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Adoption gap in pigeon pea cultivation in Akola district

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Abstract

The present study was conducted in Akola district of Maharashtra state using an exploratory research design to assess the extent of adoption gap in pigeon pea cultivation practices. A total of 120 pigeon pea growers were selected from six villages in Akola taluka and data were collected using a structured interview schedule. Despite the availability of scientific recommended practices for pigeon pea cultivation, a substantial gap was observed between the recommended practices and those actually adopted by farmers, resulting in lower productivity. The adoption gap was calculated for each recommended practice using standard formulas. The results revealed that a significant adoption gap was observed in several recommended cultivation practices such as FYM application, seed treatment, fertilizer usage, irrigation scheduling, intercultural operations and pest and disease management. Among these, the highest gap was found in seed treatment and FYM application. These results highlight the need for targeted extension efforts, such as training programs, field demonstrations and timely input support to minimize the adoption gap and improve the adoption of scientific practices and enhance pigeon pea productivity.

Keywords: Adoption gap, pigeon pea, recommended cultivation practices

Introduction

Pigeon pea is one of the major legume crop, widely cultivated in tropical and subtropical regions. It is cultivated in countries such as India, Malaysia, Indonesia, the Philippines, as well as parts of the Caribbean and East and West Africa. In India, the major pigeon pea producing states are Maharashtra, Madhya Pradesh, Karnataka, Gujarat and Uttar Pradesh.

Pigeon pea is also known as red gram, tur or arhar, has the scientific name *Cajanus cajan* and belongs to the family Leguminaceae. Pigeon pea plays a vital role in sustaining the livelihood of farmers in Akola district, being a drought-resistant pulse crop with high market and nutritional value. Despite the development and recommendation of scientific practices for its cultivation, the productivity in the region remains low. This is primarily because many farmers do not adopt certain recommended practices and also significant gap exists between the yield recommended by university scientists and the actual yield obtained by farmers in the field, mainly due to the non-adoption of improved practices. The spread of modern agricultural practices has not been uniform across different regions of India. A larger adoption gap leads to lower utilization of research-based recommendations, which in turn results in reduced agricultural productivity. The issue of low productivity remains a major concern for extension agencies. Among the various factors contributing to low yields, the adoption gap stands out as one of the most critical.

The adoption gap is defined as the difference between the recommended cultivation practices and the actual practices adopted by farmers. Studying this gap is essential to understand which cultivation practices are being left out and why, in order to design appropriate extension interventions. Hence, the present study was conducted with the primary aim of assessing the existing adoption gap in pigeon pea cultivation practices. The present study was framed with objective

- To study the adoption gap in pigeon pea cultivation

Methodology

An exploratory research design of social research was used in the present investigation. The sample was drawn from Akola taluka of Akola district of Maharashtra state, on the basis of having the highest area under pigeon pea

cultivation. In recent years, a noticeable yield gap has been observed in pigeon pea 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 6 villages were selected purposively from Akola taluka and 20 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:

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

Where,
R = Recommended practices scores
A = Adoption score

This formula was used to determine the percentage gap between the recommended pigeon pea 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 pigeon pea 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 pigeon pea growers, as reported in Table 1.

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

Sr. No.	Recommended cultivation practices of pigeon pea	Adoption Gap (%)
A	**Soil selection**	
	Medium to heavy soil are most suitable, soil should be well drained.	19.17
B	**Preparatory tillage**	
	a) Ploughing-25-30 cm at depth b) Harrowing 2 to3 times	15.00
C	**FYM Application**	
	(7.5 tons/ha, along with 2 tons of vermi-compost)	80.00
D	**Selection of Improved varieties**	
	a) Early maturing varieties – IPA-15-06, ICPL-87 (Pragati), AKT-8811, Phule Rajeshwari b) Medium to late maturing varieties – BDN-716, BDN-708, Godavari, Renuka, Phule Trupti, ICPL 87119 (Asha), PDKV-Ashlesha, BSMR-736, BSMR-853, PKV-TARA, Vipula	09.17
E	**Seed rate**	
	Seed rate – 12-15kg/ha	29.17
F	**Spacing**	
	a) Kharif tur- For early maturing variety: 60 cm x 20 cm b) For medium maturing variety: 90 cm x 20-30 cm c) Semi Rabi tur- For medium to late maturing varieties:45cm x 20 cm	35.00
G	**Depth of sowing**	
	(4-6 cm)	02.50
H	**Seed treatment**	
	1. Seed treatment with Trichoderma@10g/kg	65.00
	2. Bio-fertilizers used for seed treatment Rhizobium@25g/kg seed.	85.00
I	**Sowing Time**	
	15th June to 15th July	20.83
J	**Interculture Operation**	
	1. Thinning - 10-15 DAS,	48.33
	2. Hoeing - 25-30 DAS,	13.33
	3. Weed Control- manually and culturally, chemically (Imazethapyr 10% 15ml/10 liter water)	38.33
K	**Intercropping**	
	1. Tur + Soybean/urd/mung (1:4 / 1:6 / 1:8)	06.00
	2. Soybean + Sorghum + Tur (6:2:1)	100.00
	3. Cotton + tur (1:1 / 1:2)	92.50
L	**Fertilizer Application**	
	1. (25:50:30 NPK /ha)	48.33
	2. 20 kg S/ha (if needed)	73.33
M	**Irrigation management**	
	1. 1st -flowering,	34.16
	2. 2nd -pod filling,	54.16
	3. (if dry spell more than 15 days)	64.16

N	**Pest management**	
	1. Pod borer - application of indoxacarb 25 EC 7ml in 10 liter of water	55.83
	2. Pod fly - spray with quinolphos 28 ml in 10 liter of water	28.33
O	**Disease management**	
	1. Wilt -seed treatment with carboxin + thirum 4 gm per kg of seeds. Resistant varieties: Godavari, BDN 716, Asha, BSMR 736, BSMR 853, PKV Tara, PDKV Ashlesha	52.50
	2. Sterility mosaic – seed treatment with Aldicarb. Resistant varieties: BSMR 736, BSMR 853, Asha, PDKV Ashlesha, BDN 716, Godavari, Renuka, Phule Trupti, PKV Tara	55.00
	3. Phytophthora stem blight- seed treatment with Metalaxyl. Diseased branches or trees should be destroy by burning.	62.50
P	**Harvesting**	
	After drying 80% pods, Threshing, Cleaning, Drying, Processing, Packaging etc.	40.00

As per the findings presented in Table 1, an adoption gap of 19.17 per cent was observed in selecting appropriate soil types such as medium to heavy and well-drained soils. Similarly, 15.00 per cent of the farmers did not fully adopt preparatory tillage practices like ploughing and harrowing. The highest adoption gap 80.00 per cent was found in the application of FYM, indicating that most farmers did not follow the recommended dosage. A relatively smaller gap of 9.17 per cent was recorded in the adoption of improved pigeon pea varieties, while 29.17 per cent of farmers exhibited a gap in following the recommended seed rate. An adoption gap of 35.00 per cent was found in maintaining variety-specific spacing and only 2.50 per cent adoption gap found in maintaining the correct sowing depth.

In seed treatment practices, a significant gap was evident that 65.00 per cent of farmers did not adopt seed treatment with *Trichoderma* and 85.00 per cent did not use *Rhizobium* bio-fertilizer as recommended. The adoption gap for timely sowing (between 15th June to 15th July) was 20.83 per cent. Among intercultural operations, 48.33 per cent of farmers lacked thinning practices, 13.33 per cent did not perform hoeing and 38.33 per cent failed to implement weed control measures. In terms of intercropping, only 6.00 per cent adoption gap was found for the tur + soybean system (1:6), indicating that most of the pigeon pea growers prefer intercropping over sole cropping and are well aware of this recommended practice.

Regarding fertilizer application, 48.33 per cent of farmers did not apply the recommended NPK dosage (25:50:30 kg/ha) and 73.33 per cent did not apply sulphur (20 kg/ha), indicating low adherence to nutrient management. Irrigation management also showed gaps i.e., 34.16 per cent at flowering stage, 54.16 per cent at pod filling and 64.16 per cent during prolonged dry spells.

In pest management, 55.83 per cent of farmers did not follow recommended measures against pod borer and 28.33 per cent did not adopt measures to control pod fly. For disease management, the adoption gaps were 52.50 per cent for wilt control, 55.00 per cent for sterility mosaic and 62.50 per cent for phytophthora stem blight. Additionally, a 40.00 per cent adoption gap was observed in harvest practices like threshing, cleaning, drying and packaging.

Overall, the major areas with significant adoption gaps included FYM application, seed treatment, irrigation scheduling, intercultural operations, pest and disease management and fertilizer usage. These findings underscore the urgent need for awareness campaigns, field demonstrations and targeted extension programs to promote better adoption of critical pigeon pea cultivation practices.

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

Sr. No.	Adoption Gap	Respondents (n=120)	
		Frequency	Percentage
1	Low (up to 32.17)	13	10.83
2	Medium (32.18 to 58.81)	83	69.17
3	High (above 58.81)	24	20.00
	Total	**120**	**100**
Mean=45.49 S.D.=13.32			

From Table 2, The study showed that the majority of respondents 69.17 per cent had a medium adoption gap in following recommended pigeon pea cultivation practices, followed by 20.00 per cent of farmers exhibited a high adoption gap, while only 10.83 per cent had a low 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

It is concluded that a significant adoption gap exists among pigeon pea growers in Akola district, particularly in several recommended cultivation practices like FYM application, seed treatment, fertilizer application, irrigation scheduling, pest and disease management and Interculture operations. 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 pigeon pea productivity.

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