

Original Research Article

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Evaluation of Cluster Front Line Demonstration in Greengram Crop

Kabita Mishra*, S. Panigrahi and D. Sarangi

Krishi Vigyan Kendra, Ganjam-II, Odisha, India

*Corresponding author

ABSTRACT

Front line demonstration is an appropriate means for demonstration as well as transfer of improved agricultural innovations to the farming community. It provides an opportunity to researchers and extension personnel for understanding the farmer's resources and requirement to modify the technologies for easy adaptability at farmer's fields. Krishi Vigyan Kendra, Ganjam-II has conducted Cluster Front Line Demonstration on greengram at farmers' fields in the adopted village Rajanapalli during Rabi 2017. The KVK scientists have conducted 50 Cluster frontline demonstration in 20 hectares area by the active participation of farmers with the objective to demonstrate the improved technologies in greengram crop. The improved technologies consisting use of improved variety, seed treatment with Rhizobium culture, integrated nutrient and weed management, pest and disease management. The results revealed that the highest seed yield was obtained in demonstrated plot with an average of 701kg/ha as compared to 550kg/ha. Higher net return (15850Rs/ha) was obtained in the demonstration plots compared to farmers practice plots (9050Rs/ha).

Keywords

Greengram, Cluster front line demonstration, Seed yield, B: C ratio, Technology gap

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Introduction

Pulse is the most important food crop in India. It is the second most important group after cereals which play a key role in Indian Agriculture. Their ability to use atmospheric nitrogen through biological nitrogen fixation is economically more sound and environment friendly. Pulses are a good source of protein for a majority of the Indian population. India is the major pulse producing country in the world which shares 30-35% and 27-28% of the total area and production of pulse respectively. Even though pulse production increased significantly during last decade growth but maintaining that trend is a

challenge for researcher, extension agencies and policy makers to fulfill the domestic demand. The productivity of pulse in India (694kg/ha) is lower than most of major pulse producing countries. In year 2016 -17 the total pulse area 238.56 lakh ha with production in India was 18.25 million tonnes with productivity 765kg ha⁻¹. Greengram is one of the most important pulse crops. It contains 25 percent of high digestible proteins and consumed both as whole grain as well as split dal. It is a soil building crop which fixes atmospheric nitrogen through symbiotic action and can also be used as green manure crop adding 34 kg N ha⁻¹. Green gram or mung bean (*Vigna radiata* L.) is the major pulse

crop of the state Odisha covering total area of 8.36 lakh ha with average productivity 434 kg per ha, which is about 40 percent of the total pulse area of the state. The district of Ganjam lies in two agro climatic zones i.e. East & South Eastern coastal plain zone and North Eastern Ghat Zone of Odisha extending from 18⁰13'N to 19⁰10' North latitude to 82⁰5' to 83⁰23' East longitude. The Average Normal Rainfall of this district is 1276.2 mm and more than 75% of the precipitation is received over five months i.e. June- October. Agriculture is the primary occupation of inhabitants of this district. The maximum and minimum temperature of this district is 39⁰C and 18.9⁰C respectively. Farmers of the district adopt the rice-pulse (greengram) cropping system to utilize the residual soil moisture after the harvest of kharif rice which increase the soil fertility status, as well as yield and income of the farmer. Green gram is cultivated as major pulse crop in the district comprising total area of 159,420 ha with productivity of 976 kg ha⁻¹, which is very low. The farmers are using local cultivators i.e. Chaiti Muga which gives poor yield due to non-adoption of any soil test based fertilizer application. Disease like YMV is the major bottleneck to achieve higher productivity in greengram.

It is therefore necessary to assess the technological gap in production and also to know the problems and constraints in adopting new production technologies.

KVKs are grassroot level organization meant for application of technology through assessment, refinement and demonstration of proven technologies under different microfarming situation in a district (Das, 2010). The main objective of cluster front line demonstration was to increase the greengram production through improved crop management practices. The newly and innovative technology having higher production potential under the specific

cropping system can be popularized the demonstration programme.

The present study was undertaken to evaluate the performance of cluster front line demonstration in greengram crop.

Materials and Methods

The present study was carried out in adopted village Rajanapalli of Krishi Vigyan Kendra (KVK), Ganjam-II during Rabi 2017-18. The study was under taken in Rajanapalli village Chatrapur block of Ganjam district of Odisha and the block was selected purposefully as green gram is the major crop in Rabi season. The geographic location of the area was with 82⁰5' to 83⁰23' East Longitude 18⁰13'N to 19⁰10' North Latitude and soil and nutrient status of the experimental site is given below. The climate of the region is hot and humid climate with average rainfall 1276mm. The soil status of CFLD's is depicted in Table 1. The improved technology such as improved variety, ICM practices like seed treatment, INM, weed management and IPM was maintained during the crop period.

The field was ploughed two times and planking was done after each ploughing then seeds were inoculated with Rhizobium culture@20.0gm per kg of seed and sown in line by using seed cum fertilizer drill with spacing 20x10cm and seed rate was 20kg/ha. Soil test based fertilizer application was recommended with fertilizer dose NPK 20:40:20kg ha⁻¹ and applied as basal. Spraying of *thiamethoxam*@5gm/15 lit of water for control of sucking pests. Weed management through application of *Imazethapyr* @ 300 ml /ac was done. The seeds and other critical inputs were supplied to the farmers by KVK.

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

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

Results and Discussion

Differentiation in farmer's practices and demonstration package in greengram crop

The major differences were observed between demonstration package and farmer's practices are regarding recommended varieties, seed treatment, method of sowing, fertilizer dose, method of fertilizer application, weed management and plant protection measures.

Table 2 shows that under the demonstrated plot only recommended varieties, seed treating culture, herbicide and plant protection chemicals were given to farmer by the KVK and other practices were timely performed by the farmer itself under supervision of KVK scientist. Under farmer's practice, they generally sow seed of greengram at higher seed rate without treatment. The local variety i.e. chaiti muga was found susceptible to yellow vein mosaic disease. Therefore the farmers selected under CFLD programme were provided with the seed of YVM resistance green gram var IPM-02-14. The IPM-02-14 (Shreya) variety, being resistant to mungbean yellow mosaic virus, powdery mildew and leaf crinkling incidence led to

lower cost of cultivation resulting to higher net return as compared to local variety.

Yield performance

The seed yield of demonstration plots was higher as compared to farmers practice due to high yielding variety and other integrated crop management practices. A comparison of yield performance between demonstrated practices and local checks is shown in Table 3. The variety IPM-02-14 gives higher yield as compared to local variety Chaiti Mung. It was observed that the seed yield was 7.1 q/ha which was higher as compared to farmer practice 5.5q/ha. The increase in the yield over local check was 29.1%. Similar yield enhancement in different crops in front line demonstration has been documented by Poonia and Pithia (2011), Patel *et al.*, (2013) and Raj *et al.*, (2013). 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

The extension gap is the difference or gap between demonstration yield and farmers practices (control). The average extension gap between demonstration practices and farmers practices was recorded 1.6 q/ha (Table 4). This extension gap should be assigned to adoption of improved transfer technology in demonstrations practices resulted in higher seed yield than traditional farmer practices. This emphasized the need to educate the farmers through various means for more adoption of improved high yielding varieties and newly improved agricultural technologies to bridge the wide extension gap. More use of new high yielding varieties by the farmers will subsequently change this alarming trend of galloping extension gap.

Table.1 Soil nutrient status of the demonstration plot

Soil test report	Demonstration plot
Ph	5.4
EC (dS m ⁻¹)	0.20
Available N (Kg ha ⁻¹)	166.31
Available P ₂ O ₅ (Kg ha ⁻¹)	12.45
Available K ₂ O (Kg ha ⁻¹)	144.10
Organic carbon (%)	0.55

Table.2 Differences between farmer's practices and technological intervention for Greengram crop

Sl. No.	Practices	Demonstrated practice	Farmers' practice
1	Field preparation	2 ploughings	single plough
2	Method of sowing	Line sowing behind the plough	Broad casting
3	Variety	IPM02-14	Chaiti muga
4	Seed treatment	Seed inoculation with Rhizobium culture	No seed treatment
5	Seed rate & spacing	20 kg / ha and 20 x 10 cm	30kg/ha
6	Manures &Fertilizers	Soil test based fertilizer application	injudicious use of chemical fertilizers
7	Weed management	❖ weed management through application of <i>Imazethapyr</i> @ 300 ml /ac	No herbicide application
8	IPM Measures	❖ Plant protection chemical <i>thiamethoxam</i> @5gm/15 lit of water for control of sucking pests.	Indiscriminate usage of pesticides

Table.3 Productivity, extension gap, technology gap and technology index of Greengram as grown under demonstration

Variables	Yield (q/ha)	% increase over local check	Extension gap (q/ha)	Technology gap (q/ha)	Technology index (%)
farmer practice	5.5				
Demo	7.1	29.1	1.6	1.9	21

Table.4 Economics of front line demonstration

Variables	Gross cost of cultivation (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	B: C ratio
farmer practice	21200	30250	9050	1.42
Demo	23200	39050	15850	1.68



The new technologies will eventually lead to the farmers to discontinuance of old varieties with the new technology.

Technology gap

The technology gap is the difference or gap between the demonstration yield and potential

yield. It was found 1.9 q/ha. The technology gap observed may be attributed to dissimilarity in the soil fertility status and weather conditions. Hence location specific recommendation appears to be necessary to bridge the gap between the yields. These findings are similar to the findings of Patel *et al.*, (2013).

Technology index

The Technology index shows the feasibility of the technology at the farmer's field. The lower the value of technology index more is the feasibility. The Result of the present study depicted in Table 3 revealed that the technology index value is 21 percent. 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).

Economics of front line demonstration

The economics of green gram production under front line demonstrations have been presented in Table 4. The results of economic analysis of green gram production revealed that cost of cultivation increased in demonstration practice (23200 Rs/ha) as compared to Farmers practice plot check (21200 Rs/ha). It was observed that front line demonstrations recorded higher gross returns (Rs 39050/ha) and net returns (Rs 15850/ha). The benefit cost ratio of demonstration plot (1.68) was also more than the farmers practice (1.42)

The findings of the study showed that the integration of improved technology and the training along with active participation of farmer has a positive effect on increase the seed yield and economic return of green gram crop. Based on study the economic viability of the demonstration motivated the farmers towards adoption of interventions demonstrated.

This will subsequently increase the income as well as the livelihood of the farming community besides enhancing soil fertility. The per cent increment in yield of greengram

to the extent of 29.1% in demonstration over the farmers practice created greater awareness and motivated the other farmers to adopt the improved package of practices of greengram. These demonstrations built the relationship and confidence between farmers and KVK scientists. It is concluded that the CFLD programme is an effective tool for increasing the production and productivity of greengram and changing the knowledge, attitude and skill of the farmers. This has not only resulted in socio-economic security but also helped in attaining food and nutrition security to the community along with fodder requirement of farm animals.

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