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Adoption gap in chickpea cultivation in Akola district

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Abstract
Chickpea (*Cicer arietinum*), a vital pulse crop in India, plays a significant role in food security and soil health enhancement. Despite the availability of high-yielding varieties and scientifically developed cultivation practices, chickpea productivity remains suboptimal in many regions due to incomplete or non-adoption of recommended technologies. This study was conducted in the Akola district of Maharashtra to assess the adoption gap among chickpea growers regarding recommended cultivation practices. A sample of 120 farmers from 12 villages across Balapur and Telhara talukas was selected purposively. Data were collected through structured interviews and analyzed using statistical tools such as mean, percentage, and standard deviation. The findings revealed a wide variation in the adoption of different practices. The highest adoption gaps were observed in biological and mechanical pest control methods, followed by seed treatment, intercultural operations, fertilizer application and irrigation. In contrast, practices like variety selection and sowing time showed no adoption gap, while soil selection, seed rate, and harvesting exhibited minimal gaps. Overall, 65.84% of farmers fell into the medium adoption gap category, indicating partial implementation of key agronomic practices. The study concludes that there is a pressing need for targeted extension interventions, capacity-building programs, and improved access to quality inputs. Such measures are essential to bridge the adoption gap, enhance chickpea productivity, and promote sustainable agriculture in the region.

Keywords: Adoption gap, chickpea cultivation, recommended cultivation practices

Introduction

Chickpea (*Cicer arietinum*), commonly known as gram or Bengal gram, is one of the most important pulse crops cultivated extensively in semi-arid regions of the world. It is a rich source of protein and plays a crucial role in the diet of millions, especially in vegetarian populations. Globally, chickpea is grown in countries like India, Pakistan, Turkey, Australia, Iran, and Canada. In India, which is the largest producer and consumer of chickpea, the major producing states include Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, and Andhra Pradesh. Belonging to the family Leguminoceae, chickpea not only serves as a staple food crop but also significantly contributes to soil fertility through its nitrogen-fixing ability. In districts like Akola in Maharashtra, chickpea serves as a key Rabi pulse crop and plays a vital role in supporting the livelihoods of small and marginal farmers. It is especially suitable for cultivation in rainfed and drought-prone areas due to its moderate drought tolerance. Despite the availability of high-yielding varieties and scientifically developed cultivation technologies, the productivity of chickpea in many parts of India remains suboptimal. This low productivity is often attributed to the non-adoption or partial adoption of recommended cultivation practices. A considerable gap exists between the potential yield achievable under research station conditions and the actual yield realized at the farmer level. This adoption gap defined as the difference between scientifically recommended practices and those actually adopted by farmers poses a significant challenge to agricultural development and productivity enhancement. Understanding the reasons behind this gap is essential for improving chickpea yields. The adoption of recommended practices such as timely sowing, seed treatment, proper spacing, nutrient management, pest and disease control, and harvesting methods is critical to achieving optimal production. However, the spread and uptake of these practices remain uneven due to socio-economic, informational, and infrastructural barriers. Recognizing the importance of narrowing this gap, the present study was undertaken to assess the extent of adoption gap in chickpea cultivation practices, identify specific areas where adoption is low, and provide insights for effective extension

interventions.
Study objective.

- To study the adoption gap in chickpea cultivation

Methodology

An exploratory design of social research was used in the present investigation. The sample was drawn from Balapur and Telhara taluka of Akola district of Maharashtra state, on the basis of having the highest area under chickpea cultivation. In recent years, a noticeable yield gap has been observed in chickpea crops, which may be due to the non-adoption of recommended cultivation practices by farmers. Therefore, to assess the adoption gap, Akola district was purposively selected for the study. Total 12 villages were selected purposively from 2 taluka of Akola district and 10 farmers were drawn from each village thus in total 120 farmers constituted the sample size for the study. Data were collected through personal interviews using a pre-tested and structured interview schedule. The collected data were tabulated and analyzed using appropriate statistical tools such as mean, percentage, and standard deviation for drawing meaningful interpretations and conclusions.

The adoption gap for each recommended practice was calculated using the following formula

$$\text{Adoption Gap (\%)} = \frac{R - A}{R} \times 100$$

Where,
R = Recommended practices scores
A = Adoption score

This formula was used to determine the percentage gap between the recommended chickpea cultivation practices and the adopted practices followed by the farmers.

Results and Discussion

Adoption gap

Adoption gap refers to the difference between the recommended cultivation practices and the actually adopted practices followed by farmers in the field. The extent to which chickpea growers have not implemented the recommended cultivation practices is referred to as the adoption gap. This section presents the results of the data analysis related to the gap in adoption of recommended practices by chickpea growers, as reported in Table 1.

Table 1: Distribution of chickpea growers according to their practice wise adoption gap in recommended cultivation practices of chickpea.

Sr. No.	Recommended cultivation practices of chickpea	Adoption gap (%)
A	**Soil selection** Well drained, sandy loamy soil needed	16.67
B	**Prepartaory tillage** • One deep ploughing • Harrowing • Levelling	14.00
C	**Varieties**	00.00
D	**Seed rate**	8.33
E	**Spacing** 45 cm × 10 cm 30cm × 10 cm	40.83
F	**Depth of sowing** 8 cm - 10 cm	29.17
G	**Seed Treatment** • Seed treatment with vitavax • Trichoderma/Rhizobium/PSB etc.	63.33
H	**Sowing Time** 15th Oct to 15th Nov	00.00
I	**Irrigation** • At flowering stage • At Pod formation stage • Irrigated-Irrigation Provided during pre-sowing, pre-flowering and pod filling	36.00
J	**Intercultural Operation (35-45 DAS)** • Hoeing • Hand Weeding	39.00
K	**Fertilizer Application** • FYM- 10 cart load/ha • 30:50:30 NPK/ha as basal dose	35.00
L	**Control of Pest**	
	Gram pod borer	
	a) **Cultural Method** • Deep Ploughing • Timely Sowing • Scheduling of water and fertilizer application • Removal of alternate weeds	25.00
	b) **Mechanical Method**	92.00

	• Use of pheromone trap 4 to 5 traps/ha • Collection and destruction of infected plant parts • Release of Trichocard 1Lakh/ha • Use of bird perches • Determination of ETL level i.e. 2larvae/m2 or 5% infestation by larvae	
	c) **Biological Method** • Application of HaNPV@250-500 LE/ha • Bt spraying @1kg/ha • Use of biorational- • azadirechtin, NSKE, Neem oil etc @5% ie.500 ml/10 lit of water	100.00
	d) **Chemical Method** • Spray of quinolphos 25 EC @20ml/10 lit of water • 1st spraying of emmamectin benzoate 5 SG 5gm/10 lit of water • If needed 2nd spray of chlorantraniliprole 18.5 SC 2.5 ml or flubendiamaide 20 WG 5gm/10 lit of water	30.00
M	**Control of Diseases** • **Wilt:** Use of resistant variety JAKI 9218 • **Root rot:** Seed treatment with Tebuconazole 5.4% w/f. s fungicide 4ml/kg+Tricoderma 5gm/kg • **Stem rot:** Seed treatment with Tebuconazole 5.4% w/f. s fungicide 4ml/kg+Tricoderma 5gm/kg	40.00
N	**Harvesting** Leaves turn reddish-brown and start shedding	8.33

As per the findings presented in Table 1, the highest adoption gap was observed in biological (100%) and mechanical (92%) pest control methods, indicating a major reluctance or lack of awareness among farmers toward eco-friendly pest management strategies. These practices, though crucial for sustainable farming and reducing chemical load, are underutilized possibly due to limited knowledge, non-availability of inputs, or lack of technical support.

Similarly, considerable adoption gap was found in seed treatment (63.33%), intercultural operations (39%), fertilizer application (35%), and irrigation (36%), highlighting a partial implementation of critical agronomic practices that directly influence chickpea yield and soil health. This could be attributed to labor constraints, inadequate input availability, or insufficient training and demonstrations.

Moderate gap was noted in depth of sowing (29.17%) and chemical pest control (30%), which implies that while chemical approaches are relatively more accepted, their precise and timely application is still not fully adhered to.

On the other hand, zero adoption gap was recorded in variety selection and sowing time, indicating full compliance and awareness among farmers regarding these practices. Similarly, soil selection (16.67%), seed rate (8.33%), and harvesting (8.33%) showed minimal gaps, suggesting that these are well-understood and feasibly adoptable practices by the farming community.

Overall, the data reflects a trend where practices involving higher complexity, technical knowledge, or input requirements exhibit higher adoption gaps. Conversely, simpler or traditionally familiar practices are more likely to be adopted. Bridging these gaps through targeted extension programs, demonstration trials, farmer field schools, and input accessibility is essential for enhancing productivity and sustainability in chickpea cultivation.

Table 2: Distribution of the chickpea growers according to their adoption gap in recommended cultivation practices for chickpea

Sr. No.	Adoption Gap	Respondents (n=120)	
		Frequency	Percentage
1	Low (up to 35.58)	22	18.33
2	Medium (35.58 to 51.04)	79	65.84
3	High (above 51.04)	19	15.83
	Total	120	100
Mean=43.31, S.D.=7.73			

The findings from table 2, revealed that the over half of chickpea growers 65.84 per cent had a medium adoption gap in following recommended chickpea cultivation practices, followed by 18.33 per cent of growers exhibited a low adoption gap, while only 15.83 per cent had a high adoption gap. This indicates that although most farmers are adopting some recommended practices, there is still a significant gap that needs to be addressed through focused extension efforts, training, and access to inputs.

Conclusion

The findings of the research study concluded that, a significant adoption gap exists among chickpea growers in Akola district, particularly in several recommended cultivation practices like Pest management, disease management, seed treatment, Intercultural operation, fertilizer application and irrigation scheduling. These findings emphasize the need for targeted extension interventions through training programs, field demonstrations, and timely input support to bridge the

adoption gap and improve chickpea productivity.

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