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RESEARCH ARTICLE :

Role of front line demonstration on transfer of moth bean production technologies in Barmer district of Rajasthan

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SUMMARY : Krishi Vigyan Kendra conducted front line demonstration on moth bean variety RMO-435 at farmer's fields in district Barmer during years 2015-2017. The productivity and economic returns of moth bean in demonstrated plots were calculated and compared with the corresponding local check. The data obtained was pooled for three years. It was observed that on an average 39.15 per cent higher grain yield was recorded in demonstration plots than the local check. The extension gap, technology gap and technology index were 1.32q/ha, 3.32 q/ha and 41.46 per cent, respectively. An additional investment of Rs.854/ha coupled with scientific monitoring of demonstration and non-monetary factors resulted in additional return of Rs. 5843.33/ha over the farmers practices. Fluctuating minimum selling price of moth bean during different years influenced the economic returns per unit area (Singh *et al.*, 2005)..

KEY WORDS :
Moth bean, Pulse, Productivity, Front line demonstration

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BACKGROUND AND OBJECTIVES

Krishi Vigyan Kendra an innovative science based institution plays an important role in bringing the research scientist face to face with farmers. The main aim of Krishi Vigyan Kendra is to reduce the time lag between generations of technology at the research institution and its transfer to the farmers for increasing productivity and income from the agriculture and allied sectors on sustained basis. KVKs are grass root level organizations meant for application of technology through assessment, refinement and demonstration of provenproduce technologies under different micro farming situations in a district (Das, 2007). Front line demonstration is a long term educational activity conducted in a systematic manner at farmer's fields to prove the worth of a new practice/technology. Farmers in India are still producing crops based on the knowledge transmitted to them by their forefathers leading to a grossly unscientific agronomic, nutrient management and pest management practices. As a result of these, they often fail to achieve

Table A : Particulars showing the details of moth bean grown under front line demonstrations and farmers practices

Sr. No.	Particulars	Farmers practice (Local Check)	Frontline demonstration
1.	Variety	Local var.	RMO-435
2.	Seed rate (kg/ha)	15	12
3.	Seed treatment	No	Carbendazim@2.5 g per kg seed Rhizobium and PSB culture @ 600g/ ha
4.	Soil treatment	No treatment	Soil treatment with Trichoderma viridie @ 2.5 kg/ha (mixed with 125 kg FYM)
5.	Line spacing	22.5 cm	30cm
6.	Sowing time	Mid July	July – August
7.	Weed Management	No use of herbicide	Stomp@ 2.5 l/ha
8.	Spray technology	200 – 300 l water/ha	500 l water/ha
9.	Nutrient Management(N:P:K)	0:0:0	10:20:0
10.	Pest management	No use of plant protection measures	Imidacloprid17.8@ 120ml/ha

the desired potential yield of various crops and new varieties. Barmer district is in Western zone the traditional cropping systems of this district is Bajra/Pulse-Cumin/ Isabgol. The soil is low in organic carbon, medium in P and K. Till date the productivity level of moth bean is not sufficient on account of several causes like unavailability of quality seeds of improved varieties in time and poor crop management practices due to unawareness and non adoption of recommended production and plant protection technologies. Therefore, it is very essential to demonstrate the high yielding varieties, resistant to biotic and abiotic stresses and other production technologies which the framers generally do not adopt (Das and Willey, 1991). Keeping above points in view front line demonstration was conducted on moth bean by Krishi Vigyan Kendra. The main objectives of the study were to exhibit the performance of recommended high yielding moth bean varieties with recommended practices for harvesting higher crop yields. To compare the yield levels of local check (farmer's practices) and FLD plots. To collect feedback for further improvement in the performance of moth bean cultivation practices.

RESOURCES AND METHODS

The front line demonstrations on moth bean were conducted at farmer's field in district Barmer to assess its performance during the year 2015-2017. The soil of the district is generally sandy to sandy loam in texture which is low in organic carbon (0.09 - 0.215 %), available phosphorus (11-14 kg/ha) and medium to high in potash. Each demonstration was of 0.4 ha area and the critical inputs were applied as per the package of practices. The quality seed of moth bean variety during all the years of the study was used for conducting FLD. The sowing was done during July and harvested during September (Table A). Demonstrated at farmers fields were regularly monitored by scientist of KrishiVigyan Kendra from sowing to harvesting. The grain yield of demonstration crop was recorded and analyzed. Different parameters were calculated to find out technology gaps (Yadav *et al.*, 2004) as follows

Extension gap = Demonstration yield - Local check yield
Technology gap = Potential yield - Demonstration yield
Technology index = Potential yield - Demonstration yield x 100/Potential yield

OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summarized under following heads:

Table 1 : Grain yield and gap analysis of frontline demonstration on moth bean at farmer's field

Year	No. of Demo.	Area (ha)	Yield (q/ha)		Increase (%)	Extension gap (q/ha)	Technology gap (q/ha)	Technology index (%)
			Demon.	Local check				
2015	50	20	5.5	3.7	48.64	1.80	2.50	31.25
2016	200	80	3.72	2.67	39.33	1.05	4.28	53.50
2017	50	20	4.83	3.73	29.49	1.10	3.17	39.63
Average	100	40	4.68	3.37	39.15	1.32	3.32	

Table 2 : Economic Analysis of demonstrated plots and farmers practice

Year	Average cost of cultivation (Rs./ha)		Average gross return (Rs./ha)		Average net returns (Rs./ha)		B:C	
	Demo	Local	Demo	Local	Demo	Local	Demo	Local
2015	9586	8850	30250	20350	20664	11550	3.16	2.3
2016	9126	8390	13392	9612	4266	1222	1.47	1.15
2017	10870	9780	16905	13055	6035	3275	1.56	1.33
Average	9860.67	9006.67	20182.33	14339.00	10321.67	5349.00	2.06	1.59

Grain yield :

On an average the demonstrated plots showed 39.15 per cent increase in grain yield (Table 1). The highest increase in grainyield (48.64 %) was observed in year 2015, which might be due to seed of improved variety and other improved production technologies about which the farmers were ignorant.

Extension gap :

An extension gap between demonstrated technology and farmers practices ranged from 1.05 to 1.80q/ha during different three years and on average basis the extension gap was 1.32 q/ha (Table 1). This gap might be attributed to adoption of improved technology in demonstrations which resulted in higher grain yield than the traditional farmer's practices (Hussain *et al.*, 1995).

Technology gap :

Wide technology gap were observed during different years and this was lowest (2.5 q/ha) during 2015 and was highest during (4.28 q/ha) during 2016. The average technology gap returns found was 3.32q/ha. 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 demonstrated during different years were in accordance with technology gap. Higher technology for transferring to farmers and insufficient extension services for transfer of technology.

Economic gap :

Different variables like seed, fertilizers, bio fertilizers and pesticides were considered as critical inputs for the demonstration as well as farmers practices and on an average an additional investment of Rs. 854/ha were made under demonstrations. The highest incremental benefit: cost ratio was 3.16 during the year 2015. Overall average BCR was found to be 2.06. The results confirm the findings of frontline demonstrations on oilseed and pulses crops by Yadav *et al*. (2004); Balai *et al*. (2013); Kaur *et al*. (2014) and Singh *et al*. (2005).

Conclusion :

Frontline demonstration programmes were effective in changing attitude of farmers towards pulse cultivation. Cultivation of demonstrated plots of moth bean with improved technologies has increased the skill and knowledge of the farmers. FLD also helped in replacement of local unrecommended varieties with improved recommended varieties. This also improved the relationship between farmers and scientist and built confidence between them. The farmers where improved technology was demonstrated also acted as primary source of information for other farmers on the improved practices of moth bean cultivation and also acted as source of good quality pure seeds in their locality for the next crop. 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.

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