



Research Article

Livestock Farmers' Interaction with Punjab Livestock Department: A Study of Field Services and Outreach Programs

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Abstract | In Punjab, Pakistan, raising livestock is an essential part of agriculture and has a big impact on rural livelihoods and long-term economic viability. This study examines the effectiveness of extension programs and the use of field services in two important areas (districts) namely Muzaffargarh and Rahim Yar Khan. Four hundred (400) farmers were interviewed using purposive sampling, and the key results show that vaccination services are widely used, as reported by 91.7% of respondents for hemorrhagic septicemia, 89.5% for foot and mouth disease, and 82.7% for black quarter. However, only 0.8% of respondents asked for help with animal feeding and 10.5% had questions about diseases, indicating that the use of helplines is still not optimal. Merely 8% and 4.5% of participants reported using extension services namely hoarding notices and monthly informational booklets, respectively. Satisfaction levels with these services are generally low, indicating areas for improvement in service delivery and communication strategies to better support livestock farmers in Punjab. There is a need to increase awareness about available field services and enhance accessibility and responsiveness of helpline services. Strengthening relationships among stakeholders through various extension programs will benefit the livestock farming community.

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Introduction

Livestock farming is a vital and fast-growing agricultural subsector in Punjab, contributing to sustainable income generation and showing increasing sustainability over time due to productive stock and ecological improvements (Subash and Kaur, 2017). It provides additional income and economic stability to farming systems in Punjab, especially in rainfed and

sub-mountainous zones, where it is an integral part of the production system (Rana and Kataria, 2016). Small and medium-sized dairy farmers in Punjab, who make up a significant portion of the agricultural sector, face challenges in milk marketing and pricing, indicating a need for improved policies and awareness (Brar et al., 2017). Livestock development has a poverty-alleviating impact in Punjab, suggesting that sector growth can contribute to more equitable

income distribution and rural economic activity. The rural non-farm sector in Punjab is growing due to the agricultural crisis, with many households seeking livelihoods outside of traditional farming, including in livestock management (Vatta and Garg, 2008). During the fiscal year 2023, the livestock sector became the primary contributor to agriculture, constituting around 62.68% of the agriculture value added and 14.36% of the national GDP. Improved livestock management and technological uptake, such as better dairy livestock significantly increase the profitability of small-scale dairy farms in Punjab. Extension services that employ a whole-family approach and use various information transfer media, including group discussions and practical demonstrations, lead to higher awareness, knowledge, adoption rates and perceived benefits among smallholder dairy farmers (Cain *et al.*, 2007; Warriach *et al.*, 2019). Access to extension services, formal credit and adaptive practices like improved stock breeding and ethno-veterinary practices are positively associated with the resilience of pastoral households against climate change shocks (Ahmad and Afzal, 2021). Information needs and seeking behavior of dairy farmers in Punjab indicate a significant relationship with factors such as experience in dairy farming and membership in related organizations, suggesting the potential role of cyber extension in the future (Singh, 2015). Synergy between livestock farmers and the Livestock Department is demonstrated through the promotion of integrated crop-livestock systems that not only contribute to the sustainability of agriculture but also provide social and economic benefits to communities (Martin *et al.* 2016). These systems are supported by policies and technologies that aim to optimize resource use and minimize environmental burdens, ultimately leading to a more resilient and productive agricultural sector (Said, 2021). Collaborations in livestock farming can lead to innovative and sustainable solutions, but they do not guarantee the practical implementation of these concepts due to higher production costs and complex agricultural policies. Knowledge exchange between farmers, policymakers and researchers is crucial for navigating towards more sustainable agriculture and pioneers in this field should be supported to overcome market and regulatory challenges (Olde *et al.*, 2017).

This study seeks to investigate the nature and scope of livestock farmer interaction with the Punjab Livestock Department, with a particular emphasis on field services

and outreach activities. This study aims to uncover significant elements influencing the effectiveness of farmer-extension service provider partnerships by analyzing livestock farmers' experiences, views, and preferences, as well as the viewpoints of Livestock Department officials. The study's goal is to offer useful insights and recommendations for enhancing the delivery and adoption of livestock extension services in Punjab by conducting a thorough investigation of these parameters.

Methodology

Punjab province

Punjab is a key province in agriculture, with 4.20 million hectares of cultivated areas. Important crops in Punjab include wheat, rice, cotton, sugarcane, bajra, jawar, maize, sesamum, gram, barley, rapeseed, mustard, and tobacco (Government of Punjab, 2024). Livestock is a subsector of agriculture, and Punjab leads in this sector with a population of 73,677,851 individuals. Cattle and buffalo are two key animals in Pakistan, considered globally significant as the major portion of milk production in the country comes from them. Nili, Ravi, Nili-Ravi, Azi-Kheli (or Azakhale), and Kundhi are prominent buffalo breeds, whereas Sahiwal, Red Sindhi, Cholistani, Achai, Tharparker, crossbred animals, and some exotic breeds are prominent cattle breeds in Pakistan. The Development Department is working hard to improve the production status of livestock farmers in the Province. The department has more than 9,000 motorcycles loaded with medical kits, 347 mobile veterinary dispensaries, 9 mobile veterinary training schools, 44 mobile veterinary laboratories, digitally linking through ICT-based 9211 Virtual Governance System, and over 9,000 veterinary and para-veterinary staff. All districts of Punjab have a large number of livestock, and farmers heavily rely on livestock for their income (Government of Punjab, 2024).

Selection of the study area

Punjab province consists of 36 districts. Initially, it was decided to select two districts using a simple random sampling technique from the total 36 districts, as all districts have livestock. However, it was later decided not to use a simple random sampling technique for district selection, as the selected district might have a small number of animals. This limitation led the researcher to utilize a purposive sampling technique for district selection. The objective was to select

districts with the maximum numbers of animals. Therefore, two districts of Punjab (Rhim Yar Khan and Muzaffargarh), which have the highest number of cattle and buffalo, were chosen as the study area for the research. In Muzaffargarh important cattle breed is Sahiwal and in buffalo is Nili-Ravi. The total number of livestock in the district is 5,346,080 and the number of cattle and buffalo are 1,272,637 and 665,822 respectively, more than any other district. In Rahim Yar Khan important livestock cattle breed is Cholistani, in camel Maricha and in sheep Khadli Sheep. A huge number of buffalo are also found there. The total number of livestock in the district are 3,776,314 and the number of cattle and buffalo are 760,084 and 691,022 respectively, more than any other district after Muzaffargarh (Government of Punjab, 2024).

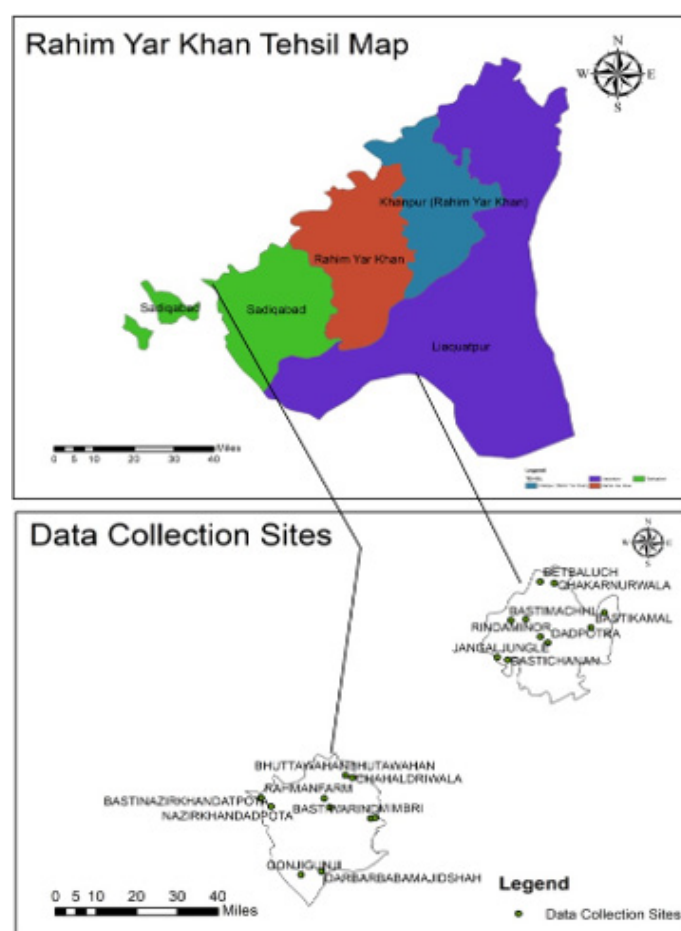


Figure 1: *Rahim yar khan selected tehsil and village map*

Sampling procedure

Two districts of the Punjab province of Pakistan were chosen for the study at the outset, as was previously mentioned with the selection rationale. Rahim Yar Khan and Muzaffargarh each have four tehsils, or sub-districts. Two tehsils were chosen at random from each district for the second stage. Liaquatpur

(25 Union Councils) and Sadiq Abad (29 Union Councils) tehsils from Rahim Yar Khan District, as well as Muzaffargarh Alipur (20 Union Councils) and Kot Addu (28 Union Councils) tehsils, were chosen at random. Five union councils (only rural) were chosen at random from each chosen tehsil (a total of 20 UC) at the third sample step. Two villages were chosen from each union council in the fourth stage, for a total of 40 villages, as shown in Figure 1 and Figure 2. The map created with the aid of Arc Gis 10.3.1 program shows several communities in the four chosen tehsils. With the assistance of progressive farmers and local leaders, a benchmark survey was carried out in order to choose the final sample. This benchmark study produced a list of 3808 livestock farmers. The researcher uses this list as a sample frame. A straightforward random sample method was used to choose ten livestock farmers from each hamlet. 400 farmers were chosen as a sample in this manner. Figure 3 provides a detailed illustration of the sampling process.

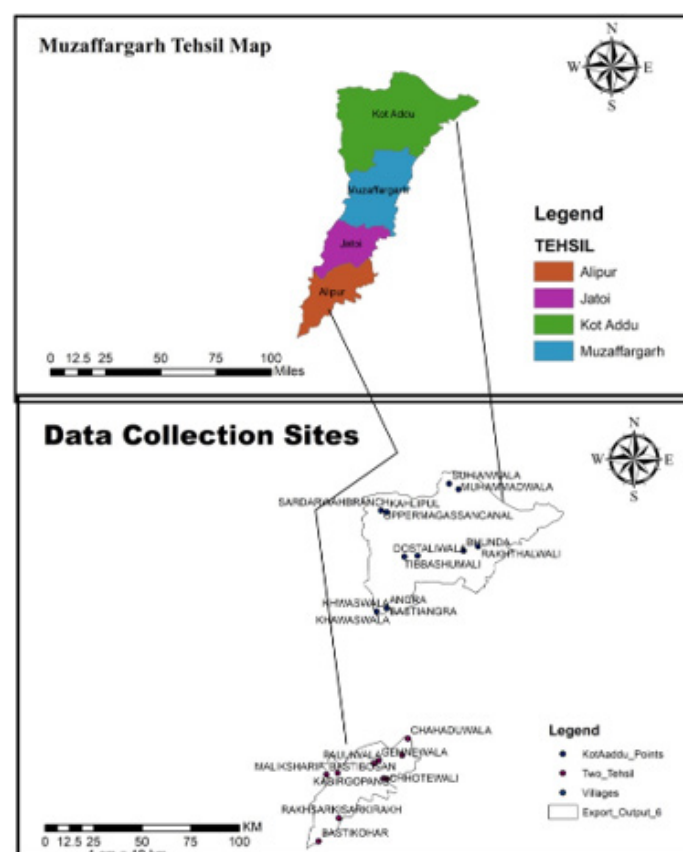


Figure 2: *Muzaffargarh selected tehsil and village map*

Results and Discussion

Demographic profile of surveyed respondents

Table 1 indicates that majority of responders (43.3% of the sample) are old. The mean age of respondents

is 44.1 years with a standard deviation of 9.29. Respondents' education levels range widely, from complete illiteracy to higher education. The mean years of education for respondents is 7.4, with a standard deviation of 2.91. The majority of respondents (34.8%) received a primary education, followed by middle education (12.2%). Family sizes range, with the majority having 5 to 10 individuals (53.8%). The vast majority of farmers (65.0%) own less than 12.5 acres of land. Mean values and standard deviations for land sizes are provided for each category, reflecting the variability in land holdings among respondents. Respondents' experience in livestock farming ranges from less than 5 years to above 15 years. The highest proportion of respondents have 5 to 10 years of experience (38.5%).

Table 1: Demographic profile of respondents

Demographic profile of respondents		F	%	$\bar{x}$	SD
Age	Young (≤ 30 years)	68	17.0	44.1	9.29
	Middle (> 31 to ≤ 50 years)	159	39.8		
	Old (> 50 years)	173	43.3		
Education	Absolute illiterate	83	21.0	7.4	2.91
	Can read or write (but no proper schooling)	18	4.5		
	Primary	139	34.8		
	Middle	49	12.2		
	Secondary	39	9.8		
	Higher secondary	47	11.8		
	Graduation	20	5.0		
	Above graduation	4	1.0		
Family size	Less than 5 members	114	28.5	8.3	3.98
	5 to 10 members	215	53.8		
	Above 10 members	71	17.7		
Land size	Landless farmers	52	13.0	4.9	1.45
	Small farmers (less than 12.5 acres)	260	65.0		
	Medium farmers (12.5 to 25 acres)	71	17.8		
	Large farmers (above 25 acres)	17	4.3		
Livestock experience	Less than 5 years	18	4.5	12.7	3.56
	5 to 10 years	154	38.5		
	11 to 15 years	110	27.5		
	Above 15 years	118	29.5		

Field services to the livestock farmers

Punjab Livestock Department is providing field services to the livestock farmers for the betterment of farm animal and prosperity of the animal husbandry.

Table 2: Distribution of livestock farmers according to the field services

Field services to the livestock farmers	Experienced		Central tendency	
	f	%	$\bar{x}$	SD
Vaccination of hemorrhagic septicemia	367	91.7	3.64	1.369
Vaccination of foot and mouth disease	358	89.5	3.07	1.288
Vaccination of black quarter	291	82.7	3.02	1.627
Treatment of sick animal	197	49.3	1.80	1.027
Mobile vet services	122	30.5	1.71	1.229
Deworming against endo-parasites and ecto-parasites	173	43.3	1.60	1.088
Dehorning/ disbudding	82	20.5	1.53	1.169
Artificial insemination	107	26.7	1.50	.986
Castration of male animal	47	11.7	1.26	.833

Scale 1= Never, 2= Rarely, 3= Some Time, 4= Very Often, 5= Always

Table 2 regarding field services to the livestock farmers indicated that majority of the respondents have experienced nearly very often vaccination services for hemorrhagic septicemia (91.7%), foot and mouth disease (89.5%) and black quarter (82.7%). Rana *et al.* (2021) also reported that Farmers in Punjab, Pakistan, adopt coping strategies such as clean cattle shelter, vaccination and disease prevention, with vaccination being the most prominent service provided by the Punjab livestock department.

Vaccination of hemorrhagic septicemia was the leading services provided by the Punjab Livestock Department ($\bar{x}=3.64$) followed by the vaccination of foot and mouth disease ($\bar{x}=3.07$) and vaccination of black quarter ($\bar{x}=3.02$). Vaccination of livestock is a critical component of animal health management, particularly in regions like Punjab, Pakistan, where agriculture and animal husbandry are integral to the economy and livelihoods. Lyons *et al.* (2021) reported that economic analysis suggests that the control of foot-and-mouth disease (FMD) in Punjab's livestock through vaccination is a significant investment, with the majority of the cost attributed to vaccination efforts and sanitary measures. Increased vaccination

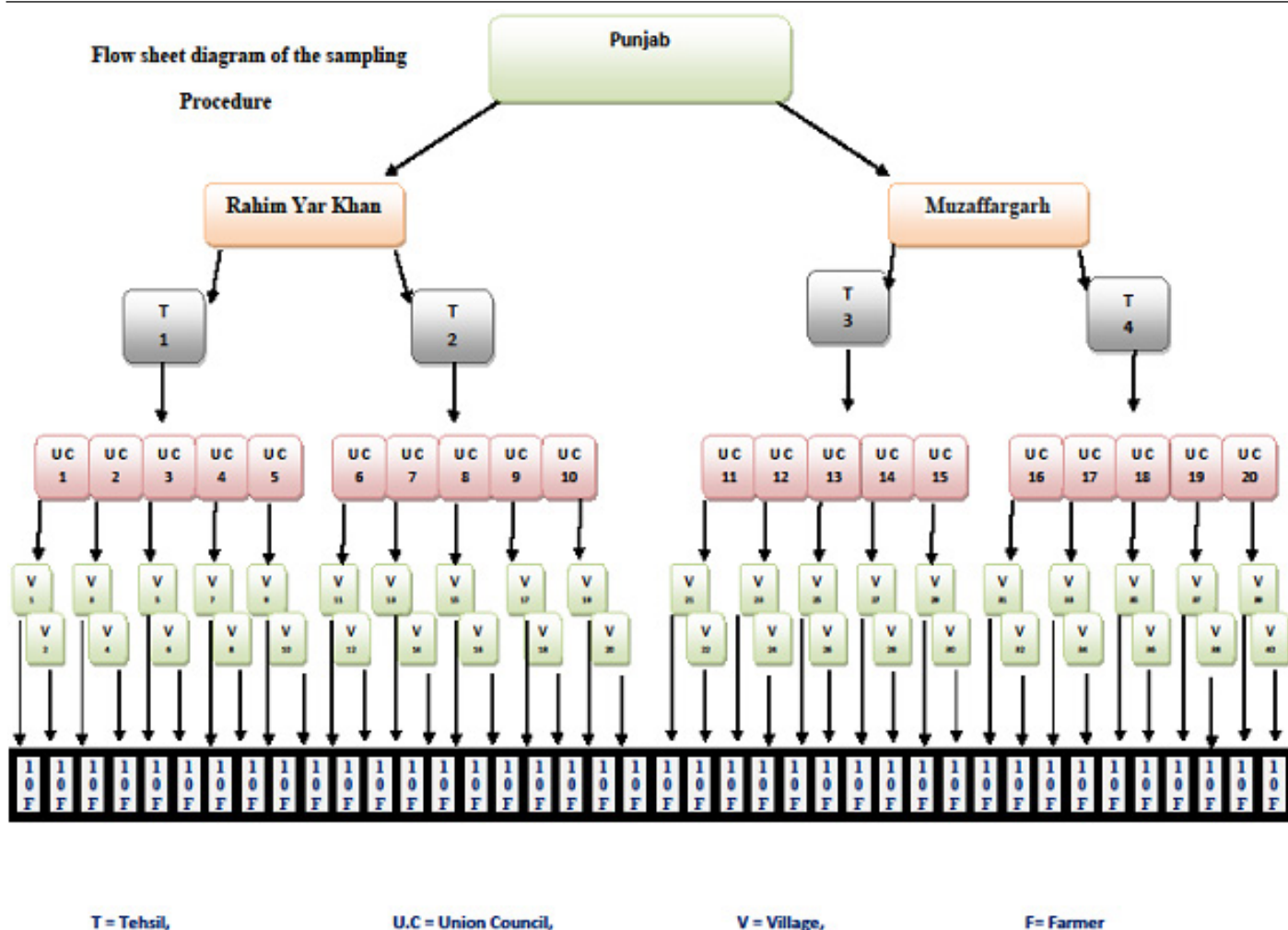


Figure 3: Flow sheet diagram for sampling procedure

coverage led to decreased outbreaks, diagnosed and death cases in sheep and goats, with benefits outweighing costs in both low and high incidence scenarios (Govindaraj *et al.*, 2019), but Farmers in Punjab Pakistan had poor knowledge about internal and external parasites and their damage to livestock was not recognized, leading to ineffective vaccination strategies (Rana, 2021). Lack of proper vaccination and poor management expose flocks to bacterial, viral and parasitic infections, leading to high mortality in lambs (22%) and adults (32%) (Jamal *et al.*, 2022). Other than the vaccination provision of other services like treatment of sick anima ($\bar{x}$ =1.80), mobile vet services ($\bar{x}$ =1.71), deworming against endo-parasites and ecto-parasites ($\bar{x}$ =1.60), dehorning/ disbudding ($\bar{x}$ =1.53), artificial insemination ($\bar{x}$ =1.50) and castration of male animal ($\bar{x}$ =1.26) were simply rare. The Punjab Animal Health Act 2019 (Act XXXII of 2019) provides for the welfare of animals, including holding, feeding and treatment necessary for their welfare. The Act also includes provisions for the prevention, control, containment and eradication of scheduled

animal diseases. Hussain *et al.* (2020) reported that during the pandemic, 71% of dairy farms in central Punjab, Pakistan, experienced a shortage of essential veterinary medications, hampering the treatment of sick animals. Furthermore Rana *et al.* (2021) expressed that High cost of semen and unskilled technicians are key obstacles in the effectiveness of artificial insemination in Punjab, Pakistan.

Table 3: Distribution of livestock farmers according to the queries through helpline

Queries through helpline	Asked		Central tendency	
	F	%	$\bar{x}$	SD
Weather	4	1.0	4.00	0.000
Animal feeding	43	10.8	3.21	0.709
Vaccination campaigns	38	9.5	3.02	1.570
Marketing	12	3.0	3.00	0.853
Diseased animal	42	10.5	2.26	0.767
Anti-Tick campaigns	42	10.5	2.17	0.908
Deworming campaigns	26	6.5	2.15	1.120

Scale 1= Very Dissatisfied, 2= Dissatisfied, 3=Neither, 4= Satisfied, 5= Very Satisfied

Queries through helpline

Queries made through helpline may include weather updates, animal feeding, vaccination campaigns, marketing, diseased animal, anti-tick campaigns and deworming campaigns.

Data presented in Table 3 regarding queries made by the farmers through help line indicate that farmers were not using it frequently. Near about 10% of the respondents used helpline number for Animal feeding (10.8%), Diseased animal (10.5%), Anti-Tick Campaigns (10.5%) and Vaccination campaigns (9.5%). Only 6.5% used for Deworming Campaigns and 3.0% for marketing and 1% for weather update. There might be couple of reason behind it, including unawareness of the helpline number, poor response from the department. Some farmers have mentioned that the call is not picked or the number is unreachable. Butt *et al.* (2022) has the perception that toll-free helpline numbers make it easier and more affordable for pet owners, especially those with limited financial resources, to access veterinary advice and services. Overall the services like vaccination and deworming is very low, Singh (2001) reported that deworming of animals was done only by 10.67% of farmers in Punjab, which may contribute to reproductive disorders. Irrespective of the how many people have made the queries, respondents were satisfied with the weather update ($\bar{x}=4.0$), while in case of animal feeding ($\bar{x}=3.21$), vaccination campaigns ($\bar{x}=3.02$) and marketing ($\bar{x}=3.0$) respondents were neither satisfied nor dissatisfied and respondents were dissatisfied with diseased animal ($\bar{x}=2.26$), anti-tick campaigns ($\bar{x}=2.17$) and deworming campaigns ($\bar{x}=2.15$). Overall use of helpline number and the service provided via helpline number was poor.

Extension services

Director Communication and Extension is delivering different types of extension services to the livestock farmers. These services may include hoarding signs, providing monthly *movaishi nama*, talk shows on TV and radio, counseling of livestock farmers, awareness regarding SMS, voice messages (Robo calls) through 9211 and farmer days/ high school focus program.

Table 4 regarding extension services rendered by the Director Communication and Extension is not experienced by the many respondents. Little less than one third of the respondents have experienced Talk shows on TV and radio (32.3%), counselling of

livestock farmers (29.8%) and awareness SMS, voice messages, robo calls, through 9211 (30.0%). There were only 8% respondents who have experienced to see sign boards installed by the Director Communication and Extension department, only 4.5% have received Providing monthly *movaishi nama*, a booklet for the guidance of the livestock farmers issued by the Director Communication and Extension department and only 2% respondents have experienced farmer day regarding livestock Husbandry. Malik, (2017) also reported that poor extension service (43.04%) is a major constraint faced by dairy farmers in the central zone of Punjab, Pakistan. Talk shows on TV and radio were the leading extension services experienced by the farmers and Kumar *et al.* (2016) also elaborated that farm telecast programs on television are effective in disseminating livestock information, with farmers preferring demonstrations by scientists, phone-in-live sessions, straight talk by scientists and inclusion of success stories. Irrespective how many respondents have experienced these extension service, the satisfaction level was not so pleasing as not a single service was rated as very satisfied or satisfied. Reported results give a picture of nearly dissatisfied with the services like Awareness SMS, voice messages, robo calls, through 9211 ($\bar{x}=2.89$) and farmer days/ high school focus program ($\bar{x}=2.38$).

Table 4: Distribution of livestock farmers according to the extension service

Extension service	Experienced		Central tendency	
	F	%	$\bar{x}$	SD
Hoarding signs	32	8.0	3.63	1.431
Providing monthly <i>movaishi nama</i>	18	4.5	3.33	1.455
Talk shows on TV and radio	129	32.3	3.26	1.330
Counselling of live-stock Farmers	119	29.8	3.21	1.383
Awareness SMS, voice messages, robo calls, through 9211	120	30.0	2.89	1.494
Farmer days/ high school focus program	8	2.0	2.38	.518

Scale 1= Very Dissatisfied, 2= Dissatisfied, 3=Neither, 4= Satisfied, 5= Very Satisfied

Conclusions and Recommendations

The study concludes by shedding light on the

complex dynamics of interactions between livestock farmers and the Punjab Livestock Department and emphasizing the vital role that outreach initiatives and field services play in assisting rural livelihoods. Although vaccinations against major livestock diseases are often used, there is a noticeable disparity in the availability of other vital services, like support with helplines and the treatment of sick animals. Additionally, extension services are underutilized and have low ratings that highlighted the need for better methods of educating the public and helping farmers. Policymakers may support the community of livestock farmers in Punjab, Pakistan, by tackling these issues and improving the efficiency and accessibility of services.

Novelty Statement

This study provides an empirical district-level comparison from southern Punjab to simultaneously quantify livestock farmers' utilization, satisfaction, and gaps across vaccination services, field extension tools, and helpline outreach of the Punjab Livestock Department. It reveals a critical mismatch between high clinical service uptake and weak advisory and communication engagement.

Author's Contribution

Hafiz Amjad Ali Rana: Conceptualization, conducted research

Muhammad Usman: Prepared draft paper

Muhammad Shahzad: Coding and Data Analysis

Muhammad Luqman: Finalized the paper

Muhammad Yaseen: Data curation, writing

Moula Bux Peerzado: Review and editing

Generative AI or AI assisted technology statement

No AI or AI Assisted Technology has been used for this manuscript.

Conflict of interest

The authors have no conflict of interest.

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