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Varietal popularization of cowpea through front line demonstrations in Tiruvallur district of Tamil Nadu

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Abstract

Cowpea is one of the major pulse crops and the farmers were cultivating only the traditional varieties with non adoption of improved varieties and management practices resulted in poor yield. Hence to combat this problem frontline demonstration was conducted to demonstrate the potential of improved cowpea variety VBN 3 in ten farmers' holdings of Tiruvallur district during Rabi season of 2018-2019. The crop was grown with improved crop management practices and compared with the farmers practice. The improved crop management practices consisting of new variety i.e., VBN 3, seed treatment with *Rhizobium*, soil application of TNAU Pulses micronutrient mixture @ 7.5 kg ha, spraying of Pulse wonder @ 5/ kg ha during flowering stage and improved pest management strategies for sucking pest. The results of the demonstration revealed that the demonstration of improved crop management practices recorded the higher number of pods per plant (36.5 t/ha) and pod yield (3.45 t/ha). Farmers practice recorded the lower number of pods per plant (26.4 t/ha) and pod yield (24.5 t/ha). The per cent increase in yield under demonstration over farmers practice was 24.5. The higher net income and benefit cost ratio (2.9) was realized in demonstration of improved crop management practices. The lower net income and benefit cost ratio (2.5) was recorded in farmers practice.

Keywords: cowpea, FLD, growth, yield, economics

Introduction

Cowpea (*Vigna unguiculata* (L.) Walp aggreg.) is cultivated widely in the tropics and has multipurpose uses: as food for human beings, fodder for livestock and atmospheric nitrogen fixers. Cowpea grains rich in protein are consumed in different forms in several parts of the tropics. Cowpea cultivars grown for the immature pods that are used as a vegetable are variously known as asparagus bean, snake bean, and yard-long bean; when grown for dry or immature seed, they are known as black-eye pea, china pea, and southern bean. Cowpea is well adapted to stress and has excellent nutritional qualities.

It's a key dietary staple for the poorest sector of many developing countries and greatly improves an otherwise bland and unbalanced diet. It serves as a good source of vegetable proteins and its seeds contain 22- 24 per cent protein. Being a legume, it can fix atmospheric nitrogen to the extent of 150 kg/ha besides it enriches the soil fertility through addition of crop residues (Rochester *et al.*, 1998) ^[4]. It is a drought tolerant crop and grows well in dry lands with limited rainfall. Farmers used to cultivate the crop under rainfed condition especially during kharif season immediately after receiving rainfall without any preparatory tillage and addition of manures. Due to the non adoption of improved management practices, imbalanced and indiscriminate use of pesticides farmers getting low yield and income. Apart from this the varieties available for cultivation are non - synchronized maturity in nature. Hence the farmers have to harvest the cowpea in two to three times which requires more labour, time and money and thus the total cost of cultivation was more. As non - availability of labour and cost of labour is the major issue in crop cultivation now a days, this has to be managed effectively. Hence, the present frontline demonstration was taken up by ICAR-Krishi Vigyan Kendra, Tiruvallur in order to create awareness among the farmers and to demonstrate the impact of Improved crop management practices on increasing the yield and income of farmer's community.

Materials and Methods

ICAR-Krishi Vigyan Kendra, Tiruvallur intervened with frontline demonstration on improved crop management in Cowpea during Kharif 2018 in ten farmers' holdings of Dharmapuri

district to overcome the problems faced by the farmers in cowpea cultivation. In the demonstration, improved variety VBN 3 was grown in 0.2 ha area with improved crop management practices and the farmers practice in 0.2 ha area for comparison. The Improved crop management practices consist of new variety VBN-3, seed treatment with rhizobium, *Pseudomonas fluorescence* @ 10g/kg or *Trichoderma viridi* @ 4 gm/ kg of seed, soil application of TNAU pulses micronutrient mixture @ 7.5 kg ha as basal, spraying of pulse wonder @ 5 kg ha during flowering stage and improved pest management strategies were demonstrated.

Special features of Cowpea VBN 3

Variety VBN-3 introduced under demonstration was released from Tamil Nadu Agricultural University, Coimbatore during 2018 with duration of 75 -80 days and matures in 78 days with 28- 34 pods/ plant. Semi erect and determinate plant type with synchronized maturity, resistant to pod borer and pod

bug, resistance to rust, anthracnose and bean common mosaic virus. It is a synchronized maturing variety which is amenable for single harvest saving labour and time. It is suitable for sowing during kharif and rabi season. It can give grain yield of 1000 qtls/ha under rainfed condition.

The technological interventions followed in farmers practice and demonstration is given in Table 1. Before conducting the demonstration, the beneficiary farmers were given with skill training on various technological interventions to be followed in cowpea cultivation. The soil samples were collected from the demonstrated fields and analyzed for major nutrients. The performance of crop was periodically observed by the scientists of ICAR-Krishi Vigyan Kendra, tiruvallur district and crop advisory recommendations were followed. During harvest, yield data was collected from both the demonstration and farmers practice. At the end, cost of cultivation, net income and cost benefit ratio were worked out.

Table 1: Particulars of the technological interventions followed under Farmers Practice and Demonstration on Cowpea

S.no	Technological interventions	Demonstrated packages of Cowpea	Farmers practices of Cowpea
1	Farmers situation	Rainfed	Rainfed
2	Variety	VBN -3(Photo sensitive)	Local (Photo sensitive)
3	Time of Sowing	Third week of July	Second week of July
4	Seed treatment	Seed treatment with <i>Rhizobium</i> and <i>Phosphobacteria</i> @ 20 g/kg; <i>Pseudomonas fluorescens</i> @ 10 g/kg and <i>Trichoderma viridi</i> @ 4 g/kg of seed	Not practiced
5	Method of sowing	Hand dibbling on ridges by following a spacing of 45 x 15 cm	Broadcasting of seeds or dibbling
6	Application of RDF	Recommended INM practices Soil application of FYM @ 12 t/ha and recommended dose of NPK fertilizers i.e., 25:50:25 kg/ha. Basal application of pulses micronutrient mixture @7.5 kg/ha. Foliar spray of Pulse Wonder @ 5 kg/ha at 50% flowering.	Basal application of 20:20:20 complex fertilizer @ 50 kg/ha. No addition of micronutrient mixtures
7	Weed management	One hand weeding on 20-25 days after sowing	Hand weeding
8	Spraying of need based pesticides	Need based of plant protection chemicals	Spraying of pesticides at regular interval without proper dose

Results and Discussion

Growth and Yield Characteristics

The performance of cowpea under demonstration and farmers practice was observed (Table 2). Results revealed that, the demonstration of cowpea variety VBN -3 with improved crop management practices recorded more number of branches per plant (14.6) and pods per plant (36.5). The lower number of branches per plant (10) and pods per plant (26.4) were recorded in farmers practice. Cow pea under demonstration mature early (79 days) compare to farmer's practice (84 days).

The damage incidence of pod borer (4.0%), bean mosaic virus (6%) and rust (5%) were lower in demonstration and higher in farmers practice viz., pod borer (14.5%), bean mosaic virus (16%) and rust (13%). Lower damage incidence in demonstration might be due to the adoption of improved pest and disease management strategies viz., placing pheromone traps, need based usage of pesticides. Similar results of reduction in pest and disease incidence due to adoption of improved pest management practices in brinjal were reported by Govardhan Rao (2015) [5].

Demonstration of improved crop management practices recorded the higher pod yield (3.45 t/ha) and farmers practice recorded the lower pod yield (2.58 t/ha). The per cent increase

in the pod yield of demonstration over farmers practice was 24.5. The yield improvement in the demonstration might be due to the combined effect of high yielding ability of variety and adoption of improved nutrient, pest and disease management practices. Similar results have been reported earlier by Mishra (2009) [6], Poonia and Pithia (2011) [7] and Sharma (2013) [8] in potato, chickpea and coriander respectively.

Economics

The data on economic indicators indicated that, the higher cost of cultivation was involved in demonstration as compared to Farmer's practice (Table 2). The front line demonstration plots fetched higher net income as compared with farmers practice. Similar results of increase in net income due to adoption of improved crop management practices were reported by Sreelakshmi (2012) [10] and Singh (2017) [11] in pigeon pea, moth bean and wheat respectively. The higher benefit cost ratio (2.9) was realized in demonstration and lower benefit cost ratio (2.5) was realized in farmers practice. It showed the economic viability of the technology demonstrated through the frontline demonstration on cowpea under Tiruvallur district.

Table 2: Performance of Improved Crop Management practices on Growth, Yield and Economics of Cowpea

S. no	Parameter	FLD (Recommended improved crop management practices)	Farmers cultivation practices
1	Plant height	35.5	24.4
2	Number of branches per plant	14.6	10.0
3	Number of pods per plant	36.5	26.4
4	Days to maturity	79	84
5	100 seed weight (g)	3.6	2.4
6	Pod yield (t/ha)	3.45	2.58
7	% increase in pod yield over FP	24.5	-
8	BC Ratio	2.9	2.5
9	Synchronization maturity (%)	82	45
10	Pod borer incidence (%)	4.0	14.5
11	Bean mosaic virus incidence (%)	6	16
12	Rust disease incidence (%)	5	13

Conclusion

From the results of frontline demonstration in cowpea, it could be revealed that the yield and income of the cowpea growers were significantly increased by the cultivation of improved variety along with improved crop management practices. The farmers were highly satisfied with the performance of cowpea variety VBN -3 and encouraged the other farmers to adopt the same in large scale in their locality thus pave way for horizontal spread of this variety.

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