INTERNATIONAL JOURNAL OF SCIENCE AND NATURE

www.scienceandnature.org

IMPROVEMENT IN PRODUCTIVITY OF THE PIGEON PEA THROUGH INNOVATIVE PRODUCTION TECHNOLOGY

[1]Raju, G. Teggelli, [2]S. Suresh S.M., & [3]Zaheer Ahamed, B.
[1]Programme co-ordinator, Krishi Vigyan Kendra, Kalaburagi-585101, Karnataka, India
[2,3]Subject Matter Specialist (Agronomy, Plant Pathology), Krishi Vigyan Kendra, Kalaburagi-585101 Karnataka, India

ABSTRACT
Kalaburagi is called as "Pulse bowl of Karnataka" and pigeonpea is one of the most important pulse crop grown in this region. In this point of view Krishi Vigyan Kendra, Kalaburagi conducted 78 demonstrations in farmers field of different villages of Kalabugragi district during the period from 2012-13 to 2014-15 of three years to enhance the yield of transplanted pigeon pea through improved production technology. The result showed that, in an average the highest yield achieved by adopting improved production technology was 27.26 q/ ha over farmer's practices was to 19.54 q/ha. Which was increase the yield 39.35 % over farmer practices. The average technological gap, extension gap and technological index were noticed 27.74 q/ha, 7.72 q/ ha and 50.44 %, respectively. The economics of average of Rs. 96697 per ha was recorded net profit under recommended practices while it was Rs 65076 per ha under farmer practices. Cost benefit ratio was 4.74 under demonstration, while was 3.85 under farmer practices.

Keywords: Economics, Pulse Magic, Technology Gap, Transplanted Pigeon Pea and Yield

INTRODUCTION

Pigeon pea, *Cajanus cajan* (L) Millsp is the second most important pulse crop in India after chickpea. India is the largest producer and consumer of Red gram in the world. India occupies 90 percent of world pigeon pea area and accounts for 80 per cent of world production (www.indiastat.com). In the state pigeon pea occupies an area of about 6.04 lakh hectares with the production of 2.79 lakh tonnes, having an average productivity of 487 kg per ha. Kalaburgi District in Karnataka occupies 3.75 lakh hectares of land with average productivity of 560 kg ha^{-1} of pigeon pea (Anon, 2013).

In order to make the nation self sufficient in pulses productivity levels of pulses need to be increased substantially from 560kg ha^{-1} to 1,200 kg ha^{-1} by 2020 (Ali and Kumar, 2005). Faulty sowing practices and seed rate usage, improper crop geometry and spacings, improper method of sowing, avoid use of biofertilizers, trichoderma, only application of DAP fertilizers, withought use of weedicides, improper method time of irrigation, indiscriminate usage of plant protection chemicals, no intercultural operations and climatic variabilities are predominant reasons for limiting the potential yield of pigeon pea.

MATERIALS & METHODS

The Frontline demonstrations (78) were organized on farmer's field to demonstrate the impact of integrated crop management technology on Pigeonpea productivity over three years during *Kharif* 2012-13to 2014-15. Each frontline demonstration was laid out on 0.4 ha area, adjacent 0.4 ha was considered as control (farmer's practice). The gap between the existing and recommended technologies of Pigeonpea in district Kalaburgi is presented in table 1. The yield data were collected from both the demonstration and farmers practices by random crop cutting method. Qualitative data were converted into quantitative form and expressed in terms of per cent increase in yield calculated using following formula.

TABLE 1: Improved technology and Farmers practices of Pigeonpea (BSMR-736) under FLD

Sl.No	Technology	Improved practices	Farmers practice	GAP (%)
1	Variety	BSMR-736	Double moog	100
2	Land preparation	Ploughing and Harrowing	Ploughing and Harrowing	Nill
3	Pre-emergent Herbicide application	Apply Pendimethalin @ 2.5 lit. per ha	No herbicide used	Full gap
4	Seed rate	2.5 kg/ ha	10-12 kg/ ha	High seed rate
5	Sowing method	Transplanting (20-30 days old seedlings)	Line sowing	Full gap
6	Time of sowing	2 nd week of june	2 nd week of june	Nill
8	Seed treatment	With Biofertilizers and Trichoderma	No seed treatment	Full gap

9	Spacing	6 × 2.5 feet	4 feet × no plant to plant spacing	Partial gap
10	Fertilizer dose (N:P:K:Zn kg/ha)	25:50:0:25	10:25:0:0	Partial gap
11	Irrigation	2 irrigations through drip	3-4 irrigation as flood	partial gap
12	Nipping practice	Nipping at 30 DAT	No nipping	Full gap
13	Pulse magic spray (Product from kvk, Kalaburagi)	2 times (flowering & pod filling stage)	No spray	Full gap
14	Plant protection	IPM	Indiscriminate application	Full gap
15	Grading the produce	Grading the produce	Not followed	Full gap
16	Harvest	Mechanical harvesting	Labor harvesting	Partial gap

Technology gap = Potential yield – Demonstration
Yield Extension gap = Demonstration yield – Farmers yield
Technology index = ((Potential yield - Demonstration yield) / Potential yield} X 100

RESULTS & DISCUSSION

Comparison of productivity levels between improved production technology in demonstration trials and farmers' practices is shown in table 2.

Yield

The yield of three years of frontline demonstrations results obtained are presented in table 2. The results revealed that due to front line demonstration on Pigeon pea an average yield was recorded 27.26 q/ ha under demonstrated plots as compared farmers practice 19.54 q/ha. The highest yield in the FLD plot was 29.85 q/ha in 2014-15 and in farmers practice 20.38 q/ha in the same year and lowest yield was recorded in 2012-13. The average yield of pigeonpea increased 39.35 %. The yield of pigeonpea could be increased over the yield obtained under farmers practices of pigeonpea cultivation. This results clearly indicated that the higher average seed yield in demonstration plots over the years compare to local check due to knowledge and adoption of full package of practices i.e. appropriate varieties such as BSMR-736, timely sowing, seed treatment with Bio fertilizers, use of balanced dose of fertilizer, method and time of transplanting, timely, pulse magic spray at flowering and pod development stage. The above findings are in similarity with the findings of Tomar (2010). The higher yield of chickpea under improved technology was due to use of latest high yielding varieties, integrated nutrient management and integrated pest management (Tomar *et al*.,1999 and Mulie *et al.,* 1995).

TABLE 2: Impact of improved production technology on realization of productivity and potential of pigeonpea

Year	Area (Ha)	Technological gap (q/ha)	Extension gap (q/ha)	Technological index (%)
2012-13	10	29.65	6.78	53.91
2013-14	10	28.43	6.90	51.68
2014-15	12	25.15	9.48	45.73
Average	-	27.74	7.72	50.44

Technology gap

The technology gap means the differences between potential yield and yield of demonstration plot. The demonstration plot yields were 29.65, 28.43 and 25.15 q/ha during 2012-13, 2013-14 and 2014-15 (Table-3), respectively. On an average technology gap under three year FLD programme was 27.74 q/ha. The technology gap observed may be attributed to dissimilarity in the soil fertility status, crop production practices and local climatic situation.

Extension gap

Extension gap means he differences between demonstration plot yield and farmers yield. Extension gap of 16.78, 6.90 and 9.48 q/ha (Table-3) were observed during 2012-13, 2013-14 and 2014-15, respectively. On an average extension gap under three year FLD programme was 7.72 q/ha which emphasized the need to educate the farmers through various extension means i.e. front line demonstration for adoption of improved production and protection technologies, to revert the trend of wide extension gap. More and more use of latest production technologies with high yielding varieties will subsequently change this alarming trend of galloping extension gap.

Technology Index

Technology index indicates the feasibility of the evolved technology in the farmers' fields. Lower the value of technology index, higher is the feasibility of the improved technology. The technology index varied from 45.73 to 53.91 per cent (Table-3). On an average technology index was observed 50.44 per cent during the four years of FLD programme, which shows the efficacy of good performance of technical interventions. This will accelerate the adoption of demonstrated technical intervention to increase the yield performance of pigeonpea.

TABLE 3: Technological gap Extension gap and Technological index of pigeonpea.

Year	No of Demonstrations	Area (Ha)	Yield Q/ha			% increase in yield over farmers practice
			Potential yield	Demonstrations yield	Farmers practice	
2012-13	24	10	55	25.35	18.58	36.47
2013-14	24	10	55	26.58	19.68	35.07
2014-15	30	12	55	29.85	20.38	46.50
Average	-	-	55.00	27.26	19.54	39.35
Total	78	32	-	-	-	-

TABLE 4: Impact of improved production technology on economics of pigeonpea

Year	Cost of cultivation (Rs/ha)		Gross return (Rs/ha)		net return (Rs/ha)		B:C	
	demo	Farmer practice	demo	Farmer practice	demo	Farmer practice	demo	Farmer practice
2012-13	23095	21345	114075	83587.5	90980	62242.5	4.94	3.92
2013-14	25456	22641	119588	88537.5	94132	65896.5	4.70	3.91
2014-15	29346	24600	134325	91687.5	104979	67087.5	4.58	3.73
Average	25966	22862	122663	87938	96697	65076	4.74	3.85

Economic return

Data in table 4 reveal that the cost involved in the adoption of improved technology in transplanted pigeonpea (BSMR-736) varied and was more profitable. The cultivation of pigeon pea under improved technologies gave higher net return of Rs. 90980, 94132 and 104979 per ha respectively, as compared to farmers practices (Rs 62242, 65896 and 67087 per ha in 2012-13, 2013-14 and 2014-15 respectively). An average net return and B:C of demonstration field is 96697 Rs/ha and 4.74 respectively as compared to farmers practice (Rs 65076 per ha and 3.85). Similar findings were reported by Singh *et al.* (2014). The benefit cost ratio of transplanted pigeon pea (BSMR-736) cultivation under improved and cultivation practices higher than farmer's practices in all the years and this may be due to higher yield obtained under improved technologies compared to local check (farmers practice). This finding is in corroboration with the findings of Mokidue *et al*. (2011).

CONCLUSION

It is concluded from the study that there exists a wide gap between the potential and demonstration yields in transplanted pigeon pea (BSMR-736) mainly due to technology and extension gaps and also due to the lack of awareness about new technology in pigenpea cultivation in Kalaburagi district of Karnataka. The FLD produces a significant positive result and provided the researcher an opportunity to demonstrate the productivity potential and profitability of the latest technology (Intervention) under real farming situation, which they have been advocating for long time. This could be circumvent some of the constraints in the existing transfer of technology system in the district, Kalaburgi of Karnataka. The productivity gain under FLD over existing practices of pigeonpea cultivation created greater awareness and motivated the other farmers to adopt suitable production technology of pigeonpea in the district.

REFERENCES

Ali, M., Kumar, S. (2005) Pulses-yet to a breakthrough. *The Hindu Survey of Indian Agriculture*, 54-56.

Anon (2013) Disrtict statistic note, Kalaburgi at Glance. PP: 30-33.

Mokidue, I., Mohanty, A.K. and Sanjay, K. (2011) Corelating growth, yield and adoption of urd bean technologies. *Indian J. Ex. Edu.*, **11**(2): 20-24.

Singh, D., Patel, A.K., Baghel, S.K., Singh, M.S., Singh, A. & Singh, A.K. (2014) Impact of Front Line Demonstration on the Yield and Economics of Chickpea (*Cicer arietinum* L.) in Sidhi District of Madhya Pradesh. *J.Agri. Search,* **1**(1): 22-25.

Tomar, R.K.S., Sharma, P. and Yadav, L.N. (1999) Comparison of yield and economics of irrigated chickpea under improved and local management practices, *Int. Chickpea Pigeonpea News Lett.*, 6: 22-23.