



Performance of Cowpea Variety (Kashi Kanchan) under Front Line Demonstration in Eastern Part of Uttar Pradesh, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aim: To promote technology among vegetable growers through front-line demonstrations on Cowpea var. Kashi Kanchan in order to increase production and earn more money.

Study Design: Not applicable.

Place and Duration of Study: ICAR-IIVR-Krishi Vigyan Kendra, Deoria, conducted front-line demonstrations on cowpea var, Kashi Kanchan at farmers' fields in the Deoria District of Eastern Uttar Pradesh during the Zaid season 2019 and 2020.

Methodology: During the study period, 45 front-line demonstrations at farmers' fields were undertaken to analyse the extension gap of cow pea. The yield data was collected and examined.

Results: According to the demonstrations that were undertaken, the improved variety of cowpea produced an average green pod yield up to 18.18% over farmers practice. Average net return was increased (25.90%) over local (long duration pole type and photo sensitive) varieties during both the year of demonstration. The benefit-cost ratio of two years from demonstrated technology was higher over farmer's practices. The higher value of the B: C ratio (3.52) and net return (Rs. 1,08,275) indicates the more feasibility of the technology in eastern plain of Uttar Pradesh, India.

Conclusion: It has been revealed that the cultivation of an improved variety, together with better crop management techniques, significantly increased the productivity and income of cowpea growers. The farmers were quite delighted with the performance of the cowpea variety Kashi Kanchan and encouraged other farmers to do the same in their fields to aid the variety's horizontal spread.

Keywords: Cowpea; front line demonstration; yield; economics.

1. INTRODUCTION

Cowpea (*Vigna unguiculata* L) is one of India's most significant vegetable legume crops, and it is widely grown in eastern Uttar Pradesh. It is a warm-season crop with multiple applications, including green vegetables, dal for humans, feed for farm animals. Being a legume vegetable cowpea consists of high-quality protein for human consumption, and it is rich in protein for livestock fodder and atmospheric nitrogen fixers in symbiotic relationship with *Rhizobium* bacteria. Cowpea cultivars produced for the green immature pod consume as a vegetable are referred to as snake bean, asparagus bean, and yard-long bean; when grown for dry or mature seed, they are referred to as black-eye pea, kaffir pea, china pea, and southern bean. [1]. Cowpea has a high nutritional value and is resistant to stress. It is an important dietary staple and source of income for many of the poorest people in developing countries. It has 22- 24 percent protein in its seeds, making it a good source of vegetable proteins. [2] It can fix 150 kg/ha of atmospheric nitrogen while also improving soil fertility through crop residue addition. Apart from this, cowpea forms excellent forage and it produces a heavy vegetative growth and covers the ground soil well that it checks the soil erosion. Cowpea is a warm-season crop that grows well in many humid tropics and temperate zones. It is a drought-tolerant crop that flourishes in arid, low-rainfall areas. Farmers used to farm crops in rainfed conditions, particularly during the kharif season, without any preparatory tillage or manure addition. Farmers are experiencing low yield and income as a result of their failure to implement enhanced management methods such as improved variety, irrigation, date of sowing, method of sowing, seed treatment, spacing, fertiliser balance, intercultural activities, and plant protection measures. [3-5]. Apart the cultivable varieties are of non-synchronized maturity dur yo photo senctive, spreading tyep and long duration in nature . As a result, farmers must harvest the cowpea several times, which costs more labour, time, and money, raising the entire cost of cultivation. Because labour

availability and cost are key issues in agricultural production these days, this must be managed properly [6,7]. Kashi Kanchan Cowpea has a short duration, dwarf bushing growth pattern and is photosensitive in nature. It is farmed for green pods throughout Uttar Pradesh. As a result, Krishi Vigyan Kendra organised the current frontline demonstration to raise awareness among farmers and illustrate the benefit of improved crop management methods on enhancing production and revenue in the vegetable grower community of Deoria district, Uttar Pradesh, India.

2. MATERIALS AND METHODS

2.1 Details of Location

The current study compared the performance of the Kashi Kanchan high yielding cowpea variety with improved packages and practises to the old variety with farmer's practises using front line demonstrations (FLDs) at farmer's fields over the Zaid seasons 2019-20 and 2020-21. During the Zaid season 2019-20 and 2020-21, the Krishi Vigyan Kendra, Malhana, Deoria, under the Indian Institute of Vegetable Research, Varanasi, UP, conducted 45 FLDs of this cultivar. Table 1 shows the packages and techniques used for the current study in terms of FLDs and farmer practises. The crop was sown in the first week of February, and the Kashi Kanchan variety of cowpea was compared to the farmers' conventional kinds. The research area's soils are very deep, loam to silt loam in texture, fairly well to well drained with ground water irrigation capability, and medium in fertility status. The district's climate is distinguished by a dry summer and a cold winter, with heavy rains during the Kharif season. Farmers were given critical inputs in the form of quality seeds of suggested improved variety FLD kinds. Through training, course visits, and field days, KVK subject matter specialists assisted farmers in executing field operations such as sowing, seed treatment, irrigations, fertiliser application, weeding, pesticide spraying, harvesting, and post harvest management, among farmer. Table 1

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 (long duration, pole type and Photo sensitive)	Kashi Kanchan(Dwarf, bushy, early duration and 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 <i>Rhizobium</i> culture and Fungicide
6.	Method of sowing	Broadcasting	Sowing on ridges
7.	Spacing	Scattered	60 x 25 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 in doses	Need based usage of plant protection chemicals
11	Harvesting (green pod)	Last week of April to last May	second week of April to mid May

compares the shown technologies in the fields with local practices. The yield and economic data of the CP 4 variety of cowpea were recorded and compared with traditional varieties grown by the selected farmers. Data was calculated using standard ways to determine the B: C ratio and extension gaps between shown technology and farmer practises using the following formula:

$$B: C \text{ ratio} = \frac{\text{Gross Return}}{\text{Cost of Cultivation}} \times 100 \dots (1)$$

$$\text{Net Return} = \text{Gross Return} - \text{Cultivation Cost} \dots (2)$$

2.2 Special Features of Cowpea Variety Kashi Kanchan

This variety was developed at ICAR-IIVR-Varanasi and 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, Chhattisgarh, Orissa, AP and MP. It is appropriate for growing in both the spring and summer seasons. Pods are 30-35 cm long, dark green, velvety, meaty, and parchment-free. The cultivar produces around 150-175 q/ha of green pods and is resistant to golden mosaic virus and Cercospora fungi. Table 1 shows the technical interventions used in farmer practices and demonstrations. “Before conducting front-line demonstrations,

beneficiary farmers received practical training on various technical interventions to be followed in cowpea cultivation. Growing Advice recommendations were followed. During harvest, yield data were collected from both demonstration and farmer practices. Finally, cultivation costs, net yields and cost-effectiveness ratios were calculated [7].

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 Kashi Kanchan under demonstration and farmers practice. Results revealed that, the demonstrated of cowpea variety Kashi Kanchan 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 Kashi Kanchan under front line demonstration mature early (75 DAS) compare to farmers practice (88 DAS).

3.2 Interpretations of Crop Yield

High yielding variety of cowpea Kashi Kanchan 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 Fig. 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 (Fig. 1). Similar yield enhancement through frontline demonstration in Indian mustard has also been reported by Meena et al. [8]. Yield gap analysis has been carried out by several workers [8,1] 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.

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. 108275/ha as compared to Rs. 86000/ha with farmers practice (Fig. 3).

On basis of an average Rs.22,275 /ha as additional income is attributed to the higher yield obtained in demonstration. Similar data was reported by Srivastava *Kashi Kanchan*. [9], Meena *Kashi Kanchan*. [1], 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, pigeon pea, moth bean and wheat respectively. The two year basis higher benefit cost ratio (3.52) was realized in demonstration and lower benefit cost ratio (3.07) was realized in farmers practice. It showed the economic viability of the technology demonstrated through the frontline demonstration.

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

Variety / Characters	Kashi Kanchan			Farmer Practice		
	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

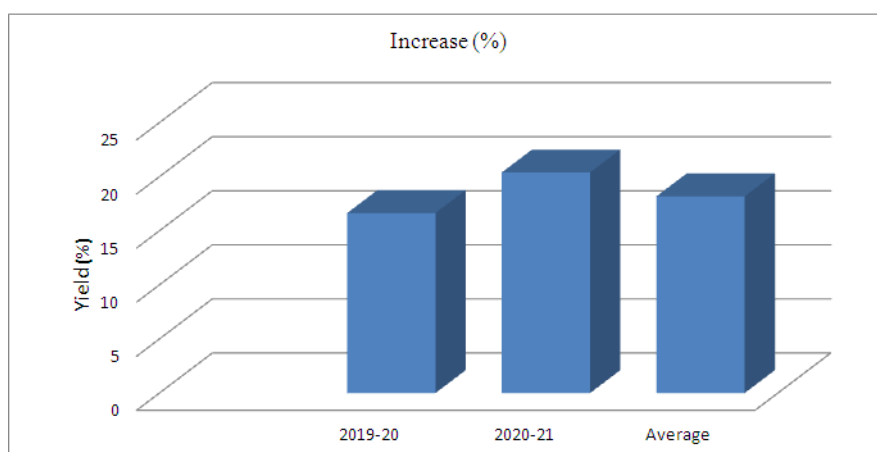


Fig. 1. Yield increase (%) of cowpea variety Kashi Kanchan over famers practice under front line demonstration during both the year of demonstration

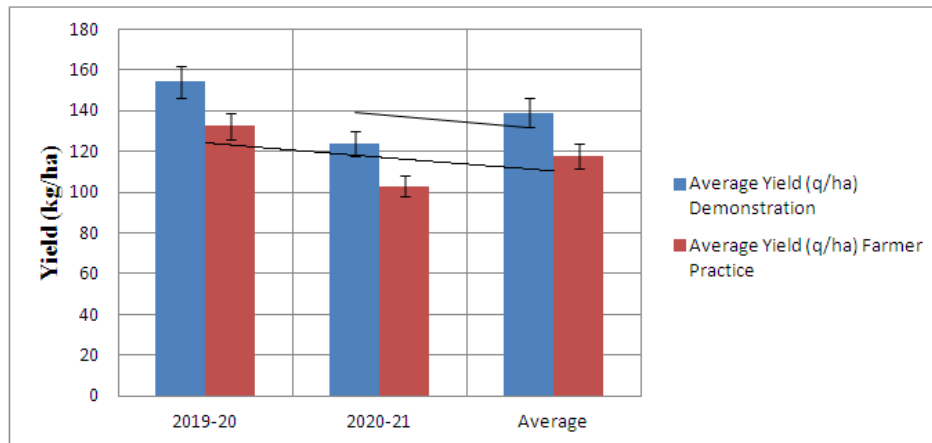


Fig. 2. Average yield (kg/ha) under front line demonstration during both the year of demonstration

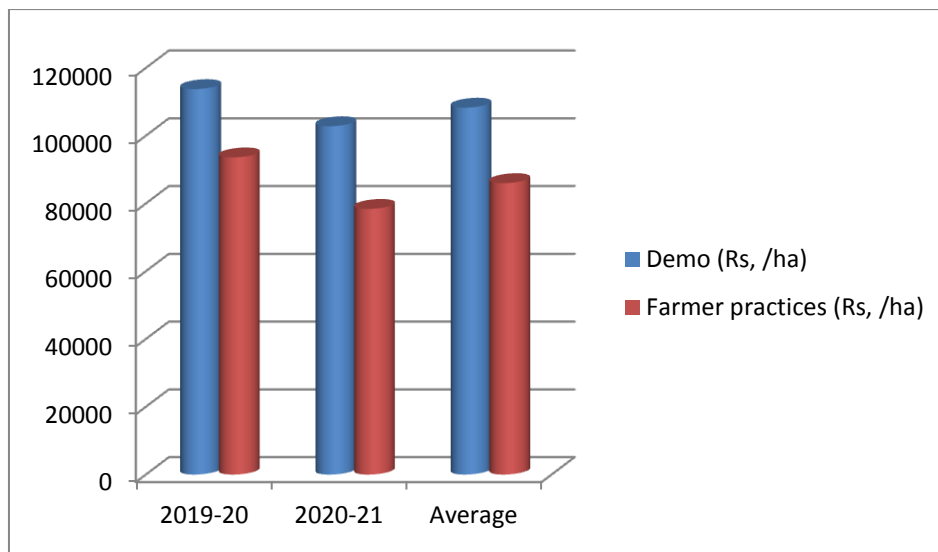


Fig. 3. Average net return (Rs/ha) under front line demonstration during both the year of demonstration

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	46000	148800	102800	3.23	45200	123600	78400	2.73
Average	43225	151500	108275	3.52	42000	128000	86000	3.07

4. CONCLUSION

Cultivating improved varieties and improving cultivation techniques have been found to significantly increase yields and incomes for cowpea growers. Farmers were very pleased

with the performance of the Kashi his Kanchan his cowpea variety and encouraged other farmers to adopt it on a large scale in their communities to facilitate horizontal transmission of this variety.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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