International Journal of Veterinary Sciences and Animal Husbandry 2026; SP-11(1): 49-54

ISSN: 2456-2912
NAAS Rating (2026): 4.61
VET 2025; SP-11(1): 49-54

www.veterinarypaper.com
Received: 13-12-2025
Accepted: 02-01-2026

Kritika Verma
Ph.D. Scholar, Department of Veterinary and Animal Husbandry Extension Education, College of Veterinary Science. Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, India

Jaswinder Singh
Professor-cum-Head, Department of Veterinary and Animal Husbandry Extension Education, College of Veterinary Science. Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, India

Corresponding Author:
Kritika Verma
Ph.D. Scholar, Department of Veterinary and Animal Husbandry Extension Education, College of Veterinary Science. Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, India

Attitude of beneficiary and non-beneficiary dairy farmers toward university-based livestock technological services in Punjab

Kritika Verma and Jaswinder Singh

DOI: https://www.doi.org/10.22271/veterinary.2026.v11.i1Sa.2940

Abstract
Attitude may be defined as a psychological, evaluative response towards a particular person, place, thing, event, etc. in positive or negative terms based on affective, behavioural and cognitive information. The present study was undertaken to assess the attitude of beneficiary and non-beneficiary dairy farmers toward livestock-based technological services provided by Guru Angad Dev Veterinary and Animal Sciences University (GADVASU) and its outreach centres in Punjab. Six districts-Bathinda, SAS Nagar, Tarn Taran, Hoshiarpur, Barnala, and Ludhiana were purposively selected based on the availability of an established extension network. From 48 selected villages, a total of 480 respondents comprising 240 beneficiaries and 240 non-beneficiaries were randomly selected. An attitude scale consisting of 25 Likert-type statements was developed to measure farmers' attitudes toward various technological services, including training programs, Pashu Palan Mela, animal welfare camps, ICT platforms, helpline services, and supply of technical inputs. Data were collected through personal interviews and analyzed using frequency, percentage, and t-test. The findings revealed that a significantly higher proportion of beneficiary farmers exhibited a highly favourable (81.67%) or favourable (16.25%) attitude toward the university-based livestock technological services. In contrast, the majority of non-beneficiaries (52.50%) reported an unfavourable attitude, indicating lower awareness and access to these services. Beneficiaries expressed particularly favourable attitudes toward training programs, Pashu Palan Mela, ICT initiatives, and technical inputs such as mineral mixture and Uromin lick, though some constraints were reported regarding follow-up support and accessibility of ICT tools. The results highlight the positive role of institutional extension services in improving farmers' knowledge, practices, and confidence toward scientific livestock management.

Keywords: ICAR, KVKs, attitude scale, extension services, livestock services

Introduction
The livestock sector is a key component of the Indian economy, providing livelihood support to about 20.5 million people. India has a total livestock population of 535.78 million and 851.81 million poultry birds (20th Livestock Census, 2019). In Punjab-popularly known as the "Bread Basket of India"-livestock farming has long been an integral part of rural life and holds strong potential for enhancing farmers' income and employment, particularly for rural youth. The state currently maintains 25.31 lakh cows and 40.16 lakh buffaloes, producing 14.30 million tonnes of milk annually, with a per-capita availability of 1,283 grams per day (Statistical Abstract of Punjab, 2020) [7]. Successful livestock development largely depends on the timely dissemination of technical knowledge and services related to breeding, healthcare, feeding, marketing, and management (Verma *et al*., 2022) [8]. Extension services therefore play a vital role in equipping farmers with the necessary skills to improve productivity, income, and overall quality of life. Krishi Vigyan Kendras (KVKs), established by ICAR, further strengthen technology transfer through demonstrations, trainings, health camps, and advisory services across 731 centers in the country. Information and Communication Technologies particularly mobile-based tools have also significantly improved farmers' access to timely livestock-related information. Dairy farming continues to be an important source of livelihood in Punjab, especially for small and marginal farmers. (Verma, 2021) [9].

Guru Angad Dev Veterinary and Animal Sciences University (GADVASU) promotes livestock production, animal health, and disease prevention through an integrated system of teaching, research, and extension activities conducted at its Ludhiana campus and various outreach centers across Punjab. The University delivers a wide range of livestock-based technological services such as training programs, Pashu Palan Melas, regional melas, animal welfare and infertility camps, farmer-scientist interactions, advisory services, ICT initiatives, and the sale of mineral mixtures, bypass fat, and publications. To effectively improve these services, it is important to understand farmers' perceptions and attitudes toward the livestock-based technological services provided by GADVASU and its outreach centers such as training programs, melas, farmer associations, expert lectures, social media platforms, helpline numbers (0161-2414026, 2414005), mobile apps, PP-TAK services (62832-97919, 62832-58834), and other advisory resources. With this objective, the present study was undertaken to assess the attitudes of both beneficiary and non-beneficiary dairy farmers toward accessing these services.

Research Methodology

The present study was carried out in selected districts of Punjab. Six districts Bathinda, SAS Nagar, Tarn Taran, Hoshiarpur, Barnala, and Ludhiana were purposively chosen based on the presence of an existing extension network of GADVASU, including Colleges, KVKs, and Regional Research and Training Centres (RRTCs). From each district, two blocks were randomly selected, making a total of 12 blocks. Further, from each block, four villages were randomly chosen, of which two were adopted and two were non-adopted by the university or its outreach centres, resulting in a total of 48 villages. From every selected village, 10 dairy farmers who owned at least 2-3 milch animals and had a minimum of five years' experience in dairy farming were randomly selected as respondents. This included 240 beneficiary farmers from adopted villages and 240 non-beneficiary farmers from non-adopted villages, making a total sample size of 480 respondents. A total of 25 statements were finalized for the attitude scale, which was developed in detail under the research methodology to assess the respondents' attitude towards the livestock-based technological services provided by the University, using the Likert summated rating method. Data were collected from these farmers using a well-structured interview schedule through personal interaction. Data collected from respondents were recorded, compiled, tabularized and subjected to statistical methods such as frequency distribution, percentage analysis, t-test analysis.

Results

Technological Statement 1: The University/ outreach centres training programs provide the needful information regarding improved livestock practices (+): Table 1 indicated that the majority of beneficiaries (57.08%) had a highly favourable attitude toward Statement 1, while 36.67 percent had a favourable attitude, followed by neutral (4.58%), unfavourable (0.83%) and highly unfavourable (0.83%). Among non-beneficiaries, majority (65.83%) were neutral. The Veterinary University regularly organized two weeks dairy training program for the farming community in which almost all relevant topics are covered in 50-60 lectures or visit. However, more technical skills like treatment, injecting medications, A.I etc. were not focused. These skills falls under purview of professional persons, this might be the reason of some unfavourable responses.

Technological Statement 2: Lack of follow-up by the University/KVK/ RRTC after completion of the training programs (-): Table 1 revealed that around 49.00 percent beneficiaries had unfavourable attitude towards statement 2, further followed by highly unfavourable (38.75%), highly favourable (5.42%) attitude. In the case of non-beneficiaries, most of the respondents (65.83%) were neutral, nearly 21.00 percent had unfavourable, attitude toward given statement. Time to time the University contacts the trainees to assess their adoption statuses. Shelly (2020) evaluated the impact of goat farming training offered by Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, by interviewing 120 farmers six months after their participation. The study found that around 40.83 percent of the respondents had adopted goat farming as a result of the training.

Technological Statement 3: Conducting exposure visits to farms/ departments during training organized by the University and its outreach centres provides practical know-how to the trainees (+): Table 1 revealed that half of the beneficiaries (50.83%) percent beneficiaries were having a highly favourable attitude towards given statement. Among non-beneficiaries, most of the respondents were neutral (65.83%). In every training, the University conducted a visit to dairy farm of the University to provide practical knowledge. However, in these trainings methods of injecting medicine, pregnancy diagnosis, A.I etc. are not demonstrated. This might be the reason for unfavourable attitude of beneficiaries.

Table 1: Categorization of respondents on the basis of their attitude regarding various technological statements

Technological Statements	Beneficiaries (N=240)					Non-beneficiaries (N=240)				
	HUF	UF	N	F	HF	HUF	UF	N	F	HF
1st	2 (0.83)	2 (0.83)	11 (4.58)	88 (36.67)	137 (57.08)	1 (0.42)	1 (0.42)	158 (65.83)	37 (15.41)	43 (17.91)
2nd	93 (38.75)	117 (48.75)	11 (4.83)	6 (2.50)	13 (5.42)	15 (6.25)	50 (20.84)	158 (65.83)	10 (4.17)	7 (2.91)
3rd	6 (2.50)	1 (0.42)	11 (4.58)	100 (41.67)	122 (50.83)	1 (0.42)	1 (0.42)	158 (65.83)	45 (18.75)	35 (14.58)
4th	2 (0.83)	5 (2.08)	11 (4.58)	112 (46.67)	110 (45.84)	1 (0.42)	1 (0.42)	158 (65.83)	44 (18.33)	36 (15.00)
5th	3 (1.25)	1 (0.42)	11 (4.58)	85 (35.41)	140 (58.33)	0 (0.00)	4 (1.67)	130 (54.17)	54 (22.50)	52 (21.67)
6th	2 (0.83)	2 (0.83)	11 (4.58)	75 (31.26)	150 (62.50)	1 (0.42)	1 (0.42)	139 (57.91)	45 (18.75)	54 (22.50)
7th	3 (1.25)	1 (0.42)	10 (4.17)	78 (32.05)	148 (61.67)	1 (0.42)	4 (1.67)	130 (54.17)	58 (24.17)	47 (19.58)
8th	11 (4.58)	4 (1.67)	10 (4.17)	119 (49.58)	96 (40.00)	4 (1.67)	5 (2.08)	148 (61.67)	57 (23.75)	26 (10.83)
9th	4 (1.67)	11 (4.58)	10 (4.17)	122 (50.83)	93 (38.75)	3 (1.25)	3 (1.25)	150 (62.50)	58 (24.17)	26 (10.83)
10th	1 (0.42)	2 (0.84)	12 (5.00)	69 (28.75)	156 (65.00)	2 (0.84)	3 (1.25)	150 (62.50)	47 (19.58)	38 (15.84)
11th	9 (3.75)	4 (1.67)	0 (0.00)	29 (12.08)	198 (82.50)	0 (0.00)	0 (0.00)	29 (12.08)	67 (27.92)	144 (60.00)
12th	9 (3.75)	4 (1.67)	28 (11.67)	81 (33.75)	118 (49.16)	2 (0.83)	2 (0.83)	162 (67.50)	49 (20.42)	25 (10.42)
13th	2 (0.83)	2 (0.83)	27 (11.26)	65 (27.08)	144 (60.00)	1 (0.42)	1 (0.42)	165 (68.75)	42 (17.50)	31 (12.91)
14th	0 (0.00)	0 (0.00)	28 (11.67)	95 (39.58)	117 (48.75)	0 (0.00)	3 (1.25)	169 (70.42)	41 (17.08)	27 (11.25)

15th	0 (0.00)	0 (0.00)	28 (11.67)	107 (44.58)	105 (43.75)	0 (0.00)	0 (0.00)	149 (62.08)	51 (21.25)	40 (16.67)
16th	60 (25.00)	110 (45.83)	0 (0.00)	31 (12.92)	39 (16.25)	78 (32.50)	101 (42.08)	12 (5.00)	18 (7.50)	31 (12.92)
17th	4 (1.67)	6 (2.50)	7 (2.92)	72 (30.00)	151 (62.91)	4 (1.67)	7 (2.92)	134 (55.83)	37 (15.42)	58 (24.17)
18th	3 (1.25)	4 (1.67)	36 (15.00)	105 (43.75)	92 (38.33)	1 (0.42)	2 (0.83)	166 (69.17)	53 (22.08)	18 (7.50)
19th	3 (1.25)	3 (1.25)	6 (2.50)	126 (52.50)	102 (42.50)	2 (0.83)	2 (0.83)	140 (58.34)	51 (21.25)	45 (18.75)
20th	3 (1.25)	3 (1.25)	7 (2.92)	101 (42.08)	126 (52.50)	2 (0.83)	2 (0.83)	136 (56.67)	65 (27.08)	35 (14.58)
21st	2 (0.83)	2 (0.83)	31 (12.92)	123 (51.25)	82 (34.16)	2 (0.83)	2 (0.83)	142 (59.17)	57 (23.75)	37 (15.42)
22nd	74 (30.83)	140 (58.33)	7 (2.92)	14 (5.83)	5 (2.08)	9 (3.75)	81 (33.75)	146 (60.83)	2 (0.83)	2 (0.83)
23rd	3 (1.25)	2 (0.83)	4 (1.67)	42 (17.50)	189 (78.75)	2 (0.83)	2 (0.83)	132 (55.00)	49 (20.42)	55 (22.92)
24th	2 (0.83)	3 (1.25)	8 (3.33)	48 (20.00)	179 (74.58)	2 (0.83)	2 (0.83)	136 (56.67)	27 (11.25)	73 (30.42)
25th	1 (0.42)	2 (0.83)	14 (5.83)	79 (32.92)	144 (60.00)	3 (1.25)	5 (2.08)	142 (59.17)	44 (18.33)	46 (19.17)

Figures in parenthesis indicate percentage of the respondents
HUF: Highly unfavourable, UF: Unfavourable, N: Neutral, F: Favourable, HF: Highly favourable

Technological Statement 4: Regional trainings organized by the University/outreach centres enables trainees to adopt new practices and technologies at the local level (+): Table 1 showed that about 46.67 percent of beneficiaries were having favourable attitude toward statement 4, followed by beneficiaries (45.84%) who had highly favourable attitude. In case of non-beneficiaries, the majority (65.83%) were having a neutral attitude towards the statement. The University has its outstations at Bathinda, Tarn Taran, SAS Nagar, Hoshiarpur and Barnala in the form of KVKs and RRTCs. These outstations regularly organize different training programs to cater the needs of local farmers. However, at times, only a single expert is available at these outstations, leading to an excessive workload. Additionally, experts are not always accessible, which could contribute to the unfavourable attitude of the beneficiaries (Patel *et al*., 2017) [3].

Technological Statement 5: The University Pashu Palan Mela (PPM) is beneficial to have glimpses of a variety of technologies at a single place (+): Table 1 showed that the majority of beneficiaries (58.33%) were having highly favourable attitude towards statement 4, followed by favourable (35.41%) and neutral (4.58%) attitude. The Veterinary University organizes Pashu Palan Mela (PPM) twice a year (one in month of March other in September) to showcase all the relevant technologies and knowledge at a single platform. Nevertheless, a few beneficiaries held an unfavourable attitude toward the statement, possibly because they were unable to locate the expert/ services or the expert was occupied when they visited the required stall.

Technological Statement 6: The University Pashu Palan Mela helps in providing the technical inputs developed by the University experts (+): Table 1 depicted that the majority of beneficiaries (62.50%) had a highly favourable attitude towards statement 6, followed by favourable (31.26%) and neutral (4.58%) attitude, respectively. The Pashu Palan Mela, organized by the University, offers various technical inputs developed by different departments, including mineral mixture, oral magnet for animal feeding, value-added dairy products, uromin lick, bypass fat, and publications/ literature in Hindi, English, and Punjabi. Disagreement with this statement might be due to the non-availability of inputs due to exhaustation of stocks.

Technological Statement 7: Participating in the University Pashu Palan Mela, visitors gain social recognition and have the opportunity to meet with other progressive farmers (+): Table 1 indicated that the majority of beneficiaries (61.67%) had a highly favourable attitude towards the given statement, while 32.50 percent expressed a favourable attitude. Additionally, 4.17 percent were neutral, with the remaining beneficiaries exhibiting highly unfavourable (1.25%) and unfavourable (0.42%) attitudes. Among non-beneficiaries, the majority of respondents (54.17%) held a neutral attitude toward the statement. The word "mela" originates from the Sanskrit term "mēlā", which means "gathering," "meeting," or "assembly." Pashu Palan Mela organized by the University provides a platform where one can interact with scientists, other farmers, companies people etc. to gain the desired knowledge. In the present study, few beneficiaries exhibited an unfavourable attitude toward the statement because they might be unable to locate the desired information/ stall.

Technological Statement 8: The University/ outreach centre's Animal Welfare Camps (AWCs) are beneficial to the farmers in awareness about proper management of diseases and First-Aid at the village level (+): Table 1 indicated that nearly half of the beneficiaries (49.58%) displayed a favourable attitude towards this statement. Among non-beneficiaries, the majority of respondents (61.67%) were neutral. The University organizes Animal Welfare Camps (AWCs) either on the demand or as per need of the area to create awareness as per topics or the lectures (Singh *et al*., 2019). AWCs are not the treatment type of camps, here the focus is mainly on knowledge dissemination. This might be the reason why some respondents showed unfavourable attitude towards this statement.

Technological Statement 9: In University/ outreach centre's animal welfare camps, farmers are made aware of the recommended animal health practices (+): Table 1 showed that half of the beneficiaries (50.83%) had a favourable attitude toward statement 9, followed by 38.75 percent with a highly favourable attitude. A neutral attitude was observed in 4.17 percent of respondents, while 4.58 percent and 1.67 percent expressed unfavourable and highly unfavourable attitudes, respectively. Some beneficiaries did not receive needed information or detailed information about specific animal health practices. This could be why they did not agree with the current statement.

Technological Statement 10: Camps organized by the University/ KVK/ RRTC help in the easy dissemination of knowledge and technical inputs developed by the University (+): Table 1 revealed that the majority of beneficiaries (65.00%) had a highly favourable attitude towards statement 10, followed by 28.75% with a favourable attitude and 5.00 percent were neutral. A small percentage had highly unfavourable (0.42%) and unfavourable (0.83%) attitude, respectively. Among non-beneficiaries, 62.50 percent were neutral, 19.58 percent had favourable attitude, and 15.83 percent had a highly favourable attitude, while only few

respondents expressed an unfavourable (1.25%) and highly unfavourable (0.84%) attitude, respectively. The University has three KVKs in Barnala, SAS Nagar, and Tarn Taran districts, along with two RRTCs in Hoshiarpur and Bathinda districts. The University and its outstations organizes various camps which help in the easy dissemination of knowledge and technical inputs developed by the University in every part and corner of the state. However, challenges such as the lack of availability of experts at the camps, along with the absence of beneficiary farmers in the camp, may have led to some beneficiaries forming an unfavourable attitude towards the statement.

Technological Statement 11: Interventions provided in the Village adoption program help in improving the productive, reproductive performance of the livestock (+): Table 1 indicated that most beneficiaries (82.50%) had a highly favourable attitude toward statement 11, with 12.08 percent showing a favourable attitude. Additionally, 3.75 percent and 1.67 percent of respondents had highly unfavourable and unfavourable attitudes, respectively. Interestingly, none of the beneficiaries were neutral about the statement. Adoption of villages is a regular feature of the University and its outstations. Technical knowledge and input services are provided in these adopted villages to enhance the productive and reproductive performance of the livestock. However, the absence of beneficiary farmers on the day of the distribution of technical inputs may have contributed to some beneficiaries developing an unfavourable attitude towards the statement.

Technological Statement 12: University Facebook page (Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana & Gadvasu Pashu Palan Sandesh) enables farmers to learn about the latest technologies of the University (+): Table 1 revealed that most of the beneficiaries (49.16%) had a highly favourable attitude towards statement 12 whereas, 33.75 percent had favourable attitude and 11.67 percent were neutral. The remaining 3.75 percent and 1.67 percent had either a highly unfavourable or unfavourable attitude, respectively. Among non-beneficiaries, about 67.50 percent were neutral. The use of social media for various purpose is all time high. To exploit the potential University also started various social media platform. The University has 2 Facebook pages for farmers namely, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (having > 9000 followers) and Gadvasu Pashu Palan Sandesh (having > 5000 followers). These Facebook pages do not promote the treatment aspect, so this might be the reason some beneficiaries displayed unfavourable attitude towards given statement.

Technological Statement 13: WhatsApp groups created by the University/ outreach centres are fastest way to exchange information among group members (+): Table 1 showed that 60.00 percent of beneficiaries had a highly favourable attitude towards the statement 13, whereas 27.08 percent of beneficiaries had a favourable attitude. Furthermore, 11.26 percent expressed no opinion, while the remaining individuals either had very unfavourable (0.83%) or highly unfavourable (0.83%) attitude, respectively. The majority of non-beneficiaries (68.75%) had a neutral attitude. WhatsApp groups are created mainly to share knowledge-based information, the latest technologies, the latest interventions, or technical inputs developed by the University. But as these WhatsApp groups are developed by farmers only, so sometimes unnecessary messages also come in these groups. This might be the reason some beneficiaries showed an unfavourable attitude towards this statement.

Technological Statement 14: The University YouTube channel (GADVASU extension services) provides the latest information to farmers in the shortest possible time (+): Table 1 indicated that most beneficiaries (48.75%) had a highly favourable attitude toward statement 14. Among non-beneficiaries, the majority of the respondents (70.42%) were neutral, followed by 17.08 percent of beneficiaries with a favourable attitude. University has started its Youtube channel namely “GADVASU extension services” in 2020. Till now it has 130 videos, >5k subscribers and content uploaded were viewed by 1.5 lakh people.

Technological Statement 15: The University's Facebook and YouTube channels are more farmer-friendly as they provide information in the local language (+): According to Table 1, most of the beneficiaries (44.58%) exhibited favourable attitude towards statement 15, whereas 43.75 percent beneficiaries demonstrated a highly favourable attitude. The University's social media platforms, including its YouTube channel and Facebook page, also share information in the local language (Punjabi), making it more accessible and easier for all farmers to understand. This approach enhances their farmer-friendly nature.

Technological Statement 16: The use of University/ outreach centre’s ICT tools by farmers are challenging (-): Table 1 indicated that 45.83 percent of beneficiaries had unfavourable attitude toward statement 16, followed by respondents (25.00%) who had highly unfavourable attitude. The University has introduced several mobile apps, which are available on the Play Store. However, farmers often struggle to locate the University’s specific apps in Play Store due to the abundance of options, and some find these apps difficult to use. Additionally, the university's social media platforms pose challenges for illiterate farmers. These issues might explain why some respondents agreed with the given statement.

Technological Statement 17: Using the dedicated University/ outreach centre’s Farmer helpline number, any query of the farmer can be answered over the phone. (+): Table 1 showed that around 63.00 percent of beneficiaries had a highly favourable attitude towards the statement 17, while 30.00 percent of beneficiaries had a favourable attitude. Furthermore, 2.92 percent expressed no opinion, while the remaining individuals either had unfavourable (2.50%) or highly unfavourable (1.67%) attitude. The majority of non-beneficiaries (55.83%) had a neutral attitude. The University has started its farmer helpline no. (0161-2414005, 2414026). The farmers ask different queries on various aspects. The University has also been receiving calls from distant areas like Haryana, U.P, Bihar, H.P and M.P. Sometimes experts (or call recipients) may be unavailable to take calls from farmers, or the call recipients may transfer the call from one expert to another. These factors could contribute to beneficiaries developing an unfavourable attitude toward this statement.

Technological Statement 18: University/ KVK websites are helpful to farmers to get the latest updates (+): Table 1

indicated that most beneficiaries (43.75%) had a favourable attitude toward statement 18, while 38.33 percent depicted highly favourable attitude. The University has a sublink namely "Farmer Portal" on the main website where information related to various schemes, digital management, advisory, selected articles etc. are available for farmers.

Technological Statement 19: Use of University/ outreach centre's ICT tools enhances transfer of technology and adoption (+): Table 1 revealed that the majority of beneficiaries (52.50%) had a favourable attitude towards statement 19, further followed by highly favourable (42.50%) and neutral (2.50%) attitude towards this statement, respectively. A small percentage had highly unfavourable (1.25%) and unfavourable (1.25%) attitude, respectively. Some respondents believe that ICT tools can be habit-forming or addictive, which could explain why some beneficiaries displayed an unfavourable attitude toward this statement.

Technological Statement 20: By receiving livestock-based information through the University/ outreach centre's ICT services, farmers are able to save their time (+): Table 1 showed that the majority of beneficiaries (52.50%) had a highly favourable attitude toward statement 20, further 42.08 percent expressed a favourable attitude. Additionally, 2.92 percent were neutral, with the remaining respondents showing highly unfavourable (1.25%) and unfavourable (1.25%) attitudes, respectively. Among non-beneficiaries, the majority (56.67%) held a neutral attitude toward the statement.

Technological Statement 21: Farmer's feedback is faster through University/ outreach centres ICTs tools and applications than traditional methods (+): Table 1 showed that nearly half of the beneficiaries (51.25%) had a favourable attitude toward this statement. ICT tools are quick methods for knowledge dissemination and feedback. The Veterinary University is trying its best to reach the unreached farmers through developing/ strengthening its different ICT tools.

Technological Statement 22: Information through University/ outreach centres ICT tool is not as effective as face-to-face extension (-): Table 1 showed that about 58.33 percent of beneficiaries were having an unfavourable attitude toward statement 22, followed by respondents (30.83%) who had a highly unfavourable attitude, about 2.92 percent were having a neutral attitude, rest 5.83 percent and 2.08 percent beneficiaries had a favourable and highly favourable attitude, respectively. In the case of non-beneficiaries, the majority of respondents (60.83%) had a neutral attitude towards the statement. Few beneficiaries prefer traditional or face-to-face extension methods (trainings, surveys, demonstrations, exhibitions etc.) as compared to ICT tools. Therefore, they agree with the given statement.

Technological Statement 23: Farmers benefit from the sale of the University publications/ literature because it provides them with the most recent reliable information and raises awareness (+): Table 1 indicated that the majority of beneficiaries (78.75%) had a highly favourable attitude toward statement 23, while 17.50 percent expressed a favourable attitude. It is worth mentioning here that the University has published around 30 books (in English, Hindi and Punjabi language) on different aspects of livestock and is regularly publishing a monthly magazine "Vigyanak Pashu Palan" in Punjabi language. Preety (2022) [4] conducted a study to evaluate the reasons behind respondents' subscription to the "Vigyanak Pashu Palan" magazine. The findings revealed that the majority of respondents (62.50%) subscribed primarily to gain knowledge and increase awareness.

Technological Statement 24: The production parameters such as daily milk yield, peak yield, and animal lactation length are improved by the University mineral mixture feeding (+): Table 1 showed that the majority (74.58%) of beneficiaries had a highly favourable attitude towards given statement, while 20.00 percent of beneficiaries had a favourable attitude. Jadoun *et al*. (2023) [1] conducted a study in Punjab to examine the impact of mineral mixture (Area Specific Mineral Mixture of the University) supplementation on the productive and reproductive performance of buffaloes under the Farmer FIRST Project (FFP). The research revealed a significant (p<0.05) improvement in the average daily milk yield, peak milk yield, and total lactation yield, which increased from 8.53 litres, 12.68 litres, and 2537.60 litres to 9.14 litres, 13.32 litres, and 2664.53 litres, respectively, in buffaloes supplemented with the mineral mixture.

Technological Statement 25: Uromin lick provided by the University enhances milk production by restoring nutrient deficiency (+): Table 1 showed that the majority of beneficiaries (60.00%) were having a highly favourable attitude toward given statement. Nimbalkar *et al*. (2022) [2] investigated the impact of adopting Uromin-lick (UML)/ Urea-Molasses Multinutrient Block (UMMB) technology across six districts in Punjab. The study found that the average daily milk yield per animal increased by 0.861 litres among the UMMB technology adopter farms (TAF).

Overall attitude of respondents regarding various technological statements

A glimpse of table 2 indicated that the majority of beneficiaries (81.67%) had a highly favourable attitude towards various technological statements, and 16.25 percent of beneficiaries had a favourable attitude. Interestingly, only 2.08 percent of beneficiaries had an unfavourable attitude towards various technological statements. In the case of non-beneficiaries, most of the respondents (52.50%) had unfavourable attitude towards different technological statements, followed by favourable (32.92%) and highly favourable (14.58%) attitude for given technological statements.

Table 2: Categorization of respondents on the basis of their overall attitude of regarding various technological statements

Categories	Beneficiaries (N=240)	Non-beneficiaries (N=240)	"T" Value
Unfavourable (0-33)	5 (2.08)	126 (52.50)	41.55**
Favourable (34-66)	39 (16.25)	79 (32.92)	
Highly favourable (67-99)	196 (81.67)	35 (14.58)	
Mean ± S.E	78.60 ± 0.79	32.23±1.62	

** Significant at p<0.01

Conclusion

The study clearly demonstrates that livestock-based technological services delivered by GADVASU and its outreach centres have created a highly positive attitude among beneficiary dairy farmers in Punjab. Regular trainings, exposure visits, Pashu Palan Melas, animal welfare camps, ICT-based advisory services, and the supply of technical inputs have enhanced farmers' awareness, skill levels, and trust in university-led extension initiatives. Conversely, the predominance of unfavourable attitudes among non-beneficiaries reflects limited exposure to and participation in these services, underscoring the need to further expand outreach coverage. Although overall responses were favourable, farmers reported concerns related to inadequate post-training follow-up, occasional non-availability of experts or technical inputs, and difficulty in using ICT tools, particularly among less-literate farmers. Addressing these gaps through strengthened field-level engagement, improved expert accessibility, user-friendly digital platforms, and enhanced feedback mechanisms would further improve farmer satisfaction and adoption of technologies. Overall, the findings reaffirm that a strong, farmer-centric university extension system plays a crucial role in promoting scientific livestock practices and improving productivity and livelihoods in the dairy sector. Scaling up such interventions, particularly among non-beneficiary farmers, will contribute significantly to sustainable livestock development in Punjab.

Acknowledgement

Vice chancellor, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab for providing all necessary facilities and in connection with this research work and support form veterinary officers, extension officers, veterinary inspectors and key stakeholders and dairy farmers is duly acknowledged.

Declarations

Fundings

The author(s) received no specific funding for this work.

Conflict of interest / Competing interests: The author declare no conflicts of interest

Financial Support

Not available

Reference

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How to Cite This Article

Verma K, Singh J. Attitude of beneficiary and non-beneficiary dairy farmers toward university-based livestock technological services in Punjab. International Journal of Veterinary Sciences and Animal Husbandry. 2025;SP-11(1):49-54.