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Knowledge of farmers about improved agricultural technologies of Indian bean crop in Bharuch district

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Abstract
The concept of demonstration plays a pivotal role in agricultural extension, enriching farmers' explicit and tacit knowledge. Among these, front-line demonstrations hold particular significance, taking place directly in the field under the guidance of National Agriculture Research System scientists. These scientists introduce novel technologies before their integration into the State Department of Agriculture's primary extension efforts. To accelerate crop output, the Indian Council of Agricultural Research in New Delhi has initiated front-line demonstrations through Krishi Vigyan Kendras. These endeavors bridge the gap between scientific innovations and practical application, vital for successful farmer adoption. Focused on the Bharuch district, this study selected 100 Indian bean farmers from 10 villages using random sampling. Employing an ex-post-facto research design, the study examines existing data to reveal causal relationships, offering insights from real-world contexts rather than controlled experiments. The finding revealed that majority of respondents had high to medium level of knowledge about improved agricultural technologies of Indian bean crop.

Keywords: Krishi Vigyan Kendra, improved technologies, Indian bean

Introduction
An important pulse crop in India is the Indian bean, commonly referred to as Lablab or Hyacinth bean popularly recognized as ‘Wal’, ‘Wal–papdi’ or ‘Valor’ in Gujarat state. It is prized for its high protein content and versatility in agro-climatic environments. States like Uttar Pradesh, Bihar, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, and Gujarat in India are among those where the Indian bean is grown. Due of its ability to fix nitrogen, which increases soil fertility, farmers frequently inter crop it with other crops. Gujarat has a notable Indian bean farming, particularly in areas with favourable climatic conditions. As part of its programmes for crop diversification and sustainable agriculture, the state's agricultural department encourages the growing of pulses like Indian beans. Indian bean is a desirable option for farmers wishing to diversify their crops because Gujarat's various agro-climatic zones provide favourable circumstances for pulse growing.
Since 1994, Krishi Vigyan Kendra has been operating in the Bharuch district. The KVK is approved by the BAIF and implemented by the ICAR (Indian Council of Agricultural Research). Technology transfer through on- and off-campus training programmes for farmers and extension agents, as well as front-line demonstration, is the core focus of Krishi Vigyan Kendra. on agricultural pathways and other outreach initiatives. Krishi Vigyan Kendra's mandated activity is front line demonstration. Farmers approved by the Agricultural Technology Application Research Institutes (ATARI) have received a frontline demonstration on the Indian bean crop from Krishi Vigyan Kendra (GNIB 21 Variety). Pune's Krishi Vigyan Kendra, Chaswad felt it necessary to demonstrate the impact of KVK in the region in order to examine the level of understanding of the Indian bean crop.
Therefore knowledge level of beneficiary and non beneficiary farmers about improved agricultural technologies of Indian bean crop by Krishi Vigyan Kendra, Chaswad was feel needed to show impact of KVK in the area with objective to study the knowledge level of beneficiary.

Methodology
The current study was carried out in the south Gujarat region's Bharuch district, which hosts the majority of BAIF Krishi Vigyan Kendra Bharuch's activities. From a list of Indian bean beneficiaries obtained from KVK Bharuch, 100 farmers were chosen for the current study. The current study employed an ex-post facto research design.

The scientist agronomist & extension from KVK, Bharuch helped create the interview schedule with the specific study purpose in mind, and the data was obtained through person interviews.

By calculating the knowledge score, the respondents' level of knowledge on new agricultural techniques for the Indian bean crop was assessed. Experts from the KVK and research station assisted in the preparation of all statements about management practise. Farmers who responded "YES" to any of the sub-questions under the main question received a "ONE" score, while those who responded "NO" received a "ZERO" score.

The respondents were grouped into three levels of knowledge by using mean and standard deviation.

Sr. No.	Category	Range
1.	Low level knowledge	$\leq \overline{X}$ - S.D.
2.	Medium level knowledge	In between $\overline{X} \pm$ S.D.
3.	High level knowledge	$\geq \overline{X}$ + S.D.

Results and Discussion

Knowledge about improved agricultural technology of Indian bean crop

In contest to present study, Knowledge refers to the farmers' knowledge of many advanced agricultural technology for the Indian bean crop. Farmers need sufficient expertise to successfully and profitably cultivate their land. Therefore, it was deemed vital to learn from the farmers what knowledge they had of modernised agricultural techniques for the Indian bean crop. The data about level of knowledge was presented in table 1.

Table 1: Distribution of respondent according to their knowledge about improved agricultural technologies of Indian bean crop

Sr. No.	Statement	Percentage
1.	GNIB 21 variety of Indian bean.	80.00 (80)
2.	Seed rate of Indian bean.	89.00 (89)
3.	Seed treatment used in Indian bean.	66.00 (66)
4.	Knowledge about cultivation time in Indian bean.	100.00 (100)
5.	Knowledge about cultivation distance in Indian bean.	86.00 (86.00)
6.	Knowledge about cultivation method in Indian bean.	100.00 (100)
7.	Knowledge about fertilizer dose in Indian bean.	75.00 (75)
8.	Knowledge about bio fertilizer dose in Indian bean.	59.00 (59)
9.	Knowledge about irrigation in Indian bean.	74.00 (74)
10.	Knowledge about weedicide use in Indian bean.	86.00 (86)
11.	Knowledge about pesticide recommended in Indian bean.	77.00 (77)
12.	Harvesting symptoms in Indian bean.	100.00 (100)
13.	Knowledge about post harvest management in Indian bean.	72.00 (72)
14.	Knowledge about training about Indian bean cultivation by KVK.	82.00 (82)
15.	Knowledge about front line demonstration on Indian bean conducted by KVK.	83.00 (83)

The findings indicate in table 1 varying levels of knowledge among the Indian bean farmers surveyed. Notably, a significant percentage of farmers (80%) reported awareness of the GNIB 21 variety, while a higher proportion (89%) possessed knowledge of the appropriate seed rate. However, aspects such as seed treatment (66%) and bio-fertilizer dosage (59%) exhibited relatively lower levels of comprehension. Cultivation-related knowledge, encompassing methods (100%), cultivation time (100%), and distance (86%), appeared to be well understood by the respondents. Similarly, farmers demonstrated understanding in pest management (77%) and harvesting symptoms (100%), but exhibited comparatively lower awareness of irrigation (74%) and post-harvest management (72%) techniques. Furthermore, the survey also assessed the impact of knowledge dissemination initiatives by Krishi Vigyan Kendras (KVKs). The results revealed that a significant proportion of farmers were familiar with training (82%) and front-line demonstrations (83%) conducted by KVKs, underscoring their role in disseminating agricultural best practices.

Table 2: Distribution of respondent based on their overall knowledge about improved agricultural technologies of Indian bean crop

Knowledge level	(n= 100)	
	Frequency	Percentage
Low Level of knowledge (Up to 9)	16	16.00
Medium Level of knowledge (10 to 14)	71	71.00
High Level of knowledge (Above 14)	29	29.00
Total	100	100

Mean = 12.29 SD = 2.61

The data presented in Table 2 provides a comprehensive overview of the respondents' knowledge levels concerning improved agricultural technologies related to Indian bean crops. The majority of the respondents, accounting for 71.00 percent, demonstrated a medium level of knowledge, scoring between 10 to 14 points. This suggests a reasonably good understanding of the subject matter within this group. However, a notable portion, constituting 16.00 percent of the respondents, exhibited a low level of knowledge (scoring up to 9 points), indicating a need for targeted training

interventions to enhance their awareness and expertise through KVK.

Encouragingly, 29.00 percent of the respondents showcased a high level of knowledge (scoring above 14 points), indicating a commendable grasp of improved agricultural technologies related to Indian bean crops. These individuals could potentially serve as valuable resources within their communities, sharing their expertise and experiences to elevate the overall knowledge base.

The mean knowledge score of 12.29, with a standard deviation of 2.61, reflects a moderate level of understanding among the respondents. While this suggests a generally stable knowledge base, it also highlights the presence of variability in the respondents' expertise.

Conclusion

This study provides insights into the agricultural knowledge landscape among Indian bean farmers. While certain aspects of cultivation and management practices are well understood, there are areas that warrant further attention and training. The majority of respondents to the survey had medium knowledge about new agricultural technology that were relevant to the Indian bean crop.

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