ROLE OF FARMERS FIELD SCHOOL (FFS) IN DISSEMINATION OF IMPROVED AGRICULTURAL PRACTICES AMONG THE FARMERS

Research Study
conducted By

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INTRODUCTION:

Farmers Field School (FFS) is an agricultural extension approach for the dissemination of improved research based knowledge to the farming community. FFS is a group-based learning process for achieving farmer empowerment, community development and education of eco-friendly farming methods/techniques. The main objective of FFS is to train farmer, developing their skills, enhancing their knowledge and enable them to solve their problems by themselves. Farmer Field School is different from farmer's trainings in a way that it is conducted practically in the field in the motive of "**Learning by Doing**" the trainer act as a facilitator rather than a teacher. The initial FFS programmes focused on agro-ecosystem based Integrated Pest Management (IPM), but proved effective in managing problems in complex systems, thus empowering farmers to improve decision-making based on local conditions. At the same time FFS encouraged community development and action, with a view to adapting the learning process to different technical content, and promoted support on important issues for local communities. (Imam, 2011).

In FFS groups of farmers meet regularly with a facilitator, observe, talk, ask questions, and learn together. Farmer field schools as an approach was first developed to teach integrated pest management (IPM) techniques in rice farming, but it has also been used in organic agriculture, animal husbandry, and also non-farm income generating activities. (FAO, 2018) FFS are classrooms without walls where participants learn about topics of common interest through observation, discovery and exchange of experiences. Furthermore, topics strengthen capacity for improving livelihoods while also supporting the establishment of Climate Smart Territories (CST). Examples of topics include gender equity, food and nutritional security, mitigation and adaptation to climate change, restoration of ecosystems services and business administration. (Aguilar et al. 2010).

The Farmer Field School program of study is planned to assist the farmers in developing skills to identify the local problems, conduct analysis, formulate solutions and draw conclusions. Further, it is used to test which solution is most suitable under the respective conditions (Gotland et al., 2004). The other developmental benefits that produced Farmer Field School are broadly described as empowerment, training,

research, advocacy and marketing (Khisa, 2002). The salient features of Farmer Field School are following:

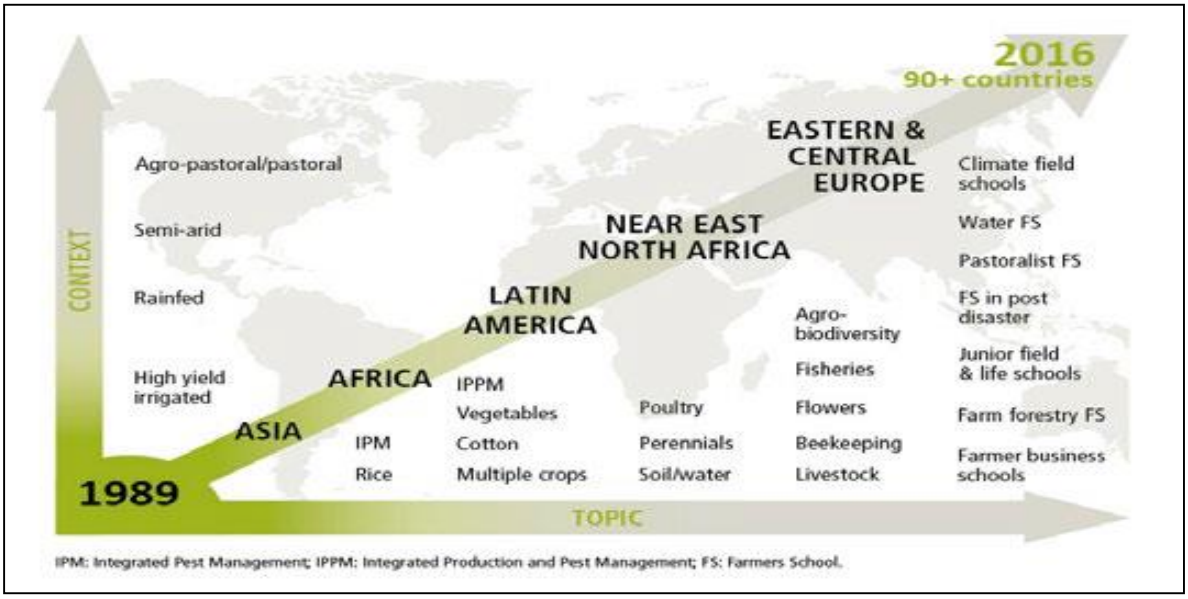
(a) Partnership (researchers and field workers consider farmers as their cohorts, and deal with them accordingly).

(b) Farmer-centered approach (the Farmer Field School approach includes intelligent, innovative, and progressive, farmers whose skills and knowledge are refined, and offered for the benefit of the fellow farmers and nearby communities).

(c) Integrated curriculum (as a components of farm are broken apart and examined in detail, so that the farming community are encouraged to consider about the entire system and the relations between components of different systems. In this view the Farmer Field School approach in agriculture is a holistic approach) (Bajwa, 2010).

EVOLUTION OF FARMERS FIELD SCHOOL APPROACH:

The FFS was first introduced by the Food and Agriculture Organization (FAO) in Indonesia in 1989 (Bartlet, 2002). This involved 200 FFSs in four districts of Yogyakarta initiated by the Indonesian National IPM Programme through funds from the Government of Indonesia and United States Agency for International Development (GoI-USAID) and technical assistance from Food and Agriculture Organization of the United Nations (FAO). Farmers were taught about techniques regarding management of crops by Agro Ecological System Analysis (AESA), especially insect-pests relation and about insects those are beneficial. More interestingly FFS uses biological control methods of pests and organic farming, having an objective to reduce the usage of pesticides and the their effects on human health (Feder *et.al.*, 2003).



FARMERS FIELD SCHOOL IN ASIA

By 1990, the Indonesian National IPM Programme scaled up and launched 1,800 FFSs for rice IPM in six provinces in Java, Sumatra and South Sulawesi. Around 1991, the pilot FFSs in IPM for rotation crops (mainly soybeans) was initiated while the FFS Programme spread out to different countries in Asia (CIP/PRGA, 2003) (a). From 1991 to 1994, with support from the FAO Inter-country IPM Programme, rice IPM-FFSs spread to Bangladesh, Cambodia, China, India, Philippines, Sri Lanka and Vietnam. During that period, the FFS Programme moved from its single-crop focus to include secondary or rotation crops within the rice-based systems and also vegetables in both low and highland systems. NGO's also became involved in further spreading and developing FFS approaches: CARE Bangladesh developed such things as rice-fish IPM-FFS; Thai Education pioneered "IPM in Schools"; and World Education Indonesia promoted farmer adaptive research approaches. These and other innovations including gender advocacy, health impact studies, field ecology, farmer-led action research and farmer planning were taken up by FAO and national programmes in order to strengthen and deepen the FFS model (CIP/PRGA, 2003(b)).

The Indonesian success was followed by expansion and innovations in Vietnam, the Philippines, Thailand, Bangladesh, India and China. Driven by farmer and donor demand for greater sustainability and wider impact, FFSs evolved under the leadership of FAO Inter-Country IPM Programme towards "community IPM" under which the wider livelihood issues of IPM were explicitly developed around FFSs for education but also farmers' for a and community associations for focusing on social capital development and dealing with environmental, health and local policy issues related to pesticides and IPM (Pontius*, et al.,* 2002). Although many of the "national" projects have not continued after the end of this project, national and local farmers' associations are still active, being testament of the sustainable nature of community IPM. Institutionally, NGOs have taken the place of the FAO programmes in many of the countries (e.g. Field Indonesia, Srer Khmer in Cambodia).

FARMERS FIELD SCHOOL IN SUB-SAHARAN AFRICA (SSA)

After a brief introduction in Sudan in 1993 and Kenya in 1995, a larger-scale launch of the approach in Africa actually started in Zimbabwe in 1997. FFSs are presently being conducted by a wide range of institutions in Africa, including FAO, DANIDA, many national governments, and numerous non-governmental organizations (NGOs). Unique challenges have arisen while attempting to apply in Africa. In Africa the focus of FFSs was on production and pest management (IPPM) because of the relatively low levels of production and pesticide usage. Cotton, vegetables and tobacco are the largest recipients of pesticide treatments. For example, in cotton IPPM, most farmers conclude that they are over-using pesticides and under-using quality seed, irrigation and fertilizers. In rice IPPM as well, farmers learn to improve crop yield without increasing amount of minimum use of costly pesticides.

As a result of the interest shown by farmers in health and nutrition, FAO, Wageningen University and Research Centre (WUR) and other institutions are in the process of adapting

the approach to work with vector-borne diseases (Van den Berg *et al.,* 2006) such as malaria particularly in West Africa. The gender and development service of FAO has put a large effort in adapting the approach in the area of health, particularly on HIV/AIDS and, also working with young orphans. These so-called Farmer Life Schools (FLS) and Junior Farmer Field and Life Schools (JFFLS) have built on the experience in Cambodia (Yadav, 2005); pilots are taking place in Kenya, Mozambique, Namibia, South Africa, Zambia and Zimbabwe.

International Livestock Research Institute (ILRI) started adapting the FFS approaches in Kenya in 2001 for similarly complex situations like animal health and production (Minjauw, 2002). As a result of the demand for livestock activities, ILRI now provides training and capacity building support in various other countries, such as Tanzania, Uganda, Costa Rica and others.

FARMERS FIELD SCHOOL IN SOUTH AMERICA AND THE CARIBBEAN

In 1997, International Potato Center (CIP) and its institutional partners in Bolivia and Peru started to experiment with more participatory approaches to training (Torrez, 1999) incorporating some elements of the FFS approach, but not the Agro-ecosystem Analysis (AESA), which many consider to be its distinguishing feature. CIP has promoted the FFS approach through a project financed by International Fund for Agricultural Development (IFAD) in six different countries, including Bolivia and Peru. In each country a national research institute and an NGO, or other extension organization, has been included. In 1999, to support this project, the Global IPM facility organized a course of three months to train FFS facilitators in Ecuador, Bolivia and Peru. These facilitators then returned to their work places and implemented the FFS, incorporating other important elements of the Asian model, such as the AESA. Although many of the fundamental principles have been the same, each country has had its own strategy of implementation, depending on the demands of the farmers and the unique institutional and organizational setting of each context.

FARMERS FIELD SCHOOL IN CENTRAL AND EASTERN EUROPE:

In Central and Eastern Europe (CEE) the FFS approach was first introduced in seven countries in 2003 through an FAO project with the aim of exploring and supporting farmers' roles in managing an introduced pest on maize, the Western Corn Rootworm, by means of IPM, and the longer term contribution of FFSs in strengthening farmers' farm enterprise management and agro-ecosystem innovation in CEE contexts. An innovative feature of this experience has been the development of risk mapping as a tool for farm and community based risk management. Two other projects have also introduced the approach in Armenia; one on rodent control through FAO funding and the other with support from USDA has triggered the emergence of an NGO that now coordinates a number of FFS projects in the country.

FARMERS FIELD SCHOOL IN PAKISTAN:

Agriculture sector in Pakistan is having a lion share in the economy and contributes about 18.9% to Gross Domestic Product (GDP) and provides employment to 42.3% of labor force. More than 65% of Pakistani population directly and indirectly depends on agriculture for subsistence. Agriculture sector in Pakistan is also an important source of foreign exchange earnings and boosts growth in other sectors. (Govt. of Pak, 2020).

In Pakistan, Agricultural Extension services have traditionally been organized as part of the Provincial Ministry of Agriculture. Several extension models and approaches have been tried since independence, including the Village Agricultural and Industrial Development Programme (Village-AID Programme), Basic Democracies System (BDS), Integrated Rural Development Programme (IRDP) and Inputs at Farmers' Doorsteps Approach. Based on the linear approach, these programmes met with limited success and were abandoned one after another. The present Training and Visit (T & V) programme, while specifically focused on agriculture, also suffers from inherent inflexibilities, namely the over-reliance on contact farmers to diffuse technical information to surrounding farmers (Raiz, 2010).

In the 1980s, when the training and visit System was working in the country, an innovative approach for farmers capacity building started from Indonesia and known as 'FFS'. In Pakistan the government policy makers were also converted towards outcome of the FFS across the globe and different programmes were started based upon FFS in many districts of Punjab such as the FFS started on cotton crop and for the development in fruits and vegetables (GOP, 2005).

Pakistan, in contrast to most other Asian FFS programmes, started a pilot program with cotton IPM-FFS with ADB funding in 1997 (Jiggins *et al.,* 2005). This program was expanded with the FAO-EU IPM Programme for Cotton in Asia (2000-2004). In 2004 the two major cotton producing provinces, Sindh and Punjab, have implemented IPM FFSs as the dominant interface between government and farmers. Policy makers have acknowledged IPM-FFS as an approach that is able to enlist farmers in rural development programmes. Therefore, Sindh Province has included FFS expertise in the job description of its agricultural officers, and Punjab has launched a major programme expansion initiative to conduct 3,500 FFSs in cotton-wheat management over the next 4 years. The FAO-EU Programme helped establish a strong National IPM Programme, which not only became the joint implementing unit for the EU and AsDB funded projects, but also addressed pesticide policy issues with ministerial decision-makers. Despite a powerful pesticide industry, the country has embarked upon its

own National IPM Project that will cover four provinces and last five years and entirely funded from national and provincial resources. NGOs and international agencies such as CABI Bioscience, World Wildlife Fund, Caritas, PLAN Pakistan, and local welfare associations became active partners in the implementation of FFS. To encourage women's participation, an AGFUND initiated project on "Pesticide Risk Reduction for Women in Pakistan" focused on training female facilitators to reach rural women in the traditional, gender-segregated society through **Women Open Schools.** Emphasis was on the toxicity and health risks arise from pesticides, but other elements in the cotton-based farming systems were also included. Significant social mobilization and empowerment was evident from the formation of officially registered farmer alumni associations and associations of IPM facilitators offering facilitation services and farmer club support. CABI introduced and tested a basic livestock management curriculum in FFS in 2001 with the technical assistance of the Livestock Extension Department (pers. Comm. Janny Voss).

Govt. of the Punjab chalked out a comprehensive integrated situation plan to increase per acre production of crops in the province and introduced as innovative approach i.e. Farmers Field School (FFS) approach. It was introduced by Pakistan Agricultural Research Council (PARC), Government of Pakistan for cotton Integrated Pest Management (IPM) during 2002 and FFS for Fruit and Vegetables development (F&V) during 2005. This approach was also adopted by Punjab Government during 2004. In this approach an intensive training has also been started in last few years across the globe to encourage information and yield enhancement with less utilize of pesticides for agricultural development (Bajwa *et al.*, 2010).

Under Fruit and Vegetable Development Project, mango, citrus and vegetable growers are being trained through Farmer Field School (FFS) system by a participatory approach i.e. learning by Doing. During the early phase of the project 48 mango FFSs, 48 citrus FFSs each in their 4 respective districts and 81 vegetable FFSs in 12 districts are in operation by the well trained facilitators.

In Pakistan Farmer Field School concept is without walls where farmers and facilitators gather on weekly/fortnightly basis to analyze the progress of a crop, learn the biotech interactions between soil, plants & insects, chart the dynamics of insect population and finally bring this knowledge together to make informed crop management decision.

COMPONENTS OF FFS

Under Fruit and Vegetable Development Project of Government of Punjab, Pakistan Farmer Field School System (FFS) comprises of following four components:

- **Master Trainer**
  Master Trainer is a key trainer who trains the facilitators. He plays a complex role as an experienced facilitator, organizer, coordinator and evaluator. 11 Master Trainers i.e. Assistant Director Agriculture are conducting "Training of Facilitators" (ToF) on each Monday at DDA/HO office in accordance to the curricula developed for each crop.

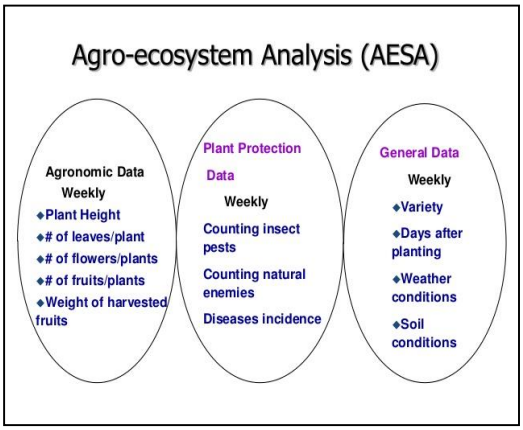
- **Facilitator**
  FFS facilitator is more than a teacher or an instructor. He plays a complex role of an experienced farmer, a questioner, a confidante, an organizer, and a coordinator. 43 teams of facilitators are running the FFS activities in project districts. Each team comprises one Agricultural Officer and one field Assistant.

- **Member Farmer**
  Farmers with piece of land under cultivation, willing to participate in FFS activities throughout the crop season and have the decision powers to implement the farm operations. During current year, 25 farmers per FFS (4425) have been selected in all project districts, keeping in view their practical engagement in self cultivation with level of interest.

- **Demonstration**
  A field with a specific crop which act as primary learning material for the training of farmers/facilitators, from where they collect, analyze and compare field data. It also acts as a class room for FFS. 48 mango, 48 citrus blocks of 5 acre each and 81 walk-in tunnels for off-season vegetables along with 162 open field vegetable plots of 2 kanals each have been established at the respective FFS sites. (Extension and Adaptive Research, 2005).

AGRO-ECOLOGICAL SYSTEM ANALYSIS (AESA) IN FFS

An AESA gives a good overview over the farm. An AESA should capture all elements of importance for the farming on every particular farm. AESA is an approach which allows us to look critically and analyze what is on a farm and how these existing things can work together for the benefit of the farmer family and the sustainability of the farming system.



Agro-Eco System Analysis data collection: In small groups, FFS participants make observations on the crop and other aspects of the agro ecosystem including disease and pest infestation, the weather, weeds, the soil. They make a drawing to represent the data they collect and analyze their findings. Each group makes recommendations on what action should be taken on the farm to address production constraints.

AESA presentation: Each group makes a presentation to the whole school on their findings. After group presentations, participants discuss the recommendations made by each group and agree on one or two actions to take. These can include learning about a topic to understand it better, doing fieldwork such as harvesting or removing diseased pods, or carrying out a simple experiment.

Implementation of a "Special topic": The special topic is the topic that participants, sometimes with the help of the facilitator, agree to learn more about. In most cases, the facilitator will lead participants through a discovery learning exercise contained in the FFS curriculum.

NEED FOR THE STUDY:

For an effective transfer of technology, Government of Pakistan has launched different agricultural extension approaches under the Department of Agricultural Extension. Farmers Field School (FFS) is one of the new technology transfer and capacity building approach for farmers. In Pakistan, both government and private sector are investing a lot on farmer's education, developing their skills, enhancing their knowledge and make possible them to solve their problems by themselves through FFS which ultimately leads towards agricultural development in the country. Many studies were conducted on FFS but limited research has been conducted on the aspect of Role of Farmers Field School. Therefore; this research will be conducted to evaluate the role of FFS approach in dissemination of improved agricultural technology among the farming community.

RESEARCH METHODOLOGY:

This research study was conducted based on the secondary data based on the SCI research papers published in well reputed journals of agriculture, agricultural extension, social sciences and socio economics. The studies were reviewed on different aspects of Farmers Field Schools (FFS) such as role of Farmers Field School (FFS), Impact assessment of Farmer Field School, Case Studies on Farmers Field School and Evaluation of Farmers Field Schools etc. The conclusions of the study were drawn based on the results of the published material.

RESULTS AND DISCUSSION:

Impact of farmer field schools case studies:

Mangan and Mangan (1998) stated that the role of Extensional field staff was not only to provide technical knowledge and skills to farmers but also act as facilitator for the farmers. The extension field staff had to provide solutions of the problems emerging from the FFS study field. Generally, FFS participants consisted of 25 farmers, those meet regularly according to a fixed schedule, throughout the season. The focus of FFS was on team building, organizational skill, seeks new approaches and techniques, gain information on particular subject or topics and improve the skill and knowledge of organizations and individual groups.

FAO (2001) reported that FFS is traditionally an adult education approach to assist farmers to learn in an informal setting within their own environment. FFS is without walls school where groups of farmers meet weekly with facilitators. Participatory method of learning is used for the dissemination of knowledge. It was evaluated that FFS approach helped the farmers in problem solving, increasing yield per acre and bring betterment in their living standard.

Quizon *et al.* (2001) observed that the FFS is a non-formal training programme for selected farmers within a local community, usually a village. The FFS approach was designed originally as a way to introduce knowledge and information on IPM to rice farmers in Asia, particularly in the Philippines and Indonesia. FFS helped the farmers in controlling the pests and diseases of cotton crop on larger area in Indonesia and Philippines.

Bartlett (2002) stated in his study that the first FFS was introduced in Indonesia in 1989. It was a group based learning approach, which mostly used by NGO, government departments and some international agencies to promote Integrated Pest Management (IPM). At this time, millions of people had participated in this type of learning. He further explained calculation of cost and benefit ratio stressed the farmer to join the IPM. In conclusion FFS was beneficial for poor farmers living in rural areas.

Guinee (2002) found that FFS worked in reducing the use of pesticides and other chemical pest control measures by switching the farmers to IPM in Netherland. FFS also helped in controlling the environmental pollution and health problems caused by the pesticides. Through FFS technology was transferred to the farmers and they acquire much knowledge regarding the biological pests control methods and save their pesticide expenses.

Onduru *et al.* (2003) reported that extension workers point of view that FFS had helped them to reach more farmers than previous extension approaches. The FFS had contributed a lot in building a close relationship between farmers and extension agents in Kenya.

Mutinda *et al.* (2004) analyzed that FFS approach is different from other approaches used in agricultural extension and in this approach the extension worker used to work as a facilitator rather than a traditional teacher or trainer. Once the farmers observed and gets knowledge in the field they have to do, the extension worker takes back sitting role, only offering help and guidance when asked.

Integrated Nutrient Management to Attain Sustainable Productivity INMASP (2006) argued that FFS have had significant impacts and FFS members were able to raise their farm incomes, improve their farming practices and boost their crop yields in East Africa.

Dzeco. (2011) described the objectives and impact of FFS approach in terms of farmer organization and community empowerment. FFS approach had been contributed empowering the participants in developing interaction between farmer's and extension agents. This approach helped in creating the friendly relations and building the trust between the farmers and the agricultural extension staff.

Govt. of the Punjab, Pakistan (2005) stated that FFS was field based learning and lasts for a full cropping season. School does not mean the primary or middle like school, but it was a weekly, fortnightly or monthly meeting of farmers, which depends upon the crop under experience. The primary learning material at any FFS was the field of a crop. The field school meeting place was close to the learning field often in a farmer's home or sometimes beneath a convenient tree, with or without boundary walls. Educational methods in FFS were experiential, participatory and learner centered. The trainer in the FFS is called a facilitator, who facilitates the learning process by giving useful information and inputs to the farmers. FFS often includes several additional field studies depending on local field problems. A group of 25 farmers participate in FFS and participants learn together in small groups of five. It was also evaluated that FFS approaches helped farmers to identify insects, diseases, weeds and their control.

Fakhar *et al.*, (2020) analyzed the skill and knowledge farmers learned from Farmer Field School, and results showed that About 40% of the farmers learned about citrus verities, Almost one-third of respondents learned about management of young plants/orchards, 28% of the respondents get the knowledge about cultivation of fruits & one-fourth of respondents get the knowledge & skills about layout & management of citrus orchards. About 35% of the respondents learned about time duration between two irrigations, (19-24%) of the respondents learned about tensiometer installment and the way to check tensiometer readings in citrus orchards, drip irrigation technique & saline water treatment. About 27% of the respondents get the knowledge and skills about lemon butterfly (20-23%) of the respondents learnt about control & management of citrus psylla & whitefly. Over (15-18%) of respondents learnt about control and management of termites, fruit fly and citrus scales. More than 52% of the respondents learnt about identification control and management of

citrus canker, 23% about fruit drop disease and citrus scab, 18% learnt about citrus melanose & (1-2 %) of the respondents learnt about gummosis, damping off and wither tip.

Khatim and Zafarullah (2013) evaluated that FFS have highly protected the environment through reduced use of pesticides and fertilizers and also helped in lessening soil, water and aerial pollution by enhancing forestation of orchards and using well decomposed farm yard manure, poultry waste, green manure and compost manure instead of chemical fertilizers in the field. Furthermore, FFS promoted local recipes for controlling insect/pests which have helped a lot in protecting the environment from pollution as well as reduced cost of production. Hence, FFS proved a highly successful approach in improving all aspects of environment.

CONCLUSIONS:

Findings conclude that the agricultural extension' training course has a positive influence on farmers' farm management skills, which, in turn, will have a positive impact on their farm productivity. Notably, this study stresses the significance of the FFS approach, as farmers showed a positive learning behavior towards it; hence empathize on its persistence and further improvement by the concerned authorities.

SUGGESTIONS:

Farmers Field School approach should be adopted as an Agricultural Extension approach throughout the country. Farmers Field School (FFS) is a very effective technology transfer approach and it is suggested that ZTBL Agriculture Technology Department may use this approach for the dissemination of improved agriculture technology among the farming community.

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