



Global Advanced Research Journal of Plant Science (GARJPS) Vol. 1(2) pp. 039-045, September, 2015.
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Full Length Research Papers

Identifying Problems Faced by Facilitators and Farmers in Integrated Pest Management Farmer Field Schools' Training Programme in Sindh Province

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Accepted 26 August, 2015

The FAO-EU-ADB funded National Integrated Pest Management Programme (Nat-IPM) for Cotton was started in Pakistan during 2001-2004 and introduced new extension training methodology called Farmer Field School (FFS). Basic principle of FFS training was to enable farmers to be self-sufficient, using Integrated Pest Management (IPM) practices that are agro-ecosystem friendly. To identify problems faced by the facilitators (ToF participants) and farmers (FFS participants) in IPM-FFS training programme with special reference to cotton, study was conducted in four districts of Sindh province (Hyderabad, Tando Allahyar, Matiari and Mirpurkhas) of Pakistan. The sample size comprised of 48 facilitators and 144 farmers in total. The results of this study indicated that facilitators and farmers were involved in IPM programme due to their self-interest despite facing some problems in IPM-FFS training programme.

Keywords: Integrated Pest Management (IPM), Farmer Field School (FFS), Training of Facilitators (ToF).

INTRODUCTION

Pakistan is recognized as an agricultural country in the world. Agriculture is considered as back bone for the economic growth of Pakistan. About 60 percent of the Pakistan's population is associated with agricultural occupation. Being the principal sector in the development, agriculture contributes 21 percent to GDP, employs 45 percent of country's labor force and contributes substantially to export earnings. Looking at the significance of agriculture, the Government's main concern is to raise the agricultural productivity through adoption of modern technologies. The grown crops in the country are cotton, sugarcane, rice, wheat, and oil seed crops such as

sunflower and mustard. Among them cotton is considered major cash crop (GoP, 2011).

Despite being one of the largest cotton growing countries, per acre cotton yield remains low as compared to other countries (GoP, 2011). The low yields result from unfavorable weather, pests attack and limited awareness of the pesticides and pest management options for improved cropping. Farmers use a variety of pesticides on cotton crop to eliminate insects and weeds from their fields, these pesticides can have the potential to harm human and the environment. The excessive or mistimed use of the pesticides can disrupt the growth of cotton beneficial insects and provide an opportunity for harmful pests to attack. Also the pesticides use increases production costs to growers (GoS, 2013). To address these challenges, research efforts have taken to minimize dependence on

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pesticides through the implementation of IPM-FFS programmes (Page & Ritchie, 2009). Unfortunately, in most cases the IPM-FFS programmes have limited success on reducing the use of pesticides (Fitt *et al.* 2004). To a certain extent reasons are environmental uncertainty, poor knowledge of farmers and untrained IPM experts.

The Farmer Field School (FFS) is a training model developed primarily by Food and Agriculture Organization (FAO) in which farmers gain the decision making power regarding use of agro-chemicals at their field. The FFS approach is unique extension season long training conducted on their fields. This extension approach is action-learning oriented where farmers are allowed to observe, analyze and make alternative decision about their crop (Kingsley, 1999). IPM-FFS training emphasized that the crops should be healthier with reduced use of pesticides, which could be deleterious to natural pest control mechanism. In addition, the basic principle of IPM-FFS training was to enable farmers to become self-sufficient, using Integrated Pest Management practices that are agro-ecosystem friendly. To tackle these issues farmers require to have improved disease and pest recognition, to understand methods of monitoring and control options and be able to correctly apply chemistry or IPM techniques. The farmers who participate in FFS become part of wide scale IPM programmes, ranging from local to national research; they analyze production issues and develop solutions for them at the country level (FAO, 2000). This collective research with farmers involves establishing local needs, information about local conditions, eco-system characteristics, and weather (Linh, 2001).

Various studies regarding IPM-FFS programmes agree that FFS strengthens farmers' eco-logical knowledge (Thiele *et al.*, 2001; Rola *et al.*, 2002; Feder *et al.*, 2004; Reddy and Suryamani, 2005; Tripp *et al.*, 2005). Improved farmer knowledge and understanding of the crop eco-system leads ultimately to reduction in pesticides use and increases production and profit (Godtland *et al.*, 2004; Khan *et al.*, 2005).

In the strategy and policy for agricultural development by Government of Pakistan, extension field workers were trained to empower the farmers in growing healthy cotton crop through understanding agro-ecosystem, conserving bio-diversity with Good Agricultural Practices (GAP) and increasing profit margin of farmers. Potential stakeholders took efforts and launched FAO-EU funded National Integrated Pest Management Programme (Nat-IPM) for Cotton in Pakistan during 2001-2004 and introduced new extension training methodology called Farmer Field School (FFS). FFS training emphasized that the crops should be healthier with minimum and rationale use of pesticides in order to avoid the adverse impact on the nature and encouraged to the stick with the natural pest mechanism through IPM practices. In this connection, IPM-FFSs

deployed around the country but problems faced by facilitators and farmers during programme activities were not assessed, the purpose of this study was to identify those problems. In addition, this study will help in evaluating FFS as reliable extension methodology to strengthen the agriculture information flow and dissemination of IPM technology.

MATERIAL AND METHODS

Data was collected from the four selected districts of Sindh province viz., Hyderabad, Tando Allahyar, Matiari and Mirpurk has, where FFSs were conducted during 2001 to 2004 through the National IPM (Nat-IPM) programme for cotton. The presented research study utilized a descriptive research approach. In descriptive survey research, the researcher selects a group of respondents, collects information and then analyzes the information to answer the research questions (McMillan, 2008). The sampling frame of facilitators (ToF Participants) and farmers (FFS Participants) involved IPM-FFS training programme in selected districts of Sindh was obtained from National IPM programme coordinator, Director General, Agricultural Extension Wing, Hyderabad. From the facilitators, the total sample of 48 were taken out of 55 and the 144 of sample size taken out of 160 farmers on a random basis by using a table to "Determining sample size from a given population" (Degree of Accuracy = ± 0.05 , Confidence Level = 95%), (Wunsch, 1986).

The questionnaires were developed in consultation with the subject specialist and following review of available literature. The concepts or ideas were predominantly measured through different statements on a continuum ranging from negative towards positive. A data coding sheet was developed and all data were analyzed using appropriate statistical analysis techniques, with IBM-SPSS version 19 used for data analysis. Frequency, mean, percentage, standard deviation and T-test were calculated.

RESULTS AND DISCUSSION

Demographic information of facilitators

The demographic characteristics of the sampled facilitators are presented in table-1 it shows most of the facilitators (87.2%) fell in the age group of 41 to 50 years. Majority of facilitators had M.Sc. degree (91.5%) and were agriculture officers (70.2%). Large number of facilitators (95.7%) had professional experience in the range between 11 to 20 years and most of them were involved in Training of Facilitators (ToF) in the interest of their self-development.

Table 1. Demographic information of facilitators

Characteristics	Category	Frequency	Percentage
Age Group (Years)	20 to 30	00	0.0
	31 to 40	4	8.5
	41 to 50	41	87.2
	51 to 60	2	4.3
Educational Qualification (Years)	Diploma	4	8.5
	B.Sc.	00	0.0
	M.Sc.	43	91.5
	M. Phil.	00	0.0
	Ph.D.	00	0.0
Designation	Field Assistant	4	8.5
	Agriculture Officer	33	70.2
	Deputy District Officer	6	12.8
	District Officer	3	6.4
	Executive District Officer	1	2.1
Professional Experience (Years)	Less than 10	00	0.0
	11 to 20	45	95.7
	21 to 30	2	4.3
	31 to 40	00	0.0
Intention to Involve in ToF	Self-Development	32	68.1
	Government Interest	7	14.9
	Incentives Attraction	4	8.5
	Colleagues Motivation	4	8.5

Demographic information of farmers

The demographic characteristics of the sampled farmers are presented in table-2 it shows most of the farmers (28.1%) were young and falling into the age grouped of 21-30 years. The educational level of farmers was not good; majority of them (27.4%) educated only up to primary level. Most of them (27.4%) were owners of land in between the range of 11 to 20 acres. Large number of (36.3%) farmers had experience in the range of 11 to 20 years followed by less than 10 years of experience (29.6%). Majority of the farmers (25.9%) had their farm yearly income more than 100,000/- (Pak rupees) followed by farm income in the range of 41,000 to 60,000 (23.0%) farmers. Majority of farmers were involved in IPM-FFS training programme in the self-interest.

Rank wise problems faced by facilitators in IPM-FFS training

The information gathered about problems faced by the facilitators during IPM-FFS activities through the open-

ended questions as respondent may answer according to their wish and ranked. According to facilitators respective opinion 'lack of participatory approach among participants was one of the problems during IPM-FFS activities' had been the top ranking barrier; while 'Late coming of the participants at IPM-FFS training' ranked 2nd and 'farmers considered pesticides are easy to apply so they felt that it's useless to go for agro-ecological sound IPM practices' ranked as 3rd most important constraint as perceived by the facilitators at IPM-FFS activities. Similarly, the polite dealing of the facilitators with participants developed ignorance and lack of enthusiasm among them, this barrier for facilitators ranked 4th, while 5th ranking barrier was that the 'some participants thought that facilitator is compelled to run IPM-FFS and they expected extra benefit to attend the training'. The problem that is a barrier and ranked 6th was that 'Not all participants were cultivated cotton so it was difficult to make them understand the harmful and beneficial cotton insect pests' while 'all participants were not decision makers themselves, so they were compelled to abide instructions by the manager/landlord' received 7th ranking. The 8th ranking as the barrier considered by facilitators that 'some participants were not interested in all

Table 2. Demographic information of farmers

Characteristics	Category	Frequency	Percentage
Age (Years)	Less than 20	25	18.5
	21 to 30	38	28.1
	31 to 40	30	22.2
	41 to 50	23	17.0
	51 & above	19	14.1
Educational level (Years)	Illiterate	26	19.3
	Primary	37	27.4
	Middle	24	17.8
	Matriculate	11	8.1
	Intermediate	13	9.6
	Graduate	15	11.1
Farm Size (Acres)	Post Graduate	9	6.7
	Less than 10	27	20.0
	11 to 20	37	27.4
	21 to 30	30	22.2
	31 to 40	21	15.6
	41 & above	20	14.8
Farming Experience (Years)	Less than 10	40	29.6
	11 to 20	49	36.3
	21 to 30	23	17.0
	31 to 40	15	11.1
	41 & above	8	5.9
Farm Yearly Income (Pak rupees)	Up to 20,000	7	5.2
	21,000 to 40,000	27	20.0
	41,000 to 60,000	31	23.0
	61,000 to 80,000	15	11.1
	81,000 to 100,000	20	14.8
	100,000 and above	35	25.9
Intention to Involve in FFS	Self Interest	69	51.1
	Request by Farm Manager	16	11.9
	Land Lord Ordered	12	8.9
	Motivated by EFW/F	38	28.1

IPM-FFS activities i.e. CESA, insect zoo, sheet preparation and presentation' (table 3).

Rank wise problems faced by farmers in IPM training

The information collected about problems faced by the farmers (FFS participants) during training programme activities through open-ended question as respondent may answers with freedom of expression and their responses were ranked (table 4). According to their respective opinion 'IPM-FFS activities were difficult and time consuming' had been the top ranking barrier; while 'no extra benefit of adopting agro-ecological sound IPM practices' ranked

2nd and 'lack of participatory approach among participants during IPM-FFS training' ranked as 3rd most important constraint at IPM-FFS activities. 'Participants lost interest in IPM-FFS training due to strict and hectic schedule' was a barrier ranked 4th and as perceived by the farmers the 5th ranking barrier was 'facilitators usually not replied the questions so it was embracing for participants'. Another important constraint as perceived by the farmers (rank 6th) was 'influence of pesticide dealer's discouraged participants to follow agro-ecological sound practices'. Chukwuone, *et al.* (2006) who described major constraints that affect the technology transfer process are extension system lapses, lack of cooperation by farmers,

Table 3. Rank wise problems faced by facilitators in IPM-FFS training

Problems/Barriers/Constraints	Rank Order
Lack of participatory approach among participants was one of the barriers during IPM-FFS activities.	1 st
Participants usually came late in IPM-FFS training so that group formation was not formed properly till group members completed.	2 nd
Participants considered that pesticides are easy to apply so they felt that it's useless to go for agro-ecological sound IPM practices.	3 rd
Facilitator dealt politely with participants so some participants ignored and not participated enthusiastically in IPM-FFS training.	4 th
Facilitator run FFS regularly so some participants thought that facilitator is compelled and they expected extra benefit for attending the training.	5 th
Not all participants were cultivated cotton so it was difficult to make them understand the harmful and beneficial cotton insect pests.	6 th
All participants were not decision makers themselves so they were compelled to abide instructions by the manager/landlord.	7 th
Some participants were not interested in all IPM-FFS activities i.e. CESA, insect zoo, sheet preparation and presentation.	8 th

Table 4. Rank wise problems faced by farmers in IPM-FFS training

Problems/Barriers/Constraints	Rank Order
IPM-FFS activities were difficult and time consuming.	1 st
There was no extra benefit of adopting agro-ecological sound IPM practices.	2 nd
There was lack of participatory approach among participants during IPM-FFS training.	3 rd
Participants lost interest in IPM-FFS training due to strict and hectic schedule.	4 th
Facilitators usually not replied the questions so it was embracing for participants.	5 th
Influence of pesticide dealers discouraged participants to follow agro-ecological sound practices.	6 th

uncertainties experienced in agriculture, and conflicts among farmers.

Facilitators and farmers perception of IPM-FFS training programme

The comparative analysis of facilitators and farmers about IPM-FFS training was assessed by enquiring opinions on various statements. Mean and standard deviation on a five-point Likert scale (e.g. 1=Strongly disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly agree) are presented in table 5. Results showed highly significance, variation on the response of facilitators and farmers on the statement "No refresher training course was conducted on IPM-FFS for farmers" but results were non-significant on the remaining statements. Fliert (2000) concluded from his

studies that capacity building of facilitators requires a system of methods. FFS training programmes offers to get benefited from experienced and trained facilitators but requirements should be recognized and improve to facilitate the future trainers.

CONCLUSION

Innovation is the interaction process and well-operating of an innovation system relies on the ability of actors to interact and exchange information and knowledge with one another. The results of this study indicated that agriculture extension provided very weak support to FFS trained farmers after the phase-out of IPM programme. Culture of cooperation and contact has to be evolved among the facilitators of agriculture extension and farmers for

Table 5. Facilitators and farmers perception of IPM-FF Straining programme

Statements about IPM Programme		ToF Participants		FFS Participants		T-Value
		M	SD	M	SD	
1	No refresher IPM-FFS training was arranged on cotton for farmers or ToF for facilitators.	3.45	1.29	4.18	0.79	-4.55
2	Concept of IPM-FFS was not clear so farmers avoid adopting the agro-ecological sound IPM practices.	2.19	1.17	2.45	1.02	-1.44
3	Agriculture extension provided very weak support after the phase-out of IPM-FFS training programme.	3.66	1.12	3.62	1.12	0.19
4	There was no follow up by any NGO since the IPM-FFS training programme ended.	3.53	1.28	3.98	1.09	-2.29
5	Influence of pesticide dealers/traders discouraged farmers to follow agro-ecological sound IPM practices.	3.26	1.15	3.29	1.13	-0.17
6	There was cultural and social risk involve if one practice the agro-ecological sound IPM practices.	2.47	1.12	2.67	1.13	-1.07
7	There was a lack of confidence among farmers to adopt the IPM practices/technology.	3.34	1.18	2.74	1.11	3.11
8	Main reason of not adopting IPM technology was lack of participatory approach among farmers.	3.53	1.21	3.28	1.04	1.35
9	There was no extra benefit to farmers of adopting IPM technology and growing healthy cotton crop.	2.60	1.22	3.13	1.26	-2.52
10	Practicing IPM-FFS activities were difficult and time consuming where pesticides easy to apply.	2.23	1.20	2.79	1.20	-2.70
11	Use of pesticides became a reliable method so farmers felt that it's useless to go for IPM-FFS activities.	2.51	1.14	2.64	1.00	-0.76
12	Unavailability of required tools/material was one of reason for not continuing IPM-FFS activities.	2.17	0.842	2.60	1.18	-2.29

M = Mean, **SD** = Standard Deviation

1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly Agree

promoting IPM programmes. In addition, those Non-Government Organizations (NGOs) established to empower farmers through IPM-FFS training programme were not effective. It was suggested that the farmers could be a good source of transferring knowledge and information. The reorientation of FFS participants is important. Regarding this, the agriculture extension and NGOs needs to play an important role to support and persuade farmers who were participated in cotton IPM programme during 2001 to 2004. However, despite

problems' facilitators and farmers were involved in cotton IPM programme due to their self-interest.

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