Performance of cowpea variety (Kasha Kanchan) under Front Line Demonstration in Eastern Part of Uttar Pradesh, India

ABSTRACT

Aim: To disseminate the technology among the farmers through front line demonstration on Cowpea for enhanced the production and fetching the more income.

Study Design: Not applicable

Place and Duration of Study: ICAR-IIVR-Krishi Vigyan Kendra, Deoria, conducted front-line demonstrations on kharif onion at farmers' fields during the Zaid season 2019 and 2020.

Methodology: Conducted 45 front-line demonstrations at farmers' fields during the study period. The yield data were recorded.

Results: To increase the output of onions through enhanced production technology, 45 front line demonstration on kharif onion were conducted. According to the demonstrations that were undertaken, the improved variety of produced an average green pod yield of Cowpea variety Kashi Kanchan (CP4) up to 18.18% over farmers practice. Average net return was increased (37.41%) in Cowpea variety Kashi Kanchan over farmer practice during the both the year of demonstration. The benefit-cost ratio of two years demonstrated technology was higher over farmer's practices. The higher value of the B: C ratio and extension gap indicates the more feasibly of the technology in eastern plain of Uttar Pradesh, India.

CONCLUSION

It is concluded 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 CP4 and encouraged the other farmers to adopt the same in large scale in their locality thus pave way for horizontal spread of this variety.

Key words: Cowpea, Front line demonstration, Yield and Economics

1. Introduction

"Cowpea (*Vigna unguiculata* (L.) Walp.aggreg.) is cultivated widely in the Eastern part of Uttar Pradesh and has multipurpose uses: as green vegetable, dal for human beings, fodder for farm

animals and atmospheric nitrogen fixers. Cowpea grains rich in protein are consumed in various forms in some parts of the country. Cowpea cultivars grown for the green pod or juvenile pods that are used as a vegetable are variously known as snake bean, asparagus bean and yard-long bean; when grown for dry or mature seed, they are known as black-eye pea, kaffir pea, china pea, and southern bean" (Meena et al., 2022). Cowpea is well adapted to stress and has very good nutritional qualities. It is 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. Rochester et al., (1998) reported that, "cowpea being a legume; it can fix atmospheric nitrogen to the extent of 150 kg/ha besides it enrich the soil fertility through addition of crop residues. It is a drought tolerant crop and grows well in dry lands with limited rainfall. Kashi Kanchan variety of Cowpea is cultivated as green pod mostly all part of Uttar Pradesh". 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, *viz.* improved variety, irrigation, date of sowing, method of sowing, seed treatment, spacing, balance use of fertilizers, intercultural operations and plant protection measures 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 many 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 Krishi Vigyan Kendra 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 the farming community of Deoria district of Uttar Pradesh, India.

2. MATERIALS AND METHODS

2.1 Details of Location

In present study performances of CP 4 high yielding variety of cowpea against traditional variety was evaluated through front line demonstrations (FLDs) at farmer´s field during Zaid season 2019-20 and 2020-21. The study was carried out by the Krishi Vigyan Kendra, Malhana, Deoria under Indian Institute of Vegetable Research, Varanasi, UP. A total of 45 FLDs were conducted

of this variety during study period from Zaid season 2019-20 and 2020-21. Agronomical practices used for the present study with respect to FLDs and farmer practices are given table 1. The crop was sown in First week of February and harvested in first week of April. CP 4 variety of cowpea was compared with traditional varieties grown by the farmers. The soils of the study area are very deep, loam to silt loam in texture and moderately well to well drained with ground water irrigation facility. Soils are medium in fertility status. Climate of the district is characterized by dry summer and cool winter with high rainfall during Kharif season. Critical inputs in the form of quality seeds of recommended high yielding varieties for FLDs was provided to the farmers. The farmers were facilitated by KVK subject matter specialist in performing field operation like sowing, seed treatment, irrigations, fertilizer application, weeding spraying of pesticide, harvesting and storage *etc.* through training, course visit and field days. The demonstrated technologies in the fields are presented in table1 and compared with local practices. Performance of CP 4 variety of cowpea the yield and economics data were recorded and compared with traditional varieties, grown by the selected farmers. Data was calculated as per standard methods to find out the B: C ratio and extension gaps between demonstrated technology and farmers practices by using following formula as given below.

B: C ratio = Gross Return/ Cost of Cultivation x 100…… (1)

Net Return = Gross Return - Cost of Cultivation…… (2)

2.2 Special features of Cowpea CP4

This was released and notified during the XIII meeting of the Central Sub-Committee on Crop Standard Notification and Release of Varieties for Horticultural Crops for Cultivation in Uttar Pradesh, Punjab, Bihar, Chhattisagarh, Orissa, AP and MP. This is the dwarf and bush type (plant height 50–60 cm), photo-insensitive, early flowering (40–45 days after sowing), and early picking (50–55 days after sowing) variety CP4 suitable for growing in both the spring-summer and rainy seasons. Pods are about 30–35 cm long, dark green, soft, fleshy, and free from parchment. The cultivar gives a green pod yield of about 150–175 q/ ha and is resistant to golden mosaic virus and Pseudocercospora cruenta**.** The technological intervention followed in farmers' practice and demonstration is given in Table 1. Before conducting the front line demonstration, the beneficiary farmers were given 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 the crop was periodically observed by the

scientists of Krishi Vigyan Kendra and crop advisory recommendations were followed. During harvest, yield data was collected from both the demonstration and the farmer's practice. At the end, the cost of cultivation, net income, and cost benefit ratio were worked out.

Table 1: Details of Agronomical practices used for the present study with respect to FLDs and farmer practices on cowpea

S.No.	Technological interventions	Farmers cultivation practice	Frontline Demonstration (Recommended Improved crop management practices)
1.	Farming situation	Irrigated	Irrigated
2.	Soil type	Sandy loam	Sandy loam
3.	Variety	Local (Photo sensitive)	CP4 ((Photo insensitive)
4.	Time of Sowing	First week of February	First week of February
5.	Seed treatment	Seed treatment practice not followed	Seed treatment with *Rhizobium* culture and Fungicide
6.	Method of sowing	Broadcasting	Sowing on ridges
7.	Spacing	Scattered	45 x 15 cm
8.	Fertilizer application	Imbalance use of fertilizers	Application of fertilizer as per recommendation
9.	Weed management	Hand weeding	One hand weeding at 20-25 DAS
10.	Plant protection	Spraying of pesticides at regular interval without proper dose	Need based usage of plant protection chemicals
11	Harvesting	Last week of May	Last week of April

3. RESULTS AND DISCUSSION

3.1 Interpretations growth and yield attributes

The data presented in Table 2 was recorded growth and yield characteristics the performance of cowpea variety CP4 under demonstration and farmers practice. Results revealed that, the demonstrated of cowpea variety CP4 with improved crop management practices recorded more

number of branches per plant (16), pods per plant (29.45), pod length (26,9 cm) and pod weight (11.8 g), which was 25.98, 63.61, 25.44 and 19.19% higher than farmer practice. Cow pea variety CP4 under front line demonstration mature early (75 DAS) compare to farmers practice (88 DAS).

Table 2: Plant height, number of branches, number of pod/plant pod length and pod weight under FLDs and traditional variety

Variety /		**CP4**			**Farmer Practice**	
Characters	**2019-20**	**2020-21**	**Pooled**	**2019-20**	**2020-21**	**Pooled**
Plant height (cm)	56.4	58.8	57.6	64.6	68.8	66.7
Branches/plant	16.6	15.4	16	12.6	12.8	12.7
Pod plant-^{1} (No.)	28.4	30.5	29.45	18.2	17.8	18
Pod length (cm)	22.4	26.9	24.65	18.8	20.5	19.65
Pod weight (g)	12.2	11.4	11.8	9.6	10.2	9.9
Maturity (Days)	72	78	75	86	90	88

3.2 Interpretations of crop yield

High yielding variety of cowpea CP 4 was evaluated against traditional variety through front line demonstration on selected farmer's field of Deoria district during Zaid season 2019-20 and 2020-21. The results of demonstrated technologies compared with farmers practices are depicted in Figure 2. The average yield of cowpea variety CP 4 under FLDs was recorded 154.2 and 124 q/ha during both the year, which was 16.64 and 20.39 % higher than the traditional variety used by the farmers (Figure 1). Similar yield enhancement through frontline demonstration in Indian mustard has also been reported by Meena *et al*., (2020). Yield gap analysis has been carried out by several workers (Meena *et al*., 2020, and Meena *et al*., 2022) in eastern part of Uttar Pradesh and reported the superiority over local or traditional technologies. Better performance and it's on farm showcasing over local varieties is enough to attracts farming community to grow mustard crop.

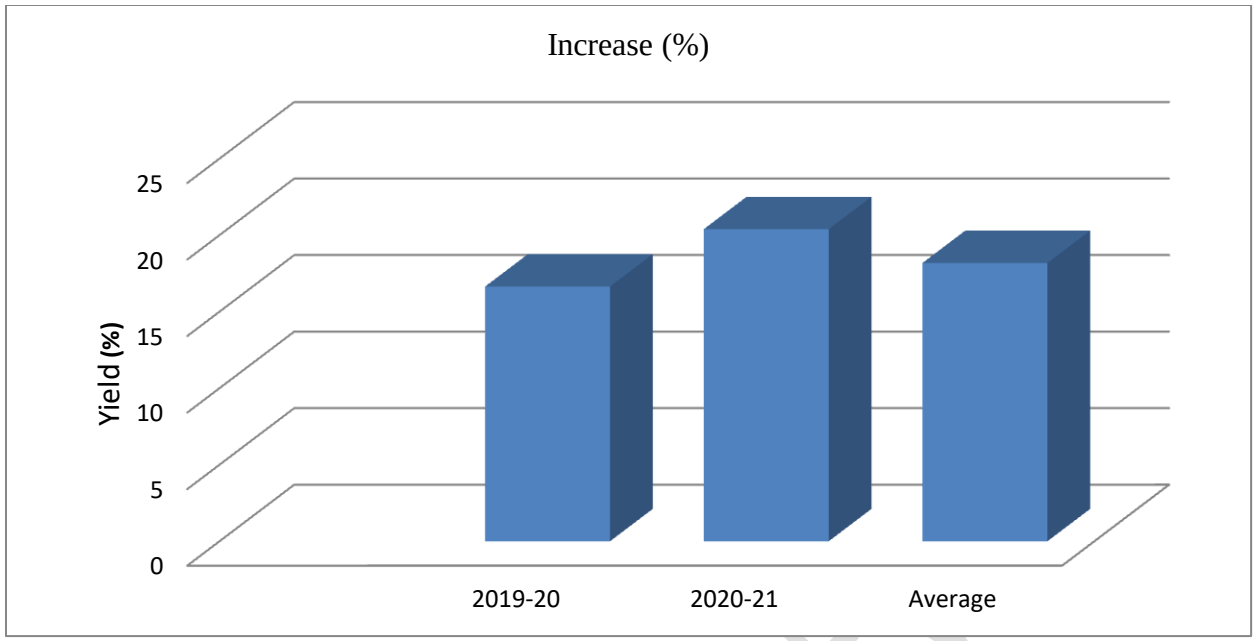

Figure 1: Yield increase (%) of cowpea variety CP4 over famers practice under front line demonstration during both the year of demonstration.

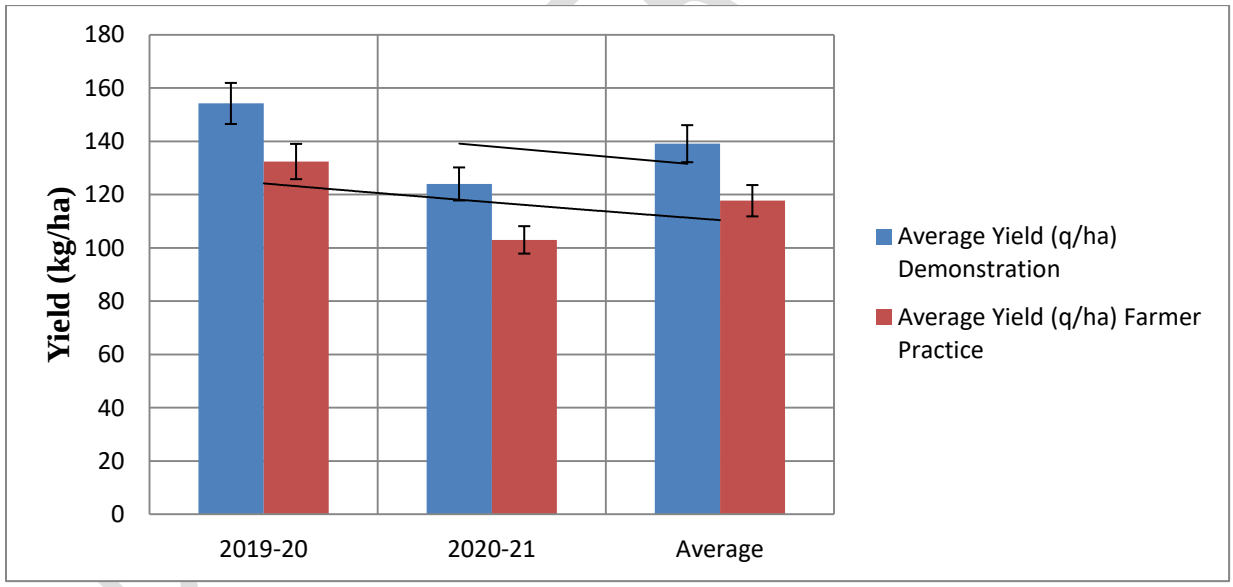

Figure 2: Average yield (kg/ha) under front line demonstration during both the year of demonstration.

3.3 Interpretations of Economics

The data presented in table 2 on economic indicators indicated that, the average gross return (Rs 151500/ha) was involved in demonstration as compared to farmers practice (Rs 128000/ha).The

front line demonstration plots fetched higher average net income of Rs. 83275/ha as compared to Rs. 60600/ha with farmers practice (Figure 3).

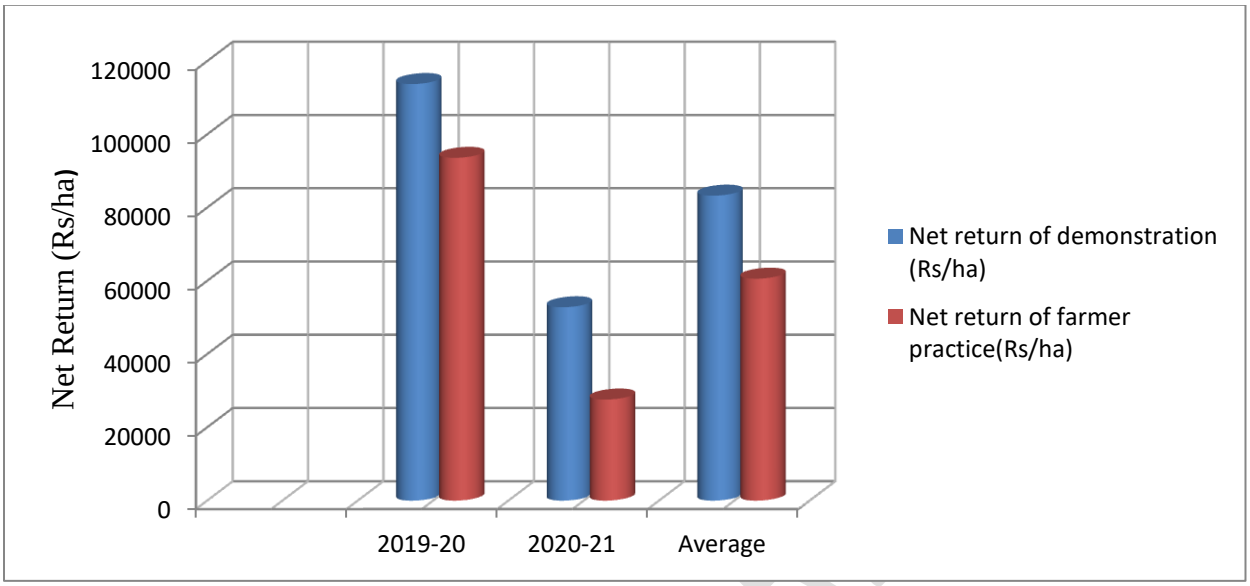

Figure 3: Average net return (Rs/ha) under front line demonstration during both the year of demonstration.

On basis of an average Rs.22675/ha as additional income is attributed to the higher yield obtained in demonstration. Similar data was reported by Srivastava *et al*., (2022), Meena *et al*., (2022), Sreelakshmi (2012) and Singh (2017) results of increase in net income due to adoption of improved crop management practices were reported by in onion, lentil, pigeonpea, moth bean and wheat respectively. The two year basis higher benefit cost ratio (2.68) was realized in demonstration and lower benefit cost ratio (2.34) was realized in farmers practice. It showed the economic viability of the technology demonstrated through the frontline demonstration.

Table 3: Analysis of economic (Rs/ha) under front line demonstration during both the year of demonstration

Year	Economic of Demonstration (Rs/ha)				Economic of Farmer Practice (Rs/ha)			
	Cost of cultivation	Gross Return	Net return	B:C	Cost of cultivation	Gross Return	Net return	B:C
2019-20	40450	154200	113750	3.81	38800	132400	93600	3.41
2020-21	96000	148800	52800	1.55	96000	123600	27600	1.28
Average	68225	151500	83275	2.68	67400	128000	60600	2.34

CONCLUSION

It was discovered that the cultivation of an improved variety along with better crop management techniques significantly increased the yield and income of the cowpea growers. The farmers were extremely pleased with the Cowpea variety CP4's performance and urged other farmers to adopt it on a large scale in their community to facilitate the horizontal spread of this variety. .

References

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