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RESEARCH PAPER

Dissemination of productivity enhancement technologies in pigeonpea through frontline demonstrations

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Abstract : The demontration was carried out during *Kharif* 2016 in three villages of Tumkur district where 25 demonstrations on Pigeonpea crop were carried out in an area of 10 ha by the active participation of farmers with the objective to demonstrate the improved technologies in pigeonpea to exploit production potential. The improved technologies consisted of use of improved wilt resistant variety, seed treatment with *Rhizobium* culture, soil application *Trichoderma* and phosphate solubilising bacteria, balanced fertilizer application and integrated pest management. Frontline demonstrations (FLDs) recorded higher yield as compared to farmers' local practice. The improved technology recorded higher yield of 10.5 q/ha compared to 8.25 q/ha in farmers' local practice. In spite of increase in yield, technological gap, extension gap existed. The improved technology gave higher gross return, net return with higher benefit/cost ratio than farmers' practices.

Key Words : Pigeonpea, FLD, Improved technologies

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INTRODUCTION

Pigeonpea, *Cajanus cajan* (L.) Millsp is an important pulse crop of India next to chickpea. It is mainly grown in states of Maharashtra, Karnataka, U.P., MP and Gujarat. It has multiple uses and occupies an important place in the prevailing farming systems in the country and vegetarian diet. It also plays an important role in sustainable agriculture by enriching the soil through biological nitrogen fixation along with deep root system of this crop which makes it more suitable for its cultivation under rainfed conditions.

The productivity of pigeonpea is Karnataka is lower than national average reason being use on local varieties, Faulty sowing practices, improper crop geometry, avoid use of biofertilizers, *Trichoderma*, other intercultural operations and climatic variability's are predominant reasons for limiting the potential yield of pigeonpea. In order to demonstrate the production potential improved technologies front line demonstrations were conducted.

MATERIAL AND METHODS

Frontline demonstration on pigeonpea using new

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Table A : The criteria's taken for improved practices and compared to farmers practices for pigeonpea under FLD

Sr. No.	Technology	Improved practices	Farmers practice	GAP (%)
1.	Variety	BRG-5	BRG-2	Partial gap
2.	Land preparation	Ploughing and harrowing	Ploughing and harrowing	Nil
3.	Seed rate	12.5 kg/ha	17.5 kg/ha	High seed rate
4.	Sowing method	Line sowing	Line sowing	No gap
5.	Seed treatment	With biofertilizers and *Trichoderma*	No seed treatment	Full gap
6.	Plant protection	IPM	Indiscriminate application of pp chemicals	Full gap

crop production technology was carried out at the Krishi Vigyan Kendra, Tumkur during *Kharif* season in the farmers' fields of 3 villages during 2016 with the objective of showing the productive potentials of the new production technologies under real farm situation over the locally cultivated varieties. All 25 frontline demonstrations in 10 ha area were conducted in different villages. Each frontline demonstration was laid out on 0.4 ha area, adjacent 0.4 ha was considered as control for comparison (farmer's practice). The integrated crop management technology comprised improved variety of pigeon pea BRG-5, proper seed rate, seed treatment with *Rhizobium* and *Trichoderma*, proper nutrient and pest management (Table A). Optimum plant population was maintained in the demonstrations. The sowing was done in first week of June, the fertilizers were applied as per as per soil test based recommendation as and when required. Other agronomic practices were followed as per recommendation. The yield data were collected from both the demonstration and farmers practice. Qualitative data were converted into quantitative form and expressed in terms of per cent increase in yield calculated using following formula as suggested by Samui *et al.* (2000) as given below:

Technology gap= Potential yield – Demonstration yield

Extension gap= Demonstration yield – Farmers' yield

RESULTS AND DISCUSSION

The gap between the existing and recommended technologies of pigeonpea in district Tumkur is presented in Table 1. Full gap was observed in case of use of resistant variety, sowing method, seed treatment, plant protection and weed management and partial gap was observed in fertilizer dose, which definitely was the reason of not achieving potential yield. Farmers were not aware about recommended technologies. Farmers in general used local or old-age varieties instead of the recommended high yielding resistant varieties. Unavailability of seed in time and lack of awareness were the main reasons. Farmers followed thick sowing against the recommended line sowing and because of this, they applied higher seed rate than the recommended.

During frontline demonstrations results obtained are presented in Table 2. The results revealed that due to

Table 1: Technology gap and extension gap of pigeonpea under FLDs

Name of the crop	Demos (No.)	Characteristics of the demo variety	Potential yield of the demo variety	Technology gap (%)	Extension gap (%)
Pigeonpea	25	Dual purpose variety, wilt resistant and medium duration	16.00 q/ha	29.18	64.63

Table 2 : Effect of integrated crop management technologies on yield of pigeonpea under FLD

Yield obtained (q/ha)						Yield increase (%)
Farmers plot			Demonstration plot			
Max.	Min.	Av.	Max.	Min.	Av.	
8.25	2.5	5.54	10.5	3.5	7.23	30.50

Table 3: Effect of integrated crop management technologies on economics of pigeonpea under FLD

Expenditure and returns (Rs./ha)								Net returns increase (%)
Farmers plot				Demonstration plot				
Gross cost (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	B:C ratio	Gross cost (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	B:C ratio	
30514	21640	8874	1.40	39765	21560	18205	1.84	205.14

front line demonstration on pigeonpea an average yield was recorded 7.23 q/ ha under demonstrated plots as compared farmers practice 5.54q/ha. The highest yield in the FLD plot was 10.5 q/ha and in farmers practice 8.25 q/ha in the same year and lowest yield yield in the FLD plot was 3.5 q/ha and in farmers practice 2.5 q/ha was recorded. This results clearly indicated that the higher average grain yield in demonstration plots over the years compared to local check due to knowledge and adoption of full package of practices *i.e*. appropriate varieties such as BRG-5., timely sowing, seed treatment with bio fertilizers) *(Rhizobium* and PSB) *Trichoderma* @4g/ kg of seed, use of balanced dose of fertilizer (10kg N and 20kg P_2O_5 per ha), method and time of sowing, timely weed management, need based plant protection. The average yield of pigeonpea increased 30.50 per cent. The yield of pigeonpea could be increased over the yield obtained under farmers practices (old variety, no use of the balanced dose of fertilizer, untimely sowing and no control measure adopted for pest management) of pigeonpea cultivation. The above findings are in similarity with the findings of Singh (2002); Raj *et al*. (2013); Sharma *et al*. (2011) and Tomar *et al*. (1999).

Technology gap:

The technology gap, the differences between potential yield and yield of demonstration plots was 29.18 per cent. The technology gap observed may be attributed to dissimilarity in the soil fertility status, agricultural practices and local climatic situation.

Extension gap:

Extension gap under FLD programme was 64.63 per centa which emphasized the need to educate the farmers through various extension means *i.e*. front line demonstration for adoption of improved production and protection technologies, to revert the trend of wide extension gap. More and more use of latest production technologies with high yielding varieties will subsequently change this alarming trend of galloping extension gap.

Economic return:

The inputs and outputs prices of commodities prevailed during the study of demonstration were taken for calculating net return and benefit: cost ratio (Table 3). The cultivation of pigeonpea under improved technologies gave higher net return of Rs.18205 per ha as compared to Rs.8874 in farmers practices. Similar findings were reported by Singh *et al.* (2014). The benefit cost ratio of pigeonpea cultivation under improved cultivation practices was 1.84 whereas 1.40 under farmer's practices. This may be due to higher yield obtained under improved technologies compared to local check (farmers practice). This finding is in corroboration with the findings of Mokidue *et al.* (2011) and Singh *et al*. (2013).

Conclusion:

The FLD produces a significant positive result and provided the researcher an opportunity to demonstrate the productivity potential and profitability of the latest technology (Intervention) under real farming situation, which they have been advocating for long time. This could be circumventing some of the constraints in the existing transfer of technology system in the Tumkur district, of Karnataka. The productivity gain under FLD over existing practices of pigeonpea cultivation created greater awareness and motivated the other farmers to adopt suitable production technology of pigeonpea in the district.

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