Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(6): 11-14
Received: 07-09-2018
Accepted: 09-10-2018

Sunilkumar NM
Scientist (Agril. Entomology), ICAR- Krishi Vigyan Kendra, Bidar, Karnataka, India

Jadhav RL
Scientist (Agronomy, Home Science, Horticulture and Soil Science), ICAR-Krishi Vigyan Kendra, Bidar, Karnataka, India

Bhavani K
Scientist (Agronomy, Home Science, Horticulture and Soil Science), ICAR-Krishi Vigyan Kendra, Bidar, Karnataka, India

Ningdalli Mallikarjun
Scientist (Agronomy, Home Science, Horticulture and Soil Science), ICAR-Krishi Vigyan Kendra, Bidar, Karnataka, India

Ravi S
Scientist (Agronomy, Home Science, Horticulture and Soil Science), ICAR-Krishi Vigyan Kendra, Bidar, Karnataka, India

Correspondence
Sunilkumar NM
Scientist (Agril. Entomology), ICAR- Krishi Vigyan Kendra, Bidar, Karnataka, India

Demonstration of black gram integrated crop management technology through frontline demonstrations (FLDS) in bidar district of Hyderabad Karnataka region

Sunilkumar NM, Jadhav RL, Bhavani K, Ningdalli Mallikarjun and Ravi S

Abstract
Black gram (*Vigna mungo* L.) is most important pulse crop, grown throughout the country. The productivity of Black gram is low because of non-adoption of available technologies by the farmers. In this view Krishi Vigyan Kendra, Bidar conducted 118 demonstrations in farmers field of Bidar district during the last 7 years i.e., from 2010-11 to 2016-17 through integrated crop management (ICM). It revealed that increase in crop yield was found due to variation in agro-climatic situations under rain fed condition. The result showed that, an average highest yield of FLDs plots of Black gram by adopting ICM technology was 10.58 q/ha compared to farmers practice (7.47 q/ha). Adoption of improved production technology increased the yield 47.89 per cent over farmer practices. The average technological gap, extension gap and technological index were noticed 14.42 q/ha, 2.97 q/ ha and 57.70 per cent respectively. The average net profit of Rs. 32866.54 per ha was recorded under FLDs plot over Rs 20641.50 per ha under farmer practice. The higher average grain yield was recorded in demonstration plots over the years compared to local check due to increased knowledge and adoption of full package of practices.

Keywords: Front line demonstrations (FLD), technological gap, extension gap and technology index, integrated crop management (ICM)

Introduction
Pulses are rich in proteins and are the second most important constituent of Indian diet after cereals. Among the different pulses, black gram is a rich source of protein which is one of the essential nutrients of the human diet. Black gram contributes to 10% of the national pulse production. The crop improves the soil fertility by fixing atmospheric nitrogen in the soil. It is reported that, black gram and green gram are reported to meet up to 50 per cent of their requirement from the N_2 fixed by them (Anon 1972) [3] and black gram produces 22.10 kg of N ha-1 which has been estimated to be supplement of 59 thousand tons of urea annually (Senaratne and Ratnasinghe, 1993) [10]. Black gram is a rich source of vegetable protein containing about 24 per cent protein, which is almost three times that of cereals and other minerals and vitamins (Anonymous, 2017) [1]. In addition, it is also used as nutritive fodder, especially for milch animals (Sathe, 1996) [9].
For the production of black gram, number of technologies are present but farmers adopt them rarely and are still practicing the unscientific methodologies. Many production technologies for black gram cultivation have been evolved for increasing the productivity but farmers have hardly adopted a few of them and those in a nonscientific manner. Jadhav *et al.*, 1992 reported that plant protection and fertilizer application are most critical inputs for increasing seed yield of chickpea.
Aim of frontline demonstrations is to identify the production constraints, to know the technology gap between the potential yield and demonstrated yield, extension gap between demonstrated yield and yield under famers practice and technology index, through various extension methods including the Participatory Rural Appraisal (PRA) technologies to boost the production and productivity through transfer of technology.

Methodology
The Frontline demonstrations were organized on farmer's field to demonstrate the impact of integrated crop management technology on Black gram productivity over seven years during *kharif* 2010-11 to 2016-17. Each frontline demonstration was laid out on 0.4 ha area, adjacent0.4 ha was considered as control for comparison (farmer's practice).

The integrated crop management (ICM) technology comprised the improved variety, proper tillage operations, recommended seed rate, pre-emergent weedicide application, seed treatment with bio agents, proper nutrient and pest management based on economic threshold level (Table 1).

The FLD was 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. Qualitative data was converted into quantitative form and expressed in terms of per cent increase in yield. (Narasimha Rao *et al.,* 2007) [5].

The data was further analyzed by using simple statistical tools. The technology gap, extension gap and technological index were calculated (Samui *et al*., 2000) [8].

Table 1: Improved production technology and Farmers practices of chick pea under FLD

S. No.	Technology	Improved practices	Farmers practice	GAP (%)
1	Variety	DU 1& AKU-15	Local	100
2	Land preparation	Ploughing and harrowing	Ploughing and harrowing	Nil
3	Pre-emergent herbicide	Pendimethalin (@ 2.5 l/ha)	No herbicide	Full gap
4	Seed rate	12 kg/ha	18 kg/ha	High seed rate
5	Sowing method	Line sowing	Line sowing	No gap
6	Seed treatment	Biofertilizers and Trichoderma	No seed treatment	Full gap
7	Fertilizer dose (NPK kg/ha)	5:10:0	10:20:0	Partial gap
8	Plant protection	IPM	Indiscriminate application	Full gap
9	Grading the produce	Grading followed	Not followed	Full gap

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

Results and Discussion

Black gram is the most important commercial pulse crop of Bidar district which is also known as pulse bowl of Karnataka. Due to continuous use of local varieties, injudicious use of fertilizers and pesticides has deteriorated the soil health. On the basis of soil testing data the area has been categorized under micro nutrient deficiency zone.

Crop Performance and Yield

Frontline demonstrations are effective educational tools in introducing various new technologies to the farmers to boost the farmer's confidence level by comparison of productivity levels between improved production technologies in demonstration trials. The performance of Black gram crop owing to the adoption of improved technologies is assessed over a period of seven years and is presented in table 1 and 2.

From the demonstration it revealed that, the integrated crop management practice in black gram recorded 47.89 per cent increase in the yield as compared to the farmers practice (7.47 q/ha) as against 10.58 q/ha in ICM practice, however, average highest yield (11.63q/ha) were recorded during 2016-17.This may be attributed to sufficient and more than average rainfall distributed fairly during the pod setting to physiological maturity stage, better utilization of applied nutrients (Poonia and Pithia, 2011) [6] The above findings are in similarity with the findings of Raju Teggelli *et al.* (2015) [7] and Tomar (2010) [12]. 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) [13]

Table 2: Impact of improved production technology on realization of productivity and potential of black gram.

Year	Area(Ha)	Technological gap (q/ha)	Extension gap (q/ha)	Technological index (%)
2010-11	9.2	13.75	5.5	55
2011-12	8	14.15	4.1	56.6
2012-13	6	12.5	2.5	50
2013-14	5	13.75	2.4	55
2014-15	5	16.58	1.14	66.32
2015-16	4	16.87	2.09	67.48
2016-17	10	13.37	3.03	53.48
Average		14.42	2.97	57.70

Technology Gap

The technology gap means the differences between potential yield and yield of demonstration plot. The technology gap of demonstration plots were 13.75, 14.15, 12.5, 13.75, 16.58, 16.87 and 13.27 q/ha during 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 (Table-3), respectively. On an average technology gap under seven year FLD programme was 14.42 q/ha. The technology gap observed may be attributed to dissimilarity in the soil fertility status, crop production, protection practices and local climatic situation.

Extension Gap

Extension gap means the differences between demonstration plot yield and farmers yield. Extension gap of 6.5, 4.1, 2.5, 2.4, 1.14, 2.09 and 3.03 q/ha was noticed during 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 (Table-3), respectively. On an average extension gap under seven year FLD programme was 3.11 q/ha which emphasized the need to educate the farmers through various extension programs 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 55.00 to 67.48 per cent (Table-3). On an average technology index was observed 57.77 per cent during the seven 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 black gram.

Table 3: Technological gap Extension gap and Technological index of black gram

Year	No. of Demonstrations	Area (Ha)	Yield Q/ha			% increase in yield over farmers practice
			Potential yields	Demonstration Yields	Farmers practice	
2010-11	23	9.2	25	11.25	5.75	95.65
2011-12	20	8	25	10.85	6.75	60.74
2012-13	8	6	25	12.5	10	25.00
2013-14	12	5	25	11.25	8.85	27.12
2014-15	5	5	25	8.42	7.28	15.66
2015-16	10	4	25	8.13	6.04	34.60
2016-17	17	10	25	11.63	8.6	35.23
Average	-	47.20	25	10.58	7.61	42.00
Total	95					

Economic Return

Data in table 4 reveals that the cost involved in the adoption of improved technology in Black gram ICM varied and was more profitable. The cultivation of black gram under improved technologies gave higher net return of Rs. 15963, 33884, 24088, 23968, 11620, 59408.75 and 61134 per ha respectively, as compared to farmers practices (Rs 9500, 18210, 18500, 13958, 9430, 41358.5 and 42534 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 32866.54 per ha and 2.74). Similar findings were reported by Singh *et al*. (2014) [11] and Raju Teggelli *et al.* (2015) [7] The benefit cost ratio of ICM of Black gram under improved 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). These finding are in line with the findings of Mokidue *et al.* (2011) [4].

Table 4: Impact of improved production technology on economics of black gram

Year	Cost of cultivation (Rs/ha)		Gross return (Rs/ha)		Net return (Rs/ha)		B:C Ratio	
	Demo	Farmer practice	Demo	Farmer practice	Demo	Farmer practice	Demo	Farmer practice
2010-11	17787	13750	33750	23250	15963	9500	1.90	1.69
2011-12	18196	14190	52080	32400	33884	18210	2.86	2.28
2012-13	23412	19500	47500	38000	24088	18500	2.03	1.95
2013-14	23450	23212	47418	37170	23968	13958	2.02	1.60
2014-15	17850	16050	29470	25480	11620	9430	1.65	1.59
2015-16	17850	16050	77258.75	57408.50	59408.75	41358.5	4.33	3.58
2016-17	17950	16150	79084	58684	61134	42534	4.41	3.63
Average	19499.29	16986	52365.82	38913.21	32866.54	21927.21	2.74	2.33

Conclusion

It is concluded from the study that there exists a wide gap between the potential and demonstration yields in Blackgram mainly due to technology and extension gaps and also due to the lack of awareness about new technology in black gram cultivation in Bidar 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 in farmers, which they have been advocating for long time. This could be circumventing some of the constraints in the existing transfer of technology system in the Bidar district of Karnataka. The productivity gain under FLD over existing practices of black gram cultivation created greater awareness and motivated the other farmers to adopt suitable production technology of black gram in the district.

References

1. Anon. Indian Food Nutrition Chart for grains, fruits and vegetables Fitjog.com, 2017.
2. Anon. District statistic note, Kalaburgi at Glance, 2013, 30-33.
3. Anon. The International Rice Research Institute Annual Report for, 1972, 41.
4. Mokidue I, Mohanty AK, Sanjay K. Correlating growth, yield and adoption of urad bean technologies. Indian J Ex. Edu. 2011; 11(2):20-24.
5. Narasimha Rao S, Satish P, Samuel G. Productivity improvement in soybean. *Glycine max* L. Merrill through technological interventions. J Oilseeds Res. 2007; 24(2):271-273.
6. Poonia TC, Pithia MS. Impact of front line demonstrations of chickpea in Gujarat. Legume Res. 2011; 34(4):304-307.
7. Raju G, Teggelli, Zaheer Ahamed B, Anand Naik, Siddappa. Transfer of Improved Technology of Black Gram Production through Frontline Demonstrations (FLDs) in Kalaburagi region of Northern Karnataka Trends in Biosci. 2015; 8(11):2814-2817.
8. Samui SK, Mitra S, Roy DK, Mandal AK, Saha D. Evaluation of front line demonstration on groundnut. Journal of the Indian Society Coastal Agricultural Research. 2000; 18(2):180-183

9. Sathe SK. The nutritional value of selected Asiatic pulses: chickpea, black gram, mung bean and pigeon pea. Legumes and Oilseeds in nutrition, 1996, 12-13.
10. Senaratne R, Ratnasinghe DS. Ontogenic variation in nitrogen fixation and accumulation of nitrogen in mungbean, blackgram, cowpea, and groundnut. Biology and Fertility of Soils. 1993; 16(2):125-130.
11. Singh D, Patel AK, Baghel SK, Singh MS, Singh A, Singh AK. Impact of Front Line Demonstration on the Yield and Economics of Chickpea (*Cicer arietinum* L.) in Sidhi District of Madhya Pradesh. J Agri. Search. 2014; 1(1):22-25.
12. Tomar RKS. Maximization of productivity for chickpea (*Cicer arietinum* Linn.) through improved technologies in farmers' field. Indian J Natul. Produ. and Resou. 2010; 1(4):515-517.
13. Tomar RKS, Sharma P, Yadav LN. Comparison of yield and economics of irrigated chickpea under improved and local management practices, Int. Chickpea Pigeonpea News Lett. 1999; 6:22-23.