

Review of Farmer Field Schools Approach to Extension Service Delivery: Utilization and Impact in Nigeria

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Abstract: The paper reviewed the farmer field schools approach to extension service delivery. Overview of farmer field school approach was highlighted with specific reference to; the concept of farmer field school, objectives of the farmer field schools, principles of farmer field schools and characteristics of farmer field schools. The paper also reviewed global experiences with farmer field schools with particular reference to the impacts of the farmer field school approaches. The utilization and impact of farmer field school in Nigeria is also discussed. The paper further identified the strengths and weaknesses of farmer field schools approaches.

Key words: Approaches • Extension service delivery • Farmer field schools • Overview

INTRODUCTION

Farmer field schools approach (FFSs) emerged out of the need to solve a concrete, immediate problem. In Indonesia, in 1989 there was problem of pest; the brown plant hopper (*Nilaparvata lugens*) as a result causes severe losses to their crops, their health and environment through massive abuse of highly toxic pesticide in rice production. Misuse of the pesticide had disrupted/eliminated the natural enemies in the rice ecosystem, leading to increase pest outbreak and negative effect on the environment and health [1]. This called for a large scale decentralized program of education for farmers in integrated pest management (IPM) [2]. That is for farmers to become “experts” in managing the ecology of their field-bringing better yields, fewer problems, increased profits and less risk to their health and the environment [3].

The first wave of FFS was conducted in 1989 in the rice field which involved 200 farmer field schools in 4 district Indonesia founded by the Indonesian national IPM program and the United State Agency for International Development (USAID) assisted by food and Agriculture organization of the United Nation (FAO). By 1990, the program scaled up and launched 1800 FFS for rice IPM in 6 provinces in Java and Sumatra. In 1991, the Pilot FFSs in IPM for rotational crops (Mainly soya beans) was

initiated and the program sprayed out to different countries in Asia [4]. FFSs program aim to provide skills to improve Agricultural, health and environmental outcomes, to empower farmers achieving their outcomes, through training of suitable facilitators, targeting appropriate farmers to attend full training schedules and undertaking activities to promote dissemination and diffusion [5]. The FFSs help participants to strengthen their knowledge of rice ecosystem and to make improved field management decision in a context of mutual learning and community participation [2].

Overview of Farmer Field School Approach: Several agricultural extension approaches from top-down to more participatory have been tried in Nigeria and other countries of the world [6]. Prominent among the approaches include: Farming system research (FSR); Small plot adaptation techniques (SPAT); Conventional agricultural extension system; Community type extension approach; Integrated agricultural development approach; Integrated rural development extension approach; Trained and visit extension approach (T and V) and Unified agricultural extension system. Many of these extension approaches fail to meet their goals effectively which leads to continuous modification and experimentation. [7]. The most recently approach is the FFSs.

Concept of Farmer Field School: FAO [8] described FFS as a platform and a “school without walls” where farmers learn in groups by trying out new ideas in their own fields. FFS improves decision-making capacity of farming communities and stimulating local innovation for sustainable agriculture through the utilization of indigenous technical knowledge (ITK). It is a forum where farmers are trainers, debate observations, apply previous experiences and present new information from outside the community [9]. Farmer field Schools (FFS) Approach is popular extension and educational programme, relatively new to reaching small holders around the world. It is a bottom-up participatory extension approach for technology validation and dissemination which aim to empower farmers to improve their agricultural outcome [5].

The farmer field school approach is reversal learning, where agricultural researchers and extension agents are learning from the farmers. It is an integrated and organized field school which create a space for farmers self learning and sharing. The participants are not the object of training but can be able to use their experiences as the subject of training. Farmers learn to manage their crops using more natural methods such as IPM. Extensionist behaves as a catalyst and facilitators, helping communities achieve their defined and perceived goals [10]. Braun *et al.* [11] added that FFSs is a plat form for promoting integrated decision making and innovation for sustainable agriculture for farmers. Braun, and Duveskog [12] also reported that, it is a participatory, discovery based learning and a technical knowledge based on non-formal adult education principles that guide group of people with a common interest who get together on a regular basics to study the “how” and “why” of a particular topic. They added that it is a participatory method of learning technology development and dissemination based on adult learning principles such as experiential learning.

FFSs that take place in a field where crop is grown and where farmers meet regularly to develop their capacity, analyze and solve their individual and shared problems and make choice in methods of production through discovery based approach. FAO developed FFS projects as a means of empowering farmers by improving their analytical and decision making skills. It is therefore a platform that teaches basic agro-ecology and management skills, used to communicate complex ideas such as integrated crop management, making farmers experts in their own farms and empowering them by strengthening their skills, problem-solving capabilities and confidence [9].

Objectives of the Farmer Field Schools: FFS according to David *et al.* [13] is to:

- provide an environment in which farmers acquire the knowledge and skills to be able to make sound management decision;
- sharpen farmer’s ability to make critical and informed decision that could make their farming activities more profitable and sustainable;
- improve farmer’s problem solving abilities;
- show farmers the benefits of working in groups and encourage group activities; and
- empower farmers to become “experts” on their own farms and to become more confident in solving their own problems.

According to Waddington and Howard [5], FFS objective aim to curb the over-use of pesticides and other harmful practices, to empower disadvantage farmers e.g. women and to build farmers skills to become more resilient and adaptive to shocks. It also provides skills in crop cultivation and resource management using sustainable agricultural production method such as integrated pest management (IPM).

According to Ooi [14, FFSs projects;

- improves farmers analytical and decision making skills; and
- develops expertise in IPM and dependency of pesticides as the main pest control measure to accomplish that the farmer had to gain an understanding of the ecological principles and processes governing pest population dynamics.

Objective of the first phase (1999-2002) of IFAD-FAO FFSs project in east Africa were to increase the competence of the extension system, establishing networking capacity for exchanging farmer field school experiences and contribute to knowledge on the effectiveness of the approach. The second phase (2005-2008) included empowerment objective to broaden the scope of farmer field school, establish the skills and methodologies necessary to enable farmer field schools to respond to farmers demand. Other objectives are towards reducing gender inequality, targeting minority groups, community development and strengthening producer groups [12].

Almost half of the FFS projects analyzed health objective either through education or by reducing harmful chemicals used in agriculture. Two thirds include environmental objectives through education on the environment and climate change, sustainable land and water use, reduction of negative environmental impacts from farming and protection of the local environment and existing natural assets [5]. FFSs approach has a broad range of topics and in a variety of context in Asia, the sub-Saharan Africa and the Latin America which among others include organic agriculture, animal husbandry, soil husbandry, ground water management, human health to income generating activities such as handicraft, others include gender advocacy, health impact studies, field ecology, farmer-led action research and farmer planning were taken up by FAO to strengthen the FFS model [4]. David *et al.* [13] reported that the approach has been applied to integrated crop pest (ICP), natural resource management (soil fertility and water management) livestock, forestry and social issues like food security, nutrition, health, HIV/AIDS and literacy.

Starting with Indonesian rice farmers in 1989, FFS have being introduced in at least 90 countries worldwide and have over 12 million graduates. Around 60% of the beneficiaries have being in Asia, which include many rice and cotton farmers. However, over half of all FFS projects after Asia have being extended to Sub-Saharan Africa which started in the 1990s with the FAOs Gezira scheme in Sudan in 1993. Africans FFSs project cover staples, vegetables and tree crops (cocoa and tea). International potato center first introduced FFS in Latin America in 1999 [5].

Principles of Farmer Field School: The principles within the FFS process as highlighted by FAO [2] are to:

- Grow a healthy crop: a healthy crop is better able to with stand pests/ diseases and can compensate for damage without leading to crop losses by covering wide range of cultural practices; soil preparation, variety selection, weeding and harvesting.
- Observed or monitor the field regularly: Farmer can observe crop regularly by taking into account the different element of the agro-ecosystem and the relationship between different elements to analyze the situation.
- Conserve a healthy environment for sustainable farming and to conserve natural enemies of insect

pest: Conservation of natural enemies involves allowing insects to feed on plants and those that feed on those insects provide a free ecosystem services (Natural biological control).

- Become IPM experts by understanding the ecology and to become experts in their field: Since farmers are the key decision makers, they need knowledge and understanding of the whole agro-ecosystem to make informed decision. They become experts in their field through exchanging information, testing and comparing different approaches [15].

Characteristics of Farmer Field School: NAERLS/ABU [9] highlighted the characteristics of FFS as follows:

Farmers are Experts: They conduct their own field studies, farmers learn-by-doing, they carry out for themselves the various activities related to the particular farming practice they want to study and learn about (investigation).

- The Field is the Learning Place: All the learning is based in the field. The group collects data in the field, analyze the data, make action decision based on the analysis of the data and present the result in the field for discussion.
- Extension Worker as Facilitators not Teachers: The extension worker takes a seat role, offer help and guidance when asked to do so and may take part in subsequent discussion session as a contributor rather than a leader.
- Scientists/ Subject Matter Specialists work with farmers Rather than Lecture them: Subject matter specialists (SMSs) role is that of a colleges and advisers who can be consulted for advice on solving specific problems. They are source of new ideas/information on locally unknown technologies.
- The Curriculum is Integrated: Crop husbandry, horticulture, land husbandry are considered together with ecology, economics, sociology and education to form a holistic approach.
- Training Follows a Seasonal Cycle: Training is related to the seasonal cycle of their practice being investigated. Example for annual crops, extends from land preparation to harvesting if it is for further production, it would include the dry season to evaluate quality and quantity at a time of the year when livestock feeds are in short supply.

- Regular Group meetings: Farmer meets at agreed regular intervals. If it is for annual crops, meetings may be every one or two weeks during the cropping season. But for other practices, the time will depend on what specific activities need to be done.
- Learning Materials are Lerner Generated: Farmers generate their own learning materials, from drawings of what they observed to the field trials themselves. The materials should be inconsistent with local conditions, less expensive to develop and are controlled by the learners.
- Group Dynamics/Team Building: These include communication skills building, problem solving and leadership and discussion methods by the farmers on their findings to others.

Review of Global Experiences with Farmer Field Schools:

Worldwide many different organizations have implemented FFS in over 87 different countries [11]. Rolling [16] asserted that FFS have proven to lead farmers on enthusiasm, self confidence and considerable reduction in insecticide use. This is because FFS focuses on farmers capacities to make well informed crop management decisions through increase knowledge and understanding of agro-ecosystem. Braun *et al.* [11], in their global survey of FFS give an estimate of over 20millions farmer have FFS graduate from FFS globally.FFS developed In Indonesia in 1986 and two million small farmers in key rice production areas of 12 Asian countries had learnt through FFS how to become informed decision-makers with respect to crop management and protection [17]. Untung [18], estimated that the resultant reduction in pesticide use in Indonesia is around 50-60%. In 1990, the Indonesian National IPM programme scaled up and launched 1,800 FFS for rice IPM in six provinces in java.

FAO implemented a cotton IPM programme in six countries of Asia [14]. Bangladesh has conducted large FFS projects, which trained hundreds of thousands of farmers on integrated fish culture and rice IPM in FFS curricular for its INTER FISH project. It also introduced the approach in Colombia, Brazil and six Caribbean countries on rice and aqua-culture. The approach has become well established throughout the Latin American's [11]. FFS contributes to farmers' knowledge and relationship between knowledge and increased productivity [19].

A number of state governments in India, realizing the effectiveness of FFS and its economic and social benefit to resource poor farmers, have taken a step to

institutionalize the use of IPM-FFS model for cotton and other crops in their main stream extension. Recent development has been the adaptation of FFS approach in recovering bio-diversity knowledge [20], Diversification of the FFS approach also occurred with livestock and seed [7].

The FFS approach are active in Asia, Africa, Latin America, the Caribbean, east and west Europe, south and central America. The geographical spread has been accompanied by local cultural and socio-economic adaptation by local facilitators [12]. The focus was more on IPM program on rice which later expanded to vegetables and estate crops. It spread to many institutions in Asia, including governmental extension programs of various countries in the continent. The FFS approach was applied to community forest management in Nepal [22], gender issues in Indonesia [15], HIV/AIDS in Cambodia [23], women's self help groups in India [24] and variety of other areas.

FFS approach has a large scale launch in Africa whose focus was on production and pesticide management because of the relatively low levels of production and pesticides usage. The farmers learn how to improve yields without increasing use of costly pesticide. Although, the problem of pesticide use was less apparent as a result, several innovations have taken place, since the introduction of FFSs from Asia [11]. More health and nutrition topics were included, due to the low level of awareness by farmers about the dynamics of diseases such as HIV/AIDs and Malaria that are crippling many rural communities. FAO, Wageningen University and Research Centers (WUR) and other institution adopted the approach to work with vector borne disease particularly in West Africa [19]. It is also working with young orphans trained as farmers life schools (FLS) and junior farmer field life schools (JFFLS) built on the experience of Cambodia. The pilot programme runs in nine countries amongst are Kenya, Tanzania, Uganda and Nigeria. In Kenya, the International Livestock Research Institute (ILRI) adapted the FFS approach in 2001 for Sanimal health and production [11]. As a result of the demand for livestock activities, it provides training and capacity building support to the farmers.

FAO in collaboration with ICRISAT and National extension have actively developed FFS for soil husbandry, minimum tillage conservation agriculture, soil conservation, water harvesting and water moisture management in rainfed system [25, 8]. FFS become the foundation of Field-based food security programme in Kenya, Sierra Leone and Nigeria. Farmers learn to better

manage their crops for efficient use of resources and graduate with new skills, such as built trust and confidence among groups and marketing networks also emerge as a larger business unit, due to FFS.

FFS approach was introduced to central and Eastern Europe (CEE) in 2003 through a FAO project with the aim of exploring and supporting farmer's role in managing and introduced pests of maize "the Western corn root worm", by means of IPM. The longer-term contribution of FFSs is to strengthen farmers' farm enterprise management and agro eco-system innovation [26]. FFS has been promoted and implemented in different potato producing provinces and FAO establish a National FFSs programme in Peru and Bolivia that has effectively scaled-up IPM throughout the country.

Impacts of Farmer Field School Approach: Studies in market and inputs intensive areas have shown that FFSs has enable farmers to significantly decrease depending on pesticides without negatively harming overall productivity [26]. Central America has tested an IPM labeling system to certify the clean production emerging from FFSs and link group to higher value urban markets. Similarly a group in Ecuador established production contracts with the agrifood industry (Fritoky and Kenturky fried chickens), which provided fairer prices and help farmers to avoid the variability of National markets. A meta-analysis of 25 impact studies commissioned by FAO concluded that majority of study reported sustained and consistent reduction in pesticides use attributable to be the effect of training. There was a convincing increase in the yield due to training. A review of 25 IPM-FFS evaluation concluded that studies reported substantial and consistent reduction in pesticide use attributable to the effect of training [5]. A number of studies describe broader developmental impact of training results demonstration remarkable widespread and lasting development impacts.

FFS stimulates continued learning and that it strengthened social and political skills, which prompted range of local activities, relationship and policies related to improved agro-ecosystem management [19]. Davis *et al.* [1] found that FFS increased income and productivity in east Africa. Global impact studies of FFS show reduced use of toxic pesticides and 4-14% higher yield for FFS graduates who cultivated cotton compared to the control [19]. Despite this impact, an additional benefit of FFS includes facilitating collective action, leadership, organization and improved problem solving skills [6].

An Indian alumni of FFSs were trained to establish their own farmer field schools known as farmer to farmer schools (F₂FSs) [8], from 2000-2004. Within these years, more than 50,000 farmers where trained in cotton IPM strategies through extension service and NGOs and research institutes in 3 states, each state conducted 2,300 FFS in a year. About 100,000 farmers were trained directly in chickpea, 248 FFS have been organized, benefitting over 200,000 farmers. The impacts include increase of 30-40% in knowledge in Andhra Pradesh (6947 plum bodies were organized), another name for FFS [27]. FFS study by Davis *et al.* [1] found that FFS increased income and productivity and knowledge gain among farmers in Africa. FAO [8] study conducted in Ghana on four different approaches in extension, FFS models proven very effective at strengthening farmers capacity and empowering rural people.

The adult education concept and principles that underlie the design of curricula and the learning process has proven robust in all areas where FFS has been developed and applied [12]. Convincing evidence exist in terms of impact related to pesticide reduction, increase in productivity, knowledge gained among farmers [28]. Empowerment outcomes reported from FFS include changes in perspectives with busted self-confidence and pride, as well social change and action been triggered following participation in FFSs. Farmers have gained agency in terms of taking a greater control over their lives. Much of the social change experienced among FFS graduates relates to farmers taking steps for dealing with challenges and obstacles faced through reflective critical thinking or collective action. FFS groups formalize their relations and continuous studying together and developing action projects including FFS on other subjects after the initial FFS has finished.

Within the Indonesian community IPM programme, six cases reported compelling description of change in graduated farmers in terms of increased self-regard, increased control over their assets, social skills and their interaction with other farmers, service providers and local governments [8]. FFS are considered "stepping stones" to move to networks, federations and associations. It has emerged as a follow-up effect of FFS and this unit has increasingly been breaking manipulative relationship with trade middle men and thereby gains access to more lucrative markets for sales of their produce. This is large break through considering that normal practice often entails farmers been manipulated and exploited by market actors. Farmers attribute these achievements to the social bounding and trust building taking place within the FFS context.

Following the FFS networking and capacity for collective actions, FFS members have gained access to governance and policy processes. FAO[29] reported that farmers extend activities such as local bulletins, people theatre, field days and seminars from the neighborhood to the national arena. In several countries, field school methods found their way into primary, secondary and even college curricula, revamping teaching-learning processes. Reducing pesticide use resulted in an average reduction in the environmental impact quotient (EIQ), an indirect measure of human and environmental cost based on estimate of pesticide use. Beneficial effect on the quotient was found in projects in Pakistan, Thailand and Ecuador. There is no liable evidence on health outcomes resulting from lower pesticide use. FFS in Africa increased productivity, knowledge gain and empowerment but limited to the most directly engaged farmers. Davis *et al.* [1] also found that FFs increased income and productivity in East Africa. Waddington and Howard [5] added that participants in FFS increased yield by 13% on the average and net revenue (profit/unit of land) by 19%. Project in Africa, Asia and Latin America reported positive impact on net revenue which is greater than yield because, cost fell as farmers use pesticides. The effects were found in IPM field schools in China, Pakistan, Kenya, Tanzania and Ethiopia. The effect on net revenue were strong for field schools covering cash crops which also provide complementary input making components, such as the plataforma programme linking potato farmers with Agribusiness in Ecuador and coffee producers to International market in Peru [5].

Utilization and Impact of Farmer Field Schools in Nigeria: Farmer field schools after introduced into Nigeria several studies were conducted in Ondo, Edo and cross river states. The FFSs scale up and adopted by cocoa producing states to train cocoa farmers in integrated crop pest management. A study was conducted in Ondo and Cross River states of Nigeria to investigate the effect of FFSs on Job Performance of cocoa farmers in the two states of Nigeria to investigate the effect of FFSs on job performance of cocoa farmers in the two states where findings of the study concluded that FFSs had positive effect on cocoa farmer job performance and added that if properly managed, the approach has the capability of transforming the performance of cocoa farmers thereby increasing the quality of cocoa bean yield and income of cocoa farmers [30].

A study in Ondo state assessing the perceived benefit of FFS extension approach to graduate farmers as

a result of their participation in FFS training, to identify major cocoa farmers perceived benefits items, determine the level of benefit compared cocoa FFS performance in terms of benefit and cost with non FFS farmers. The findings of the study indicated that FFS extension approach is effective and beneficial to cocoa farmers in the study area and had improved the welfare of farmers in the area [31]. Another study in Edo state to assess the contribution of FFS in improving farmers knowledge on control measures and ascertain the percentage of farmers who benefited from the training on cocoa mirids (pest). The results of the findings show that FFS has contributed significantly to the knowledge level of farmers on the control of cocoa mirids. It was reported that the training helped to reduce the menace of not only pest, but can also assist farmers in making reasonable returns from their investment [7].

A study conducted in Ondo and Edo state compared FFS approach with other major participatory practice. The result from the empirical evidence confirms that FFS approach to extension was perceived as more effective than other extension approaches because it possesses all the features of participatory extension approach [7].

Strengths and Weaknesses of FFS

Strengths: Hands-on-education is needed especially to improve farmer expertise in the management of site-specific agro-ecosystem for which there appears to be no shortcut alternative. FFS play important role since the approach does not rely on highly trained external advisors but on farmer own discovery and reflection. FFS play an important role in serving as a platform for human capacity building and empowerment which in turn can ensure success of services provided for the community [12]. FFS process builds self-confidence, particularly for women encourages group action of the process and builds group management skills. Thereby the FFS is a means to enable vulnerable farmers to create their own cohesive economic empowerment groups that are capable to venture into collective, commercially-oriented endeavors and ability to interact with service providers and market intermediaries. A major strength of FFS is that it helps in strengthening civil society or social capital at village level. This happens when FFS mobilizes interest in a community, especially among those who do not belong to the “official” class of the community farmers again voice and are taken more seriously as part of the decision making processes.

Related to the issue of lack of formal extension staff in many countries particularly in dry lands and pastoral areas, FFS provides an opportunity for farmer to farmer extension which will scale - up FFS intervention and for

cost reduction since graduate can be selected and appointed as facilitator for new FFS groups in the community. It is possible to scale up interventions even when there is very few extension staff, since solution are obtained jointly through experimentation process. FFS can function well even with facilitators of relatively low technical skills. This is the big advantage in the current situation.

Due to the informal and participatory nature of FFS with its inbuilt group dynamic and team building exercises, it provide an ideal entry point to deal also with broader livelihood issues such as nutrition, health science sanitation and in particular sensitive aspect such as HIV/AIDs, violence, family planning and human traumas can be effectively dealt with in FFS. The FFS approach can further act as a bridge between emergency and development by forming a platform for immediate input supply, agricultural training as well as building, organizational capacities for future longer-term interventions. Inputs and emergency supports among communities suffering from civil strife or returnees efforts are also needed in-terms of knowledge for efficient utilization of the inputs, food and income security and psycho-socio rehabilitation [12].

FFS provides a set of rules and processes that are easily understood by most extension/facilitators, which are in-experienced or have a somewhat top-down attitude to still implement extension in a participatory extension practice of more flexible nature. The “Package” like structure of FFS also makes it easier to scale up FFS in national extension systems [12].

Weaknesses: FFS are not a universal panacea for development nor are they a substitute for more familiar technology-centered or profit driven approach to rural development, such as extension, credit cooperatives, core-estates with out-growers, farmers training centers, or the use of mass media [12]. It supports an educational approach that emphasizes experiential learning, action research and critical thinking to enable farmers to take the lead to local adaptation of practices. Clearly, the FFS is not the best instrument for achieving quick and wide application of standardized recommendations. They are instances in which technology transfer is useful and for such issues, non FFS methods such as radio and community meetings are often more appropriate. Campaigns and the FFS were thus implemented side by side or are considered complementary.

FFS is specified as costly, which is likely to rise problems of financial sustainability. The training activities are expensive per farmer trained. According to [28], FFS

cost US \$ 62 per farmer trained. Cost effectiveness and financial sustainability can be improved if only farmer-trainers were to become the main trainers. The major costs involved in implementing FFS are facilitating training, transport materials, supervision and graduation [2010].

FFS are vulnerable to loss of quality, particularly in terms of poor or inappropriate curriculum design and inadequate attention to the quality of the learning process. Sometimes when sub aspect of the approach are pick and choose and not paying attention to the necessary adult education and experiential learning principles woven into FFS. The approach often loses its effectiveness when the fundamental principles and components are overlooked. FFS needs to be implemented as a complete package to achieve desired results.

Many FFS projects encounter problems due to shortfalls or delay in funding/lack of other resources and logistical problems e.g. in Tanzania, where there was insufficient provision of farm tools, fertilizers and improved varieties of seeds or delivery of these items was delayed or did not reach site at all. In-appropriate site selection has also an impediment to some IPM-FFS projects e.g. of Kenya, the FFS plot was on a remote site which limited irrigation and poor soil fertility, limiting crop growth and farming practices. Inadequate follow-up constrained farmer willingness to continue practicing IPM due to lack of consistent support to backup their struggles Agricultural benefit have only being achieved in small scale programme and the evidence for other benefits is weak. It is difficult to scale up the benefit by farmers who participate in the FFS to farmer who do not directly participate in the FFS [12]. FFS increased productivity and knowledge but benefits were limited to those directly engaged farmers [25]. Concentration on one crop or animal species at a time is not suitable for commodities with long gestation period.

Critique of FFS: FFS promote better use of pesticides which requires hands-on experienced encouraging adoption; as a result diffusion is unlikely and has rarely occurred in practice. Waddington and Howard [5] estimates that over 12 million farmers has been trained by FFSs in over 90 countries across Asia, Africa and Latin America. Hundreds of studies of evaluation of FFSs design and implementation have conflicting findings that the effectiveness of this approach remains a matter of debate. Diffusion effect of FFS is largely debated with several studies showing little diffusion of knowledge from FFS to Non-FFS participants [12]. However, practitioners argue that the reason for little diffusion lies in the nature of FFS where learning is about developing problem

solving and innovation skills, thus not about simple technological message that can easily be passed on to others. According to them from a systematic review of over 500 documents, the study finds that FFS changed practice and yields in pilot projects, but they have not being effective when taken to a scale. Therefore, FFS approach requires a degree of facilitation and skilled facilitators, which are difficult to sustain beyond the pilot programs.

In addition to the debate on effectiveness, the scalability and financial sustainability of FFS have been questioned. It is not clear whether farmers have the time and resources to participate in field schools or whether public agricultural system has the capacity and resources to manage the fiscal obligations required long-term public training programmes. An influential impact evaluation of Indonesia's IPM-FFS programme concluded that the programme did not show significant impact on the performance of graduates and their neighbors in promoting appropriate pesticides use or yield. These negative findings contributed to the World Bank pulling out of the global IPM-facility multi-donor trust fund [12, 32].

Positive impact on agricultural outcomes were generally found in the short-run that is two years or less after a FFS was implemented and for relatively small-scale projects for larger programme implemented at national scale over longer periods. The only two national IPM programme and have being evaluated in Indonesia and Vietnam found no significant positive impact, because adoption was not sustained. There is no convincing evidence that IPM field schools offer sustained diffusion to neighboring farmers who live in the same community as field school graduates. This lack of diffusion is an important weakness of FFS implementation approach [5].

Some studies have indicated that FFS have limited or no effect on economic performance, the environment and health and farmer to farmer dissemination of information and technologies. Many development actors have also questioned the sustainability of FFS, because most studies are limited in scope and carried out within project contexts, thus with bias in terms of what is being studied and there is insufficient long time series data to assess longer-term impact. No agreement as yet exists as to what to measure, how to measure it or how to access the results of the measurement of impacts. The lack of consensus arises in part because of disputes over whether to classify FFS as an educational investment or as an extension activity and whether important impacts are those relating to technological change or social human capacity [12]. No thorough effort has been made to measure environmental

impacts of FFSs programme. In Asia, the pesticides risk indicator model; Environmental Impact Quotient (EIQ) has been used to assist in the assessment of environmental impact of FFSs in comparison with conventional and organic crop management. However, empirical work on the impact of FFS on the environment in general is lacking [12].

CONCLUSION

The review examined the concepts, implementation, effectiveness, strength and weaknesses of FFS approach. It focuses more on training farmers on integrated pest management (IPM) program in rice production which letter on expanded to other topics in a variety of context such as organic agriculture, animal and soil husbandry, forest management, ground water management, human health, gender issues/advocacy and a varieties on other areas. The FFSs Approach has a Large-Scale Lunched in Asia, Sub-Saharan Africa and Latin America. The wide spread has been accompanied by local cultural and socio-economic adaptation by local facilitators. Available empirical evidences shows how the approach reached the small holder farmers in sharing knowledge and skills which has had positive effect in transforming farmers and increasing quality of produce (yields) and income of farmers. It was also concluded that majority of study reported sustained and consistent reduction in pesticide use and attribute to be the effect of training.

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