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Impact of KVK activities on the adoption of improved horticultural technologies in Kolar district

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Abstract

The present investigation was conducted in the Kolar district of Karnataka, utilizing a multi-stage sampling design to select sample farmers as respondents. A total of 225 farmers participated in the study. Primary data were collected from the selected respondents using a specially designed interview schedule. The results indicated that approximately 76.67% of beneficiary respondents had a high to medium level of adoption of improved horticultural technologies, while only 23.33% demonstrated a low level of adoption. In contrast, among non-beneficiary respondents, a significant proportion (42.67%) exhibited a low level of adoption of these technologies. Overall, the adoption quotients for various aspects of horticultural production practices were notably skewed in favor of beneficiary respondents. The mean adoption quotient of beneficiary respondents was significantly higher than that of non-beneficiary respondents.

Keywords: Level of knowledge, impact, training programme, adoption level, satisfaction level

Introduction

Karnataka is one of the most progressive states in India, with immense potential for horticultural development. The state benefits from ten diverse agro-climatic regions, making it suitable for cultivating a wide variety of fruits and vegetables throughout the year. Kolar district, in particular, is surrounded by Bangalore Rural district to the west, Chikballapur district to the north, Chittoor district of Andhra Pradesh to the east, and the Krishnagiri and Vellore districts of Tamil Nadu to the south. Agriculture, including dairy farming, sericulture, and floriculture, forms the backbone of the district's economy. Kolar is widely recognized as the land of "silk & milk," with its farmers relying on borewell water for both irrigation and drinking purposes.

Kolar district is situated in a semi-arid, drought-prone region, spanning an area of 8,225 square kilometers (3,176 sq mi). It stretches approximately 135 kilometers (84 mi) from north to south and almost the same distance from east to west. Kolar ranks high in horticultural productivity, with 49.95% of the net sown land dedicated to horticultural crops. Additionally, 33.34% of the district's cultivated area is used for cereals and 10.58% for pulses. Key horticultural crops grown in the region include potatoes, tomatoes, onions, beans, green chilies, cole crops, carrots, radishes, and beetroots. In terms of fruit crops, mango, banana, guava, sapota, and grapes are prominent, while the floriculture sector grows marigold, jasmine, chrysanthemum, and rose.

The Krishi Vigyan Kendra (KVK), also known as the Agriculture Science and Knowledge Centre, is a grassroots initiative designed and nurtured by the Indian Council of Agricultural Research (ICAR) for over four decades. Since the establishment of KVKs, significant time has passed, making it critical to assess their performance and impact. The key question is whether KVK activities have positively influenced beneficiary farmers in adopting improved horticultural technologies, ultimately contributing to the district's horticultural development.

In light of these considerations, a study titled "Impact of KVK Activities in the District of Kolar for Adoption of Improved Technology in Horticulture" has been conducted with the following specific objectives:

1. To assess the socio-economic attributes of KVK beneficiaries.
2. To evaluate the impact of KVK activities on the adoption of improved horticultural production practices.

Methodology:

The present investigation was conducted in Kolar district of Karnataka, using a multi-stage sampling design to select the sample farmers. In the first stage, Kolar district was purposively selected. In the second stage, five talukas from the district were chosen. In the third stage, five villages adopted by Krishi Vigyan Kendra (KVK), Kolar, were selected from each taluka. Finally, in the last stage, a comprehensive list of beneficiary farmers from each selected village was prepared with the help of KVK records.

From each village, 30 beneficiary farmers were randomly selected as respondents. Additionally, to assess the impact of KVK in terms of the adoption of improved horticultural practices, a sample of 75 non-beneficiary farmers was chosen from control villages. Thus, a total of 225 farmers were selected for the study.

Primary data were collected from the selected respondents through specially designed schedules, which included information on the respondents' profiles and their adoption of various improved horticultural practices. The data were recorded directly onto the schedule after personally introducing the purpose of the study to each respondent. The data were collected through a recall method in one round and subsequently transferred to work tables and tally sheets for processing, tabulation, classification, analysis, and statistical treatment. Cross tables were also prepared, and the data were interpreted in line with the study's objectives. Hypotheses were tested, and key interpretations were drawn.

To measure the extent of adoption of improved horticultural production technologies, an index was developed based on recommended procedures. Respondents were asked to rate their adoption of various practices on a five-point continuum: 'full adoption' (5), 'partial adoption' (4), 'less adoption' (3), 'symbolic adoption' (2), and 'non-adoption' (1), with corresponding weightages.

- Full adoption was defined as the complete and regular adoption of the practice in each season for a continuous three-year period.
- Partial adoption referred to the adoption of part or all of the recommended practice once per year for three continuous years.
- Less adoption referred to the adoption of part of the recommended practice once in a three-year period.
- Symbolic adoption indicated a mental decision to adopt the practice, without actual implementation.
- Non-adoption meant the farmer did not adopt the recommended practice at all.

Based on responses, the total adoption score for each individual was calculated by summing the scores for each item. The adoption quotient for each respondent was computed using the following formula and served as their adoption score:

$$\text{Adoption quotient (AQ)} = \frac{\text{Adoption score obtained by respondent}}{\text{Maximum possible adoption score}} \times 100$$

Overall adoption level in the area was also worked out by calculating the arithmetic mean of the adoption quotient of all the respondents as below:

Overall adoption level = AQ N ∑

Where, AQ = Adoption quotient for the respondents

N= Total number of respondents

The adoption scores assigned to each respondent was totaled and mean scores of adoption (x) and standard deviation (SD) were computed. Adoption behavior was categorized into three levels i.e. (I) low extent of adoption, if the total score of an individual respondent is below Mean- SD (ii) medium extent of adoption, if the score varies from Mean-SD to Mean + SD and (iii) high extent of adoption, if individual score is above mean + SD.

Results and Discussion

Socio-Economic Profile of Respondents

The socio-economic characteristics of respondents, representing their personal attributes such as family size, caste, social participation, educational status, aquaculture experience, and income levels, are crucial in understanding the dynamics of their agricultural engagement and livelihoods. The data, as summarized in Table 1, reveals insightful trends among both beneficiary and non-beneficiary groups, reflecting their socio-economic status and participation in agricultural activities.

1. Age Distribution

The age distribution of respondents indicates that a significant proportion of the beneficiaries belonged to the young age group (46.67%), followed by those in the middle age (33.33%) and older age groups (20.00%). A similar age pattern was also observed in the non-beneficiary respondents, which suggests a balanced participation of different age cohorts in the study. The predominance of younger participants, particularly among the beneficiaries, reflects the engagement of a more active and potentially more adaptable demographic in the adoption of improved farming practices, which could lead to better results in productivity and income generation.

2. Caste Composition

In terms of caste, the majority of both beneficiary (90%) and non-beneficiary respondents (93.33%) belonged to the Other Backward Classes (OBC) category. This is significant as it highlights the socio-economic challenges faced by marginalized groups, especially in rural areas, and the need for targeted interventions to uplift them through programs like those provided by KVKs (Krishi Vigyan Kendras). The focus on OBC respondents suggests that the interventions are reaching socially disadvantaged sections, promoting inclusivity and equity in the distribution of resources.

3. Family Structure and Size:

More than half of the respondents, across both categories, preferred a nuclear family structure with medium family sizes (5-10 members). This is indicative of the evolving family dynamics in rural India, where traditional joint family systems are gradually being replaced by nuclear setups. The medium family size further implies a moderate burden on household resources, allowing for more manageable distribution of land and income among family members. It also reflects a balance between labor availability within the family for agricultural activities and household consumption needs.

4. Educational Status

Education plays a critical role in the adoption of agricultural technologies and practices. The study found that the majority of respondents were literate, with a high level of education, particularly among beneficiaries (53.33%) and to a lesser extent among non-beneficiaries (40.00%). The higher educational attainment among beneficiaries suggests a positive correlation between education and access to or willingness to engage with KVK interventions. Education not only improves understanding and implementation of advanced farming techniques but also facilitates better decision-making and resource management, ultimately leading to improved farm productivity.

5. Social Participation

Social participation, measured in terms of involvement in community and agricultural organizations, was found to be medium among 46.67% of respondents and low among 45.33%. This implies that while many farmers are moderately involved in social networks that can provide support and knowledge-sharing, there is a significant portion that remains relatively isolated. Social participation is crucial for the diffusion of innovation in rural settings, and the low level of participation could be a limiting factor in the broader dissemination of agricultural innovations.

6. Landholding and Economic Status

The respondents predominantly possessed medium-sized landholdings and exhibited a medium level of socio-economic status. This suggests that while they are not among the poorest strata, they are not wealthy landowners either. This middle-class agrarian profile is important because it reflects the target demographic that KVK interventions aim to assist—the segment of farmers that has enough resources to invest in improved practices but still needs external support and guidance to enhance their productivity and income.

7. Income and Economic Motivation

A key observation from the study is the disparity in farm family income between beneficiary and non-beneficiary respondents. Beneficiary respondents from the KVK-adopted villages had higher income levels compared to their non-beneficiary counterparts. The frequency distribution of income levels among beneficiaries was skewed towards the higher side, indicating better economic outcomes due to their participation in KVK programs. On the other hand, the income distribution among non-beneficiaries followed a more normal curve but with a slight skew towards lower income levels. This suggests that the non-beneficiaries, despite having access to general agricultural knowledge, may lack the specialized support that beneficiaries receive, which can lead to improved income generation.

Economic motivation, as measured by the respondents' aspirations for higher income and better livelihoods, was notably higher among beneficiaries. More than one-third of the respondents in KVK-adopted villages exhibited high levels of economic motivation, suggesting that the KVK programs instilled greater optimism and ambition for economic growth. In contrast, in non-adopted villages, 32% of the respondents had lower levels of economic motivation, which may reflect a lack of exposure to successful farming models or limited access to resources.

8. Extension Contact and Media Exposure

Moderate levels of extension contact and mass media exposure were recorded among respondents. Extension services play a vital role in disseminating agricultural innovations, and moderate contact suggests room for improvement in outreach and farmer engagement. Similarly, moderate exposure to mass media highlights the potential for leveraging communication channels to increase awareness and adoption of improved farming practices. Enhancing both extension services and media outreach could further bridge the gap between knowledge and implementation in rural farming communities

Table 1: Distribution of respondents according socio economic and personal characteristics

Characteristics	Attribute	Respondents			
		Beneficiary (n=150)		Non Beneficiary (n= 50)	
		Number	%	Number	%
Age	Below 35 years	70	46.67	40	53.33
	35 years 50	50	33.33	20	26.67
	More than 50	30	20.00	15	20.00
Caste	Schedule caste	35	23.33	20	26.67
	Schedule tribe	20	13.33	20	26.67
	Other backward caste	80	53.33	30	40.00
	General	15	10.00	5	6.67
Family type	Nuclear	70	46.67	38	50.67
	Joint	80	53.33	37	49.33
Size of family	Small (Up to 5 members)	40	26.67	15	20.00
	Medium (5-10 members)	90	60.00	50	66.67
	Large (more than 10 members)	20	13.33	10	13.33
Education	Illiterate	20	13.33	5	6.67
	Literate (can read and write)	80	53.33	30	40.00
	Educated (up to 10+2 level)	30	20.00	35	46.67
	Highly educated (graduate and above)	20	13.33	5	6.67
Social participation	Low	60	40.00	55	73.33
	Medium	65	43.33	12	16.00
	High	25	16.67	8	10.67
Socio-economic status	Low	68	45.33	24	32.00
	Medium	70	46.67	28	37.33
	High	12	8.00	23	30.67
Land holdings	Marginal	45	30.00	15	20.00
	Small	40	26.67	20	26.67
	Medium	50	33.33	35	46.67

	Large	15	10.00	5	6.67
Annual family income	Up to Rs. 100,000/	10	6.67	12	16.00
	>Rs. 100,000 to <Rs.200,000/	54	36.00	14	18.67
	>Rs. 200000 to <Rs.400,000/	60	40.00	34	45.33
	>Rs.400,000/	26	17.33	15	20.00
Agricultural progressiveness	Low	10	6.67	30	40.00
	Medium	76	50.67	35	46.67
	High	64	42.67	10	13.33
Extension contact	Low	20	13.33	42	56.00
	Medium	110	73.33	28	37.33
	High	20	13.33	5	6.67
Mass media exposure	Low	20	13.33	35	46.67
	Medium	105	70.00	35	46.67
	High	25	16.67	5	6.67

Level of adoption

The data presented in Table 2 highlights significant differences in the adoption of improved agricultural production technologies between beneficiary and non-beneficiary respondents. A detailed analysis of these findings and comparison with previous studies reveals important insights into the effectiveness of interventions like those offered by Krishi Vigyan Kendra (KVK) in promoting the adoption of innovative practices.

Adoption of Improved Agricultural Technologies

The study reveals that 76.67% of beneficiary respondents exhibited high to medium levels of adoption of improved agricultural technologies. This suggests a strong impact of the KVK interventions, which include training programs, frontline demonstrations, and on-farm testing, all designed to encourage the adoption of new and efficient farming practices. In contrast, only 23.33% of the beneficiaries demonstrated a low level of adoption, showing that a majority of them were responsive to the KVK's efforts.

For non-beneficiaries, however, the adoption levels were considerably lower. A significant portion (42.67%) of the non-beneficiary respondents showed low levels of adoption of improved technologies. This gap highlights the critical role that active participation in training and demonstration programs plays in improving technology adoption rates among farmers.

The results indicate that the non-beneficiary group had a lower likelihood of adopting modern agricultural practices, with a large number falling into the low to medium adoption categories. The lower level of adoption in non-beneficiary respondents can be attributed to their limited exposure to the hands-on training, resources, and information provided by the KVK.

Factors Influencing Adoption

The higher level of adoption among the beneficiaries is largely attributed to the training programs, frontline demonstrations, and on-farm testing organized by the KVK. These programs bridge the gap between research and practice, providing farmers with practical knowledge and skills that directly influence their farming techniques. According to Sharma (2002) [10], farmers in KVK-adopted villages adopted more advanced agricultural practices compared to those in non-adopted villages. Similarly, Chauhan (2012) [2] observed that training programs and demonstrations led to an increase in adoption levels, particularly among tribal farmers.

The findings are further supported by Behera *et al*. (2014) [1], who concluded that KVKs play a pivotal role in disseminating improved crop production technologies, which not only increase crop yields but are also economically viable and accepted by the farming community. Kharatmol (2006) [4] reported a similar trend in his study, where 45% of trained respondents exhibited high levels of adoption, followed by 40% with medium adoption and 15% with low adoption. These studies underline the critical role of targeted interventions and training in motivating farmers to adopt new technologies and improve their agricultural productivity.

Adoption of Horticultural Practices

The data from Table 3 offers a more nuanced look at the adoption of horticultural production practices. The adoption quotient for various aspects of horticultural practices is heavily skewed toward the beneficiary respondents. This suggests that KVK interventions are not only effective in general agricultural production but also play a key role in promoting the adoption of advanced horticultural techniques.

Beneficiary farmers, having undergone KVK programs, are more likely to adopt improved horticultural practices such as better crop management, pest control, and efficient resource use. These practices directly contribute to enhanced productivity and profitability. Non-beneficiary farmers, on the other hand, showed lower levels of adoption, which may hinder their ability to maximize their horticultural yields.

Table 2: Distribution of respondents based on level of adoption

Category	Respondents			
	Beneficiary (n=150)		Non Beneficiary (n= 50)	
	Frequency	%	Frequency	%
Low	35	23.33	32	42.67
Medium	78	52.00	30	40.00
High	37	24.67	13	17.33

Table 3: Overall adoption of improved Horticultural production practices

Aspects	Beneficiary			Non-Beneficiary		
	Total score	Mean score	Adoption quotient	Total score	Mean score	Adoption quotient
Preparatory cultivation	454.50	3.03	60.60	220.50	2.94	58.80
Transplanting and Spacing	513.00	3.42	68.40	220.50	2.94	58.80
Integrated Crop Management	730.50	4.87	97.40	227.25	3.03	60.60
Fertilizer management	574.50	3.83	76.60	239.25	3.19	63.80
Integrated Nutrient Management	730.50	4.87	97.40	239.25	3.19	63.80
Irrigation management	730.50	4.87	97.40	330.75	4.41	88.20
Weed management	465.00	3.10	62.00	256.50	3.42	68.40
Plant protection	454.50	3.03	60.60	281.25	3.75	75.00
Integrated Pest Management	478.50	3.19	63.80	256.50	3.42	68.40
Integrated Disease Management	478.50	3.19	63.80	239.25	3.19	63.80
Value addition	454.50	3.03	60.60	220.50	2.94	58.80
Farm Machineries	465.00	3.10	62.00	232.50	3.1	62.00
Storage Technique	441.00	2.94	58.80	256.50	3.42	68.40
Drudgery Reduction	562.50	3.75	75.00	310.50	4.14	82.80
Frontline line demonstrations	730.50	4.87	97.40	310.50	4.14	82.80
On farm technology	574.50	3.83	76.60	220.50	2.94	58.80
Mean adoption quotients	73.65			67.7		

To determine whether the higher adoption quotient of beneficiary respondents was significant, the adoption quotient of beneficiary respondents was compared with that of non-beneficiary respondents using an independent 't' test. It is evident from the table that the computed 't' value of 6.712 was statistically significant at the 1% probability level. This indicates that the adoption quotient of beneficiary respondents was significantly higher than that of non-beneficiary respondents. This demonstrates the positive and significant impact of Krishi Vigyan Kendra (KVK) services on the adoption of improved agricultural production practices. The results can be attributed to the exposure of beneficiary farmers to advanced cultivation technologies through demonstrations, on-farm trials, and training sessions conducted by KVK. Similar findings have been reported by Malabasari and Hiremath (2016) [5], Sharma *et al*. (2014) [12], Behera *et al*. (2014) [1], Meena and Gupta (2013) [6], Dudi and Meena (2012) [3], Sharma *et al*. (2011) [11], Sahu *et al*. (2010) [9], Singh (2010) [13], Nagar *et al*. (2008) [7], Sharma (2002) [10], and Savita Singha and Lalita Vatta (2017) [8]

Conclusion

In conclusion, the Krishi Vigyan Kendra (KVK) has made a significant contribution to enhancing farmers' adoption levels across various aspects of agricultural production technologies. The practices promoted by KVK have raised awareness and motivated farmers to adopt appropriate production technologies. The efforts of KVK have had a positive impact on improving farmers' technical knowledge regarding agricultural practices. The interventions carried out by KVK scientists—through training sessions, demonstration activities, on-farm trials, and other extension services—have effectively enhanced farmers' knowledge levels. This increased understanding has, in turn, led to a higher adoption of agricultural production technologies among the farming community.

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