Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.6413

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **6 (2):** 1252-1258 (2018)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Impact of Trainings & Improved Transfer Technology on Chickpea Production

Hukam Singh Kothyari*, K. C. Meena, B. L. Meena and Ramkishan Meena

Krishi Vigyan Kendra, Agriculture University, Kota (Rajasthan)

*Corresponding Author E-mail: jadonhukam555@gmail.com

Received: 15.03.2018 | Revised: 22.04.2018 | Accepted: 27.04.2018

ABSTRACT

The research study was conducted during Rabi 2017-18 with 125 field demonstrations on chick pea in 50 ha area. The Result revealed that the highest grain yield obtained under demonstrated plots was ranged between 17.10 qha^{-1} to 21.70 qha^{-1} with an average 19.77 qha^{-1} as compared to farmer's practice with an average 16.10 qha^{-1} which was increased 23.05 percent more as compared to farmer's practices. An average extension gap between demonstrated practices and farmers practices was obtained 3.67 qha^{-1} (Table 3) The total cost of cultivation (Rs/ha), Gross return (Rs/ha) and net return (Rs/ha), B: C Ratio under the demonstration plots were reported with an average of 25163 Rs/ha, 92982 Rs/ha, 67819 Rs/ha, 2.70 as compared to local check with an average of 24077 Rs/ha, 73575 Rs/ha, 44498 Rs/ha and 2.06 respectively during the period of research study (Table 4). The results of the study revealed that the increase percent in adoption level ranging from 20.00 percent of storage and marketing to 65.60 percent of Irrigation management after conducting the FLD programmes. It can be concluded that the Trainings and improved technology under chickpea production technology gave higher Seed yield, net return with higher benefit cost ratio under demonstrated plot as compared to farmer's practices.

Key words: *Chick pea, Net return, Extension gap, Seed yield.*

INTRODUCTION

Chick pea (*Cicer arietinum* L.) is the premier pulse crop widely consumed in India. It is a soil building crop, which fixes atmosphere nitrogen through symbiotic action. It is an important Rabi season legume having extensive geo-graphical distribution and contributing 39 per cent to the total production of pulse in the country. The major chick pea producing states are Madhya Pradesh, U P, Rajasthan, Maharashtra, AP., Gujarat, Karnataka, Haryana, Bihar and West Bengal[1].

The number of chickpea growing countries has increased from 36 to 52 and importing countries from 30 to 150 during 1981 to 2011. Chickpea reached a record high global area of 13.3 million ha (mha) and production of 11.75 million tons (MT) during 2011.

Cite this article: Kothyari, H.S., Meena, K.C., Meena, B.L. and Meena, R., Impact of Trainings & Improved Transfer Technology on Chickpea Production, *Int. J. Pure App. Biosci.* **6(2):** 1252-1258 (2018). doi: http://dx.doi.org/10.18782/2320-7051.6413

In 2013 the area of chickpea cultivation increased to 13.5 m ha but production remained at 13.1 million tons[2]. Front line demonstration (FLD) is one of the most powerful tools of extension because farmers, in general, are driven by the perception that "Seeing is believing". The main objective of front line demonstrations is to demonstrate newly released crop production and protection technologies and its management practices in the farmer's field under different agro-climatic regions and farming situations. During demonstration in the farmer's field, scientists are required to study the factors contributing higher crop production, field constraints of production and there by generate production data and feedback information. The present study was conducted at farmer's field with objective to know the impact of Trainings and Improved transfer technology on chick pea with respect to farmer's community.

MATERIAL AND METHODS

The present study in which each demonstration conducted an area of 0.4 ha and total 125 demonstrations in 50 ha area were conducted in Sawai Madhopur, Rajasthan during Rabi 2017-18. Soil of the area under research study was sandy loam with low to medium fertility status. The improved technology includes improved varieties, treatment of seed, proper irrigation, weed management, seed rate & sowing method and optimum plant population, plant protection measures etc. were maintain under demonstrated plots. The treatment comprised of recommended package of practices viz. Improved variety GNG-1958 + Seed Treatment with Trichoderma - 6 gm/kg seed + Bavistin with 3 gm/kg seed +Fertilizers N:P:K @ 20:40:20: kg/ha + adoption of IPM techniques each as soil application were maintained under demonstrated plots during period of research study. The seed rate of chickpea is kept 80 kg / ha under demonstration plots for obtained adequate plant geometry and higher seed yield. The sowing of chickpea crop seed was done during 15 October to 20 October. The fertilizers were given as per soil test based recommendations as basal dose. Two hand weeding were done at 25-30 and 50-55 DAS. The spacing between Row & Plant was kept 30 x 10 cm for chick pea under front line demonstration. The crops were harvested at perfect maturity stage by manually. The Front Line Demonstration was conducted to study the following parameters such as technology gap between the potential yield and demonstrated yield, extension gap between demonstrated yield, technology index and seed yield under existing practices. The data were collected through personal contact with farmers at farmer's field and after that tabulated and analyzed to find out the findings and conclusion. The statistical tool like percentage used in this study for analyzed data. The extension gap, technology gap and the technology index were work out with the help of formulas given by Samui *et al.*[3] as mentioned below:

Extension gap = Demonstrated yield – Yield under existing practice
Technology gap = Potential yield-Demonstrated yield
Percent increase yield = Demonstration yield-farmers yield/ Farmers yield x 100
Technology index = Technology gap/ Potential yield x 100

Table 1: Gap Analysis between demonstrated practices and farmers practices on chickpea

S N	Name of Technology	Demo. practices	Farmer's practices	Gap
1	Land preparation	Two ploughing	Two ploughing	No gap
2	Variety	GNG-1958	Local seed	Full gap
3	Seed rate (kg/ha)	80 kg/ha	100-120 kg/ha	Higher seed rate
4	Seed treatment	Bavistin @ 3g/kg seed & Trichoderma@6g/kg of seed	No seed Treatment	Full gap
5	Sowing method & spacing	Line sowing (R x P 30 cm x 10 cm respectively)	Line sowing (R x P 20 cm x 10 cm)	Partial gap
6	Manures & Fertilizers	20 kg/ha N_2O: 40 kg/ha P_2O_5	No use of fertilizer	Full gap
7	Weed management	Two hand weeding at 25-30 and 55-60 DAS	One hand weeding at 35-40 DAS	Partial gap
8	Disease management	Need based plant protection measurement	No plant protection measurement	Full gap
9	Irrigation management	Two irrigation at pre flowering and at pod development stage	One irrigation	Partial gap

RESULTS AND DISSCUSION

The findings of the present research study as well as relevant discussion have been conferred under following points:

The Gap between the demonstrated practices and farmer's practices of chickpea in district was presented in Table-1. Full gap was observed in case of use of varieties, seed treatment, Manures & fertilizers, dose and disease management while partial gap was observed in sowing method & spacing, weed management and irrigation management. Farmers were not aware about recommended technologies. Farmers used of local or old varieties seeds instead of the recommended high yielding resistant varieties due to lack of awareness of seed.

Table 2: Overall knowledge level of Scientific Production of chickpea (N=125)

Category	Level of knowledge at Contact with KVK (%)				Adoption level after Contact with KVK (%)	
	Before		After			
	No.	%	No.	%	No.	%
Low level of knowledge	86	65.60	08	06.40	78	38.40
Medium level of knowledge	28	25.60	16	16.80	12	09.60
High level of knowledge	11	08.80	101	76.80	90	72.00

Level of Scientific Knowledge

The data revealed in Table-2 showed that before contact with KVK 65.60 percent of the farmer had low level of scientific knowledge which was increased (76.80%) after contact with KVK whereas the overall knowledge level percent of the farmer after contact with KVK was increased 72.00 percent. Singh *et al.*[4] reported that knowledge level had significant association with adoption of production technology. Jatav[5] reported that the FLD respondents had medium level of knowledge of scientific temperament. Sharma *et al.* [6] reported that the majority of soybean growers (71%) had moderate level of adoption, while 16.67 and 12.72 per cent had low and high level of adoption respectively. Goswami *et al.*[7] reported that the extension participation reflected the strong association and effect with the extent of adoption.

Table 3: Increased in Knowledge level of farmer's in Chickpea production (%) (N=125)

Name of scientific Technology of chick pea production	Before FLD		After FLD		Increased Knowledge (%)	
	No.	%	No.	%	No.	%
High yielding varieties	78	62.4	113	90.40	35	28.00
Seed Rate and spacing	10	8.00	42	33.60	32	25.60
Seed treatment	07	5.60	76	60.80	69	55.20
Soil Treatment	09	7.20	59	47.20	50	40.00
Soil Testing	04	3.20	51	40.80	47	37.60
Sowing time & method	11	8.80	82	65.60	71	56.80
Irrigation Management	24	19.20	106	84.80	82	65.60
Weeding	32	25.60	93	74.40	61	48.80
Integrated Nutrient Management	18	14.40	66	52.80	48	38.40
Harvesting	42	33.60	102	81.60	60	48.00
Seed storage and marketing	23	18.40	48	38.40	25	20.00

Increased Knowledge level of farmer's

The data revealed that the increased knowledge levels of the improved chick pea production technologies were recorded fewer than two parameters *viz.* adoption before conducting and after conducting frontline demonstration. The data presented in Table-3 showed that the farmers were followed the improved practices of chick pea production like High yielding varieties (62.40%), soil testing (3.20%), soil treatment (7.20%), seed treatment (5.60%), seed rate & spacing (8.00%), Sowing time & method (8.80%), Irrigation Management(19.20%), Weeding (25.60%), Integrated Nutrient Management (14.40%), Harvesting (33.60%), Seed storage and marketing(18.40%) etc. at before conducting FLDs whereas, after conducting FLDs they were adopting High yielding varieties (90.40%), soil testing (40.80%), soil treatment (47.20%), seed treatment (60.80%), seed rate and spacing (33.60%), Sowing time & method (65.60%), Irrigation management (84.80%), Weeding (74.40%), Integrated nutrient management (52.80%), Harvesting (81.60%), Seed storage and marketing (38.40%) etc. The majority of farmers with adoption level percent were followed improved practices of chick pea production such as Irrigation management (65.60%), Sowing time & method (56.80%), Seed treatment (55.20%), weeding (48.80%), Harvesting (48.00%), Soil treatment (40.00%), Integrated nutrient management(38.40), Soil testing (37.60%), High yielding varieties (28.00%), Seed rate & spacing (25.60%), and storage & marketing (20.00%)[8]. study was conducted on Impact and yield gap analysis of Trainings and FLD's Regarding's Scientific Practices of chick pea (*Cicer arietinum*) in Tapi district of south Gujrat in which the result regarding overall knowledge of chickpea indicated that the low, medium, high level of knowledge before contact with KVK was 78.00, 16.00, 06.00 percent, respectively it was changed up to 08.00, 10.00 and 82.00 percent respectively after contact with KVK. In case of knowledge regarding selected scientific innovations for chick pea high knowledge regarding selected scientific innovations were found viz. 80.00 percent regarding new high yielding varieties, 83.00 percent for integrated nutrient management, 81.00 percent land configuration and 78.00 seed rate respectively. Majority of farmers had low level of knowledge (76.00 %) before contact with KVK. After contact with KVK, 84.00 percent of the farmers had high level of Knowledge. The 89.00 percent of the farmer had adopt new high yielding variety followed by land configuration (85.00 %), INM (83.00%), Seed rate (82.00%).

Table 4: Seed productivity, Extension gap, Technology index, Technology gap under demonstration and farmer practices

Village	Seed Yield (q/ha)		Extension gap (q/ha)	Technology gap (q/ha)	Technology index (%)	% Increase Yield
	Demo	Local				
Kustla	20.36	16.13	4.23	1.64	7.46	26.59
Sinoli	20.15	16.00	4.14	1.85	8.99	26.16
Mainpura	18.74	16.15	2.59	3.26	8.42	16.15
Jeevad	20.02	16.08	3.94	1.98	14.83	24.81
Bhadlav	19.03	16.20	2.84	2.97	13.48	17.76
Average	**19.77**	**16.10**	**3.67**	**2.23**	**10.14**	**23.05**

Yield Parameters

The data revealed on yield Parameters of chick pea are presented in [Table-4] showed that the maximum seed yield of chick pea was obtained under demonstrated plots ranged between 17.10 qha^{-1} to 21.70 qha^{-1} with an average of 19.77 qha^{-1} as compared to farmer practices ranged from 14.30 qha^{-1} to 17.80 qha^{-1} with an average of 16.10 qha^{-1} which was increased percent with a mean value of 23.05 percent for chickpea production[9]. conducted front line demonstration on 400

demonstrations on pigeon pea, chick pea, black gram and green gram crops during *kharif*, Rabi and summer seasons in fifty villages of Narmada, Gujarat during 2012-13 in which the improved technology recorded higher yield of 1880 kg/ha, 1480 kg/ha, 880 kg/ha and 927 kg/ha in pigeon pea, chick pea, black gram and green gram, respectively than 1450, 1130, 680 and 711 kg/ha. [10] study was conducted during *Kharif*, and *Rabi* seasons in adopted NICRA village Koste, Balaghat, Madhya Pradesh, India during 2012-13 to 2015-16 on pigeon pea and chickpea crops in which the improve technology recorded higher yield of 1310kg/ha, and 1370 kg/ha pigeon pea and chickpea, respectively farmers practice 970 kg/ha and 1110 kg/ha.

Technology gap (q/ha)

The result revealed on technology gap is the gap in the demonstration yield over potential yield was observed with an average of 2.23 qha^{-1} [Table-4] The technology gap observed may be attributed to dissimilarly in the soil fertility status and weather conditions as well as the soil moisture availability[11]. Daivi *et al.*[12] observed that extent of technological gap experienced by farmers was 25.90% for plant protection measure, and for use of fertilizers 22.58% use of FYM/compost 18.09% seed treatment 17.33%, seed and sowing 12.07% and the composite technological gap was 19.16%.

Extension gap (q/ha)

The Extension gap of demonstrated plots was obtained ranged from 1.40 qha^{-1} to 6.50 qha^{-1} with an average mean of 3.67 qha^{-1} during the period of research study [Table 4] This is emphasized the need to educate the farmer's through various means for more adoption of improved high yielding varieties and newly improved agricultural technologies to bridge the wide extension gap. More use of new high yielding varieties by the farmers will subsequently change this extension gap. The new technologies will eventually lead to the farmers to discontinue the old technology and adopt the new technology[13].

Technology Index (%)

The data revealed that the technology index under front line demonstration was calculated ranged from 6.36 to 22.27 percent with a mean value of 10.14 percent for chickpea production which shows the efficacy of good performance of technical interventions. This will accelerate the adoption of demonstrated technical intervention to increase the yield performance of chick pea [Table-4][14]. conducted on farm testing (OFTs) and front line demonstration (FLDs) as technological interventions on improved package of practices of chick pea during 2007-2008 to 2009-2010 in three villages of Sidhi district of M.P. in which the technology index varied from 48.93 to 66 per cent with an average technology index was observed 56.30 per cent during the three years of FLD programmes. The technology index shows the feasibility of the evolved technology at the farmer's field and the lower the value of technology index more is the feasibility of technology[15].

Table 5: Gross cost Cultivation, Gross Return, Net Return & BC Ratio of under FLD's and existing package of practices

Village	Cost of Cultivation (kg/ha)		Gross Return (kg/ha)		Net Return (kg/ha)		B:C Ratio	
	Demo	Local	Demo	Local	Demo	Local	Demo	Local
Kustla	25127	23881	95578	73529	70451	49648	2.81	2.08
Sinoli	25124	24199	94646	73213	69552	49014	2.77	2.03
Mainpura	25219	24236	88442	73819	63223	49583	2.51	2.05
Jeevad	25173	23903	94096	73529	68923	49626	2.74	2.08
Bhadlav	25208	24206	89747	74020	64539	49814	2.56	2.06
Min.	24290	23140	81240	66060	55420	42380	2.15	1.73
Max.	25970	24980	101480	80760	77160	56200	3.17	2.36
Average	25163	24077	92982	73575	67819	49498	2.70	2.06

Economic Return (Rs/ha)

The data represented on the cost of cultivation was increased under demonstration practice ranged from 24290 Rs/ha to 25970 Rs/ha with an average of 25163 Rs/ha as compared to farmer practices 24077 Rs/ha. Use of costly seeds for seed sowing, seed treatment, use of chemical fertilizers, integrated pest management, integrated nutrient management etc. are the main factors for increased in cost of cultivation under demonstration practices as compared to farmer practices. The figures depicted in [Table 5] clearly explicated the implication of front line demonstration at farmer's field during the period of study in which higher net returns (67819 Rs/ha) were obtained under demonstration plots as compared to farmer practices (49498 Rs/ha). The data depicted on higher Gross returns (92982 Rs/ha) were obtained under demonstration plots as compared to farmer practices (73575 Rs/ha). Benefit cost ratio was recorded higher under front line demonstrations 2.70 as compared to farmer practices 2.06 during the period of research study. The result clearly showed that the front line demonstration was given a good impact over the farming community as they were inspired by the new agricultural technology used in the demonstrated plots. The high yielding variety under demonstrated plot was performed very well as compared to local check. Bhargav *et al.*[16] conducted the Front line demonstrations on chick pea were organized in Pankhedi and Bhadoni villages of Shajapur district during Rabi seasons of 2011 and 12. The result revealed that percentage increase in the yield in demonstrations over farmer practices was 34.4 and 37.2 in year 2011 and 2012 respectively. The benefit: cost ratios of chick pea cultivation under improved practices were 2.31 and 2.26 as compared to 2.02 and 1.94 under farmer practices for the two consecutive years[17] organized 133 Frontline demonstrations on 54 farmer's field to demonstrate the impact of integrated crop management technology on Pigeon pea productivity over four years during *Kharif* 2010-10 to 2013-14. The results revealed that due to front line demonstration on Pigeon pea an average yield was recorded 11.9 q/ ha under demonstrated plots as compared farmers practice 10.1q/ha. The highest yield in the FLD plot was 13.62 q/ha in 2013-14 with net returns of 34, 883 Rs/ha compared to check trial net return of 26,194 Rs/ha.

CONCLUSION

The results obtained under front line demonstration were increased by conduct of Trainings and Knowledge level of package of practices, the farmers can achieved higher yields and net profit in chickpea cultivation. The result showed that the front line demonstration was given a good impact over the farming community as they were inspired by the new agricultural technology. Thus, it can be concluded that the research study is playing one of the important role in awareness of the farmers for adoption of production technology resulting in increasing their yield and profit.

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