P-ISSN: 2618-0723
E-ISSN: 2618-0731

NAAS Rating (2025): 5.04
www.extensionjournal.com

International Journal of Agriculture Extension and Social Development

Volume 8; Issue 9; September 2025; Page No. 166-169

Received: 13-06-2025
Accepted: 17-07-2025

Indexed Journal
Peer Reviewed Journal

Adoption gaps and strategic interventions in pigeonpea cultivation in Telangana State

[1]Madasu Alekhya, [2]Dr. N Praveen, [3]Dr. R Vasantha and [4]Dr. I Shakuntala Devi

[1]P.G Scholar, Department of Agricultural Extension Education, College of Agriculture, Rajendranagar, Hyderabad, Telangana, India

[2]Professor, Extension Education Institute, Rajendranagar, Hyderabad, Telangana, India

[3]Professor, Extension Education Institute, Rajendranagar, Hyderabad, Telangana, India

[4]Assistant Professor, Department of Agricultural Economics, Agricultural college, Warangal, Hyderabad, Telangana, India

DOI: https://www.doi.org/10.33545/26180723.2025.v8.i9c.2393

Corresponding Author: Madasu Alekhya

Abstract

Pigeonpea (*Cajanus cajan*) is a key pulse crop in Telangana, with Vikarabad district being a major cultivation area. This study assessed the adoption gap in recommended pigeonpea cultivation practices among 120 farmers from twelve villages in Vikarabad and Tandur divisions. Findings revealed practice-wise gaps ranging from 22% to 46% in seed selection and treatment, field preparation, nutrient and weed management, irrigation, pest and disease control, intercropping, and post-harvest operations. These gaps indicate partial or non-adoption of scientific recommendations, limiting yield and farm income. To bridge this gap, targeted interventions are essential, including farmer training, field demonstrations, timely access to quality inputs, mechanization support, sustainable pest and nutrient management, and financial assistance through credit and crop insurance. Implementing these strategies can enhance adoption of recommended practices, improve productivity, and strengthen livelihoods of pigeonpea farmers in semi-arid regions of Telangana.

Keywords: Adoption gap, cultivation practices, farmer adoption, pulse productivity, extension services

Introduction

Pigeonpea (*Cajanus cajan*), popularly known as Redgram, Tur, or Arhar, is an important pulse crop widely cultivated in tropical and subtropical regions. Countries such as India, Indonesia, Malaysia, the Philippines, and several parts of Africa and the Caribbean contribute substantially to its production. In India, the major pigeonpea-producing states are Maharashtra, Madhya Pradesh, Karnataka, Gujarat, Uttar Pradesh, and Telangana.

Within Telangana, Vikarabad district stands out as one of the leading regions for Redgram cultivation. The crop is grown on approximately 71,606 hectares in this district, placing it at the forefront of pulse area coverage in the state. Vikarabad makes a considerable contribution to overall production; however, its productivity levels remain below the potential achieved in research trials. The gap between expected yields and those realized in farmers' fields reflects the partial or non-adoption of recommended scientific practices. Examining the trends in area, production, and productivity within Vikarabad is therefore crucial to assess the extent of this gap and to identify appropriate interventions that could improve performance.

At the state level, Telangana produced about 1.70 lakh tonnes of Redgram during 2024-25, cultivated over 2.13 lakh hectares (5.26 lakh acres). with an average productivity of 798 kg per hectare. While this state average provides a benchmark, the yields obtained in Vikarabad are likely lower due to challenges that are common across the region.

The key issue limiting productivity is the adoption gap, which refers to the difference between the scientific package of recommended practices and the methods actually followed by farmers. This gap is not merely a technical problem but a barrier that reduces the effectiveness of agricultural research, suppresses yield growth, and restricts income improvement for farm households.

Several constraints contribute to the persistence of this adoption gap. Farmers often have limited awareness of new technologies or face inadequate access to quality seeds and inputs. Socio-economic challenges, such as small landholdings, lack of institutional credit, and risk aversion, also discourage the adoption of improved practices. Furthermore, inadequate extension support and weak research-farmer linkages make it difficult to ensure uniform dissemination of knowledge and technologies.

As a result, the benefits of research-based recommendations are underutilized, leading to lower yields and reduced farm incomes. Addressing this gap is therefore critical. Well-designed extension strategies, capacity-building initiatives, and reliable input delivery systems can play a pivotal role in closing the adoption gap. Doing so will not only enhance Redgram productivity in Vikarabad and across Telangana but also strengthen farmer livelihoods and promote the long-

term sustainability of pulse cultivation in the semi-arid regions of the state. The present study was framed with objective

- To analyze the adoption gap in Pigeonpea cultivation practices in Telangana.

Methodology

The study employed an ex-post facto research design. Telangana state was purposively selected, with Vikarabad district chosen due to its significant Pigeonpea acreage. Within the district, Vikarabad and Tandur revenue divisions were selected. From these, six mandals were chosen (three from each division), and two villages were randomly selected from each mandal, yielding a total of twelve villages. From each village, ten farmers were randomly selected, resulting in a sample of 120 respondents. Primary data were collected through structured, pre-tested interviews. Data were analyzed using descriptive statistics, including mean, percentage, and standard deviation. The adoption gap for each recommended practice was calculated using the formula:

$$\text{Adoption Gap \%} = \frac{\text{Recommended} - \text{Adopted}}{\text{Recommended}} \times 100$$

Where,
R = Recommended practices scores
A = Adoption score

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

Results and Discussion

Adoption gap

Adoption gap means the difference between the farming practices recommended by experts and the practices that farmers actually use in their fields. It shows how much of the suggested methods are not being followed. This section presents the findings of the data analysis on the adoption gap of recommended practices among Pigeonpea farmers, as shown in Table 1.

Table 1: Distribution of Pigeonpea growers according to gaps in adoption of recommended cultivation practices.

S. No	Recommended practices	Adoption Gap%
1.	**Field Selection and Soil Preparation**	
	Select a field with no previous record of wilt	30.56
	Avoid sowing in low-lying patches prone to waterlogging	40.28
	Cultivation is best in well-drained shallow or deep black soils, and also red loam and light soils.	29.44
	Deep ploughing to manage gram pod borer	36.11
2.	**Seed Selection and Treatment**	
	Grow wilt-tolerant varieties such as TDRG 59, TDRG 4, or LRG 105 (Krishna).	26.11
	Prefer early maturing varieties	35.56
	Seed treatment with Carbendazim 50% WP @ 3g/kg seed for fungal protection.	33.33
	Apply Trichoderma viride (2kg) with 80kg farmyard manure + 20kg neem powder behind plough during sowing to manage root rot and wilt.	37.50
	Dry seeds under shade after treatment.	38.06
3.	**Sowing and Intercropping**	
	Sowing time: June-July.	24.17
	Ensure flowering and pod formation do not coincide with peak rainy period.	32.78
	Sowing method: line sowing method.	28.33
	Follow intercropping with short-duration crops	32.22
	Use 4kg seed rate for maize as intercrop.	38.62
4.	**Fertilizer and Weed Management**	
	Apply different quantities of manure for intercrop and main crop.	29.17
	Apply optimum nitrogen fertilizer to Redgram.	38.33
	Use Imazethapyr 5% EC @ 300ml/200L water to control grassy and broadleaf weeds.	45.83
	Do 2-3 inter-cultivations within 20-25 days of sowing for weed management.	22.22
	Hoeing and weeding using power tiller/manual tools at 20 and 45 days after sowing.	38.33
	Maintain year-round soil cover with vegetation/crop residues for water conservation and pest management.	35.00
5.	**Irrigation and Pest Management**	
	Give two life-saving irrigations	25.56
	Destroy alternate host plants.	31.39
	Set up bonfires during 7-8 PM to attract and kill pests.	38.61
	Conserve natural enemies through ecological engineering.	40.83
6.	**Harvest and Post-Harvest**	
	Harvest Redgram when 80% of pods are fully developed.	24.72
	Thresh pods by beating with sticks or using Pullman thresher.	26.94
	Use modern mechanical threshers and winnowers	28.33
	Grading produce	25.00

The analysis of adoption gaps in Pigeonpea cultivation practices in Vikarabad district clearly demonstrates that farmers have not fully aligned their practices with the recommended scientific package of technologies. In the domain of field selection and soil preparation, considerable gaps were observed, particularly in the selection of wilt-free

fields at 30.56 percent, avoidance of waterlogged areas at 40.28 percent, and cultivation on well-drained soils at 29.44 percent. Similarly, deep ploughing after harvest to expose gram pod borer pupae showed a gap of 36.11 percent, suggesting that preventive soil health and pest management measures are only partially followed.

In seed selection and treatment, gaps ranged between 26 and 38 percent. The adoption of wilt-tolerant varieties such as TDRG 59, TDRG 4, and LRG 105 was 26.11 percent, while the adoption of early maturing varieties for the rabi season stood at 35.56 percent. Essential plant protection practices were also inadequately followed, with seed treatment using carbendazim recorded at 33.33 percent, incorporation of *Trichoderma viride* with farmyard manure and neem powder at 37.50 percent, and shade drying of treated seeds at 38.06 percent. These gaps highlight the limited penetration of varietal improvement and seed health management technologies among farming households.

Adoption of sowing and intercropping practices also remained suboptimal. The recommended sowing window of June-July showed a gap of 24.17 percent, while adjusting sowing to avoid peak rains during flowering and pod formation stood at 32.78 percent. Line sowing recorded 28.33 percent, intercropping with short-duration crops such as black gram, green gram, groundnut, soybean, or maize was 32.22 percent, and the recommended maize seed rate in intercropping systems showed a gap of 38.62 percent. This reflects weak adoption of integrated cropping strategies designed to enhance system productivity and stability.

The most prominent deficiencies were observed in fertilizer and weed management practices. Application of differentiated manure for main and intercrops stood at 29.17 percent, optimum nitrogen application at 38.33 percent, and use of Imazethapyr herbicide for weed control at 45.83 percent. While traditional practices such as inter-cultivations within 20-25 days of sowing recorded 22.22 percent and were relatively better adopted, crucial measures such as hoeing and weeding at 20 and 45 days stood at 38.33 percent, and maintaining year-round soil cover for water and pest management was 35.00 percent, all of which remained largely neglected.

In the area of irrigation and pest management, life-saving irrigations at flowering and pod filling stages recorded 25.56 percent. Preventive practices such as destroying alternate host plants stood at 31.39 percent, setting up bonfires to suppress pests at 38.61 percent, and ecological engineering to conserve natural enemies at 40.83 percent, all of which remained inadequately practiced. The latter, in particular, indicates the low acceptance of sustainable, eco-friendly pest management strategies.

Finally, harvest and post-harvest practices showed relatively lower adoption gaps compared to other stages, yet they still reflected underutilization. Harvesting at the correct physiological maturity stood at 24.72 percent, threshing methods such as stick beating or the use of a Pullman thresher recorded 26.94 percent, and the adoption of modern mechanical threshers and winnowers reached only 28.33 percent. Even simple value-enhancing practices such as grading produce for better market price were followed at only 25.00 percent.

Bridging these adoption gaps requires a multipronged approach involving strengthened extension services, farmer-oriented capacity-building programs, and reliable delivery of quality inputs. Strengthening research-extension-farmer linkages will be crucial to ensure that scientific recommendations are not only disseminated but also practically adopted. Addressing these gaps will enhance Pigeonpea productivity, improve farm incomes, and contribute significantly to the long-term sustainability of pulse cultivation in the semi-arid regions of Telangana.

To bridge the identified adoption gaps and enhance Pigeonpea productivity, a combination of targeted interventions and supportive measures is essential. The following strategies are proposed:

1. **Enhanced Extension Support**: Conduct on-field demonstrations, farmer field schools, and regular advisory visits to encourage adoption of recommended practices.
2. **Capacity-Building Programs**: Provide training on improved seed treatment, integrated pest management, intercropping, and nutrient management.
3. **Access to Quality Inputs**: Ensure availability of certified seeds, biofertilizers, Trichoderma viride, neem powder, and other essential inputs.
4. **Promotion of Mechanization**: Introduce line sowing, modern threshers, winnowers, and grading systems to reduce labor and improve efficiency.
5. **Sustainable Pest and Weed Management**: Encourage eco-friendly pest control methods, conservation of natural enemies, and judicious use of herbicides.
6. **Monitoring and Feedback**: Establish follow-up mechanisms to assess adoption levels and refine local recommendations.
7. **Financial and Institutional Support**: Facilitate access to credit, crop insurance, and risk-mitigation schemes to incentivize adoption of improved technologies.

Conclusion

Pigeonpea growers in Vikarabad district exhibit substantial adoption gaps across several recommended practices, particularly in seed treatment, nutrient and weed management, irrigation, pest and disease control, and intercropping. Weak adoption of improved field preparation, varieties, and post-harvest management further limits productivity. Strengthened extension services, training programs, field demonstrations, timely input delivery, and financial support are crucial to bridging these gaps. Targeted interventions can enhance productivity, improve farm incomes, and ensure sustainable Pigeonpea cultivation in semi-arid Telangana.

References

1. Bansilal A. Management efficiency and effectiveness of extension services received by redgram growers in North-eastern Karnataka. University of Agricultural Sciences, GKVK; 2019.
2. Bibhishan MBR. Adoption gap of production practices followed by chickpea growers. Mahatma Phule Krishi Vidyapeeth; 2021.
3. Burman RR, Singh SK, Singh AK. Gap in adoption of improved pulse production technologies in Uttar Pradesh. Indian Res J Ext Educ. 2010;10(1):99-104.
4. Kale SP. Knowledge and adoption of pigeonpea production technology by the growers. Vasantrao Naik

Marathwada Krishi Vidyapeeth; 2021.
5. Krishnamurthy A. Knowledge management, technological gap and attitude towards improved cultivation practices of pigeonpea and chickpea among small and marginal farmers in Hyderabad-Karnataka region. University of Agricultural Sciences; 2015.
6. Nain MS, Kumbhare NV, Sharma JP, Chahal VP, Bahal R. Status, adoption gap and way forward of pulse production in India. Indian J Agric Sci. 2015;85(8):1017-25.
7. Pavan Kumar P. A study on the knowledge and adoption of the recommended production technologies by the redgram growers of Prakasam district of Andhra Pradesh. Acharya NG Ranga Agricultural University; 2019.
8. Singh B, Singh YK, Tripathi S, Binjhade CL. Adoption of improved pulse production technology by pulse growers of Chhindwara district of Madhya Pradesh. Indian Res J Ext Educ. 2015;15(4):189-90.
9. Umesha C, Sridhara CJ, Kumarnaik AH, Shivarajkumar HS. Ways to bridge yield gaps and production problems in pigeonpea cropping systems. J Pharmacogn Phytochem. 2017;6(5):2651-7.
10. Yadav P. Study on level of adoption towards pigeonpea production technology among the farmers of Raipur district (Chhattisgarh). Indira Gandhi Krishi Vishwavidyalaya; 2021.