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RESEARCH ARTICLE

Boosting chickpea production through front line demonstrations in KVK operational area district Mandsaur Madhya Pradesh

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ABSTRACT

This study was undertaken in Mandsaur district, situated in Malwa plateau semi-arid region of Western Madhya Pradesh Total 65 front line demonstrations were conducted during 2007-08 to 2011-12 in *Kharif* season in five villages (Guradiadiada, Udpura, Surkheda, Lasudawan and Barkheda dev Dungari) of three blocks *viz.*, Mandsaur-I, Malhargarh- II and Sitamau-III. During these five years (2007-2011), 26 hectares under chickpea were demonstrated with improved management practices using improved varieties. Total 65 farmers were closely associated with chickpea demonstrations. To demonstrate production potential and economic benefit of improved technologies integrated pest management (Deep ploughing) consisting suitable varieties (J.G. 130 and J.G. 322), integrated nutrient management (20:60:20) NPK kg/ha.+ seed treatment with 1 gm carbendazim+2 g thiram per kg seed + *Rhizobium* or PSB culture @ 5+5g per kg seed + pheromone trap @ 10-12/ha. + bird perchers @ 50/ha.+ recommended insecticides. There was an appreciable increase in yield level 29.89 to 48.41% in chickpea under demonstration plots. Adoption of improved technology had significant impact on seed yield vis-à-vis yield gaps in chickpea. Improved technology enhanced chickpea yield from 301 kg to 486 kg/ha compared to farmers practice with an overall increase yield of 38.23 per cent.

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INTRODUCTION

Chickpea (*Cicer arietinum* L.) is one of the important grain legumes of the world which is grown in 44 countries across five continents. India is the largest producer of chickpea accounting to 75 per cent of world production. Madhya Pradesh shares 29.37 per cent of the country's area under chickpea. However, the average productivity in the state is low (711.93 kg/ha). This is not because of the unavailability of improved varieties but lack of adoption of improved production technologies. India produces 58.90 lakh ton chickpea in area of 73.70 lakh ha. and given average productivity 799.19 kg/ha. Madhya Pradesh produces 17.30 lakh ton chickpea in area of 24.30 lakh ha. and given average productivity 711.93 kg/ha and district Mandsaur produce 179303 tons chickpea in area of 26682 ha. and given average productivity 672 kg/ha. The frontline demonstration programme (FLD's) in pulses is a noble initiative by Ministry of Agriculture, Govt. of India, which is conducted under close supervision of the scientists. The main objective of FLD's in pulses is to demonstrate and popularize the improved agro-technology on farmers' fields under varied existing farming situations for effective transfer of generated technology and fill the gap between improved technology and adopted/ indigenous technology to enhance the pulse productivity and farm gains through pulses intensification and diversification for sustaining the production systems. Keeping in view the importance of pulses in food security and being vital component of our farming systems, KVKs to bring in enhanced application of modern technologies to generate yield data

and collection of farmer's feedback. Keeping the importance of FLDs, the KVK Mandsaur conducted demonstrations on pulse crops chickpea at farmer's field under rainfed situations in Rabi 2007-08, 2008-09, 2009-10 and 2011-12.

Objectives :

- To exhibit the performance of recognized and recommended high yielding chickpea varieties with Full recommended package of practices for harvesting higher crop yields.
- To compare the yield levels of local check (farmers' field) and FLD fields.
- To collect feedback information for further improvement in research and extension programme.

MATERIAL AND METHODS

Front line demonstrations on chickpea were conducted at farmers' field in district Mandsaur (M.P.) to assess its performance during *Rabi* seasons of the year 2007-08, 2008-09, 2009-10,2010-11 and 2011-12 in Five villages (Guradiadiada, Udpura, Surkheda, Lasudawan and Barkheda dev Dungari) of three blocks *viz.,* Mandsaur-I, Malhargarh- II and Sitamau-III. During these Five years (2007-2011), 26 hectares under chickpea were demonstrated with improved management practices using improved varieties. Total 65 farmers were closely associated with chickpea demonstrations. Each demonstration was of 5.20 ha area and using recommended package of practices and the farmers were provided quality seed of chickpea variety/technology J.G-130,and J.G.-322 during all the years of the study. The sowing was done during October under rainfed conditions and harvested during last fortnight of February. The demonstrations on farmers' fields were regularly monitored by Krishi Vigyan Kendra, Mandsaur scientist's right from sowing to harvesting. The grain yield of demonstration crop was recorded and analyzed. Different parameter as suggested by Yadav *et al.* (2004) was used for calculating gap analysis, costs and returns. The detail of different parameters is as follows:

Extension gap = Demonstration yield - Farmers practice yield

Effective gain = Additional return - Additional cost

Technology gap = Potential yield - Demonstration yield

Additional return = Dem. return - Farmers practice return

Incremental B: C ratio = $\frac{\text{Additional return}}{\text{Additional cost}}$

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

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented as under :

Grain yield :

The increase in grain yield under demonstration was 29.89 to 48.41 per cent than farmers 'local practices. On the basis of five years, 37.24 per cent yield advantage was recorded

Table 1 : Grain yield and gap analysis of front line demonstrations on chickpea at farmer's field

Year	No. of demo.	Variety/ Technology	Potential yield (kg/ha)	Demo yield (kg/ha)	Farmers practice (kg/ha)	Increase (%)	Extension gap (kg/ha)	Technology gap (kg/ha)	Technology index (%)
2007-08	13	J.G. 130	1700	1276	790	38.10	486	424	24.94
2008-09	13	J.G. 322	1600	1308	1007	29.89	301	292	18.25
2009-10	13	J.G.130	1700	1450	977	48.41	473	250	14.71
2010-11	13	J.G.130	1700	1392	1007	38.23	385	308	18.12
2011-12	13	J.G. 322	1600	1508	1146	31.58	362	92	5.75
Average	13		1660	1386.8	985.40	37.24	401.4	273.2	16.35

Demo. = Demonstration, FP=Farmers practice INM=Integrated Nutrient Management

Table 2 : Economic analysis of front line demonstrations on chickpea at farmer's field

Year	Cost of cultivation (Rs./ha)		Additional cost in Demo. (Rs./ha)	Gross return (Rs./ha)		Net returns (Rs./ha)		Additional return in demo. (Rs./ha)	Effective gain (Rs./ha)	INC B:C ratio (IBCR)
	Demo.	FP		Demo.	FP	Demo.	FP			
2007-08	9100	7500	1600	31900	19750	22800	12250	10550	8950	6.59
2008-09	11545	9450	2095	27468	21147	15923	11697	4226	2131	2.02
2009-10	11845	10450	1395	31900	21494	20055	11044	9011	7616	6.46
2010-11	12500	11250	1250	32016	23161	19516	11911	7605	6355	6.08
2011-12	12890	11900	990	52780	40110	39890	28210	11680	10690	11.8
Average	11576	10110	1466	35213	25132	23637	15022	8614	7148	6.59

under demonstrations carried out with improved cultivation technology as compared to farmers' traditional way of chickpea cultivation (Table 1).

Gap analysis :

An extension gap of 362 – 486 kg per hectare was found between demonstrated technology and farmers practices during different five years and on average basis the extension gap was 401.40 kg per hectare (Table 1). The extension gap was lowest (301 kg/ha) during 2008-09 and was highest (486 kg/ha) during 2007-08. Such gap might be attributed to adoption of improved technology in demonstrations which resulted in higher grain yield than the traditional farmers practices.

Wide technology gap were observed during different years and this was lowest (92 kg/ha) during 2011-12 and was highest (424 kg/ha) during 2007-08. On five years average basis the technology gap of total 65 demonstrations was found as 273.2 kg per hectare. The difference in technology gap during different years could be due to more feasibility of recommended technologies during different years. Similarly, the technology index for all the demonstrations during different years were in accordance with technology gap. Higher technology index reflected the inadequate proven technology for transferring to farmers and insufficient extension services for transfer of technology. Technology index was lowest (5.75%) during 2011-12 and was highest (24.94 %) during 2007-08. On five years average basis the Technology of total 65 demonstrations was found as 16.35 per cent.

Economic analysis:

Different variables like seed, fertilizers, bio fertilizers and pesticides were considered as cash inputs for the demonstrations as well as farmers practice and on an average an additional investment of Rs. 1466 per ha was made under demonstrations. Economic returns as a function of grain yield and MSP sale price varied during different years. Maximum returns (Rs. 39890 per ha) during the year 2010-11 was obtained due to higher grain yield. The higher additional returns and effective gain obtained under demonstrations could be due to improved technology, non-monetary factors, timely operations of crop cultivation and scientific monitoring. The lowest and highest incremental benefit: cost ratio (IBCR) were 2.02 and 11.8 in 2008-09 and 2011-12, respectively (Table 2) depends on produced grain yield and MSP sale rates. Overall average IBCR was found as 6.59. The results confirm the findings of front line demonstrations on oilseed and pulse crops by Yadav *et al.* (2004) and Lathwal (2010).

Conclusion:

These technologies were found to be the main reason for increase in the yield of chickpea and thus it can be said that FLDs were the most successful tools for transfer of technology. The concept of front line demonstration may be applied to all farmer categories including progressive farmers for speedy and wider dissemination of the recommended practices to other members of the farming community so the front line demonstration (FLDs) plays a very important role to disseminate recommended technologies because it shows the potential of technologies resulting in an increase in yield at farmers' level. Under demonstrations some specific technologies like seed treatment, seed rate, improved varieties, balance use of fertilizer, intercultural and plant protection measures were undertaken in a proper way the demonstration farmers acted also as primary source of information on the improved practices of chickpea cultivation and also acted as source of good quality pure seeds in their locality and surrounding area for the next crop.

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