Original Research Article

Performance of Groundnut under Broad Bed Furrow Method in Buldana District of Maharashtra

ABSTRACT

The Cluster Frontline Demonstrations (CFLDs) on groundnut were carried out by Krishi Vigyan Kendra, Jalgaon Jamod, Buldana district of Maharashtra during the summer season of 2015-16 to 2016-17 in fields of 50 farmers' in different villages of Buldana district. Farmers were randomly selected from adopted villages for carried out frontline demonstration. The result of the present study showed that sowing irrigated groundnut crop on broad bed furrows in demo plots recorded higher yield over to conventional farmers farming practices. The average pod yield in broad bed furrow seed drill sowing method was 23.79 q/ha. The technological gap range found 1.26 q/ha to 3.17 q/ha. The technology index varied from 4.85 percent to 12.19 percent with an average of 8.52 per cent over study period, which showing the effectiveness of technological interventions. The economics of improved production practices under frontline demonstration was estimated based prevailing market prices, the average highest gross return of FLDs plots was Rs 57,548/- per hectare i.e. more than 26 percent higher at demonstration compared to the practices and average the benefit-cost-ratio (2.24) was recorded. Groundnut productivity was considerably increased by conducting cluster frontline demonstration of better variety with intervention methods using proven technologies in farmers' fields and improving the livelihood of the farming community.

KEYWORDS: Groundnut, Broad bed furrow technology, FLD, Technology gap, Extension gap, Technology Index and Economic return

INTRODUCTION

'India is one of the major oilseeds producer and importer of edible oils. With regards to vegetable oil economy, India ranks fourth in the world after USA, China & Brazil. Groundnut (*Arachis hypogaea L.*) is one of the most important oilseed crops in India. Groundnut contributes nearly 65% to the vegetable oil

produced in India and holds the key to the fluctuating fortunes of vegetable oil industry. Low crop yields under rainfed conditions are due to recurring drought stress, high soil temperature, widespread soil degradation and desertification, and poor management. Soil-related constraints that exacerbate drought stress include crusting and compaction, low water infiltration rate, low water retention capacity, high surface runoff, and high losses due to soil evaporation' (Rattan Lal, 2008). 'Among the various land surface management practices like raised and sunken bed, ridge and furrow developed for Vertisols, broad bed and furrow (BBF) system is very promising in controlling surface runoff, reducing the soil loss through erosion and increasing infiltration' (Singh et al., 1999). The BBF landform management system essentially reduces runoff water velocity and consequently increases the time that water can infiltrate and reduces sediment losses. In addition, during the periods of heavy rainfall the furrow allows excess water to safely drain away from the plots and thus avoiding water congestion to the crop (Kampen, 1982). It points that that the the productivity of groundnut in Buldana is comparatively low, mainly due to unavailability of suitable varieties as well as the lack of improved production technologies, especially sowing method and nutrient management. The present study was conducted to observe the role of the planting method in groundnut. The raised bed system of planting was compared t the flat bed method prevalent in the district.

MATERIALS AND METHODS

In order to increase the production and productivity of groundnut crop Krishi Vigyan Kendra, Jalgaon Jamod, Buldana district, Maharashtra introduced the technology for sowing of groundnut crop on broad bed furrow in demo plots in that region while control plots crop were grown according to commonly accepted agricultural .The trial was carried out in summer season in 2015-16 and 2016-17 in farmers fields in Jalgaon Jamod and Sangrampur tahsil, Buldana district of Maharashtra. Each year different areas were chosen for the study. Before the FLD trail implemented, the farmers were trained by experts and KVK's scientists on use of broad bed furrow machines. In demonstration quality seeds of an improved variety of groundnut crop i.e. TAG-25, seed treatment, recommended dose of fertilizers, Rhizobium, PSB bio-fertilizer and crop protection management techniques demonstrated in the farmer's field through frontline demonstration at various locations. The raised bed planted every year on was done at five fields of one acre each. A tractor drawn bed planter was used to planting groundnut in broad bed furrow technique. Irrigation was done by sprinklers at different stages of groundnut. Crop yield was collected based on actual yield per hectare basis. Growing cost and gross return were calculated on prevalent market prices. The conventional practices were maintained in case of local checks. All major agricultural operations were carried out under the supervision of KVK scientist by

regular visits. The yield increase in demonstrations over farmers' practice was calculated by using the following formula:

Extension Gap (q/ha) = Demonstration Yield – Check Yield

Technology Gap (q/ha) = Potential Yield – Demonstration Yield

Technology Index (%) = Technology Gap / Potential Yield X 100

RESULTS AND DISCUSSION

Groundnut yield

The difference in groundnut pot yield with a broad bed furrow and conventional sowing is justified in Table-1.Results from 50 frontline demonstrations conducted on 20 ha area in farmer fields between 2015-16 and 2016-17 showed that the average higher pod (23.79 q/ha) yield of groundnut was recorded in FLDs over the average farmer pod yield (18.96 q/ha) recorded. Due to the introduction of improved TAG-25 variety with appropriate production technology, the pod yield of groundnut may be raised by 25.78 % above the pod yield achieved by local agricultural methods of groundnut cultivation. Jat and Katiyar (2015), Pawar et al., (2017) and Undhad et al., (2019) all found similar results.

Technology Gap

Technology gap refers to the difference between the potential yield of the variety and the demonstration yield. Farmers will eventually stop using old kinds in favour of new technology as a result of new technologies. The technology gap of 1.26 and 3.17 q/ha in 2015-16 and 2016-17 respectively (Table 1). The average technological gap was observed to be 2.32 q/ha. The technological gap observed can be attributed to the difference in soil fertility status and weather conditions i.e. irrigation and temperature can be traced. Therefore, variety wise location specific recommendation seems necessary to minimize the technology gap for yield level in different situations.

Extension Gap

The extensions gap referred to the difference between demonstrated yield and yield under existing agricultural practice. An extension gap of 4.46 and 5.19 q/ha was observed in 2015-16 and 2016-17 respectively (Table 1). The average extension gap was recorded in the demonstration as 4.83 q/ha emphasizing the need to train the farmers through various means to adopt improved groundnut production technologies to reverse this large extension gap trend. The increasing use of the latest production technologies with high-yielding varieties will subsequently change this alarming trend of the galloping extension gap.

Technology Index

The technology index referred to the relationship between the technology gap and the potential yield expressed as a percentage. The technology index shows the feasibility and performance of the demonstrated technology in the farmers' field. The lower value of the technology index shows the effectiveness of a good performance of technological interventions. In the present demonstration, the technology index fluctuated between 4.85 to 12.19 percent (Table 1). The average technology index was recorded at 8.92 percent in the groundnut crop during the three consecutive years of FLD programmes The technology index can be reduced through the correct application of demonstrated technical interventions to increase the yield performance of groundnut crop. The finding of this study are consistent with those of Jat and Katiyar (2015) and Pawar et al., (2017).

Economic Return

The economic analysis of broad bed furrow technique of seed drill in groundnut under frontline demonstration and framers control plots are shown in Table 2. Table 2 shows that the average total return of both cluster of FLDs and the farmers' control plots are Rs 57,548/- and Rs 33,471/- per hectare respectively i.e. more than 72 per cent higher in the demonstration compared to the farmers' practices.
Jat and Katiyar (2015), Pawar *et al*., (2017) and Undhad *et al.,* (2019) all found similar findings.

Benefit cost ratio

Benefit-to-Cost ratio was also worked out for farmers' practice and demonstration plots as given in Table 2. The B:C ratio as reported in Table 2 was greater BBF plots (2.24) than in the conventional method (1.68) of sowing of groundnut. This is due to the reduction in the primary tillage operation method as well as increased production.

CONCLUSION

Based on the results obtained in the present study, groundnut productivity was considerably boosted as a result of conducting cluster frontline demonstrations of better variety with intervention methods of proven technologies in the farmers' field, resulting in greater farmer revenue and improved farming community livelihoods. However, 40 to 50% savings in irrigation water were recorded with broad bed furrow method of groundnut in compared to flood irrigation of controlled plots. The results showed that broad

bed furrow technology has great potential to increase water productivity of groundnut. Farmers were inspired by cluster frontline demonstrations in groundnut crop and they planned to use this technology for many years.

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Table 1 : Grain yield and gap analysis of front line demonstration on Ground nut

Year	Area (ha)	No. of farmers	Yield q/ha			% increase over farmer practices	Technology gap (q/ha)	Extension Gap	Technology Index
			Potential	FLD plots	Farmer practices				
2015-2016	10	25	26	24.74	20.28	22.14	1.26	4.46	4.85
2016-2017	10	25	26	22.83	17.64	29.42	3.17	5.19	12.19
			Mean	**23.79**	**18.96**	**25.78**	**2.22**	**4.83**	**8.52**

Table : 2 Economics analysis of demonstrated plots and farmers practices of Ground nut

Year	Av. Cost of Inputs (Rs/ha)		Av. Gross return (Rs/ha)		Average net return (Rs/ha)		B;C ratio	
	Demo. Plots	farmers practices	Demo. Plots	farmers practices	Demo. Plots	farmers practices	Demo. Plots	farmers practices
2015-2016	46994	47718	99665	81688	52671	33969	2.12	1.71
2016-2017	46066	50700	108490	83682	62424	32973	2.36	1.65
Mean	**46530**	**49209**	**104078**	**82685**	**57548**	**33471**	**2.24**	**1.68**