ISSN: 2687-8410
DOI: 10.33552/ACCS.2026.05.000605
Archives of Clinical Case Studies
Iris Publishers

Research Article



# Effect of Human Resource Development through Farmer Field School Approach on livestock and Poultry Production in Rural Chitral Pakistan

**Safir Ullah[1]*, Afshan Bibi[2], Niaz U Din[2], and Shamin Akhtar[3]**

[1]*Veterinary Research and Disease Investigation Centre, Chitral, Khyber Pakhtunkhwa, Pakistan*

[2]*Livestock Extension Department, Khyber Pakhtunkhwa, Pakistan*

[3]*Aga Khan Rural Support Program Chitral Kp, Pakistan*

***Corresponding author:** Safir Ullah, Veterinary Research and Disease Investigation Centre, Chitral, Khyber Pakhtunkhwa, Pakistan

**Received Date:** March 31, 2026

**Published Date:** April 08, 2026

## Abstract

Livestock and Poultry production plays an important role in improving rural livelihoods and household nutrition, particularly in mountainous regions where livelihood opportunities are limited. However, productivity in backyard poultry systems is constrained by disease outbreaks, poor management practices, and limited access to veterinary knowledge. This study evaluated the impact of human resource development through the Farmer Field School (FFS) approach on poultry production knowledge and skills among rural farmers in Chitral, Pakistan. A participatory training intervention was conducted between July 2024 and March 2025 across 27 villages in Upper and Lower Chitral. A total of 762 farmers (542 women and 220 men) participated in the training. The program included modules on poultry and livestock management, bacterial and viral vaccination and especially the Newcastle disease prevention, vaccination protocols, feeding practices, housing management, and bio-security measures. Pre- and post-training knowledge assessments and practical skill evaluations were conducted.

Results showed substantial improvements in farmer knowledge after training. Awareness of mass vaccination and especially the Newcastle disease increased from 23% to 89%, knowledge of vaccination protocols from 18% to 85%, and understanding of bio-security practices from 12% to 78%. Practical vaccination skills improved significantly, with 92% of participants demonstrating correct vaccine administration techniques after training. The findings indicate that the FFS approach effectively enhances livestock and poultry management knowledge and technical capacity among rural farmers. Regular participatory training, improved vaccine accessibility, and gender-inclusive extension programs are recommended to support sustainable poultry production in remote regions.

**Keywords:** Farmer field school; livestock and poultry production; human resource development; newcastle disease; chitral; pakistan

## Introduction

### Background

Livestock and Poultry production is a critical component of rural livelihoods in developing countries, providing a reliable source of high-quality protein (meat and eggs), income generation, and economic empowerment, particularly for women [1,2]. In Pakistan, the poultry sector contributes significantly to the national economy, with backyard poultry systems playing an essential role in food security and poverty alleviation in rural areas [3]. Chitral, a remote mountainous district in Khyber Pakhtunkhwa, Pakistan, is characterized by challenging topography, limited access to veterinary services, and vulnerable agricultural systems [4]. The region's rural communities depend heavily on livestock and poultry for their subsistence and economic well-being [5]. However, poultry production in these areas faces numerous constraints, including [6-10]. The Farmer Field School (FFS) is a participatory extension approach that originated from integrated pest management programs in Asia [11].

It emphasizes experiential, hands-on learning where farmers observe, analyse, and make decisions based on field conditions [12]. The FFS approach has been successfully adapted for livestock and poultry extension, demonstrating positive impacts on knowledge, practices, and productivity [13,14]. Human resource development through FFS interventions focus on building farmers' capacity to identify problems, implement solutions, and adopt sustainable practices [15]. This approach is particularly relevant for women farmers, who often face barriers to accessing traditional extension services [16]. Despite the recognized potential of FFS approaches, limited research has evaluated their effectiveness in poultry production development in remote Pakistani mountain regions. This study assessed the effect of human resource development through FFS interventions on poultry production knowledge, practices, and outcomes among rural farmers in Chitral.

## Materials and Methods

### Study Area

The study was conducted in Upper and Lower Chitral districts of Khyber Pakhtunkhwa, Pakistan. The region is characterized by mountainous terrain, harsh winters, and limited access to veterinary services. Livestock and poultry production play an important role in rural livelihoods.

### Study Design

A participatory intervention study was conducted using the Farmer Field School approach. Pre- and post-training assessments were used to evaluate knowledge improvement, while practical demonstrations assessed vaccination skills.

### Training Intervention

Training sessions were conducted between July 2024 and March 2025 across 27 villages. A total of 762 farmers participated in three phases of the program (Table 1).

### Training Modules

**Table 1:** A total of 762 farmers participated in three phases of the program.

| Phase | Period | Villages | Participants |
|---|---|---|---|
| Phase I | July 22–27, 2024 | 12 villages | 239 women |
| Phase II | August 18–22, 2024 | 4 villages | 83 women |
| Phase III | March 2025 | 11 villages | 440 farmers |

**Table 2:** The livestock and poultry production training module covered.

| Topic | Content |
|---|---|
| Importance of livestock and Poultry | Livelihood significance, nutritional benefits, economic potential |
| Breed Selection | Local vs. exotic breeds, suitability for backyard systems |
| Disease Management | Bacterial, viral and especially Newcastle Disease (ND) signs, prevention, control strategies |
| Vaccination Protocols | Schedules, timing, dosage, routes of administration |
| Feeding Programs | Balanced nutrition, feeding patterns, feed formulation |
| Environmental Management | Light, water, temperature effects on production |
| Parasite Control | Ectoparasites, endoparasites, treatment options |
| Housing and Biosecurity | Shelter design, ventilation, sanitation, isolation |
| Practical Demonstration | Live vaccination of poultry and animal |

### Data Collection

Data were collected through:

- Pre-training knowledge assessments
- Post-training knowledge assessments
- Practical skill evaluation during vaccination demonstrations
- Structured participant feedback questionnaires

### Data Analysis

Quantitative data were analysed using descriptive statistics. Knowledge improvement was calculated by comparing pre- and

post-training percentages. Participant feedback was analysed using thematic categorization.

## Results

### Participant Demographics

A total of 762 farmers participated in the training program, including 542 women (71.1%) and 220 men (28.9%). The majority of participants were smallholder farmers practicing backyard poultry and livestock production.

### Knowledge Assessment

Pre- and post-training assessments revealed significant improvements in knowledge across all poultry and livestock management topics (Table 3).

**Table 3:** Pre- and Post-Training Knowledge Scores.

| Topic | Pre-Training (%) | Post-Training (%) | Improvement (%) |
|---|---|---|---|
| Livestock and poultry Diseases recognition | 23 | 89 | +66 |
| Vaccination protocols | 18 | 85 | +67 |
| Biosecurity measures | 12 | 78 | +66 |
| Feeding programs | 35 | 88 | +53 |
| Breed selection | 42 | 91 | +49 |
| Parasite control | 28 | 82 | +54 |
| Housing management | 31 | 86 | +55 |

### Practical Skill Acquisition

During the live vaccination demonstration:

- 92% of participants demonstrated correct vaccine administration technique post-training
- 96% expressed strong interest in vaccine availability for their flocks
- 88% reported confidence to administer vaccines independently after training (Table 4)

**Table 4:** Thematic Analysis of Participant Feedback.

| Theme | Frequency (%) | Representative Quotes |
|---|---|---|
| Need for regular training | 94 | Training should be repeated at least three times a year |
| Fodder formulation training | 89 | Training on concentrate formula ration making is essential" |
| Vaccine accessibility | 87 | We need vaccines available in our villages |
| Advanced training opportunities | 76 | We want 7-10 days of advanced training at a government institute |
| Breeding support | 68 | A breeding bull is required for natural breeding |

### Knowledge Dissemination

Participants reported sharing training content with:

- Family members (92%)
- Neighbours (78%)
- Community groups (54%)
- Extended family in other villages (41%)

### Village Coverage

**Table 5:** Geographic Distribution of Training.

| District | Union Councils | Villages | Participants |
|---|---|---|---|
| Upper Chitral | Laspur, Mastuj, Yarkhun | 23 | 679 |
| Lower Chitral | Kalasha Valleys, Ayun | 4 | 83 |
| Total | 5+ | 27 | 762 |

### Participant Feedback

Most participants expressed strong interest in continued training and improved veterinary support. Key recommendations included:

- Regular training sessions throughout the year
- Training on poultry feed formulation
- Improved access to vaccines in villages
- Advanced technical training programs

## Discussion

The significant improvements in knowledge scores across all livestock and poultry management topics demonstrate the effectiveness of the Farmer Field School approach for human resource development in rural areas. The increase from 23% to 89% in bacterial and viral diseases and especially the Newcastle Disease recognition is particularly noteworthy, as ND remains the most devastating disease affecting backyard poultry in Pakistan [6,17]. Previous studies have similarly reported that participatory extension approaches can substantially improve disease awareness and control [18,19]. The 92% success rate in practical vaccine administration skills acquisition highlights the value of hands-on demonstrations. Research by Bagnol et al. [20]. Emphasized that practical training is essential for building confidence in vaccine administration among women farmers. Our findings align with studies showing that experiential learning significantly outperforms purely theoretical instruction in agricultural extension [21,22].

The inclusion of 542 women farmers (71.1% of total participants) reflects the project's commitment to gender-inclusive extension services. Women in Chitral traditionally manage backyard poultry, yet often lack access to formal training opportunities [10,23]. The high participation rate and positive feedback suggest that FFS approaches are particularly well-suited for reaching women farmers in conservative, remote communities [24]. Research in South Asia has demonstrated that empowering women through poultry extension leads to improved household nutrition, increased income, and enhanced decision-making power [25, 26]. The strong demand for advanced training expressed by participants (76%) indicates a desire to further develop their capacities and potentially serve as community resource persons. The participant recommendation for training to be conducted three times annually (94% of respondents) underscores the need for sustained capacity-building interventions.

Single training events often yield limited long-term impact without follow-up support [27]. Regular FFS sessions could establish continuous learning cycles, enabling farmers to address emerging challenges and reinforce practices [28]. The knowledge dissemination observed (92% sharing with family members, 78% with neighbours) suggests multiplier effects beyond direct participants. This aligns with social learning theory and studies demonstrating that trained farmers become important information sources in their communities [29,30].

## Conclusion

This study demonstrates that the Farmer Field School approach significantly enhances livestock and poultry production knowledge, practical skills, and capacity among rural farmers in Chitral, Pakistan [31-34]. The training reached 762 farmers across 27 villages, with substantial improvements in disease recognition (66% increase), vaccination protocols (67% increase), and biosecurity practices (66% increase). Practical skill acquisition was high, with 92% of participants demonstrating correct vaccine administration post-training. Participant feedback emphasized the need for regular training (three times annually), specialized fodder formulation sessions, improved vaccine accessibility, and advanced training opportunities. The strong demand for continued capacity building underscores the effectiveness and perceived value of participatory, hands-on extension methodologies.

### Recommendations

- Regular training cycles: Implement FFS sessions three times annually to reinforce learning
- Fodder and feed training: Develop specialized modules on concentrate ration formulation
- Vaccine supply chains: Establish reliable vaccine distribution systems in remote villages
- Advanced training: Provide 7-10 days residential training for selected women farmers
- Breeding support: Introduce improved breeding stock for poultry and livestock
- Community extension workers: Train women farmers as community-based animal health workers

## Acknowledgment

None.

## Conflict of Interest

No Conflict of Interest.

## References

1. FAO (2023) Smallholder poultry production: Livelihoods, food security and gender. Food and Agriculture Organization of the United Nations, Rome.
2. Wong JT, de Bruyn J, Bagnol B, Grieve H, Li M, et al. (2017) Small-scale poultry and food security in resource-poor settings: A review. Global Food Security 15: 43-52.
3. Pakistan Bureau of Statistics (2023) Agricultural census 2022: Livestock and poultry report. Government of Pakistan, Islamabad.
4. Khan AR, Khan S (2021) Livelihood vulnerability and adaptation in the Hindu Kush Himalayas: A case study of Chitral, Pakistan. Climate and Development 13(4): 345-358.
5. Ahmad S, Hussain A (2020) Role of livestock in rural livelihoods of Chitral, Pakistan. Journal of Animal and Plant Sciences 30(3): 612-620.
6. Alders RG, Pym RAE (2009) Village poultry: Still important to millions, eight thousand years after domestication. World's Poultry Science Journal 65(2): 181-190.
7. Abebe W, Assefa A (2022) Constraints to backyard poultry production in developing countries: A systematic review. Poultry Science 101(3): 101-112.
8. Habib M, Hameed A (2021) Veterinary service delivery in remote mountain regions of Pakistan: Challenges and opportunities. Frontiers in Veterinary Science 8: 654-667.
9. Awa DN, Njoya A (2019) Biosecurity in small-scale poultry production in Africa: A review. Veterinary Medicine: Research and Reports 10: 23-34.
10. Raza MA, Akhtar S (2020) Gender dimensions of livestock extension in Pakistan: Barriers and opportunities. Gender, Technology and Development 24(2): 215-233.

11. van den Berg H, Jiggins J (2007) Farmer Field Schools: A critical review of the literature. Wageningen University and Research Centre, Wageningen.

12. Braun A, Jiggins J, Röling N, van den Berg H, Snijders P, et al. (2006) A global survey and review of farmer field school experiences. International Livestock Research Institute, Nairobi.

13. Duveskog D, Friis-Hansen E, Taylor EW (2011) Farmer Field Schools in East Africa: A transformative learning process. Journal of Agricultural Education and Extension 17(1): 5-20.

14. Davis K, Nkonya E, Kato E, Mekonnen DA, Odendo M, et al. (2010) Impact of farmer field schools on agricultural productivity and poverty in East Africa. World Development 40(992): 402-413.

15. Bunch R (2019) Farmer field schools and human resource development. World Neighbors, Oklahoma City.

16. Farnworth CR, Colverson KE (2016) Building a gender-transformative extension and advisory facilitation system in sub-Saharan Africa. Journal of Gender, Agriculture and Food Security 1(1): 20-39.

17. Habib M, Khan A (2022) Newcastle disease in backyard poultry of Pakistan: Prevalence and control challenges. Pakistan Veterinary Journal 42(1): 1-8.

18. Catley A, Alders RG, Wood JLN (2012) Participatory epidemiology: Approaches, methods, experiences. The Veterinary Journal 191(2): 151-160.

19. Mariner JC, Paskin R (2020) Manual on participatory epidemiology: Methods for the collection of action-oriented epidemiological intelligence. FAO, Rome.

20. Bagnol B, Alders R, McConchie R (2017) Gender issues in human and animal health: A case study of Newcastle disease vaccination in Mozambique. Journal of Gender, Agriculture and Food Security 2(1): 1-15.

21. Kolb DA (1984) Experiential learning: Experience as the source of learning and development. Prentice-Hall, Englewood Cliffs.

22. Waddington H, Snilstveit B, Hombrados J, Vojtkova M, Phillips D, et al. (2014) Farmer field schools for improving farming practices and farmer outcomes. Campbell Systematic Reviews 10(1): 1-335.

23. Noreen S, Ali T (2019) Women's participation in livestock management in Pakistan: A case study of Chitral. Journal of Agricultural Extension 23(2): 45-56.

24. Njuki J, Sanginga PC (2013) Women, livestock ownership and markets: Bridging the gender gap. Routledge, London.

25. Nielsen MR, Meilby H (2021) Women's empowerment through poultry production in Bangladesh. World Development 138: 105-118.

26. Kristjanson P, Waters-Bayer A, Johnson N, Tipilda A, Njuki J, et al. (2014) Livestock and women's livelihoods: A review of the recent evidence. ILRI Discussion Paper 20: 1-40.

27. Kiptot E, Franzel S (2015) Gender and agroforestry in Africa: A review of women's participation. Agroforestry Systems 89(1): 1-18.

28. Van den Berg H, Van Huis A (2019) Farmer Field Schools in low-income countries: A review of the evidence. Annual Review of Entomology 64: 363-383.

29. Conley T, Udry C (2005) Learning about a new technology: Pineapple in Ghana. American Economic Review 100(1): 35-69.

30. Foster AD, Rosenzweig, MR (2015) Learning by doing and learning from others: Human capital and technical change in agriculture. Journal of Political Economy 123(3): 568-594.

31. Grace D, Mutua F, Ochungo P, Kruska R, Jones K, et al. (2021) Mapping of poverty and likely zoonoses hotspots. ILRI, Nairobi.

32. Perry BD, Grace D (2019) The impacts of livestock diseases and their control on growth and development in developing countries. OIE Scientific and Technical Review 34(1): 37-48.

33. Aini I, Alders R, Young M (2018) The role of Farmer Field Schools in controlling Newcastle disease in village chickens in Indonesia. World's Poultry Science Journal 74(1): 65-74.

34. Conroy C, Raza MA (2020) Women's empowerment through poultry in Bangladesh: The role of participatory extension. Development in Practice 30(4): 452-464.