



P-ISSN: 2349-8528

E-ISSN: 2321-4902

[www.chemijournal.com](http://www.chemijournal.com)

IJCS 2020; 8(4): 2279-2281

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Received: 07-05-2020

Accepted: 09-06-2020

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## Effect of large scale demonstration of Chickpea (*Cicer arietinum* L.) improved variety JG-11 under CFLD programme in Vijayapur district

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DOI: <https://doi.org/10.22271/chemi.2020.v8.i4z.9971>

**Abstract**

Frontline demonstration of Chickpea (*Cicer arietinum* L.) was aimed to improve the production after bringing new variety in to cultivation in Vijayapur district of Karnataka. Studies were carried out to assess yield and economics of a new variety, JG-11 at the farmer's field under cluster front line demonstration (CFLD) for two years (2018-19 to 2019-20). Among two varieties JG-11 recorded significantly higher yield (11.55 q ha<sup>-1</sup>) as compared to the local variety A-1 (8.45 q ha<sup>-1</sup>). Similar trend was observed for growth and yield parameters. The highest gross returns and BC ratio of Rs. 51447 ha<sup>-1</sup> and 2.06, respectively were realized with JG-11 variety as compared with local variety A-1.

**Keywords:** Chickpea, JG-11, farmers practice, CFLD, A-1, yield and economics

**Introduction**

Chickpea is one of the most important pulse crops grown in India. It has been well recognized as a valuable source of protein particularly in India, where a majority of the population is vegetarian and depends on the low priced food for meeting its dietary requirements. It is consumed as a dry pulse, after cooking, germination, soaking or fermentation or as a green vegetable. It is also used for the preparation of various sweets and spicy dishes where the split grains or flour are used besides dhal.

India occupies the first position in the world in terms of chickpea area (7.1 m.ha.) and production (5.75 m.t.) during 2004-05 accounting for nearly 30.9 per cent and 39.9 per cent of total pulses area and production respectively. The largest chickpea producing state in the country is Madhya Pradesh followed by Uttar Pradesh, Maharashtra, Andhra Pradesh and Karnataka. Madhya Pradesh, Rajasthan and Haryana are the main surplus producing states wherein nearly 37 per cent chickpea production is brought to the wholesale markets for trading. Karnataka ranks 5<sup>th</sup> in the cultivation of chickpea with an area of 4.18 lakh ha, 2.31 lakh tonnes of production and 582 kg ha<sup>-1</sup> of productivity. In Karnataka, Gulbarga occupies the first position in chickpea area (1.24 lakh ha), production (8.63 lakh tonnes) and productivity (695 kg ha<sup>-1</sup>) followed by Bijapur, Bidar, Gadag, Dharwad.

Chickpea is the major pulse crop in Karnataka state. However its area and production are fluctuating year after year due to high incidence of pest and diseases, rainfed condition and fluctuating marketing prices. Farmers do not get remunerative price for their produce on the one hand and incur high cost of cultivation on the other. The farmers take their produce to the other states hoping for better prices and marketing facilities. The lower productivity of chickpea is due to less importance given to this crop, non-adoption of proper production technologies, severe incidence of pests and diseases, non-remunerative market price, lack of area under irrigation and its cultivation mainly as a mixed crop. Marketing facilities available to this crop are not efficient. Thus both production and marketing of chickpea is associated with the various technological and economic constraints.

Chickpea is a very important *rabi* pulse crop of Vijayapur district. Earlier A-1 variety was grown in this region and yields were low because of susceptibility to wilt. KVK Vijayapur introduced new Chickpea variety JG-11 which is resistant to wilt, erect type, high yielding. This variety recorded 16 per cent higher yield as compared to A-1 variety.

The JG-11 variety has spread over an area of 30,000 ha in Vijayapur district. Hence the present study is taken up to analyze the trend in area, production and productivity of chickpea in Vijayapur district.

### Materials and Methods

A field demonstration was carried out during the *rabi* season of 2018-19 and 2019-20 under Northern Dry Zone of Karnataka at Tajpur village of Vijayapur district (situated at 16° 22' N latitude, 75° 56' E longitude and at an altitude of about 586 m above mean sea level). With the improved package of practice, assessment was carried out by taking 0.4 ha as a unit and covered a total area of 20.0 ha. The demonstration was carried out with 2 treatments (T<sub>1</sub>=Farmers variety, T<sub>2</sub>= Improved variety JG-11) and 50 replications under randomized complete block design in the farmer's field. The land was brought to optimum tilth by ploughing twice with tractor drawn mould board plough. The soils of demonstration field for evaluating Chickpea crop was deep clay soil with pH 8.4, available organic carbon 0.43 per cent, available N, P and K were 241.1, 39.1 and 462.2 kg ha<sup>-1</sup>, respectively.

Sowing of Chickpea was done on 12<sup>th</sup> September 2018 and 20<sup>th</sup> September 2019, respectively. Weeds were controlled through one hoeing at 30 days after sowing and one manual weeding. The recommended rate of N (25 kg ha<sup>-1</sup>) and P<sub>2</sub>O<sub>5</sub> (50 kg ha<sup>-1</sup>) was applied for Chickpea at sowing. The remaining cultivation practices were followed as per the package of practice of UAS, Dharwad. In each year a pre-seasonal training and four trainings during the crop period were conducted to prepare the farmers on implementation of selected package of practices. The critical inputs were supplied to the farmers by procuring certified seeds of JG-11, solar operated nipping machine and pulse magic from KVK, Vijayapur of Karnataka. Chickpea was harvested on 12<sup>th</sup> and 17<sup>th</sup> January 2019 and 2020, respectively. Five randomly selected plants from 50 sites in each treatment were harvested. Standard procedures were used to measure the yield attributes and yield parameters of Chickpea. Variables were analyzed and least significance difference (LSD) test was carried out for analyzed mean square errors using Web Based Agricultural Statistics software Package (WASP 2.0). Significance and non-significance difference between treatments was derived through procedure provides for a single LSD value (Gomez and Gomez, 1984) [2]. Correlation studies among the yield components of pigeon pea was done using XLSTAT package.

## Results and Discussion

### Growth parameters

Impact of two varieties of Chickpea on plant height was recorded (Table 1), among the two varieties of Chickpea, variety JG-11 has recorded the highest plant height 89.0 cm followed by local variety A-1 with 80 cm. Similarly, among the various varieties of Chickpea the highest number of pods per plant was recorded in variety JG-11 with 62 number followed by local variety A-1 is 41. The results are in good agreement with the findings of Siddayya *et al.*, (2016) [5] who have reported that the short duration of the crop, more grain yield and high market price were found to be the main reasons for adoption of the improved varieties. The results are also in line with the results of Suryavanshi and Mahindre Prakash (1993) [6] and Arun kumar *et al.*, (2005) [1] who have reported that the adoption of recommended practices in frontline demonstration trials in oilseeds and in hybrid cotton have shown increased yield over respective check plot.

### Chickpea yield and cost economics

Average yield recorded in two varieties of Chickpea was ranged from 8.95 to 11.55 q ha<sup>-1</sup> (Table 1). Among the varieties JG-11 was recorded highest yield of 12.60 q ha<sup>-1</sup> followed by local variety A-1 (8.40 q ha<sup>-1</sup>). The total mean cost of cultivation was higher in Chickpea variety A-1 demonstrated plots (Rs. 25200<sup>-ha</sup>) and lower was in JG-11 variety (Rs. 24400<sup>-ha</sup>). This is due to indiscriminate use of pesticides to manage pests in local variety A-1. Present results were in line with the earlier findings of Jayalakshmi *et al* (2018) [3] who reported higher net profits in demonstration with an additional income of Rs 7743/ha and B:C ratio of 2.09 against control (1.59).

The comparative profitability of Chickpea crop has been studied by estimating the net profit and benefit cost ratio (Table 2). Highest gross return, net profit and BC ratio were recorded in Chickpea variety JG-11. The variety JG-11 recorded higher mean gross return of Rs. 51447<sup>-ha</sup> mean net profit of Rs. 26647<sup>-ha</sup> with a mean benefit cost ratio of 2.06 followed by local variety A-1. The results obtained in the present study were in line with the findings of Mauria *et al* (2017) [4] who reported the higher net returns (Rs. 46250<sup>-ha</sup>) and benefit cost ratio (3.53) for chickpea gained through the improved production technologies demonstrated under CFLD programme. Moreover, extension agencies in the district need to provide proper technical support to the farmers through different educational and extension methods to reduce the extension gap for better Chickpea production in the district.

**Table 1:** Impact of various varieties of Chickpea on growth and yield parameters

Treatments	Plant height (cm)			No. of pods per plant			Yield (Q/ha)		
	2018-19	2019-20	Pooled	2018-19	2019-20	Pooled	2018-19	2019-20	Pooled
T <sub>1</sub> :JG-11	87	90	89	59	64	62	10.50	12.60	11.55
T <sub>2</sub> : A-1	79	81	80	39	43	41	8.40	9.50	8.95
SEM	2.71	3.05	3.06	6.93	7.19	7.00	6.18	1.09	0.92
CD@0.05	8.2	9.15	9.18	20.75	21.40	21.01	2.20	3.25	2.75

**Table 2:** Impact of various varieties of Chickpea on economics

Treatments	Gross return (Rs/ha)			Gross Cost (Rs/ha)			Net Profit (Rs/ha)			B:C ratio		
	2018-19	2019-20	Mean	2018-19	2019-20	Mean	2018-19	2019-20	Mean	2018-19	2019-20	Mean
T <sub>1</sub> :JG-11	45807	57087	51447	23000	25800	24400	22007	31287	26647	1.92	2.21	2.06
T <sub>2</sub> : A-1	42575	42318	42446	23800	26600	25200	19475	15718	17596	1.85	1.59	1.72
SEM	1079	4925	3002	--	--	--	845	5191	3019	0.04	0.22	0.13
CD@0.05	3235	14770	9003	--	--	--	2534	15570	9053	0.09	0.63	0.35

## Conclusion

Frontline demonstration was effective changing of farmers towards the adoption of integrated crop management in Chickpea production. Most of the farmers became aware about recommended production practices of Chickpea after conducting the frontline demonstration on farmers field. Yield of Chickpea, net return and BC ratio were found to increase in demonstrated plot as compared to farmers practice. Improved technology for cultivation of Chickpea under CFLD was proved profitable in the present yield economics assessment. The economic details of the demonstrations give us a green signal to further popularize them among the farming community for large scale adoption. It can be concluded from the study that increased Chickpea yield was due to the adoption of improved varieties and agronomic practices.

## Accoutrement

I would like to express heartiest gratitude and indebtedness to the ATARI, Bengaluru for financial assistance provided to conduct the demonstrations and also to the host organization University of Agricultural Sciences, Dharwad, Karnataka.

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