DOI: 10.15740/HAS/AU/14.1/18-21
Agriculture Update
Volume **14** | Issue 1 | February, 2019 | 18-21
Visit us : *www.researchjournal.co.in*
ISSN-0973-1520

RESEARCH ARTICLE :

Analysis of yield gap and economic performance of Bengal gram through frontline demonstrations in Davanagere district of Karnataka

J. Raghuraja

ARTICLE CHRONICLE :
Received :
12.11.2018;
Revised :
28.12.2018;
Accepted :
04.01.2019

KEY WORDS:
Frontline demonstrations, Yield gap, Extension gap, Technology gap, Economic performance

SUMMARY : ICAR-Taralabalu Krishi Vigyan Kendra, Davanagere has organized front line demonstrations on integrated crop management of Bengal gram in 77 hectares covering 158 farmers in 9 villages for 8 years. The average yield of 3 demonstrated varieties was 744.38 kg/ha. and that of local check was 522.5 kg/ha. The average increase of demonstration yield over local check yield was 40.51 per cent. The average technology gap for 3 varieties was 355.62 kg/ha. and extension gap was 221.88 kg/ha. In 6 years out of 8 years under study technology gap was more than extension gap. The average technology index for 8 years was 31.57 per cent. The average gross return for demonstration and local check was Rs. 27557.76 and Rs. 19359.00, respectively. The average increase in gross return of demonstration over local check was 41.58 per cent. Average increase in net returns compared to demonstration over local check was 77.23 per cent. The frontline demonstrations on Bengal gram helped farmers to realize higher yield and income.

How to cite this article : Raghuraja, J. (2019). Analysis of yield gap and economic performance of Bengal gram through frontline demonstrations in Davanagere district of Karnataka. *Agric. Update*, **14**(1): 18-21; **DOI : 10.15740/HAS/AU/14.1/18-21.**

Author for correspondence :
J. Raghuraja
ICAR-Taralabalu Krishi Vigyan Kendra, Davanagere (Karnataka) India
Email: raghuraja92@yahoo.com

BACKGROUND AND OBJECTIVES

Bengal gram (*Cicer orietinum* L.) generally known as 'Chickpea', 'Chana' or 'Gram' is grown in many states of India. The major Bengal gram production comes from Madhya Pradesh (39 %), Maharashtra (14%), Rajasthan (14 %), Andhra Pradesh (10 %), Uttar Pradesh (7 %), Karnataka (6 %) and other states (10 %). In 2015-16, Bengal gram was grown in 70.03 Lakh hectares with production of 59.01 Lakh tones and yield being 727 kg/ha (Anonymous, 2016). In Karnataka sowing period starts from 1st week of October to 1st week of November depend on soil moisture condition and generally harvesting after 110-120 days of crop sowing date. Davanagere district has average productivity of 750 kg/ha and grown in *Rabi*. ICAR-Taralabalu Krishi Vigyan Kendra, Davanagere has taken up frontline demonstration on Bengal gram to reduce time gap between technology generated and its adoption and to transfer the improved technologies to increase production and

productivity. This helps field extension functionaries to advocate production technologies and give feedback to research system. In order to analysis the yield gap of different Bengal gram varieties and its economic performance, this study designed with following objectives.

– To analyse the yield levels of different varieties of Bengal gram through frontline demonstration in different villages.

– To know the economic performance of different varieties of Bengal gram through frontline demonstrations.

– To understand rainfall pattern in Davanagere district.

RESOURCES AND METHODS

Frontline demonstration on integrated crop management of Bengal gram for 8 years in 9 villages of Davanagere district was conducted by ICAR-Taralabalu Krishi Vigyan Kendra.These demonstration covered 77 ha. and 158 farmers and introduced 3 varieties of Bengal gram. Similar number of local check varieties were carried out in all the villages for comparison. The results of frontline demonstrations for 8 years on different varieties of Bengal gram were compiled and detailed data on yield, cost of cultivation, gross returns, net returns, additional cost, additional returns and benefit cost ratio for both demonstration and local check plots were calculated. The following procedure was used to determining the performance indicators:

– Benefit cost ratio= Gross return/Cost of cultivation.

– Technology gap = Potential yield-Demonstration yield.

– Extension gap = Demonstration yield – Local check yield.

– Technology index = $[(P_y-D_y)/P_y] \times 100$

where,

P_y = Potential yield and D_y = Demonstration yield.

OBSERVATIONS AND ANALYSIS

Among the 3 varieties of Bengal gram introduced through frontline demonstrations, JAKI-9218 variety got highest average demonstration yield of 1083 kg/ha, in 2016-17 (Table 1) followed by JG-11 variety 910 kg/ha, in 2012-13 and A1 variety 830 kg/ha, in 2011-12. The recent variety JAKI-9218 has tolerance to wilt with highest potential yield of 1800 kg/ha, when compared to A1and JG-11 with 1000 kg/ha.The average demonstration yield of 3 varieties for 8 years in 9 villages was 744.38 kg/ha, compared to local check varieties yield of 522.5 kg/ha, with 40.51 per cent increase over average yield of local check varieties.

The highest technology gap was found in JAKI-9218 variety (717 kg/ha) in 2016-17 followed by 466 kg/ha, in A1 variety during 2007-08 and 382 kg/ha, during 2006-07. The average technology gap was found to be 355.62 kg/ha. The possible reasons for this were soil moisture levels, previous crops grown in the same land and differential soil fertility status. This clearly indicates

Table 1: Yield and other parameters of Bengal gram varieties in different villages in Davanagere district

Year	Name of the village	Variety	Area (ha)	No. of farmers	Highest yield demo (kg/ha)	Lowest yield demo (kg/ha)	Average yield of demo (kg/ha)	Average yield of local check (kg/ha)	Per cent increase of yield	Technology gap (kg/ha)	Extension gap (kg/ha)	Technology index (%)
2006-07	Anaji and Bhimaneri	A1	10	17	800	475	618	481	28.48	382	137	38.2
2007-08	Bhimaneri	A1	15	30	650	410	534	390	36.92	466	144	46.6
2008-09	Kanchiganalu and Shettihalli	A1	15	22	740	430	630	445	41.57	370	185	37.0
2010-11	Rangapura	A1	05	10	770	410	660	420	57.14	340	240	34.0
2011-12	Kalledhevarapura	A1	05	12	890	540	830	540	53.57	170	290	17.0
2012-13	Bennehalli	JG-11	07	17	1030	680	910	670	35.82	90	240	9.0
2015-16	Kadabagere	JG-11	10	25	980	510	690	498	38.55	310	192	31.0
2016-17	Hunsihalli	JAKI -9218	10	25	1190	925	1083	736	32.04	717	347	39.8
Total			77	158								
Avg.					881.25	547.5	744.38	522.5	40.51	355.62	221.88	31.57

Potential yield (kg/ha): Annigeri (A1):1000, JG-11:1000, JAKI-9218:1800

the need for location specific recommendations to narrow down the existing gap. Higher technology gap in mustard was also recorded by Meena *et al*. (2012). The comparison between technology gap and extension gap for 8 years of demonstrations, in 6 years technology gap was more than extension gap. This may be due to the fact that scientists were educating the farmers in adoption of improved technology to get maximum yield levels. Close supervision of demonstrations by the scientist played important role in reducing gap between potential yield and demonstration yield.

Technology index shows the feasibility or the adoptability of the evaluated technology in the farmers field. Lower the value of technology index, higher will be the adoption of technology. The technology index value was lower (9.0 %) in 2012-13 in JG-11 variety, followed by 17.0 per cent in 2011-12 in A1 variety and 31.0 per cent in 2015-16 in JG-11 and 37.0 per cent in 2008-09 in A1 variety. Considering all the 8 years and 3 varieties of Bengal gram, average technology index was found to be 31.57 per cent. Similar findings were also reported by Jat and Gupta (2015) (40.98 %).

The economic performance of Bengal gram varieties described in Table 2. The average gross return for demonstration and local check was Rs. 27557.76 and Rs. 19359.00 per hectare. The average increase of gross return of demonstration over local check was 41.58 per cent. This was a significant increase and might be due fact that scientists demonstrated appropriate technologies in integrated mode; In this case technologies like improved varieties, proper seed rate, spacing, seed treatment, integrated nutrient management and integrated pest and disease management. The highest increase in net returns of 122.59 per cent was realized in A1variety in 2008-09 followed by 117.00 per cent in A1 variety in 2010-11 and 82.22 per cent in JAKI -9218 variety in 2016-17. The average increase in net returns was found to be 77.23 per cent compared net returns of demonstration and local check plots. This implies that demonstrated farmers realized higher income and indirectly helped to increase their standard of living. The highest benefit cost ratio of 2.94 was found in JG-11 variety of Bengal gram in 2015-16 followed by 2.80 in JAKI-9218 variety in 2016-17 and 2.69 in JG-11 variety in the year 2012-13.

Rain fall pattern of Davanagere district has been presented in Table 3. The normal rainfall of the district is 656.9 mm and the last 10 years data reveal that in 6

Table 2: Economic performance of Bengal gram varieties under frontline demonstrations in different villages in Davanagere district

Year	Name of the village	Variety	Area (ha)	No. of farmers	Cost of cultivation demo (Rs./ha)	Cost of cultivation local (Rs./ha)	Gross return demo (Rs./ha)	Gross return local (Rs./ha)	Increase in gross returns (%)	Net returns demo (Rs./ha)	Net returns local (Rs./ha)	Increase in net returns (%)	Additional cost (Rs./ha)	Additional returns (Rs./ha)	B:C ratio demo	B:C ratio local
2006-07	Anaji and Bhimaneri	A1	10	17	7905	6675	16068	12506	28.48	8163	5831	39.99	1230	3562	2.03	1.87
2007-08	Bhimaneri	A1	15	30	6500	6000	14585	10725	36.92	8185	4725	73.23	500	3960	2.25	1.79
2008-09	Kanchiganalu and Shettihalli	A1	15	22	6900	6300	17540	11125	58.56	10740	4825	122.59	600	6515	2.56	1.76
2010-11	Rangapura	A1	05	10	7100	6400	17320	13340	33.58	10720	4940	117.00	700	4480	2.52	2.08
2011-12	Kalledevarapura	A1	05	12	9500	7500	24900	16200	53.70	15400	8700	77.01	2000	8700	2.62	2.16
2012-13	Bennehalli	JG-11	07	17	10800	9400	29120	21440	35.82	18320	12040	52.16	1400	7680	2.69	2.28
2015-16	Kadabagere	JG-11	10	25	11200	9635	33120	23904	38.55	21920	14269	53.62	1565	9216	2.94	2.64
2016-17	Hunsihalli	JAKI-9218	10	25	23962	21954	67108.8	45632	47.06	43146.8	23678	82.22	2008	21476.8	2.80	2.08
Total			77	158												
Average					10483.38	9233.00	27557.76	19359.00	41.58	17074.35	9876.00	77.23	1250.37	8198.73		

Potential yield (kg/ha.): Annigeri (A1):1000, JG-11:1000, JAKI: 9218-1800

Table 3: Rainfall pattern of Davanagere district

Month	Normal (mm)	Rain fall in different years(mm)										Monthly average rainfall (mm)
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
January	0.0	0.0	1.0	0.0	17.7	1.9	0.4	1.2	40.2	0.4	2.1	6.49
February	0.1	0.0	0.9	0.0	0.0	1.3	0.0	4.5	88.8	0	0.6	9.61
March	0.8	4.8	95.5	28.9	6.7	4.1	0.4	22.3	60.7	11.2	0.9	23.55
April	48.3	36.1	23.4	19.7	55.2	38.8	115.3	33.7	136.0	30.8	6.9	49.59
May	73.8	77.9	65.6	151.5	52.4	84.2	17.7	117.7	185.8	116.2	63.8	93.28
Jun	82.4	121.6	67.1	88.6	73.6	68.0	25.6	97.8	105.0	85	155.9	88.82
July	70.3	105	65.1	136.8	127.6	98.1	52.8	121.7	145.8	75.2	105.6	103.37
August	86.2	126.2	107.2	140.6	199.6	79.5	107.1	72.4	35.5	91.5	40.0	99.96
September	53.9	162.6	70.7	114.5	137.8	114.5	45.4	136.7	32.0	126.8	65.1	100.61
October	102.5	179.8	85.3	116.4	135.5	119.3	25.3	63.0	0.2	114.7	12.5	85.2
November	10.4	9.0	63.6	40.3	213.4	40.4	104.4	7.3	0	36.1	2.7	51.72
December	0.3	4.8	0.5	58.2	0.0	7.0	1.1	0.3	13.5	1.0	8.0	9.44
Total	656.9	827.8	645.9	895.5	1018.5	529	495.5	678.5	843.5	688.9	463.8	708.69

Source: Department of Agriculture, Davanagere

years average rainfall was more than normal and in 4 years it was less than normal rainfall. The average annual rain rainfall in the last 10 years was 708.69 mm. The district has bi-model rainfall pattern in major parts provides an opportunity for both *Kharif* and *Rabi* season crops. Residual moisture content in the soil due good *Kharif* monsoon helps better crop stand in *Rabi* especially, Bengal gram.

Conclusion:

ICAR-Taralabalu Krishi Vigyan Kendra, Davanagere has introduced 3 varieties of Bengal gram in 8 years in the form of integrated crop management approach. The frontline demonstration on Bengal gram in Davanagere district helped the farmers to adopt new technologies, realize higher yield and income. Scientists efforts showed results in the form of adoption of technologies and helped to realize higher returns. The demonstration helped the farmers in minimizing the technology gaps by adopting recommended practices. Lower values of technology index indicates suitability and feasibility of demonstrated technologies. Frontline demonstrations also help in vertical and horizontal spread of demonstrated technology among farming community.

REFERENCES

Anonymous (2015). *Davanagere district at a glance,* District statistical office, Davanagere (Karnataka) India.

Anonymous (2016). Annual report, Department of Economics and Statistics, Ministry of Agriculture, Government of India.

Anonymous (2017). *Annual reports (various issues),* ICAR-Taralabalu Krishi Vigyan Kendra, Davanagere (Karnataka) India.

Jat, B.L. and Gupta, J.K. (2015). Yield gap analysis of pearl millet through demonstrations in Rajasthan, *Karnataka J. Agric. Sci.,* **28** (1) : 104-106.

Meena, B.L., Meena, R.H. and Balai, C.M. (2012). Yield gap analysis of mustard through frontline demonstrations in agro climatic zone-1 of Rajasthan, *J. Oilseed Brassica,* **3** (1) : 51-55.