3]. India is contributing highest share in area and production in the world [4]. It is used as nutritive fodder for mulch animals in chickpea growing area. Its productivity is low may be due to the poor practices of farmers such as seed treatment, agronomic practices, weed management, application fertilizers and pesticides. Chickpea var. CSJ-515 was grown in front line demonstration in farmer fields. This variety is recommended for irrigated semi arid areas, this variety is resistant to dry root rot, wilt and collar rot and tolerant to Ascochyta blight and botrytis grey mould (BGM). For batter yield of chickpea, front line demonstrations were conducted in different villages of Hisar to educate the farmers [5]. The front line demonstrations (FLDs) are one of the best techniques to educate the farmers regarding the productivity, profitability and livelihood improvement of chickpea crop.

Materials and Methods

Thirty front line demonstrations were conducted which covers an area 12 ha by Krishi Vigyan Kendra, Sadalpur (Haryana) in irrigated semi arid condition during 2018-19 in different villages of Hisar. Improved variety of chickpea (var. CJS 515) was sown as per guidelines mentioned in package of practices published in 2021 by CCS Haryana Agricultural University, Hisar.

Soil of all the villages under demonstration were loam to sandy loam in texture with low to medium in organic matter and other plant nutrients like N, P and K which is essential for growth and development of crop. In demonstrated plots the chickpea seeds were sown at 45 cm row-row distance in demonstrated fields after treated with Rhizobium culture and all the cultural and management practices were followed as mentioned in Package of Practices like sowing distance, irrigation at critical stages, weed management, use proper doses of fertilizers and pesticides. The gap between both the practices *i.e*., demonstrated field and farmer practices are given in [Table-1]. The output data were collected for analysis from demonstrated field as well as farmer practices (FP) field to find out the yield and net return gap of chickpea. Finally, the technology gap, extension gap, technology index and cost benefit ratio (B:C) were analyzed [6,7].

Technology Gap = Potential Yield (q/ha) - Demonstration Yield (q/ha)

Extension Gap = Demonstration Yield (q/ha) - Farmers Practices Yield (q/ha)

Technology Index =(Potential Yield (q/ha) - Demonstration Yield(q/ha)) / (Potential Yield (q/ha)) X 100

B:C=(Gross Return (Rs/ha))/(Cost of Cultivation (Rs/ha))

Results and Discussion

Thirty front line demonstrations were conducted which cover an area 12 ha during 2018-19 shown in [Table-2]. In demonstrated field all the practices of growing chickpea were followed as mentioned in package of practices like use of improved variety (CSJ-515), treatment of seeds with rhizobium culture, proper weed management and application of recommended doses of fertilizers and pesticides [8]. Application of improved technology of growing chickpea gave higher yield in demonstrated field than that obtained from farmer practices [9]. The average seed yield of chickpea under improved technology was 15.33 per cent higher as compared to local check [10].

Table-1 Comparison of recommended practices and farmers practices

Components	Recommended practices	Farmers practices
Variety	CJS 515	Local variety
Seed rate	15-18 kg per acres	15-20 percent higher
Time of sowing	Mid-October to 30 October	Delay in sowing
Seed treatment	Seed treatment with *Rhizobium* culture	No seed treatment
Row to row spacing	45 cm distance	Broadcasting of seeds
Fertilizer doses	100 kg SSP and 35 kg DAP	Apply imbalance doses of fertilizers
Water management	Before flowering, pod formation	Water stress during critical periods
Plant protection	1.Control of cutworm applied 80ml Fenvalerate 20EC/50ml Cypermethrin 25EC/150ml Decamethrin 28EC in 100 liters water/acre 2.For pod borer control apply 400ml Quinalphos 25EC/200ml Monocrotophos 36SL/8ml Fenvalerate 20EC/125ml Cypermethrin 10EC/50ml Cypermethrin 25EC/150ml Decamethrin 28EC in 100 liters water/acre. 3.For control of fungal diseases seed treated with Bavistin @ 2.5g/kg seeds	Use of improper doses of pesticides

Table-2 Comparison of yield (q/ha), Technology Gap, Extension Gap and Technology Index of Chickpea between Front line demonstration practices and Farmers practices

Year	No. of Farmers	Area (ha)	Yield (q/ha)			% increase Over farmers practices	Technology Gap	Extension Gap	Technology Index
			PY	DY	FP				
2018-19	30	12	26	19.5	16.4	18.9	6.5	3.1	25.0

Table-3 Comparison of Gross cost, Gross return, Net return and B:C ratio between demonstration and farmer practices

Year	Economic of demonstration (Rs/ha)				Economic of farmer practices (Rs/ha)			
	Gross cost	Gross return	Net return	BCR	Gross Cost	Gross return	Net return	B:C
2018-19	41475	84950	43475	2.0	41475	72240	30765	1.7

In demonstration field farmer adopting the latest technology and management practices as described in package of practices from sowing to final harvest of summer moong resulted, they can obtained good quality and higher yield than traditional farming systems. The yield of chickpea in demonstration field was obtained 19.5q/ha in 2018-19 and found that yield of chickpea was 18.9 percent increase over farmer practices during 2018-19 [11]. Yield obtained from demonstrated field was higher due to conducting various training programmes related to the cultivation of chickpea and applied the knowledge as mentioned in package of practices resulted farmer can obtain more yield and net profit [12]. Average chickpea yield was higher in front line demonstrated field by adopting integrated crop management technology over farmers practice. By the adopting the improved production technology, the yield was found in increasing trend as compared with farmer practices. Lower yield in short duration paddy in traditional farming system may be due to used local variety, applied over doses of fertilizers and pesticides [13]. The technology gap was found 6.5extension gap 3.1, technology index 25.0 percentin 2018-19 and it's notice that there is lot of possibility to apply improved technology at farmer fields. If the technology index was found lower, the technology feasibility will be increased. The average technology gap and extension gap suggested further improvement in the extension activities to overcome the gap for better adoption of improved technology [14].

The comparison of economics of demonstration and farmer practices is mentioned in [Table-3]. Gross cost (Rs/ha) was same in both the practices *i.e.*, demonstration and farmer practices. Gross return (Rs/ha) was higher in demonstration field over farmer practices resulted net return was recorded more in demonstrated field when compared with farmers practices. The higher net return obtained in demonstration field by adopting the latest technology and proper management practices as described in package of practices of cultivating the chickpea crop. Similarly, the cost benefit ratio (B:C) was obtained better in demonstration field than farmer practices. Higher yields and net return obtained in demonstrated field and less cost of cultivation than farmer practices were due to the adoption of improved technologies [15]. Higher net return of greengram was recorded in demonstrated fields than farmer practices. The higher returns obtained under demonstrations could be due to applied improved technology in greengram production [16]. B:C ratio was better in demonstrated field than farmer practices by using better technology as mentioned in package of practices. Better B:C ratio under demonstrated field proved that the farmers using the scientific technology for cultivation of green gram as describe in package of practices gave better return than farmer practices [17].

Conclusion

After analysis the results of both the practices *i.e.*, demonstrated field as well as farmer practices, it is concluded that the farmers adopting the latest technology of growing chickpea in their field as described in package of practices like seed treatment with rhizobium culture, timely sowing, maintain proper sowing distance, use of improved variety, timely weed control, application of proper doses of fertilizers, pesticides etc obtained higher yield and net return.

Application of research: The gap between demonstrated field and farmers practices of growing crop can be overcome by organizing trainings, field visit etc., for aware the farmers to adopt the latest technology and management practices for getting higher yield and net return.

Research Category: Front Line Demonstration

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Study area / Sample Collection: ICAR-Krishi Vigyan Kendra, Sadalpur, 125052

Cultivar / Variety / Breed name: Chickpea (*Cicer arietinum* L.)

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Ethical Committee Approval Number: Nil

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