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Impact of Front Line Demonstration on Yield and Economics of Pigeonpea Variety (BDN 711) in Beed District of Maharashtra, India

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A B S T R A C T

The frontline demonstrations on BDN 711 variety of pigeonpea were conducted by Krishi Vigyan Kendra, Khamgaon of Beed District, Maharashtra State. Frontline demonstration of pigeonpea variety BDN 711 were conducted during 2019-20, 2020-21 and 2021-22 on 20 ha area in 50 number of demonstration each year. Pigeonpea variety BDN 711 which is released by Vasantarao Naik Marathada Krishi Vidyapeeth which is resistant to wilt, drought tolerant and suitable for medium type of soil. Improved cultivation practices were demonstrated in farmer's field for three consecutive years. The result of the demonstrations showed higher yields compared to farmers practices followed for pigeonpea cultivation. The average increased per cent seed yield is 31.11 over the years from frontline demonstrations compared to check plots. However, during the year 2021-22, the per cent increase in seed yield was 44.00. The huge variation in farmers practices adopted in the cluster villages. The other parameters like extension gap, technological gap and technology index were derived for assessment of technology adoption rate. The average technology gap and technology index were 540 and 25.74 per cent, respectively. The improved technology recorded higher average seed yield 1660 kg/ha. over farmers practice 1267 kg/ha. The improved technology gave higher average gross return (97967 Rs./ha.) average net return (70633 Rs./ha.) with higher benefit cost ratio (2.43) as compared to farmers practices. The results clearly indicated that the beneficial impact of front line demonstrations over the farmers practices towards enhancing the productivity of pigeonpea cultivation under rainfed condition in Beed district of Maharashtra state, India. Demonstrated technologies proved more remunerative and economically feasible compared to farmers traditional practices in pigeonpea cultivation.

Introduction

India is major pulse growing country. In Indian agriculture role of pulses needs hardly any special importance. The pulses are integral part of cropping system all over the country. Pulses are considered as lifeblood of agriculture because they occupy a unique position in every known system of farming as a main, catch, cover, green manure, intercrop, relay and mixed crop. India, particularly Maharashtra region, from last few decades is facing severe problem of drought due to vagaries of monsoon like late onset, early withdrawal, prolonged dry spell between two rains etc. As a

result of this, crop failure due to lack of water availability has become a common phenomenon. Lack of moisture at pod development stages is one of the major reasons that limits yield of crops. Though pigeonpea is widely grown in Beed district, various factors influences potential yield of the crop such as, faulty sowing practices, lack of knowledge about high yielding and disease resistant varieties. Lack of awareness about seed treatment wit h biofertilizers *Rhizobium, PSB*, *Trichoderma* viridae and improper management of pod borer. Above all in the district predominantly noticed problems for pigeonpea cultivation are high incidence of wil t and terminal drought condition. Hence drought tolerent variety appears to be major challenges to increase productivity. Tolerant crop variety with consistently higher yields under deficit rainfall is paramount importance. This can be achieved by means of use of drought tolerant variety and improved cultivation practices. With this background, Front line demonstrations were conducted to show the worth of high yielding and drought tolerant BDN 711 improved variety of pigeonpea.

Materials and Methods

Technology demonstration on pigeonpea variety BDN 711 was conducted by Krishi Vigyan Kendra, Khamgaon during 2019-20, 2020-21 and 2021-22 in district of Beed. The total 50 number of demonstarion was conducted on 20 ha area each year. In general soil of the area under study was medium to heavy and medium fertility status. The component demonstration technology in pigeonpea was comprised i.e. university recommended improved variety BDN 711 which was medium duration, escaping terminal drought and wilt resistant. In the demonstration, one control plot was also kept where farmers practices was carried out. The demonstration were conducted to study the technology gap between the potential yield and demonstrated yield, extension gap between demonstrated yield and yield under existing practice and technology index. The yield data were collected from both the demonstration and farmers practice by random crop cutting method and analyzed by using simple statistical tools. The percent increase yield, technology gap, extension gap and technology index were calculated by using following formula as per Samui *et al.*, (2000), as given below-

$$\text{Percent increase in yield} = \frac{\text{Demonstration yield} - \text{farmers practice yield}}{\text{farmers practice yield}} \times 100$$

Technology gap = Potential yield - Demonstration yield

Extension gap = Demonstration yield – farmers practice plot yield

$$\text{Technology index (\%)} = \frac{\text{Technology gap}}{\text{potential yield}} \times 100$$

Results and Discussion

Frontline demonstrations studies were carried out in Beed district of Maharashtra state in Kharif season from 2019-20 to 2021-22. During three years of technologies results obtained are presented in Table 1. The results revealed that the demonstration on pigeonpea an average seed yield recorded 1660 kg/ha under demonstrated plots as compare to farmers practice 1267 kg/ha. The highest seed yield in the demonstration plot was 1800 kg/ha during 2021-22.

The average yield of pigeonpea increased 31.11 per cent (Table 1). These results clearly indicated that the higher average seed yield in demonstration plots over the compare to farmers practice due to integrated crop management practices and awareness of drought resistant of BDN 711 variety. Adoption of scientific package of practices like seed treatment with bio-fertilizers and need based right plant protection practices resulted in higher yields. The above findings are similar in lines with Raju *et al.*, (2015) and Kishor Zade *et al.*, (2020)

Based on observation made, extension gap, technology gap and technology index were worked out. The extension gap observed during different years was 280, 350 and 550 kg/ha during 2019-20, 2020-21 and 2021-22 respectively. On an average extension gap observed in three years under FLD implemented villages was 393 kg/ha. The highest extension gap 550 kg/ha was recorded in 2021-22 followed by 350 kg/ha (2020-21) and 280 kg/ha (2019-20). The above findings are similar in lines with Keshavreddy *et al.,* (2018) and Kishor Zade *et al.,* (2020)

Technology gap is the difference between potential yield and demonstrated plot yield. The technology gap observed during different years was 770, 450 and 400 kg/ha during 2019-20, 2020-21 and 2021-22 respectively. On an average technology gap observed in three years under FLD implemented villages was 540 kg/ha. The highest technology gap 770 kg/ha was recorded in 2019-20 followed by 450 kg/ha (2020-21) and 280 kg/ha (2021-22) (Table 1). The above findings are similar in lines with Keshavreddy *et al.,* (2018)

On an average technology index observed was 25.74 % for three years where front line demonstrations were conducted. This shows the efficiency and effectiveness of the improved technologies as a result of successful technical interventions to increase the yield performance of pigeonpea. Economics returns related to input and output prices of commodities prevailed during the study period, were recorded. The cultivation of pigeonpea under improved technologies FLD gave higher net returns of Rs.57500, Rs. 78000 and Rs. 76400 per hectare as against to farmers practices i.e., Rs. 35500, Rs. 60800 and Rs 48750 per hectare during the years 2019-20, 2020-21 and 2021-22 respectively (Table 2) Similar results were observed with Singh *et al.,* (2014) and Raj *et.al.,* (2013) findings.

The Benefit : cost ratio of pigeonpea observed during different years 2019-20, 2020-21 and 2021-22 under improved cultivation practices were 1.90, 2.33 and 3.06 respectively while it was 1.61, 1.95 and 2.62under farmers practice for the respective years. The highest Benefit : cost ratio in demo plots is because of higher yields obtained under improved technologies compared to farmers practices during all the three years (Table 2). Similar results were observed with Raju *et al.,* (2015)

Pigeonpea variety BDN 711 gave higher seed yield, gross monetary returns, net monetary returns and B: C ratio over farmers practice.

Table.1 Yield, technology gap, extension gap and technology index in pigeonpea cultivation during 2019-20, 2020-21 and 2021-22.

Year	Potential Yield (Kg/ha)	Average seed yield (Kg/ha)		Percent increase	Technology gap (Kg/ha)	Extension gap (Kg/ha)	Technology index (%)
		Demo	Farmers Practice				
2019-20	2200	1430	1150	24.34	770	280	35.00
2020-21	2200	1750	1400	25.00	450	350	20.00
2021-22	2200	1800	1250	44.00	400	550	22.22
Mean	2200	1660	1267	31.11	540	393	25.74

Table.2 Economic impact of pigeonpea cultivated under FLD and Farmers practice during 2019 20, 2020-21 and 2021-22.

Year	No. of Demo	Area (ha)	Gross Income Rs./ha.		Net Income Rs./ha.		B: C Ratio	
			Demo	Farmers Practice	Demo	Farmers Practice	Demo	Farmers Practice
2019-20	50	20	75500	49500	57500	35500	1.90	1.61
2020-21	50	20	105000	85800	78000	60800	2.33	1.95
2021-22	50	20	113400	78750	76400	48750	3.06	2.62
Mean	50	20	97967	71350	70633	48350	2.43	2.06

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