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RESEARCH ARTICLE :

Role of KVK in enhancing the productivity and profitability of moong bean through FLDs in Sikar district of Rajasthan

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SUMMARY : The KVKs play an important role in transferring new agricultural technologies and enhancing the productivity of crops through trainings and FLDs. Keeping in view all beneficiaries of moong bean demonstrations (96) from 18 adopted villages of KVK were selected purposively. To compare the production and profitability, the yield data of FLDs and control plots were collected from each farmers and averaged out in each year at all locations during study 2010-2013. Maximum average demonstration yield 11.83 q ha^{-1} was recorded in *Kharif* 2011 while minimum yield 6.02 q ha^{-1} was recorded in *Kharif* 2013. It clearly shows that maximum 39.69 per cent yield increased over control plot during the *Kharif* season 2010, it was followed by 24.26, 19.36 and 21.86 per cent in each study year. Similarly, after conducting the FLDs and trainings by KVK in adopted villages the change in extent of adoption of new technological interventions were increased upto 29.16 per cent in case of HYVs, 29.13 per cent balance dose of NPK, 21.87 per cent in seed treatment, 20.83 per cent use zinc sulphate, and 18.75 per cent increases were in proper seed rate and use of insecticides. During studies years the net profit from demonstrations were found higher than control plot, it was maximum *i.e.,* Rs. 35350/- in which Rs. 6400/- per hectare was more as compared to control plot *i.e.,* Rs. 28950/- in year 2012. Maximum extention gap (2.58) recorded in *Kharif* 2010 which was later on decreased upto 2.31, 1.52 and 1.08 in all, respectively years. It shows positive role of KVK in performance of FLDs moongbean with improvement in socio-economic status of the farmers.

KEY WORDS:
KVK, Moong bean, HYVs, FLDs, Productivity, Profitability

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BACKGROUND AND OBJECTIVES

The first Krishi Vigyan Kendra (KVK) of Rajasthan was established in Fatehpur in the year 1976 to bring out improvement in production and productivity of major crops and economy status of farming community in the district. This KVK comes under Zone-II A semi arid region of Rajasthan where moong, moth, cluster bean and bajra are major *Kharif* crops in rainfed condition. The average productivity (530 kg ha^{-1}) of moong bean during study period in Sikar district is very low and unstable due to abiotic and biotic stress.

In this area many problems arise due to climatic changes such as low and erratic rainfall, drought, temperature extremes, land degradation, poor human resources, poor-market linkage etc. and due to uncertain production the farmers are not in the position to adopt complete latest package of practices, plant protection measures.

With the inception of KVK it has played an important role in transferring new agricultural and animal husbandry technologies to the farmers of their operational area through trainings, front line demonstrations (FLDs), on farm testing and other supporting extension activities which have been conducted in different adopted villages of the district.

Recognizing the important role of KVK in transferring new technologies to the farmers the Ministry of Agriculture, Government of India has allotted 24 pulses demonstrations of moong bean crop in each *Kharif* season from 2010-2013 for four years regularly under TDHPP for boost up and enhancing the production and productivity of pulses through conducting FLDs with complete new package of practices and different technological intervention. Keeping in view the importance of FLDs, KVK, Fatehpur conducted demonstrations on moong bean at farmers field under rain-fed situations in *Kharif* season from 2010-2013 to know the responses of farmers about its production and profitability as compare to the local check (farmers field)". Present study was carried out to know the collision of these demonstrations with following objectives:

- To study the production performance of demonstrations as compared to local check.
- The extent level of adoption of technology interventions of FLDs before and after KVK activities.
- To study economic analysis of profitability.

RESOURCES AND METHODS

The present study was conducted in five Panchayat Samittee of Sikar district of Rajasthan. All beneficiaries' of moong bean demonstrations (96) from 18 adopted villages of KVK were selected purposively to know the responses of farmers about extent of adoption of the scientific cultivation practices of moong bean before and after contact with KVK, where moong bean demonstrations were conducted during *Kharif* season 2010 to 2013 at farmers field. Most of demonstrations were conducted under rainfed farming situation. In these villages ON/Off campus training programmes and extension activities were carried out during these years. The KVK scientists visited the FLDs field regularly on different critical stages of crops to ensure timely application of nutrients, weedicides and plant protection measures and also to give other suggestive measures to the farmers and collect the feedback information on each stage for further improvement in research and extension programme.

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 improved production technology of moong bean. To compare the production and profitability of crop the yield data of FLDs and control plots were collected from each farmers and averaged out in each year at all locations during the study. The collected information was grouped and tabular analysis was done for calculating the technological gap and extension gap in yield by using the suitable statistical tools.

OBSERVATIONS AND ANALYSIS

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

The effect of FLD programme on production performance of moong bean :

The production performance of technological demonstrations of moong bean were obtained during last four years (2010 to 2013) presented in Table 1, taken from annual reports of KVK, Fatehpur.

It is revealed from the Table 1 that maximum average demonstration yield 11.83 q ha^{-1} was recorded in *Kharif* 2011 while minimum yield 6.02 q ha^{-1} was recorded in *Kharif* 2013. It is clear from the table that maximum 39.69 per cent yield increased over control plot during the *Kharif* 2010, followed by 24.26, 19.36 and 21.86 per cent in each respective year. It is also clear that maximum extension gap was observed 2.58 in year 2010, 2.31 in 2011, 1.52 in 2012 and minimum extension gap 1.08 was found in 2013, it showed direct role of KVK in positive performance of moong bean technological demonstrations over farmer's practices. These results created greater awareness and motivation among the farmers to adopt the new production technologies on their farm. Similarly, Kirar *et al.* (2005)

also reported that increase in productivity and income gain under FLD's over traditional practices of soybean cultivation support the present results.

The major differences in extent of adoption of technology interventions of FLDs before and after KVK activities :

The data presented in Table 2 indicated that before the activities of KVK in the adopted village the extent of adoption of moong bean technology interventions were recorded very low due to lack of knowledge and unavailability of inputs timely.

It was found that before the activities of KVK 100 per cent farmers were not applying the micro nutrients in their fields while 56.25 per cent farmers adopted proper seed rate and plant spacing, 52.09 per cent used HYVs, 18.75 per cent used balance dose of NPK, 16.66 per cent used insecticides for spray and only 12.50 per cent farmers adopted the seed treatment practice. While after the adoption of KVK and conduction FLDs and trainings in adopted villages the extent of adoption of new technology interventions among moong bean growers were increased upto 29.16 per cent in case of HYVs followed by use balance dose of NPK 29.13 per cent, seed treatment 21.87 per cent use zinc sulphate 20.83 and 18.75 per cent increased in proper seed rate and use of insecticides. It may be due to regular follow up by KVK scientists and face to face contact with farmers maintained by KVK team. Similar findings were reported by Asiwal *et al*. (2014) in groundnut.

The economic analysis of profitability of moong bean FLD :

Economic analysis of four years moong bean demonstrations compared with control plot is presented in Table 3. The gross income was calculated with average yield multiplied by prevailing market price of that particular year. From the table it is observed that maximum gross income per hectare was Rs. 46850/- obtained from FLD plot during *Kharif*-2012 while in case

Table 1 : Production performance of technology demonstration of moong bean for harnessing pulse productivity conducted during *Kharif* 2010 to 2013 (4 years)

Year	Demons. variety	No. of farmers	Potential yield (qtl/ha.)	Yield (qt/ha)		% increase	Tech. gap	Extension gap
				Demo.	Control plot			
Kharif-10	RMG-268	24	15	9.08	6.50	39.69	5.92	2.58
Kharif -11	RMG-268	24	15	11.83	9.52	24.26	3.17	2.31
Kharif -12	IPM-02-03	24	15	9.37	7.85	19.36	5.63	1.52
Kharif -13*	SML-668	24	15	6.02	4.94	21.86	8.98	1.08

* Yield affected due to heavy rainfall during early stage and late maturity stage of crop.
Technology gap = Potential yield – Demonstration yield
Extension gap = Demonstration yield – Control plot yield

Table 2: Adoption level of technology intervention of front line demonstrations (n=96)

Sr. No.	Problems	Technology intervention	Adoption level				Change in adoption %
			Before KVK		After KVK		
			f	%	f	%	
1.	Lack of knowledge and unavailability of HYVs	Improved variety: RMG-268, IPM-02-03, SML-668,	50	52.09	78	81.25	29.16
2.	Lack of knowledge of proper seed rate	Seed rate and plant spacing	54	56.25	72	75.00	18.75
3.	Lack of knowledge and no use of micro nutrients	Supply of zinc sulphate @15 kg/ha	-	-	20	20.83	20.83
4.	Lack of knowledge of seed treatment about PSB and R. culture	Seed treatment with carbend-azim @ 2 g/kg seed and PSB and R. culture @ 3-3 pkts/ha each	12	12.50	33	34.37	21.87
5.	Lack of knowledge and imbalance use of fertilizer	Balance use of NPK Fertilizer @ 20: 30:15 kg/ha.	18	18.75	45	46.88	29.13
6.	Lack of knowledge and unavailability of pesticides	Use of diamethoate @ 1.25 lit./ha	16	16.66	34	35.41	18.75

of control plot it was Rs. 39250/- during the year. The table also shows that net profit from demonstration plots in all four studies years were found more than control plot, it was maximum *i.e.*, Rs. 35350/- which was Rs. 6400/- per hectare more over control plot in year 2012. The similar findings were also observed by Patel *et al*. (2009) in groundnut and Choudhary *et al*. (2014) in pea yield under demonstrations confirms these results.

According to the economic analysis of demonstrations data, it is concluded that technological demonstrations played an important role in increasing the production and profitability of the farmers.

Table 4 revealed that horizontal spread and adoption of technology was observed maximum in HYV among 280 farmers adopted and nearby 24 villages spread over more than 200 hectare area, followed by the seed rate and plant spacing, balance use of fertilizer, seed treatment, PP measures, weed management, harvesting and storage techniques was spread among 50 to 100 farmers of nearby 10- 16 villages in more than 100 hectare area. It might be due to the popularization of advance technologies beneficial as compared to the traditional one and approaching the KVK personnel to farmers of nearby villages to beneficiaries with personal contact, field days, Kishan Gosthies and other social occasions. Tandel *et al*. (2014), Chauhan and Pandya (2012) and Tiwari and Saxena (2001)

Conclusion :

It is concluded that before KVK most of the farmers of the adopted villages were using uncertified seed without treatment and not adopting improved practices resulting in low production of moong bean. But after contact with KVK and conducting the FLDs and trainings in adopted villages the change in extent of adoption of new technologies were increased upto 29.16 per cent in case of HYVs, 29.13 per cent balance dose of NPK, 25.00 per cent in use of zinc sulphate, 21.87 per cent in seed treatment and 18.75 per cent increased in proper seed rate and use of insecticides. The percentage of increase in production of FLDs ranged from 19.36 to 39.69 per cent with additional net profit ranged from Rs.15700 to Rs. 35350/- over local plots. Similarly, horizontal spread and adoption of technology among 280 farmers of nearby 24 villages in more than 200 hectare area which created greater curiosity and motivation among other nearby farmers showed positive role of KVK in enhancing the production and profitability of moong bean with improvement in socio-economic status of the farmers.

Table 3 : Economic analysis of profitability of moong bean FLD as compare to control plot

Sr. No.	Variables	FLDs plot year				Control plot year			
		2010	2011	2012	2013	2010	2011	2012	2013
1.	Average yield (Q/ha.)	9.08	11.83	9.37	6.02	6.50	9.52	7.85	4.94
2.	Prevailing market price (Rs./q)	3000	3200	5000	5400	3000	3200	5000	5400
3.	Gross income (Rs./ha)	27000	37856	46850	32508	19500	30464	39250	26676
4.	All cost of cultivation (Rs./ha)	11300	11500	11500	12400	9200	9800	10300	11400
5.	Net profit (Rs./ha)	15700	26356	35350	20108	10300	20664	28950	15276
6.	B:C ratio	2.39	3.29	4.07	2.62	2.11	3.10	3.81	2.34
7.	% increase in yield over control plot	39.69	24.26	19.36	21.86	--	--	--	--

Table 4 : Role of KVK in horizontal spread of technologies in the nearby villages

Sr. No.	Technology demonstrated	Details of popularization methods suggested to the extension system	Horizontal spread of technology		
			No. of village	No. of farmers	Area in ha
1.	Improved variety	- Institutional trg. (On- Campus)	24	280	200
2.	Seed rate and plant spacing	- Village level trg. (Off- Campus)	16	120	100
3.	Seed treatment	- Farmers scientist interaction	14	95	70
4.	Weed mgt	- Demonstration method	10	25	50
5.	Plant protection measures	- Literature	13	35	100
6.	Balance use of fertilizer	- Kisan mela	16	24	80
7.	Harvesting and storage	- Telephone helpline	10	40	40
		- Field days, Kisan Goshti			

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