POPULARIZATION OF IMPROVED CHICKPEA PRODUCTION TECHNOLOGY THROUGH FRONT LINE DEMONSTRATIONS IN PANCHMAHAL

A. K. Rai[1], Kanak Lata[2] and B. S. Khadda[1]

1 & 3 SMS Soil Agro., Krishi Vigyan Kendra- Panchmahals, Vejalpur, Godhra - 389 340
2 Head, Krishi Vigyan Kendra- Panchmahals, Vejalpur, Godhra - 389 340
Email : ajayrai74@gmail.com

ABSTRACT

Chickpea (Cicer arietinum L.) is as one of the most important pulse crops of the Panchmahal district of Gujarat. However, its productivity of chickpea in the district is very low. Attempts are made to improve productivity and to increase area under chickpea by adopting HYVs (high yielding variety). In order to compare conventional chickpea with HYVs varieties, 50 front line demonstrations were carried out in systematic manner on farmers' field to show the worth of a new varieties in comparison to local check and thereby convincing farmers about potentialities of improved production management practices of chickpea for further adoption, involving feasible and effective scientific package of practices. The demonstrations clearly showed enhancement of productivity, at the same time area under chickpea cultivation was also noticed to be enhanced. The yield was found to be increase from 1290 kg/ha in local check to 1990 kg/ha in demonstrations. Similarly, the benefit cost ratio for HYVs varieties was found to increase to 4.6 as compared to local check (3.2). The impact of FLDs was analysed which showed improvement of knowledge and satisfaction of farmers as the main reason for mass scale adoption.

Keywords: *chickpea, production technology, frontline demonstration*

INTRODUCTION

Chickpea (Cicer arietinum L.) is a self-pollinated, important pulse crops in Indian agriculture. Chickpea are rich in essential nutrients which are potential to provide health benefits. Groundnut gives 364 calories per 100 g serving and are an excellent source of protein (38%), fat (9%) and carbohydrate (20%) dietary minerals, such as iron (34% DV), magnesium (28% DV), potassium (20% DV) and dietary fiber (68%). Chickpea is grown on nearly 261.66 lakh ha worldwide with the total production of 171.10 lakh tons and an average yield of 858 kg/ha. (Singh, 2011)). However, the low chickpea productivity in many developing countries remains a cause of concern to the scientific community and policy makers. Good crop agronomy is crucial in harnessing the full potential of the crop in addition to appropriate variety and quality seed in order to facilitate a synergistic effect on crop productivity. This farmer friendly booklet provides information on improved cultural practices in chickpea cultivation which will empower smallholder farmer to make his/her own decision on various components of integrated crop management technology. India recorded the highest production of chickpea about 74.80 lakh tonnes in 2010-11, of which, Gujarat contributed nearly 1300 MT tonnes, owing record productivity of 1200 kg/ha from 900 MT ha area. Integrated nutrient management (INM) is one among the possible way to improve this soil for sustainable farming.

OBJECTIVE

To know the popularization of improved chickpea production technology through front line demonstrations in panchmahal

METHODOLOGY

An extensive survey was conducted to collect information pertaining to various usage of chickpea in the Panchmahals District. Fifty farm families each from five villages of (who grew chickpea) were selected from three Talukas viz. Halol, Kalol, and Godhra for gathering the information. A questionnaire containing (8) questions were put to the respondents and data were analyzed. To popularize the improved chickpea production practices, were identified through participatory approach. Preferential ranking technique was utilized to identify the constraints faced by the respondent farmers in chickpea production. Farmers were also asked to rank the constraints they perceive as limiting chickpea protection in order of preference. The quantification of data was done by first ranking the constraints and then calculating the Rank Based Quotient (RBQ) as given by Sabarathnam (1988), which is as follows:

$$R.B.Q = \frac{\sum fi\ (n + 1 - ith)}{N \times n} \times 100$$

Wherein,

fi = Number of farmers reporting a particular problem under i^{th} rank

N = number of farmers

n = number of problems identified

Based on top rank farmers problems identified, front line demonstrations were planned and conducted at the farmers' field under technology demonstration. In all, 50 full package frontline demonstrations were conducted to convince them about potentialities of improved variety of chickpea 'GG-3' during 2015 and 2016. All the participating farmers were trained on all aspects of chickpea production management. The technology gap and technology index were calculated using the following formulas as given by Samui et al. (2000):

$$\text{Technology gap} = \text{Potential yield} - \text{Demonstration yield}$$

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

The data thus collected were tabulated and statistically analyzed to interpret the results.

RESULTS AND DISCUSSION

Constraints in Chickpea Production

Farmers' chickpea production problems were documented in this study. Preferential ranking technique was utilized to identify the constraints faced by the respondent farmers in chickpea production. The ranking given by the different farmers are given in table 1. A perusal of table indicates that lack of suitable HYVs was given the top most rank by 50 respondent farmers. The FLD participants were provided HYVs seeds as critical inputs. Based on the ranks given by the respondent farmers for the different constraints listed out in table 1, the rank based quotients were calculated and presented in table 2.

Table 1: Ranks given by farmers for different constraints **n=50**

Sr. No.	*Constraints*	*Rank*							
		I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*
1	Lack of suitable HYVs	19	08	08	06	04	05	00	00
2	Low technical knowledge	10	09	08	05	04	03	02	01
3	Low soil fertility	10	11	14	09	03	02	01	00
4	Wild animals	10	12	09	08	04	03	02	02
5	Weed infestation	08	08	07	10	08	05	06	04
6	Disease infestation	04	06	07	07	10	06	06	04
7	Insect infestation	04	03	08	04	10	09	07	05
8	Irrigation facility	02	05	04	09	10	07	05	08

The analysis of data presented in the table 2 revealed that lack of suitable HYVs, low soil fertility, wild animals, weed infestation and followed by low technical knowledge were the major constraints to chickpea production. Other constraints such disease infestation, insect infestation and irrigation were also found to reduce chickpea production. Other authors (Joshi et al. 2005) have reported similar problems in maize production.

Table 2: Frequency distribution of RBQ values given by farmers **n=50**

Sr. No.	Problems	R.B.Q	Overall rank
1	Lack of suitable HYVs	79.25	I
2	Low technical knowledge	57.50	V
3	Low soil fertility	76.50	II
4	Wild animals	72.25	III
5	Weed infestation	68.75	IV
6	Disease infestation	56.25	VI
7	Insect infestation	51.75	VII
8	Irrigation facility	49.75	VIII

Performance of FLD

A comparison of productivity levels between demonstrated variety and local checks is shown in table 3. During the period under study it was observed that in front line demonstrations, the improved chickpea variety GG-3 recorded the higher grain yield (19.9 q ha^{-1}) compared to local check (12.9 q ha^{-1}). The percentage increase in the yield over local check was 54.26. Similar yield enhancement in different crops in front line demonstration has amply been

documented by Mishra et al. (2009), Kumar et al. (2010) and Rai et al. (2015). From these results it is evident that the performance of improved variety was found better than the local check under local conditions. Yield of the front line demonstration trials and potential yield of the crop was compared to estimate the yield gaps which were further categorized into technology index and harvesting index. The technology gap shows the gap in the demonstration yield over potential yield and it was 2.1 qha^{-1}. Technology index shows the feasibility of the variety at the farmer's field. The lower the value of technology index more is the feasibility. Table 3 revealed that the technology index values were 9.5%. The finding of the present study is in consonance with the findings of Hiremath and Nagaraju (2009) in case of onion crop.

Table 3: Yield, technology gap and technology index of demonstration

Variables	Yield (q ha^{-1})	Increase (%) over Local check	Technology gap(kg)	Technology index (%)
Local check	12.9			
Demonstration (GM-5)	19.9	54.26	2.1	9.5

The economics of chickpea production under front line demonstrations were estimated and the results have been presented in table 5. Economic analysis of the yield performance revealed that front line demonstrations recorded higher gross returns (Rs. 87560 ha^{-1}) and net return (Rs. 68660 ha^{-1}) with higher benefit ratio (4.6) compared to local checks (table 5). These results are in line with the findings of Rai et al. (2012), Hiremath and Nagaraju (2009) in case of sesamum and onion crop.

Table 4: Economics of frontline demonstrations

Variables	Cost of cultivation (₹ ha^{-1})	Gross return (₹ ha^{-1})	Net return (₹ ha^{-1})	Benefit cost ratio
Local check	17500	56700	39260	3.2
Demonstration	18900	87560	68660	4.6

CONCLUSION

The study undertaken with the help of 50 FLD participants at KVK Panchmahal to know the economics of gram production using HYVs and adoption level and constraint influencing the adoption of HYVs. The results revealed that lack of knowledge of suitable HYVs, soil fertility and low technological knowledge were the three most important factors which inhibited the adoption of HYVs of gram in Panchmahal. The yield of gram in demonstration was 19.9 qha^{-1} as compared to the local check (12.9 qha^{-1}). The benefit/cast ration for HYV was 4.6 as compared to 3.2 in case of local check. The impact of FLD was also analyzed which showed that there was significant improvement in knowledge level and satisfaction on the part of farmers.

REFERENCES

Hiremath S M and Nagaraju M V.2009. Evaluation of front line demonstration trials on onion in Haveri district of *Karnataka. Karnataka Journal of Agriculture Science*, 22(5): 1092- 1093.

Kumar A, Kumar R, Yadav V P S and Kumar R. 2010. Impact Assessment of Frontline Demonstrations of Bajra in Haryana State. *Indian Research Journal of Extension Education*, 10(1): 105-108.

Mishra D K, Paliwal D K, Tailor R S and Deshwal A. K. 2009. Impact of Frontline Demonstrations on Yield Enhancement of Potato. *Indian Research Journal of Extension Education*, 9(3): 26-28.

Samui S K, Maitra S, Roy D K, Mondal A K and Saha D, 2000. Evaluation of front line demonstration on groundnut (Arachis hypogea L.) in Sundarbans. *Journal Indian Soc Coastal Agric Res*, 18(2): 180-183.

Singh RP 2011. Status report on pulses. Directorateof Pulses Development, Bhopal, Madhya Pradesh, pp 66-78.

Rai, A. K., Khajuria, S, Lata ,K, Jadav, J K., kumar, Raj and Khadda B. S.(2015), Popularization of vegetable pigeonpea (Cajanus cajan) in central Gujarat through demonstration in farmers field. I*ndian Journal of Agricultural Sciences* 85 (3): 349–53

Rai, A. K., Khajuria, S., Lata ,K., Jadav, J K., Khadda B. S. and kumar, Raj (2012) Impact of Front line demonstration on sesamum production in Panchmahal District of Gujarat. *Indian Journal of Extension Education* Vol.48 No 3&5, 45-48

Received : September 2017 : Accepted : November 2017