Farmers' Perceived Effectiveness of Farmers Field School in Anambra State, Nigeria

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Abstract
The study assessed the effectiveness of farmer field schools in Anambra State, Nigeria. Specifically, it determined the knowledge of FFS activities by the farmers, determined participation in FFS, assessed the effectiveness of FFS and identified factors influencing the effectiveness of FFS in the study area. Multistage sampling technique was used to select a sample of 120 farmers. A set of structured questionnaire was used to collect data from the farmers. Data were analyzed using percentages, mean score and bar chart. Results show that the farmers acquired knowledge in all the FFS activities, participated in all the FFS activities but most in identification of needs (61.7%), livestock production (60.0%), development of planting practices (58.3%) and identification of improved crop varieties (58.3%). FFS was shown to be effective in pests and disease identification (X = 3.0), development of weeding practices (X = 2.9), control of pests and diseases (X = 2.8) and identification of preservation methods (X = 2.8). Illiteracy (70.0%), inadequate funding (63.3%), inadequate trained facilitators (51.7%) and inappropriate monitoring (50.0%) were identified as problems militating against the programme in the study area. The recruitment of more agricultural extension agents was recommended.

Key words*: Farmers, perceived effectiveness, Farmer Field School, Nigeria.*

Introduction

Agricultural extension and advisory services are critical means of addressing rural poverty, since they have the mandate to transfer technology, support farmers in problem-solving and enable farmers to become more actively embedded in the agricultural knowledge and information system (Christopolos & Kidd, 2000). There are almost one billion small-scale farmers worldwide that extension is responsible to (Davis, 2006). Majority of these farmers are found in Africa where the dominant occupation is farming (New Partnership for African Development, NEPAD, 2013).

The Nigerian agricultural extension service has been has over time developed and tried many approaches towards serving the needs of the myriads of farmers spread across the country. Among these approaches are the ministry-based general extension approach, Training and Visit extension approach, the integrated approach, University-based extension approach, animation rural approach, commodity-based approach and the private extension approach. The traditional extension approaches were criticized for providing a 'one size fits all' approach (Birner et al. 2006) which failed due to factors in the diverse socioeconomic and institutional environments faced by farmers, or non-involvement of farmers in the development of technologies and practices appropriate to their contexts. Ultimately, extension is considered to have failed in

achieving its main objective of improvements in farm productivity and in reaching the poor, particularly in Africa (Anderson, 2007; Birkhauser, Evenson & Feder, 1991).

Consequent upon this has been the search for more participatory approaches which enable farmers' self-learning and sharing and also allow those facilitating farmer training as well as agricultural researchers further upstream to learn from the farmers (Birner et al. 2006).

Popular among these approaches is the farmer field school (FFS). Started in Indonesia in 1989, the approach has expanded throughout many parts of the world such as sub-Saharan Africa, Latin American, Near East, North Africa, the Caribbean, Central and Eastern Europe and the United States (Braun and Duveskog, 2008). In Kenya alone, there are over 1,000 FFS with 30,000 farmer graduates (FAO – KARI-ILRI, 2003). As Davis (2006) states, FFS approach is an adult education method to teach groups of farmers. It is used to educate and empower farmers as well as to disseminate information and technology. It is sometimes viewed as 'schools without walls' where facilitators use experiential learning, group dynamics, and simple experimentation to 'co-learn' with farmers.

Essential elements of FFS include the group (20 -25 farmers who have a common interest), the field (the teacher who provides most of the training materials like plants, pests and other facilities), the facilitator (a competent person who leads the group members through hands-on exercises) and the curriculum (which follows the natural cycle of the subject, be it crop, animal, soil or handicrafts) (Sustainable Agricultural Initiative, 2010).

FFSs have shown remarkable impacts in terms of pesticide reduction, increases in productivity, knowledge gain among farmers and empowerment (Davis, 2006). In Africa, the problem of pesticide use was less apparent and as a result several innovations have taken place since FFSs were introduced from Asia. First is the inclusion of more health and nutrition 'special topics' 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. Basic nutrition, water boiling, intestinal parasites and women's reproductive health are included in FFS. Another innovation includes the development of commercial plots by women's group, which are group production plots adjacent to the FFS learning plots. Such commercial plots allow the groups to raise funds and become self-financing in their activities (Braun & Duveskog, 2008).

In sub-Saharan Africa, FFSs are becoming the foundation of field-based food security programmes, specifically in Kenya, Sierra Leone and Nigeria. Under IPM, farmers learn to better manage their crops for efficient use of resources (Braun & Duveskog, 2008). A new trend that has emerged is marketing networks in FFSs that cooperate as a larger business unit (Kisha & Heinemman, 2005).

Several studies have reported the success of FFS in Africa. A study by Ebowore et al. (2013) reported that FFS contributed considerably to farmers' knowledge regarding the control of cocoa diseases in Nigeria. Similarly, a study by Nathaniels (2005) reported that FFS enhanced farmers' sharing of information and knowledge and promoted the development of innovations on cowpea in Zimbabwe. Furthermore, Simpson and Owens (2002) found evidence of some diffusion in an evaluation of FFS experiences in Ghana and Mali, with frequent communication between trainees and other farmers regarding specific agricultural practices.

Several studies have evaluated farmer field schools. These studies provide conflicting conclusions on effectiveness. One particularly influential impact evaluation of the National IPM-FFS Programme in Indonesia concluded that the programme did not have significant impacts on the performance of the graduates and their neighbours (Feder et al. 2004). Furthermore, Tripp et al. (2005) noted the lack of rigorous evidence on the effectiveness of the approach despite

sizeable investments in FFS in Asia. While FFSs is rapidly becoming popular in SSA, it imperative to assess its effectiveness in Nigeria. It is against this backgroundthat the study seeks to provide answers to the following research questions: Are the farmers aware of FFS? What is their level of participation in FFSs? And how effective are FFSs in the study area?

Objectives of the study

The broad objective of the study is to assess the perceived effectiveness of farmer field schools in knowledge acquisition and transfer among farmers in Anambra state, Nigeria. Specifically, the study seeks to:

1. Determine the knowledge of FFS activities by the farmers;
2. Determine the level of participation in FFSs by the farmers;
3. Assess the perceived effectiveness of FFSs in knowledge acquisition and transfer; and
4. Identify factors influencing the effectiveness of FFS in the area.

Materials and methods

The study was carried out in Anambra state. It is among the six states in the southeast geopolitical zone of Nigeria. It is bordered on the north by Kogi state, on the south by Imo state, on the west by Delta state and on the east by Enugu state. The state lies within latitude $6^{o}20'$N, $7^{o}00'$E and longitude 6.333^{o}N, 7.000^{o}E and has a total area of $4{,}844km^2$ (Anaeto, 2000). The population of the state was 4,177,828 as at 2006 (NPC, 2006).

The climate is typically equatorial with two main seasons – the dry and the rainy seasons. The rainy season starts in March and lasts till the end of October and the dry season starts in November and ends in March. The state records about 3,000 mm of rain water per annum and this makes the area suitable for agricultural production. The major crops grown are cocoyam, oil palm, cassava, rice, yam and vegetables while livestock include sheep, goat and poultry (Anaeto, 2000).

The population for the study comprised all farmers in Anambra state, Nigeria. Multistage sampling technique was used to select the sample for the study. The first stage was the selection of one zone (Aguata) out of the four agricultural zones in the state using simple random sampling technique. The second stage was the selection of two blocks out of the six agricultural blocks in the zone using simple random sampling technique. The third stage was the selection of six circles from each of the selected two blocks, using simple random sampling technique to give a total of 12 circles. The fourth stage was the selection of 10 farmers, five participating and five non-participating farmers from each of the selected 12 circles, from the list of all the farmers in the circles, obtained from Anambra state ADP, using simple random sampling technique to give a total of 120 farmers of which 60 are FFS members and 60 are not.

Knowledge of FFSs by the farmers was determined by providing a list of FFS activities measuring how much the farmers know about them on a 3 – point likert scale of 3 = Highly Knowledgeable, 2 = Knowledgeable and 1 = Not Knowledgeable. The mean of the scale was determined by adding the numbers assigned to scales (3+2+1) and any activity with a mean $\geq$ 2.0 was regarded as known by the farmers. Level of participation in FFS was determined by providing a list of all the activities undertaken in the FFSs and asking the farmers to indicate their level of participation in each of the activities and their responses were recorded on a 3-point rating scale of 3 = highly participated, 2 = Participated and 1 = Not participated. The mean was determined using also the method above. So any activity with a mean score of $\geq$ 2.0 was taken as being participated in by the farmers. The effectiveness of FFSs in knowledge and skill

acquisition was determined by providing a list of the possible knowledge and skills farmers could gain through FFSs and asking the farmers assess their effectiveness on a 3-point likert scale of 3 = Highly Effective, 2 = Effective and 1 = Not Effective. The mean of the scale was determined and any item with a mean $\geq$ 2.0 was regarded as being effective.

Data for the study were obtained from both primary and secondary sources. Primary data were obtained from the field with the aid of a structured questionnaire while secondary data were obtained from the internet, textbooks, journals and government official papers. Data were analyzed using frequency, percentage and bar chart.

Results and Discussion

Socioeconomic characteristics of the farmers

Data in Table 1 show that majority (55.0%) of the farmers were between the age bracket of 41 – 60 years while the mean age was 41 years, majority (58.3%) was female, a greater proportion (45.0%) was married and a majority (86.7%) received one form of formal education or the other. The result on age implies that the farmers were still young and could meaningfully engage in economic activities. This could be attributed to the rudimentary nature of agriculture in many developing countries meaning that only young and able-bodied people can efficiently engage in it. According to Agbamu (2006) younger farmers can easily adopt agricultural innovations. Also, the dominance of female farmers in the area confirms the increasing involvement of women in agriculture. According to Saito *et al*. (1994) women are engaged on a more regular basis than men in all farm activities and phases of the production cycle. Also Rola*et al*. (2002) found out that participant in FFS tended to be more of female. The result on educational attainment is in agreement with the finding of a study by Ozor*et al*. (2010) that majority of the farmers in the Southeastern Nigeria received one form of formal education or the other. Acquisition of formal education could enhance farmers' innovativeness and participation in group activities. Asiabaka (2012) argues that farmers are intelligent. This presupposes that farmers whether formally educated or not are rational. However, acquisition of formal education could enhance farmers' reasoning and problem-solving ability and facilitate interaction among them and FFS facilitators.

Data on Table 1 further revealed that a greater proportion (40.0%) of the farmers had a household size of 6 – 10 persons and a mean household size of eight persons, a greater proportion (26.0%) of the farmers had trading as their major occupation, majority (55.0%) had farm size of less than one hectare with a mean farm size of 1.7 hectares, a greater proportion (45.0%) had farming experience of 21 – 40 years with mean farming experience of 25 years and majority (71.7%) had an annual income of 51,000 – 90,000 naira with a mean annual income of 73,000 naira. This means that the farmers were earning about 200 naira a day. However, with a mean household size of eight persons, it implies that each member of the household earns 25 naira ($USD0.04) per day, which is far below the international poverty line of 380 naira ($USD1.90) per person per day. Hence, the farmers could be seen as poor and low income earners. Poverty could hinder farmers' participation in FFS and adoption of innovations. Also, the result shows that majority (55.0%) of the farmers had farm sizes of less than one hectare while the mean farm size was 1.7 hectares. Rahman et al. (2002) reported that adoption index may positively or negatively be related to household size depending on the nature of age structure and amount of labour contributed by the members. Furthermore, a study by Davis et al. (2010) found out that farmers of different ages engaged in FFS in Tanzania.

Also, the result showing that greater proportion (26.0%) of the farmers was traders supports the report of Umunakweet al. (2015) that many local farmers in Nigeria diversify their livelihood sources as an adaptation strategy to certain uncertainties involved in agriculture. The finding on farm size is in line with the assertion of Okulola and Adekunle (2000) that 55% of the Nigerian farmers have farm size of below four hectares. This implies that they operate small land holdings and this could limit their trial of the acquired technologies. Small land holding could be viewed as an index of poverty since it could be associated with lack of access or control over productive resources and this characterizes female farmers in developing countries (Ani, 2004). The result on mean annual income reveals that the farmers live on less than $US1.00 per person per day which is well below the international poverty line of $USD1.00 per day. This implies that the farmers are poor. A study by Davis et al. (2010) reported that wealthier farmers rarely participate in FFS in Tanzania because they do not want to waste their time.

Table 1: Distribution of farmers according to socioeconomic characteristics

Socioeconomic characteristic	%	M
Age (Years)		
≤ 20	8.3	
21 – 40	36.6	41
41 – 60	55.0	
> 60	0.1	
Sex		
Male	41.7	
Female	58.3	
Marital status		
Single	28.8	
Married	45.0	
Widowed	20.0	
Divorced	6.7	
Educational attainment		
No formal education	13.3	
Primary school not completed	8.3	
Primary school completed	10.0	
Secondary school not completed	36.7	
Secondary school completed	13.3	
Tertiary institution	18.3	
Household Size (Persons)		
1 - 5	36.7	
6 - 10	40.0	8
> 10	23.3	
Major occupation		
Farming	23.3	
Trading	26.7	
Handicraft	11.7	
Civil servant	25.0	
Artisan	13.3	
Farm Size (Ha)		
> 1	55.0	
1 - 3	30.0	1.7
> 3	15.0	
Farming Experience (Years)		
≤ 10	8.3	

11 - 20	30.0	
21 – 30	45.0	25.00
> 30	16.5	
Annual Income (Naira '000)		
> 10	0.0	
11 - 50	3.3	
51 - 90	71.7	73
> 90	2.5	

Source: Field Survey Data, 2014

Knowledge of FFSs activities by the farmers

Data in Table 2 reveal that the farmers were knowledgeable on all the activities of FFS listed. This could be as a result of the participatory nature of FFS that promotes problem-solving and knowledge sharing among the participants. The knowledge of all the FFS activities listed could be attributed to the inclusion of topics in FFS that suits farmers' situations. This will stimulate their interest in the activities, thus enhancing their knowledge. It could also be associated with the acquisition of formal education. Asiabaka (2012) argues that farmers are intelligent and rational. However, the acquisition of formal education Waddington et al. (2014) recommends targeting highly educated farmers in FFS. Studies have revealed that FFSs enable farmers share information, acquire more knowledge, retain the acquired knowledge, share the knowledge acquired and improve their productivity (Bunyatta*et al*. 2005; Godtland*et al*. 2003; Rola*et al*. 2002). This finding confirms the report by Ebewore (2013) that FFS contributed to the understanding of cocoa cultivation practices among cocoa farmers in Edo state, Nigeria. Rejesus et al. (2010) reported also that participation in FFS enabled farmers to acquire knowledge. This could result to increased productivity among the farmers as they are more likely to apply the acquired knowledge in their various enterprises.

Table 2: Distribution of farmers according to knowledge of FFS activities

FFS Activities	M	S.D
Situation analysis	2.7*	0.0117
Livestock production	2.4*	0.0007
Land preparation	2.7*	0.0117
Planting practices	2.7*	0.0117
Needs identification	2.6*	0.0100
Evaluation and monitoring	2.4*	0.0007
Conflict resolution	2.5*	0.0910
Identification of improved varieties of crops	2.6*	0.0100
Fish management	2.4*	0.0007
Weeding practices	2.5*	0.0910
Identification of pests and diseases	2.4*	0.0007
Methods of preservation	2.4*	0.0007
Control of pests and diseases	2.6*	0.0100

Source: Field Survey Data, 2014, * Knowledgeable activities

Participation in Farmer Field Schools

Entries in Figure 1 show that the farmers participated in all the FFS activities. However, it was revealed that their participation was more in the identification of needs (61.7%), livestock production (60.0%), development of planting practices (58.3%), identification of improved crop varieties (58.3%) and development of weeding practices (58.3%). Davis (2006) observes that the

relevance of FFS depends on the goals for which it is set up. He further maintains that it has shown promise in terms of participatory methods, empowerment and productivity gains. The high participation of the farmers in almost all the FFS activities listed could be attributed to its ability (FFS) to empower farmers and involve them in the development of solutions that relate directly to their situations. Unlike the conventional extension approaches, FFS employs a bottom-up approach and concentrating on member farmers' situations, thus avoiding incorrect recommendations. According to Braun and Duveskog (2008) incorrect recommendations cause lack of trust between farmers and the extension worker. Moreover, hands-on education is needed to improve farmer expertise in the management of site-specific agro-ecosystems. FFSs are believed to play a very useful role here (Braun & Duveskog, 2008). This may have accounted for the high participation in FFS among participating farmers.

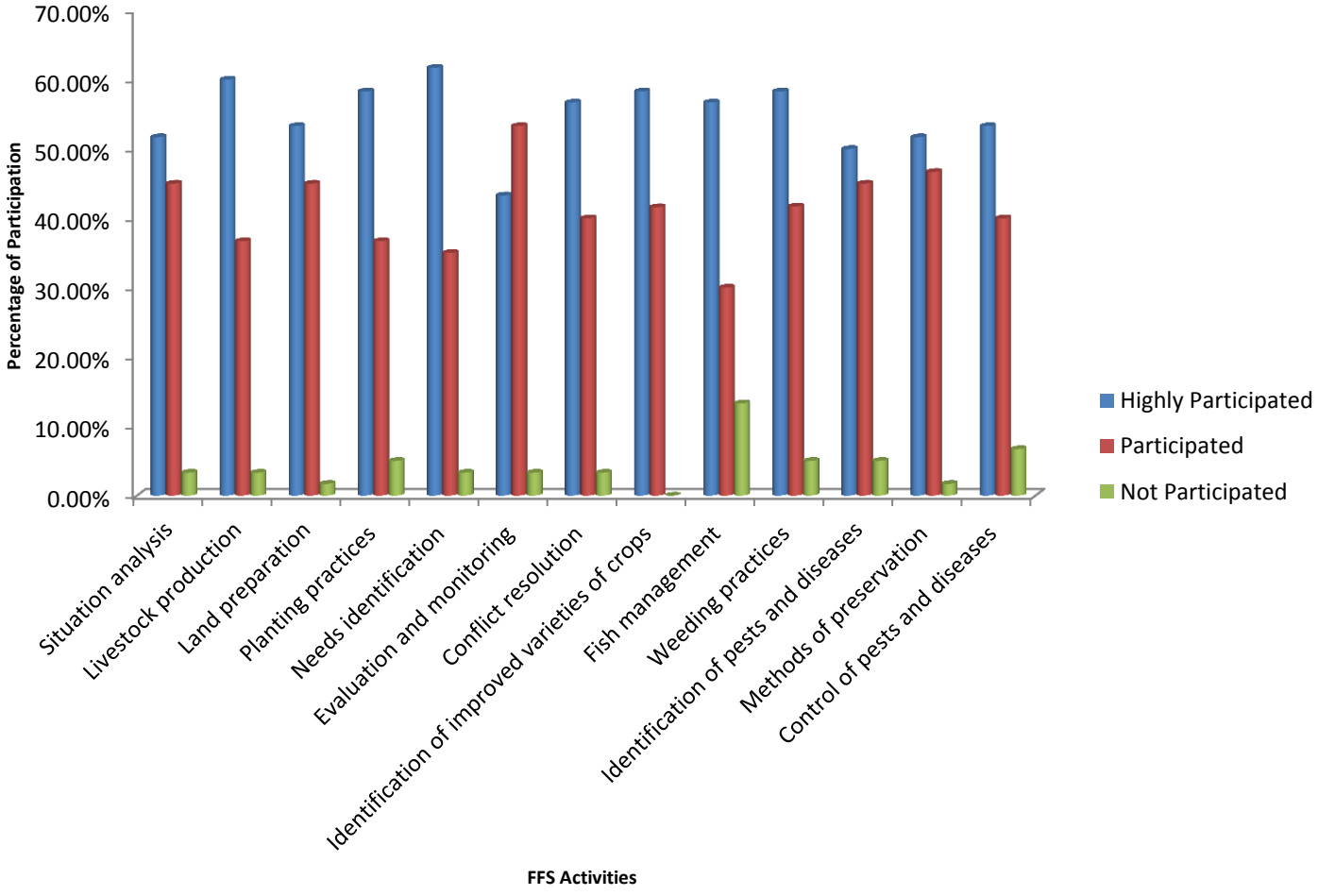

Figure 1: Bar chart showing the percentage participation of farmers in FFS activities
Source: Field Survey Data, 2014.

Perceived Effectiveness of Farmer Field Schools

Result in Table 3 show that FFSs were adjudged effective by participating farmers in all the activities listed. However, they were more effective in the identification of pests and diseases (M = 3.0), control of pests and diseases (M = 2.9), development of weeding practices (M = 2.9) and identification of preservation methods (M = 2.8). Studies have found out that FFSs assisted

farmers to gain more knowledge on pests and disease control in sub-Saharan Africa (Braun & Duveskog, 2008; Feder*et al*. 2004). Also FFSs were found to be effective in teaching farmers better crop production practices in Tanzania (SUSTANET, 2010). Similarly, a study by Nathaniels (2005) reported that FFS helped farmers to develop innovations on cowpea production in Benin. The effectiveness of FFSs in these activities could encourage farmers' participation, thus promoting the dissemination/sharing of agricultural information, adoption of agricultural innovations and agricultural productivity generally.

Table 3: Distribution of Farmers according to perceived effectiveness of FFS

FFS Activities	M	S.D
Situation analysis	2.4*	
Livestock production	2.4*	
Land preparation	2.7*	
Planting practices	2.7*	
Needs identification	2.4*	
Evaluation and monitoring	2.7*	
Conflict resolution	2.0*	
Identification of improved varieties of crops	2.8*	
Fish management	2.6*	
Weeding practices	2.9*	
Identification of pests and diseases	3.0*	
Methods of preservation	2.8*	
Control of pests and diseases	2.9*	

Source: Field Survey Data, 2014

Factors influencing the effectiveness of FFS

Entries in Table 4 show that illiteracy (70.0%), inadequate funding (63.3%), length of time required (60.0%), inadequate trained facilitators (51.7%) and inappropriate monitoring (50.0%) were very serious factors influencing the effectiveness of FFS in the study area. Other serious factors however included scarcity of land for practical (66.7%) and gender sensitivity (50.0%). Several literature (Ani, 2004; Igbokwe, 2011) have reported significant differences in the way male and female farmers access agricultural resources in developing countries. CTA (1993) observed that they have no land ownership rights. In some communities, they have only annual rights of use of individual fields given to them by the head of the household. Often, this land is given to them for a short period, perhaps just one growing season (Modupe, 1990). This prevents them from making long-term use of the land such as planting of perennial fruit crops. Chale (1991) identified some problems facing women farmers in Nigeria participating in agricultural development programmes as lack of demonstration equipment and teaching aids, insufficient and ineffective extension services to farm women, lack of training on gender specific tasks, lack of access to credit, lack of basic infrastructure, inadequate training of extension agents etc. Madukwe (2008) supports this view by pointing out inadequate extension personnel and poor funding as among the major problems facing extension service delivery in Nigeria. These factors could interfere with the effectiveness of FFS. For example, lack of trained extension personnel could bring about poor coordination and facilitation while lack of credit could prevent farmers from participating in FFS since female farmers lack access to agricultural productive resources.

Table 4: Distribution of farmers according to factors influencing effectiveness of FFS

Factors	Very Serious (%)	Serious(%)	Not Serious(%)
Inadequate funding	63.3	28.3	8.4
Illiteracy	70.0	30.0	0.0
Scarcity of land for practical	33.3	66.7	0.0
Gender insensitivity	16.7	50.0	33.3
Inadequate trained facilitators	51.7	48.3	0.0
Inappropriate monitoring	50.0	45.0	5.0
Requires so much time	60.0	40.0	0.0

Source: Field Survey Data,

Conclusion

The farmers participating in FFS in the area were young and acquired formal education. They were majorly women, smallholder farmers and low income earners and belonged to social organizations. They had knowledge of all the FFS activities. Their participation was high in all the FFS activities listed. All the FFS activities listed were adjudged effective by the farmers. Factors influencing the effectiveness of FFS in the area included illiteracy, inadequate funding, inadequate trained facilitators and poor monitoring. Though, FFS was adjudged effective by farmers in the area, failure to adequately address the factors working against its effectiveness could render it ineffective.

Recommendations

Based on the findings of the study, the following recommendations were being made:

1. The farmers should be provided with credit facilities to enable them purchase productive resources such as land. This can be achieved through the resuscitation of the moribund agricultural and cooperative bank and encouraging the farmers to form cooperative societies.
2. Policies encouraging access to and control of resources by women farmers should be formulated. This has become necessary considering the increasing roles women play in agriculture and the challenges they face in respect of ownership and control of resources.
3. The quality of extension service should be improved. This can be achieved by the recruitment of more extension agents and organizing regular training for them. Also, monitoring of extension programmes should be encouraged so as to detect weaknesses easily and addressing them.
4. FFS should be scaled-up and given adequate support like other agricultural extension approaches. Since no extension approach is 'one cap that fits all', there is need to combine FFS with other agricultural extension approaches for a more positive result.

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