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Ankita
Department of Agronomy, College of Agriculture, Indira Gandhi Krishi, Vishwavidyalaya, Raipur, Chhattisgarh, India

Dr. Sunil Kumar
Department of Agronomy, College of Agriculture, Indira Gandhi Krishi, Vishwavidyalaya, Raipur, Chhattisgarh, India

Dr. MC Bhambri
Department of Agronomy, College of Agriculture, Indira Gandhi Krishi, Vishwavidyalaya, Raipur, Chhattisgarh, India

Dr. SS Porte
Department of Agronomy, College of Agriculture, Indira Gandhi Krishi, Vishwavidyalaya, Raipur, Chhattisgarh, India

Dr. RR Saxena
Department of Agronomy, College of Agriculture, Indira Gandhi Krishi, Vishwavidyalaya, Raipur, Chhattisgarh, India

Dr. SK Jha
Department of Agronomy, College of Agriculture, Indira Gandhi Krishi, Vishwavidyalaya, Raipur, Chhattisgarh, India

Aditya Swarnkar
Department of Agronomy, College of Agriculture, Indira Gandhi Krishi, Vishwavidyalaya, Raipur, Chhattisgarh, India

Harshika Tiwari
Department of Agronomy, College of Agriculture, Indira Gandhi Krishi, Vishwavidyalaya, Raipur, Chhattisgarh, India

Corresponding Author:
Ankita
Department of Agronomy, College of Agriculture, Indira Gandhi Krishi, Vishwavidyalaya, Raipur, Chhattisgarh, India

To workout the economics of chickpea (*Cicer arietinum*) cultivars under organic production system

Ankita, Dr. Sunil Kumar, Dr. MC Bhambri, Dr. SS Porte, Dr. RR Saxena, Dr. SK Jha, Aditya Swarnkar and Harshika Tiwari

Abstract
The experiment in the field condition were conducted [at Agriculture farm i.e., Instructional-cum-Research, I.G.K.V., Raipur, (Chhattisgarh) during *Rabi* 2020-21, to work out the economics of chickpea cultivars under organic production system. Among the all-chickpea cultivars the highest net realization (59481 Rs/ ha.) and benefit cost ratio (2.88) was obtained with cultivar Vaibhav., followed by RG 2009-01 and RG 2009-16, *i.e.* (56674 and 54592 Rs/ ha.) respectively.

Keywords: Agriculture, cost, organic, cultivars

Introduction
Pulse crops are important in Indian agriculture. Aside from being high in protein, they also contribute to agricultural yield. Their capacity to utilize atmospheric N via biological N fixation (BNF) is both economically and ecologically suitable. Pulses are an essential component of the chief vegetarian diet in India. Cereals are the staple meal and primary source of energy, while pulses, which are the primary source of vegetable proteins, offer nutritionally balanced diet. Pulses provide 20-25% protein contents on a dry seed basis, which is almost 2.5-3.0 times the proportion occurs in cereals. The chickpea (*Cicer arietinum* L.) is one of the most important winter pulse crop. It is a protein sources and play essentially important function in human nutrition for a majority of the population in the developing countries. Chickpea, which has a large amount of high-quality stored protein, is the world's most important pulse crop, and it plays a significant role in low-input farming by lowering dependency on inorganic fertilizers. Chickpea seeds include 23% protein, 64% total carbs, 5% fat, 6% crude fiber, 3% ash, and a high mineral value on average. Chickpea is the world's second most significant pulse crop, behind red gram, for human consumption and other uses. 14.8 million tons were gathered on 14.6 million hectares throughout the world in 2017.

Chickpea is a winter season pulse crop that is farmed in India as the dry pulse crop or as a green vegetable, according to the farmer usage being the most prevalent. It is the most widely farmed crop in India, [covering an area of 105.61 lakhs ha. and producing 112.29 lakh tons with an average productivity of 1063 kg ha. in 2017-18 (Samriti Sharma, Subhash Sharma Ravinder, and Pathania Ankit, 2020) [33]. Chhattisgarh state offers favorable agro-ecological conditions for chickpea cultivation, with an annual yield of 4.56 lakh. Tones and an average productivity of 1050 kg ha. in 2019-20 (Anonymous, 2021) [2].

Chickpea increases soil fertility due to its N-fixation capabilities. Chickpea have ability to fix up to 140 kg N ha. in the growing season (Poonia and Pithia, 2013) [20]. The leaves consist of significant quantity of residual N for succeeding crops and contributes an abundance of organic biomass to keep maintain and improve soil health and soil fertility. Because of its N fixation capabilities, it is a significant contributor to agricultural sustainability and is thus regarded as an excellent rotating crop. It enhances soil health by increasing microbial population and activity in the root zone. Although chickpea fixes N from the environment, there is strong evidence that N fertilizer boosts seed production, seed protein yield, and amino acid output. However, it is necessary.

The soil health deteriorates because of the overload application of the inorganic fertilizers in crop production that imbalances the normal soil physical chemical properties thereby dropping the quality of food. The unfavorable effects of these chemicals results in poor soil structure, micro-flora, qualities of water, foods and fodders. The quality of produce is deteriorated by the entry of destructive chemicals to the plants which also get transferred into the subsequently

food chain level. The significant difficulties that have rekindled farmers' and researchers' interest in chemical-free sources of plant nutrients such as biofertilizers, farmyard manures, green manures, composts, and so on. Are due to energy crisis, sustainability; in crop productivity, higher fertilizer cost and ecological firmness. Hence, to overcome the disturbing situation it is necessary to adopt the practices that can maintain the soil health by moving to organic farming and sustainable system in order to supply qualitative and nutritious food to human beings. The notice of people has increased towards organic farming due to their awareness about crop quality and soil health. (Sharma *et al*., 2008) [27].

Organic farming makes the soil sustainable for organic crop production by enhancing soil organic; carbon, availability of nutrient content and improving microbial population enzymatic activity. In order to produce maximum; crop yield with optimum input level and to sustain soil fertility it is requirement to use balanced nutrients] through organic sources like farmyard manure, vermi-compost, green manure, neem [cake and bio-fertilizers (Dahiphale *et al*., 2003) [4]. Stagnation and declining productivity of various agro ecosystems are matter of serious worry which is mainly due to the emergence of general multi nutrient deficiencies, imbalanced fertilization and reduction of native nutrient reserves. Sustainability problem caused by the haphazard use [of chemical fertilizers and pesticides can be solved with organic farming production system. Organic farming has been designed to conserve and maximize the use of all natural resources for a reasonable profit while maintaining a specific level of profit from farming. All farming techniques must be modified in order to reverse the negative consequences that have crept into the existing agricultural environment while also increasing chickpea output.

There is a constant search for agronomic development to optimize agricultural systems under organic farming, and appropriate varieties are required to achieve its potential. Despite of the potential benefits of organic practices of farming in respect of improved health of soil and quality of crop, maintaining high yields is a key difficulty in the organic agricultural practices. Plant breeders chose modern cultivars in conventional systems, and they may not perform well in organic farming systems when they are cultivated in stressful environments without the addition of external inputs that are quite different from those in which they were selected. As a result, there is a need to choose types for organic farming, which is thought to be a stressed environment because crops are not provided with chemicals for either.

Materials and Methods

The experiment “Evaluation of chickpea (*Cicer arietinum* L.) Cultivars under organic production system" were conducted at IGKV Research and Instructional Farm in the rabi season of 2020-21. The climate in the area ranges from subhumid to semi-arid. The experimental-field soil were vertosols having low, medium, and high N_2, P_2O_5, and K^+ levels, respectively, and a neutral response. The experiment used Randomized Block Designs, with three replications and 10 treatments. (Cultivars) *viz*. V_1- JAKI-9218, V_2- RG 2009-01, V_3- Vaibhav, V_4- RG 2009-16, V_5- JG-130, V_6- Vishal, V_7- JG-226, V_8 - Daftari-21, V_9- JG-14 and V_{10}- Indira chana-1, was sown on December 07, 2020 and harvested on as per their maturity. Various yield attributing variables such as pods plant, seed pod, seed index, seed yield, and stover yield were collected throughout crop growth as per the investigation's timetable and requirements.

Results and Discussion

Economics is the last criteria used in the evaluation of the best treatments that contains both economically sound and acceptable to the farming community. Different economic characteristics such as cost of cultivation (Rs. ha.), gross return (Rs/ ha), net return (Rs. ha.), and B: C ratio for several "Chickpea" varieties were computed and reported in table No.1 and illustrated in appendices I and II.

Cost of cultivation (Rs/ ha.)

Costs of cultivation of the different chickpea cultivars is presenting in table no.4.8

Gross return (Rs. / ha.)

Higher gross return was [found in Vaibhav (72836 Rs/ ha.) followed by RG 2009-01 (70590 Rs/ ha.) and lowest was recorded in Jaki-9218 (52696Rs/ ha.).

Net (return (Rs. / ha.).

Higher net returns were received by Vaibhav (41626 Rs/ ha.) Followed by RG2009-01 (39380 Rs/ ha.), and lowest in Jaki-9218 (21486 Rs/ ha.).

B: C ratio

Highest B: C ratio were received in treatment Vaibhav (2.33) and lowest in Jaki-9218 (1.69). It may be ascribed that higher amount of the seed and straw yield recorded in V_3 with comparatively less cost of cultivation.

Table 1: Economics of different Chickpea varieties under organic production system.

Varieties	Cost of cultivation (Rs. ha.)	Gross Return (Rs. ha.)	Net return (Rs. ha.)	B: C Ratio
Jaki-9218	31209.99	52696	21486	1.69
RG 2009-01	31209.99	70590	39380	2.26
Vaibhav	31209.99	72836	41626	2.33
RG 2009-16	31209.99	68925	37715	2.21
JG-130	31209.99	67524	36314	2.16
Vishal	31209.99	55973	24763	1.79
JG-226	31209.99	61607	30397	1.97
Daftari-21	31209.99	58064	26854	1.86
JG-14	31209.99	62403	31193	2.00
Indira chana-1	31209.99	60915	29705	1.95

* B: C ratio was calculated on the basis on Net realization

Conclusion

Vaibhav had the best gross realization (Rs. 72836 ha.) and net realization (Rs. 41626 ha.) as well as the highest benefit cost ratio (2.33), followed by RG2009-01.

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