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# Impact of famers field school in knowledge of cotton production technology in western Rajasthan

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**ABSTRACT :** The Farmers' Field School (FFS) is a nonformal learner centered education process. It seeks to empower people to solve their field problems actively by fostering participation, interaction, dialogue, joint decision making etc. The present investigation was carried out in Pali district of Rajasthan. The three blocks *viz.,* Raipur, Jaitaran and Sumerpur were purposively selected for the study where FFS has been organized in the year 2015-2016. The study revealed that there was a significant difference in the overall knowledge level of participants and nonparticipants of FFS. More number of participants (85.00 % belonged to high level of knowledge, whereas, more number of non participants (73.75 %) belonged to low level of knowledge. The farmer field school is nonformal education process where farmers will be trained on various aspects like how to select a seed, suitable varieties for the area, Agro ecosystem Analysis (AESA), Integrated Pest Management (IPM), field observation, observation of pests and natural enemies, important features of the crop environment and so on. Variables like age, education, extension participation and extension contact, mass media exposure and achievement motivation of the farmers were found to have significant association with knowledge level of participants.

***Key words :*** Association, awareness, cotton, farmer field school, impact, knowledge

The traditional *"Transfer of Technology Model"* in research extension services in many developing countries has increasingly come under considerable pressure. Imperfections in agricultural information flow among research, extension and farmers have led to high transaction costs, which in turn have lowered the pace of agricultural production. Currently, one of the practical dilemmas is to improve the performance of agricultural extension service, which is currently facing resource, logistical and methodological constraints. In order to develop farmers' capacity to learn and to exploit opportunities in their local specific situation, it is essential that the learning materials be developed by farmers themselves through personal involvement from field experiments. Since the learners themselves develop the materials, they can relate to them and even explain their contents. These conditions are satisfied by the Farmer Field Schools' approach making it a springboard for enhancing learning among farmers.

Cotton, the **'White Gold'** or the **"King of Fibers"**, is one of the oldest fibers cultivated all over the world. Cotton production and trade is widely spread across the world with more than 80 nations cultivating the crop. In a development context, cotton is crucially important for income and employment providing by its production and processing. Cotton cultivation is a very important part of the Indian agrarian landscape and provides sustainable livelihood to a sizeable population in India. Cotton is cultivated in about 12.38 million ha in the country, which accounts for 30 per cent of the

global cotton area and contributes to 23.8 per cent of the global cotton produce. The crop with such a huge commercial value requires meticulous production management for obtaining lucrative returns for the farmers. Cotton, being the most important commercial crop, its cultivation is the most challenging and requires intensive and dynamic efforts of farmers to keep up the growth and development of cotton industry as well as cotton cultivation.

The first wave of FFS was conducted in 1989 in the rice fields of Indonesia. This involved 200 FFSs in four districts of Yogyakarta initiated by the Indonesian National IPM Programme with funds from the Government of Indonesia – United States Agency for International Development (GOI-USAID) and technical assistance from Food and Agriculture Organization of the United Nations (FAO). With this background, the present study was undertaken to assess the knowledge level of participant and non participant cotton growers of Farmers' Field Schools (FFSs) and its association with socio economic characteristics.

The present investigation was carried out in Pali district of Rajasthan state. Three blocks *viz.,* Raipur, Jaitaran and Sumerpur were purposively selected for the study where FFS was organized in the year 2015-2016 by KVK, Pali. List of villages where FFS was organized was collected from CAZRI, Krishi Vigyan Kendra, Pali-Marwar. Eight FFS were selected randomly for the study and a total of 160 respondents were selected from the villages, out of which, 80 respondents were participants and 80 were nonparticipants. To know the impact of farmer field schools on knowledge level of cultivation practices 10 participants and 10 nonparticipants from each FFS were selected randomly. The present study was concentrated on cultivation practices of cotton. However, KVK established FFS for different crops like vegetables, cereals *etc.* Expost facto research design was employed for conducting the study. Thirty one major improved cultivation practices of cotton were selected for the study. Data were collected by using a detailed pretested interview schedule and PRA technique was employed wherever necessary. The information regarding knowledge about production technologies were gathered, scored, quantified, categorized, tabulated and interpreted using statistical methods like mean, standard deviation and chisquare.

**Knowledge level of participant and nonparticipant cotton grower of farmer field school regarding cultivation practices of cotton :** The overall knowledge level of respondents regarding cultivation practices of cotton presented in Table 1 indicated that there existed difference between participants and non-participants in their overall knowledge level with respect to cultivation practices of cotton. More number of participants (85.00%) belonged to high level of knowledge whereas more number of nonparticipants (73.75 %) belonged to low level of knowledge. The farmer field school is non-formal education process where farmers will be trained on various aspects like how to select a seed, suitable varieties for the area, Agro ecosystem Analysis (AESA), IPM, field observation, observation of pests and natural enemies, important features of the crop environment and so on. Hence, the participant farmers will be having the required knowledge about all these practices. The low knowledge level among nonparticipants may be due low exposure to new technology, lack of participation in training programmes, lack of participation in FFS, low mass media exposure and low extension contact when compared to participants who are in constant touch with day to day developments.

The findings are in agreement with findings of Meena and Singh (2016), Reddy and Suryamoni (2009) and Sharma *et al.,* (2016). The knowledge level of respondents regarding specific cultivation practices of cotton is presented in Table 2. The analysis of knowledge level of 80 participants is compared with 80 nonparticipants on 31 specific cultivation practices of cotton. The result shows that majority of participants (63.33 %) had correct knowledge about seed rate compared to non-participants of whom only 41.25 per cent had correct knowledge. Regarding spacing between the rows majority of both participants (85.00 %) and non-participants (31.25 %) had correct knowledge and when it comes to spacing between the plants, majority of participants (82.50 %) had correct knowledge whereas 26.25 per cent of nonparticipants had correct knowledge. Further, majority of participants had knowledge about suitable month for sowing (88.75 %), recommended varieties (95.00 %) and chemicals for seed treatment (57.50 %) when compared to non participants 45.00, 51.25 and 26.25 Per cent, respectively. It is quite evident that Farmer Field Schools train the farmers on all aspects related to cultivation practices in a participatory mode, farmers know about appropriate cultivation practices. Where, it is not so in case of non-participants since they did not have the required knowledge due to their non-participation in FFS and less exposure to other source of information. Findings confirm with the findings of Manoj and Vijayaraghavan (2014) and Meena and Chaudhary (2016).

Regarding fertilizers, majority of the participants had correct knowledge about recommended quantity of farm yard manure (63.75 %) and nitrogen fertilizer (80.00 %) whereas less number of nonparticipants (31.25 %) knew the recommended quantity of farm yard manure and nitrogen fertilizer (23.75 %). In farmer field schools, IPM and INM are given prime importance; as a result most of the participants had required knowledge about the organic and inorganic fertilizers as they are exposed to it and gave more importance to conservational agriculture as their prime motto in this method. Hence, the participants of farmer field schools are influenced to use organic manures extensively in their field along with the chemical fertilizers wherever required.

Regarding pest and diseases, sufficient number of participants had correct knowledge when compared to non participants *viz.,* difference between beneficial and harmful insects (72.50 %), difference between pest and disease (67.50 %), difference between fungicide and insecticide (63.75 %), name of the insect pest attacked (68.75 %) and name of the diseases attacked (61.25 %). Participants were influenced by FFS carry out regular experiments in the field

**Table 1.** Distribution of participation and non participation cumin growers farmers for farmer field school according to effectiveness of cumin cultivation (N=160)

| Effectiveness category | Participants (N=80) | | Non participants (N=80) | | Overall(N=160) | |
|---|---|---|---|---|---|---|
| | F | (%) | F | (%) | F | (%) |
| Low | 02 | 02.50 | 59 | 73.75 | 61 | 38.13 |
| Medium | 10 | 12.50 | 18 | 22.50 | 28 | 17.50 |
| High | 68 | 85.00 | 03 | 03.75 | 71 | 44.38 |
| **Total** | **80** | **100.00** | **80** | **100.00** | **160** | **100.00** |

F=Frequency; N= Number of farmers; %= Per cent

since farmers are regularly exposed to different IPM practices and educating themselves regarding pest and disease management. With respect to integrated nutrient management (INM), majority of participants had correct knowledge about FYM/compost (96.25%) and vermicompost (90.00 %). Since conservation agriculture is a part of FFS where farmers will be trained on these practices which involve the way of growing crops that conserve the soil and maintain soil fertility. Participant farmers know about the importance of the FYM, vermicompost and other organic manures in the field to maintain soil structure and fertility. Hence, most of the participant farmers have knowledge about these.

Regarding biofertilizers, more than ninety per cent of both participants and nonparticipants did not have correct knowledge. The reason for low knowledge regarding biofertilizers may be due to complex technology of biological practices, nonavailability of biofertilizers, cost of the technology and lack of desired risk involved. The reason for low knowledge level of nonparticipants about cultivation practices may be due to lack of participation in FFS, low mass media exposure, medium cosmopoliteness and low extension contact as revealed in the study. Also, the complexity involved, understanding of the above practices and cost involved might be the reasons for low knowledge level of non participants. The findings of the study are in conformity with Gopala *et al.,* (2012), Meena and Chaudhary (2016) and Singh *et al.,* (2014).

**Association between knowledge level and independent variables :** The association between dependent and independent variables was studied by using statistical test chisquare test. The contingency coefficient (c) of participants and their knowledge presented in Table 3 shows that among eleven variables taken up for the study, variables like age, education, extension participation and extension contact are highly significantly associated with knowledge. Variables like mass media exposure and achievement motivation had significant association with knowledge level of the respondents whereas, variables like landholding, organizational participation, cosmopoliteness, economic orientation, innovative proneness were not significantly associated with knowledge level of participants of farmer field schools. Contingency Coefficient (c) of nonparticipants and their knowledge level showed that among eleven variables, variables like education, mass media exposure, extension contact, cosmopoliteness had highly significant association with knowledge. Age, landholding, extension participation and innovative proneness are significantly associated with knowledge level of the respondents. Whereas, variables like organizational participation, economic orientation and achievement motivation are not significantly associated with knowledge level of non-participants of farmer field schools. The results of the study are supported by the findings of Duveskog *et al.,* (2009) and Dinpanah *et al.,* (2010). Education had highly significant association with knowledge level of cotton growers who are the participants of FFS. The possible reason could be that education was found to have significant influence on the rational decision making. Also, educated farmers were having better opportunities to acquire more scientific information by the way of mass media contact, printed materials, interaction with the scientists and extension workers to clarify doubts in scientific practices. The study reveals that among the respondents selected, majority

**Table 2.** Knowledge level of participant and non participant cotton growers of farmer field schools regarding specific cultivation practices of cotton (N=160)

| S. No. | Particulars | Participants (N=80) | | Non participants(N=80) | |
|---|---|---|---|---|---|
| | | F | (%) | F | (%) |
| 1 | Seed rate | 51 | 63.75 | 33 | 41.25 |
| 2 | Spacing (Row) | 68 | 85.00 | 25 | 31.25 |
| 3 | Spacing (Plants) | 66 | 82.5 | 21 | 26.25 |
| 4 | Suitable method for sowing | 71 | 88.75 | 36 | 45.00 |
| 5 | Recommended varieties | 76 | 95.00 | 41 | 51.25 |
| 6 | Chemicals for seed treatment | 46 | 57.50 | 21 | 26.25 |
| 7 | Farm yard manure recommended | 51 | 63.75 | 25 | 31.25 |
| 8 | Nitrogen fertilizers recommended | 64 | 80.00 | 19 | 23.75 |
| 9 | Phosphorous fertilizers recommended | 60 | 75.00 | 18 | 22.50 |
| 10 | Potassic fertilizers recommended | 58 | 72.50 | 38 | 47.50 |
| 11 | Dose fertilizers at sowing time | 64 | 80.00 | 41 | 51.25 |
| 12 | Number of irrigation requirement for cotton | 72 | 90.00 | 26 | 32.50 |
| 13 | Method of irrigation for cotton field | 65 | 81.25 | 22 | 27.50 |
| 14 | Difference between beneficial and harmful insects | 58 | 72.50 | 19 | 23.75 |
| 15 | Difference between pest and disease | 54 | 67.50 | 20 | 25.00 |
| 16 | Difference between fungicides and insecticide | 51 | 63.75 | 15 | 18.75 |
| 17 | Name of the insect pest attacked | 55 | 68.75 | 21 | 26.25 |
| 18 | Name of the diseases attacked | 49 | 61.25 | 29 | 36.25 |
| 19 | Chemical used for controlling pest attacked | 53 | 66.25 | 38 | 47.50 |
| 20 | Chemical used for controlling disease | 61 | 76.25 | 24 | 30.00 |
| 21 | Knowledge about trap crop | 66 | 82.50 | 15 | 18.75 |
| 22 | Knowledge about NSKE | 48 | 60.00 | 13 | 16.25 |
| 23 | Knowledge about panchagavya | 68 | 85.00 | 20 | 25.00 |
| 24 | knowledge about pheromone trap | 54 | 67.50 | 34 | 42.50 |
| 25 | Suitable time for inter cultural operations | 70 | 87.50 | 31 | 38.75 |
| 26 | Knowledge about tank silt | 63 | 78.75 | 14 | 17.50 |
| 27 | FYM/compost | 77 | 96.25 | 15 | 18.75 |
| 28 | Vermi compost | 72 | 90.00 | 31 | 38.75 |
| 29 | Green leaf manure | 62 | 77.50 | 23 | 28.75 |
| 30 | *Neem* cake | 51 | 63.75 | 25 | 31.25 |
| 31 | Azotobacter | 44 | 55.00 | 11 | 13.75 |

of them were young and middle aged. As these categories of farmers are more receptive to new technology, education had significant influence on knowledge. The findings are in line with the findings of Siddique *et al.,* (2012).

Landholding had significant association with knowledge level of nonparticipant cotton growers of FFS and not so in case of participants. The possible reason could be that the large landholdings might have necessitated the farmers to acquire more knowledge. There was a significant association between knowledge level of participants of FFS and their extent of exposure to mass media. It is logically true that educated farmers with more exposure to mass media will have more knowledge. Mass media exposure had highly significant association with knowledge level of nonparticipant cotton growers of FFS. This is because mass media provides ample opportunity for the farmers for exposure to new technology.

There was a highly significant

association between extension contact of participants of FFS and their knowledge level. This may be due to the reason that the contact of extension worker and his suggestions would help to increase the knowledge of the farmers. There was a highly significant association between extension contact of nonparticipants and their knowledge level. This may be due to the reason that the contact of extension worker and his suggestions would help to increase the knowledge of the farmer. The findings of the study are in conformity with results of Khatam and Khan (2013). The association between organizational participation and knowledge was found to have been nonsignificant in both the cases of participants and nonparticipants. The possible reason may be mere participation in gram panchayat, panchayat samiti and zilla parisad might not have helped them to acquire knowledge. Further, FFS involves any farmers irrespective of their participation in any organization.

Cosmopoliteness and knowledge was found to have non-significant association. It was well accepted that the cosmopoliteness of the farmers increases the contact with outside world so that individual may expose to the new ideas but here in this case FFS farmers obtain all the necessary knowledge in their fields itself and minimum knowledge from outside. In case of non-participants, the association between cosmopoliteness and knowledge was found to be highly significant. There was no significant association between farmers' economic orientation and their knowledge level. This may be due to the fact that the participants are not ready to take the risk in case of the high returns and tried to gain more returns within their existing farming systems through better technologies. The findings are in line with the results obtained by Feder *et al.,* (2010).

The achievement motivation and the knowledge level of participant cotton growers were found to be significantly associated. It may be due to the fact that respondents with higher achievement orientation would actively participate in extension methods like FFS and acquire more knowledge. There was a nonsignificant association between achievement motivation and the knowledge level of nonparticipant cotton growers. It must be owing to the fact that, most of the non-

**Table 3.** Association between knowledge level of participants and non-participants of farmers field school and independent variables (N=160)

| S. No. | Independent variables | Participants (N=80) | | Non participants (N=80) | |
|---|---|---|---|---|---|
| | | Chi square | Contingency coefficient | Chi square | Contingency coefficient |
| 1 | Age | 16.864** | 0.844 | 12.455** | 0.432 |
| 2 | Education | 20.543** | 0.879 | 19.567** | 0.531 |
| 3 | Landholding | 04.087NS | 0.755 | 12.438** | 0.232 |
| 4 | Mass media exposure | 13.765** | 0.956 | 19.578** | 0.544 |
| 5 | Extension participation | 18.644** | 0.989 | 12.345** | 0.490 |
| 6 | Extension contact | 23.498** | 0.957 | 20.498** | 0.476 |
| 7 | Organizational participation | 02.532NS | 0.754 | 06.832NS | 0.456 |
| 8 | Cosmopoliteness | 05.233NS | 0.848 | 17.567** | 0.530 |
| 9 | Economic motivation | 04.571NS | 0.813 | 05.342NS | 0.322 |
| 10 | Achievement motivation | 14.894** | 0.932 | 6.438NS | 0.455 |
| 11 | Innovation proneness | 05.438NS | 0.877 | 13.678** | 0.398 |

participants have not participated in FFS due to low and medium achievement motivation. There was a nonsignificant association between participants' innovative proneness and their knowledge level. It may be due to the reason that high innovative proneness might have not helped the farmers to enhance their knowledge. There was a significant association between non participants' innovative proneness and their knowledge level. This may be due to the reason that a farmer who is highly proned to new technology would try to know more about them to satisfy his needs. The findings of the study support the results obtained by Rustam (2010), Gopala *et al.,* (2012) and Singh and Sharma (2016). It is clear from the results that age, education, extension contact and extension participation contributed significantly towards knowledge level of participants of FFS which needs attention from different agencies to design programmes/activities accordingly.

## CONCLUSION

The results of this study showed that an extension service to the people through the farmer field school is a better option to the changing scenario. As a participatory approach, it could produce some striking features on the basis of which one can conclude that the process of technology development has always been the same, but the difference between these two categories of respondents indicates that the FFS has proved its effectiveness. The findings of the study on knowledge level of participants and nonparticipants regarding cultivation practices of cotton have shown that the FFS has proved its worth in enhancing the knowledge of the cotton growers with respect to recommended cultivation practices of cotton which shows that the farmer field schools have significantly influenced the farmers to gain the knowledge related to the improved technologies. On the basis of this, it is recommended that the FFS approach should be encouraged as an intensive teaching method to enhance adoption of critical technologies. Efforts should be made to extend it to different states of the country on a wide range of crops with well trained facilitators for an effective takeoff. Further, FFS on food crops would further enhance food production to meet the food crisis of the country. New and vigorous drive should be made to set up small groups where the FFS farmers can become trainers or facilitators of other farmers. Therefore, the planners and administrators can make policy to promote the FFS concept as one of the extension tools for effective transfer of technology through the development departments.

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