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

A. Khatam1∗, S. Muhammad2, 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...
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 Pakhtunkhwa-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
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>
<thead>
<tr>
<th>Controlling pre-harvest losses caused by</th>
<th>Improved</th>
<th>No change</th>
<th>Deteriorated</th>
<th>Total score</th>
<th>Rank order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodents</td>
<td>121</td>
<td>91</td>
<td>68</td>
<td>53</td>
<td>1</td>
</tr>
<tr>
<td>Grain shedding</td>
<td>87</td>
<td>134</td>
<td>59</td>
<td>28</td>
<td>2</td>
</tr>
<tr>
<td>Birds</td>
<td>103</td>
<td>99</td>
<td>78</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>Wild animals</td>
<td>97</td>
<td>106</td>
<td>77</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>Immaturity</td>
<td>75</td>
<td>127</td>
<td>78</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Weather</td>
<td>26</td>
<td>191</td>
<td>63</td>
<td>-37</td>
<td>6</td>
</tr>
</tbody>
</table>

Capacity building in various aspects of post-harvest technology:

| Packing                             | 113      | 127       | 40           | 93          | 1          |
| Harvesting/Picking                  | 126      | 101       | 53           | 73          | 2          |
| Storing                             | 107      | 116       | 57           | 50          | 3          |
| Transportation                      | 97       | 113       | 70           | 27          | 4          |

Capacity building in various aspects of marketing:

| Educates in labeling                | 103      | 122       | 55           | 48          | 1          |
| Trains in grading                   | 95       | 135       | 50           | 45          | 2          |
| Helps in packing                    | 76       | 139       | 65           | 11          | 3          |
| Transportation                      | 88       | 110       | 82           | 06          | 4          |
| Facilitation in marketing in        | 27       | 177       | 76           | -48         | 5          |

Controlling losses caused by store insect/pest:

| Grain borer or wheat weevil         | 141      | 101       | 38           | 103         | 1          |
| Store weevils                       | 129      | 114       | 37           | 92          | 2          |
| Grain beetles                       | 132      | 96        | 52           | 80          | 3          |
| Grain moths                         | 83       | 158       | 39           | 44          | 4          |
| Flour beetles                       | 56       | 133       | 91           | -35         | 5          |
| Maize weevils                       | 45       | 123       | 112          | -67         | 6          |

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*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.
was ranked 1\textsuperscript{st} with a score of 53 followed by grain shedding and birds which were ranked 2\textsuperscript{nd} and 3\textsuperscript{rd} 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 the present study are strengthened by those of Kwarteng \textit{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 1\textsuperscript{st} with score of 93, followed by harvesting/picking and storing which stood 2\textsuperscript{nd} and 3\textsuperscript{rd} 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 1\textsuperscript{st} and 2\textsuperscript{nd} 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 Berdegué (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 1\textsuperscript{st}, 2\textsuperscript{nd}, and 3\textsuperscript{rd} 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
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 of FFS activities was seen in controlling losses by rodents, proper packaging and labeling of the produce, and controlling some stored grain pests 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 flour 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.

REFERENCES

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

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چکیده

پژوهش حاضر که در طی سال 1399 انجام شده هفته نانجی پیشاور، چارصدخدا، نوشر، مردان، سوابی، کوهت و هانگو را در منطقه مرکزی خیبر پختونخوا در پاکستان در بر می‌گرفت. هدف این مطالعه تحلیل اثرهای پنداری مدرسه صحرایی کشاورزان (FFS) روی ظرفیت سازی در کشاورزان برای مهار تلفات بیش و پس از برداشت محصول بود. برای تحلیل داده‌های گردآمده آن، 280 کشاورز که به طور تصادفی انتخاب و مصاحبه شده بودند، از آماره‌های توصیفی استفاده شد. تجربه و تحلیل داده‌ها آن‌ها با مدل رگرسیون میانی بررسی شد. نتایج نشان داد که مدرسه صحرایی کشاورزان به گونه‌ای چشمگیر ظرفیت و مهارت کشاورزان را برای مهار تلفات بیش و پس از برداشت محصول ناشی از بیماری‌های مختلف جنگلی، بردندگان، برداشت زودتر از موعود، به دنبال وانیار داری ناماسب، و حمل و نقل محصول افزایش داده بود. همچنین مدرسه مزبور در کاهش تلفات در بیمار تله‌گرم و مهار تله‌گرم شرخ‌شکمی و سوسک سرخرطومی ایثار به گونه‌ای مؤثر بود که در بازار کشاورزان کمکی کرد. از این پژوهش نتیجه گیری شد که پیش‌ترین بهبود ناشی از فعالیت‌های روش مدرسه صحرایی در مهار تلفات گونگلاز، به دنبال ورود نیز محصول و مهار بند از آفت انباری غلظت مانند تله‌گرم دارالادم بوده به طور کلی، ظرفیت و مهارت کشاورزان در تقریبا همه جنبه‌های مهار تلفات بیش و پس از برداشت محصول افزایش یافته‌گیر در موارد محدودی مانند تلفات ناشی از برداشت زودتر از موعود و مهار تلفات ناشی از حشرات انباری، که این امر نیازمند توجه مقامات مسئول است.