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"Assuring Caribbean Food and Nutrition Security in the Context of Climate Change"

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THE FARMER FIELD SCHOOL APPROACH FOR INTEGRATED PEST MANAGEMENT: THE ST. LUCIA EXPERIENCE

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ABSTRACT: The use of excessive amounts of chemical pesticides and other inputs in the production of short-term, high-value crops in the Caribbean is well-documented. This excess has serious negative implications on human and environmental health, cost of production and trade in agricultural commodities. Over the past decade, a number of regional initiatives have successfully used the Farmer Field School (FFS) approach towards rationalizing the use of chemical inputs in agricultural production. One such initiative was implemented during 2009-10 by the Food and Agriculture Organization of the United Nations (FAO) in partnership with the Ministry of Agriculture, Land, Forestry and Fisheries (MALFF), St. Lucia, under the Project *European Community (EC)-Funded Assistance to Agricultural Diversification in the Windward Islands (GCP/RLA/167/EC – SFA2006).* Using the FFS methodology, the intervention facilitated an Integrated Pest Management (IPM) programme in vegetables. Under Phase 1 (May-August 2009), eighteen Extension Officers, drawn from the eight agricultural regions of St. Lucia, successfully graduated as FFS Facilitators in a Training of Trainers (TOT) programme. The TOT comprised intensive classroom and field training sessions and incorporated a pilot FFS, from which thirteen farmers graduated. Phase II was implemented (February-June 2010) in five agricultural regions, with ninety-eight farmers graduating. It is noteworthy that the cost-benefit ratio using IPM was higher compared to traditional farmer practices in all five regions. Indeed, plans were already in train for Phase III as a collaborative effort between farmers and the MALFF. This joint ownership by the two main stakeholders—farmers and the MALFF—augurs well for the sustainability of the FFS movement in St Lucia. This paper underscores the benefits of the TOT/FFS model, which leads to improved technical capacity of the Extension and Plant Protection services and in turn to the delivery of enhanced services to farmers, resulting in safer and more effective pest and crop management.

Keywords: Farmer Field School, Integrated Pest Management

INTRODUCTION

Integrated Pest Management (IPM) was initially conceived in the 1950's as a programme of combining and integrating pest control measures (biological, chemical, cultural) as a means of reducing the use of highly toxic pesticides in crop production. The concept was later expanded to the integration of all pest control measures used in a compatible manner. One definition is the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discharge the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risk to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption of agro-ecosystems and encourages natural pest control mechanisms (International Code of Conduct on the distribution and use of pesticides, revised version, FAO, 2002).

The participatory IPM approach using the Farmer Field School (FFS) approach was introduced in 1989 in Indonesia in direct response to the high use of pesticides by rice farmers. Given the success of this method in reducing the use of pesticides, the method has been expanded globally. According to van der Berg and Jiggins (2007), "FFS programmes have now been initiated in 78 countries graduating over four million farmers". Farmer participatory approaches seek to empower farmers with the knowledge and confidence to make their own well-informed decisions that are appropriate and relevant to their own individual circumstances (Lopez et al, 2004).

In St. Lucia, a number of pests attack vegetable crops in the field, and pesticide use is the most common, and often preferred, method of control. According to Ramroop (2009), the rate and frequency of application of fertilizers and pesticides by farmers is often higher than the rate recommended by the Ministry of Agriculture, Land, Forestry and Fisheries (MALFF). It was against this background that the MALFF partnered with the Food and Agriculture Organization of the United Nations (FAO) and the European Community (EC) to enhance vegetable production by way of introducing the FFS approach through the Special Framework of Assistance (SFA) 2006. The organizations collaborated to enhance small-farmer crop production by way of a Training of Trainers (TOT)/FFS programme during the period May to August 2009 (Phase 1). Eighteen Extension officers, drawn from eight agricultural regions on the island, participated in the TOT/ FFS and graduated as FFS Facilitators under the programme. The training consisted of intensive classroom and field training and incorporated a pilot FFS, in which thirteen farmers graduated.

In St. Lucia, extension programmes are planned and implemented based on several factors, including specific farmer's requests, perceived farmers problems (by extension service) or government policy. A range of extension methods are employed for information dissemination, but these are mostly "top-down". The introduction and implementation of the FFS approach in 2009 was therefore a hallmark event for the extension service, as this represented a different strategy to traditional approaches.

MATERIALS AND METHODS

The FFS is an open learning environment in which farmers school themselves in IPM techniques for agricultural food production and other related topics. In general, FFS consists of groups of people who get together on a regular, often weekly, basis (season long) to study the "*how and why*" of a particular topic. FFS is about practical, hands-on topics where the field is the teacher and provides most of the training materials like plants, pests, natural enemies and other crop production problems.

One key factor in the success of the FFS has been that there are no lectures and all activities are based on experiential (learning-by-doing) creation and sharing of knowledge. A typical FFS comprises of the following: agro-ecosystem observation, analysis, presentation of results, a special topic and a group dynamic activity. The Agro-Ecosystem Analysis (AESA) is a core activity of the FFS and other activities are designed to support it. The St. Lucia FFS programme was tailored to suit the needs of the farmers. Prior to the start of the FFS, a needs assessment survey was conducted to determine the problems experienced by farmers in successfully growing a particular crop. Based on this survey, a programme of FFS activities was developed and participatory discussions held with the farmers to validate the data collected. This information was then used to develop the cropping calendar for the Farmer practice (FP) plot.

As part of the Field School and based on the AESA, facilitators guided the farmers selecting management methods, combining, cultural, biological and chemical (environmentally friendly products) options, thus leading to the development of an IPM crop management programme.

The AESA process honed the farmers' skills in the areas of observation and decision-making and helped develop their powers of critical thinking. The process began with small group observation of the IPM and FP plots. During the observation process, participants collected field data such as plant height, the types of insects and their populations, and took samples/specimens of insects and plants.

Following the field observations, farmers returned to the meeting place and, using crayons/pencils, drew on a poster paper what they had just observed in the fields. The drawings included: pests and natural enemies observed in the fields (pests on one side, natural enemies on the other); the plant indicating the size and stage of growth, important growth factors such as the colour of the plant and any visible damage and other important features of the environment (the water level in the field, sunlight, weeds, and inputs). All members of the small groups were involved in the creation of the drawing and data analysis. While drawing, farmers discussed and analysed the data they collected and based on their analysis they determined a set of IPM decisions to be carried out in the field. A summary of these management decisions as agreed by the group was also included in the drawing and one member of each small group then presented these findings to the larger group, followed by open questions and discussions. Once consensus was arrived at with regard to the management of the crop, the group reached agreement on the implementation of the recommendations. Drawings from previous weeks were kept on hand as a reference and as material for discussion later in the season. Generally, farmers were very vibrant, innovative and participated in all activities. The trainees and the farmers undertook the implementation of the decisions (spraying, fertilizer application, removal of weeds, etc.) made during the AESAs.

Following the TOT/FFS in 2009, Phase 2 (February to June 2010) was implemented through five FFSs held in various agricultural regions, in which ninety-eight farmers participated and graduated. The participating regions were Regions 1 (Gros Islet), Region 2 (Babonneau), Region 4 (Micoud), Region 5 (Vieux Fort) and Regions 7&8 (Anse La Raye/ Bexon). The crops selected were melons (honey-dew and cantaloupe), cucumber, tomato, melons (cantaloupe) and tomato, respectively. There was a high level of interest for FFS programmes among the MALFF staff, FFS facilitators, farmers, regional heads and other stakeholders.

In both Phase 1 and Phase 2, in the IPM plots the farmers' crop management options included the use of more environmentally-friendly pesticides when compared to the FP plots. The rate of use and frequency of application of pesticides and fertilizer use was generally higher in the FP plots when compared to the IPM plots. This impacted on the higher cost of production (inputs and labour) in the FP plots.

A wide range of IPM management options were incorporated into the FFS/IPM plots. These included plants with beneficial properties, use of natural products and environmentally-friendly pesticides. The establishment of companion plants to repel insect pests or to attract natural enemies was encouraged. The practice of minimal or no use of chemicals for IPM crop management practices was encouraged and enforced since farmers have a general tendency to incorporate chemical pesticides into their crop management practices. It is suggested that the use of natural pesticides, for example, neem, garlic and pepper sprays and other IPM strategies be fully explored by FFS Facilitators and farmers in future IPM programs.

Details of Phase 2 FFS were as follows:

- In Region 1 (Gros Islet), the very cohesive and enthusiastic group of twenty-two farmers opted to incorporate a number of IPM options that included the use of companion/antagonistic plants (cilantro, marigold, corn) and plastic mulch in the rows, resulting in reduced weed growth, reduction of rain splash and subsequently disease incidence. Farmers obtained a premium price for the produce in the IPM plot, compared to that from the FP plot. This was because the IPM fruits were firmer and larger and marketed to the hotels, elite restaurants and other high-end markets.
- In region 2 (Babonneau) a group of twenty farmers developed Farmer Practices and the cropping calendar for the production of cucumbers, wherein farmers used as many as nine different pesticides. In the IPM plots, only three safer and environmentally-friendly pesticides were used during the crop cycle. In addition, farmers opted to incorporate number of IPM options such as use of yellow sticky traps, corn as a barrier crop and cultural control practices for weed control and field sanitation. Weeds were removed before the flowering stage and neighboring areas on the borders were kept weed free.
- In Region 4 (Deruisseaux), twenty-two farmers selected tomato as their crop of choice. IPM interventions included planting on the borders and within the plots plants (marigold, citronella, lemon grass) to attract natural enemies. A trellis system was also used; this allowed for an easy support of the plant and was less labour-intensive than the staking method used in the FP plot.
- In Region 5 (Vieux Fort), the very vibrant group of nineteen dedicated farmers from the Black Bay area selected melons.
- In Region 7&8 (Bexon), fifteen farmers participated, with tomato as the selected crop.

Cost-benefit analysis (CBA) was conducted on the FFS during Phase 2 in an attempt to review and assess the economics of the activities. The process involved weighing the total expected benefits against the total expected costs of one or more actions in order to choose the best or most profitable option. In the CBA for the FFS in the various regions, costs were limited to the expenses incurred for the inputs into the field plots and the benefit was measured by the revenue received from the output or produce. The cost-benefit ratio (ratio of benefit to cost), calculated for the FFS in the five regions, demonstrated the extra benefits that the farmer was likely to get for each unit of cost incurred and therefore gave an indication of the likely size of the return for a given level of investment.

Cost of production exercises during the FFS activities highlighted the importance of proper record keeping. CBA for the FFS (FP vs. IPM) in all regions was determined. The economic benefits of using the IPM far outweighed the economic benefits of using the FP practices in all regions. In Region 1, the CBR was 1:1 in the FP plot, compared to the IPM (3:1) indicating that the economic benefit derived was almost three times compared to the FP plot. The CBR trend continued for Regions 2, 4 and 7&8, where the FP (BCR) was 1: 1, when compared to the IPM (CBR) of 2:1. In region 5, the produce was not separated into the FP and IPM plots and as such the CBR for the entire crop production was determined and this worked out to 3:1.

Beyond the FFS (Phase 2), FFS facilitators, Regional Heads, farmers and other stakeholders have embarked on FFS (Phase 3) activities utilizing resources from the sales of the previous crop and contributions by farmers. Graduating farmers recognized that the benefits of the FFS (in particular the sharing and exchange of knowledge and experience) were great and opted to embark in training other farmers in various areas. Some FFS graduates also formed community

groups and spearheaded business activities, for example production and sale of seedlings and other crops.

Team and group activities during the FFS encouraged experimentation and fostered innovation. Farmers learnt how to build on and use their own knowledge. The FFS involved many farmers and so it is a vehicle for speeding up the adoption of IPM and other techniques.

An evaluation conducted at the end of the FFS in each region is summarized here. Generally farmers indicated that they benefited immensely from the various activities in the programme. There was a general increase in knowledge in crop management and good agricultural practices (GAP). Farmers indicated that they would recommend that all farmers participate in such a programme to have a better understanding of GAP.

CONCLUSIONS

During the workshop on the way forward, the following measures were recommended as imperatives in the process of building long-term resilience and sustainability of FFS:

- promoting FFS as an initiative to empower farmers
- linking policy at all levels, incorporation of practical messages continuously during FFS
- strengthening links among stakeholders, seek ways to reduce cost of farm inputs for farmers
- implementing strategies targeted at different types of farmers (small and large)
- conducting impact assessments to generate information on the FFS.
- involving all stakeholders (farmers, MALFF, NGOs, Extension Services, private sector etc.) in the process.

According to Augier (2009), "as part of a legacy of shifting paradigms in Agricultural Technology Transfer, FFS is here to stay in St. Lucia". It gives the extension personnel more options in terms of technology transfer approaches. The electronic network (St. Lucia FFS Facilitators) continues to provide the medium for the continuous sharing and exchange of information among FFS Facilitators. The benefits of the TOT/FFS model in St. Lucia need to be underscored as it led to improved technical capacity of the Extension and Plant Protection services and in turn to the delivery of enhanced services to farmers, resulting in safer and more effective pest and crop management.

Thus, going forward, farmer participatory approaches should be scaled up so that a larger number of farmers can be reached. It is also necessary to incorporate FFS in policy and in the recurrent budget of the extension services in order to integrate and mainstream it in the national extension system.

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