Impact Brief

SUSTAINABLE TREE CROPS PROGRAM

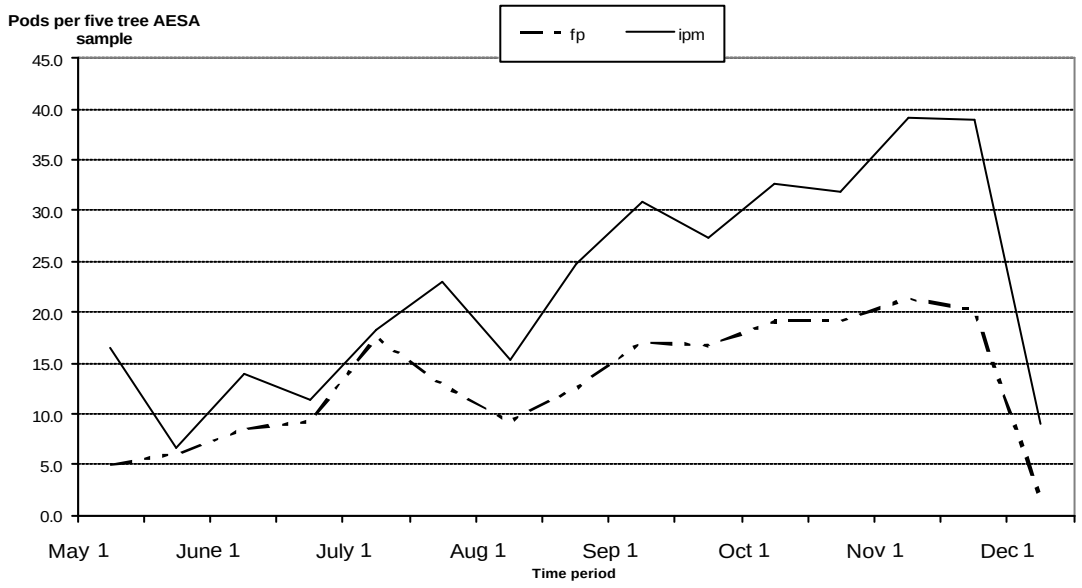
Published by the International Institute of Tropical Agriculture **Issue No.03** **April 2005**

AN INITIAL ASSESSMENT OF THE PRODUCER COSTS AND BENEFITS OF FARMER FIELD SCHOOL TRAINING

The farmer field school approach for increasing farmer knowledge about Integrated Crop and Pest Management (ICPM) is to lead farmers to discoveries about underlying principles in the "field school" (see Im pact Brief No. 1). One of the key tools in this discovery learning process is the regular practice of Agro-Ecosystem Analysis (AESA) in which the farmer's powers of observation are developed. Part of this exercise is the regular monitoring of the development of pods and the incidence of pest and disease. The participants track this information over the course of the school year in order to better understand the various causes and effects associated with cocoa production. Observations are made on randomly selected trees from ICPM and farmer practice (FP) plots in order to compare effects.

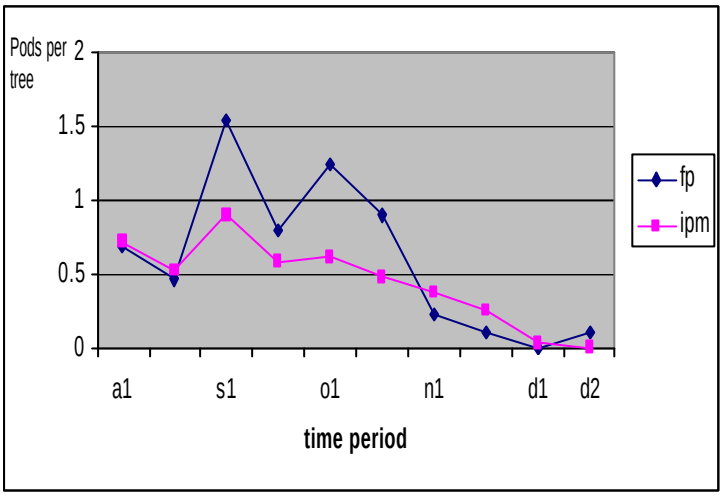
Figure 1 presents aggregated results for 25 farmer field schools in Atwima District, Ghana and illustrates the 35 to 50% productivity differentials that participants witnessed as part of their AESA observations.

The monitoring of blackpod disease over time is another key indicator of agro-ecosystem health and performance. Figure 2 presents the results of ICPM on the development of the disease as compared to farmer practice in Nigeria. These observations, made by the FFS participants near Akure, Nigeria, correspond to a 58 kilogram greater loss per ha on the farmer practice plot. With an average farm size of approximately 4 ha, the potential gain from implementing ICPM would be on the order of 250 kilograms per household which would be a substantial contribution to household income.



Source: 2004 FFS participants Ghana

Figure 1. Cocoa Pod Development Under Integrated Crop and Pest Management versus Farmer Practice



Source: AESA monitoring by participants of 15 FFS in 2004, Akure, Nigeria.

Figure 1. Number of Pods Infected by Blackpod Disease Under Integrated Crop and Pest Management versus Farmer Practice

Results in farmers' fields will not necessarily match those obtained in the FFS. To address impacts in farmers' fields, surveys were conducted in early 2005 with 2003 FFS graduates in Cote d'Ivoire, Ghana, Nigeria and Cameroon to see what if anything has changed in the way they grow cocoa. Preliminary findings for the latter three are presented below.

In Cameroon, the focus of ICPM is squarely on the control of black pod disease through four specific field practices: pruning of the cocoa tree, canopy shade management, phyto-sanitary harvesting of diseased pods, and improved spraying practices.

A recently completed study with 90 FFS graduates estimated a net $17 decrease in the costs of controlling blackpod under the ICPM management regime as compared to pre-FFS practice (Table 1). An increase in labor cost of

Table 1. Estimated Costs of Implementing ICPM for the Control of Blackpod Disease in Cameroon

	Estimated mean expenditure per farm		*Change in cost*
Management practice	*Pre FFS 2002*	*Post FFS 2004*	*(n=90)*
Pruning labor	15	30	15
Phytosanitary harvest labor	8	14	6
Labor for shade adjustments	3	15	12
Spraying labor	58	36	(22)
Subtotal labor	83	95	12
Fungicide expenditures	74	46	(29)
Total	157	140	(17)

Source: IITA/STCP adoption survey 2004

$12 was offset by a $29 decline in fungicide expenditures achieved through the implementation of ICPM focused on better crop husbandry combined with targeted spraying techniques and the use of appropriate sprayer nozzles that generated 20% savings on the quantity of fungicide applied per spraying. In addition to agrochemical cost savings, the reduction in the number of sprayings also resulted in a significant labor saving (Table 1). In contrast, the labor inputs for pruning, phytosanitary harvesting and shade adjustments more than doubled.

In Ghana and Nigeria, surveys of FFS participants and non-participants conducted in March 2005 measured changes in productivity. In Ghana at the time of the release of this briefing, preliminary analysis suggests a twenty percent yield differential between participant and non-participants (Table 2).

Table 2. A Comparison of Yields, Agrochemical Use and Extent of Cocoa Hybrids in Atwima District, Ghana

Variables	*FFS participant (n=90)*	*Non-participant (n=30)*
Yield per ha	102.0	80.7
Kg of fertilizer per ha	15.1	3.4
Number of fungicide sprayings	0.6	0.4
Number of insecticide sprayings	1.5	1.3
Proportion of farm planted to hybrids	0.2	0.1

Further analysis will be needed to discern to what extent this difference is due to improved ICPM knowledge versus other confounding factors such as agrochemical use and prevalence of improved hybrids. The low yields recorded in the study locale (Atwima District, Ashanti region) raise sustainability concerns.

In Nigeria, there was no overall difference in the mean cocoa yields of FFS-trained versus non-FFS-trained producers but there was a decrease of slightly more than 1 kg per ha in the amount of copper sulfate applied to control blackpod (Table 3). Given the producing area among FFS producers and a per kg price of $1.50 this input reduction results in an estimated savings of $10 per producer.

The widespread institution of share cropping in Ondo State (reported by 97% of FFS participants) is thought to lie behind these rather modest results. The knowledge gained in the FFS must be effectively diffused from the producer to the sharecropper and then acted

Poverty Reduction Strategies and ICPM-FFS

In the impoverished rural households of southern Cameroon, cash reserves are extremely limited while labor is in relative abundance. ICPM, which substitutes knowledge and labor for purchased inputs, is particularly suited to the household resources of the poorer cocoa-producing households in West Africa where an additional $29 in cash resources may be sufficient incentive alone for the adoption of these practices. This economic aspect of the ICPM-FFS approach makes it a prime candidate for funding under poverty reduction strategies in West Africa. Most farmers indicated that they were expecting to see significant increases in production; however, the impact on yields is still to be determined as the study was completed before the end of the cocoa harvest.

upon by the sharecropper. Producers, who evaluated the performance of their sharecroppers in implementing practices based on this new knowledge as "very good", had much better results than those who rated their performance as only fair (Table 3). Where sharecroppers were evaluated as very good in implementation, producers' yields were 17% higher than non-FFS producers, while the quantity of copper sulfate applied was 12% lower. Further consideration of sharecroppers in the institutional design of the FFS is strongly recommended.

Based on these preliminary assessments, the benefits generated by ICPM practices in the farmers' field schools are being replicated to varying extent in farmers' fields and tangible benefits generated. ICPM-FFS appears to be ideally suited to the needs of smaller cocoa producers with surplus labor and cash constraints, and should therefore be considered in rural poverty reduction strategies. Within the cocoa sub-sector, the poorest stakeholders are sharecroppers who typically receive one-third of cocoa producers' output as remuneration. More direct and effective means of impacting these tenant farmers through ICPM-FFS may need to be developed for those areas where this institution is common such as Ondo State (Nigeria) or the South-west Province of Cameroon.

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Table 3. Comparisons of Mean Levels of Productivity, Input Use and Management Practices between Non-FFS Producers and FFS Producers, and between Non-FFS Producers and FFS Producers Grouped According to Their Subjective Evaluation of Sharecropper Implementation of ICPM practices, in Akure, Nigeria, 2005.

	Cocoa producers		*FFS producers grouped according to their subjective evaluation of sharecropper implementation*		
Variable	*Non FFS (n=86)*	*FSS (n=176)*	*Poor/fair (n=62)*	*Good (n=78)*	*Very Good (n=31)*
Cocoa yield per ha in 2004	297	296	249	316	345
Copper sulfate applied 2004 (kg/ha)	15.2	13.9	14.0	13.4	13.4
No. of prunings in 2004	1.2	1.4	1.3	1.5	1.5
No. of phytosanitary harvests in 2004	2.1	6.1	1	4	21
Productive cocoa area (ha)	4.0	5.0	5.2	4.8	5.8
Production diff relative to non FFS (kg)		-5	-250	93	282
Copper sulfate diff relative to non FFS (kg)		-7	-6	-9	-10

Source: IITA FFS adoption survey 2005

STCP Impact Brief is a series on tree crops issues, and related research done by or on behalf of the Sustainable Tree Crops Program (STCP).

STCP Impact Brief aims to provide information to be utilised by the public and private sectors, and community organizations. It intends to help frame policy discussions while stimulating dialogue amongst tree crops stakeholders so as to foster an understanding of the social, economic, environmental and political implications of the integration of innovations in West and Central Africa.

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