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Perceived Effect of Farmers Field School Approach on Capacity Building in Controlling Pre and Post Harvest Losses

A. Khatam[1*], S. Muhammad[2], and I. Ashraf [2]

ABSTRACT

The present study was conducted in the central region of Khyber Pakhtunkhwa (KPK), Pakistan comprising seven districts: Peshawar, Charsadda, Nowshera, Mardan, Swabi, Kohat and Hangu, during 2010. The objective was to analyze the perceived effect of Farmer Field School (FFS) approach on farmers' capacity in controlling pre- and post-harvest losses. Descriptive statistics were used to analyze the data collected from 280 randomly selected farmer respondents. The analysis revealed that FFS had remarkably built up farmers' capacity in controlling pre and post-harvest losses caused by rodents, birds, immature harvesting/picking, and inappropriate packing, storing, and transportation of the produce. Furthermore, FFS helped farmers in reducing losses at the market and controlling grain borer, wheat weevil, and store weevils effectively. The study concluded that the highest improvement as a result of FFS activities was in controlling losses by rodents, proper packaging and labeling of the produce, and controlling some stored grain pests like grain borer and wheat weevil. By and large, farmers' capacity was built up in almost all aspects of controlling pre- and post-harvest losses, except a few i.e. losses due to immature harvesting of crops, and controlling losses caused by store insects, which needed special focus of the authorities concerned.

Keywords: Controlling crop losses, Farmers' Capacity building, Farmers' Training, FFS extension approach, Immature harvesting.

INTRODUCTION

Despite the huge contribution of agriculture sector to national economy, crop production in Pakistan is among the lowest as compared to the world's averages (Government of Pakistan, 2011-12), while it can be increased reasonably using improved crop management practices by farmers. In this connection extension organizations can perform a key role in the dissemination of improved crop management practices among farming communities and their motivation for adoption. Ali (2013) reported that the majority (68%) of the farmers had received information from various public and private sources excluding information sought from peer groups, progressive farmers, friends and relatives. But unfortunately, extension agencies are facing numerous challenges in the 21st century. Khatoon-Abadi (2011) recommended that the extension system deal with those issues that have oppressed farmers and employ tactics and methods of empowering disadvantaged groups within rural communities. The most important among these challenges is how to design an agricultural extension strategy that goes beyond simply delivering improved knowledge to the growers, to play a guiding role in assisting small farmers, organize themselves for sharing improved technologies, marketing, and advocacy in

[1] Deputy District Officer, Agricultural Extension Department, Swabi, Khyber Pakhtunkhwa (KPK), Pakistan.
[*] Corresponding author; email: gilluaf707@uaf.edu.pk
[2] Institute of Agricultural Extension and Rural Development, University of Agriculture, Faisalabad, Pakistan.

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such a way that empowers the farming community (David, 2007). To cope with the challenge and shift in paradigm, many extension approaches were used in Pakistan for increasing productivity in general and profitability in particular. These approaches, however, failed to achieve the required goal because they were almost top down in nature. Therefore, provincial Government of Khyber Pakhtunkhw-Pakistan introduced a new extension approach known as FFS which provides a season-long, field based and discovery-oriented learning opportunity to improve farmers' livelihood. It comprises of a group of 25-30 farmers who are facilitated by an extension worker in conducting various integrated crop management practices. The participants of the group are divided into sub groups of 4-5 farmers who learn how to make and record detailed observations regarding various growth and development stages of crop including identification of insect pests, predators, and weeds. Similarly, they recognize disease levels, determine the effect of soil and weather conditions on the overall plant health (Habib *et al.,* 2007). FFS provides an opportunity to its participants to learn together, test and adopt the practices which have proved to be useful. This approach employs practical ways of learning i.e. observing various phenomena, making discoveries, discussing relevant topics, thinking critically and undergoing group decision processes. Discussion and analysis of different events are important ways to merge local knowledge with scientific ideas. This process improves farmers' skills and builds their self-confidence thus making them capable of effective decision making. The basic objective of FFS is capacity building of farmers for analysis of their crop production and protection systems, identification and prioritization of problems, testing possible solutions, and finally, adoption of the most appropriate practices. Capacity building through participatory learning process of FFS helps farmers to adopt recommended production technologies that are more profitable and responsive to their varying agro-ecological conditions. The training organized under FFS approach assists farmers in improving their capacity to make critical decisions that may make their production systems more productive, profitable, and sustainable (Khisa, 2003). Therefore, FFS play an important role in serving as a platform for human capacity building and empowerment, which in turn can ensure the success of services provided for the community (Duveskog and Friis-Hansen, 2008). FFS creates conformity between conventional and scientific knowledge, thus enabling farmers to make better decision in their respective agro-ecology. FFS approach develops as well as modifies technologies, which actually perform well and are acceptable to their ultimate users farmers (Röling, 2002; Nederlof and Odonkor, 2004; Röling *et al.* 2004). FFS develops farmers' skills and knowledge and, thus, makes them empowered in choosing appropriate crop management practices. Aslam *et al.* (2006) stated that a large size of horticultural crops in Pakistan including fruits, vegetables and flowers go to waste in pre- and post-harvest handling and in transit of these commodities. They estimated that on average 25-40% of annual production of horticultural crops in Pakistan was lost because of poor pre- and post-harvest practices/conditions. This study is, therefore, designed to analyze the perceived effect of FFS approach on capacity building of farmers in controlling pre and post harvest losses.

MATERIALS AND METHODS

The population for the study consisted of all the FFS farmers in the study area, which comprised 7 districts of the central region of Khyber Pakhtunkhwa i.e. Peshawar, Charsadda, Nowshera, Mardan, Swabi, Kohat and Hangu having similar agro-ecological condition. Four FFS out of 16 and 10 farmers out of 25 were selected at random from each FFS and from each district, thereby making a total of 280 farmer

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respondents. The selected FFS were representative of the entire population. The primary data were collected by the researchers using "survey" method with the help of interview schedule covering both open and close-ended questions (Taylor *et al.*, 2007). The content validity of the data collection instrument was checked by the four different experts in the Department of Agricultural Extension, University of Agriculture Faisalabad having specialization in communication, evaluation, research methodologies and in training (Farooq, 2001). After making minor amendments, the research instrument was pre-tested. To analyze the data, descriptive statistics were used through computer software called SPSS for different variables and the results drawn are given in Table 1.

RESULTS AND DISCUSSION

Table 1 depicts a highly improved effect of FFS (based on farmers' perceptions) on controlling losses caused by rodents which

Table 1. Distribution of farmer respondents according to the effect of FFS on their capacity building in controlling various pre-harvest losses, various aspects of post-harvest technology, various aspects of marketing, controlling losses caused by store insect/pest. [a]

Controlling pre-harvest losses caused by	Improved		No change		Deteriorated		Total score	Rank order
	No. *X* (+1)	%	No. *X* (0)	%	No. *X* (-1)	%		
Rodents	121	43.21	91	32.50	68	24.29	53	1
Grain shedding	87	31.07	134	47.86	59	21.07	28	2
Birds	103	36.79	99	35.36	78	27.86	25	3
Wild animals	97	34.64	106	37.86	77	27.50	20	4
Immaturity	75	26.79	127	45.36	78	27.86	-3	5
Weather	26	9.29	191	68.21	63	22.50	-37	6
Capacity building in various aspects of post-harvest technology [b]								
Packing	113	40.36	127	45.36	40	14.29	93	1
Harvesting/Picking	126	45.00	101	36.07	53	18.93	73	2
Storing	107	38.21	116	41.43	57	20.36	50	3
Transportation	97	34.64	113	40.36	70	25.00	27	4
Capacity building in various aspects of marketing [c]								
Educates in labeling	103	36.79	122	43.57	55	19.64	48	1
Trains in grading	95	33.93	135	48.21	50	17.86	45	2
Helps in packing	76	27.14	139	49.64	65	23.21	11	3
Transportation	88	31.83	110	39.29	82	29.29	06	4
Facilitation in marketing agricultural produce	27	9.64	177	63.21	76	27.14	-48	5
Controlling losses caused by store insect/pest [d]								
Grain borer or wheat weevil	141	50.36	101	36.07	38	13.57	103	1
Store weevils	129	46.07	114	40.71	37	13.21	92	2
Grain beetles	132	47.14	96	34.29	52	18.57	80	3
Grain moths	83	29.64	158	56.43	39	13.93	44	4
Flour beetles	56	20.00	133	47.50	91	32.50	-35	5
Maize weevils	45	16.07	123	43.93	112	40.00	-67	6

[a] Source: Field Data; n= 280, Average score= 14.33, [b] Average score= 60.75. , [c] Average score= 12.40., [d] Average score= 36.17.

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was ranked 1st with a score of 53 followed by grain shedding and birds which were ranked 2nd and 3rd with score values of 28 and 25, respectively. Controlling losses through wild animals was also improved. However, controlling losses through immature harvesting and weather got deteriorated. The positive effect of FFS on rodents and grain shedding may be due to the higher focus of farmers on these aspects, as these factors cause great damage and sometimes destroy the whole crop, and also because precious irrigation water is lost in the holes made by rodents in the fields. The findings of study are supported by those of Kwarteng *et al.* (2004) who assessed the participatory technology development and extension (PTD&E) approach adopted in Ghana to introduce integrated pest management (IPM) practices and found that the approach had positive effect on farmers-extension workers relationships with each other and improved farmers' competencies in controlling pests and diseases and sharing technical information effectively. Table 1 indicates that the highest improvement was observed with respect to packing of the produce and was ranked 1st with score of 93, followed by harvesting/picking and storing which stood 2nd and 3rd with score values of 73 and 50, respectively. However, transportation was also improved. The findings of the present study are strengthened by those of David (2007) who conducted a case study of those farmers who participated in an Integrated Crop and Pest Management (ICPM) on cocoa in Cameroon and those who did not participate in the ICPM-FFS. The results of the study confirmed the efficiency of discovery-based learning supported by a facilitator. FFS provided its participant farmers with sufficient opportunities to learn new skills and knowledge regarding cocoa ICPM as compared to the non-FFS participants and most of the participant farmers applied these skills and knowledge on their farms. FFS participants had greater test scores than non-FFS participants and got below average scores in the field of tree physiology and used pesticide rationally. Table 1 shows that farmers' capacity was highly built up in labeling their produce closely followed by the training in grading, which ranked 1st and 2nd with score values of 48 and 45, respectively. The aspects of packing and transportation were less improved. However, facilitation in marketing agricultural produce got deteriorated. The improvement in various aspects of marketing might be due to the knowledge gained by farmers in various sessions of FFS. Other reason may be better prices/ returns for their produce. However, no change or less effect on the aspect of marketing facilitation may be due to the small land holdings and, consequently, low harvest, which encourages the farmers to sell the crop to the middle men in their fields at low prices. Another factor contributing to the situation is the inadequate focus of the FFS facilitators on disseminating information regarding price situation in various markets or one collective marketing. The findings of this study are strengthened by those of Ahmad (2009) who perceived that efficiency of extension workers in marketing was at the least level under decentralized agricultural extension system in Peshawar district as reported by a good number of farmers and also by Reardon and Berdegue (2002) who reported that the public sector agricultural extension and advisory services had been unsuccessful in training farmers to respond to the changing market demands in the scenario of globalizing food and commodity trade. Table 1 reveals that capacity of the respondents was highly improved in controlling grain borer or wheat weevil, store weevils, and grain beetles in FFS, which were ranked 1st, 2nd, and 3rd on the basis of total scores i.e. 103, 92, and 80, respectively. However, their skill in controlling losses caused by grain moths, flour beetles, and maize weevils were comparatively less improved as shown by the farmer respondents in the area. The highest rating of controlling losses caused by grain borer or wheat weevils may be due to high infestation of insect/ pests in stored

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grains which was really a threat for them in the sense of food security. The findings of this study are strengthened by those of Irshad and Baloch (1985) who reported that storage losses of wheat in the Punjab province ranged from 3.5% to 25.0 % and Navarro *et al*. (1978) who reported that heavy storage losses occurred due to insect pests' infestation. Mohammad (2000) reported that loss percentage in average weight of wheat in storage ranged from 0.008 to 10.4%.

In short the highest improvement as a result FFS activities was seen in controlling losses by rodents, proper packaging and labeling of the produce, and controlling some stored grain pest like grain borer and wheat weevil.

CONCLUSIONS

The following conclusions can be derived from the present study:

Overall FFS had successfully built up the capacity of farmers in controlling pre- and post-harvest losses, especially those caused by pests. Farmer respondents learnt to control pre-harvest losses caused by rodents, birds, weather, grain shedding, wild animals and immature harvesting. The highest capacity building in these areas suggested that FFS had improved managerial capabilities of farmers with respect to pre and post harvest losses. Farmers were also trained in controlling losses occurring during harvesting/picking of crop, packing of the produce, transportation from farm to market, and improper storing of the produce. The capacity building achieved in these aspects may be due to the focus of FFS on the skill development of the farmers relating to these areas. Marketing facilitation was perceived to be deteriorated by the respondents, which may be due to farmers' small holdings, low production level, and less focus of FFS facilitators on collective marketing. Farmers' skill was improved in controlling losses caused by store insect/pests.

Recommendations

EFS facilitators should focus on crops harvest at the right stage of physiological maturity in order to avoid losses through grain shedding.

Farmers should be educated to control wild animals by beating drums, making non target firings near the fields and making plastic statues where there is a fear_of its invasion.

FFS facilitators should focus on the control of fluor beetles and maize weevils besides marketing facilitation.

To benefit the rest of the community, it is recommended that the number of FFS be increased.

A comprehensive study may be planned to develop strategy to control pre- and post-harvest losses at farmers' field.

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اثرهای پنداری روش مدرسه صحرایی روی ظرفیت سازی در کشاورزان برای مهار تلفات پیش و پس از برداشت محصول

ا. خاتم، س. محمد، و ا. اشرف

چکیده

پژوهش حاضر که در طی سال ۲۰۱۰ انجام شد هفت ناحیه پیشاور، چارصددا، نوشرا، مردان، سوابی ، کوهت و هانگو را در منطقه مرکزی خیبر پختونخوا در پاکستان در برمیگرفت. هدف این مطالعه تحلیل اثرهای پنداری مدرسه صحرایی کشاورزان(FFS) روی ظرفیت سازی در کشاورزان برای مهار تلفات پیش و پس از برداشت محصول بود. برای تحلیل داده های گردآمده از ۲۸۰ کشاورز که به طور تصادفی انتخاب ومصاحبه شده بودند، ازآماره های توصیفی استفاده شد. تجزیه وتحلیل داده ها آشکار ساخت که مدرسه صحرایی کشاورزان به گونه ای چشمگیر ظرفیت ومهارت کشاورزان را برای مهار تلفات پیش و پس از برداشت محصول ناشی از جوندگان ، پرندگان ، برداشت زودتر از موعد ، بسته بندی وانبار داری نامناسب ، و حمل ونقل محصول افزایش داده بود. همچنین ، مدرسه مزبور در کاهش تلفات در بازار ، مهار نقب زن غلات ،سرخرطومی گندم و سوسک سرخرطومی انبار به گونه ای موثر به کشاورزان کمک کرد. از این پژوهش نتیجه گیری شد که بیشترین بهبود ناشی از فعالیت های روش مدرسه صحرایی در مهار تلفات جوندگان، بسته بندی وبرچسب زنی محصول، و مهار چند آفت انباری غلات مانند نقب زن غلات و سرخرطومی گندم بود. به طور کلی ، ظرفیت و مهارت کشاورزان در تقریبا همه جنبه های مهار تلفات پیش و پس از برداشت محصول افزایش یافت مگر در موارد معدودی مانند تلفات ناشی از برداشت زودتر از موعد ومهار تلفات ناشی از حشرات انباری ،که این امر نیازمند توجه مقامات مسول است.

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