

Research Article

Impact analysis of groundnut FLDs technology on extent of adoption, enhancing the productivity and profitability in Sikar district of Rajasthan

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SUMMARY : The impact study was conducted in Sikar district of agro-climatic Zone IIa. To evaluate the productivity potential and profitability of groundnut production technology, the front line demonstrations (FLDs) on groundnut crops were conducted by Bharatia Krishi Vigyan Kendra (BKVK), Fatehpur in Sikar district during three years 2007, 2008 and 2009 were taken for study against farmer's practice. After conduction of demonstrations a significant improvement was found in extent of adoption of seed treatment 43.33 per cent, use of sulphur fertilizer 41.67 per cent, seed rate 35.0 per cent, soil treatment 30.0 per cent, HYVs with 26.67 per cent and plant protection measures 20.00 per cent. The highest yield in FLD (31.33 q ha⁻¹) was recorded in the year 2007; it was 21.20 per cent increase over the farmer's practice (25.85 q ha⁻¹). The 21.20 per cent more yield increases over traditional practices help in improving the additional net income Rs. 8456/- besides incremental benefit cost ratio 2.55 shows direct and positive effect of FLD with increase in extent of adoption of all the improved groundnut production technologies in the study area. Thus, it is concluded that the FLD is an effective technology for changing the knowledge, extent of adoption which ultimate resulting in higher production and productivity of groundnut with additional net profitability of farmers.

KEY WORDS :

Front line demonstration (FLD), Adoption, Productivity, Groundnut

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BACKGROUND AND OBJECTIVES

Groundnut (*Arachis hypogaea*) is one of the most important oilseed crops in India, which plays a major role in supplementing the income of small and marginal farmers of Sikar district in the Rajasthan. Groundnut is main oilseed crop in the district during *Kharif* season and cultivated in 24062 hectare area, having production of 43025 metric tons with productivity of 19.50 q ha⁻¹ in year 2009. Sikar district has the sizeable area under groundnut cultivation but the productivity level is very-very low. Obviously, there is an urgent need for increasing the production and productivity of groundnut. For this purpose Govt. of India had established a "Technology Mission

on Oilseed" in 1986 to achieve self-sufficiency in oilseeds production and to tide over the heavy import of edible oils. Under this mission the ICAR evolved a new concept of first line demonstration during 1990-91. These demonstrations are conducted under the close supervision of scientists of the NARS, KVKs, SAUs and their regional research stations in a block of two to four hectares of land. Realizing the role of KVK in transfer of new technologies through FLDs and trainings, it was thought that it is appropriate to study the impact analysis of groundnut FLDs technology on extent of adoption, enhancing the productivity and profitability in Sikar district of Rajasthan was undertaken with following objectives:

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Sr. No.	Particular practice	Existing practice	Demonstration package
1.	Variety	Local	HYVs: HNG-10, M-13, M-335
2.	Seed rate	120-140 kg ha ⁻¹	80-100 kg ha ⁻¹
3.	Seed treatment	Applied without knowledge	Bavistin 1 g +Thiram 2 g + chloropyriphos 20 EC @ 20 ml/kg seed + <i>Rhizobium</i> culture
4.	Sowing method	Proper distance not maintained	Line sowing (30 x 10 cm)
5.	Fertilizer application	Less quantity without knowledge	30: 60 : 20 and 250 kg ha ⁻¹ (N : P : K and gypsum)
6.	Use of sulphur	Not used	Use of sulphur containing fertilizer
7.	P. P. measures White grub and termite control	Low use of carbofuran 3% or forat 10% without knowledge	Use of carbofuran 3% or forat 10% or quanalphos 5% dust before sowing @ 25 kg ha ⁻¹ for control of white grub and termite
8.	Weed control	Manual weeding	Use of fluchloroline herbicide at the time of last ploughing and before germination of seed @ 1.0 kg ai./ha.

- To identify the differences between demonstration package and farmer's practice.
- To evaluate the extent of adoption of recommended groundnut production technology before and after conducting the FLD.
- To evaluate production and profitability performance of groundnut FLD plots as compared to existing practice.

RESOURCES AND METHODS

The present study was conducted in Sikar district of Rajasthan. From the district two Panchayat Samities namely Khandella and Dhod were purposively selected where the maximum oilseed demonstrations on groundnut were conducted in 4 village viz., Dujod, Netadwas, Kudan and Bavari by KVK, Fatehpur during *Kharif* years 2007, 2008 and 2009. The performance of total 60 beneficiary respondents of 4 villages where FLDs were conducted in an area of 0.5 ha of each farmer was included in the study. A material for the present study has been identified with respect to FLDs and farmer's practices are given in Table A. In case of local check plots; existing practices being used by farmers were followed.

The data were collected through personal interview schedule consisting of set of questions, which were asked to the FLD farmers by the investigator in face to face situation to give their response about each technology for the extent of adoption of improved practices of groundnut production. The yield data of FLDs were collected from each farmer and average out in each year at all locations during *Kharif* season for three years 2007, 2008 and 2009. The collected information was grouped and tabular analysis was done for calculating the yield data by using the following formula:

$$\% \text{ increased in yield} = \frac{D - L}{L} \times 100$$

where,

D= Demonstration yield,

L= Local check yield (Existing practice)

OBSERVATIONS AND ANALYSIS

The differences in extent of adoption of recommended package and practices of groundnut were measured as before FLD and after FLDs conducted.

Extent of adoption of recommended package of practices of groundnut :

In order to find the extent of adoption of improved practices of groundnut production, the respondents were asked to give their responses about each technology. The data in Table 1 indicated that majority of the respondents (91.66%) adopting timely irrigation on their farm through tube well by sprinkler system. Followed by time of sowing (90.0%), HYVs (88.33%), recommended seed rate (86.66%), seed treatment (81.66%), spacing (80.0%), intercultural operation (78.33%), application of FYM (71.66%), recommended dose of fertilizers (70.0%), soil treatment (66.66%), use of sulphur fertilizer (58.33%) and plant protection measures (53.33%) were practiced in groundnut by farmers after conducting the FLDs on their farm.

After conduction the demonstrations, adoption per cent has been increased up to 43.33 per cent in seed treatment practice, followed by use of sulphur fertilizer (41.67%); recommended seed rate (35.00%); soil treatment (30.0%); HYVs (26.67%); and plant protection measures (20.0%).

Thus, there was a significant difference observed in the extent of adoption which were 20-40 per cent increased in practices like: seed treatment, use of sulphur, recommended seed rate, soil treatment, HYV and plant protection measures; and 10-20 per cent in practices like intercultural operation, spacing and recommended dose of fertilizer etc. after conducting FLDs. Above findings are in line with the findings of Singh *et al.* (2007) and Singh *et al.* (2009) in mustard crop

and Patel *et al.*(2009) in groundnut crop.

Production and profitability performance of groundnut crop under FLD as compared to existing practices :

The yield performance results of groundnut crop obtained under demonstrations and farmers practice during three years are presented in Table 2.

Results of 60 front line demonstrations conducted during *Kharif* 2007, 2008 and 2009 in 30.00 ha area on farmers fields of 4 villages of Sikar district indicated that the cultivation practices comprised under FLD *viz.*, use of HYV, line sowing, balance application of fertilizers (N:P:K @ 30:60:20 and gypsum @ 250 kg/ha) and control of white grub through insecticide as

seed treatment and soil trenching, produced on an average 19.66 per cent more yield of groundnut as compared to local check (23.14 q/ha). The results indicate that the front line demonstration has given a good impact over the farming community of Sikar district as they were motivated by the new agricultural technologies applied in the FLD plots. The highest extension gaps which ranged from 3.90 to 5.48 q/ha during the period of study emphasized the need to educate the farmers through various means for the adoption of improved agricultural production technologies to reverse this trend of wide extension gap.

The result also revealed that the average yield in the FLD field was recorded 31.33, 27.90 and 23.80 q ha⁻¹ and at

Table 1: Extent of adoption of recommended practices of groundnut crop before and after FLD (n=60)

Sr. No.	Practices	Adoption						Adoption % increased after FLD
		Before FLD			After FLD			
		Number	%	Rank	Number	%	Rank	
1.	HYVs	37	61.66	VI	53	88.33	III	26.67
2.	Recommended seed rate	31	51.66	VIII	52	86.66	IV	35.00
3.	Seed treatment	23	38.33	IX	49	81.66	V	43.33
4.	Soil treatment for white grub	22	36.66	X	40	66.66	X	30.00
5.	Time of sowing	51	85.00	I	54	90.00	II	5.00
6.	Spacing	41	68.33	III	48	80.00	VI	11.67
7.	Application of FYM	40	66.66	IV	43	71.66	VIII	5.00
8.	Recommended dose of fertilizers	32	53.33	VII	42	70.00	IX	17.67
9.	Use of sulphur fertilizer	10	16.66	XII	35	58.33	XI	41.67
10.	Intercultural operation	38	63.33	V	47	78.33	VII	15.00
11.	Timely irrigation	48	80.00	II	55	91.66	I	11.66
12.	Plant protection measures	20	33.33	XI	32	53.33	XII	20.00

Table 2 : Production performance of groundnut crop grown under FLD and existing practices

Years	Area (ha)	No. of FLD	Yield Q ha ⁻¹						Avg productivity of Sikar district	% increase over existing practice	*Extension technology gap (q ha ⁻¹)	Cost benefit ratio	
			FLD			Existing practice						FLD	Existing practice
			Max.	Min.	Avg.	Max.	Min.	Avg.					
2007	20	40	38.0	24.0	31.33	31.0	17.0	25.85	16.67	21.20	5.48	2.48	2.22
2008	05	10	31.0	24.0	27.90	26.0	20.0	24.00	17.16	16.25	3.90	2.53	2.30
2009	05	10	25.6	20.5	23.80	23.0	15.3	19.58	19.50	21.55	4.22	2.64	2.30
Average			27.68			23.14			17.78	19.66		2.55	2.27

* Extension gap = Demonstration yield - yield under existing practice

Table 3 : The economic analysis of profitability of groundnut FLD fields during year 2007 -2009

Years	Demonstration			Farmer's practice			Additional income over F.P. (Rs./ha)	Income % increase
	Average cost of cultivation (Rs./ha)	Gross income (Rs./ha)	Net income (Rs./ha)	Average cost of cultivation (Rs./ha)	Gross income (Rs./ha)	Net income (Rs./ha)		
2007	26500	65793	39293	24500	54285	29785	9508	31.92
2008	26500	66960	40460	25000	57600	32600	7860	24.11
2009	27000	71400	44400	25500	58740	33240	12160	36.58
Mean	26667	68051	41384	25000	56875	31875	9843	30.87

Prevailing market price in year 2007@ Rs. 2100/-, in 2008 @ Rs.2400/- and in 2009 @ Rs. 3000/-

farmer's field was recorded 25.85, 24.00 and 19.58 q ha⁻¹, with per cent increases in yield over existing practices was recorded up to 21.20 per cent, 16.25 per cent and 21.55 per cent during *Kharif*- 2007, 2008 and 2009, respectively; which created greater awareness and motivated the other farmers to adopt the complete package of new production technology of groundnut on their farm. Above findings are in line with the findings of Kirar *et al.* (2005) in soybean, Patel *et al.* (2009) in groundnut and Meena *et al.* (2012) in Mung bean FLD crop.

Economic analysis of demonstration and farmer's practice:

The economic analysis presented in Table 3 indicated that net income under demonstration plot was highest (Rs. 44400/-) in the year 2009 and lowest net income (Rs. 39293/-) was noted in the year 2007. Similarly the highest net income (Rs. 33240/-) was observed in the farmer's practice during 2009. The average additional income (Rs. 9843/-) over farmer's practice were observed with 30.87 per cent increase in their income as a result of front line demonstrations showed positive impact of FLD, trainings and other supporting activities of KVK's. Similar findings were also reported by Kirar *et al.* (2005) in soybean and Meena *et al.* (2012) in Mung bean crop. Similar work related to the topic was also done by Hirevenkanagoudar *et al.* (1989); Kilbey *et al.* (1984); Mathukia (1981) and Chander *et al.* (2009).

Problems identified in groundnut cultivation :

- A variety of groundnut is required which can tolerate root-rot as well as stress condition.
- Culture packet and fungicide for seed treatment should be supplied in the bag of seeds.
- High cost of fertilizers responsible for poor nutrient supply and imbalance use of fertilizers.
- Lack of knowledge about insecticide responsible for their low adoption.

Conclusion :

From the study it is concluded that after conduction of the demonstrations, the extent of adoption of proven technologies were significantly increased up to 20-43 per cent in practices like; seed treatment, use of sulphur fertilizer, recommended seed rate, soil treatment, HYVs and plant protection measures. The results also revealed that the average 18.69 per cent increase in production with additional net income (Rs. 8456 ha⁻¹) from front line demonstrations over existing practices of groundnut cultivation which may be possible due to latest agricultural information available to the farmers

through a large number of sources *i.e.* trainings, all inputs available in demonstrations, electronic and printed media etc. created greater awareness and motivated the other farmers to adopt proven production technologies in the district. Thus, the front line demonstrations definitely helps in the transfer of newly released crop production technology to increase production and profitability of farmers with their maximum extent of adoption in the nearby villages also.

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