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Performance Evaluation of Cluster Front Line Demonstration in Black gram

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A B S T R A C T

Krishi Vigyan Kendra, Lam Guntur has conducted Cluster Front Line Demonstration on Black gram variety TBG-104 at farmer fields in the two adopted villages namely Pamulapadu and Chinaparimi during *Kharif* 2017 under National Food Security Mission, Govt. of India, scheme. The KVK Scientists has conducted 50 Cluster frontline demonstrations in 20 hectare area at two different locations in Guntur district. The increase in yields of black gram crop under cluster front line demonstrations was attributed to spreading of improved technologies *viz*. YVM resistant variety, seed treatment with bio-fertilizers, use of recommended seed rate, proper dose of fertilizers and plant protection measures. The results revealed that the highest seed yield was obtained in demonstrated plots with an average of 17.85 q/ha as compared to farmers practice plots with an average of 14.8 //ha. An average extension gap between demonstrated Practices and farmers practices was recorded 3.05 q/ha. Higher net return (71510 Rs/ha) was obtained in the demonstration plots compared to farmers practice plots (50975 Rs/ha). Further Benefit cost ratio was recorded higher in front line demonstrations (3.37) as compared to farmers practice plots (1.98).

Introduction

India is one of the major pulses producing country in the world which shares 30-35% and 27-28% of the total area and production of pulses respectively. The increase in pulse production has been only marginal when compared with wheat and rice. Black gram (*Vigna mungo*) is a widely grown legume, belongs to the family Fabaceae and assumes considerable importance from the point of food and nutritional security in the world. It is a short duration crop and thrives better in all seasons either as sole or as intercrop. India is the world's largest producer as well as consumer of black gram. Its seeds are highly nutritious with protein (25-26%), carbohydrates (60%), fat (1.5%), minerals, amino acids and vitamins. Black gram has been distributed mainly in tropical to sub-tropical countries where it is grown mainly in summer season. This crop is itself a mini-fertilizer factory, as it has unique characteristics of maintaining and restoring soil fertility through fixing atmospheric nitrogen in symbiotic association with *Rhizobium* bacteria, present in the root nodules. An important feature of this plant is its ability to establish a symbiotic partnership with specific bacteria, setting up the biological N_2-fixation process in root nodules by rhizobia that may supply the plant's needs for N. Black gram output accounts for about 10 per cent of India's total pulse production. It is therefore, necessary to assess the technological gap in production and also to know the problems and constraints in adopting modern black gram production technologies. Krishi Vigyan Kendra is an innovative institution providing for (i) effective linkage among researchers, farmers and extension workers (ii) practical approach to training through "Learning by doing" (iii) flexible syllabi based on a survey and needs of farmers and location specific requirements. 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 proven produce technologies under different micro farming situations in a district (Das, 2010). The main objective of cluster front line demonstration was to increase the Blackgram production through improved crop management practices. The present investigation was undertaken to Performance of Cluster Front Line Demonstrations (CFLD's) on integrated crop management in Black gram.

Materials and Methods

The present study was carried out by Krishi Vigyan Kendra lam, Guntur and All 50 farmers from two Adopted villages were selected under Cluster front line demonstration. The soil of CFLD's soils was Black cotton soils and the pH of soil is near about 7.0- 7.5 (Table 1). The improved technology such as improved varieties, ICM practices like treatment of seeds, integrated nutrient management, weed management and Integrated Pest management was maintained during period of research study. Seed treatment is done with carbendazim@2.5 gm/kg of seed and Imidacloprid 600 FS @ 5 ml /kg of seed 24-48 hours before sowing to protect the crop from sucking pests and diseases up to 15-20 days after sowing. The seed rate of Black gram is kept *20 kg / ha in* demonstration plots. The sowing of Black gram crop seed was done during first fortnight of October. The spacing between Row and Plant was kept 30 x 10 cm for the cluster front line demonstration. Biofertilizers like *PSB* 500 ml and *Rhizobium* 500 gm with 100 kg of Vermicompost were also incorporated with soils. The fertilizers doses of 20N+50kgP_2O_5 kg/ha were also given as basal dose. Spraying of Pendimethalin @ 2.5 to 3.5 lt/ha immediately after sowing or the next day to check the weed growth for the first 20-25 days post emergence application of Imazethapyr 500m/hal at 21-28 DAS and IPM Practices like errection of pheromone traps with along with *Helicoverpa* lures 4/acre, installation of yellow sticky traps 10/acre for controlling of white flies and spraying of neem oil @ 5ml/(3000ppm) as prophylactic spray at 20 and 35 DAS against *Maruca* pod borer and application of need based recommended pesticides. The data were collected through personal contact with farmers at farmer's field and after that tabulated and analyzed to find out the findings and conclusion. The statistical tool like percentage used in this study for analyzed data. The extension gap, technology gap and the technology index were work out with the help of formulas given by Samui *et al.,* (2000) as mentioned below:

Extension gap = Demonstration yield-farmers' yield (control)

Technology gap = Potential yield-demonstration yield

$$\text{Technology index} = \frac{\text{Technology gap}}{\text{Potential Yield}} \times 100$$

Results and Discussion

The present research findings as well as relevant discussion have been conferred under following points:

Yield performance

The seed yield of Demonstration plots was higher as compared to check a plot which was due to high yielding variety and ICM practices were followed in Demonstration plots.

The table 2 depicted that the average seed yield was 17.85 q/ha which was higher as compared to check plots (14.8 q/ha). 16.8 percent increase in yield was observed in CFLD's over farmers practice plots. However, the obtained seed yield (17.85 q/ha) in CFLD's was low as compared to Potential yield (20 q/ha) of blackgram the variety TBG 104 due to severe attack of bud necrosis virus at the time of flowering and pod formation stage of the crop. The similar results were also observed by Mahalingam *et al.,* (2018), Dubey *et al.,* (2010) and Poonia and Pithia (2011). Yield of the front line demonstration trials and potential yield of the crop was compared to estimate the yield gaps which were further categorized into technology and extension gaps (Hiremath and Nagaraju, 2009).

Extension gap

An average extension gap between demonstrated practices and farmers practices was recorded 3.05 q/ha (Table 2).

This Extension gap should be assigned to adoption of improved transfer technology in demonstrations practices resulted in higher grain yield than traditional farmer practices. The similarly observations were also obtained in Black gram crop by Mahalingam *et al.,* (2018) Bairwa *et al.,* (2013) and also Hiremath and Nagaraju (2010).

Table.1 Technology demonstrated in CFLD's and farmers' practices

S. No.	Practice	Demonstrated practice	Farmers' practice
1	Field preparation	3 ploughings	Single plough
2	Method of sowing	Mechanical seed drill	Broad casting
3	Variety	TBG-104	LBG-752
4	Seed treatment	carbendazim@2.5 gm/kg of seed	No seed treatment
5	Seed rate & spacing	20 kg / ha &30 x 10 cm	25-30 kg/ha and 22 X 7 cm
6	Manures &Fertilizers	PSB 500 ml and Rhizobium 500 gm with 100 kg Vermicompost & NPK as basal dose 20:40:00 kg/ha	Excessive usage of chemical fertilizers
7	Weed management	Pendimethalin @ 2.5 to 3.5 lt/ha	No pre emergence herbicide, high value herbicide
8	IPM Measures	IPM practices like spraying of neem oil need based pesticides and errection of pheromone traps, yellow sticky traps.	Indiscriminate usage of pesticides

Table.2 Productivity, extension gap, technology gap and technology index of black gram as grown under CFLD's and existing package of practices

Village	Yield q/ha		Percent yield increase over control	Extension gap (q/ha)	Technology gap(q/ha)	Technology Index %
	Demo	Farmers practice plot				
Pamulapadu	18.5	15.2	17.8	3.3	1.5	7.5
Chinaparimi	17.2	14.4	15.8	2.8	2.8	14.00
Average	17.85	14.8	16.8	3.05	2.15	10.75

Table.3 Gross Return, Net Return, Gross cost Cultivation and BC Ratio of black gram as grown under FLDS and existing package of practices

Village	Gross cost of Cultivation (Rs/ha)		Gross Return(Rs/ha)		Net Return(Rs/ha)		B:C Ratio	
	Demo	Farmers practice plot	Demo	Farmers practice plot	Demo	Farmers practice plot	Demo	Farmers practice plot
Pamulapadu	20950	24950	95400	79500	74450	54550	3.55	2.19
Chinaparimi	21530	26800	90100	74200	68570	47400	3.18	1.77
Average	21240	25875	92750	76850	71510	50975	3.37	1.98

Yield gap and technology index

Yield of the demonstration plots and potential yield of the crop was compared to estimate the yield gaps which were further categorized in to technology and extension gaps. The technology gap in the blackgram demonstration yield over potential yield was maximum (2.15 q/ha) observed during *Rabi* 2017. The observed technology gap may be attributed dissimilarity in soil fertility status, rainfall distribution, disease and pest attacks as well as the change in the locations of demonstration plots every year. Further, the maximum extension gap of 3.05q/ha was recorded in blackgram (TBG-104) demonstrations during Rabi 2017. The table 2 also revealed that the technology index was 10.75 percent. The technology index shows the feasibility of the variety at the farmer's field. The lower value of technology index more is the feasibility of technology. This indicates that a gap existed between technology evolved and technology adoption at farmer's field. The similar results were also observed by Gangadevi *et al.*, (2017), Kumar *et al.*, (2014), Thakral and Bhatnagar (2002), Bairwa *et al.*, (2013), Hiremath and Nagaraju, (2010) and Dhaka *et al.*, (2010). Hence, it can be concluded from the table 2 that increased yield was due to adoption of improved varieties and conducting demonstration of proven technologies. Yield potentials of crop can be increased to greater extent by demonstrations in addition to trainings.

Economic return

Cost of cultivation increased in demonstration practice (21240 Rs/ha) as compared to Farmers practice plot check (25875 Rs/ha). The figures showed in Table 3 clearly explicated the implication of front line demonstration at farmer's field during the period of study in which higher net returns (71510 Rs/ha) were obtained under demonstration plots as compared to farmer practices (50975 Rs/ha). Benefit cost ratio was recorded under front line demonstrations (3.37) as compared to farmer practices (1.98) during the period of study. The similarly findings was also obtained by Gangadevi *et al.,* (2017) and Bairwa *et al.,* (2013). The above results showed that the integration of improved technology and training along with active participation of farmer has a positive effect on increase the Grain yield and Economic return of Black gram crop Production in Guntur district. Based on study the economic viability of the demonstration motivated the farmers towards adoption of interventions demonstrated. Hence, by conducting front line demonstrations of proven technologies and trainings, yield potential of Black gram crops can be increased to great extent. This will subsequently increase the income as well as the livelihood of the farming community. Further farmers expressed their views regarding timely procurement of blackgram from farmers with increased minimum support price will greatly encourage them for cultivation of pulses.

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