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Farmers' Field School -An Efficient Package Programme for Participatory Technology Transfer in Brinjal

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A B S T R A C T

Farmers' Field School (FFS) offers a platform for farmers to have a field oriented, crop oriented and hands on training. It helps to enhance the technology domain of the farmers. It is normally a time bound activity which continues throughout the crop period. It is a participatory mode of technology transfer. Farmers Field School on IPM in brinjal was taken up as an intervention for the technology transfer of integrated pest management technologies among the farmers of Anaikattucheri village of Poonamallee block of Thiruvallur District. The awareness level of farmers was assessed by using ballot box test and agro eco system analysis was also done for biological parameters. The IPM strategies viz., clipping and disposal of affected shoots, removal of fruits with boreholes, installation of pheromone traps @ 12/ha, release of Trichogramma *chilonis* @ 8 cc/ha for 4 times at weekly interval, spraying of *Bacillus thurinjiensis* @ 1 kg/ha and spraying of Flubendiamide 20 WDG 7.5 g /10 lit were imparted through trainings and demonstrations. As a result, it is observed that the FFS plot showed good results in terms plant population, number of fruits per plant, shoot and fruit borer incidence, little leaf of brinjal of pest incidence, yield and income. It is observed that the plant population was 9440 /ha as it is 13 % increase over the check plot. Further it is observed that the incidence of shoot and fruit borer as 25 % and 10 % in Non-FFS and FFS plots respectively. While comparing the yield it is revealed that the Non-FFS plot recorded 29 t/ha and the FFS plot recorded 34t/ha which in turn increases the income by 70 % and the BC ratio was 3.94.

Introduction

The first FFS were designed and managed by the UN Food and Agriculture Organisation in Indonesia in 1989 since then more than two million farmers across Asia have participated in this type of learning. Further, the Farmers' Field School is an informal field school which evolved from the concept that farmers learn optimally from field observation and

experimentation with the help of facilitators. In FFS, the aim of a healthy agro-ecosystem is to manage insect pest populations to the point where natural predation operates in a balanced way and crop losses to pests are kept to an acceptable minimum and the emphasis is on holistic crop and pest management with the objectives of grow a healthy crop, conserve natural enemies of crop pests, conduct regular field observations, make farmers competent in their own field and reduce production costs. FFS is generally carried out on demo plot which serves as operational unit and always under observation. Based on the observations future line of activities will be carried out. It is composed of group of farmers with similar interest who meet regularly during the crop season to experiment as a group with new production or protection options. Typically FFS group has 25-30 farmers. After the FFS the farmers continue to meet and share information.FFS aims to increase the capacity of group of farmers to test new technologies in their own fields, assess results and their relevance to their particular circumstances, and interact on a more demand driven basis with the researchers and extensionists. In summary it is referred that a Farmer Field School (FFS) is a forum where farmers and trainers share observations, apply their past experiences and follow the present new information from outside the community. The results of the sessions are management decisions on what action to take. Thus FFS as an extension methodology is a dynamic process that is practiced and controlled by the farmers to transform their observations to create a more scientific understanding of the crop / livestock agro-ecosystem.

Brinjal is grown in an area of 261 ha in Tiruvallur district in Tamil Nadu. Even though, the crop covers considerable area the productivity is low. The main reason for yield loss is incidence of shoot and fruit borer (*Leucinodes orbonalis* Guen.) and little leaf of brinjal transmitted by brown leaf hopper. Farmers rely only on insecticides to combat brinjal shoot and fruit borer damage (Rahman *et al.*, 2006; Yousafi *et al.*, 2015). About 47 per cent insecticides are used for management of fruit and shoot borer out of the total pesticide consumed in vegetables. The indiscriminate and injudicious application of synthetic insecticides is the cause for the problems viz., increased production costs, residual toxicity, development of pesticide resistance, resurgence, secondary pest outbreak, health risks, environmental threats and destruction of natural enemies (Gaur and Chaudhary, 2009). In this context, to alleviate the consequences of insecticides, Integrated Pest Management strategy has been emphasized to the farmers. With this in mind FFS on IPM in brinjal was taken up as an intervention by the Krishi Vigyan Kendra, Thiruvallur for the technology transfer of integrated pest management technologies among the farmers of Anaikattucheri village of Poonamallee block of Thiruvallur District. It was implemented to help farmers to tailor their Integrated Pest Management (IPM) practices to diverse and dynamic ecological conditions especially in brinjal cultivation.

Materials and Methods

Brinjal is selected for the study as the crop demands more concentration on pest management and the farmers used to spray myriad rounds of pesticides. Further, based on the queries raised by the farmers during Scientific Advisory committee meeting of KVK, the Poonamalle block one of dominant areas of vegetable growers particularly brinjal was selected for the study. 25 farmers growing brinjal have been selected and enrolled for the conduct of farmers filed school. A farmer named Mr. Srinivasan of the village was identified as the convener of the school who voluntarily involved himself in developmental activities of the village. The demo area is 0.25

acres as FFS plot and 0.25 acres is also allocated as check as non-FFS plot. The awareness level of farmers was assessed by using ballot box test and the same test was applied after implementation of the FFS.

The farmers were trained in all aspects of brinjal crop cultivation in field based setting to investigate a wide range of topics, such as soil fertility and water resources, methods of local varietal selection and portray nursery management, risks associated with toxic pesticides and implementation of low-toxicity alternatives, knowledge on natural enemies and biological pest management techniques. The school was conducted throughout the season and the observations were made periodically and visualised by all the members of the school.

Results and Discussion

FFS on IPM in brinjal was conducted during Rabi 2014 in Anaikattucheri village of Poonamalle block of Thiruvallur District. As a premier domain of pest control, IPM strategy facilitates the farmers to manage crops by preventing pests from becoming a threat.

The school was conducted in various sessions namely nursery management, main field preparation, crop production and crop protection and marketing. The school started with an introduction class with the prelude of the concept FFS. Before the start of the regular classes ballot box test was conducted among the stakeholders on awareness and adoption of IPM technologies in brinjal and the results were documented. Scientists and specialists in horticulture crop production and plant protection were involved as resource persons during the conduct of the school. The farmers were also taken to an exposure visit to the nearby research station and KVK, Thiruvallur to know more about production and protection of brinjal crop.

The IPM strategies viz., clipping and disposal of affected shoots, removal of fruits with boreholes, installation of pheromone traps @ 12/ha, release of *Trichogramma chilonis* @ 8 cc/ha for 4 times at weekly interval, spraying of *Bacillus thurinjiensis* @ 1 kg/ha and spraying of Flubendiamide 20 WDG 7.5 g /10 lit were imparted through trainings and demonstrations.

Adjacent to the FFS field, another plot is maintained as non FFS plot wherein farmers applied only insecticides. Farmers sprayed insecticides viz., monocrotophos, cypermethrin, lambda cyhalothrin, imidacloprid etc. Observation on the healthy plant and plants infected with little leaf of brinjal disease, healthy shoots and shoots drooped at vegetative phase and healthy fruits and fruits with bore hole during each harvest, were made and then per cent plants infected with little leaf disease, shoot and fruit damage were calculated.

The result revealed that shoot and fruit borer damage assessed at reproductive phase as fruit damage was found to be low 10.0 per cent in FFS plot while in non-FFS plot it was 25.0 per cent.

Adoption of IPM strategies resulted in reduction in the fruit damage, little leaf brinjal and increase in yield were found to be 60.0, 77.7 and 17.2 per cent respectively (Fig. 2). Adoption of IPM strategies viz., clipping and disposal of affected shoots, removal of fruits with boreholes, installation of pheromone traps @ 12/ha and release of *T.chilonis* and spraying of insecticide reduced the shoot and fruit borer damage (Satpathy *et al.*, 2005). Now-a-days, major emphasis is being given on biological control as an alternate to the insecticides for management of the pest. More than a dozen parasitoids and three pathogens have been recorded as natural enemies of *Leuciniodes orbonalis* (Khorsheduzzaman *et*

al., 1998). Inundative release of bio agents, particularly egg parasitoids in pest management may be more advantageous.

The adult activity was monitored using sex pheromone traps and the moth catch was found to be high (12 moths / trap/ week) during first week of January, 2015. Sex pheromones are important component of IPM programmes and they are mainly used to monitor as well as mass-trap the male insects (Srinivasan, 2008). Delta traps, water traps and funnel traps could be used for the shoot and fruit borer sex pheromone lures in field conditions. However, the trap design that would attract more numbers of insects will vary from one location to the other. Hence, it had to be confirmed in repeated field experiments.

Pruning and prompt disposal of infested brinjal shoots at regular intervals up to the first harvest is an important component in the shoot and fruit borer IPM strategy (Srinivasan and Huang, 2009). This pruning is especially important in early stages of the crop growth, and this should be continued until the final harvest. This will be more effective when it is being followed by the whole community in a particular region than an individual grower. In addition, this pruning will not adversely affect the plant growth as well as yield (Talekar, 2002).

Egg parasitoid *T. chilonis* was found to be effective against *L. orbonalis*. The efficacy of *T. chilonis* may further be enhanced by improving the release technique and better integration with other tactics (Raja *et al.,* 1998). Adoption of IPM strategies for brinjal shoot and fruit borer resulted in less no. of insecticide spray, low plant protection cost, high fruit yield and high benefit coast ratio.

As a result in toto, it is observed that the FFS plot showed good results in terms plant population, number of fruits per plant, shoot and fruit borer incidence, little leaf of brinjal of pest incidence, yield and income. It is observed that the plant population was 9440 /ha as it is 13 % increase over the check plot. Further it is observed that the incidence of shoot and fruit borer as 25 % and 10 % in Non-FFS and FFS plots respectively. While comparing the yield it is revealed that the Non-FFS plot recorded 29 t/ha and the FFS plot recorded 34t/ha which in turn increases the income by 70 % and the BC ratio was 3.94.At the end of the season the group of FFS farmers had a field day to show case the results to other farmers and encourage them to follow the technologies imparted. The post awareness test showed a significant result *i.e.,* 84 per cent of the farmers aware of the technologies while compared to the pre awareness test and it was 0.08 per cent (Table 1; Fig. 1 and 2).

Table.1 Data on parameters FFS Vs Non-FFS plots (Comparative analysis)

Parameters	Check (Non FFS plot)	Demo (FFS plot)
Plant Population/ha	8333	9440
No of fruits / plant	12.8	15.1
Shoot & fruit borer incidence (%)	25	10
Little leaf of brinjal (PDI)	9	2
Yield (t/ha)	29	34
Net Return (Rs.)	1,85,300	3,22,000
BCR	2.77	3.94

Fig.1 Fruit damage, yield and BCR

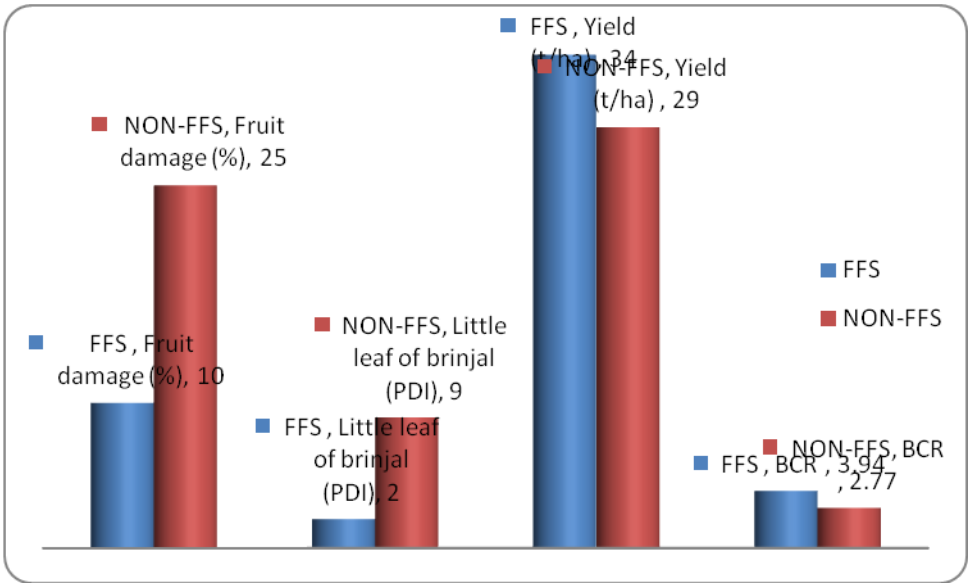
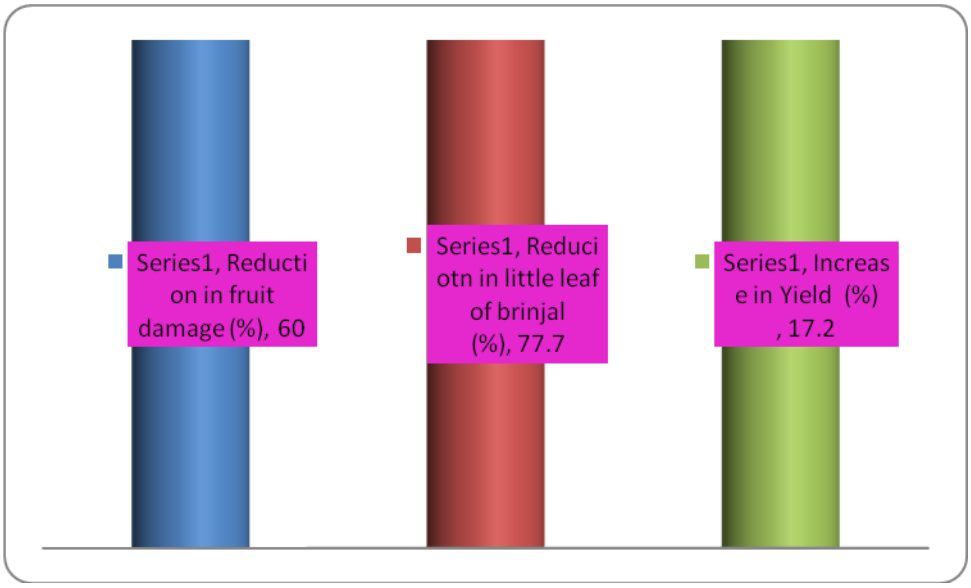


Fig.2 Impact of adoption of IPM strategies in FFS



Farmer field schools (FFS) is described as a Platform and "School without walls" for improving decision making capacity of farming communities and stimulating local innovation for sustainable agriculture. It is a participatory approach to extension, whereby farmers are given opportunity to make a choice in the methods of production through discovery based approach.

The main objective of the introduction of FFS as an alternative extension approach to the conventional extension approaches was to sharpen farmers' knowledge and skills through the season of FFS training on farmers' demand driven technology. The farmer field school approach since its inception has gained prominence as an extension methodology for effective transfer of technology transfer.

References

Farmer Field Schools to promote Integrated Pest Management in Asia: the FAO Experience1 Andrew Bartlett. Case Study presented to the 'Workshop on Scaling Up Case Studies in Agriculture', International Rice Research Institute, 16-18 August 2005, Bangkok.

Feder, G., R. Murgai, and J. B. Quizon (2004b) 'The acquisition and diffusion of knowledge: The case of pest management training in farmer field schools, Indonesia'. Journal of Agricultural Economics 55, no. 2 (2004b): 221-43.

Guidelines for conducting farmers' field school on improved package of practices for rice Ravinder Singh Saini National Consultant (Extension) National Food Security Mission Government of India Ministry of Agriculture Department of Agriculture and Cooperation "National Food Security Mission" Krishi Bhawan, New Delhi

Gaur K and Chaudhary B. The development and regulation of Bt brinjal in India (Eggplant/Aubergine). ISAAA Brief No. 38. 2009.

Khorsheduzzaman AKM, Ibrahim Ali M, Mannan MA, Ahmad A and Karim MA. Component technologies of IPM package for brinjal shoot and fruit borer for Bangladesh: A Review. Bangladesh J. Agric. Res. 1998; 23(4): 593-606.

Rahman MM, Latif MA, Yousuf M, Ali M. Judicious use of cypermethrin for the management of brinjal shoot and fruit borer, *Leuciniodes orbonalis* Guenee. Bangladesh Journal of Entomology. 2006; 16:45–56.

Raja J, Rajendran B and Pappiah CM. Management of egg plant shoot and fruit borer, *Leucinodes orbonalis* Guen. In: Reddy PP, Kumar NKK and Verghese A (eds.) Advances in IPM for horticultural crops. In Proceeding of the First Horticultural Crop: Environment implications and thrusts. Bangalore, 15-17 October, 1997, pp. 84-86.

Satpathy S, Shivalingaswamy TM, Akhilesh Kumar, Rai, AB and Mathura Rai. Biointensive management of eggplant shoot and fruit borer (*Leucinodes orbonalis* Guen.). Vegetable Science, 2005; 32(1): 103-104.

Srinivasan R. Integrated pest management for egg plant fruit and shoot borer (*Leucinodesorbonalis*Guen.) in South and South East Asia: Past, Present and Future. Journal of bio pesticides.2008; 1(2): 105 -112.

Talekar NS. Controlling eggplant fruit and shoot borer: A simple, safe and economical approach. International Cooperators' Guide, AVRDC Pub. #02-534. Asian Vegetable Research and Development Center, Shanhua, Taiwan. 2002. pp 4.

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