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Farmers Field School – An Innovative Approach for Transfer of Technology to Dairy Farmers

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ABSTRACT

The present study was conducted during the year 2023-24 to evaluate the effects of a Farmer Field School (FFS) on scientific dairy farming . The findings of the study revealed that the mean knowledge and adoption index were 97.57 and 82.56 per cent, respectively for the trained dairy farmers under FFS, while the corresponding values for pre FFS were 46.36 and 31.31 per cent, respectively. The overall impact of the FFS was observed to be 51.23 per cent regarding the existing knowledge and adoption after attending the FFS indicating a significant enhancement compared to the pre-FFS for various dimensions of improved dairy farming practices following the intervention. The mean milk yield recorded for cows and buffalo was 13.49±0.39 and 11.40±0.34 kg per day, respectively, after technological interventions in the farmer field school. This represents an increase compared to traditional dairy farming, which yielded 10.88±0.54 and 9.17±0.41 kg per day, respectively. The increase in milk yield for cows and buffalo was found to be 23.99 and 24.32 percent, respectively, following the implementation of FFS over the traditional system. The study indicated that the FFS model was the most suitable extension tool for enhancing milk production. This approach is expected to contribute not only increase in quality milk production but also to the improvement of the socio-economic conditions of the dairy farmers.

Keywords: Adoption, Dairy farming, Impact, Knowledge, Respondents.

INTRODUCTION

Farmer Field Schools (FFS) are a participatory, group-based learning approach that empowers farmers to solve agricultural challenges through hands-on training and experimentation. The Farmer Field School is an interactive and collaborative approach of agricultural extension designed to facilitate shared learning between participants and trainers. Its purpose is to effectively communicate and refine production techniques with the ultimate goal of increasing the rate of adoption. The farmers' field school is an extensive, season-long training plan that incorporates participation exercises, practical analysis and decision-making. The primary goal of the field schools is to provide farmers with a chance to acquire knowledge and gain more mastery over the circumstances they encounter on a daily basis. They learn how to use new technologies to minimize dairy input costs, improve management, boost productivity, and raise profitability.

At least 78 countries are implementing the FFS approach, a classic example of a participatory extension strategy (Braun *et al,* 2006). In order to successfully implement a field school, it is essential that the individuals responsible for its formation and management possess the appropriate mindset (attitude change) to effectively handle the difficulties and requirements of this strategy. Thus, a farmer field school was organised to focus on the benefits of improved low cost production technologies with special references to general management, healthcare and supplementary feeding to dairy animals.

MATERIALS AND METHODS

In this program, a random selection of 25 dairy farmers was conducted from the Khijrabad village located in the Majri block of the S.A.S. Nagar district in Punjab. The primary constraints encountered by the trainees in dairy production were gathered from the respondents and subsequently ranked in order of significance. The visit of trainers to FFS was held fortnightly at the farmers' farm, incorporating instructional sessions alongside front line demonstrations of enhanced dairy husbandry practices, facilitating the acquisition of new technologies through

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a hands-on approach. The group was divided into five sub-groups each consisting of five individuals, to conduct field observations about data on production of the selected dairy bovines in both the technical interventions and traditional groups. A pre-evaluation test was conducted for each group on the chosen FFS activities. In each lesson, they were assigned group assignments independently. The livestock farms were chosen, and the Frontline Demonstrations on requiring operational skills were executed. The classes concluded upon the group's acceptance of the outcomes derived from the demonstrations. Field days/ exposure visits were organized to impart technological knowledge to farmers regarding new technologies through the Seeing is believing approach at various scientifically managed dairy farms. The assessment for FFS was performed after a six-month period with all trainees. An impact study was conducted to assess the knowledge and adoption levels of respondents regarding various management aspects of practices, including housing, feeding, health care, and techniques for producing clean and quality milk. The respondents' knowledge and adoption levels were assessed as per Rahman (2007).

The data concerning milk yield and fat percentage were collected from a sample of 20 animals (10 cattle and 10 buffalo) following scientific interventions, which included balanced rations, supplementation with area-specific mineral mixtures, common salt, bypass fat, and timely deworming. Twenty animals served as the control group, comprising ten cows and ten buffaloes, managed under traditional farming practices. The animals were chosen at comparable lactation stages, body weights, milk yields, and parities. Partial budget was employed to assess the items of expenditure and income (Khadda *et al, 2014*). Consequently, the expenses associated with roughage, concentrate, mineral mixture, common salt, and bypass fat have been taken into account. The labour cost was excluded from the computation since it was identical in both groups as family members managed the cattle. The input costs were determined based on the market rates existing during FFS. The collected data were organized and examined according to established statistical methods (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

The participants exhibited a strong preference for animal husbandry and maintain traditional practices of raising dairy animals such as cows and buffaloes. The findings of the study indicated that the farmer field school significantly impacted the knowledge and adoption levels of dairy farmers regarding improved dairy husbandry practices.

Knowledge level of dairy farmers:

The analysis of data indicated that the mean knowledge index of respondents before and after the FFS was recorded at 46.36 and 97.57 percent, respectively. The findings of the study indicated that all respondents possessed very good knowledge of various improved practices for dairy farming, specifically including: ventilation in shed, proper space for each animal, cleaning of shed daily, bedding material use in shed, balance ration feeding, mineral mixture, bypass fat and common salt feeding, formulation of balance ration, not to feed fusty fodder, drinking clean and fresh water, timely vaccination, deworming regularly, dusting regularly, washing entire animal daily, teats and udder washing before milking, wipe teats and udder with dry cloth after washing, kmno4 use in water for washing of teats and udder, examine milk, udder and teats daily, dry, and clean utensils use for milking, dome-shaped milking pots use for milking, milking done by healthy being, hands wash with plain water before milking, transfer the milk to milk collection center after milking immediately, whereas, the corresponding knowledge level regarding the same practices for the respondents prior to FFS were 70.66, 32.00, 64.34, 24.38, 37.33, 61.37, 24.66, 52.00, 32.33, 16.00, 68.00, 76.00, 64.34, 48.00, 36.00, 68.00, 12.67, 6.34, 64.34, 52.33, 40.66, 62.00 and 80.00 per cent was recorded, respectively. The overall increased of 110.46% in knowledge level regarding various aspects of improved dairy farming practices after the FFS. Comparable findings were also documented by Mallikarjuna *et al* (2012), Khadda *et al* (2012), Singh *et al* (2014), *Khadda et al* (2014a) and Khadda *et al* (2020).

Adoption level of dairy farmers

The findings of the current study indicated that the average adoption index was significantly higher (82.56%) for the farmers who benefited from the Farmer Field School, in contrast to their adoption index before participating in the program (31.31%). The respondents implemented enhanced dairy management practices, including daily shed cleaning, providing mineral supplements, ensuring access to clean and fresh water for the animals, washing teats and udders prior to milking, and washing hands with plain water before milking (100%). This was followed

Table 1. Knowledge and adoption indices of scientific dairy farming among the dairy farmers.

Sr. No.	Scientific dairy farming practices	Knowledge		Adoption	
		Pre	Post	Pre	Post
1.	**Management of housing**				
i	Ventilation	70.66	100.00	20.33	72.00
ii	Spacing	32.00	96.00	21.33	76.00
iii	Cleaning of shed daily	64.34	100.00	48.00	100.00
iv	Bedding material use in shed	24.38	100.00	16.67	72.33
2.	**Feeding management of dairy animals**				
i	Feeding of balance ration	37.33	88.00	21.33	80.00
ii	Mineral mixture supplementations	61.37	100.00	28.00	100.00
iii	Bypass fat f supplementations	24.66	100.00	12.00	68.67
iv	Common salt supplementations	52.00	100.00	28.00	92.00
v	Formulation of balance ration	32.33	100.00	12.00	64.34
vi	Not to feed fusty fodder	16.00	100.00	16.34	88.00
vii	Drinking clean and fresh water	68.00	100.00	40.00	100.00
3.	**Health Care of dairy animal**				
i	Timely vaccination	76.00	100.00	52.00	96.00
ii	Deworming regularly	64.34	100.00	41.33	80.00
iii	Dusting regularly	48.00	92.00	46.67	88.00
4.	**Clean milk production tech.**				
i	Washing entire animal daily	36.00	92.00	12.00	72.00
ii	Teats and udder washing before milking	68.00	100.00	56.00	100.00
iii	To wipe teats and udder with dry cloth after washing	12.67	100.00	8.34	60.33
iv	To use of kmno4 in water for washing of teats and udder	6.34	68.00	1.00	54.34
v	Regularly examine milk, udder and teats	64.34	100.00	54.33	92.00
vi	Use dry, clean and hygienic utensils for milking	52.33	100.00	40.67	96.00
vii	Use dome-shaped milking pots for milking	40.66	96.00	20.00	64.34
viii	Milking by healthy person	62.00	100.00	40.00	84.00
ix	Hand wash	80.00	100.00	60.00	100
x	Keep milk away from coughing and sneezing	72.00	100.00	64.34	84.33
xi	Full hand milking	16.33	100.00	12.00	80.00
xii	Complete milking time	36.00	100.00	36.00	88.00
xiii	Keep animal in standing position	8.00	100.00	8.00	76.00
xiv	Transfer the milk to milk collection center immediately after milking	72.00	100.00	60.00	84.00
	Mean Index	46.36	97.57	31.31	82.56

by timely vaccinations and the use of dry, clean, and hygienic utensils for milking (96.00%), supplementing with common salt and regularly examining milk, udder, and teats (92.00%), avoiding fusty fodder, regular dusting, and completing milking within 6-7 minutes (88.00%). Additionally, milking was performed by healthy individuals, keeping milk away from coughing and sneezing, and transferring the milk to the collection center immediately after milking (84.00%). The practices also included feeding a

Table 2. Effect of FFS on knowledge and adoption of scientific dairy farming practices.

Sr. No.	Particular	Pre	Post	Difference
1.	Knowledge Index	46.36	97.57	51.21
2.	Adoption Index	31.31	82.56	51.25
Total		77.67	180.13	102.46

Table 3. Performance of milch cattle pre and post farmer school.

Sr. No.	Parameter	Trainees of FFS		Non- trainees of FFS	
		Cattle	Buffalo	Cattle	Buffalo
1.	Av. milk yield/ day (kg)	13.49±0.39	11.40±0.34	10.88±0.54	9.17±0.41
2.	Lactometer reading	29.56±2.09	30.96±1.61	27.79±1.92	29.81±2.10
3.	Fat %	4.17±0.21	7.16±0.17	3.63±0.14	6.86±0.12
4.	Feeding cost/ kg of milk production (Rs.)	17.86	18.59	22.05	22.90
5.	Gross income from milk (Rs./ day)	674.50	741	544	641.90
6.	Net return (Rs./ day)	433.50	529	304	431.90
7.	B: C ratio	2.80	3.50	2.27	3.06

balanced ration, regular deworming, and full hand milking (80.00%). Ensuring adequate space for dairy animals in the shed and maintaining them in a standing position for 15 minutes post-milking (76.00%), providing proper ventilation in the shed and washing the entire animal daily (72.00%), incorporating bypass fat supplementations (68.67%), utilizing dome-shaped milking pots during milking (64.34%), formulating a balanced ration (64.00), wiping teats and udder with a dry cloth after washing (60.33%), and using KMnO4 in water for cleaning teats and udder (54.00%) after FFS. Comparable findings were also documented by Mallikarjuna *et al* (2012), Khadda *et al* (2012), Singh *et al* (2014a), Khadda *et al* (2014), Akila and Bharathi (2020) and Khadda *et al* (2020).

Impact of FFS on knowledge and adoption

The data (Table 2) revealed that the average knowledge and adoption index were 97.57 and 82.56 per cent, respectively, for the dairy farmer after FFS, while the relevant values prior to FFS were 46.36 and 31.31 per cent, respectively. The results clearly demonstrated that the respondents who received training under FFS exhibited advanced levels of knowledge and adoption compared to pre FFS. The analysis highlighted the comprehensive effects of the field school on dairy farming was 51.23 percent in terms of knowledge and adoption among the trained respondents, indicating a significant increase compared to pre FFS program. The respondents experienced a significant impact, particularly regarding their knowledge and adoption of scientific dairy farming practices, as a result of attending the Farmer Field School.

Production performance of milch animals

The compiled data concerning the production of dairy bovines indicated that the mean milk yield for cows and buffaloes was recorded at 13.49±0.39 and 11.40±0.34 kg/ day, in that order, following scientific intervention in the FFS. This represented an increase compared to the traditional dairy farming system, where yields were 10.88±0.54 & 9.17±0.41 kg per day, correspondingly. The recorded milk yield increase for cows and buffalo was 23.99 and 24.32 percent, correspondingly, following scientific involvement under FFS as compared to the conventional system. The increased milk yield observed in cows and buffalo could be attributed to improved managemental practices, including enhanced housing environment, balanced feeding strategies such as the incorporation of uromin lick, supplementation with mineral mixtures and common salt, as well as superior health management techniques implemented by the cattle keepers following the FFS. The data concerning to economic aspects of milk production from cows and buffalo indicated that the farmers adopted a systematic approach in dairy after attending the FFS, resulting in more gross and net returns, along with a high profit ratio compared to conventional dairy farming methods. The findings indicated a decrease in the cost of milk production per liter for cows and buffaloes by 23.46% and 23.18%, respectively, attributed to the technological interventions implemented by FFS

trainees in contrast to the non-trainees of FFS. Yadav *et al* (2013), Khadda *et al* (2014), Khadda *et al* (2014a), Khadda *et al* (2016), Akila and Bharathi (2020), Khadda *et al* (2020), and Yadav *et al* (2020) have indicated that the production performance of dairy cattle is significantly influenced by the implementation of scientific dairy farming practices.

CONCLUSION

From the findings of the study, it can be determined that the Farmer Field School (FFS) program has been found to enhance dairy farmers' knowledge and attitudes towards advanced farming technologies. The program has led to increased milk yields and improved attitudes towards scientific animal husbandry practices. Farmers take on the role of investigators, exploring different technological options and actively participating in sharing and refining production technology. This approach directly addresses farmers' needs, improving the exchange of technologies and information among farmers. FFS serves as an exemplary model for validating and disseminating agricultural technologies, fostering sustainable agriculture and improving socio-economic conditions.

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