



Research Article

Prioritizing the Training Needs of Extension Field Staff regarding Professional Development in Punjab, Pakistan

Syed Mufeed Hadi Naqvi* and Raheel Saqib

Department of Agricultural Extension, Education and Communication, The University of Agriculture Peshawar, Pakistan.

Abstract | Pakistan being an agricultural country depends on its agricultural production; it contributes 24.0% to GDP and provides employment to 37.4% of the labor force. Professionalism is the major competency for Extension Field Staff, particularly sub-competencies of work ethics and activities. These sub-competencies build the foundation of effectiveness, efficiency and impact on cotton growers at large farming community. Extension Field Staff must sustain the highest standard of ethics while interacting the farming community, stakeholders and colleagues. Professionalism in work activities is related to being punctual and responsive. Continuous advancements in agricultural technology and growing needs of farming community requires professional development of EFS for enhancing their skill set. Despite the recognized importance, there is limited evidence on the specific training needs of EFS in Punjab. It is required to identify and prioritize these needs for designing specific capacity-building programs. By addressing this gap, present study prioritized the trainings required for EFS regarding professional development needs which helps in improving extension services and sustainable agriculture. Multistage sampling technique was used to drawing the samples from population. A sample of 359 respondents were selected from population of 540 with the help of Cochran sampling technique. By using proportional technique, 151 EFS from Rahimyar Khan, 67 EFS from Bahawalpur, 72 EFS from Bahawalnagar, 52 EFS from Multan and 17 EFS from Rajanpur districts of different agro-ecological zones were selected as respondents. Results of study indicate that most (43.5 %) of the respondents were young comes in age group of 20-35 years. Majority (82.2%) of the extension field staff had diploma in agriculture while small number (2.5%) of the respondents had doctorate of Philosophy (Ph.D.) in agriculture. Majority (82.7%) of the respondents served as field assistants in their allocated area/village and 61.8% of the respondents had experience of up-to 15 years in performing extension activities while small number (7.2%) of the respondents had experience of above 30 years regarding extension activities. Statements such as attending conferences related to better cotton production, in-service training programme related to better cotton production, and participation in professional meetings were ranked as 1st, 2nd, and 3rd most prioritized needed training area for professional development of extension field staff with the discrepancy score (DS) of 2.109, 2.061, and 2.026 respectively. Based on the findings, study suggests arrangement of regular in-service training programs and collaboration with agricultural universities for providing higher educational degrees may help in professional and personal development of the extension workers.

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*Correspondence | Syed Mufeed Hadi Naqvi, Department of Agricultural Extension, Education and Communication, The University of Agriculture Peshawar, Pakistan. Email: naqvi.mufeed@aup.edu.pk

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Keywords | Better cotton production, Competency based analysis, Discrepancy score, Pakistan



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Introduction

Agriculture is the major strength of country's economy and play important role in the nation's development. It provides food and fiber for the individual's consumption, input for the agro-based industries and output for the export, which help in foreign exchange. World population is increasing at an alarming stage and it is expected to be doubled up to 2050 (FAO, 2009). In this scenario, for fulfilling the food demand of the entire world population it is necessary to increase the food productivity up to 70-100% (Godfray *et al.*, 2010). In most of the countries, crop production is low due to unsuitable techniques and old methods being used in the sector of agriculture (NRC, 2011).

Pakistan being an agricultural country depends on its production; agriculture contributes 24.0% to Gross Domestic Product (GDP). It also provides employment opportunity to 37.4% of the labor force in the country. More than 65% of the Pakistani population depends on agriculture for their livelihood (GoP, 2024). Old traditional methods, non-adoption of latest agricultural technologies and poor farm management are some factors that affect the productivity of agriculture (Farooq *et al.*, 2007). Competent field staff can fill the gap in potential and existing production of crops.

In the modern age, when knowledge-based economies emerged it is required that workforce of the country must become more qualified and possess skills for performing their duties effectively and efficiently (Affero and Razali, 2013). Studies found that nowadays workforce had higher knowledge and skill set compared to the past years so, it is mandatory to keep it constantly updated and renew the skill set for sustainable growth (Yilmaz, 2024). Despite of these facts, speedy changes in technological knowledge,

methods of production and latest developments force those staff who already working to constantly update their knowledge and skill set (Özer, 2018). The extension officer's role in the development sector is very important they are responsible for delivering timely and latest technologies to the rural communities. Extension process serves an intermediary that facilitate stakeholders and essential economic actors for access to market information, capital, additional resources and technology. To accomplishing these tasks, it is necessary for them to be updated, more professional and had latest knowledge about different technologies used in agriculture sector (Izmi *et al.*, 2021).

The effectiveness and efficiency of a programme completely depends on different factors, competence of the staff serving as counselors, quality, support, and alignment of staff with the line departments (Tucker, 2020). Professional development opportunities for the staff plays an important role in driving engagement of staff, as they determine department is investing in its staff growth and career advancement (Calestin *et al.*, 2024). A survey conducted by linkedin (2021) found that majority of the people were willing to work efficiently if they determine that department or institute is investing in their professional development. Career advancement opportunities, trainings and mentorship helps staff members to enhance their skill set, obtain advanced knowledge and contribute more efficiently to accomplishing the goals set by the institute (Kyndt *et al.*, 2020). By providing pathways for professional development not only engages staff in various activities but helps in achieving the long-term goals set by the institute.

Extension field staff (EFS) serve as instructor to farming community, professional development of the instructor is a major component of any educational setup, deals with preparing and educating instructors to obtain the required competencies and skill set for

improving the quality of instructors in their training session to farming community (Vadivel *et al.*, 2021). A well-known phrase “continuing professional development” denotes to “intentional, continuous and systematic procedures and activities intended to boost instructors’ professional knowledge, skill set, attitudes so that in return they may increase the learning of farming community (Collins and O’Brien, 2003, p. 284). The professional development is a long-term process that is important in a dynamic need of society for competent, qualified and experienced field staff.

Continuing professional development is important for professionals to obtain and keep the essential information and skills for providing condition centered, efficient and effective advice (King *et al.*, 2021). Several past studies by Shang (2010) showed that professional development is a positive learning environment that positively influences trainings. Field staff keep learning, sharing information and creating resources for future development. It is fact that if staff members obtain the right resources, support and training, they become more effective, competent and inspires other professionals. Professional development can also be described as enhancing skills set, ability and knowledge of the staff member for improving their extension teaching methods that they used in serving farming community. It is a long-term process, which is essential in keeping updated about the latest changes and developments in extension teaching methods. There are different methods to professional development, through trainings degrees, courses and workshops but collaborative work in this process is most significant (Vadivel *et al.*, 2021).

Professionalism is the major competency for the Extension Field Staff, particularly the sub-competencies of work ethics and activities. These sub-competencies build the foundation of effectiveness, efficiency and impact on cotton growers at large farming community. Extension Field Staff must sustain the highest standard of ethics while interacting with farming community, stakeholders and colleagues. Maintaining Integrity, honesty, and transparency in the work included in this as information shared with farming community is accurate and unbiased. Commitment with their work and serving the farming community is central for the professionalism. EFS must prioritize the needs of the farmers and allocate their efforts and time to solve their problems and assist them in resolving the issues by disseminating information. Effective

communication is the main sub-competency of professionalism. EFS should communicate respectfully and provide clear information that farmers understand easily and build favorable environment for discussions.

Professionalism in work activities is related to being punctual and responsive. Extension staff must honor the appointments, promptly response the enquiries and meet deadlines within the farming community. Working collaboratively with colleague, stakeholders, experts of agriculture and local authorities can enhance the effectiveness of the extension activities. Good appearance and manners impart confidence in the farming community. Extension workers must dress properly, having professional behavior and maintain a manner of respect. By expressing and maintain these work activities and ethics, EFS demonstrate professionalism. They can earn trust and respect from the farming community and play their role significantly in the development and improving agricultural practices in the farming community especially for cotton growers.

Extension field staff plays an important role in distribution of latest technology and its application methodologies, innovative practices to the farming community, helps in increasing agricultural productivity and sustainability. For bridging the gap between research station and farming community EFS play crucial role. However, efficiency of extension services depends on skills level and competencies of EFS. Continuous Advancements in agricultural technology and growing needs of farming community requires professional development of EFS for enhances their skill set. Despite the recognized importance, there is limited evidence on the specific training needs of EFS in Punjab. It is required to identify and prioritize these needs for designing specific capacity-building programs. By addressing this gap, present study prioritized the trainings required for EFS regarding professional development needs which helps in improving extension services and sustainable agriculture. Study’ findings help extension department and organizations to develop competency-based modules that improves efficiency and performance of EFS and contributes in sustainable agriculture.

Materials and Methods

The study intended to prioritize training needs of ex-

tension field staff regarding professional development for enhancing cotton productivity in the Punjab Pakistan. Universe of study was Punjab province, which is second largest province of country by area and largest by population. In Punjab, almost 69.3 million people lives in rural areas and depends on agriculture for their livelihood (GoP, 2023). Punjab is divided in nine (09) administrative units called division, while fourteen agroecological zones on the basis of different climatic and agricultural conditions. Five districts (Multan, Rajanpur, Rahimyar Khan, Bahawalpur and Bahawalnagar) from different agroecological zones were selected purposively for the execution of present study. Map of the Punjab province with highlighted sampling sites presented as Figure 1.



Figure 1: Map of Punjab with highlighted sampling sites.

The extension field staff including agriculture officers, cotton inspectors and field assistants were the respondents of present study. Multistage sampling technique was used to drawing the sample from population. A sample of three hundred and fifty-nine (359) respondents were selected from the population of five hundred and forty (540) with the help of Cochran sampling technique at 95% of confidence level and 03% of confidence interval. By using proportional technique, 151 EFS from Rahimyar Khan, 67 EFS from Bahawalpur, 72 EFS from Bahawalnagar, 52 EFS from Multan and 17 EFS from Rajanpur districts of different agro-ecological zones were selected as respondents. Required data was collected by using well structured interview schedule consisting of open ended as well as close ended questions. Five-point Likert scale was used for collecting data regarding possessed and required competencies. Scale used was 1= very low, 2= Low, 3= Medium, 4= High, 5= Very High.

Before executing the actual survey, data collection instrument was pre-tested to ten (10) staff members. After discussion with experts of agriculture extension in light of pre-testing, necessary amendments were taken in instrument for getting proper information. The data collection techniques such as face-to-face interviews and telephonic interviews were used for collecting information from extension field staff. Cronbach's α test was used to check the internal consistency and reliability of research instrument. The value for Cronbach's α test was 0.929 which means it is reliable to execution and collecting information.

After the data collection, it was recorded in Microsoft excel and coded in Statistical Package for Social Sciences (SPSS) V. 25.0. Inferential as well as descriptive statistics was performed to analyze the data. Data regarding socio-economic variables was presented as counts and percentages while for prioritizing the needed competencies regarding professional development of extension field staff discrepancy score (DS) was calculated. Discrepancy score was calculated by subtracting mean of possessed competency from mean of required competency. Mathematically it is denoted as:

$$\text{Discrepancy Score (DS)} = \text{Mean of Required} - \text{Mean of Possessed}$$

The detail regarding dependent and independent variables under consideration in present study are mentioned in Table 1.

Table 1: Dependent and independent variables of the study.

Dependent Variable	Independent Variables
Required competency of extension field staff regarding professional development	Possessed competency of extension field staff regarding professional development
	Age of the respondents
	Education of the respondents
	Designation of the respondents
	Job Experience of the respondents

Results and Discussion

Age of the Respondents

Age is a vital attribute that affects the decision/response of an individual during his/her span of life and activities. Intellectual decision making as well as

discussions also depends on age. The young person showed a more adoptive response toward latest technologies and application methodologies as compared to older ones (Basant, 1988; Tsur *et al.*, 1990).

Results of study indicate that most (43.5 %) of the respondents were young comes in age group of 20-35 years while one-third (38.2 %) of the respondents comes in age group of 36-50 years (Table 2). The results further showed that one-fifth (18.4 %) of the respondents were old having age above 50 years. Results of the study are similar with Khan (2012) who also disclosed that 38 % of the respondents comes under the age group of 35-45 that were middle aged.

Table 2: *Distribution of respondents regarding age.*

Age (Years)	Frequency	Percent
Young (20-35)	156	43.5
Middle (36-50)	137	38.2
Old (Above 50)	66	18.4
Total	359	100.0

***Source:** *Field Survey, 2024.*

Education of the Respondents

Education is an important factor in assessing the competency level of extension field staff. It enables a person to enhance his/her intellectual ability to act or react against any statement, activity and phenomenon.

Results of the study presented in Table 3 indicates that majority (82.2%) of the extension field staff had Diploma in agriculture while small number (2.5%) of the respondents had Doctorate of Philosophy in agriculture. The results also identify that 12.5% of the respondents had M.Sc. (Hons.) degree and 2.8% of the respondents had B.Sc. (Hons.) degree as their education. Results of the study are similar with Ashraf (2020) who identified that majority (81.3%) of the respondents had agricultural diploma as their educational status.

Portfolio Held by the Respondents

The results of the study presented in Table 4 indicates that majority (82.2%) of the respondents serving as field assistants in their allocated area/village. They are responsible for disseminating information and knowledge to farming community. Results further disclosed that 14.2% of the respondents serving as agricultural officers and responsible for monitoring

and executing the extension activities in their allocated Markaz which is the smallest unit in agricultural extension setup of study' province consist of 8-10 villages. Furthermore, 3.1% of the respondents serving as cotton inspector and they are responsible for planning, executing, and monitoring the extension activities regarding cotton crop. Results of the study are slightly similar with Ashraf (2020) whose 78.5% of the respondents serving as field assistant in the department of agriculture, Punjab.

Table 3: *Distribution of respondents regarding education.*

Education	Frequency	Percent
Agricultural Diploma	295	82.2
B.Sc. (Hons.)	10	2.8
M.Sc. (Hons.)	45	12.5
Ph.D.	9	2.5
Total	359	100.0

***Source:** *Field Survey, 2024.*

Table 4: *Distribution of respondents regarding designation.*

Portfolio	Frequency	Percent
Agriculture Officer	51	14.2
Cotton Inspector	11	3.1
Field Assistant	297	82.7
Total	359	100.0

***Source:** *Field Survey, 2024.*

Job Experience of the Respondents

Experience is counted as important factor in determining the possessed skills, expertise, and competencies of a person. The adoption of any skills, technology and knowledge is directly influenced by the experience of an individual.

The results of study presented in Table 5 identify that most (61.8%) of the respondents had experience of up-to 15 years in performing extension activities while small number (7.2%) of the respondents had experience of above 30 years in performing extension activities. Results also indicates that almost one-third (30.9%) of the respondents had experience of 15-30 years in performing extension activities. Results are contradictory with Ashraf (2020) whose 58.5% of the respondents had experience of 21-30 years in performing extension activities. This contradiction in results is due to the locality and different area of study.

Table 5: *Distribution of respondents regarding job experience.*

Job Experience (Years)	Frequency	Percent
Up-to 15	222	61.8
15-30	111	30.9
Above 30	26	7.2
Total	359	100.0

***Source:** *Field Survey, 2024.*

Rating of possessed competencies regarding professionalism

The results of the study presented in Table 6 indicates that the extension field staff follow policy and directives given by department of agriculture extension and they are also committed toward their professional development. The statements regarding possessed professional competency I follow policies and directives given by my organization, I have commitment to my carrier development, I apply professional ethic in my job ranked as 1st, 2nd and 3rd possessed professional competency by the extension field staff with the mean value of 1.880, 1.852, and 1.835 respectively.

Furthermore, statements of professional development such as I promote better cotton production with honesty and integrity, I have positive attitude towards various extension activities, and I participate in professional meetings were ranked as 4th, 5th, and 6th possessed professional competency by the extension field staff with the mean value of 1.676, 1.662, and 1.662 respectively.

Rating of required competencies regarding professionalism

The results of the study presented in Table 7 identify that extension field staff are less competent in attending conferences regarding better cotton production and attending in-service trainings related to better cotton production. The statement I attend conferences related to better cotton production, I attend in service training programme related to better cotton production, and I participate in professional meetings were ranked as 1st, 2nd, and 3rd most required competency by the extension field staff of study area with the mean value of 3.727, 3.710 and 3.688 respectively.

Table 6: *Rating of possessed competencies of professional development.*

Personal and professional development (Statements)	Possessed					
	1	2	3	4	5	Mean
I follow policies and directives given by my organization.	199	81	34	13	32	1.880
I have commitment to my carrier development.	198	86	32	16	27	1.852
I apply professional ethic in my job.	199	88	33	10	29	1.835
I promote better cotton production with honesty and integrity.	256	27	38	12	26	1.676
I have positive attitude towards various extension activities.	257	29	35	13	25	1.662
I participate in professional meetings.	257	30	34	12	26	1.662
I attend in service training programme related to better cotton production.	257	33	33	10	26	1.649
I attend conferences related to better cotton production.	263	28	32	14	22	1.618

***Scale:** 1= *Very Low*, 2= *Low*, 3= *Medium*, 4= *High*, 5= *Very High*

Table 7: *Rating of required competencies regarding professional development.*

Personal and professional development (Statements)	Required					
	1	2	3	4	5	Mean
I attend conferences related to better cotton production.	22	33	21	228	55	3.727
I attend in service training programme related to better cotton production.	25	27	25	232	50	3.710
I participate in professional meetings.	28	26	26	229	50	3.688
I have positive attitude towards various extension activities.	27	28	26	229	49	3.682
I promote better cotton production with honesty and integrity.	28	26	28	228	49	3.679
I apply professional ethic in my job.	29	25	84	176	45	3.509
I have commitment to my carrier development.	28	29	82	175	45	3.501
I follow policies and directives given by my organization.	34	24	82	173	46	3.481

***Scale:** 1= *Very Low*, 2= *Low*, 3= *Medium*, 4= *High*, 5= *Very High*

Table 8: Prioritized competency needs to EFS regarding professional development.

Personal and professional development (Statements)	Possessed	Required	Prioritized	
	Mean	Mean	DS	Rank
I attend conferences related to better cotton production.	1.618	3.727	2.109	1
I attend in service training programme related to better cotton production.	1.649	3.710	2.061	2
I participate in professional meetings.	1.662	3.688	2.026	3
I have positive attitude towards various extension activities.	1.662	3.682	2.02	4
I promote better cotton production with honesty and integrity.	1.676	3.679	2.003	5
I apply professional ethic in my job.	1.835	3.509	1.674	6
I have commitment to my carrier development.	1.852	3.501	1.649	7
I follow policies and directives given by my organization.	1.880	3.481	1.601	8

***Scale:** 1= Very Low, 2= Low, 3= Medium, 4= High, 5= Very High

****DS=** Discrepancy Score.

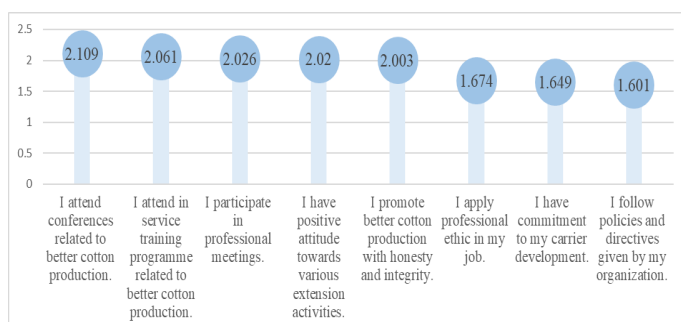


Figure 2: Matchstick graph for prioritized needed competencies of professional development.

Furthermore, statements such as I have positive attitude towards various extension activities, I promote better cotton production with honesty and integrity, and I apply professional ethics in my job ranked as 3rd, 4th, and 5th most required competencies by the extension field staff regarding professional development with the mean value of 3.682, 3.679, and 3.509 respectively.

Prioritizing competency needs of EFS regarding professionalism

The competency statements regarding professional development of the extension field staff were prioritized and ranked on the basis of discrepancy score (DS) obtained from the responses given by the EFS and results presented in Table 8. The results of the study indicate that attending conferences and In-service training programme related to better cotton production, and participation in professional meetings were ranked as 1st, 2nd, and 3rd most needed prioritized competencies for professional development of extension field staff with the DS value of 2.109, 2.061, and 2.026 (Figure 2).

Furthermore, positive attitude towards various extension activities, promoting better cotton production with honesty and integrity and applying professional ethics in job ranked as 4th, 5th and 6th prioritized statement for professional development of extension field staff with the DS value of 2.02, 2.003, and 1.674 respectively. It indicated that there is a need for extension field staff to attend conferences and in-service training programs related to better cotton production.

Multiple linear regression estimation of dependent and independent variables

Results of the regression estimates indicate that 84% of variance in the dependent variable (required competencies regarding professional development) explained by independent variables such as (possessed competencies regarding professional development, age, education, job experience and designation of the respondent) (Table 9).

The hypothesis was formulated as;

H_0 = There will be no significant change in dependent variable due to independent variables .

The statistical notation for test was

$$H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$$

$$H_1 = \beta_j \neq 0 \text{ for at least one } j \neq 0$$

The significant level (p-value) was measured at $F(5, 353) = 395.075$, p-value = 0.000.

The calculated significant level indicated the model is overall statistically significant, which means there is a significant relation between dependent and independent variables. Required competencies regarding

Table 9: Regression analysis for dependent variable (Required Competencies regarding professional development) and independent variables (Age, Job Experience, Education, Portfolio and Possessed competencies regarding professional development).

Model Summary ^a					
R	R Square	Adjusted R Square	Std. Error of the Estimate		
.921 ^a	.848	.846	.40107		
ANOVA ^b					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	317.761	5	63.552	395.075	.000 ^b
Residual	56.784	353	.161		
Total	374.545	358			
Coefficients ^c					
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	β	T	Sig.
(Constant)	4.084	.320		12.756	.000
Possessed competency professional development	-.702	.028	-.815	-25.110	.000
Age of the Respondents	.019	.044	.014	.431	.667
Job Experience	.019	.053	.012	.360	.719
Education	.040	.075	.031	.536	.593
Designation	.238	.082	.165	2.895	.004

^a: Predictors: (Constant), portfolio, Age of the Respondents, Possessed competency professional development, Job Experience, Education.

^b: Dependent Variable: Required competency professional development b. Predictors: (Constant), portfolio, Age of the Respondents, Possessed competency professional development, Job Experience, Education

^c: Dependent Variable: Required competency professional development.

Table 10: Multivariate Correlation analysis of different socio-economic variables with Possessed competency for professional development /.

Education	1				
Designation	-0.929**	1			
Age of the Respondents	-0.095	0.078	1		
Job Experience	-0.217**	0.216**	0.751**	1	
Possessed competency of professional development	0.759**	-0.745**	-0.008	-0.139**	1

**Correlation is significant at the 0.01 level (2-tailed).

professional development depends on independent variables such as possessed competencies, age, education and experience of the field staff.

Multivariate Correlation analysis of socioeconomic variables

Multivariate correlation analysis was performed for checking the relationship between socio-economic variables and possessed competencies regarding professional development. The results of the analysis presented in Table 10 indicate that job experience had a significant positive relation with designation and age of the extension field staff having value of 0.216 and

0.751 respectively. Furthermore, possessed competencies regarding professional development had significant positive relation with education having value of 0.759.

Conclusions and Recommendations

The study concludes that agricultural field staff were young and middle-aged, most of them had diploma of agricultural sciences, with a smaller representation of higher education M.Sc. (Hons.) and Ph.D. in subject specialized fields of agriculture. Most of EFS serves as a field assistant who are responsible for exe-

cuting extension activities in their jurisdiction, while a small proportion also serves as agriculture officers and cotton inspectors. Furthermore, they possessed strong competencies towards professional development like, applying ethical practices, following policies of department and commitment of career growth. However, there is a significant need for professional development areas, particularly through attending conferences and in-service training programs focused on better cotton production. These areas are critical for enhancing the staff's effectiveness and overall contribution to agricultural extension services.

Based on the above conclusion the study recommends that; Arrangement of regular in-service training programs and collaboration with agricultural universities for providing higher educational degrees may help in professional and personal development of the extension workers.

Engaging and providing logistic as well as financial privileges for attending regional conferences regarding better cotton production may help in networking, professional and personal development of EFS by that they can efficiently serve cotton growers.

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Novelty Statement

This study uniquely identifies and prioritizes the professional development training needs of agricultural extension field staff using a systematic and evidence-based approach. Unlike previous studies, it offers a structured ranking of competencies required to enhance field performance. The findings provide actionable insights for designing targeted capacity-building programs to strengthen extension services

in the region.

Author Contribution

Syed Mufeed Hadi Naqvi; Collected data, analyze and prepare the manuscript.

Raheel Saqib; Supervised overall work. All authors read and approved the final manuscript.

Conflict of Interest

The author(s) declare(s) that there is no conflict of interests regarding the publication of this article.

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