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Evaluation of farmer training programmes of Krishi Vigyan Kendra in Tonk, Rajasthan

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Abstract

The present investigation was undertaken to evaluate the effectiveness of farmer training programmes conducted by Krishi Vigyan Kendra (KVK), Banasthali Vidyapith, Niwai, Tonk district, Rajasthan. Farmer training constitutes a fundamental component of agricultural extension for enhancing farmers' knowledge, skills, and adoption of improved agricultural technologies. Assessing the effectiveness of such training programmes is essential for strengthening the quality and responsiveness of public extension services. An ex post facto research design was employed, and primary data were collected from 90 trained farmers selected through proportionate sampling from five villages using a pre-tested structured interview schedule. The data were analysed using descriptive statistical techniques, including frequency, percentage, mean, and ranking. The results revealed that the majority of respondents were middle-aged (60.00%), literate (86.67%), primarily engaged in agriculture (94.44%), and belonged to the small and marginal farmer category (67.78%), indicating the effective outreach of KVK programmes among resource-constrained farming households. Village Pradhan/Sarpanch (42.70%) and Subject Matter Specialists (31.25%) were the principal motivating sources for participation in training programmes. Most respondents expressed favourable perceptions regarding the training duration (62.22%), timeliness (54.44%), teaching methods (82.23% rated appropriate or most appropriate), usefulness (61.11% rated very useful), and course content (60.00% considered adequate). Respondents recommended strengthening trainer competency (81.25%), ensuring appropriate participant selection, advance publicity, and skill-oriented training (79.16% each) to improve programme effectiveness. The study concludes that KVK training programmes effectively strengthen farmers' capacities and enhance the quality of agricultural extension services. Strengthening need-based training, participatory approaches, trainer competency, post-training follow-up, and digital advisory services could further improve the effectiveness and long-term impact of KVK-led capacity-building programmes.

Keywords: Agricultural extension, Krishi Vigyan Kendra, training programs, capacity building, evaluation, extension effectiveness, Rajasthan

1. Introduction

Agriculture constitutes a foundational pillar for global food security, rural livelihoods, and sustainable economic development. However, the sector faces mounting challenges due to rapid population growth, climate change, natural resource degradation, biodiversity loss, and escalating production costs (FAO, 2023; World Bank, 2024) ^[4, 12]. The Green Revolution markedly increased agricultural productivity by introducing improved crop varieties, irrigation infrastructure, and external inputs. Nevertheless, mounting concerns about environmental sustainability have redirected scholarly and policy attention towards the development of climate-resilient, resource-efficient, and knowledge-intensive agricultural systems (Berrueta *et al.*, 2021) ^[2]. The sustainable transformation of agriculture, therefore, necessitates not only technological innovation but also the effective dissemination and adoption of these innovations, which is largely facilitated through responsive extension systems (Anderson & Feder, 2004) ^[1]. In this context, agricultural extension serves as a strategic mechanism for the transfer of knowledge, the promotion of behavioural change, and the enhancement of informed decision-making among farming communities. Agricultural extension has evolved from a conventional

technology transfer approach to an integrated agricultural development system emphasizing participatory learning, institutional collaboration, digital transformation, and farmer empowerment (Birner *et al.*, 2009; Klerkx *et al.*, 2012) ^[3, 6]. Modern extension services increasingly function as knowledge brokers linking researchers, policymakers, private organizations, and farming communities. Simultaneously, advances in digital agriculture, artificial intelligence, mobile-based advisory services, precision farming, and ICT-enabled extension have improved farmers' access to timely, location-specific information and strengthened advisory services (Yadav *et al.*, 2026; Mukherjee *et al.*, 2026) ^[13, 7]. However, their effectiveness depends on farmers' awareness, technical competence, institutional support, and the quality of extension delivery (Varshney *et al.*, 2022) ^[11].

In India, agriculture remains central to rural livelihoods and food security. Yet, fragmented landholdings, diverse agro-climatic conditions, and deficient access to quality extension services continue to limit the adoption of improved technologies. To address these constraints, India's extension system has progressively adopted decentralised, demand-driven, and farmer-centred approaches (Birner *et al.*, 2009) ^[3]. Within this system, the Indian Council of Agricultural

Research (ICAR) established Krishi Vigyan Kendras (KVKs) as district-level frontline extension institutions responsible for technology assessment, refinement, frontline demonstrations, vocational training, and advisory services. Driven by the principle of "learning by doing," KVKs deliver need-based, location-specific training programmes that synthesize scientific knowledge with practical field experience. Such interventions facilitate the dissemination of new technologies, foster entrepreneurship, promote climate-resilient agricultural practices, support natural resource management, and encourage livelihood diversification. Empirical evidence substantiates that KVK initiatives significantly enhance farmers' knowledge, the adoption of innovative technologies, agricultural productivity, and socio-economic welfare (Jaiswal *et al.*, 2019; Natarajan *et al.*, 2025; Thirumal *et al.*, 2025) [5, 8, 10]. Farmer training remains the central focus of KVK activities, with research indicating that advisory services offered by these institutions yield both direct and spillover benefits in terms of knowledge acquisition, improved management practices, increased technology adoption, and strengthened livelihood resilience (Varshney *et al.*, 2022) [11]. Moreover, integrating digital advisory platforms with conventional extension modalities has further augmented farmers' access to pertinent information and improved their capacity for effective decision-making (Yadav *et al.*, 2026; Mukherjee *et al.*, 2026) [13, 7].

Despite these advances, the effectiveness of KVK training programmes varies across regions and farming communities. Existing studies have largely focused on technology adoption and productivity outcomes, with comparatively limited attention to farmers' motivations, perceptions of training quality, and institutional effectiveness. Moreover, district-level evidence from Rajasthan, particularly Tonk district, remains limited regarding how socio-economic characteristics, motivational factors, and trainees' perceptions together influence KVK training effectiveness (Varshney *et al.*, 2022; Natarajan *et al.*, 2025) [11, 8]. Addressing this empirical and geographical gap is essential to develop more responsive, demand-driven, and farmer-centred extension interventions.

Against this backdrop, the present study appraises the farmer training programmes organized by Krishi Vigyan Kendra, Banasthali Vidyapith, Niwai, District Tonk, Rajasthan. Specifically, it examines the socio-economic characteristics of participating farmers, identifies factors motivating their participation, reviews their perceptions of KVK training programmes, and documents their suggestions for improvement. The findings are projected to generate empirical evidence to strengthen KVK-based extension services and promote more effective, participatory, and context-relevant agricultural advisory systems.

2. Research Methodology

The methodology adopted in the present study describes in detail the procedures used in the selection of study area, respondents, research instruments, methods of data collection, and statistical analysis.

The study was conducted in the operational area of Krishi Vigyan Kendra (KVK), Banasthali Vidyapith, Niwai, located in Tonk district, Rajasthan, India. Niwai tehsil lies between 26.35° N latitude and 75.93° E longitude at an average

elevation of approximately 400 m above mean sea level and covers a geographical area of 1,022.94 km². The region has a semi-arid subtropical climate with agriculture as the predominant occupation. Farming is largely characterized by small and marginal landholdings, with major crops grown under both rainfed and irrigated conditions. KVK Banasthali Vidyapith actively implements farmer training, technology assessment, frontline demonstrations, and advisory services across its operational villages. The study area was purposively selected because of the KVK's active extension programmes and its suitability for evaluating the effectiveness of farmer training interventions.

The study employed a descriptive ex post facto research design, as the independent variables had already occurred and no experimental manipulation was involved. This design was considered appropriate for assessing farmers' perceptions, motivational factors, and suggestions regarding the training programmes organized by the selected KVK. The investigation was conducted using a cross-sectional survey approach to collect information from farmers who had previously participated in KVK training programmes.

A list of farmers who had attended training programmes organized by KVK Banasthali Vidyapith during the preceding two years was obtained from the KVK records. From a total of 622 trained farmers, approximately 20% were selected using proportionate sampling, resulting in a final sample of 90 respondents distributed across five villages, namely Churada, Manoharpura, Banasthali, Chikana, and Dangarthal. Each village contributed 18 respondents, ensuring balanced representation of trainees across the operational area.

Primary data were collected through a pre-tested structured interview schedule consisting of both closed- and open-ended questions. The schedule was originally prepared in English and subsequently translated into the local language to facilitate accurate responses. Face-to-face interviews were conducted after establishing rapport with the respondents to improve the reliability of the information collected. Secondary information relating to the study area and KVK activities was obtained from KVK records, district statistical offices, and relevant institutional publications.

The study considered socio-personal, socio-economic, communication, and psychological characteristics of the respondents as independent variables. These included age, education, caste, occupation, operational landholding, annual income, family size, family type, material possessions, urban contact, extension contact, change-agent linkage, social participation, and socio-economic status. The dependent variables comprised farmers' motivational factors for participating in KVK training programmes, perceptions regarding different dimensions of the training programmes, and suggestions for improving future training interventions. Standardized scales, including the modified Pareek and Trivedi Socio-economic Status Scale, were used wherever applicable, while other variables were measured using structured schedules specifically developed for the study.

The collected data were edited, coded, classified, and tabulated before analysis. Descriptive statistical techniques, including frequency, percentage, mean, and ranking, were employed to summarize respondents' characteristics and their perceptions of KVK training programmes. The statistical analyses were performed according to the nature of the

variables to facilitate interpretation and presentation of the findings.

3. Results and Discussion

3.1 Socio-economic characteristics of the respondents

The socio-economic profile of the respondents provides valuable insights into the characteristics of farmers participating in KVK training programmes and their potential influence on technology adoption and extension participation. The majority of respondents (60.00%) belonged to the middle-age group (31–50 years), followed by young (21.11%) and older farmers (18.89%) (Table 1). This finding indicates that economically active farmers were more inclined to participate in KVK training programmes, probably because they are directly involved in farm decision-making while remaining receptive to technological innovations. Similar observations were reported by Jaiswal *et al.* (2019) ^[5] and Natarajan *et al.* (2025) ^[8], who found that middle-aged farmers constituted the dominant group attending KVK training programmes due to their greater involvement in agricultural operations and willingness to improve productivity.

Education is widely recognized as a key determinant of farmers' ability to understand, evaluate, and adopt improved agricultural technologies. In the present study, 86.67% of respondents were literate, with nearly three-fifths (58.89%) educated up to high school or intermediate level. The relatively high educational status of the respondents suggests greater capacity to comprehend scientific recommendations delivered through KVK training programmes. These findings corroborate those of Varshney *et al.* (2022) ^[11], who demonstrated that agricultural advisory services significantly improve knowledge acquisition and technology adoption among trained farmers, particularly where literacy facilitates effective knowledge transfer.

The study further revealed that 42.22% of respondents belonged to the general caste category, while 33.33% and 24.44% belonged to other backward classes and scheduled caste categories, respectively. Although KVKs are mandated to provide inclusive extension services, the higher representation of socially advantaged groups indicates the need for strengthening outreach among marginalized farming communities. Moreover, 70.00% of respondents reported no membership in any formal social organization, indicating relatively low social participation. Similar findings were reported by Sarnaik *et al.* (2020) ^[9], who observed that farmers' extension contact and training exposure significantly influenced their perception of KVK services, highlighting the importance of institutional engagement in enhancing learning outcomes.

Agriculture was the principal occupation of 94.44% of the respondents, while 67.78% belonged to the marginal and small farm categories. These findings indicate that KVK training programmes primarily reached resource-constrained farmers who generally require greater institutional support for technology adoption. Similar beneficiary profiles have been documented by Natarajan *et al.* (2025) ^[8] and Thirumal *et al.* (2025) ^[10], who reported that KVK interventions substantially improved the knowledge, skills, and socio-economic status of smallholder farmers through need-based capacity-building programmes.

The majority of respondents maintained one to four livestock

animals, belonged to the medium-income category (₹60,001–100,000), and possessed basic farm machinery such as sprayers (80.21%), chaff cutters (64.58%), and tractors (40.62%). Although mechanization was moderate, ownership of essential farm implements suggests a reasonable level of production orientation among trainees. Respondents also reported frequent interaction with Village Development Officers and Subject Matter Specialists, indicating that public extension agencies continue to serve as important sources of agricultural information. This observation agrees with Varshney *et al.* (2022) ^[11], who emphasized that regular interaction with extension personnel strengthens knowledge dissemination and creates positive spillover effects on technology adoption among neighbouring farmers.

Overall, the findings indicate that KVK training programmes primarily attracted literate, middle-aged, smallholder farmers with moderate resource availability but limited social participation. Such farmers represent an important target group for extension interventions aimed at enhancing agricultural productivity, livelihood resilience, and technology adoption through need-based training programmes.

3.2 Factors motivating farmers to participate in KVK training programmes

Identifying the factors that motivate farmers to participate in extension programmes is essential for improving the effectiveness and outreach of agricultural training initiatives. Since respondents could indicate multiple motivational sources, the cumulative percentage exceeded 100%.

Among the different sources, the Village Pradhan/Sarpanch emerged as the most influential motivator, encouraging 42.70% of respondents to participate in KVK training programmes, followed by Subject Matter Specialists (31.25%), friends (29.16%), neighbours (27.08%), and family members (23.95%) (Table 2). In contrast, printed extension materials such as pamphlets (7.29%) and newspapers (18.75%) had relatively limited influence on farmers' participation (Table 1).

These findings underscore the continuing importance of interpersonal communication and local leadership in influencing farmers' participation in extension activities. Village leaders often enjoy high social credibility and maintain close interaction with farming communities, making them effective agents for mobilizing participation in training programmes. Likewise, the prominent role of Subject Matter Specialists reflects the confidence of farmers in technically competent extension personnel. Similar results were reported by Jaiswal *et al.* (2019) ^[5], who identified farmer training as an effective mechanism for transferring agricultural technologies through direct interaction between scientists and farmers. Furthermore, Varshney *et al.* (2022) ^[11] demonstrated that advisory services not only improve knowledge among direct beneficiaries but also generate significant spillover effects through farmers' social networks, emphasizing the value of interpersonal communication in technology dissemination.

The relatively limited influence of newspapers, pamphlets, and exhibitions suggests that mass media alone may not be sufficient to motivate farmers to participate in extension programmes. Instead, combining community-based leadership with expert advisory services and digital

communication platforms is likely to improve participation and programme effectiveness. Similar conclusions were drawn by Yadav *et al.* (2026) ^[13], who highlighted the growing role of digital platforms in strengthening agricultural extension through personalized and interactive advisory services, and by Mukherjee *et al.* (2026) ^[7], who reported significant improvements in farmers' knowledge through ICT-enabled advisory systems. These findings indicate that integrating conventional interpersonal extension approaches with digital communication technologies could substantially enhance the outreach and impact of future KVK training programmes.

Table 1: Factors responsible for Motivation

S. No.	Factor	No. of respondents N = 90	Percentage	Rank
1.	VDO/VEW	15	15.63	XI
2.	A.A.O./A.E.O.	22	22.92	V
3.	Progressive farmer	21	21.88	VII
4.	Local leader	20	20.83	VIII
5.	Relatives	16	16.66	XI
6.	Family	23	23.95	V
7.	Neighbors	26	27.08	III
8.	Friends	28	29.16	IV
9.	Village Pradhan	41	42.70	I
10.	New paper	18	18.75	X
11.	S.M.S.	30	31.25	II
12.	T.V./ Radio	15	15.63	IX
13.	Exhibition	16	16.66	XI
14.	Pamphlet	7	7.29	XIII
15.	Any other	-		

3.3 Farmers' opinion regarding various aspects of KVK training programmes

Farmers' perceptions of different components of KVK training programmes provide valuable insights into the effectiveness of extension interventions and identify areas requiring further improvement. The respondents evaluated seven major dimensions of the training programme, namely duration, timeliness, teaching methods, usefulness, course content, boarding facilities, and lodging facilities.

3.3.1 Duration of training

The majority of respondents (62.22%) perceived the duration of the training programmes as adequate, whereas 37.78% considered it inadequate and suggested extending the training period to improve understanding of technical content (Table 5.17). The predominance of favourable responses indicates that the existing duration generally meets farmers' learning requirements; however, the proportion seeking longer training reflects the growing demand for more comprehensive and practical sessions. Similar findings were reported by Natarajan *et al.* (2025) ^[8], who observed that appropriate training duration significantly enhanced farmers' understanding of improved agricultural practices and contributed to better livelihood outcomes. Likewise, Jaiswal *et al.* (2019) ^[5] emphasized that sufficient exposure time is essential for effective technology transfer, particularly where practical demonstrations constitute a major component of extension training.

3.3.2 Timeliness of training

More than half of the respondents (54.44%) expressed

satisfaction with the timing of KVK training programmes, while 31.11% were partially satisfied and 14.44% were dissatisfied (Table 5.18). Farmers suggested organizing short, need-based training sessions at different crop growth stages rather than a single programme before the cropping season. This finding highlights the importance of synchronizing extension interventions with crop calendars to maximize learning and technology adoption. The results support the observations of Varshney *et al.* (2022) ^[11], who reported that timely advisory services significantly improve farmers' decision-making and generate positive spillover effects within farming communities. Similarly, Yadav *et al.* (2026) ^[13] demonstrated that continuous, stage-specific advisory services through digital platforms substantially improve farmers' access to relevant information.

3.3.3 Teaching methods

Teaching methods were perceived positively by the respondents, with 46.67% rating them as most appropriate and 35.56% as appropriate, whereas only 17.78% considered them inappropriate (Table 5.19). Respondents suggested greater use of audiovisual aids, videos, and field demonstrations to enhance practical understanding. These findings indicate that experiential and visual learning approaches are preferred over conventional lecture-based methods. Similar observations were reported by Jaiswal *et al.* (2019) ^[5], who concluded that practical demonstrations and interactive teaching methods substantially improve farmers' comprehension and adoption of agricultural technologies. Furthermore, Mukherjee *et al.* (2026) ^[7] reported that ICT-enabled learning tools significantly enhanced farmers' knowledge of recommended crop production practices.

3.3.4 Usefulness of the training programme

A substantial majority of respondents perceived the training programmes as beneficial, with 61.11% considering them very useful and 32.22% useful, while only 6.67% rated them as least useful (Table 5.20). This finding demonstrates the effectiveness of KVK training in addressing farmers' information needs and strengthening their technical competence. Similar outcomes were documented by Varshney *et al.* (2022) ^[11], who reported that agricultural advisory services significantly improved farmers' knowledge, management practices, and technology adoption. Likewise, Thirumal *et al.* (2025) ^[10] concluded that KVK interventions have played an important role in empowering farming communities through knowledge enhancement and capacity building.

3.3.5 Course content

The course content was considered adequate by 60.00% of the respondents, whereas 36.67% perceived it as partially adequate and only 3.33% considered it inadequate (Table 5.21). The high level of satisfaction suggests that the training curriculum was largely relevant to farmers' production needs. However, the responses also indicate the need for periodic revision of training modules based on emerging technologies and local farming problems. Similar findings were reported by Natarajan *et al.* (2025) ^[8], who emphasized that context-specific and demand-driven training content significantly improves the effectiveness of KVK programmes.

3.3.6 Boarding and lodging facilities

Most respondents expressed favourable opinions regarding the facilities provided during training. About 61.11% considered the boarding arrangements appropriate, while 31.11% rated them most appropriate, with only 7.78% expressing dissatisfaction (Table 5.22). Likewise, the majority of respondents were satisfied with the lodging facilities, indicating that the overall training environment was conducive to learning. Although logistical facilities are not directly related to knowledge transfer, they contribute substantially to trainees' comfort, participation, and overall satisfaction with extension programmes. These findings agree with Sarnaik *et al.* (2020) ^[9], who reported that farmers' perceptions of extension effectiveness are influenced not only by technical quality but also by the overall organization and management of training programmes.

3.4 Suggestions for improving KVK training programmes

The suggestions provided by respondents offer practical insights for strengthening future KVK training programmes (Table 5.24). Improving the technical competency of trainers emerged as the highest-ranked suggestion (81.25%), followed by adopting appropriate participant selection methods (79.16%), advance publicity of training programmes

(79.16%), and placing greater emphasis on skill-oriented learning (79.16%). Farmers also recommended improving trainers' communication skills, ensuring that technical concepts are presented according to participants' educational levels, and strengthening follow-up through regular field visits by KVK personnel (Table 2).

Several respondents emphasized the need for greater logistical support, including free distribution of critical agricultural inputs, improved transportation facilities, enhanced classroom infrastructure, and wider use of audiovisual teaching aids. These suggestions reflect farmers' preference for experiential, participatory, and demand-driven extension approaches rather than conventional classroom instruction. Similar recommendations have been reported by Jaiswal *et al.* (2019) ^[5], Natarajan *et al.* (2025) ^[8], and Thirumal *et al.* (2025) ^[10], who emphasized that improving trainer competency, participatory teaching methods, continuous advisory support, and practical skill development significantly enhance the effectiveness of KVK training programmes. Moreover, Varshney *et al.* (2022) ^[11] demonstrated that strengthening advisory quality and follow-up interactions contributes to sustained knowledge dissemination and wider technology adoption among farming communities.

Table 2: Suggestions for further improvements

S. No.	Suggestions	No. of trainee	Percentage	Rank
1.	The methods of selection for the participant should be appropriate	76	79.16	II
2.	Physical facilities	65	67.70	XIII
3.	Publicity of the training programme should be made well in advance	76	79.16	III
4.	Duration of training should be increased from the existing period	60	62.5	XIV
5.	Provision of vehicle should be provided by training centre for conveyance	61	63.54	X
6.	More and more audio-visual aids should be used for training.	63	65.62	XII
7.	Free sample	80	83.33	XI
8.	The technical competency of trainers should be improved.	78	81.25	I
9.	The facility should be provided for regular mailing of literature by KVK.	46	47.91	IV
10.	The behaviour of the trainer should be better.	78		VII
11.	The trainer should have the ability to present the subject matter at the understanding level of the trainees.	75	77.3	VIII
12.	The regular visit should be made by the KVK staff	72	72.00	V
13.	During training as far as a possible emphasis on skill teaching should be given to provide the adequate skill to the trainees.	76	79.16	IX
14.	Any other			

Overall, the findings indicate that while respondents expressed a high level of satisfaction with the KVK training programmes, they also highlighted opportunities for improving programme delivery through enhanced trainer capacity, timely communication, greater use of experiential teaching methods, and stronger post-training support. Addressing these suggestions could substantially improve the effectiveness, relevance, and long-term impact of KVK-led extension interventions.

4. Conclusion

The present study demonstrated that the farmer training programmes organized by Krishi Vigyan Kendra (KVK), Banasthali Vidyapith, Niwai effectively contributed to farmer capacity building and agricultural extension. The majority of respondents were middle-aged (60.00%), literate (86.67%), primarily engaged in agriculture (94.44%), and belonged to the small and marginal farmer category (67.78%), indicating that KVK programmes successfully

reached their target beneficiaries. Village Pradhan/Sarpanch (42.70%) and Subject Matter Specialists (31.25%) were the major motivating sources for participation. Most respondents expressed positive perceptions regarding the training duration (62.22%), timeliness (54.44%), teaching methods (82.23% rated appropriate/most appropriate), usefulness (61.11% rated very useful), and course content (60.00% considered adequate). Farmers recommended improving trainer competency (81.25%), participant selection, advance publicity, and skill-oriented training (79.16% each) to enhance programme effectiveness.

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