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Demonstration on high yielding, light red attractive and good storability onion (*Allium cepa* L.) variety Bhima kiran under central Telangana agro climatic condition

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Abstract

Onion (*Allium cepa* L.) is one of the most important crops in Medak district during the rabi season, as 25 to 30 percent of farmers in the district cultivate onion commercially as well as for daily household consumption. However, most farmers cultivate local private varieties that perform with low yield, non-uniform size, and poor storability. As part of technical program, KVK, Tuniki, Medak, conducted frontline demonstrations on the onion variety Bhima Kiran over three consecutive years (2021-22 to 2023-24) in three adopted villages and five locations in Medak district, Telangana. The demonstration results revealed that the demonstrated technology recorded a higher yield (37.47 t/ha) than the local check (33.61 t/ha). Biometric observation data (Table.2) also showed better results for the Bhima Kiran variety compared to the local check. The percent increase in yield over farmer practice was about 11.47%, and the extension gap in yield was 3.7 t/ha. The demonstrated technology showed higher gross returns (Rs. 3, 49,333.30/ha), net income (Rs. 1, 74,833.3/ha), and B: C ratio (2.00) than the local check (Table.3). This study concluded that the Bhima Kiran variety results are more beneficial to farmers than the local check variety.

Keywords: Onion, FLD'S, high yielding, good storability

Introduction

The onion (*Allium cepa* L.) is a biennial herbaceous plant and is typically grown as an annual crop for its edible bulb. Nowadays, the onion crop is grown all over the world, but it is probably native to southwest Asia. Although it is a temperate crop, it can be grown in a wide range of climatic conditions including subtropical, tropical and temperate. But moderate weather that avoids extremes of heat, cold, and precipitation is ideal for its cultivation. Onion crop can be grown in any type of soil, but deep, friable loam and alluvial soils with good drainage are the most suitable soil types for onion cultivation. Onion cultivation is significant in Telangana, particularly in districts like Gadwal, Medak, Sangareddy, and Mahabubnagar, with both red and white varieties grown for local consumption, processing, and export, though the region faces challenges from pests and climate, driving research into better, higher-yielding varieties suited for kharif (rainy) and rabi (winter) seasons to ensure year-round production, supply and improved farmer income. Red onions dominate in southern Telangana, known for their pungency, while white onions are preferred in the north for dehydration due to lower pungency. Traditionally, onion is grown as a rabi (winter) crop because heavy rains, diseases and pests (especially thrips causing purple blotch) during kharif season and erratic monsoon weather significantly impact kharif yields. Moreover, the Medak district farmers are cultivating paddy crop during kharif preceding to onion crop in rabi season for domestic and commercial purpose. The major problem faced by farmers is low yielding, non-uniform size and low storability. To bridge this technology gap, Krishi Vigyan Kendras as farm science centres are conducting demonstrations to disseminate the new technologies released by ICAR research institutes, DOGR and agricultural universities. In this context, the ICAR-KVK, Tuniki, Medak has taken up demonstration on a high-yielding, attractive, uniform size, light red-coloured bulb and good storability variety in Medak district of Telangana.

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Materials and Methods

The present study was carried out in the farmers' fields of three adopted villages in Medak district, Telangana. During 2021-22, 2022-23, and 2023-24, an improved onion variety-Bhima Kiran was introduced through frontline demonstrations (FLDs) by Krishi Vigyan Kendra, Tuniki, Medak. Each demonstration was laid out on 0.4 ha to evaluate the performance of the variety and compare it directly with the farmer's local check for easy visual understanding of the differences. Five demonstrations were conducted annually, covering a total area of 2 ha per year. Over three years, a cumulative total of 15 demonstrations across 6 ha were implemented. Prior to the demonstrations, farmers received training on the planned technological interventions, site selection, layout design, farmer participation, and other aspects as recommended by Choudhary (1999)^[1] and Singh *et al.* (2007)^[6]. The major cultivation practices under the trial included sowing of the high-yielding variety at standardized spacing, balanced fertilizer application, and timely adoption of

recommended plant protection measures. Details of the farmers' practice versus the demonstrated FLD technology are presented in Table 1. Data on physical parameters, yield attributes, cost of production, gross income, net income, B: C ratio, extension gap, technology gap, and technology index were collected and analysed. To compute extension gap, technology gap, and technology index, the formulae suggested by Samui *et al.* (2000)^[5], Kadian *et al.* (2004)^[3], and Sagar and Chandra (2004)^[4] were followed.

Technology gap = (Potential yield) - (Demonstration yield)

Extension gap = Demonstration yield - Farmer's yield

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

Table 1: Details of the farmers practice and Demonstrated technology in Onion

Farmer's Practice	- Variety: Local - FYM: 10t/ha. - Fertilizers Applied: 100 N: 46 P₂O₅: 30 K₂O/ha
Demonstrated Technology	- Variety: Bhima kiran - FYM: 25t/ha - RDF: 150 N: 60 P₂O₅: 60 K₂O /ha. - Sprayed Nem oil (1500 ppm) @5 ml per lit for control of thrips with 15 to 20 days intervals - Sprayed Need based chemicals

Result and Discussion

As per the data recorded in this frontline demonstration, positive results were observed over the farmer's practice. Biometric observations viz., plant height, number of leaves, leaf length, bulb diameter, and bulb weight were recorded to be significantly better in Bhima Kiran than the local variety (Table.2). Storability of onion bulbs is a crucial factor, especially to store during market glut and sell later in the off-season at higher prices; the storability duration of Bhima Kiran was 171.6 days, markedly higher than the local variety's 116.5 days (Table.2). Compared to farmer practice, the demonstrated plot showed an 11.47% increase in onion yield (Table.3). The average bulb yield under demonstration was 37.47 t/ha, surpassing the farmer's practice of 33.61 t/ha. The extension gap in yield between Bhima Kiran and the local variety was 3.85 t/ha, while

the technology gap (difference between potential and demonstrated yield) was 4.02 t/ha, yielding a technology index of 9.69% (Table.3). Gross income (₹3, 49,333.3), net income (₹1, 74,833.3), and B: C ratio (2.00) were all notably higher than the check. The low yield of local varieties is mainly attributed to use of low-yielding seeds, poor fertilizer and weed management, and severe damage from purple blotch, downy mildew, and thrips all causing substantial economic loss. Introduction of the high-yielding Bhima Kiran variety, coupled with awareness creation on scientific practices timely sowing, recommended spacing, balanced manure/fertilizer use, effective weed control, and integrated pest-disease management helped bridge the gap. These findings corroborate the study by Hiremath and Mantur (2018)^[2] conducted during 2013-15.

Table 2: Comparative studies on growth and yield parameters of Local check and Bhima kiran

Parameters	Local check							Bhima Kiran						
	Plant height (cm)	No. of leaves/bulb	Leaf length (cm)	Bulb diameter (cm)	Bulb weight (g)	Storability (days)	Yield (t/ha)	Plant height (cm)	No. of leaves/bulb	Leaf length (cm)	Bulb diameter (cm)	Bulb weight (g)	Storability (days)	Yield (t/ha)
Mean	52.7	7.33	39.2	5.6	85.8	116.5	33.61	63.5	9.2	51.8	6.01	103.4	171.6	37.47
SD	0.60	0.21	0.39	0.07	0.65	1.14	0.27	0.42	0.16	0.42	0.07	0.43	1.14	0.27
CV (%)	1.15	2.88	1.00	1.26	0.76	0.98	0.80	0.66	1.72	0.81	1.23	0.42	0.66	0.72
Range	1.5	0.55	0.9	0.2	1.7	3	0.7	1.1	0.4	1.1	0.2	1.2	3	0.7

Table 3: Bulb yield, technology gap, extension gap and technology index of demonstration on onion variety Bhima kiran with existing package of practices

Year	No. of demos	Area (Ha.)	Yield (t/ha)			% increase in yield over FP	Extension gap (t/ha)	Technology gap (t/ha)	Technology Index (%)
			Potential	Demo	Check				
2021-22	5	2	41.5	36.50	32.80	11.28	3.70	5.0	12.04
2022-23	5	2	41.5	38.12	33.75	12.94	4.37	3.38	8.14
2023-24	5	2	41.5	37.8	34.3	10.20	3.5	3.7	8.91
Total/Average	15	6	41.5	37.47	33.61	11.47	3.85	4.02	9.69

Table 4: Economic analysis of Onion varieties

Year	Cost of cultivation		Gross Income		Net Income		B:C ratio	
	Demo	Check	Demo	Check	Demo	Check	Demo	Check
2021-22	1,75,250	1,49,380	3,65,000	2,95,200	1,89,750	1,45,820	2.08	1.97
2022-23	1,81,000	1,70,000	3,05,000	2,36,250	1,24,000	66,250	1.68	1.38
2023-24	1,67,250	1,39,125	3,78,000	3,08,700	2,10,750	1,69,575	2.26	2.22
Mean	1,74,500	1,52,835	3,49,333.3	2,80,050	1,74,833.3	1,27,215	2.00	1.85

Conclusion

The results of the present investigation concluded that the increased yield, superior storability, and higher net returns were attributable to the adoption of a high-yielding, light-red, good-storability variety like Bhima Kiran, together with the implementation of the recommended scientific package of practices which, in turn, is expected to enhance the income and improve the livelihood of farmers in Medak district, Telangana.

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