



Final Report

Sustainable Cocoa Enterprise Solutions for Smallholders (SUCCESS) Alliance – Indonesia



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Submitted to:
Firman B. Aji, Cognizant Technical Officer
Office of Economic Growth
United States Agency for International Development
USAID/REM/S03
American Embassy
Jl. Merdeka Selatan 3
Jakarta 10110

Submitted by:
ACDI/VOCA
50 F Street NW, Suite 1100
Washington DC, 20001
USA

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List of Terms and Acronyms

ACIAR	Australian Center for International Agricultural Research
ACRI	American Cocoa Research Institute
APKAI	Indonesian Cocoa Farmers Association
ASKINDO	Indonesian Cocoa Association
BCCCA	Biscuit, Cake, Chocolate and Confectionary Alliance
Black Ant	Latin - <i>Delichoderus thoraciccus</i>
BPTPH	<i>Balai Proteksi Tanaman Pangan dan Hortikultura</i> , Ministry of Agriculture, Department of Plant Protection
BSC	Blommer SUCCESS Continaf
BSP	Business Service Providers
CPB	Cocoa Pod Borer
DAI	Development Alternatives International
DISBUN	<i>Dinas Perkebunan</i> , Ministry of Forestry, Division of Estate Crops
FAO	Food and Agriculture Organization
FF	Farmer Forum
FFS	Farmer Field School
FFS-CPB	Farmer Field School – Cocoa Pod Borer
FG	Farmer Group
FLR	Farmer-Led Research
FM	Financial Manager
FT	Field Technician
GDA	Global Development Alliance
ICCRI	Indonesian Cocoa and Coffee Research Institute
M&E	Monitoring and Evaluation
Mealy Bug	Latin - <i>Cataenococcus hispidus</i>
MEC	Monitoring and Evaluation Coordinator
MEA	Monitoring and Evaluation Analyst
OM	Office Manager
PFT	Practical Farmer Training in side-grafting
PLCF	Participatory Learning with Cocoa Farmers
PC	Provincial Coordinator
PENSA	Program for Eastern Indonesia SME Assistance
PRA	Participatory Rural Appraisal
PRIMA	Pest Reduction Integrated Management
PsPSP	Panen Sering Pemangkasan Sanitasi Pemupukan
Red Ant	Latin - <i>Oecophylla smaragdina</i>
SL-PBK	Farmer Field School on Cocoa Pod Borer [CPB] Pest
SNI	Indonesian National Standards
STORMA	Stability of Rainforest Margins in Indonesia
SUCCESS	SUstainable CoCoa Enterprise Solutions for Smallholders
TC	Training Coordinator
TL	Team Leader
TOF	Training of Facilitators

TOT	Training of Trainers
USAID	United States Agency for International Development
VCD	Video Compact Disc
VSD	Vascular-Streak Dieback
WCF	World Cocoa Foundation

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1 Executive Summary

The SUCCESS Alliance program (2003-2005) built upon the achievements and methods of the SUCCESS program, implemented by ACDI/VOCA from 2000-2003.

Core to the program was the implementation of the methodology developed to combat the Cocoa Pod Borer (CPB) pest in the CPB Management Project 1996-1998: PsPSP, a combination of frequent harvesting, pruning, sanitation of cocoa pod husks and fertilizer usage. The SUCCESS program recorded significant impact from the dissemination of this crop husbandry method through a methodology developed by the FAO (Food and Agriculture Organization) called Farmer Field Schools (FFS).

The SUCCESS Alliance program built on the strengths of the previous programs to deliver an expanded message of training and group mobilization directly to over 100,000 farmers throughout Sulawesi, Papua, Bali and Sumatra as well as indirectly, through a media and communications campaign, to over 270,000 smallholder cocoa farmers in Sulawesi.

The program was divided into six main categories of activity:

1. **Farmer Field Schools (FFS)** – the main method of information dissemination and training to farmers, which was conducted throughout the target areas over four-six month periods with PsPSP and other messages related to crop husbandry and group formation. Three cycles were conducted between 2003 and 2005. VCD-based training with a less intensive version of the FFS curriculum was also conducted.
2. **Farmer Organization (FO)** – motivation and training of FFS alumni in representative groups to engage in joint marketing and other activities.
3. **Communications Initiative (CI)** - dissemination of information on garden management, pest control and quality issues through market and extension channels as well as through mass media.
4. **Farming as a Business (FaaB)** – originally a part of the FFS, this was expanded in 2005 into a stand-alone program focusing on the business management, marketing and economic aspects of cocoa farming.
5. **Side-grafting** – the technique for transferring the genetic benefits of cocoa strains directly onto the stem of an old or poorly performing plant, as well as a quick method for rejuvenating old and unproductive trees.
6. **Bio-control** – a part of integrated pest management (IPM) that uses natural methods for the control of pests of the cocoa plant. After a round table workshop with national and international experts on the topic, the use of ants as a bio-control was added to the FFS curriculum and much research was conducted.

This report provides a detailed explanation of SUCCESS Alliance activities and results in each of these main categories. Analysis is based on monitoring and evaluation (M&E) data generated from within the program as well as studies and reports conducted through

independent research and evaluation activities. The SUCCESS M&E system and external data sources are described in section 12.

Each category of program activity is detailed in a section of the report that provides background information, explanation of implementation strategies and activities, an explanation of baseline analysis and a review of program outputs and available impact data. Lessons learned have been elaborated for each activity in each of the report sections and a set of final recommendations based on program experiences can be found in the concluding section.

The following table summarizes the outputs of the SUCCESS Alliance program:

Indicator	Target	Achievement
Number of farmers trained through FFS	29,700	30,655
Number of farmers trained in side-grafting*	8,250	8,328
Number of farmers trained in FaaB*	2,775	2,982
Number of farmer groups formed and trained*	30	31 (1,126 farmers)
Number of farmers trained through VCD ¹	70,000	69,439
Number of farmers reached through media	300,000	271,000 ²

*Farmers trained in side-grafting, advanced FaaB and farmer organization, are FFS alumni and therefore form part of the 30,655 trained in FFS

Total farmers reached through direct training = 100,094 (30,655 FFS + 69,439 VCD)

Total farmers reached [directly (FFS + VCD) and indirectly (through media)] = 371,094 (100,094 + 271,000)

The impact of the program has been substantial in terms of farmer uptake of the methods that were taught and the effect of those methods on farm productivity. While the overall conditions for cocoa have deteriorated over the course of the program – due to a series of poor rainfall seasons coupled with the spread of CPB – farmers participating in the SUCCESS Alliance program have maintained or increased their production in many cases, and where production has decreased, it has not done so to the extent that it has for untrained farmers.

The average amount saved or generated per FFS participant over the life of the three-year program has been calculated to be US\$435 per hectare per year³. This is equal to eighty percent of Indonesia's per capita income. The average holding size of SUCCESS Alliance beneficiaries is approximately 1.5 hectares; therefore this is equivalent to twenty million dollars per year⁴ or sixty million dollars⁵ in additional or saved income for FFS farmers alone throughout the life of the project.

¹ Video compact disc

² This is an estimate based on the total number of information packages distributed and the farmer listenership from the participating radio stations.

³ John Mumford. SUCCESS/SUCCESS Alliance: Progress in Cocoa Pod Borer control in Sulawesi, September 2005

⁴ (30,655 FFS alumni) x (1.5 hectares) x (US\$435/hectare/year) = US\$20,002,388

⁵ US\$20,002,388 x 3 years of program implementation = US\$60,007,163

The total SUCCESS Alliance program cost was US\$5.9 million. The average per farmer cost for this program was approximately US\$5.3 per year⁶. If the farmers reached indirectly through media are excluded from the calculation, the average per farmer cost was approximately \$17.5 per year⁷.

The program completed activities in December 2005, and leaves a legacy of over 100,000 directly trained farmers, thirty-one well-trained farmer groups (with another fifty formed as a result of the initial FFS training) and five mid-level Business Service Providers (BSPs) that can continue to offer needed extension and training services to cocoa farmers in Sulawesi.

In addition, links have been forged between farmer groups and cocoa processors and exporters, facilitating direct marketing and thus paving the way for increased vertical integration within the industry, leading to quality increases over time.

There are two major challenges still facing the cocoa industry in Indonesia. The first is to continue to build effective service provision mechanisms that can deliver improved technologies and training to all cocoa producers. Effective solutions and learning models have been identified, tested and utilized both through the SUCCESS programs and through other cocoa programs operating in Sulawesi. The challenge today is organizational: to institutionalize information and technology services for farmers that help to mitigate the impact of CPB.

The second challenge is the creation of farm-level incentives for the improvement of cocoa quality in order to support the needed on-farm investment to stabilize and improve cocoa production in Indonesia. These do not exist as of yet, and further work is needed with farmers, buyers and traders to ensure that Indonesia's potential as a cocoa supplier is realized.

⁶ This is equal to the total program cost (\$5,941,800) divided by the total number of farmers reached (371,094) divided by the three years of program implementation.

⁷ This is equal to the total program costs (\$5,591,800) minus the cost of the media/communications initiative activity (\$350,000) divided by the total number of farmers reached directly (100,094) divided by the three years of program implementation.

2 Background to Program Activities

Cocoa in Indonesia

With over 426,000 metric tons (MT) of cocoa beans produced in 2003, Indonesia is the third largest producer of cocoa in the world after Ghana and the Ivory Coast. Indonesian cocoa exports are currently valued at approximately \$600-700 million per year and provide the main source of income and livelihood for over 500,000 smallholder farmers and their families.

On the island of Sulawesi, over 450,000 smallholder farmers working on plots ranging from 0.5 to 1.5 hectares produce over eighty percent of the cocoa exports from Indonesia. However, cocoa is produced in increasing amounts in other parts of Indonesia such as Papua, Bali and Sumatra. The Indonesian Minister of Agriculture announced in 2004 that Indonesia would seek to have 100,000 hectares under new cocoa cultivation in Sumatra alone.

Indonesia's primary competitive advantage in global cocoa trade lies in its ability to supply large quantities of beans. Indonesia's output is predominantly of unfermented (Fair Average Quality) beans that receive a lower price on the world market due to lower overall quality. Current cocoa yields in Indonesia range from 400 to 800 kg/hectare, with the potential to increase yields as high as 1 to 1.5 MT/ha. Cocoa yields in West Africa and other major producing countries, on the other hand, are much lower and only average 300 kg/ha.

The major challenge is to improve, or at least maintain, local cocoa productivity; not increased competition from suppliers in other countries. Quality is another critical concern that must also be addressed.

The smallholders have experienced a dramatic decline in yield of saleable cocoa, especially over the last five years, mainly due to damage caused by CPB. Besides reducing production, the CPB infestation also causes a dramatic decrease in quality, resulting in large quantities of clumped, flat and small beans. Inappropriate mixing and blending practices by the cocoa collectors and traders as well as high levels of waste and foreign materials aggravates the problem.

SUCCESS Project

The SUCCESS Project was introduced in Sulawesi in 2000 in partnership with the American Cocoa Research Institute (ACRI) to train Indonesian farmers in essential non-pesticide growing techniques. The core of this program was the development and dissemination of a training model consisting of four main activities: frequent harvesting, pruning, sanitation of pod husks and litter, fertilization, as well as the use of natural enemies. This curriculum (known by its Indonesian acronym PsPSP) was taught through the FFS training model based on a methodology created by the FAO. Through 712 FFS, a

total of 35,135 farmers were trained on controlling CPB. Other activities undertaken in the SUCCESS Project were:

- Disbursement of 116 small grants to farmer groups for field schools, research and group organization activities.
- Production and distribution of a farming training VCD to an estimated 59,000 farmers.

SUCCESS Alliance

The SUCCESS Alliance developed from the SUCCESS Project as a joint initiative between ACDI/VOCA, USAID-Indonesia under the Global Development Alliance, the World Cocoa Foundation (WCF), and Mars Inc.

USAID Indonesia's Strategic Objective is *Sustainable and Equitable Economic Growth*. In contributing to this Strategic Objective, activities of the project were implemented with the following two objectives and six sub-objectives in mind, which have been monitored and evaluated:

Objective 1: Improve the quantity and quality of smallholder-grown cocoa in Indonesia through the adoption of good crop husbandry methods and effective IPM practices and maintain a regular source of income for cocoa farmers.

Sub-objective 1.1: Promote greater knowledge among cocoa farmers regarding CPB and adoption among the farmers of effective cultural practices (PsPSP) and alternative methods to control CPB.

Sub-objective 1.2: Develop Integrated Pest Management (IPM) adjuncts to PsPSP consisting of biological controls.

Sub-objective 1.3: Develop genetic resistance to CPB and other pests/diseases by improving the genetic stock of cocoa and rate of cocoa farm rehabilitation by promoting selection of pest-resistant genotypes by farmers and side-grafting.

Sub-objective 1.4: Improve the quality of services to cocoa farmers through the support of better farmer organizations and the development of locally managed services for cocoa farmers.

Objective 2: Strengthen the partnership between local governments, universities, farmer groups, and the local and international private sector to better utilize resources to support the sustainable development of the cocoa industry while ensuring the conservation of the forest base.

Sub-objective 2.1: Sponsor local research at collaborating universities on IPM adjuncts (biological controls) and link with Alliance partners and international researchers.

Sub-objective 2.2: Build farmer and cocoa industry support for locally managed services for cocoa farmers.

Governing Program Documentation

During three years of program implementation, a number of alterations were made to the original program strategy and agreement. The major changes include: a geographic and target expansion in year two, a retooling of strategies at the mid-term evaluation to increase program impact on economic outcomes and a no cost extension in mid-year three. Each of these reconsiderations and refiguring of the program strategy, activities and objectives affected accomplishment of targets established under the original program agreement. This section provides a detailed explanation of program documents and the ways in which they shaped program implementation and achievement of targets.

Year One

The originally stated goals of the program were to:

Improve the quantity and quality of smallholder-grown cocoa in Indonesia through the adoption of good crop husbandry methods and effective integrated pest management practices and maintain a regular source of income for cocoa farmers.

Strengthen the partnership between the local governments, universities and farmer groups and the US private sector to better utilize resources to support the sustainable development of the cocoa industry while ensuring the conservation of the forest base.

The intended focus of the program was the islands of Sulawesi and Irian Jaya (West Papua Province), where a total of 38,540 farmers were proposed to be directly trained over the three-year program in PsPSP through the FFS. In addition, research and field testing would be conducted in promising methods of biological control and in improving the genetic resistance of cocoa plants to pests and diseases.

The most useful and practical methods of bio-control would be added to the FFS curriculum, while knowledge and techniques for improvements in genetic stock, and rehabilitation of aging cocoa gardens, would be spread through the teaching of side-grafting techniques to participating farmers.

The SUCCESS Project of 2000-2003 showed that for each farmer trained, approximately four other farmers received training or relevant knowledge indirectly, thus the SUCCESS Alliance program proposed to reach, directly and indirectly, a total of over 180,000 farmers over three years.

The design of the program was itself intended to sustain the achievements and gains of the program after it ended. Farmers constituted the program trainers, and would be available after program close out; the program would work closely with Government of Indonesia agricultural extension agents and an Indonesian-registered apex organization called “Lembaga SUCCESS Sulawesi” would build on the experience of the Alliance activities, contacts, farmer constituency and network to provide training, advocacy,

marketing, networking, quality control and group purchasing services for fee-paying member farmer groups.

Year Two

In the second year of the program, the SUCCESS Alliance proposed to expand the geographic area of the program to include North Sumatra and Bali in the original training activities, and also to extend the scope of the program to increase the potential for economic development through the promotion and support of indigenous local farmers' organizations within Sulawesi. In Papua, additional and more sophisticated trainings were proposed to increase the knowledge and skills of previously trained farmers.

Improved regional cooperation and information sharing was to be promoted through cocoa conferences and workshops on best practices. A cocoa resource center and library was to be established to provide a communal resource on cocoa cultivation and management and a website showcasing the program would be set up.

The expansion to Sumatra and Bali would include a total of 5,500 additional farmers in the program, with an additional 1,000 farmers receiving advanced training in Papua. In addition, eighteen nurseries would be established and supported in Papua to provide the trained farmers with a source of cocoa seedlings, addressing a significant challenge faced by Papuan farmers.

Improved economic development would be promoted through the training of thirty farmer organizations and provision of small grants for organizational development to those groups who demonstrated interest and desire to transform into formal farmer groups.

Year Three

In year three of the program, the lessons learned from the previous years were capitalized upon to improve the outreach and quality of the program, as well as to better reflect USAID's redesigned strategic objectives for Indonesia focusing on improved economic growth and business climate.

The FFS curriculum was modified to include additional training on FaaB to broaden participants' basic understanding of market dynamics and simple business tools. In addition, a new VCD-based training that would reach up to 70,000 farmers with a less intensive version of the FFS curriculum was developed. This necessitated a reduction in the number of farmers reached directly through the FFS. In addition, further communications initiatives were included as a separate project. The new communications initiative would produce a range of radio programs to be broadcast throughout the cocoa-growing areas of Sulawesi, develop posters and brochures demonstrating improved production and marketing methods for distribution through existing industry channels, and distribute the SUCCESS Alliance newsletter to a wider audience. This project was intended to reach up to 300,000 farmers throughout Sulawesi with key project messages.

In addition, the SUCCESS Alliance would explore product innovation through the implementation of fermentation trials in conjunction with industry and also the possibility of developing private extension services by linking farmer trainers providing regular garden support with an agronomist employed by industry on a cost recovery basis, in order to support farmers to produce for quality.

The sustainability of the program through the development of the Lembaga SUCCESS Sulawesi local organization was deemed to be unlikely to succeed at this point, so alternative strategies for generating farmer-led sustainability were explored in the final year of the project.

Half way through the third year of the program, the SUCCESS Alliance received a no-cost extension to continue the program quality initiatives related to business development and training of the farmer organizations that had been supported, completion of the extended communications activities and development of the sustainability of the program through BSPs that had replaced the original Lembaga SUCCESS Sulawesi concept.

The program was completed at the end of December 2005.

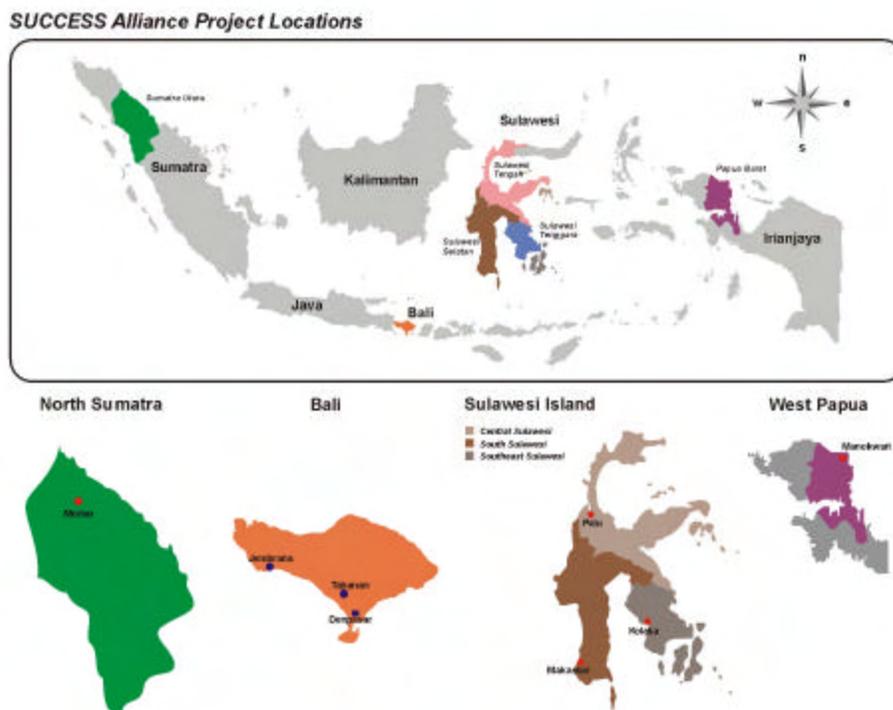


Figure 1: SUCCESS Alliance Program Locations

Program Targets, Activities and Impacts

Outputs/Activities

As the program matured and developed, original targets were changed and new targets set for new activities. The accumulated summary final targets for the program are:

Number of farmers trained through FFS	: 29,700
Number of farmers trained in side-grafting	: 8,250
Number of farmers trained in advanced business	: 2,775
Number of farmer groups formed and trained	: 30
Number of farmers trained through VCD	: 70,000
Number of farmers reached through media	: 300,000

The SUCCESS Alliance envisaged a total direct impact on over 100,000 farmers. Following the indications that for every farmer directly trained, four others receive indirect training, the majority of cocoa farmers across Sulawesi would receive some benefit from the program – not taking into account the projected 300,000 beneficiaries of the communications program. However, the VCD training was considerably less intensive than the FFS training so impact and spread would be expected to be less.

Impacts

The original program proposal and subsequent modifications indicated that a potential impact of 400 kgs of increased cocoa production per hectare per year for farmers participating in the program could be expected. The modification document in year three states that the evidence from the demplots in the target areas and an independent impact study conducted by USAID/Development Alternatives International (DAI) in 2003 showed that farmers who used improved crop husbandry and CPB control methods increased their production between nineteen and twenty-five percent as compared to farmers employing traditional cocoa growing methods, therefore the proposed improvement of up to 400kgs/ha/year (equivalent to approximately US\$400, or eighty percent of per capita income in Indonesia) was attainable.

The program also projected an increase in cocoa bean purchases from Indonesian farmers, including beneficiary farmers. These buying contracts from Alliance partners, such as Hershey and PT Effem, were recorded as industry contribution to the Success Alliance program (refer to section 9).

Program Partners

The SUCCESS Alliance consisted of a number of key industry, public sector and civil society players, who contributed significantly to the program. The members of the Alliance were:

- ACDI/VOCA – managed and implemented the field level activities of the SUCCESS Alliance through their Indonesia offices.
- USAID/ Indonesia – provided overall oversight, monitoring, and coordination.

- Mars Inc. – provided cocoa consultants to the region and technical advice and guidance.
- WCF – provided in-kind consulting assistance, coordination, access to relevant research and consolidated reports to ACDI/VOCA on the value of cocoa purchased from Indonesia by its industry members.

In addition to the SUCCESS Alliance partners, a range of civil society, governmental and academic partners supported program implementation:

- The Department of Estate Crops (DISBUN – Dinas Perkebunan) provided agricultural extension workers in Sulawesi, Bali, West Papua and North Sumatra to be trained as trainers for beneficiary farmers.
- YPANSU, a local non-governmental organization in North Sumatra, was primarily responsible for the rollout of training to farmers there.
- YALHIMO, a local NGO in West Papua, conducted the trainings for farmers there through its staff and volunteers.
- CARE International partnered with the SUCCESS Alliance to undertake trainings in the Poso and Palu areas of Central Sulawesi where security concerns prevented Alliance staff from working there. CARE has an established presence in these areas on which they were able to build to implement the training activities.
- Hasanuddin University in Makassar, South Sulawesi, was a key research partner. A number of research projects on natural predators of CPB were conducted by its plant science department.
- The University of Tadulako, Palu, Central Sulawesi, also conducted research trials on cocoa pests and predators.
- The Australian Centre for International Agricultural Research (ACIAR) supported consultants to undertake research and provided guidance and advice to the program's efforts to improve the genetic stock of Sulawesi cocoa plants.
- The UK Biscuit, Cake, Chocolate and Confectionary Alliance (BCCCA) provided support for Prof. John Mumford, from Imperial College, London, to conduct detailed research on the economic impact of the SUCCESS and SUCCESS Alliance programs since 2000.
- A number of industry partners (Blommer, Continaf, PT Effem, PT Olam, Cargill, Unicom, Socomex, ASKINDO and others) provided guidance and advice to the program, participated in conferences and coordination meetings during the program implementation, and supported activities in the field. A number of direct quality improvement activities were initiated that directly linked traders and buyers with FFS alumni groups, creating and strengthening vertical linkages within the industry.

3 Farmer Field Schools

This section covers the activities conducted under Sub-objective 1.1 – promotion of greater knowledge of CPB among farmers and adoption of effective cultural control practices (PsPSP) to control CPB.

Both geographical scope and the methodology and strategy for the achievement of these objectives have been modified from those planned at program startup. Specifically, the program was expanded to North Sumatra and Bali (with original targets in Sulawesi and West Papua), and greater numbers of beneficiaries were included. Inclusion of these extra beneficiaries necessitated some changes in the training methods used – a shorter, video-based training program was designed to deliver the key CPB control methods and targeted to 70,000 farmers through village based training by DISBUN in the final year of programming. In addition, a communications strategy was developed which covered the major PsPSP topics and was expected to reach over 300,000 farmers. This media based intervention used a short film, radio programs, posters, brochures and newsletters to disseminate the improved production and marketing messages.

In addition, all training interventions were enhanced in 2004 and 2005 to more directly address economic implications by introducing business and group marketing topics to the FFS, VCD and communication activities.

The FFS component of the SUCCESS Alliance program was implemented both directly by SUCCESS Alliance trainers and also through a range of partners. In Sulawesi, farmer trainers selected by partner communities, and Department of Estate Crops (DISBUN) extension agents, were trained as trainers before going on to implement FFS. In West Papua, Bali and Sumatra, local NGO partners were responsible for independently disseminating of training to local cocoa farmers and for reporting on all project activities to the SUCCESS Alliance.

The expansion of the program targets in year three necessitated a reduction of the more intensive and more expensive FFS structured training. In order to achieve this, all planned FFS training with DISBUN was converted to VCD-training and the number of DISBUN partners at the district level was increased. Farmer and NGO-led FFS were carried out as planned.

Background

Definition of PsPSP

PsPSP is a low cost, low input cultural method for controlling the CPB and other pests as well as for increasing tree productivity. This method is now commonly known by its Indonesian acronym, PsPSP. The cultural practices are:

1. Frequent harvesting (Panen sering): This method requires the removal of the pods from the garden while the larva is still inside, thus preventing them from exiting and

multiplying and reducing potential damage to beans. Farmers are encouraged to harvest a minimum of three times per month year round.

2. Pruning (*Pemangkasan*): This is necessary for increasing production as it creates a better-lit farm, which is not the preferred habitat for the adult CPB moth, and farmers are able to see and harvest all the pods. Unharvested pods are a major source of infestation.

3. Sanitation of pod husks (*Sanitasi*): Sanitation destroys the larva still living in the pod husks. Sanitation of pods is accomplished through burying them or covering them under plastic sheeting for a few days.

4. Fertilizing (*Pemupukan*): The method emphasizes good soil fertility through composting and application of chemical fertilizers such as urea, potassium chloride, and tri-sodium phosphate. Application of fertilizer promotes healthier trees that are better able to resist CPB. Many farmers cannot regularly afford to purchase fertilizer so there is training also on organic fertilizers and composting.

These cultural management practices remain the most promising and easiest technology to disseminate to farmers, and are the main thrust of training on CPB control and increased productivity. In the course of working with cocoa farmers in the FFS environment, adaptations to the curriculum have been made and additional training modules developed.

History of PsPSP

PsPSP was identified as the most promising method of controlling CPB during the Cocoa Pod Borer Management Project carried out in Sulawesi between 1995 and 1998. It was disseminated to farmers during the USDA-funded SUCCESS program implemented in partnership with ACIDI/VOCA and the American Cocoa Research Institute (ACRI) using the FFS approach developed by the FAO. The methodology was disseminated over two years to train nearly 35,135 farmers in Sulawesi in the low cost and easily implemented techniques for reducing cocoa losses to CPB. The achievements of the SUCCESS program resulted in the development of the expanded SUCCESS Alliance to reach 29,700 farmers with this technique.

Effectiveness of PsPSP

PsPSP (or variants thereof, but comprising the same core activities) has been shown through numerous field trials to be an effective methodology for the control of CPB and other pests and diseases that affect the cocoa plant. However, the effectiveness of the key activities comprising PsPSP is highly dependent on the motivation of the cocoa farmers to implement them. Monitoring and evaluations of the various projects using PsPSP have indicated that smallholder farmers are typically enthusiastic about new learning and agronomic practices but the level of work required to maintain a 'perfect' cocoa farm is beyond what many farmers are prepared to undertake for such reasons as:

- The farmer may have other crops/income generation activities which predicate against frequent time spent in the cocoa gardens

- Traditional ideas of cocoa as a ‘zero maintenance’ crop that stem from the pre-CPB era when minimal labor was required for a good crop
- Lack of available labor among smallholders
- Land tenure uncertainty (often due to the large expansion of smallholdings as a result of the cocoa boom of the late ‘90s) resulting in reluctance to invest time, labor and money in improvement
- Cultural weight (status) is placed on quantity of land owned rather than quantity/quality of crops produced, resulting in management being spread too thinly
- Temporary sharecropping arrangements whereby a ‘manager’ maintains and harvests the crop of another for a percentage – encouraging a short-term view
- Per kilo price at the Sulawesi farm gate is often targeted at attracting a medium to low quality bean regardless of the bean quality on offer. Though PsPSP increases volumes of saleable beans and thus increasing income as long as base prices remain stable, the lack of a unit price increase is perceived by farmers as a lack of reward for the additional labor required to combat CPB and properly clean and dry beans.

In November 2003, the Food Policy Support Activity section of USAID through a contract with Development Alternatives International (DAI) undertook an economic analysis of the costs and return of cocoa farming in eight villages of South Sulawesi. The villages were participating in the SUCCESS Alliance program.

The key findings were as follows:

1. On average, cocoa farmers selected to represent best practice used thirty-four percent more labor and sixteen percent more fertilizer per tree than non-best practice cocoa farmers, and achieved nineteen percent higher yields per tree.
2. The additional cost, in terms of labor (including family labor) and fertilizer, incurred by best practice farmers was more than covered by the revenue earned from higher cocoa yields.
3. Commuting costs from the home to the cocoa garden are sometimes mentioned as an impediment to adopting best practice techniques, since frequent harvesting involves many additional trips. However, even for gardens located one hour from the farmer’s house, the time spent in commuting should not be an impediment to adopting best practice techniques.
4. Most farmers, even among those trained in PsPSP techniques, do not implement as frequent harvesting as recommended.
5. Semi-frequent harvesting raised yield per tree by eleven percent. Additional research would be needed to determine whether the gain in yield from frequent harvesting is worth the extra time and expense.
6. Labor time is the key difference between best practice management of the CPB, as advocated by PsPSP, and non-best practice management.

A field evaluation in 2004 of the PRIMA (Pest Reduction Integrated Management) cocoa project, implemented by the Program for Eastern Indonesia SME Assistance (PENSA) using PsPSP methods reported an average yield increase of twenty-four percent among participating farmers when compared with farmers who were not participating.

Other FFS Topics

In addition to PsPSP practices, additional training was given to farmers who participated in the Field Schools in the areas of bio-control, side grafting, and FaaB. Detailed activity summaries of each of these trainings are presented in further sections. A short summary of each is given below.

Bio-control

This is a range of pest and disease control activities that was included in the FFS curriculum. The primary bio-control method that was included with the FFS' was the propagation of ants in cocoa farms to naturally predate on the CPB eggs and larva. This method has been proven to reduce losses due to CPB and herbivorous larva/caterpillars, particularly when used with other PsPSP practices.

Side Grafting

Most of the cocoa gardens in Sulawesi were planted ten or more years ago. As the productivity of cocoa trees decrease after ten years, a considerable amount of replanting would be necessary to maintain production levels. However, use of side grafts onto the stems of existing plants rejuvenates the tree, leading to production levels being restored in considerably less time (nine to twelve months) than would be the case with replanting. In addition, side grafts can be made with stock from higher-producing or more pest-resistant trees, thus further improving productivity.

Farming as a Business

In response to monitoring feedback from participants in the FFS, the SUCCESS Alliance aimed to deliver training at the producer level to transfer knowledge and practice in small business management.

Farmer Field School Implementation

Training of trainers

Farmer Field Schools were implemented by trainers from three sources: farmers from the communities where the SUCCESS Alliance was working, local NGOs and employees of DISBUN. Each Training of Trainers (TOT) session was with a class of thirty trainers, and covered ten days of instruction in each location. Initially, class sizes of forty trainees were envisaged, but team management made the decision to reduce the training numbers due to saturation of trainers in project areas and to better ensure quality training through smaller class size.

The training was based on the SUCCESS TOT curriculum, topic materials and proven PsPSP methods.

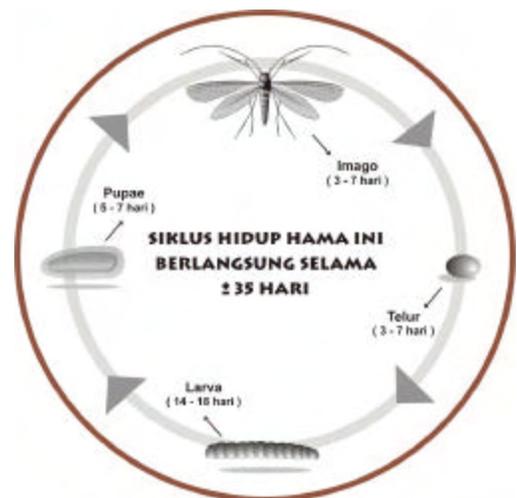
FFS Curriculum

The FFS approach teaches farmers through practice, on-farm observation, and farmer led research. Farmers learn about the life cycle, breeding, and reproduction of pests and the cause and transmission vectors of diseases. Farmers must understand the ‘enemy’ before they can effectively manage it. Importantly, they also observe and learn about the natural predators of pests, thus learning that much of the necessary pest control is accomplished in their farms’ agro ecosystem.

Participant farmers are selected on the basis of the following criteria:

- Their primary or only source of income comes from cocoa.
- The area of cocoa garden(s) owned equals 0.5 ha or more.
- They are capable of taking part in the learning process for a minimum of eight meetings.
- They are willing to apply the results of the learning process in their own cocoa gardens and disseminate the knowledge to other cocoa farmers.

The FFS curriculum covered three months (increased to four months in year three) of training and one month for follow up and planning, during which time the farmers participate directly in the control measures and observe their impact on the quantity and quality of cocoa production. The FFS uses participatory approaches and ensures that farmers understand the nature of the CPB, the logic behind the control measures, and how to evaluate the effectiveness of control measures undertaken. Six direct visits to participants’ gardens were undertaken throughout the training and follow up period.



Life cycle of CPB, from FFS training manual

Demonstration plots were used to show the increase in productivity and profitability, to document and record results for analysis, and as training sites for other farmers.

Through the FFS process, farmers also learned a system for training other farmers. The multiplier effect of a FFS is the continued interaction of alumni from a village field school with one another and with other farmers in their area. Because FFS emphasizes farm research and analysis, farmers continue to innovate and share their experiences as time goes on.

The FFS methodology and curriculum also emphasized farmer leadership and farmer organization throughout the program and taught specific management and business skills in a special FaaB module introduced in year three. As a result of the FFS training, many farmers self organized into farmer groups. These farmer groups are not only supporting members to implement FFS lessons and communicating with other farmers about CPB control, but also have the potential to negotiate preferential pricing and possibly even a

VCD-For Cocoa Pod Borer Training

The VCD training was adapted from the FFS training curriculum using an existing video that explains the CPB lifecycle and demonstrates implementation of the PsPSP methods. The video materials were supplemented with visual aids that illustrate specific improved farmer techniques and pest control information.

DISBUN trainers and farmer facilitators participated in a training of trainers to learn how to implement the training and to orient them to the necessity of following up the training sessions to ensure understanding of the material presented. The VCD training itself was a full day event with pre- and post-testing, viewing of the video, exercises in the training groups and assigned exercises to carry out in the garden. An additional day of follow-up allowed for clarification of the lessons after practical experience with them.

Implementation of the VCD training activity was carried out parallel to the CI, trainers followed up on the media campaigns, visiting villages to provide consultation services and to reinforce the media messages by carrying out VCD training. VCD training was a lower cost, less intensive form of training that replaced DISBUN-led FFS-CPB in the year three of the program.

Areas that have not had FFS training were targeted for this training, including new districts. It was expected that 70,000 farmers would be trained through 1,400 sessions of the program.

FFS Baseline Analysis

Despite the fact that Indonesia has become the third largest cocoa producer in the world (the vast majority of that production in Sulawesi), its farmer-producers are largely self-taught and self-supporting. As a result of farmers being left without a system of support, the cocoa production industry has been vulnerable to pests such as CPB, and has thus been deteriorating since the end of the last decade. Increases in infestation by CPB coupled with falling global prices have resulted in the quantity and quality of Sulawesi cocoa decreasing as a whole.

**% CPB loss for non/pre FFS farmers
Three province average (S, SE & Cent. Sulawesi)**

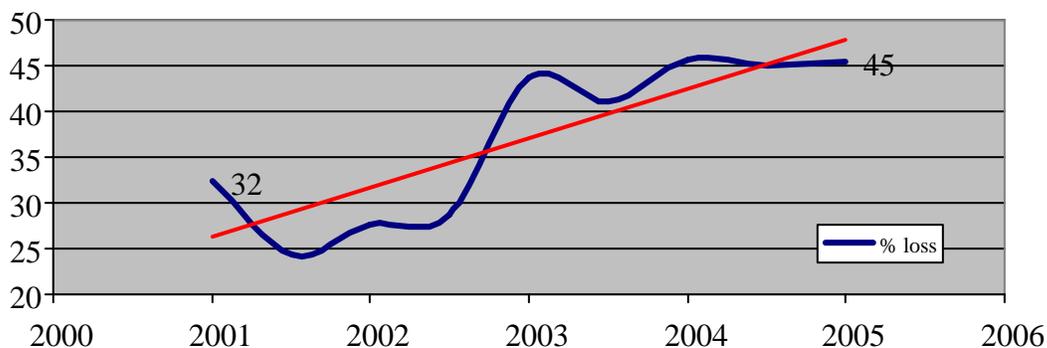


Figure 2: %CPB Losses. Source: Mumford, 2005

The above graph from the SUCCESS Alliance baseline studies illustrates the substantial losses attributed to CPB across three of the five provinces of Sulawesi. Losses among untrained farmers or farmers who are not practicing PsPSP or similar techniques have climbed to an average of forty-five percent of their entire crop during peak season⁸.

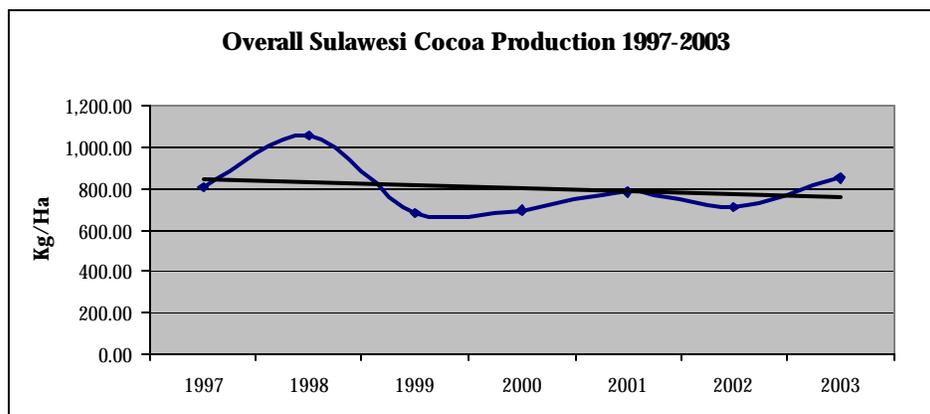


Figure 3: Cocoa Production in Sulawesi 1997-2003 Source: Estate Crops Office

⁸ Unless otherwise stated, baseline data referred to in this report was collected from farmers who were about to participate in the SUCCESS Alliance Farmer Field Schools.

The graph above showing data from DISBUN indicates that the overall production for Sulawesi has been showing a decline for the last number of years, though some areas experienced a small resurgence in 2003. However, the data gathered directly from the field by the SUCCESS Alliance program indicates that the deterioration is greater.

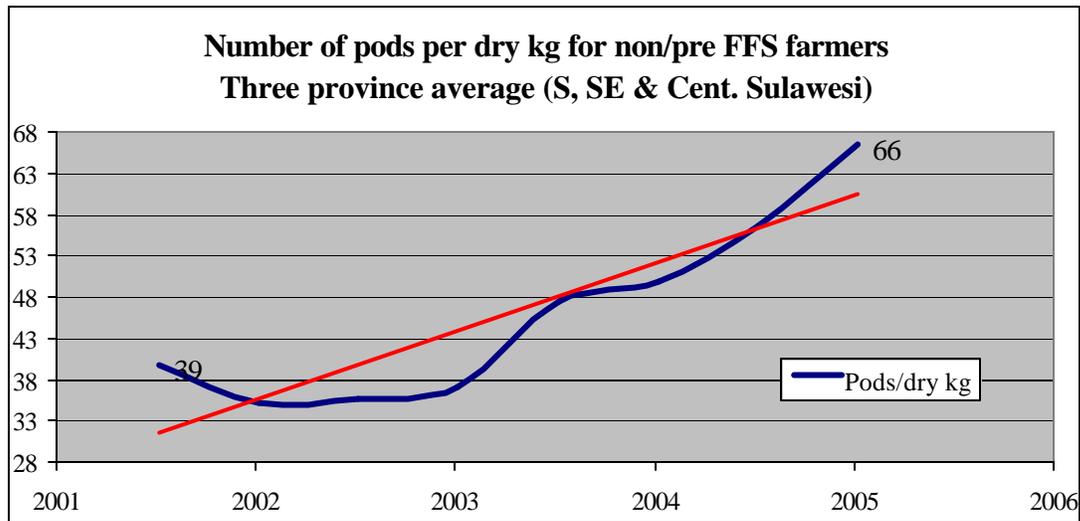


Figure 4: Cocoa pod counts Source: Mumford, 2005

A similar increase is seen above in the quantity of pods required per kilogram of dry beans between 2001 and 2005. This increase is among farmers who do not use any form of improved farm management techniques – an increase of 169% over a four year period; thus reducing overall productivity of farms due to higher pod/bean counts.

Main pests affecting Sulawesi farmers 2002 (n = 186)

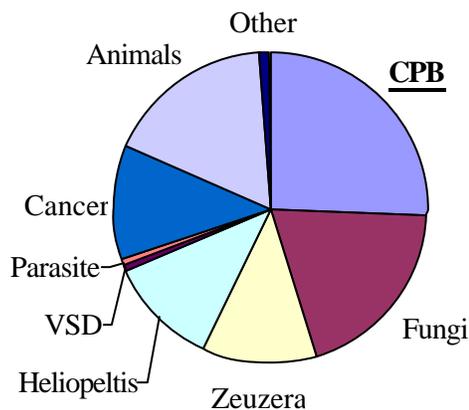


Figure 5: Main Pests affecting Cocoa

Farmers themselves identified CPB as the main pest affecting their crop prior to the implementation of the SUCCESS Alliance program with more than a quarter of farmers surveyed considering it to be their most significant problem. The next most significant problems are fungi (primarily Black pod/*phytophthora*) and animal damage (primarily rats/mice).

Activities to reduce CPB and other pests were not extensive or effective prior to the SUCCESS intervention. Farmers have been very reliant on pesticides. The graph below shows that over seventy percent of farmers untrained in garden management use pesticides for controlling CPB infestation.

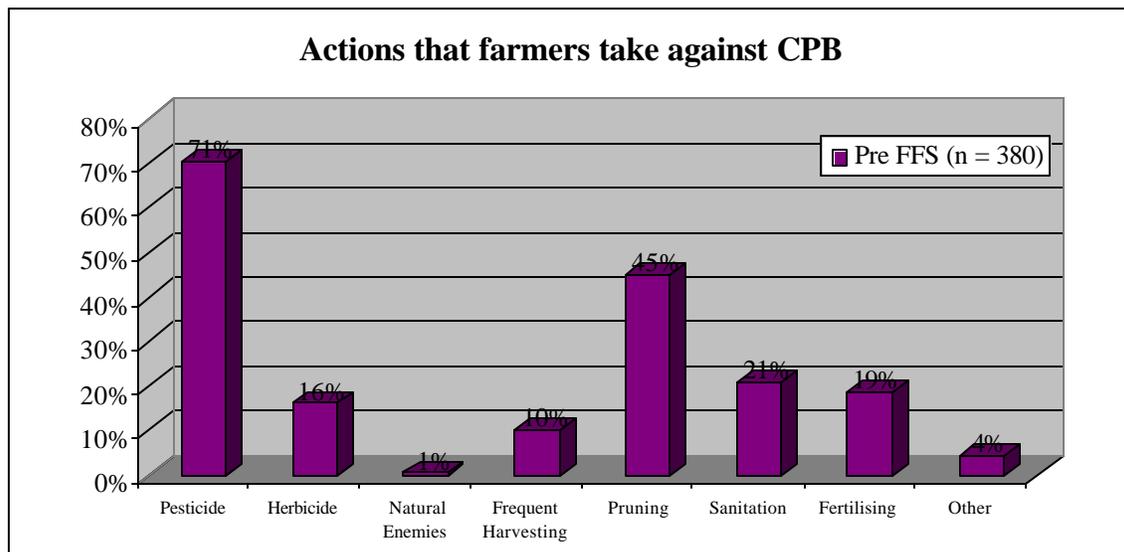


Figure 6: Farmer action against CPB

The pattern of pesticide use, shown below, indicates a frequent application of pesticides within gardens. This is a largely ineffective practice as the CPB larva lives deep inside the cocoa pod and will only be affected by pesticide if the spraying time coincides closely with the emergence of the larva to form a pupa. To date, the use of pesticides has been shown not to be cost-effective, as good spraying regimes and appropriate pesticides have not been identified. The health and environmental issues surrounding intensive pesticide use is also a concern.

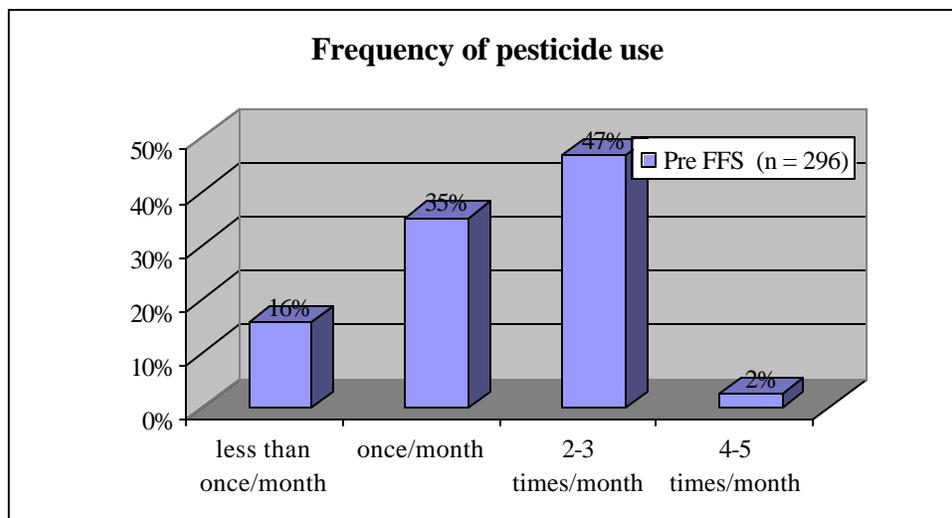


Figure 7: Pesticide use among farmers

The level of training of farmers reflects their poor performance in terms of cocoa quality and production.

**Farmer training 4 province average (n = 586)
(Bali, S, Central & SE Sulawesi)**

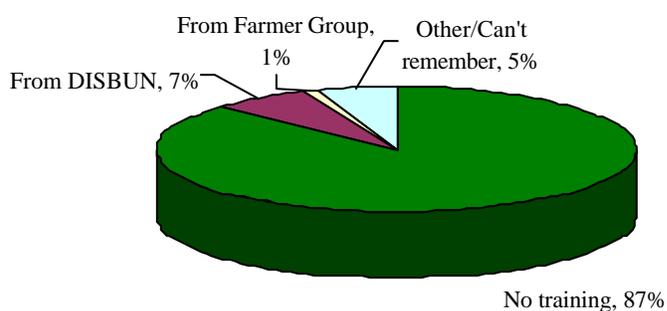


Figure 8: Proportion of trained farmers

Prior to the FFS activities in Bali and Sulawesi, farmers were asked about their training history (excluding FFS training by SUCCESS) – most had received no training⁹. Those who had received some form of training had done so primarily in the last five/six years, and most trainings were received from the Indonesian Government through DISBUN. The trainings received were primarily in cocoa production.

⁹ Farmers who participated in the 2000-2003 SUCCESS Project were excluded from the SUCCESS Alliance program and are not represented by this data. As the total number of farmers trained was 35,135 (approx. six percent of the smallholders of Sulawesi), the true figure can be approximated downward to eighty-one percent. Site-specific trainings not covered by this survey (such as the PRIMA project), provide a negligible difference.

The overall picture of the cocoa primary production industry in Sulawesi is one of deteriorating volumes and quality as a natural evolution of a relatively unregulated system that has received patchy support from extension providers, whether private or public sector.

Unimproved farming methods, a result of the lack of farmer training, have provided the perfect environment for the CPB to multiply, which is reflected in increasing cocoa losses. Previous experience with this pest has shown that if unchecked, it can increase its depredations to the point where the entire production base becomes non-commercially viable.

The SUCCESS and follow-on SUCCESS Alliance direct-training FFS programs, despite proven results, only address a proportion of the smallholder population of Sulawesi (not more than twenty-five percent), so results will only be seen among that proportion. The overall impact on the entire output of Sulawesi will therefore be hidden, so is not considered in this report, unless as a statistical comparison.

FFS Activities

The following table summarizes the broad outputs for FFS activities in the SUCCESS Alliance program:

Table 1: Summary Activities for FFS Program

FFS Activity	Target Area	Methodology	Timeline	Target
TOT FFS for farmer trainers and DISBUN extension agents using PsPSP and FaaB	Sulawesi	TOT Workshops	2003 – 2005	8 training workshops of 30 trainers in each = 240 trainers
	West Papua (through Yalhimo)	TOT Workshops	2003 – 2005	3 workshops of 88 trainers in each = 264 trainers
	North Sumatra (through YPANSU)	TOT Workshops	2004 – 2005	1 workshop of 30 trainers
	Bali	TOT Workshops	2004 - 2005	2 workshops of 20 trainers in each = 40 trainers
FFS to reduce CPB	Sulawesi	FFS by farmer facilitators FFS by DISBUN	2003 – 2005	22,700 farmers through FFS
	West Papua	PLCF ¹⁰ by farmer facilitators PLCF by DISBUN	2003 – 2005	1,400 farmers
	North Sumatra	FFS	2004 – 2005	3,500 farmers through FFS
	Bali	FFS	2004 – 2005	2,100 farmers through FFS
Advanced FFS	West Papua	Advanced PLCF by DISBUN	2005	22 activities reaching 1,300 farmers
Establish Community nurseries	West Papua	FFS	2005	18 nurseries distributing 63,000 seedlings
VCD CPB training	Sulawesi	TOT workshops	2003 – 2005	19 workshops
		FFS by farmer facilitators, DISBUN & CARE		300 trainers 1400 trainings reaching 70,000 farmers through VCD

The implementation of the FFS was planned to take a cyclical approach, reflecting the two harvest cycles of cocoa farmers in Indonesia. The three year program would cover three cycles of growing season.

In addition, two types of trainer were trained. Trainer farmers were selected from participant communities to be trained in the FFS curriculum and transfer their knowledge to their peers, and employees of DISBUN would be trained in parallel. Teams of farmer

¹⁰ FFS in Papua were known as Participatory Learning with Cocoa Farmers (PLCF)

trainers and DISBUN staff would jointly conduct training sessions for FFS farmers, thus improving the relationship between DISBUN extension workers and the cocoa farmers.

VCD-CPB Training

DISBUN staff carried out VCD training based on the video training series on PsPSP and good farming practices already developed with a set of companion materials which had previously been disseminated to DISBUN offices. This series was modified somewhat to include new lessons and methods. Based on field experience, it was concluded that target communities have access to the televisions and VCD players that were used to carry out the training.

The VCD consisted of a thirty minute movie, using local people as actors, which covered the main topics of the FFS curriculum, though in a much compressed format. The video training consisted of a full day event with pre- and post-testing, viewing of the VCD, exercises in the group and practical exercises to carry out in the garden as well as time for discussion.

Each targeted village was divided into two training groups of twenty-five people each as space around a television set is limited. The training consisted of one day of exposure plus one day of follow up for each of the training groups within the village.

The areas that did not receive FFS training were targeted for the VCD training, including new districts. In total, 69,439 farmers were trained through 1,399 sessions of the VCD training program. An average of nineteen percent of the beneficiaries were women. The complete target was not achieved due to insecurity in one target area, Poso, where there is a considerable amount of civil unrest.

Sulawesi FFS Activities

Training of trainers began in Sulawesi in May/June of 2003. In July 2003, the SUCCESS Alliance signed Recipient Agency Agreements with district heads of DISBUN representing eight districts in three provinces across Sulawesi. Signing ceremonies were held in Makassar (South Sulawesi), Palu (Central Sulawesi) and Kendari (Southeast Sulawesi).

These agreements covered the FFS that commenced in August 2003 in Sulawesi and were amended to include training carried out in 2004. FFS trainings in Sulawesi were undertaken over three major crop cycles:

- Cycle one of the FFS training consisted of 139 FFS by farmers and DISBUN in South, Central and Southeast Sulawesi and finished in mid 2004. There were 6,996 participants, twenty-nine percent of whom were women.
- Cycle two consisted of 202 FFS led by farmers and DISBUN which reached 10,139 cocoa farmers, of which twenty-one percent were women.
- Cycle three of the FFS-CPB with participating farmers only in South and Southeast Sulawesi commenced in December 2004. FFS in Central Sulawesi started in January 2005 and finished in April 2005 – 125 schools were conducted.

During this cycle, 6,178 farmers took part in training on FFS-CPB control and extra training on side grafting and FaaB, seventeen percent of whom were women.

West Papua FFS Activities

SUCCESS Alliance program activities started in Papua with a Rapid Training Needs assessment in West Papua during the months of November and early December 2002. The training needs assessment was used as a basis for the design and curriculum of the FFS TOT activity.

On September 30, 2003, ACDI/VOCA signed a new program modification with USAID to expand SUCCESS Alliance programming to include sixteen tree nurseries in West Papua. The nurseries would provide seedling stock for up to 900 West Papuan cocoa farmers.

The SUCCESS Alliance signed agreements with a local NGO, Yalhimo, to cover a Volunteer Program whereby final year students from the National University of West Papua and recent graduates would be given the opportunity to work with the SUCCESS Alliance Participatory Learning with Cocoa Farmers Program (PLCF).

The program training, known as introductory PLCF, commenced in May 2003 and trained 1,664 farmers, sixteen percent of whom were women. October 2004 marked the end of the Introductory Phase and the commencement of the Advanced Phase of the PLCF program. During this phase, 249 farmers were trained in farm management, group marketing, group formation and advanced crop husbandry. Activities were completed in West Papua in March 2005.

Bali FFS Activities

SUCCESS Alliance program activities were planned in Bali with a modification to the GDA agreement on September 30, 2003. An additional 2,100 farmers were to be targeted with the FFS activities over the remaining life of the program.

The first TOT workshop for FFS-CPB training began in the District of Tabanan, Bali, on March 24, 2004. This activity trained twenty cocoa farmers and government extension workers to become trainers for SUCCESS Alliance field schools in Tabanan. A further twenty-two trainers were trained in Jembrana and Tabanan in late 2004. All trainings in Bali were conducted by farmer and DISBUN trainers.

FFS-CPB trainings commenced in April 2004 in the district of Tabanan. In Bali, the trainings were very successful, with the traditional 'group mentality' (*Subak Abian*) prevalent, ensuring that group learning dynamics and motivation remain high. Participation was above ninety-seven percent for each training month, with the Balinese participants showing very high levels of motivation and enthusiasm to implement the recommended methods in their gardens. The total number of farmers trained in this cycle was 1,000; twenty percent of the participants were women.

A second cycle of training in Bali commenced in January 2005 with a total of twenty-two Field Schools involving 1,100 cocoa farmers in two districts (Tabanan and Jembrana), twenty-two percent women. This final cycle was completed in July 2005

Sumatra FFS Activities

SUCCESS Alliance activities were planned in Sumatra with a modification to the GDA agreement on September 30, 2003 to add 3,500 farmers from North Sumatra to the program.

In September 2004, thirty North Sumatran cocoa farmers and DISBUN staff participated in the TOT program for FFS-CPB. They were responsible for carrying out thirty-seven FFS-CPB and FFS Field Studies within four districts.

A total of eleven regular FFS-CPB and twenty-six FFS Field Study activities were completed by January and February 2005 respectively, with over 1,845 cocoa farmers having participated, thirty-two percent of whom were women.

The second cycle of FFS-CPB and Field schools began in April 2005 and trained a further 1,733 farmers, twenty-two percent women, by completion in September 2005.

Other FFS Activities

In March 2003, ACDI/VOCA Country Representative, Ross Jaax, was invited to attend and contribute to a workshop for the overview of the FFS approach as it applies to cocoa, and also a workshop to further develop modules or protocols that could be used by FFS trainers. The workshop was organized by the International Institute of Tropical Agriculture (IITA) station in Yaounde, Cameroon, which is the leading agency for the implementation of the Sustainable Tree Crops Program (STCP) in West Africa. Five country programs participated in the workshop; Guinea-Conakry, Ivory Coast, Ghana, Nigeria, and Cameroon.

Accessing challenging training locations

In the effort to expand training impact, SUCCESS Alliance sought out a partnership with CARE International to teach farmers in Poso, Central Sulawesi. In the past, SUCCESS has provided training of trainer-resources to CARE but they conducted direct training under contract to SUCCESS for the first time under the VCD-Training program. This partnership, which grew out of NGO coordinating meetings in Central Sulawesi, demonstrates the effectiveness of synergistic partnerships to reach farmers in a conflict area. Poso farmers did not participate directly in the SUCCESS program in the past because of the difficulty of establishing a program management unit in a conflict prone area. CARE has a long standing operational presence in Poso and experience providing support to cocoa farmers but lacks the depth of cocoa experience to effectively teach improved farm management practices. The SUCCESS-CARE partnership, which commenced in May 2005, overcame both organizations' operational constraints.

Results of the FFS Activities

Table 2: Summary Results for FFS Program

FFS Activity	Target Area	Target	Achievement
TOT FFS for farmer trainers and DISBUN extension agents using PsPSP and FaaB	Sulawesi	8 training workshops of 30 trainers in each = 240 trainers	100 %
	Papua	3 workshops of 88	100%
	North Sumatra	1 workshop of 30 trainers	100%
	Bali	2 workshop of 20 trainers each	105% (42 trainers)
FFS to reduce CPB	Sulawesi	22,700 farmers through FFS	103% (23,313 farmers trained; 22% (5,213) women)
	Papua	1,400 farmers	119% (1664 farmers trained; 250 (16%) women)
	North Sumatra	3,500 farmers through FFS	102% (3578 farmers trained; 27% (953) women)
	Bali	2,100 farmers through FFS	100% (442, 21%, women)
Advanced PLCF (FFS)	Papua	22 activities reaching 1300 farmers	20% (10 activities reached 249 farmers)
Establish Community nurseries	Papua	18 nurseries distributing 63,000 seedlings	28% (20 nurseries distributed 17,810 by prog. end)
VCD CPB training	Sulawesi	19 workshops 300 trainers 1,400 trainings reaching 70,000 farmers through VCD	116% (22 workshops conducted) 222% (665 trainers trained) 99% (1399 trainings reaching 69,439 farmers)¹¹

Impact of FFS on target farmers

Impact on overall production

The primary measures of cocoa production and quality used in the measurement of impact from PsPSP are overall yield (kg/ha) and the pod count, which measure the

¹¹ One location, Poso, did not receive VCD training due to civil insecurity. A complete breakdown of VCD training locations is given in Appendix 2.

number of cocoa pods that provide one kg of cocoa beans and is an indicator of bean quality as it relates to bean size.

While the overall per hectare yield of cocoa farmers in Sulawesi has been declining due to CPB and other pest/disease attacks, the yields of FFS alumni have been considerably better.

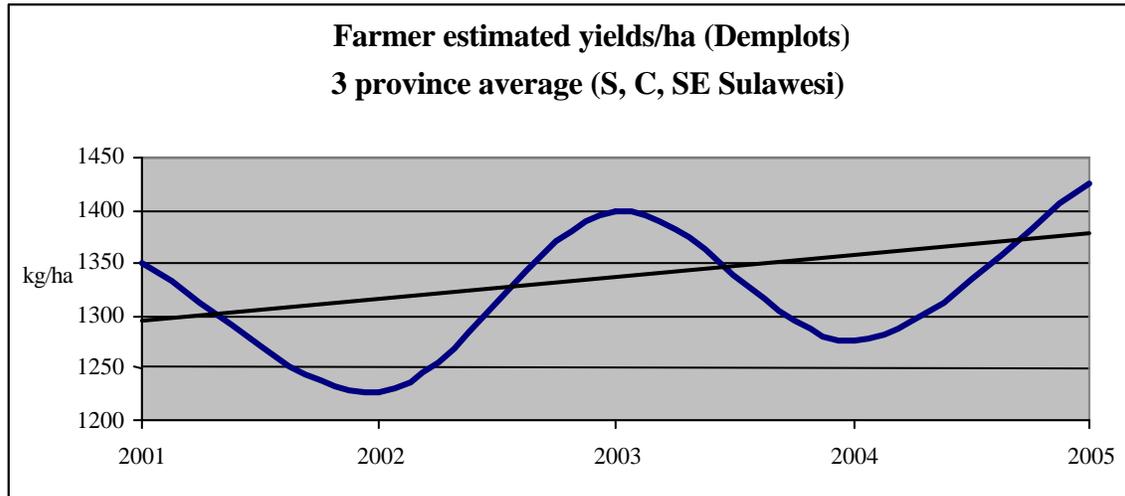


Figure 9: Farmer estimated yields. Source: Mumford, 2005

The above graph indicates an overall trend of increasing pod yields per hectare for FFS farmers.

Though pods/kg for all farmers, both FFS and non FFS, are still experiencing a decline, this decline is notably less pronounced for FFS farmers, as illustrated below.

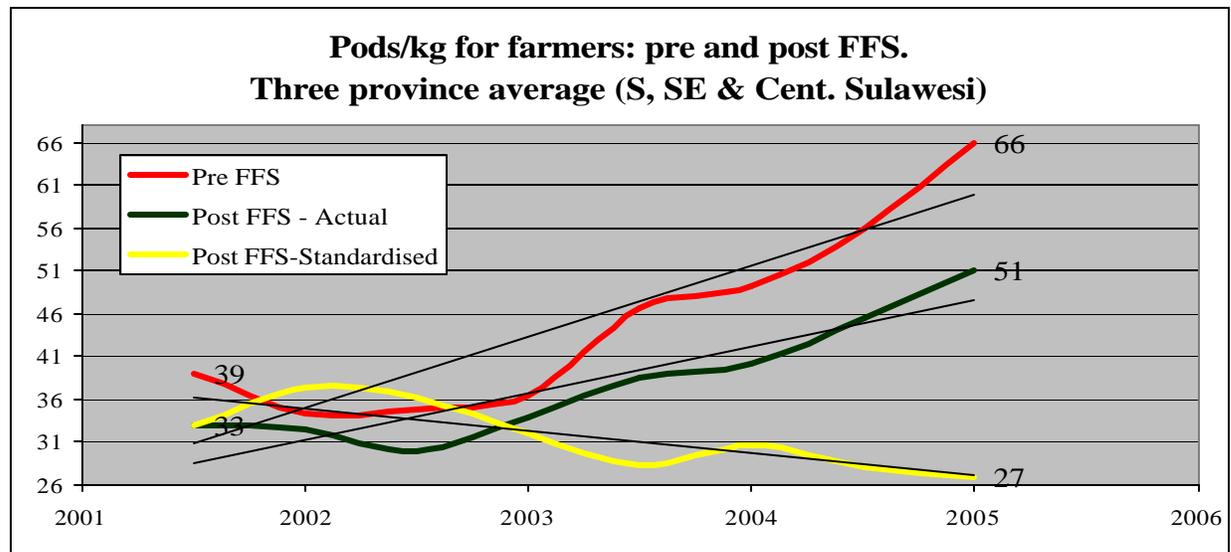


Figure 10: Pre and post FFS pod counts. Source: Mumford, 2005

Farmers participating in the FFS have experienced considerably less of an *actual* decline in quality than farmers who have not received training (dark green and red lines).

If the results are adjusted to eliminate the overall negative trend due to increasing CPB infestation (calculating the trained farmers' results as if the overall harvest had *not* been deteriorating in quality and remained *constant* since 2001), the FFS farmers would have improved their yield qualities by twenty-five percent since 2003. Not only are FFS alumni farmers doing better than their untrained counterparts but the difference between them is widening.

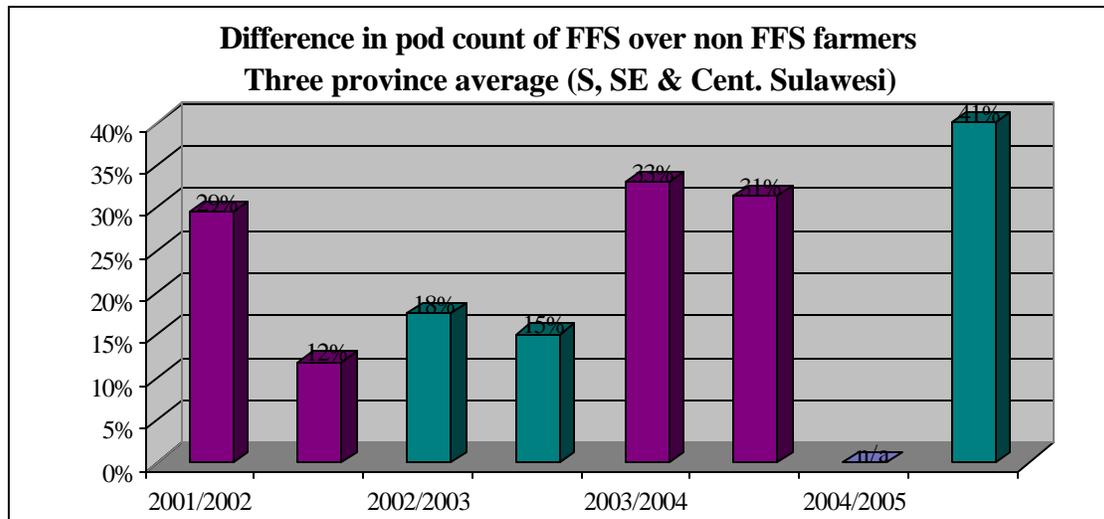


Figure 11: Pod counts for trained and untrained farmers. Source: J. Mumford, Imperial College, London

The graph above illustrates the percentage differences between farmers who have yet to be trained over those who have already been trained (each pair of bars represents a pair of harvests) throughout the training cycles undertaken by the SUCCESS Project and the SUCCESS Alliance programs. FFS Farmers in the low season in 2005 were producing forty-one percent more cocoa than non- (or pre) FFS farmers during the same season – this is contrasted with only a fifteen percent difference at the beginning of the program in 2003. This illustrates how the effect of CPB is becoming more and more pronounced among the overall industry in Sulawesi due to lack of improved techniques among the majority of the farming population.

Impact on farmer incomes

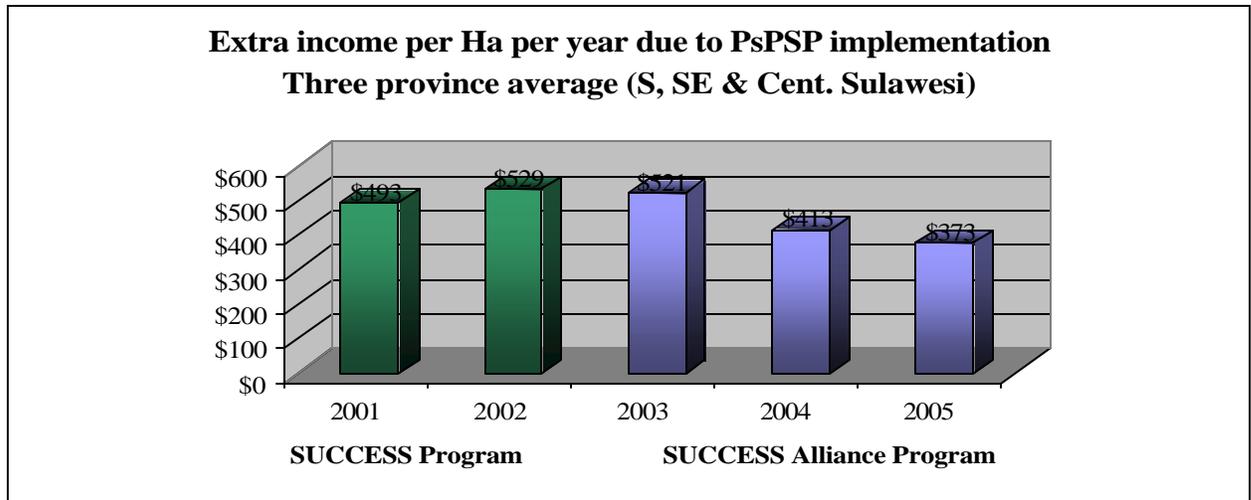


Figure 12: Extra farmer income. Source: Mumford, 2005

Income levels among farmers practicing PsPSP have therefore become higher relative to incomes of non-practicing farmers (increases in absolute incomes may not have occurred due to fluctuations in the price of cocoa, inflation etc.). Essentially, FFS/PsPSP farmers have been earning an average of \$435 more than non-PsPSP farmers per year since the SUCCESS Alliance program started.

A breakdown of the activities to which this increase in income is due is given below. The figures provided reflect the whole duration of the SUCCESS Alliance program.

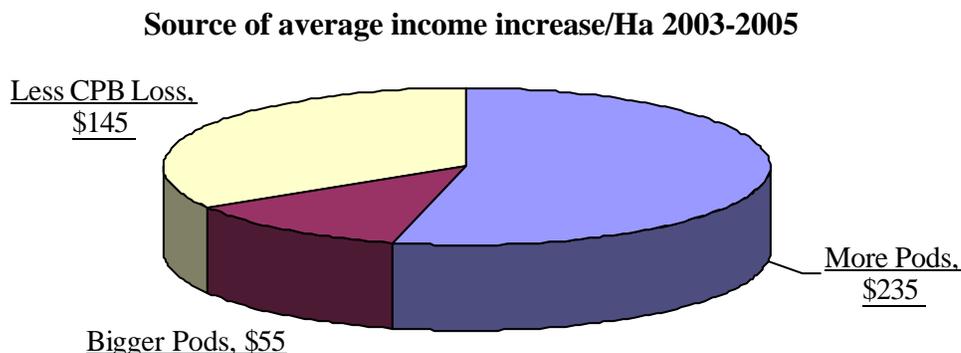


Figure 13: Source of extra income

Impact on farmer activities

Cocoa Pod Borer awareness and action

The first training session for farmers participating in the FFS is on the CPB life cycle. Farmers without formal training have a moderate awareness of the causes of the deterioration of their crop – most farmers could state one to three symptoms of CPB infestation.

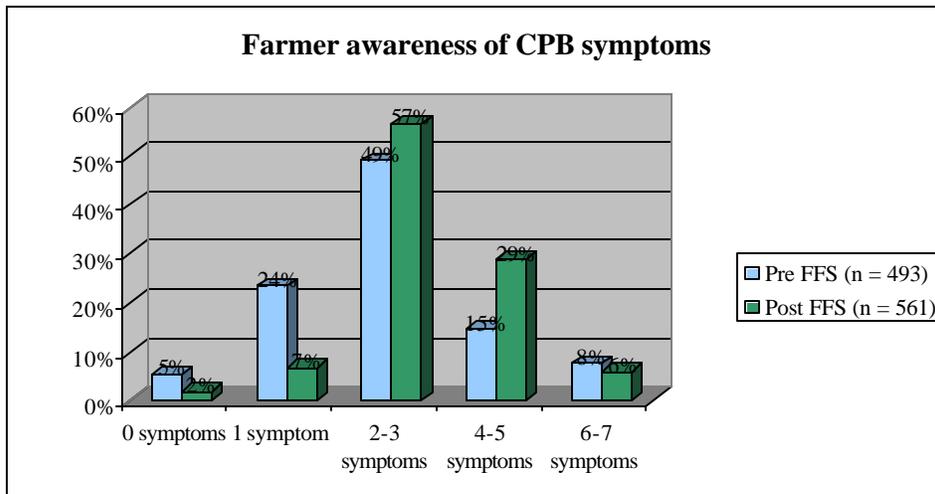


Figure 14: Base and Endline farmer CPB knowledge

Post training, farmers were more aware of what damage was caused by CPB and how to spot it.

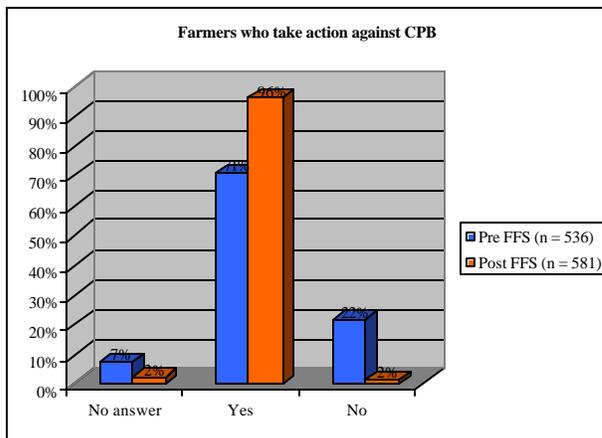


Figure 15: Do farmers take action against CPB?

Most farmers traditionally take some form of action against CPB, showing a high level of motivation to combat the pest. Six months after attending the FFS, ninety-six percent of farmers took some form of action, and as can be seen below, the actions taken have become much more targeted and appropriate in terms of usefulness.

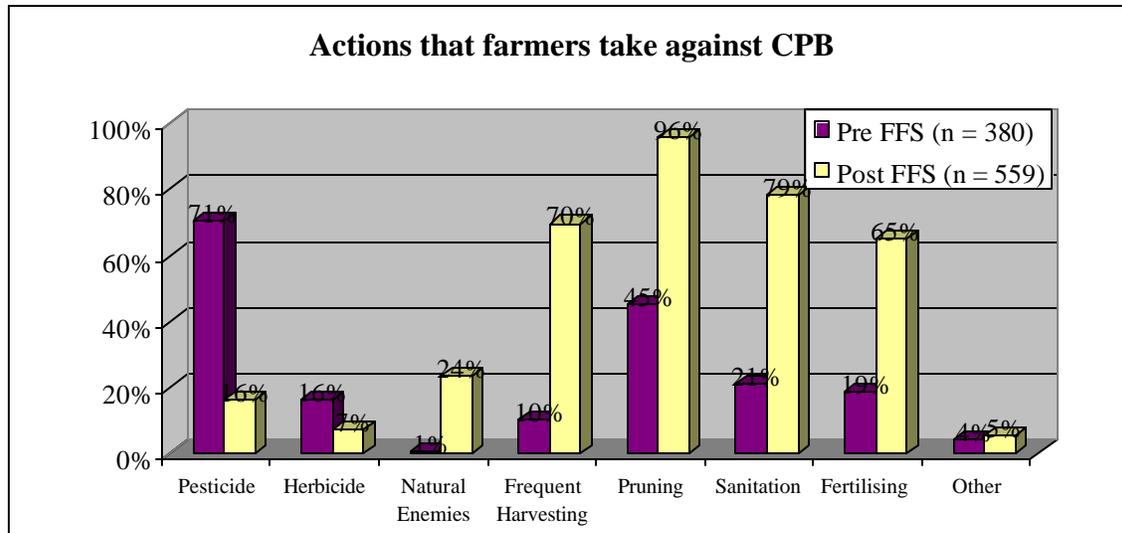


Figure 16: Action that farmers take against CPB

The above graph shows that the pattern of action farmers are taking to combat CPB changes dramatically post FFS. Whereas prior to the training, farmers primarily used pesticides to try and limit attacks (with very limited success), subsequent to the training, the use of pruning, frequent harvesting, sanitation, fertilization and natural enemies were used by a much higher proportion of farmers. The level of pesticide use had dropped from seventy-one percent to sixteen percent, resulting in benefits to the crop, environment and a cost saving to the farmers.

Frequent Harvesting

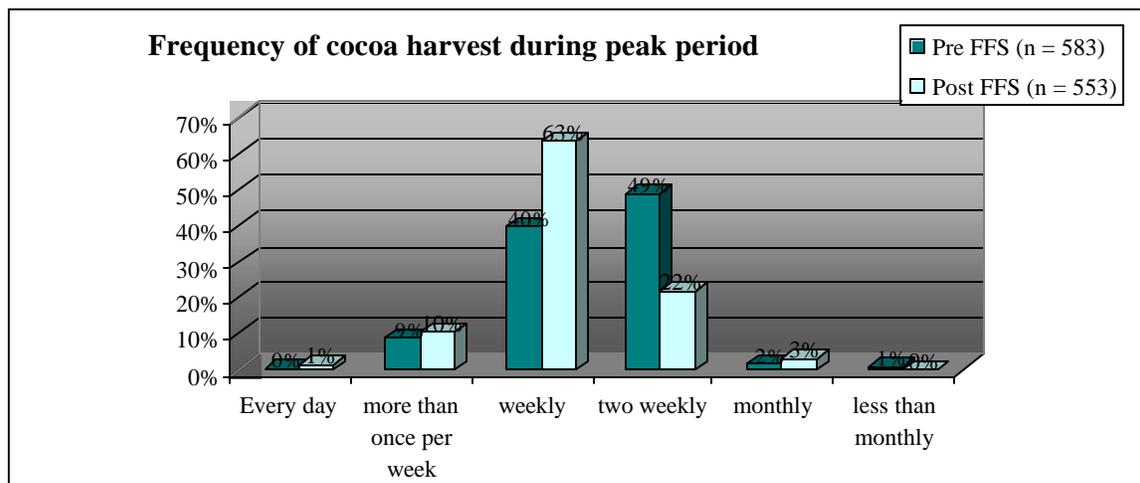


Figure 17: Base and Endline frequency of peak harvesting

Frequent harvesting has gained popularity as a result of the FFS. Prior to the FFS, the majority of farmers harvested less than once per week during the peak period. Post training, seventy-four percent of farmers were harvesting at least once per week. This contributes greatly to interrupting the life cycle of the CPB thus reducing damage.

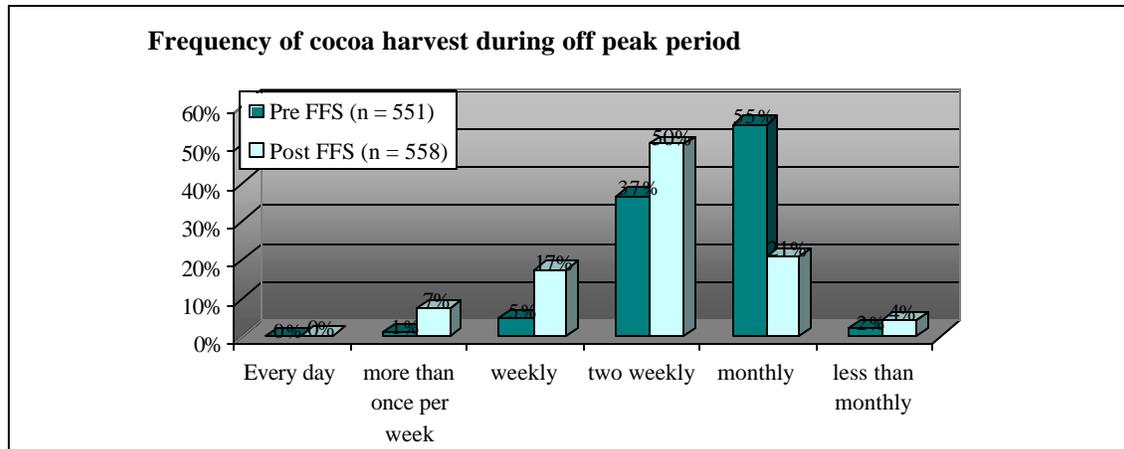


Figure 18: Base and Endline of off-peak harvesting

A similar change is seen in the off peak period – this is the time when CPB infestation is generally at its highest, due to fewer pods on trees but high numbers of insects. Farmers are less inclined to harvest frequently as the return on labor is less, but such harvests are equally important. After the FFS training, nearly seventy-five percent of farmers harvest at least every two weeks, an increase from forty-three percent pre training. This result is good, but ideally farmers should be harvesting weekly, at least, through both seasons. The reasons for such frequent harvesting have changed also. Farmers traditionally harvested more than normal for purposes of income – cocoa is a cash crop, so when extra cash was required, a harvest was done. This was quite acceptable in pre-CPB times, but a new paradigm of working is necessary if the deterioration of crops is to be arrested.

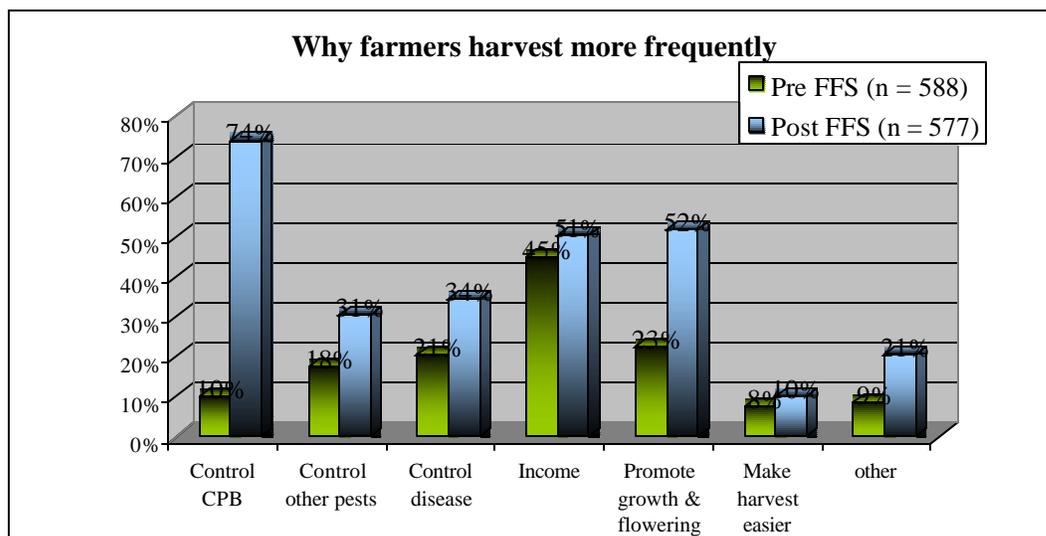


Figure 19: Base and Endline reasons for frequent harvest

Harvesting for quick sale is still a popular reason for farmers, but the control of CPB and other pests/diseases and promotion of growth has taken on much greater significance for farmers – seventy-four percent of them now harvest more frequently in order to control CPB, up from ten percent before FFS training, and the number of farmers who are taking

promotion of growth and flowering into account has more than doubled, from twenty-three percent to fifty-two percent.

A similar change in attitudes toward farmers' cocoa crops has been seen in how farmers judge pods ready for harvest. Whereas previously farmers did not consider diseased pods as a threat to their healthy pods, now fewer farmers are inclined to leave ripened pods long on the trees before harvesting, due to the threat of infestation. In addition, the majority of farmers will now harvest their pods on signs of attack, thus mitigating the threat of spread of infection.

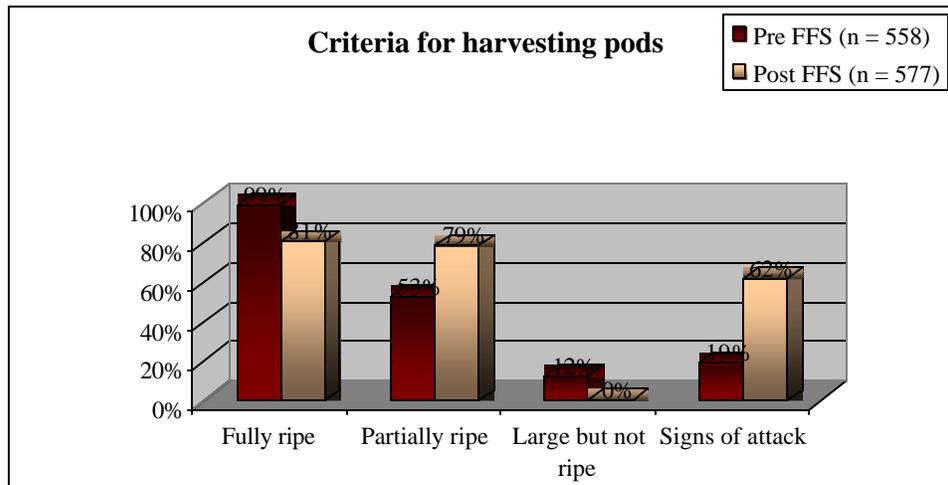


Figure 20: Base and Endline criteria for harvesting pods

It is noted that the harvest of unripe pods can negatively impact quality of the beans, so special attention was paid to making sure farmers knew unripe pods should not be harvested. However, the proportion of farmers harvesting partially ripened pods has increased – further training may be required.

Over sixty percent of farmers now will harvest their pods on signs of attack – as opposed to nineteen percent pre-FFS, thus mitigating the threat of spread of infection.

Quality of Cocoa

Production quality and post harvest treatment of beans is becoming a greater issue for the cocoa industry in Indonesia. CPB affects cocoa quality by competing with the developing bean for nutritional resources provided through the pod. The result is a smaller bean with lower fat content, or in the worst case a bean that fails to develop properly which cannot be used and contributes to increased waste in the supply chain.

Controlling CPB helps to mitigate the damage to beans, but once bean production is improved, farmers must also attend to post harvest handling, assuring that beans are properly dried to avoid mold and fungus and ultimately adopting fermentation to improve flavor.

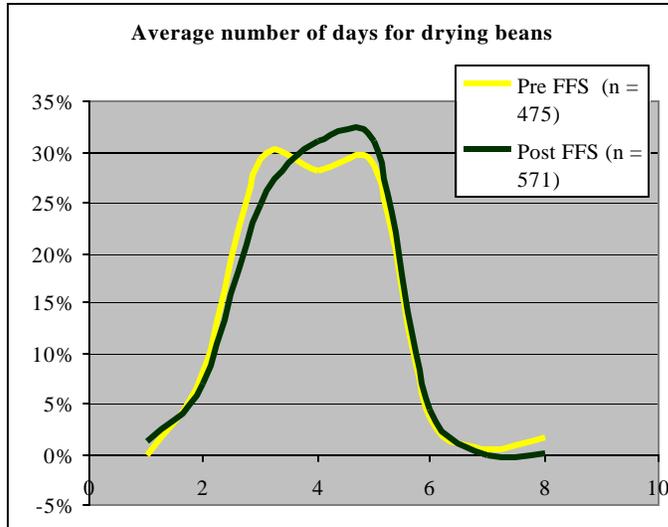


Figure 21: Base and Endline average bean drying days

The average time spent drying beans has only slightly changed over the course of the FFS trainings. Farmers generally spend between two and six days drying their beans before sale.

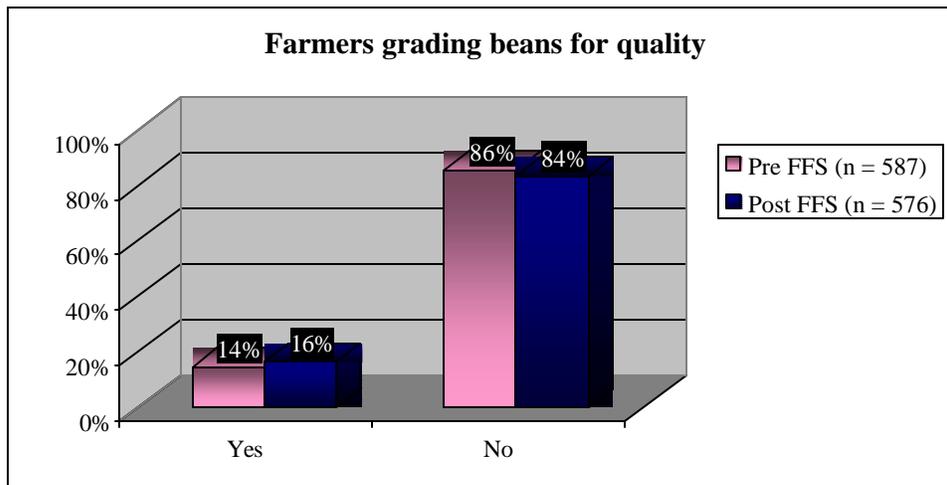


Figure 22: Base and Endline % of farmers who grade their beans

Similarly, the number of farmers who grade their beans for quality has only changed by two percent despite training in post-harvest handling – though this training was given only to farmers attending FFS in year three.

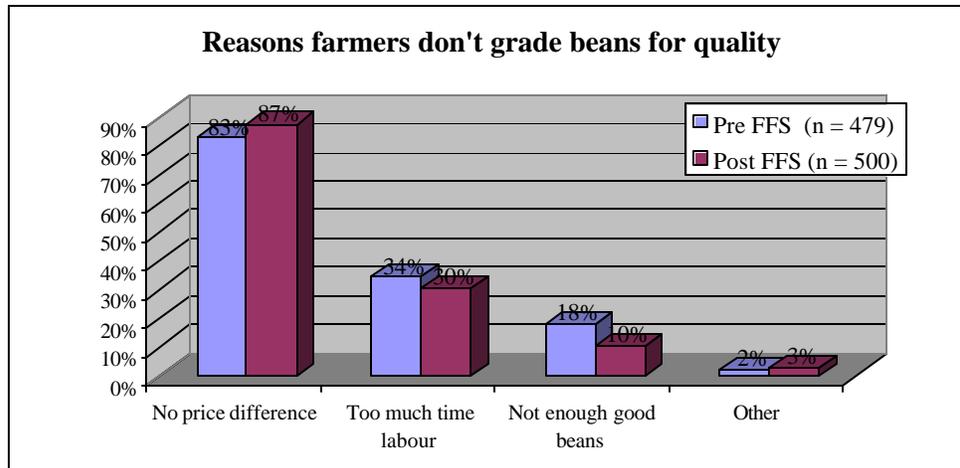


Figure 23: Base and Endline reasons for not grading beans

The reasons for the poor performance in terms of added quality value are clear. The majority of farmers (eighty-seven percent) do not receive any difference in the price received if they grade their beans or not. It may appear that this trend is increasing – pre FFS, eighty-three percent of farmers did not grade for this reason.

There is a clear lack of incentive for farmers to improve the quality of the beans they sell at their farm gate or in the market, so therefore improvements in quality are not to be expected in the current context.

Pruning

As seen above, pruning is considered the most important activity in controlling CPB, and is taught extensively in the FFS. Pruning reduces CPB infestation by eliminating shade areas where the CPB moth likes to inhabit, but also improves yields through elimination of unproductive branches and makes it easier for the farmer to harvest their cocoa.

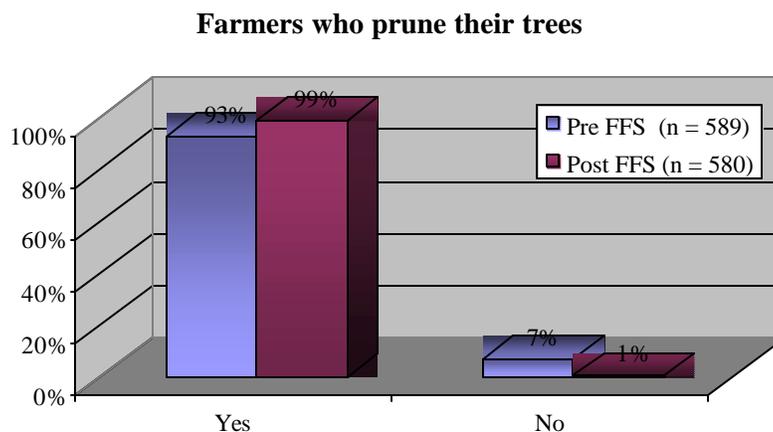


Figure 24: Base and Endline farmers who prune

The proportion of farmers who prune was already high – ninety-three percent, but this increased to ninety-nine percent post FFS, and the quality and frequency of the pruning has also increased. Pre-FFS farmers who did not prune their trees were asked why they did not do so.

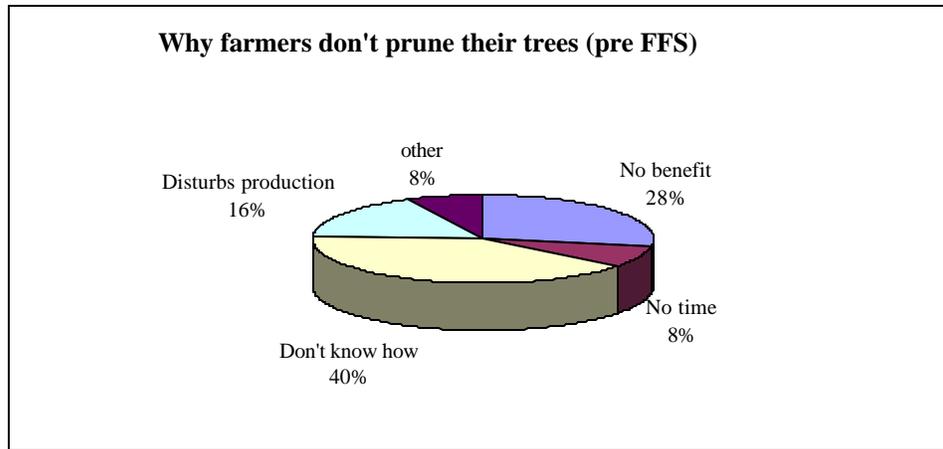


Figure 25: Why farmers don't prune

The primary reason for not pruning was that they did not know how to do it (forty percent), while others did not see the benefit or believed it disturbed production. All of these concerns were covered in the FFS, resulting in the vast majority of FFS graduates now practicing pruning in their gardens.

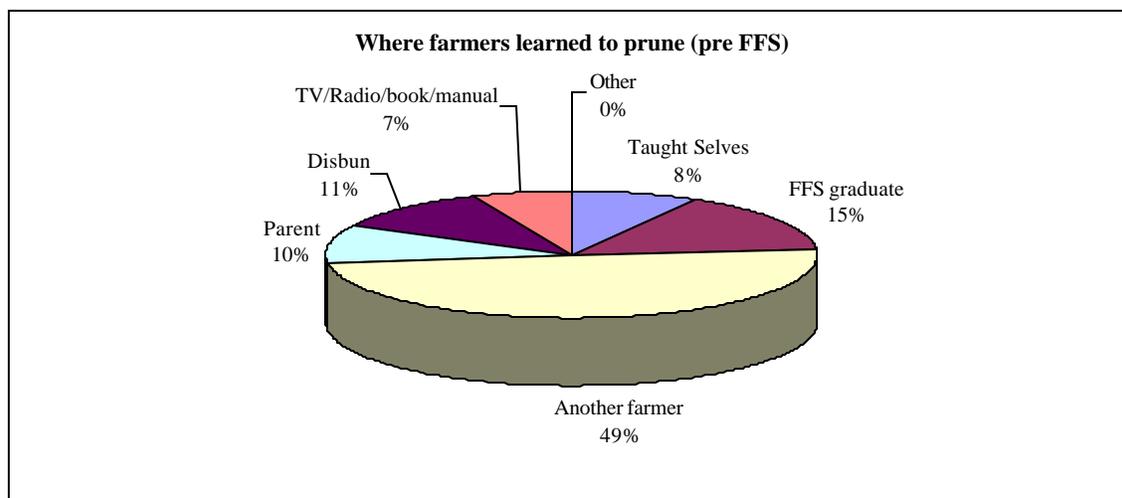


Figure 26: Where farmers typically learn pruning

The sources of information for farmers regarding pruning techniques before their FFS training were quite varied, with eighty-nine percent of farmers obtaining information from informal sources such as other farmers (some of whom were trained within a FFS), their parents or simply teaching themselves. DISBUN trained eleven percent of the farmers polled in pruning.

Sanitation

As the chart below reveals, there has been a very substantial change in farmers' attitudes towards the cocoa pod waste produced during harvest.

Husks infested with CPB larvae can result in greater infestation of farms, so FFS farmers are taught a variety of methods for sanitation and disposal of pod waste after harvest.

The chart shows that approximately eighty-five percent of farmers are practicing disposal of their cocoa pod waste since being trained in the FFS, with only fifteen percent of untrained farmers doing so.

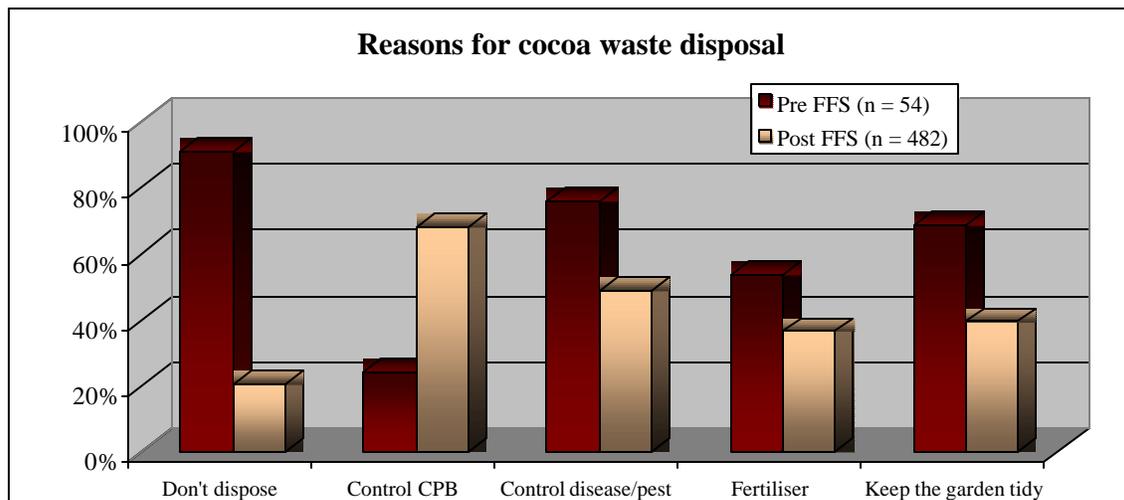


Figure 27: Base and Endline reasons for disposal of cocoa waste

The reasons for disposal have changed considerably – farmers have become considerably more focused on the control of CPB, but also use husks for fertilizer and are concerned about the tidiness of their gardens.

The various methods of pod waste disposal have changed also.

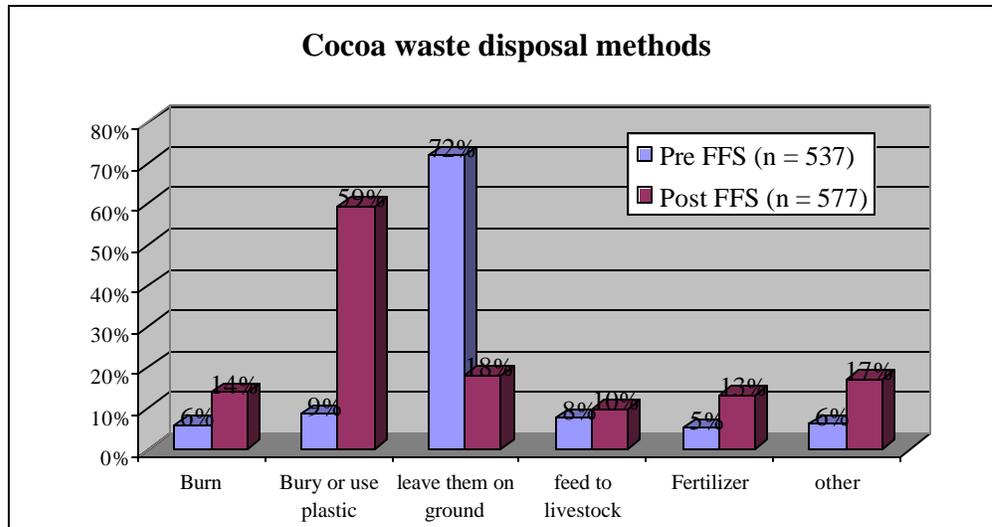


Figure 28: Base and Endline methods of cocoa waste disposal

Farmers use a variety of methods for disposing of their cocoa pod waste – the majority of farmers (seventy-two percent) put the husks into trenches dug for this purpose, as taught through the FFS.

Over half the farmers then bury the husks or cover them with a sheet of plastic, which kills the CPB larvae after a few days.

Other farmers convert the husks to fertilizer or animal feed – these methods are gaining popularity. But because fertilizer production is somewhat labor intensive and livestock need to be accustomed to the taste of the husks, both methods have not gained widespread popularity as of yet.

The removal of black pods from trees is another husbandry method taught through the FFS that has shown strong uptake, though not as strong as husk disposal.

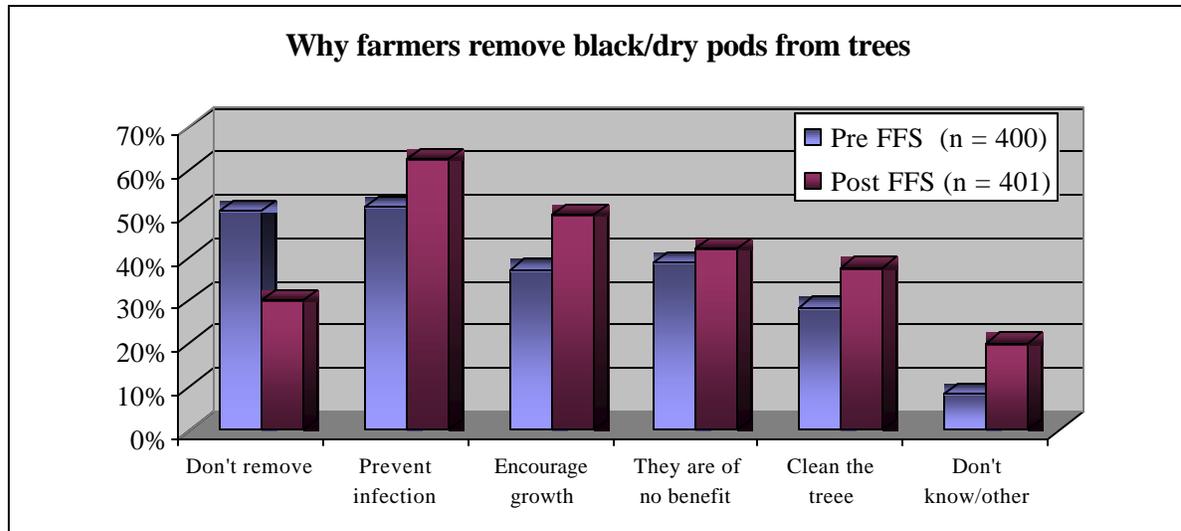


Figure 29: Base and Endline reasons for removing black pods

The proportion of farmers removing black and wasted pods from their trees has increased from fifty-one percent to seventy-two percent post FFS training, with most farmers doing so for a variety of good reasons, from prevention of infection to the upkeep of the trees.

Fertilizing

Farmer use of fertilizer has shown a small but significant change as a result of the FFS.

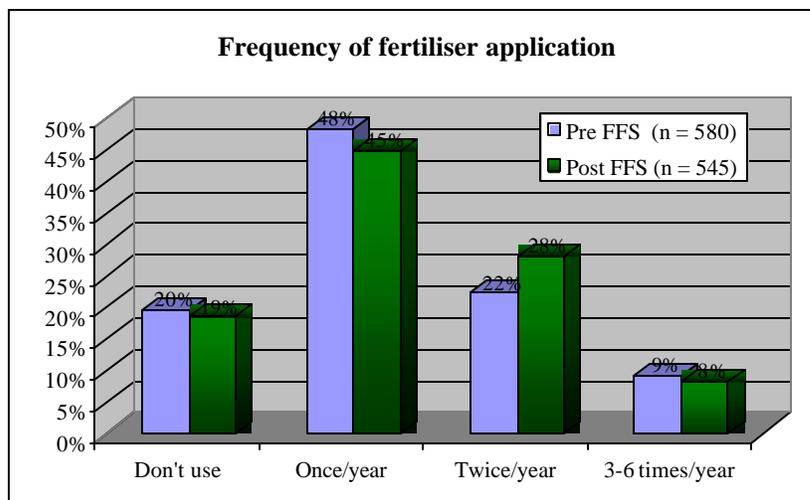


Figure 30: Base and Endline fertilizing frequency

Slightly more farmers are now using fertilizer on their trees, and the frequency of fertilizing is tending more towards twice per year, as taught through the FFS.

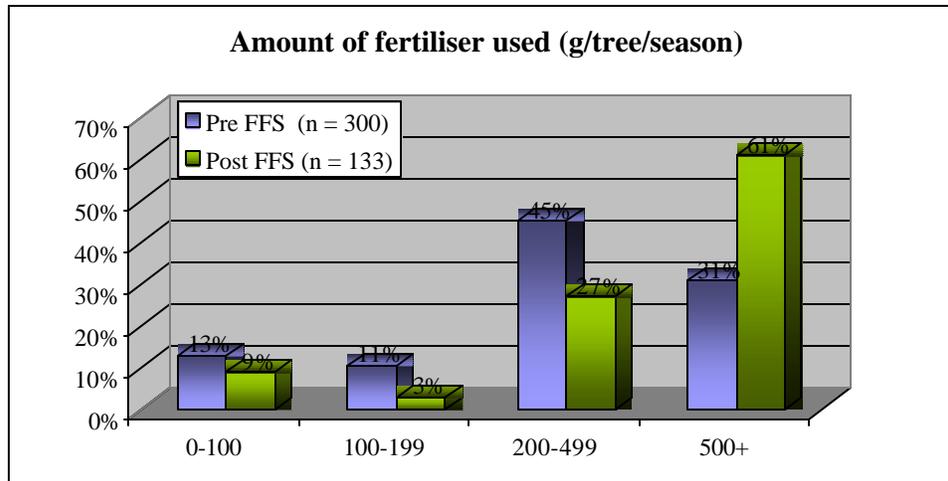


Figure 31: Base and Endline quantity of fertilizer used

The amounts of fertilizer used per tree have increased among trained farmers.

The field schools recommend approximately 550g of fertilizer per tree per season, and the proportion of farmers adhering to this has increased from thirty-one percent to sixty-one percent - almost double.

A small reduction in pesticide usage was seen among trained farmers.

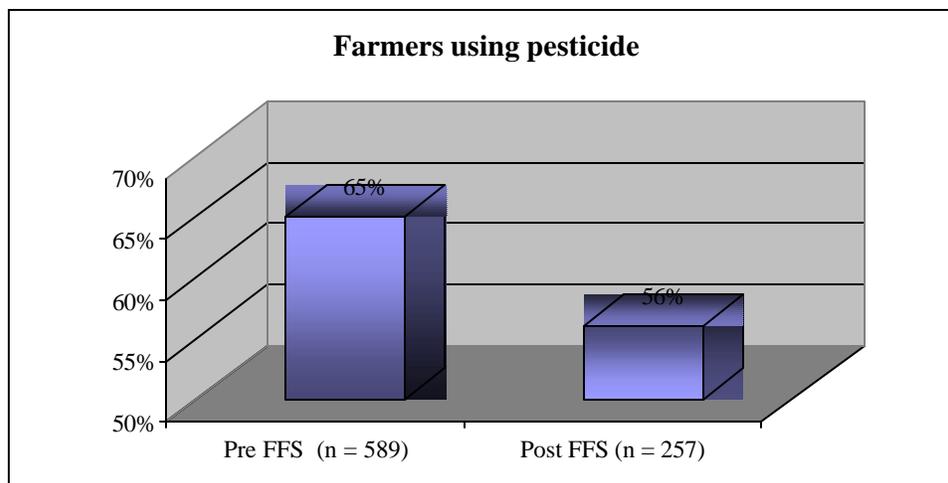


Figure 32: Base and Endline farmers using pesticide

A difference of ten percent in pesticide use between untrained and trained farmers was seen. The frequency of usage was also seen to drop.

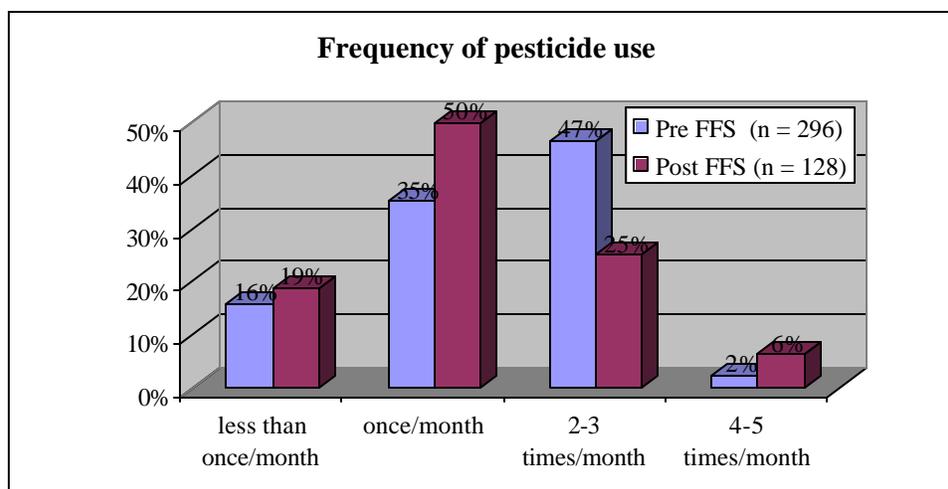


Figure 33: Base and Endline frequency of pesticide use

It seems that farmers are still inclined to rely on pesticides to try and control CPB, which may be a combination of the short lead time between their beginning to use the techniques taught through the FFS and the Endline study (six months), and the perception that pesticides offer a quick and labor un-intensive solution to pest problems.

Conclusions

Achievements and outputs of the program were consistently beyond target, except for some small exceptions where certain planned activities were replaced with others.

Overall, from a short term analysis, it can be concluded that the SUCCESS Alliance program activities in relation to the FFS have been largely successful. The short time between the initial baseline data and the endline data collection has shown a significant strength of the program, but also has an inherent weakness.

A strong result of the program is extremely rapid uptake of new techniques of crop management and husbandry. The uptake of the key activities that contribute to reduced CPB damage and increased yields (frequent harvest, pruning, sanitation and fertilizing) has quickly resulted in substantial improvements in yield in comparison to farmers who have not received the training.

However, due to the short time span between baseline and endline surveys, it is difficult to show the impact of the changes in behavior of farmers. Six months is a short time to demonstrate to farmers and other stakeholders the utility of the FFS techniques in a field setting. It also does not take into account persistence of the training – many of the techniques taught through the FFS are labor intensive, and it remains to be seen whether farmers will sustain the enthusiasm and momentum generated over the several months of training.

However, analysis of data over the three cycles of the SUCCESS Alliance program, and also including the three cycles of the previous SUCCESS program, show an increase in

production of FFS-trained farmers relative to untrained farmers. FFS farmers have begun to hold their own with respect to the CPB infestation, whereas non-FFS farmers are losing income due to a combination of falling farm gate prices and greater losses due to CPB.

The stated SUCCESS Alliance target for production increase over the life of the program was 400kgs/ha/year – representing an increase in production of nineteen to twenty-five percent as compared to farmers employing traditional cocoa growing methods. The actual achievement has been calculated to be 440kgs/ha in the sentinel demplots.

FFS/PsPSP farmers have been earning an average of \$435 more than non-PsPSP farmers per year since the SUCCESS Alliance program started. The program target as restated in the program modification document in 2005, was that farmers will be able to increase their annual income by up to \$400 per year. Nonetheless, despite the *relative* increase, it should be noted that farm incomes have not increased by the same amount relative to absolute income levels at program start.

Perceptions of the farmers themselves are also of importance. When asked about their perception of their harvest over the previous six months, most farmers affirmed that their yields are increasing.

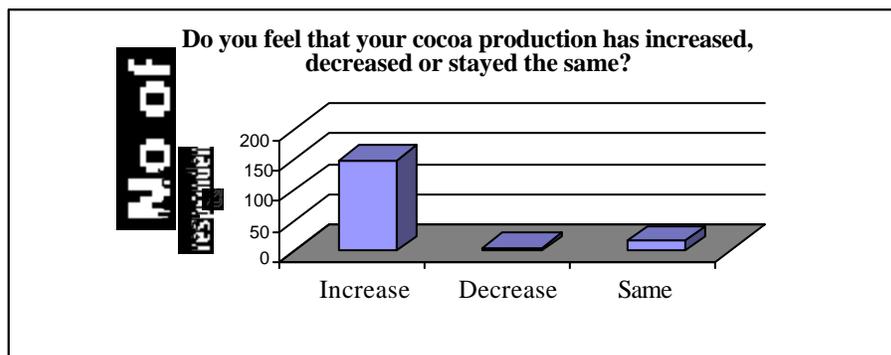


Figure 34: Farmer perceptions of yield change

A similar number of farmers stated that their losses due to CPB were decreasing.

Quality of the cocoa being produced by these farmers was expected to be of higher quality as problems resulting from CPB infestation and poor garden maintenance are addressed. However, post harvest handling of beans, primarily drying, has not significantly changed. This is invariably due to the fact that there is no difference between prices received by farmers for their beans so they have no incentive to change their practices.

Training in post harvest handling was given to FFS trainees only in year three of the program, so the impact of this training, if any, is most likely yet to be seen.

4 Farmer Organization

This section covers the activities conducted under Sub-objectives 1.4 and 2.2 – improvement of the quality of services to cocoa farmers through farmer organizations and development and building of support for locally managed services for cocoa farmers.

These Sub-objectives were focused on Sulawesi only.

The development of farmers' organizations was an original aspect of the SUCCESS Alliance strategic plan. It was further developed in Year two (2003) in order to build on the extensive farmer network developed through ACDI/VOCA's original SUCCESS Project and the SUCCESS Alliance.

This activity was viewed as a method for mobilizing farming communities to increase information flow, improve market linkages and reinforce the uptake of training. The original approach, which was modified as implementation progressed, focused on three levels of organizational development: (1) strengthening FFS alumni groups to become institutionalized agri-businesses, (2) forming secondary organizations to provide advocacy and higher level market linkages for farmers in a given geographic area, and (3) a tertiary non-profit organization to provide on-going training and technical assistance.

Farmer Organizations Background

Farmer Groups/Alumni Groups

FFS alumni groups were formed at the close of learning activities with a workplan that focused on garden management activities providing the basis for farmer organizing. Under the FO program, selected alumni groups would receive technical assistance and training support and grants would be provided to promote group formation organizational development, business operations, and marketing. These farmer groups were to be formal entities with defined strategic goals, a structure, memberships and registration with the Government.

Farmer group formation and organizational development was directed at farmer leaders/representatives/groups that had completed FFS training and alumni groups who genuinely demonstrated strong interest and desire to transform themselves into a formal farmer organization.

Farmer Forums

The FFS platform of farmer participation and technology spread was to be maintained and enhanced through peer reinforcement meetings and sessions, known as *farmer forums*.

The forums would: (1) reinforce the material learned in the preceding FFS, (2) lead to stronger farmer organization and institutions, (3) promote uptake of additional

technology through a stronger farmer support network, (4) provide a platform for taking advantage of collective bargaining and economies of scale for individual farmer organizations to increase bargaining power.

Initially, structured farmer forum capacity building was envisaged, but alumni groups and FO activity participants tended to focus on their own capacity building rather than on a higher-level advocacy body, so SUCCESS Alliance management decided to focus resources on the farmer groups, providing more extensive business training (Farming as a Business) to a wider population of FFS graduates, to introduce a model of Farmer Forum meetings that emphasized business linkages and to support the development of the BSPs – which was deemed to be the most sustainable option for continued technical support to cocoa farmers in Sulawesi.

Business Service Providers

In order to sustain the program after the GDA/USAID funding cycle was complete it was envisaged that the SUCCESS Alliance would evolve into a locally funded and managed organization – Lembaga SUCCESS Sulawesi, which was founded by program staff under the SUCCESS Project and would build upon the experience of the SUCCESS Alliance activities, contacts with the farmer constituency as well as the network that had been created as a result of both SUCCESS and SUCCESS Alliance programs.

It was envisaged that this apex organization was to be supported from key industry stakeholders and also membership of cocoa farmers in return for providing needed services to farmers and their organizations. Such services would include additional training in cocoa cultivation, assistance with marketing cocoa, especially quality control and linking farmers with buyers, and facilitating the procurement and bulk purchases of inputs.

However, in 2004, it was decided that the objectives of the program would be better served through building the capacity of the local farmer organizations themselves, and facilitating the formation of four decentralized Business Service Providers (BSPs) operating out of the four program field offices which would retain the skills and expertise of the SUCCESS Alliance (employing many of the field technicians and trainers from SUCCESS Alliance) and would operate a fee-based service to cocoa farmers, farmer organizations and industry.

Trade Network Linkages

Buyers, traders and producers were supported in the third year of the program (2005) to build relationships in order to relate production technique improvements to quality, pricing and market demand. Through seven exporter-trader-farmer seminars in four Sulawesi provinces, participants in various cocoa supply chains shared information on purchasing systems; set up direct marketing linkages; and shared knowledge in business management, marketing, and cost control.

Farmer Organization – Curriculum

For the FFS-CPB farmer alumni groups targeted under the FO activity, the SUCCESS Alliance provided technical guidance and training support in organizational and financial management, business and operational planning, and cocoa marketing. The training was centered on a three phase curriculum, which covered the broad areas necessary for development of the groups. Phase One focused on the area of organizational structures, management and membership and financial records. Phase Two involved business management and planning. Phase Three was focused on implementation of activities and problem solving.

Priority training areas included:

- Sound governance; farmer groups/organizations and their members to operate under sound democratic principles, bylaws, transparency, and accountability;
- Organizational planning and structure; farmer groups to examine different organizational models and the legal aspects that suit their operational aims (cooperatives or farmer associations or a shareholder approach). Model types to be considered would be feasible for the group to implement and provide adequate incentives for members in a sustainable, financially viable manner. This would be reviewed from a legal point of view with the legislation for cooperatives and institutions in mind to determine which model best suited the group requirements;
- Ownership and control (membership, board appointment and obligations, general assembly, and record keeping);
- Membership services;
- Economies of scale for collective group formation (organizational size and capacity will influence possibilities);
- Gender focus (women's roles and participation in farmer groups);
- Advocacy;

Other key areas that farmer groups would focus on through organization development included:

- Skills training in member services;
- Activity financing, budgeting, fee collection and accounting;
- Marketing;
- Strategic planning;
- Quality control (benefits of sorting and standardizing cocoa quality), and collectively marketing cocoa production to achieve a more favorable premium in price.

In addition, the targeted farmer organizations would be trained in democratic principles that can contribute to building civil society. Small matching support grants would be offered for operational support once an organization met certain benchmarks, equity contribution or other performance criteria.

It was planned that at least thirty farmer groups of varying member size would receive training.

Baseline Analysis

Prior to the SUCCESS and SUCCESS Alliance programs, farmer organization in Sulawesi was very limited in scope and level of development. Most joint activities were undertaken informally and with a specific task in mind, e.g. group purchasing of inputs, communal labor activities (called *Gotong Royong*) etc. As such, they are transient and unstructured. Nonetheless, the concept of working together is common and popular amongst Indonesian smallholder farmers. As the graph below illustrates, the majority of Indonesian smallholders (sample taken from pre-FFS farmers) see the value of joint activities.

Do farmers think it useful to work together?

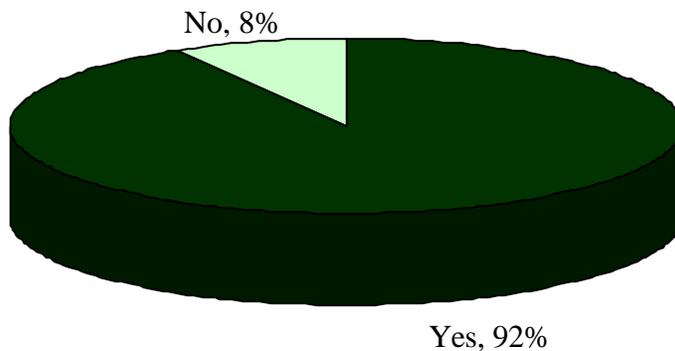


Figure 35: Farmer willingness to work together

This suggests that the likelihood of success in organizing farmers into more structured groups is higher than where farmers do not have a tradition of working together.

When asked specific questions regarding the type of work that farmers can do together, as in the graph below, farmers clearly do not have defined tasks in mind.

Why do farmers consider it useful to work together?

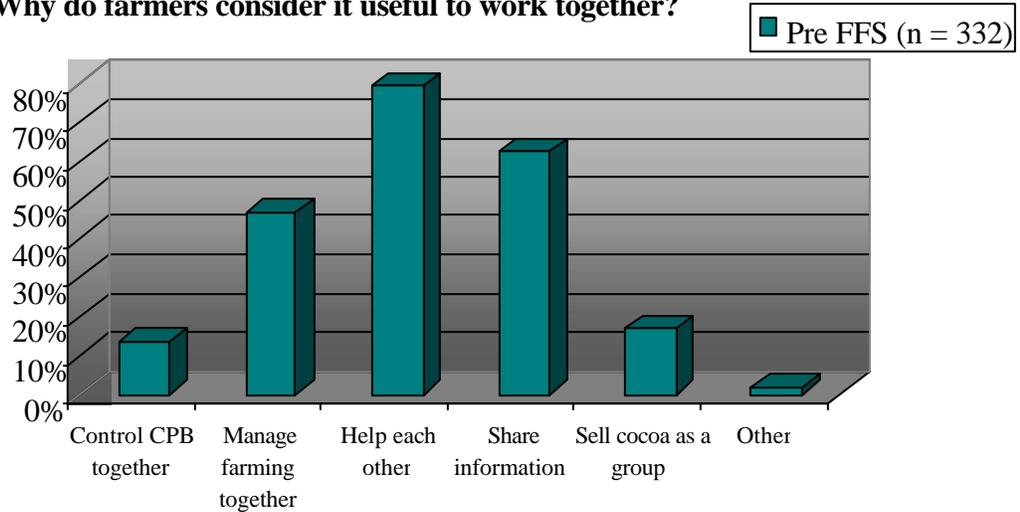


Figure 36: Reasons for farmers to work together

The highest scoring activities are the most general – ‘helping each other’ or ‘sharing information’. Specific activities that might be of more value in a more structured setting, such as cocoa marketing or pest control, rank poorly.

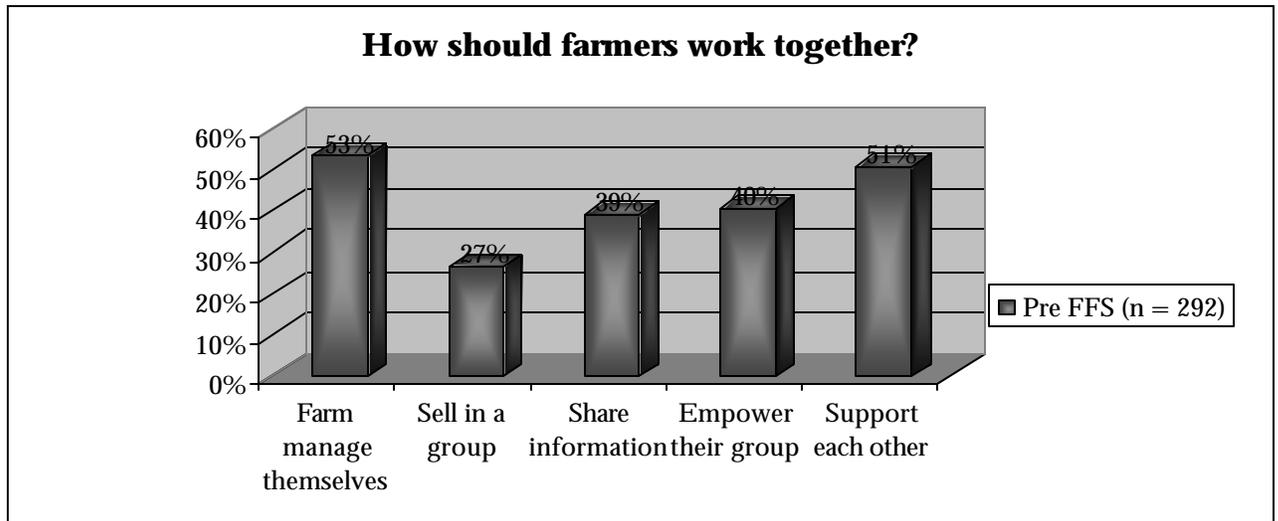


Figure 37: How farmers should work together

A similar question regarding farmers’ aspirations towards working together further illustrates the reality of farmer cooperation prior to the FO training – most farmers have an idea that it is good to support each other, but specific activities such as the power of group selling are not something that they consider an advantage.

In this context, it was hoped that the provision of training through the FFS would sensitize farmers to the benefits of working as a group, and provide them with some of the overall agronomic skills that could underpin further action as a collective.

The training offered through the FFS generated a considerable amount of interest in farmer groups – the initial assessment of potential alumni groups for inclusion in the FO training resulted in 185 groups that had self-formed as a result of the training received through the SUCCESS and SUCCESS Alliance programs.

Many of these groups were not at a viable stage of organizational maturity to warrant inclusion in the trainings, and application of simple criteria (see below) resulted in the total being reduced to eighth-three groups.

These groups were surveyed in detail with respect to aspects of their organizational development – registration status, membership, structure, decision making processes, facilities available to them, their financial controls, their regular activities and the nature of any external relationships that they had.

The results of the survey were analyzed into a form of ‘report card’ for each farmer group in order to determine those who had the best potential to take advantage of the training and resources offered by the SUCCESS Alliance.

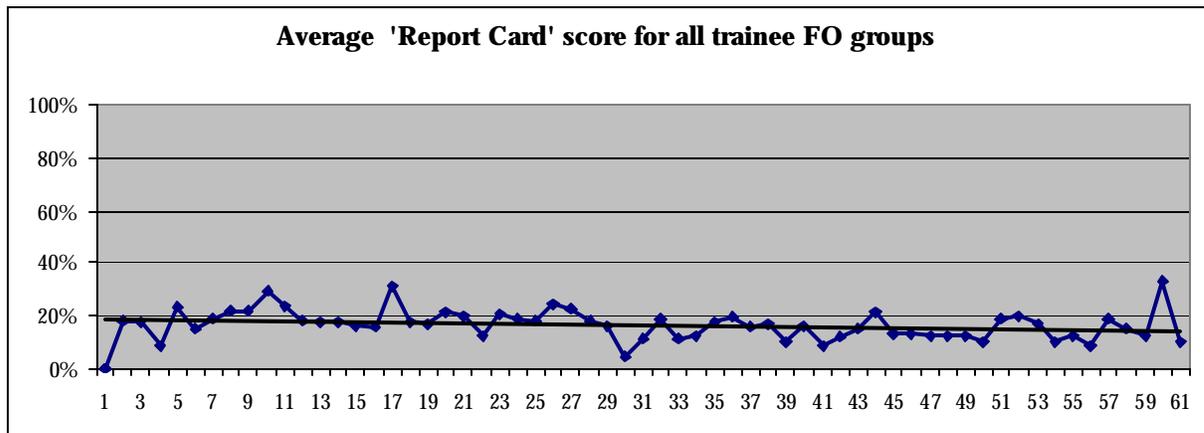


Figure 38: Average scores for all Farmer Groups pre training

As the graph above shows, the average score (across eight categories) for all potential members of the FO program was very poor – the average was under fifteen percent.

This was not a surprising result as most organizations had only recently formed (though some had been around since the first SUCCESS Alliance FFS cycle in 2003), and none had received any training in group management other than that offered in the FFS.

Farmer Organization Program Activities

The following table summarizes the broad outputs for FO activities in the SUCCESS Alliance program:

Table 3: Summary Activities for FO Program

FO Activity	Target Area	Methodology	Timeline	Target
Farmer Forums established for quarterly meetings	Sulawesi	Direct FO trainings	2004-2005	Initially 15, but farmer feedback prompted change to FaaB training and BSP support
Technical assistance to farmers on group formation & org, development	Sulawesi	Direct FO trainings	2004-2005	30 trainings
Disbursement of grants to farmer groups	Sulawesi	Direct disbursement	2005	45 disbursements (30 to farmer groups, 15 to FFs – this was changed to 30 on restructuring the farmer forum activity)
Legal establishment of farmer groups	Sulawesi	Through FOs	2005	30 groups
Establishment of Lembaga SUCCESS Sulawesi	Sulawesi	Direct set up with SUCCESS Alliance staff	2004-2005	Local organization was folded into BSP development.
Grant Management training	Sulawesi	Direct FO trainings	2004	No trainings planned (see results section for conducted trainings)
Market Linkages	Sulawesi	Seminars, meetings between industry and producers	2005-2005	No specific targets set

Farmer Organizations

SUCCESS Alliance capacity building of farmer groups commenced with a baseline survey conducted with all potential farmer groups to assess their organizational capacity. Initially from a combination of SUCCESS data and discussion with field technicians the FO team identified 185 potential alumni groups. Through field verification this number was further reduced using a simple set of criteria to distinguish between active and largely inactive groups.

For this purpose, the team defined active groups as those that supported PsPSP and had one additional joint activity: regular meetings, saving or marketing. Using these criteria as a filter, the number of groups to be surveyed in the baseline was reduced to eighty-three. The baseline survey was completed and analyzed in August 2004.

The highest scoring groups were included in the training program, based on the following criteria:

- At least fifty percent of the groups' members were alumni of SUCCESS Project/Alliance FFS programs;
- The main economic activity was related to cocoa production;
- Administrative structures were in place and up to date: membership book, minutes book, accounts book, record of activities and others;
- The leadership committee met on its stated schedule and had regular communication with members;
- Rules and/or sanctions in place governing member participation;
- The group had a secretariat/meeting place; and
- The members who participated in the survey expressed an interest in participating in the program.

In total, thirty-two farmer groups – the program target was thirty, but on the basis of feedback from the field teams, eight groups were chosen per province – were identified to receive further training and capacity building. Subsequently, a series of one-day needs assessment workshops with each alumni group was conducted.

As an output of each workshop, each farmer group prepared a workplan and training plan. Training and capacity building activities were grant-based on the basis of their strategic plans and proposals were developed from the workshops that identified the primary training needs, training plans, any infrastructural requirements of the groups, plus budgets. This process itself was considered part of the capacity-building of the farmer groups.

Each group and forum in the program worked with the FO team to carry out a business planning and start-up process that resulted in self-managed activities being carried out by the final quarter of program implementation.

SUCCESS Alliance financial staff worked with the groups on development of their budget and financial tracking and reporting systems. The plans were then developed into proposals for funding from the SUCCESS Alliance, with a matching contribution from the Farmer Groups. All plans were developed and submitted to SUCCESS Alliance for funding by early 2005. In many cases, the funds granted by SUCCESS Alliance were leveraged by the groups to obtain further funds from other sources to purchase capital items (e.g. mechanical cocoa driers) for shared use by group members.

As the farmer groups themselves were primarily responsible for the development of their strategic operational and training plans, and their budget implementation, a range of different training topics were identified for different groups. Once the plans had been agreed with the SUCCESS Alliance management, the farmer groups signed Recipient Agency Agreements with ACDI/VOCA for grants to cover a portion of the budgets.

The schedule and implementation of the training was also the priority of the groups themselves. The three-phase approach as planned by SUCCESS Alliance was suggested to the groups as a guide, but ultimately they took responsibility for setting their own training priorities. The SUCCESS Alliance training coordinators were responsible for

facilitating the development and training process and assisting the groups in identifying suitable trainers for the areas of expertise they had identified.

The following specific training modules were covered (not all modules were taken by the farmer groups, typically between five and eight modules were taught):

- Marketing for small industry
- Cooperative management
- Entrepreneurship development
- Quality standardization in cocoa marketing
- Motivational group training/group dynamics
- Group administration and book keeping
- Group capital development
- Supervisory methods
- Critical awareness
- Leadership
- Institutional strengthening
- Group management and administration
- Soil nutrition
- Field management and conservation
- Group Business Management (marketing, savings-loan and mini-market units)
- Institutionalization and group strengthening
- Household economic management
- Household savings and finance

The FO program completed training activities in mid 2005 in all four provincial target areas. All targets for farmer group formation, development and business linkages were met.

Farmer Forums

Initially, it was planned that fifteen forums would participate in the capacity building programs. They would participate in program implementation in the same manner as the farmer groups.

During the baseline survey in June 2004, however, few farmer forums were identified that had the potential capacity to participate fully, so it was decided to fold the farmer forum capacity building into the Business Service Provider development.

Business Service Providers

In mid 2004, the local organization counterpart to the SUCCESS Alliance, Lembaga SUCCESS Sulawesi, intended to eventually assume management of the program, came under serious scrutiny due to its impact on the already heavy workloads of the local staff who made up its board of directors.

After serious consideration, it was agreed with USAID at the mid-term review to drop Lembaga development goals and further investigate the options for building sustainability into the program through local provision of services to cocoa farmers.

The development of BSPs was decided as the optimal strategy for creating sustainability.

The four business service provider organizations were initially based in the SUCCESS field offices and staffed by SUCCESS FTs, managers and farmer trainers.

Planning began in June 2005 with the development of their vision/mission statements, design of organizational structures and research on available types of business registration.

The BSPs received training in the following areas:

- Financial training from Yayasan Penabulu, a Jakarta-based non-profit organization that specializes in accounting, auditing and financial training services for NGOs;
- Strategic planning training to identify development tasks accomplished, and to further the completion of strategic planning documents;
- Technical assistance on bylaw development and registration;
- Technical assistance on budgeting and financial planning;
- Marketing planning to identify clients, define marketable services, develop pricing plans and promote the services of the local NGOs to institutional clients, farmers and value chain participants;
- Fund-raising and proposal writing for non-profits;
- Technical assistance in policy development and human resources planning;
- Small organization management mentoring through a two-day workshop led by Pak Suhardi Suryadi chairman of LP3ES a national community development NGO targeted at the lembaga boards; and a week long site visit to Ypansu, a community agriculture focused NGO in Sumatra targeted at technical and program staff of the lembagas.

Training and technical assistance activities with the BSPs were completed in November 2005 and the capacity building targets described in the August 2005 program modification have been met, with the exception of establishing a sub-contractual relationship with the BSPs during the final quarter of program implementation.

The pace of legal registration made it difficult to transition the BSPs to sub-contractor status while simultaneously meeting program implementation goals, therefore the members of the BSPs continued as SUCCESS Alliance direct employees while the BSPs supervised VCD follow on meetings, collected SUCCESS M&E data, planned and implemented FaaB and farmer forum meetings, and participated in BSP training and development activities.

Trade Network Linkages

Starting in October 2005, SUCCESS Alliance began working with Blommer Chocolate USA and Continaf/PT Mitra Celebes who are trading partners in the export of cocoa to the United States.

Over the past five years, Blommer's purchase of Sulawesi cocoa has declined, primarily due to declined cocoa quality. The Blommer SUCCESS Continaf (BSC) partnership sought to increase the flow of quality cocoa to Blommer USA by increasing the linkages between SUCCESS Alumni farmers, intermediate traders and Continaf/PT Mitra Celebes.

Three BSC quality seminars were conducted in 2005 to orient traders to production issues currently contributing to reduced quality and to emphasize the need for transparent price incentives to attract improved quality cocoa. The seminars also presented farmers with a basic map of the cocoa market and an introduction to the factors that affect prices. By late October 2005, Blommer was reporting that close to nine million dollars worth of cocoa had been purchased as a result of the BSC effort.

The BSC seminars provided an encouraging example to other traders seeking improved quality cocoa and led to a further two seminars conducted jointly with PT Olam in Central Sulawesi and one conducted in Southeast Sulawesi with Cargill.

The seminars were conducted concurrently with the distribution of communication materials through exporter/trader networks and provided an effective medium for introducing the communication program.

Results of the Farmer Organization Activity

Table 4: Summary Results for FO Program

FO Activity	Target Area	Target	Achievement
Farmer Forums established for quarterly meetings	Sulawesi	Initially 15, but farmer feedback prompted change to FaaB training and BSP support	0 – target changed to FaaB and BSP establishment
Technical assistance to farmers on group formation & org, development	Sulawesi	30 groups trained	107% (32 groups trained)
Disbursement of grants to farmer groups	Sulawesi	45 disbursements (30 to FGs, 15 to FFs – this was changed to 30 on restructuring the farmer forum activity	103% (31 grants made) One group dropped out of the program prior to grant making
Legal establishment of farmer groups	Sulawesi	30 groups established	107% (32 groups)
Establishment of Lembaga SUCCES Sulawesi	Sulawesi	LSS established	LSS was established, but objective was refocused on BSP development.
Grant Management training	Sulawesi	no targets set	64 (32 x 2) trainings - bookkeeping training pre-disbursement of grants - workshop on financial reporting post grant disbursement
Market Linkages	Sulawesi	no specific target set	Blommer/SUCCESS/Continaf /Mitra Celebes seminars on cocoa quality held January 2005, April 2005, PT Olam buyer-farmer meetings resulting in 2 farmer groups directly selling to Olam Training with Cargill on cocoa purchasing policies

The results of the FO training were from two major interventions by the SUCCESS Alliance – the FFS and the FO training.

Farmer Field Schools

The Farmer Field Schools, which reached over 30,000 farmers in Sulawesi, initiated a process of mobilization among farmer alumni which led to a process of awareness raising and empowerment of farmers and spurred them to self-organize into groups to improve their production and return on their production,

As the graph below shows, even though the level of farmer awareness of the usefulness of working together was already high at ninety-two percent of farmers surveyed, after their training, this number increased to ninety-seven percent.

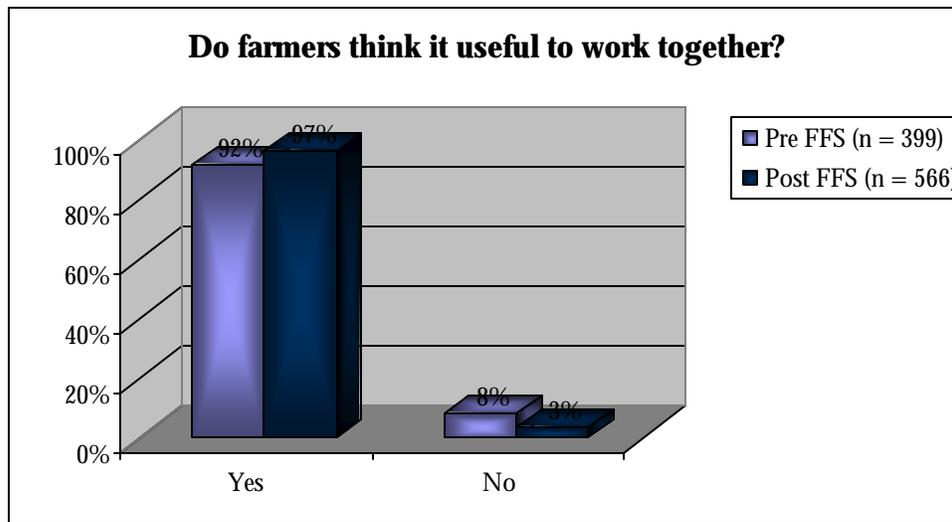


Figure 39: Farmers perceptions of working together

The nature of their willingness to cooperate changed as a result of the FFS. Whereas prior to the FFS, most farmers had a vague idea of the benefits of collective action, the specific trainings given through the Field Schools resulted in a change in perceptions.

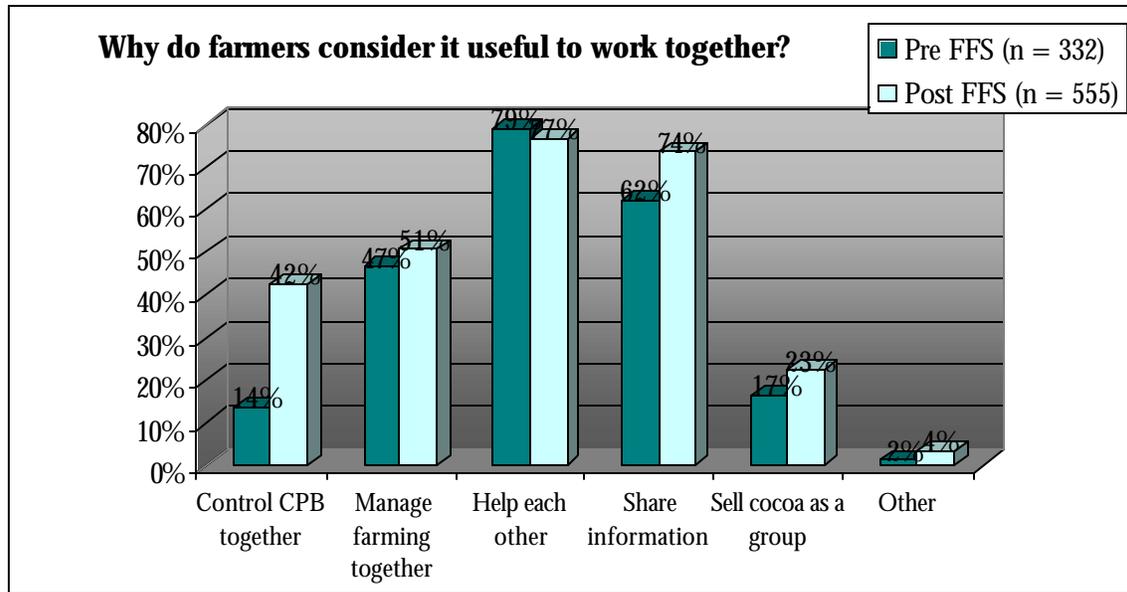


Figure 40: Reasons for farmers to work together - Base and Endline

Specific actions – namely control of CPB and selling of cocoa – received a higher rating, though the sharing of information was rated higher than previously, possibly illustrating the popularity of the field schools as a forum for farmers to come together, and further underscoring the potential value of formal farmer groups.

Farmer Organization Training

The FO training was directed specifically at thirty-two farmer groups – the best of the groups that were surveyed for possible inclusion in the program. Those groups themselves received intensive training in organizational development as well as funding for infrastructure and equipment.

The SUCCESS Alliance surpassed the original target of thirty groups in order to spread the program evenly over the four provinces of Sulawesi where it was operational. The groups were also selected in order to provide maximum geographical separation, so as to increase the possibility of transfer of training and knowledge from formally trained and supported groups to those groups that had not been selected for the program.

One participating group dropped out of the FO program as a result of internal conflict. The group received financial management training from SUCCESS Alliance staff and concluded that their leadership lacked transparency in financial management to the extent that group members were not confident in their ability to appropriately manage grant funds. As a result, the group members formally requested that they be dropped from the program.

The overall impact of the training and support on the participating groups has been substantial, as the graph below shows.

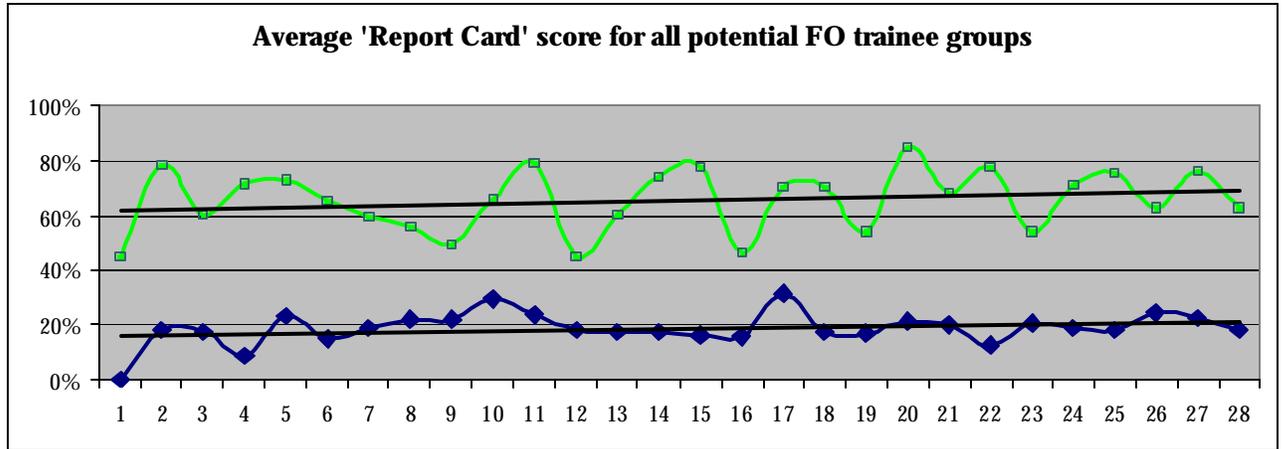


Figure 41: Base and Endline comparison of FO trainee performance

The average score (across the eight categories of registration status, membership, structure, decision making processes, facilities, financial controls, regular activities and external relationships) for the participant groups in the training has increased from twenty percent to over sixty-five percent in one year – these categories are based on demonstrated organizational benchmarks that were surveyed by independent consultants after the trainings. An interesting facet of the research is that those groups that participated in the FFS but not in the FO trainings have also substantially increased their performance over the past year, as illustrated below.

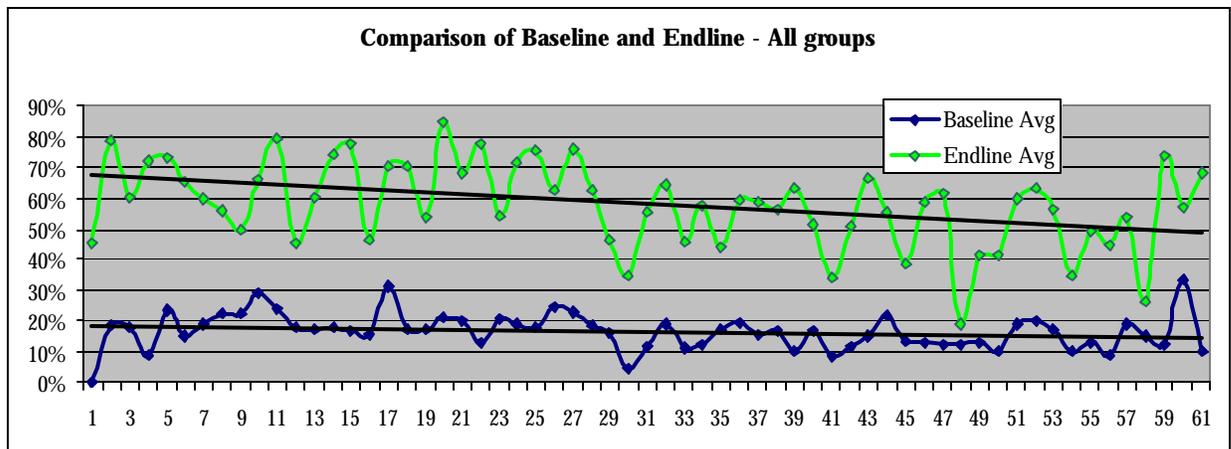


Figure 42: Base and Endline comparison of Farmer Group Case and Controls

The graph shows an overall improvement – with some exceptions – in the total score average. The FO trained groups are clustered in the left side of the graph, showing more improvement over the non-trained groups, as is to be expected.

There are a number of possible factors that have contributed to the improvement of the untrained groups. In many cases, alumni groups are led by SUCCESS farmer trainers and stay in close contact with program staff after training is concluded, receiving information and advice informally. It has also been observed that farmers emerging from

the FFS system receive increased attention from DISBUN in terms of the training, extension and grants/loans offered by them.

In other cases, it is possible that the training that has been given to the farmer groups has been passed on to other groups not participating in the program. This was one consideration given to the selection of farmer groups for training – that they would set an example for other groups in their area. Specifically looking at the areas in which the farmer groups received training, dramatic improvements can be seen.

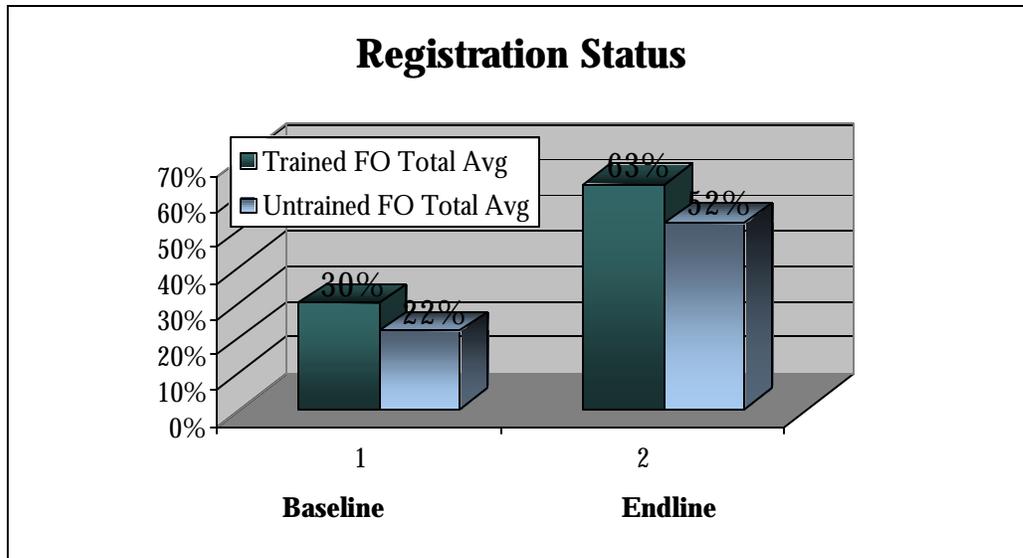


Figure 43: Base and Endline Registration Status Comparison

Participating farmer groups with formal registration have more than doubled over the course of the training program. This result also looks at the frequency and regularity of meetings held by the group.

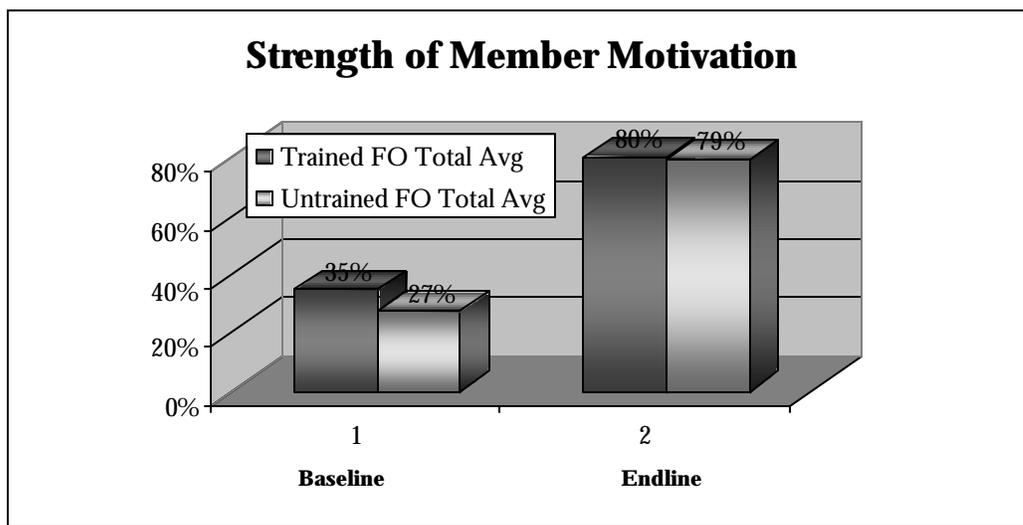


Figure 44: Base and Endline Member Motivation Comparison

The motivation of the groups' members has also dramatically increased, from thirty-five percent to eighty percent - this is a measure of member's activity within the group and their willingness to purchase a share to enter the group or make a regular financial contribution.

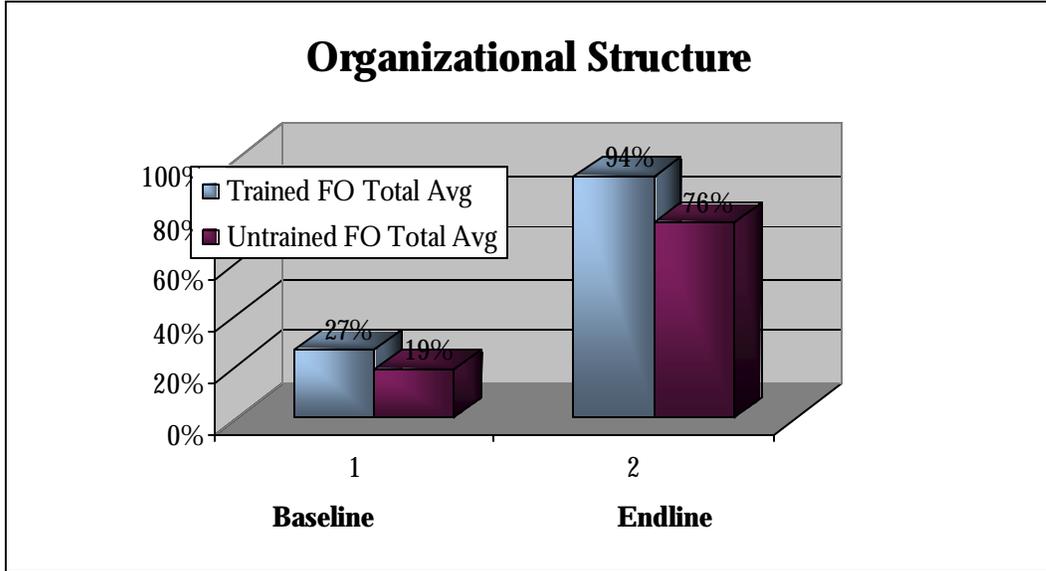


Figure 45: Base and Endline Org. Structure Comparison

The graph above is based on the presence of rules and sanctions governing member and group activities and the presence of written bylaws in the organization. The average score has more than quadrupled throughout the course of the year.

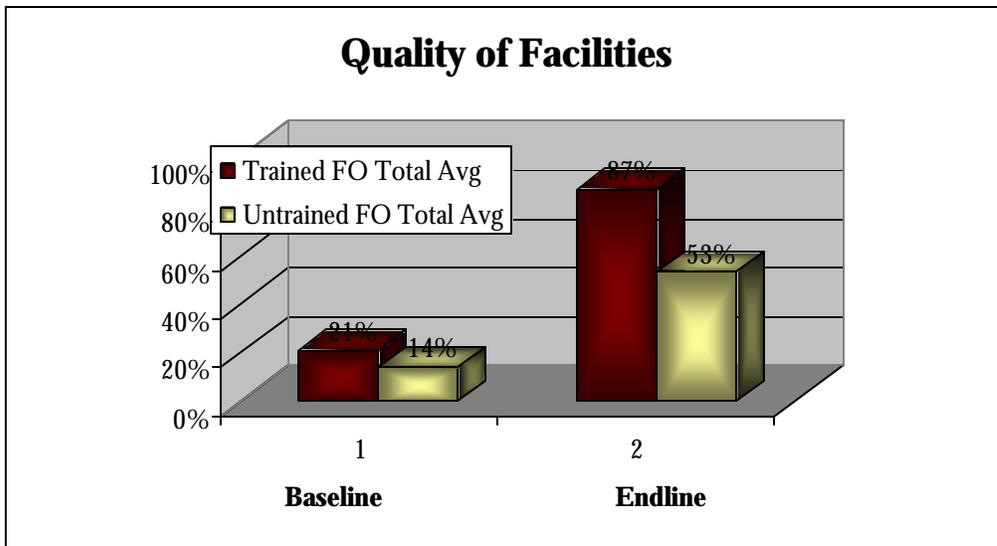


Figure 46: Base and Endline Facility Comparison

Quality of facilities looks at the availability of a meeting place/office for the group, and whether they have workspace – for drying, fermenting, sale or storage.

As most of the participating farmer groups received part of their grant for the development of their own building, a substantial increase was expected.

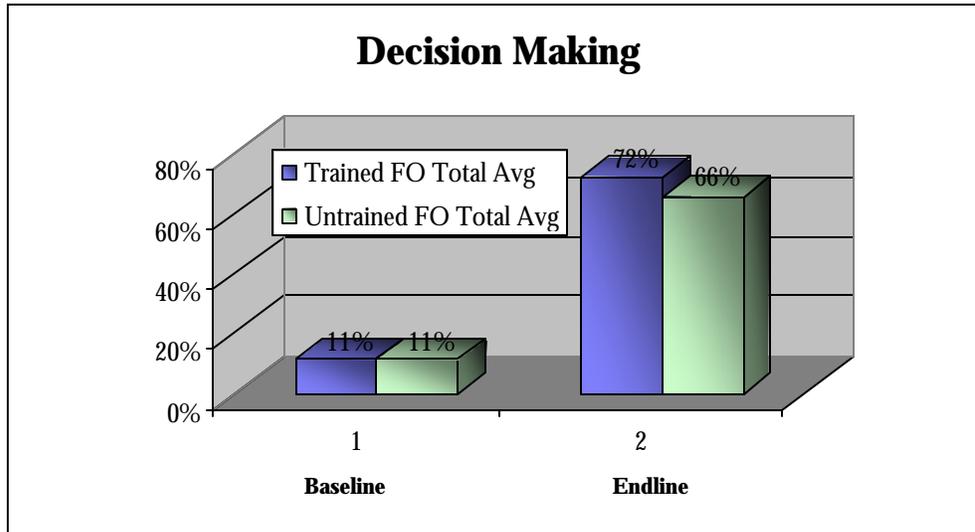


Figure 47: Base and Endline Decision Making Structure Comparison

The decision making procedures of the farmer groups were examined from a structural aspect – was a board of directors appointed with written job descriptions for both the board and the individual appointees, and a procedural aspect – the presence or absence of rules ensuring participation of members in decision making.

Although both the trained and untrained groups were broadly similar before their training, the FO groups improved substantially more than the other groups.

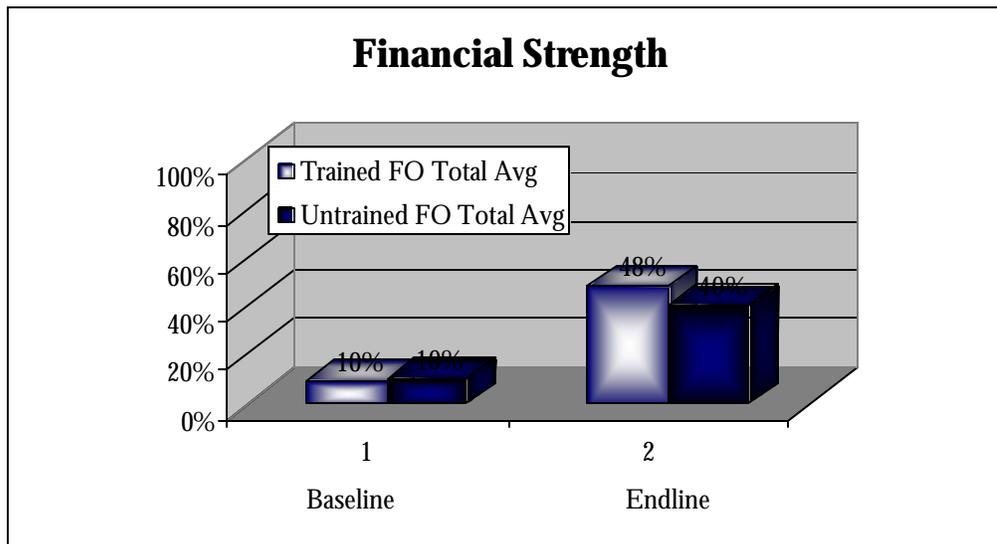


Figure 48: Base and Endline Financial Strength Comparison

The financial strength of the farmer groups was one of the weakest aspects of their development. The analysis of the groups' financial controls was based on the presence of financial records, the accounting for of the group's capital, and their debt/equity ratio. In addition, transparency – the provision of budgets and financial reports to members – was assessed. Though there has been improvement, most of the farmer groups would require further support or training in this key aspect of organizational management.

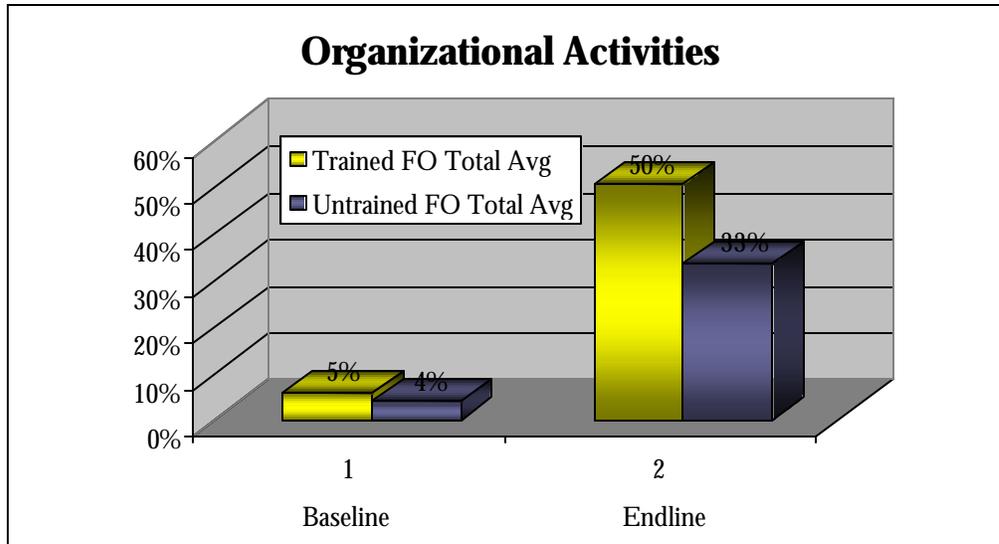


Figure 49: Base and Endline Org. Activities Comparison

The level of activity exhibited by the groups has undergone a substantial increase. The specific activities that were surveyed for were: cocoa marketing, input marketing, provision of credit, administration, planning and presence of sub-groups tasked with implementing work plans.

Approximately fifty percent of groups undertake joint cocoa marketing, and more than half offer some form of credit to their members.

It is anticipated that the level of activity will increase over time as the groups see the benefits of group marketing.

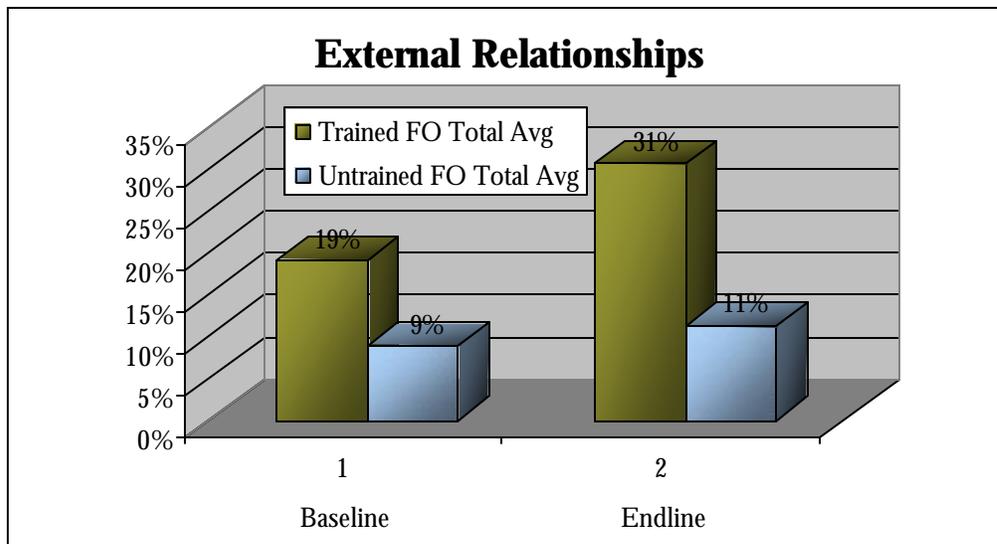


Figure 50: Base and Endline Networking & Relationships Comparison

The level of networking between groups or to industry was the poorest improvement among the farmer groups – though there was only negligible improvement among the control group.

To a certain extent, the geographical separation of the groups selected when starting the program contributes to this, but it also may indicate that the environment in which the farmer groups operate does not yet have the vertical market linkages that would benefit both producers and processors.

Business Service Provider Development

As a result of training and support provided through the final six months of the SUCCESS Alliance program, the four provincial field offices located in Sulawesi have successfully established themselves as legal non-profit member associations. In addition, the technical team along with a number of Makassar based staff has launched a technical support organization to ensure the translation of cocoa research to farmers. A sixth association, formed by West Papua staff and participants in April 2005 also continues to operate.

Each BSP has established a unique set of business objectives, adapted to conditions in the area in which it operates and built on a network of local relationships with farmers, farmer organizations, industry partners, other NGOs, and local government representatives and offices tasked with supporting agriculture and community development.

Other Impacts

Site supervision discussions with participating farmer groups indicated that the training program has provided a good foundation on operating administration and finance systems and have provided a focus for mobilizing group members' participation.

Approximately half the groups interviewed had leveraged their participation in the SUCCESS Alliance program to establish direct marketing relationships with provincial level traders or Makassar based exporters, earning a higher per kilo price for SNI (Indonesian National Standards) qualifying cocoa sales.

These sales have heightened groups' awareness of the need for effective post harvest handling of cocoa to achieve optimal sales, particularly with respect to drying to seven percent moisture levels.

In addition, the trade network seminars between industry members and producers resulted in an increased number of direct marketing linkages between cocoa producers and buyers interested in purchasing better quality cocoa.

It is anticipated that this will contribute to greater communication between industry and farmers, resulting in an improvement in quality, quantity and prices.

Conclusion

Overall, there has been a dramatic improvement in the performance of the farmer groups over the course of the program year.

There has also been a concomitant improvement among alumni groups that were only supported through the training provided as part of the FFS.

This suggests that there is a general 'raising of the bar' of standards within the groups that have formed since the FFS. The reasons for this have been discussed, but what is also clear is that there is still need for further capacity building of farmer organizations.

The development and operation of the BSPs is one way to serve that clear need of farmers to approach their cocoa farming with improved business and management skills, as well as the improved skills in husbandry as offered by the FFS. It is hoped that the BSPs will operate and thrive in Sulawesi providing continued support that existing and future farmer groups need.

While the uptake of the FO training has been clearly seen in the results, the timescale over which the groups were surveyed did not allow for a significant impact on the benefits that such groups offer. However, there are promising signs that such practical benefits are occurring – with nearly fifty percent of groups now marketing cocoa on behalf of their members, up from thirty percent before training, and a similar proportion offer credit; thus enabling farmers to opt out of high-interest loans traditionally offered by local moneylenders.

The presence of direct sales relationships between farmer groups and processors/exporters is also a good sign of development of the market due to the creation and strengthening of the farmers' organizations. This development also provides a platform for industry and trading stakeholders to form stable purchasing relationships in which farmer services can be embedded.

5 Communications and Media

This section covers the activities conducted under sub objective 2.2: Build farmer and cocoa industry support for locally managed farm service.

The Communications Initiative (CI) comprised a number of activities that widened the audience for the lessons learned during SUCCESS Alliance's three years of cocoa production improvement experience.

Overseas Strategic Consulting, Ltd. (OSC) was engaged to design and implement a seven-month communications initiative in support of the SUCCESS Alliance program. The CI began as FFS activities were winding down but prior to the launch of SUCCESS VCD and business-related trainings.

The SUCCESS Alliance program was slated to end on September 30, 2005 but was granted a no-cost extension by USAID through December 31, 2005. The CI was granted a no-cost extension through November 7, 2005.

Communications Initiative Background

Communications Initiative Objectives

OSC completed an initial communications needs assessment of SUCCESS and created a seven-month implementation strategy that included the following components:

1. Engaging the Department of Estate Crops (at the central government level), the main office of ASKINDO/Jakarta (Indonesian cocoa association), and ACDI/VOCA, through a Memorandum of Understanding in support of the SUCCESS CI.
2. Using the CI as a backdrop for capacity building at the South Sulawesi office of ASKINDO (located in Makassar).
3. Utilizing the technical expertise of SUCCESS staff to create farmer friendly educational materials on CPB and PsPSP to be distributed via stakeholder networks.
4. Creating a multi-channel farmer information distribution network by leveraging stakeholder relationships with cocoa farmers and via local media outlets.
5. Working with research firm to design and implement KAB (Knowledge, Attitude and Behavior) cocoa farmer surveys.

ASKINDO

ASKINDO is the Indonesian cocoa industry's representative body, drawing its membership from among exporters, processors, traders, and farmers. The association's goals are to represent the cocoa industry in lobbying the government on trade and other issues, raising the profile of Sulawesi's cocoa industry, and attempting to increase the quality of cocoa through sponsoring research and cocoa demonstration plots.

The association has successfully lobbied the government on numerous tax issues, however it suffers from a lack of credibility among its members and outsiders, as it is seen as a vehicle for local cocoa traders who dominate the executive board. Most organizational decisions come from the executive. The International Finance Corporation (IFC) has carried out a set of capacity building activities with ASKINDO to strengthen member participation in strategic planning and governance, and to support the board to develop clear membership policies and services. In addition, ASKINDO has recently joined the WCF and will receive additional guidance through stronger international cocoa industry relationships.

The CI office was located at ASKINDO South Sulawesi in order to have better access to exporters and tap into trader and collector networks. Although plans to leverage ASKINDO structural and human resources to establish an industry center for generating and disseminating communication campaigns did not materialize, the director proved a reliable partner when CI needed to contact exporters or facilitate meetings or seminars with ASKINDO members. ASKINDO also included CI distribution in their work with their demonstration plots (demplots), providing the CI team with valuable feedback from farmers in a relatively short amount of time. Additionally, ASKINDO staff collaborated with the CI team in early-stage drafts of informational materials. Collaboration with ASKINDO was, on the whole, successful considering the short-term nature of the project and the limited organizational resources available.

Communication Initiative Activities

Information Materials

SUCCESS Alliance has developed a suite of written and video informational materials about CPB and PsPSP, including brochures, fact sheets, posters, and VCDs for use in FFS and other trainings. The CI team used the core design and technical information of these materials to create printed educational materials focusing primarily on the CPB lifecycle and each individual step of PsPSP.

As the CI progressed, content was adjusted and edited according to feedback received on farmer feedback forms (see below) and from meeting with stakeholders such as collectors and the cocoa farmer organization, APKAI (Indonesian cocoa farmer's association). CI also tapped the expertise of stakeholders to produce farmer-focused radio programs and an educational VCD about cocoa quality.

Print

Four distributions of printed informational/educational materials were made to cocoa farmers during the CI. Content of the materials focused on two basic messages: 1) how a farmer's cocoa garden becomes infested by CPB and 2) how utilizing PsPSP can break the lifecycle of the pest and stop damage to beans. As mentioned above, the CI team ensured that a farmer friendly approach to delivering these messages was consistent throughout the materials and that an appropriate amount of photographs depicting the CPB lifecycle, damaged versus healthy beans, and each step of the PsPSP methodology

accompanied the text. Three of the four distributions included VCDs along with printed materials.

Radio

A series of radio shows and promotional spots were produced by the CI team, utilizing SUCCESS Alliance technical staff, cocoa farmers and exporters. Three thirty-minute radio programs were produced in scenario and question and answer formats, and broadcast on ten private and public radio stations across Sulawesi. An additional series of radio shows were reproduced by the agricultural radio staff at the government radio station in Makassar. While the majority of these programs were broadcast in Bahasa Indonesia, versions of the programs aired in the Bugis, Makassar, and Mandar dialects. For a detailed list of radio programs and stations, please see the Appendix 6.

Video

In response to the considerable disconnect between the cocoa quality standards that exporters and processors require/expect, and farmer and collector knowledge levels of those standards, the CI team produced a cocoa quality VCD based on SUCCESS cocoa quality seminars that was distributed to farmers. The VCD reinforced the message that quality control practices begin in the cocoa garden, clearly explained the quality standards that industry expects from farmers and collectors, and gave a step-by-step demonstration of cocoa processing and the products that are made from cocoa.

The VCD gives farmers an opportunity to hear about cocoa quality directly from exporters and processors, to see exactly what happens to their beans during processing, and to receive instruction on how to improve bean quality in their farms. The VCD also stresses the message that industry has made considerable, long-term investments in Sulawesi cocoa, but that the current standard of quality is not sustainable.

Prior to the first large-scale distribution of information materials, the CI team printed 1,000 envelopes containing pre-existing SUCCESS Alliance CPB brochures and fact sheets on PsPSP and distributed them as a test to farmers and village collectors at a CI orientation meeting organized in cooperation with a local exporter, PT Socomex. Over thirty farmers and village collectors participated, giving positive and constructive feedback about the concept of CI and the content and design of the informational materials. Below is a list of the materials distributed during CI. For a detailed chart on each distribution, please see the Appendix 5.

Distribution 1

Envelope containing:

- Introduction to CI
- One CPB brochure
- Four PsPSP fact sheets
- One farmer feedback form

Distribution 2

Envelope containing:

- Introduction to CI
- One detailed CPB lifecycle diagram and healthy beans vs. damaged beans comparison
- Four re-designed PsPSP explanation sheets (two sided)
- One SUCCESS Alliance CPB-PsPSP VCD
- One farmer feedback form

Distribution 3

Twelve-page color booklet on CPB lifecycle

- CI “instructions” to farmers
- CPB lifecycle diagram, bean comparison photos with explanations
- Step by step PsPSP explanation with specific connection to breaking CPB lifecycle
- One SUCCESS Alliance CPB-PsPSP VCD
- One farmer feedback form

Distribution 4

Sixteen-page color booklet on CPB lifecycle

- CI “instructions” to farmers
- CPB lifecycle diagram, bean comparison photos with explanations
- Step by step PsPSP explanation with specific connection to breaking CPB lifecycle
- Step by step explanation of side grafting technique (tree regeneration technique)
- One CI Cocoa Quality VCD
- One SUCCESS Alliance CPB-PsPSP VCD
- One Farmer Feedback Form

The following are the summary activities for the Communications Program:

Communications Technique	Target Area	Methodology	Timeline	Target
Brochure and VCD distribution	Sulawesi	Direct distribution through DISBUN exporters, extension workers	2005	Up to 300,000 farmers
Radio programming	Sulawesi	Radio programs broadcast 2-4 times per week	2005	

Building upon the cocoa community relationships forged by SUCCESS Alliance through its FFS and other trainings, the CI team stressed a collaborative approach with all cocoa stakeholders in order to expand the reach of the SUCCESS Alliance cocoa improvement messages to Sulawesi’s smallholder cocoa farmers. Through small-scale meetings in the field, the CI team created opportunities to bring private and public cocoa stakeholders to the collaborative table in order to create solutions for better information flow to farmers on CPB and PsPSP.

During these meetings, the CI team would identify the communications assets that already existed among Sulawesi's cocoa community but were being underutilized. Through this process, the CI team then worked with stakeholders to agree on ways to leverage those assets to create a multi-channel information distribution network to farmers. Examples of these assets include:

- The economic relationship between exporters and collectors, and between collectors and farmers;
- High levels of farmer trust of local agricultural extension workers (DISBUN);
- Local village and "neighbor" networks; the emerging number of formal or informal farmer groups; and
- Government-sponsored agricultural radio programming.

Exporters and Processors

The CI collaborated with cocoa exporters, processors and traders that already had or were in the process of developing direct relationships with farmers or were consolidating trading relationships to address their quality issues. These firms used their business relationships to introduce the CI team to key cocoa suppliers in different areas of Sulawesi. The CI team met with these collectors to discuss frequency of visits to farmers, interactions with farmers, and how to incorporate delivering informational materials to farmers into their regular operations. CI would then arrange with exporters to have information materials delivered 1) from exporter to collector, and collector to farmer 2) from exporter directly to farmer groups, and in some cases 3) exporters to DISBUN offices. Exporter and processors also provided their expertise and/or access to their facilities while CI was producing its radio shows and VCD. CI cocoa industry collaborative partners were:

Exporters: PT Olam, PT Cargill, PT Mitra Celebes, PT Socomex, PT Hakiwa

Processors: PT Unicom, PT Effem, PT Maju Bersama

DISBUN

Extension workers from DISBUN visit the field to advise cocoa farmers on proper harvesting techniques and to train on CPB prevention. Two key factors affected DISBUN capacity to implement program activities. The first was a lack of budgetary resources at the district level that hampered their capacity to invest funds in program activities while the second, much harder to address effectively, was the poor work ethic that led to inconsistencies in quality and frequency of trainings from office to office.

Despite these inconsistencies, farmer perceptions of DISBUN as a source of practical information on PsPSP and CPB remained high. Thus DISBUN-farmer relationships were seen as a key asset and natural partner for delivery of messages and informational materials to farmers.

In most cases, DISBUN would agree to partner in the CI, immediately seeing how distributing information materials would benefit the reputation of DISBUN by adding

value to its trainings and field visits. Nonetheless, barriers were encountered when the CI team met with DISBUN offices, such as:

- 1) Solicitation of payments: It was common to encounter requests for transportation payments (funds to pay for petrol) from DISBUN staff for delivering CI materials to farmers. Although the CI activity was intended to be carried out as a part of regular DISBUN extension services, this was a persistent barrier to overcome.
- 2) Delivering to previously existing SUCCESS farmer groups: One of the primary goals of CI was to reach beyond the areas of previous SUCCESS interventions. Despite repeated requests to deliver materials outside of the SUCCESS-influenced areas, DISBUN field officers would regularly distribute materials to those areas and groups that had been formed during previous SUCCESS interventions because it required less time and effort.
- 3) Hoarding materials: Some DISBUN offices saw the CI as an opportunity to utilize CI-produced materials for DISBUN activities. Despite best efforts to reinforce collaboration and the awareness-raising goals of CI, a few instances were recorded of DISBUN not distributing materials as agreed. In one particular case in Central Sulawesi, farmers complained to SUCCESS Alliance that they had received farmer feedback forms from DISBUN, but not any information materials.

The seventeen district DISBUN offices in South, West, and Central Sulawesi formed the basis for the information distribution network. CI did not work with Southeast Sulawesi DISBUN for two reasons; Provincial DISBUN required a separate MOU with CI and it was impossible to find a sustainable delivery method through exporters or other stakeholders to get materials to DISBUN offices in Southeast Sulawesi on a regular basis.

Farmer Groups

CI utilized a number of formal and informal farmer groups as well as APKAI to deliver informational materials to farmers. While CI found this channel very effective in terms of message delivery, the main problem was finding consistent delivery mechanisms for getting materials from Makassar to a distribution point in the field that could regularly be tapped by the farmers themselves. With a view to making the process sustainable, CI worked with exporters to deliver materials to these farmer groups, while in other cases it was most efficient to have SUCCESS Alliance field staff deliver the information or have the materials on hand in SUCCESS Alliance field offices for collection from the farmers themselves.

While APKAI was a good collaborative partner to CI (it participated in stakeholder meetings, delivered information materials and collected farmer feedback forms) it currently does not have resources to deliver a significant quantity of materials in a time-effective manner.

ASKINDO/Demplot

ASKINDO demplots were also used as a delivery mechanism; approximately once per month ASKINDO staff would visit their demplots in twelve South and West Sulawesi districts. Demplots proved a reliable source of farmer feedback, as ASKINDO methodically collected forms during its visits. This feedback was an influential factor in how CI developed its educational materials in the early stages of activities.

Feedback Mechanism

A key component of the CI is emphasizing a two-way communication flow between farmers and the producers of information materials. Every CI envelope or booklet contained a farmer feedback form – a basic questionnaire asking for reactions from farmers to the materials that they have received, and what information they wish to receive in the future. Stakeholders who delivered materials to farmers would also collect feedback forms from the farmers and return them to CI staff for analysis. Feedback received via this system led the CI team to adjust the format of printed materials on the CPB lifecycle and PsPSP and to include the SUCCESS Alliance instructional VCD in distributions.

Feedback forms were also incorporated into radio show productions; a series of technical questions were taken from farmer feedback and then answered on-air by SUCCESS Alliance technicians. Unfortunately, due to low telephone penetration in rural agricultural areas, Radio stations were unable to accommodate a “live” question and answer radio show between SUCCESS Alliance technical staff and cocoa farmers.

While CI included a feedback form in every materials packet it distributed, it did not expect to receive 100% of the forms back from farmers. The forms were a means to 1) reinforce to farmers that their input was critical to improving the information that was provided to them, and 2) to create a two-way information flow between farmers and the stakeholder who handed them the materials. For the first distribution of 30,000 envelopes, CI received over 3,000 feedback forms, or just over ten percent. At the conclusion of the CI, the team was still receiving feedback forms from second and third distributions. Over 6,000 feedback forms had been returned to the CI team by project closeout.

Stakeholder Collaboration

In principle, all cocoa sector stakeholders share a common goal of increasing the quality and quantity of cocoa being grown in Sulawesi and are, in one way or another, working to achieve this goal. However, communication between stakeholders is inconsistent and, in some cases, adversarial relationships have blossomed due to previous events or negative perceptions of counterparts.

In some cases, attempts by the CI to re-build communication or collaboration between stakeholders were met with flat refusal or consistent skepticism. In the better cases, initial skepticism gave way to agreements to collaborate on delivering information to farmers.

Generally, exporters and processors were the most flexible and creative in utilizing their resources to assist with delivery of materials to other stakeholders. By utilizing the exporter and processor trucks, and the trucks of the trading partners, who deliver cocoa to their Makassar warehouses on a daily basis, the CI was able to send information materials into the field.

In one exemplary case of collaboration, the CI developed a relationship with an exporter that would truck CI materials from its warehouse in Makassar up to its warehouse in Central Sulawesi (a forty-eight-hour trip). From the exporter’s warehouse, the local ASKINDO chapter would pick up materials and distribute them to farmer groups, other exporters, and DISBUN. The exporter would also deliver the materials to its own traders and collectors.

Knowledge, Attitude and Behavior (KAB) Survey

The CI contracted with a local survey firm to conduct baseline and endline KAB surveys of smallholder cocoa farmers in South, West, Central and Southeast Sulawesi. The goal of the survey was to track awareness of CPB and PsPSP, farmer practices in the garden, attitude towards PsPSP as a control method, and attitudes towards cocoa industry stakeholders. Due to the short timeframe of the CI, the questionnaire focused primarily on knowledge and attitudes of the sample group, rather than behavior. The criteria for the survey was:

- Respondents were the owner or decision-maker of a farm on no less than half a hectare and no more than five hectares under cultivation for cocoa bean production for at least the past three years;
- Twenty-five percent of respondents had participated in SUCCESS Alliance FFS;
- Seventy-five percent of respondents had not participated in SUCCESS Alliance FFS;
- Sample size of 1,000.

The sample was weighted according to levels of cocoa production, with South and West Sulawesi accounting for over fifty percent and twenty percent of the sample, respectively.

Communications Initiative Results

The following are the summary results for the Communications Initiative:

Communication Techniques	Target Area	Target	Achievement
Brochure, VCD distribution and Radio Programming	Sulawesi	Up to 300,000 farmers	271,000 farmers

Survey results in chart format are included in the Appendices. Below is analysis of key survey results:

Knowledge

Respondents were asked whether they knew about CPB. A positive response was followed by detailed questions about knowledge levels of PsPSP methods, and sources of CPB knowledge. A negative response was followed by an explanation of CPB and then additional questions on cocoa farming attitudes and behaviors. Knowledge levels according to Sulawesi provinces were as follows:

<u>Province</u>	<u>Baseline</u>	<u>Endline</u>	<u>Difference</u>
South Sulawesi	26.9%	23.2%	-3.7%
West Sulawesi	15.8%	9.8%	-6.0%
Southeast Sulawesi	10.4%	10.2%	-0.2%
Central Sulawesi	5.0%	4.9%	-0.1%

The level of knowledge of CPB for each province between the baseline and endline survey remained basically unchanged except for in the newly established province of West Sulawesi, where new DISBUN offices and networks are still being established. The difference was greatest in North Mamuju. For the endline survey, only three villages were sampled in this area, versus six in the baseline, and the proximity of the baseline villages to South Sulawesi DISBUN may have been a factor. Additionally, although North Mamuju is in the range of radio broadcasts organized by CI, the access of farmers in the area to print materials distributed through industry channels is not certain.

Although the cumulative results of the KAB survey show a decline in knowledge, positive results were noted from those respondents who answered that they had some knowledge of CPB. In the endline, five percent more respondents know that CPB lives inside the cocoa pod and eleven percent more know that a pod infested with CPB will produce fewer beans. A total of fifteen percent more of the endline sample also correctly responded (a “false” answer) to the question that the CPB pest destroys the tree by eating the leaves.

When asked about PsPSP, there was an increase in knowledge of frequent harvesting (four percent) and pruning (five percent) as specific methods of controlling CPB. Knowledge of fertilizer as a CPB control method remained flat (zero percent), and garden sanitation dropped slightly by three percent.

Respondents were also asked the sources of their information on CPB. After the CI activity there was an eleven percent increase in knowledge gained from printed materials and mass media. Additionally, a small increase was noted in the number of farmers learning about CPB from the person who buys their cocoa (collector/buyer). While only a three percent increase, this hopefully represents the beginning of a positive trend that will continue as exporters and collectors become more pro-active about engaging farmers on quality improvement.

There was a significant increase (twenty-two percent) in VCDs being cited as a source of information on CPB. During the program period preceding the survey, the CI delivered 80,000 information packets containing VCDs and 69,000 farmers participated in the

SUCCESS Alliance VCD training program, which left video training packets in 1,400 villages. Thus, the increase in awareness due to VCD sources can be attributed to both the SUCCESS Alliance VCD intervention and the CI.

Regarding the sources of the printed materials, there was a seven percent increase in farmers reporting that they received materials from SUCCESS Alliance. Although some materials were distributed through SUCCESS staff and offices, the majority of materials were distributed through DISBUN and buyers. It is possible that this increase is a result of SUCCESS Alliance logos on the distributed materials. A five percent decrease was recorded in fellow farmers as a source of printed materials; however, there were slight increases in respondents who had received materials from village or farmer group leaders and local collector/buyers.

The inconsistencies in CPB knowledge are indicative of the situation across Sulawesi's cocoa landscape. Sources of information and communication linkages are weak, so many smallholder farmers rely on local collectors and traders – who themselves are not well informed – for advice on effective CPB control, improved cocoa garden management techniques and cocoa quality specifications and price information

Attitudes

After being read a description of CPB by the surveyor, farmers were asked whether they thought they had CPB in their garden. Ninety-eight percent of endline respondents thought that their garden was indeed infected. Additionally, ninety percent of the sample confirmed that cocoa farming was their primary source of income. All respondents were asked to acknowledge trust levels of the major cocoa industry stakeholders to give them practical information on CPB. DISBUN and neighboring farmers rank the highest for farmer trust in both surveys. Collectors/buyers also saw a small percentage increase in farmer trust of them as a source of information on CPB.

Behavior

Both surveys demonstrate that the majority of farmers are engaged in sanitation, pruning, fertilizing, and to a large extent, frequent harvesting. Reasons for not using these methods in the cocoa garden are dominated by claims that the farmer:

- 1) Has no time to do the activity
- 2) Does not have the necessary resources to do the activity

Farmer Feedback

The results from the feedback sent in by farmers after watching the VCDs were extremely positive. Only one percent of farmers stated that they did not find the material useful – primarily due to a desire for information on other issues such as irrigation in drought-prone areas.

When asked what additional information or methods they would like to receive, most farmers (thirty-eight percent) sought information and training related to side-grafting. Other farmers were interested in information related to other cocoa pests and diseases

(twenty percent), marketing information (ten percent), pruning and fertilization (thirteen percent), and alternative crops (five percent).

Handover to SUCCESS Alliance BSP's

SUCCESS Alliance will formally ceased to operate as of December 31, 2005. Technical staff prepared for the transition from a donor-funded organization into five SUCCESS Alliance follow-on BSPs who will seek to work on a contractual basis with cocoa stakeholders and international organizations active in cocoa.

In order to increase the assets for these BSPs, the CI provided copies of designs for all informational materials, radio shows, VCD, contact lists, presentations, or other relevant documents that may add value to BSP marketing efforts and client building.

Conclusion

The number of smallholder cocoa producers and the wide area over which they are dispersed necessitates a multiplicity of information sources to support dissemination of new cocoa learning, provision of market and production information and to provide a mechanism for farmer feedback. The CI successfully mobilized existing private and public sector resources through which it channeled key messages on good cocoa husbandry and market knowledge, thus creating a multiplicity of reinforcing messages and providing a model for collaboration that can be built on by Sulawesi's dynamic cluster of cocoa stakeholders.

Some important lessons were learned in the implementation of the CI activities:

- Delivery and uptake of CPB/quality improvement messages are made difficult by the structure of village level trading relationships in which many farmers are in long-term trading and credit relationships with collectors who are also poorly informed and thus ill-equipped to support quality improvements.
- The lack of price incentives for increased investment in quality improvement not only diminishes impact of messages but also directly contradicts efforts to encourage changes in farmer behavior.
- Low penetration of and inconsistent access to media for smallholder cocoa farmers places the majority of the communications burden on person-to-person interaction. This accentuates the need not only for increased stakeholder collaboration, but designing that collaboration around a set of specific stakeholder inputs and resource allocation at the outset of any communications-building activities with farmers.
- Literacy rates are low in rural regions and local dialects dominate. Farmer educational materials should, in principle, be produced in five local Sulawesi dialects and distributed accordingly. However, this can be cost prohibitive when mass producing materials, and controlling the distribution of language-specific materials through supply chain channels can be problematic.
- Industry (exporters and processors) is the most creative, flexible, and willing to allocate resources to building communications channels with farmers. Industry is also the least biased in its approach to working with other stakeholders.

- ASKINDO is not realizing its full potential in regards to addressing cocoa quality improvement. A long-term capacity building program focusing solely on its approach to cocoa quality improvement and stakeholder mobilization is necessary.

6 Farming as a Business

This section covers the activities conducted under Sub-objective 1.1: the promotion of effective practices in cocoa cultivation. FaaB was initially included as part of the third cycle of the FFS curriculum.

The goal was to deliver training at the producer level that improved their capacity to manage their activities from a more business-oriented standpoint introducing cost control and other analytic tools that would result in improved economic performance. In order to deliver the FaaB training to an expanded target population and to provide the SUCCESS Alliance legacy organizations an opportunity to fine-tune their delivery of the training, the original FaaB training was refined and separated out from FFS-CPB training cycle, and additional topics were included. Both aspects of the training are reported on in this section.

The FaaB training, both the embedded FFS curriculum and the expanded stand alone version evolved from the realization that price signals were impeding farmers' application of PsPSP and other cocoa farm investments. By introducing training that supported a business analysis of PsPSP and other inputs it was hoped that cocoa farmers would be enabled to bring their experience with on-farm experimentation together with cost/benefit analysis to identify a farming strategy that met their goals, making price only one variable in the decision-making process. FaaB was introduced as a part of the year three modification, and the stand alone training was added under the no cost extension.

Farming as a Business Background

Rationale

One of the major constraints on cocoa farm income generation in Indonesia is the low level of marketing skills and knowledge among cocoa farmers, which limits the options available to farmers in the local market.

Farmers' inexperience with marketing is combined with some key gaps in the business environment in which they operate:

- Information on quality grades and standards for cocoa beans is limited;
- There is a lack of available "disinterested" price information;
- Limited models for setting up joint marketing activities; and
- Limited opportunities for assembling quantity, sorting for quality, or value adding

These factors undermine farmers' bargaining position, influence their selling decisions and ultimately impact their willingness to invest time and money in improving their cocoa production techniques. In the FaaB training, ACDI/VOCA worked with individual farmers and farmer groups to improve members' knowledge of the market, to learn new

skills that support improved marketing decisions and to set up operational structures in support of group marketing activities.

Examples of outcomes that were sought from this activity were:

- Farmers developing group marketing;
- Improved access to information;
- Increasing added values;
- Increasing quantity and improving quality of cocoa beans;
- Developing good relationships with the entire market network

Curriculum

The FaaB curriculum was introduced as an extension of FFS-CPB in cycle three of the program (2004-2005), covering two days of training from the total twelve to sixteen days of training sessions. The topics covered were:

Introduction to Farming as a Business

1. Defining the meaning of business	Develop a working meaning of 'business' Development of examples of types of businesses Discussing the importance of business
2. Overview of FaaB	Understand the concept of FaaB
3. Farm Business Management	Brainstorm on what is needed to manage a business

Work Planning and Cash Flow Analysis

1. Introduction to planning	Promotion of discussion of current information management techniques used by farmers Delivery of the key training message: the measure of business success is profit and profit can be improved through management Introduction of the planning process
2. Developing a workplan and cash flow	Identification of the key inputs and activities of cocoa farming Identification of typical costs associated with cocoa farming Development of an annual or seasonal workplan and cost timeline

Cocoa Farm Logbook and Cost Benefit Analysis

1. Record keeping: The cocoa farm logbook	Discussion of forms / simple records used by farmers Review of the cocoa farmer logbook and exploration of how record keeping relates to planning learned in the previous session
2. Analysis of cocoa farm performance	Review of the planning process steps Identification of the forms of analysis that can support more profitable cocoa farming Practice of analysis of cocoa farming methods and profit or loss based on workplan, cash flow and the cocoa farmer logbook

In the final year of the program, the FaaB training was expanded to six days of training. The original curriculum was retained, but was expanded to three days of training in order to practice the skills learned, and additional topics, centered on the area of group marketing, were introduced in the three remaining days:

1. The meaning of work	Learning the signs of a successful farmer Participation in learning because knowledge leads to success Devising one way of achieving success
2. Using Marketing to realize goals	Recognizing the importance of the customer The practice of marketing and self perception that farmers are marketers Cocoa marketing activities within the categories of the 4Ps ¹²
3. Factors affecting success	Differences between internal and external environmental market factors Marketing SWOT (Strengths, Weakness, Opportunities, Trends) analysis Creation of a strategy from the SWOT analysis to improve the marketing situation
4. Pricing for Profit	Demonstration that profit and sales are obtained through price and cost The advantages of bringing produce to market to avoid low farm gate price Ways to add value to produce so as to minimize price competition
5. Group Marketing	The usefulness of middlemen The case for group marketing Planning of meetings between members or farmers with farmer groups to discuss the possibility of marketing cooperation
6. Marketing information	The importance of information in decision-making The types of information that are of benefit to the small farmer Use of media, printed and electronic, to obtain information needed by farmers or farmer groups
7. Reflection	Speaking positively about the training to others Appreciation of the time spent for training Use of the knowledge and skills to improve work habits

In addition to the training received, each participant received one logbook and was trained in its use. All business activities of participants were to be written up in the logbook.

This was an exercise in record keeping on a day-to-day basis that would enable farmers to obtain actual data on their activities to provide a tool for comparison, analysis, reflection and improvement of future business activities.

¹² Product, Price, Place, Promotion

The cocoa farm logbook included charts for recording all of the information needed to compare plans to performance and calculate a simple profit or loss.

The contents included:

- The size of each cocoa garden
- The distance of each garden and the time it takes to get there
- The number of cocoa trees in each garden
- The average age of the trees in each garden
- The amount of time spent on pruning, sanitation, weeding and spraying;
- The types, amount and price of fertilizers applied
- Each harvesting date and the amount harvested (yield)
- The amount of time spent drying cocoa
- The price that is paid for each sale of cocoa, including notes on any discounts or premiums paid

Baseline Analysis

Farmers' knowledge of business with relation to their cocoa farming has been very limited.

Most smallholder farmers (forty-four percent) have no more than primary education, ill equipping them for the record keeping and analysis necessary for small business management. Only three percent of the farmers trained had any education beyond secondary school.

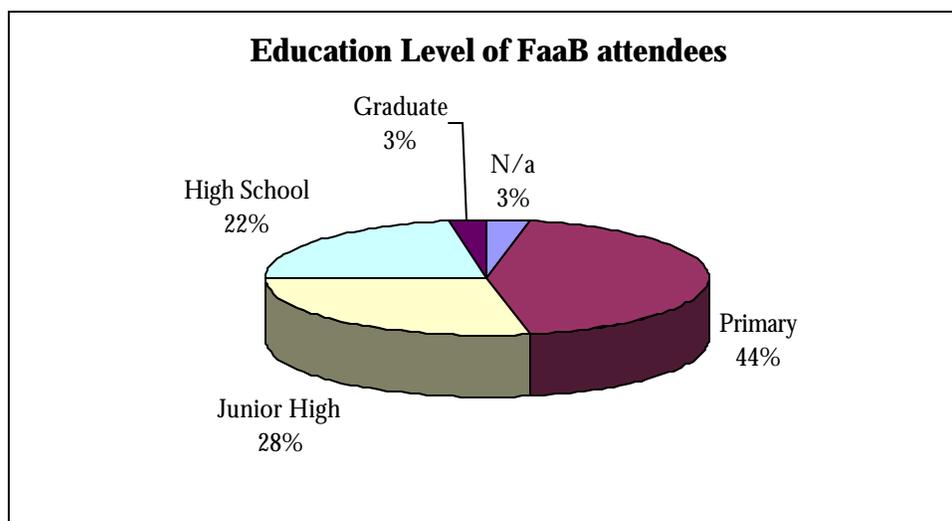


Figure 51: Education level of FaaB trainees

The typical range of occupations of smallholder farmers in Indonesia also reflects a low proportion of business skills.

The graph below illustrates the range of primary, secondary and tertiary occupations among farmers participating in the FFS.

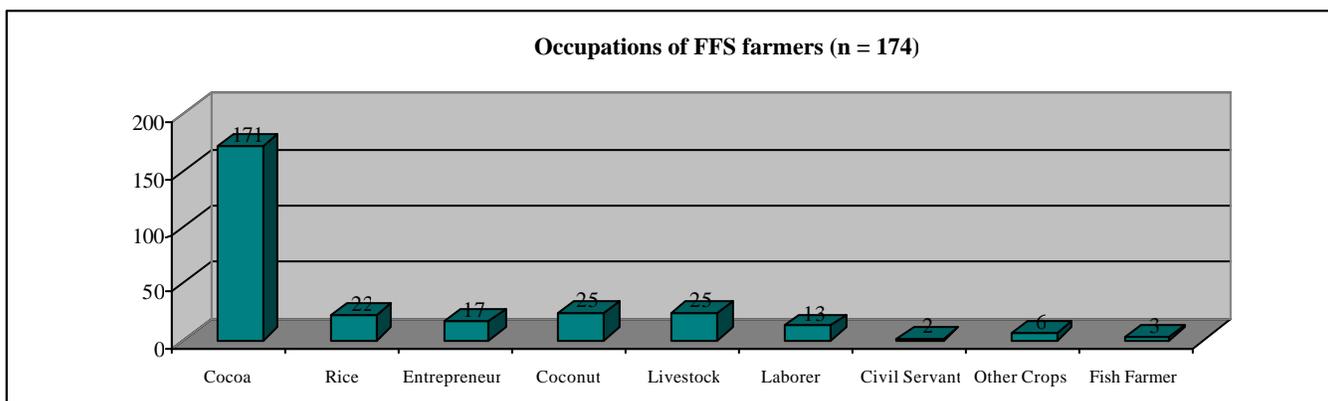


Figure 52: Primary, Secondary, Tertiary sources of income among pre FFS farmers

The majority of surveyed farmers derive their income from cocoa farming, but there is a very limited spread of other activities, particularly those related to business activities. Only seventeen out of 174 farmers engaged in entrepreneurial activities in addition to their farming, and two were civil servants.

The figures below illustrate sources of business information for farmers – prices and crop improvement – most farmers obtain their information locally – either from another farmer or a trader.

It is important that farmers are able to obtain reliable information from a source they can trust, and have the knowledge to make appropriate choices regarding their business and livelihood.

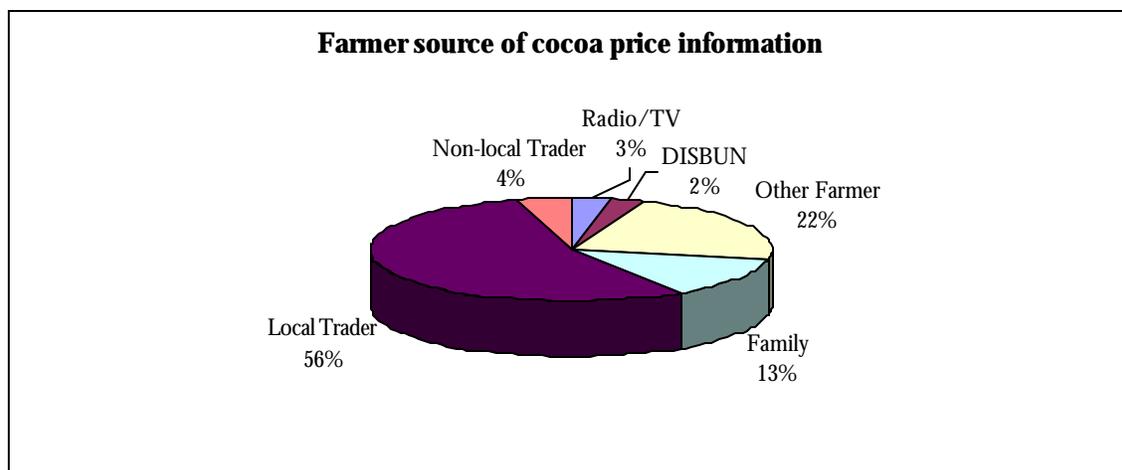


Figure 53: Farmer sources of cocoa price information

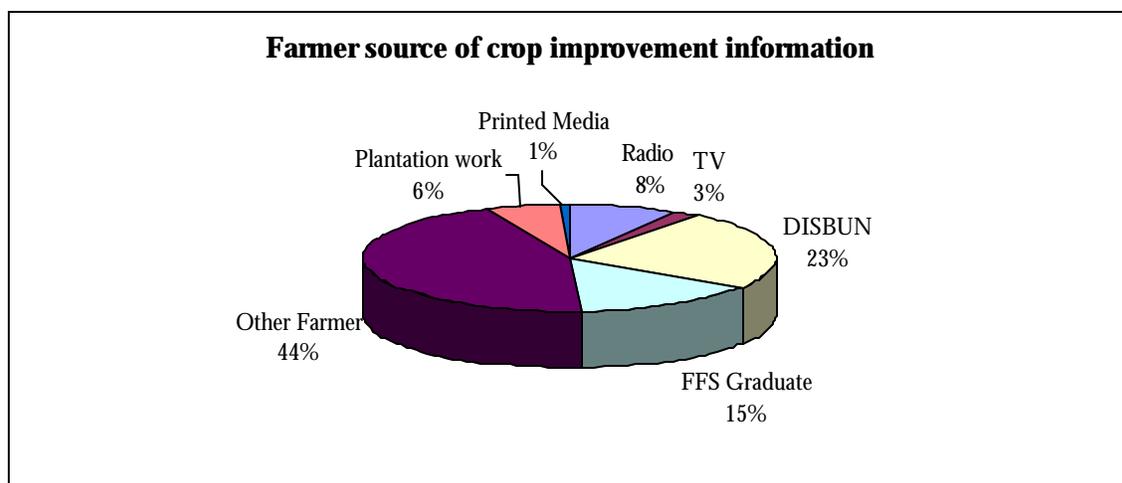


Figure 54: Farmer source of crop improvement information

Specific areas of business activity such as group marketing of cocoa beans were uncommon prior to the training – among already established farmer groups, only 6% of them engaged in group marketing (see below).

Overall, the level of business education and training among smallholder cocoa farmers in Sulawesi, and in Indonesia, in general, is low. Only thirteen percent of farmers surveyed had received any form of training in Sulawesi prior to the SUCCESS and SUCCESS Alliance programs, and the nature of the cocoa industry as a ‘new’ industry, with approximately seventy percent of farmers having taken up cocoa growing in the last ten to fifteen years, indicates that the base of institutional history and knowledge from which farmers can build their businesses is small.

Farming as a Business Activities

Table 5: Summary Activities for FaaB

FaaB Training	Target Area	Methodology	Timeline	Target
Through FFS	Sulawesi	Training of trainers	2004-2005	240 trainers
		Part of FFS Cycle 3	2004-2005	6,250
Direct training	Sulawesi	Training of trainers	Early 2005	180 trainers
		Training of farmer group members	2005	3,250 farmers

Training through FFS-CPB (two- day training)

FaaB was introduced into the FFS curriculum for cycle three of the FFS training in all four target provinces in Sulawesi, which took place in year three of the SUCCESS Alliance Program (FY 2004-2005).

The FFS trainings took place in Central, South East, South and West Sulawesi, beginning with training of trainer sessions.

FaaB master trainer orientations were conducted in the SUCCESS Makassar office in February 2005 to prepare trainers for conducting TOTs in the field.

Six sessions of FaaB TOTs were conducted by the SUCCESS Alliance field staff in February and March 2005 to prepare 174 farmer trainers to teach business courses at the end of the FFS cycle.

FFS-FaaB: Direct Training of farmer group members (six- day training)

FaaB was expanded into a six-day stand-alone training in late year three of the program. Initial three-day master trainings on FaaB and Marketing were conducted in September 2005.

Facilitated by the SUCCESS Alliance technical team, the trainings were attended by ten representatives from four field offices who then conducted six TOT sessions with 164 field-based farmer facilitators and SUCCESS field technicians in preparation for 111 FaaB and marketing training activities targeting 3,250 farmers implemented in South, West, Central and Southeast Sulawesi in October 2005.

In total, 2,982 farmers were trained, twenty percent of them women.

The final six-day trainings of graduates of previous FFS activities focused on production and sales record keeping, expense and revenue calculations and an introduction to marketing issues and strategies.

Training was conducted by farmer facilitators based in the locality with program oversight and management provided by SUCCESS field technicians. In addition, the SUCCESS Alliance technical team provided on-site assistance to trainers in forty-three of the training locations as well as meeting with field technicians to ensure effective application of the teaching methods promoted through the FaaB TOT.

The material taught in these sessions contains a fair amount of math and analytical reasoning skills, which facilitators and training participants often found challenging.

Farming as a Business Results

Table 6: Summary Results for FaaB Program

FaaB Activity	Target Area	Target	Achievement
Through FFS	Sulawesi	240 trainers	100% (240)
		6,250 farmers	99% (6,178)
Direct training	Sulawesi	180 trainers	97% (164 trainers + 10 master trainers)
		3,250 farmers	92% (2,982 farmers)

FFS Training

The FFS training reached a total of 6,175 participants with FaaB. This training has created changes in how farmers view their cocoa production. As can be seen from Figures 55 & 56 below, a change has been seen in farmers' information sources pre and post the FFS training.

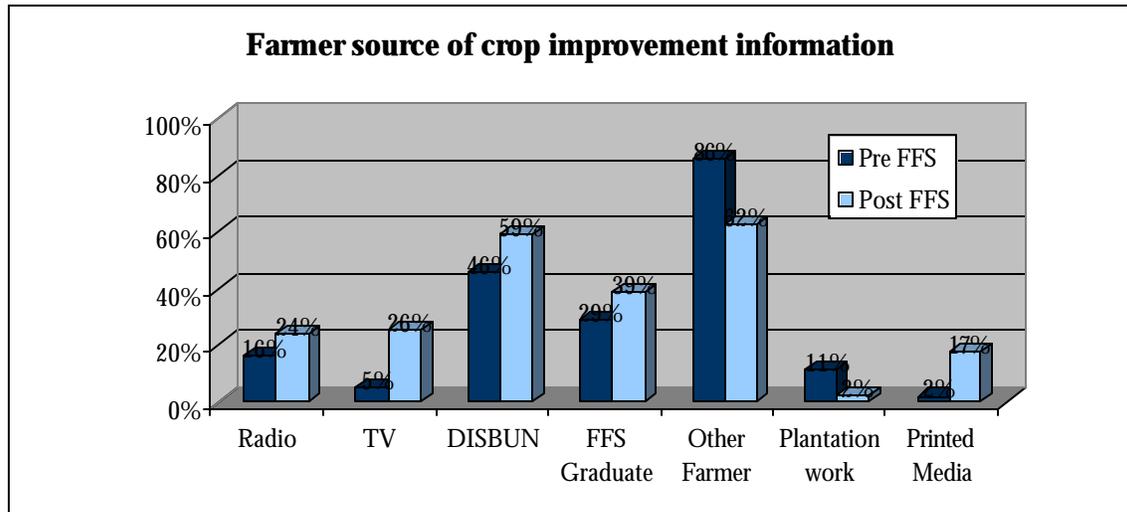


Figure 55: Farmer source of crop improvement information

Since receiving FaaB training through the FFS, farmers are less inclined to rely on informal sources for their technical information related to crop improvement. Greater trust in formal extension services has been created, as have messages from the mass media (SUCCESS Alliance undertook a mass media education campaign at the same time as this training, reported in another section).

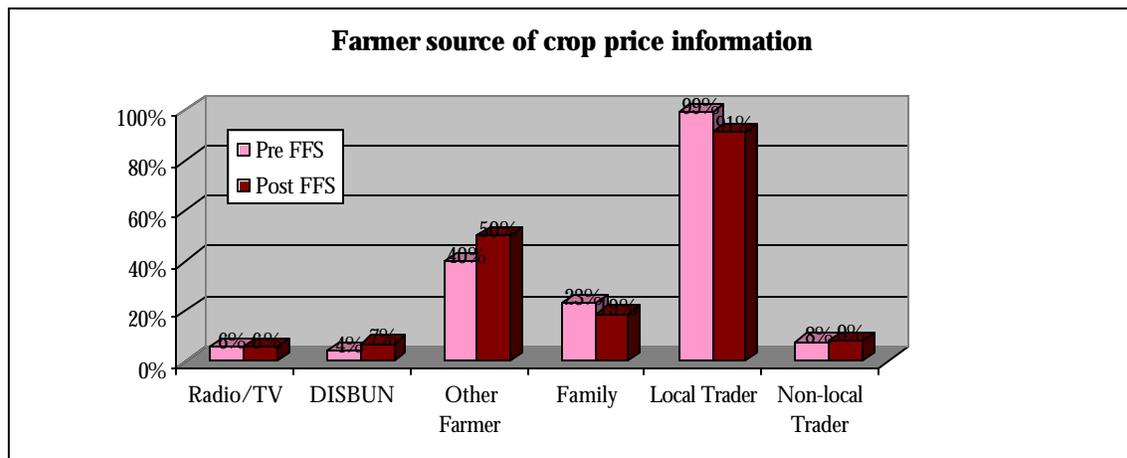


Figure 56: Farmer source of crop price information

Farmers are also less inclined to trust local traders for their price information, and are more inclined to rely on their farmer networks and formal extension providers (DISBUN).

FaaB Six-day Training

The advanced training was given to a total of 2,982 participants, twenty percent of whom were women. This training was directed at FFS alumni of the first and second cycles (2003/2004).

Of the participants in the training, eighty-seven percent of them were engaged in individual marketing of their cocoa prior to the training. Seventy-eight percent of the participants marketed their cocoa at village level.

Only eighteen percent of farmers had any relationships outside the immediate area.

As the graph above shows, that proportion had increased to twenty-nine percent after training. Approximately fifty percent of farmers who belonged to farmer groups undertook group marketing at the end of the program.

As the delivery of the FaaB training took place towards the end of the SUCCESS Alliance program, there was little opportunity to measure the impact of the training on farmers' practices with regard to the operation of their farms.

Data was collected, however, on the uptake of the information that was taught through the schools. The participants were examined on:

- Knowledge of the course material;
- practical applications of the theory to simple calculations on cocoa revenue and income;
- conceptual issues and tools;
- price calculations and factors influencing price;
- marketing theory and practice;
- group marketing practice.

The participating farmers show a considerable uptake of the knowledge that was taught through the FaaB training.

An understanding of the basics of business and marketing knowledge increased from approximately forty percent of trainees to over seventy percent after the training.

The participants' level of education did not seem to be a significant factor in their uptake of the concepts taught through the FaaB training, indicating it is well geared towards the educational level of the participant farmers.

Conclusion

The successful development of the cocoa industry in Sulawesi and throughout Indonesia is dependent on not just the application of good crop husbandry techniques. While such techniques are essential in order to reduce losses from CPB and other pests, and also maximize yields, the development of the Indonesian cocoa value chain is equally important.

In the current economic climate, cocoa farmers operate in a largely unregulated market, and are thus dependent on subjective sources for a great deal of their market information relating to cocoa, starting with prices, the majority of which information comes from local traders, who have an obvious interest in maximizing their own return, and who do not necessarily take a wider view of the industry.

The cocoa industry in Indonesia is still young, and most small farmers have been growing cocoa in quantity for only the last fifteen to twenty years, and have neither the experience nor training in business and marketing to operate at a level that contributes to the improvement of the industry in Indonesia. This is clear from the deterioration in quality that Indonesian cocoa is experiencing. This deterioration is partially a result of poor efforts on the part of farmers to maintain or increase quality, as there are no incentives to do so through better prices for better quality.

The training of farmers in basic business and marketing practices by the SUCCESS Alliance has proven extremely popular and addresses some of this need. However, it has been limited in its scope and is necessarily more labor intensive than a mass-media approach. Nonetheless, this type of training offers smallholder farmers not just the opportunity to learn from the trainers, but also gives them the chance to network with each other and exchange information, thus strengthening the cocoa infrastructure at grass roots level.

Future activities should build on the value of intensive teacher training with time spent practicing the theoretical concepts delivered.

Of additional importance is the transfer of market concepts to the next level of the cocoa value chain – the cocoa buyers and traders. Although many traders are perceived as an obstacle to the improvement of cocoa quality and prices and opportunistic moneylenders, many of them occupy a pivotal and useful role of credit provider and buyer of cocoa in numerous communities. They provide credit where no other provider will, and in many cases are members of the community of cocoa farmers, so are trusted and reliable, and will continue to occupy their role for some time.

If the negative aspects of the trader's role are to be mitigated, it may not be a question of removing their influence through creation of alternative structures, but of educating and training them in marketing and business management so they can contribute to the improvement of cocoa quantities and quality, rather than exist as an obstacle.

7 Side Grafting

This section covers the activities conducted under Sub-objectives 1.3 – development of genetic resistance to CPB and other pests/diseases by improving the genetic stock of cocoa and rate of cocoa farm rehabilitation by promoting selection of pest-resistant genotypes by farmers and side-grafting – and 2.1 – sponsorship of local research at collaborating universities and linkage with Alliance partners and international researchers.

Basic side-grafting was taught through the FFS, while a more detailed training took place with selected farmer groups. The side-grafting training was undertaken in Sulawesi, Bali and West Papua. In West Papua, community nurseries were to be developed in eighteen locations which would provide 63,000 seedlings and grafting material for at least 900 farmers, as well as be a locus for training and best practices for cocoa farmers in the areas.

The total number of intended beneficiaries of the expanded PFT (Practical Farmer Training)-side-grafting training was 4,350 farmers – with at least twenty percent of the overall beneficiaries of the program being women.

In Sulawesi and Bali, the program was directly implemented through the SUCCESS Alliance staff and trainers, with collaboration from industry, academia and the Indonesian Government. In West Papua and Bali, implementation of the program was through a local NGO partner, Yalhimo.

In addition to the PFT, collaborations with industry and research institutes: Mars Inc, the ACIAR, La Trobe University; were undertaken to trial different genotypes of cocoa for their value in commercial cocoa development.

The data that has been used for the baseline and endline analysis has been drawn from detailed surveys of FFS farmers before the start of their training, and six months after the FFS has completed. Data from the demplots where the side-grafting was demonstrated to farmers is also used.

Side-grafting – Background

What is Side-grafting?

Improving genotype selection of cocoa and side-grafting of selected genotypes onto cocoa is a proven method for improving the genetic stock of cocoa and increasing resistance to diseases and pests.

Genetic benefits can be transferred across agricultural environments by either planting the seed or cuttings of plants that have the desired trait, but this takes considerable time for the plant to grow. Side-grafting is a more effective and efficient way of improving the genetic stock of plants.

The process of side-grafting involves taking a cutting of the plant with the desired trait and grafting it onto the side of a stem of a plant without the trait. The branches of the plant to be grafted are all cut back to allow the grafts to thrive. Several grafts can be made onto the stem of an existing plant in order to provide a



Side-grafting in process on an older cocoa stem range of new branches that offer improved yields, resistance to infection, or both.

In addition, side-grafting provides the opportunity to shape the garden to decrease the amount of shade (thus reducing the desired habitat for CPB) and make the harvest of cocoa pods easier. A different method of grafting is where the chupons or water shoots are cut back and replaced with a new graft, rather than being introduced to the side of the stem. This is known as chupon grafting, and has also been taught to farmers participating in the SUCCESS Alliance training program.

Effectiveness of Side-grafting

The benefits of side-grafting are as follows:

- It enables farmers to select the most productive trees and propagate them across the garden without extensive replanting, and the resulting time it takes to re-grow. Typically seventy percent of production on an average unimproved cocoa farm comes from thirty percent of the trees, so there is significant scope for development of the genetic stock.
- It allows farmers to select those trees that are least susceptible to disease and pass that resistance on to the rest of the garden.
- Aging orchards can be rehabilitated within nine months, as opposed to two to three years for fresh pod production from seedling growth.

- Rehabilitation mitigates the tendency of farmers to abandon unproductive gardens and open up new land, possibly forested, to production, thus conserving the forest base.
- Side-grafted gardens have much reduced canopies and shade, eliminating favored conditions for CPB, so a sharp reduction in CPB generally results from side-grafted gardens.
- It creates better tree structure which is easier to manage and makes it easier to carry out the components of PsPSP. Trees that are not pruned at the beginning of their development can be too tall or have too many branches to prune easily;



A bumper crop, the results of side-grafting

Side-grafting in Sulawesi

In this project, Mars Inc, in cooperation with ACIAR, researched and developed genotype gardens in Sulawesi, which will be a source for improved genetic material to be distributed to farmers. The research focused on resistance to black pod (caused by a fungal infection, *Phytophthora palmivora*) and Vascular Streak Dieback (VSD) diseases and CPB.

Side Grafting Curriculum

Side-grafting training was carried out as a practical training using demplots of land in selected communities in which the FFS took place. A full summary of the process for selection of demplots is given in the section on FFS.

The curriculum for PFT in side-grafting was carried out over five meetings covering a period of four to six months. The first meeting was carried out over two days, and the second, third and fourth meetings over one day each (see the ‘Schedule Matrix’ below). The PFT process (training and practical application) was carried out in the demplot area.

Schedule Matrix for PFT Side-Grafting

Module	Activity Description	Timing Notes
Module I (2 Days)	Day 1 - Opening session, 'pre test', theory and practice, selection of bud wood Day 2 - Practical application of the side-grafting method in the demplot	Most ideal time for side-grafting is from August to October following active new canopy renewal
Module II (1 Day) <i>Side-grafts are one month old</i>	Observation, the opening of <i>entres</i> cap (protective cover) and replacement of failed grafts	
Module III (1 Day) <i>Side-grafts are three months old</i>	Side-graft maintenance techniques (upper stem and main stem)	Three months after the initial training session
Module IV (1 Day) <i>Side-grafts are six months old</i>	Evaluation of the grafting results, light pruning, follow-up work plan creation, post test and closing session	Three months after the third training session
Module V (1 Day) <i>Age of graft is 3 months</i>	Evaluation of results, technique of pruning/cutting of scion and stock trees, light pruning on stock tree, repair grafting results, observation and pest & disease control on grafting	Four months after the first meeting
Module VI <i>Graft is 4 months.</i>	Advanced maintenance, light pruning on stock tree, repair graft result, observation and pest & disease control on grafting	5 months after the first meeting
Module VII <i>Graft is 5 months.</i>	Evaluation of grafting result, Group follow-up work plan, post test and closing session.	6 months after the first meeting

The PFT activities were conducted by two trainers who had completed a TOT for side-grafting workshop conducted by a SUCCESS Alliance team led by the Malaysian side-grafting expert David Lim. These trainers were certified and qualified to conduct a PFT in side-grafting.

Each PFT on side-grafting was initially targeted to train no less than thirty cocoa farmers. However, due to the complexity of the topic, it was decided to reduce class numbers to twenty. At least ten percent of places were reserved for women.

Baseline Analysis

Cocoa trees retain their maximum productivity up to the age of approximately twelve to fifteen years. After this time, yield starts to gradually decrease. Regeneration of gardens through either replanting or side-grafting is recommended to avoid this drop off in yield.

Participants in the SUCCESS Alliance program were typical cocoa smallholder farmers, and as such can be held to be representative of the vast majority of cocoa producers in Indonesia. The majority (sixty-four percent) of these farmers have gardens whose trees

are more than eleven years old. Only eighteen percent of farmers could be considered to have orchards that are young (< eight years old).

This suggests that a considerable proportion of cocoa trees in Sulawesi are approaching the age where they need to be replanted or rejuvenated, or cocoa yields will fall, as they appear to be doing.

Average age of cocoa trees of FFS students

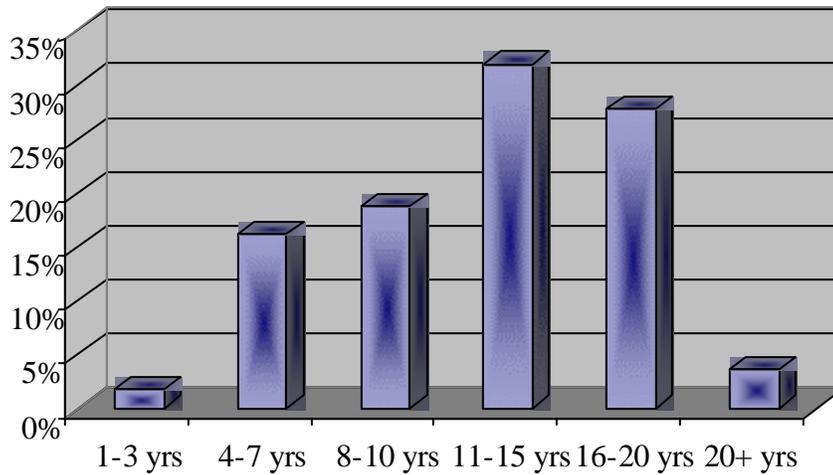


Figure 57: Average age of FFS trainee cocoa trees

In addition, the dramatic increase in infestation levels by CPB may be attributable to these maturing orchards which have received little or no structured attention in terms of care or pruning back to remove cover for the CPB moth.

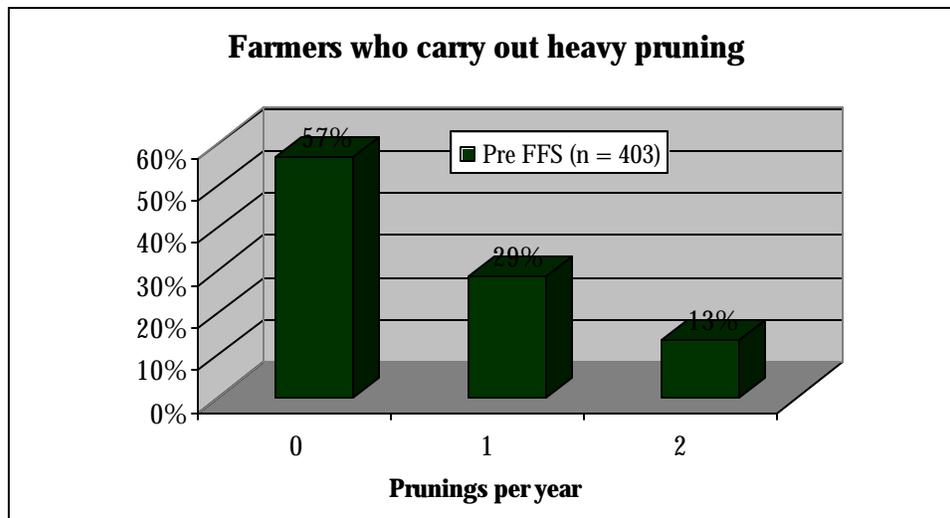


Figure 58: Number of heavy prunings per year

More than half of farmers surveyed do not carry out any form of heavy pruning of their cocoa gardens, suggesting that the combination of heavy growth and age inhibits good yields and promotes CPB infestation.

Forty-two percent of farmers surveyed hadn't heard of side-grafting before while the majority (fifty-eight percent) stated that they had heard about side-grafting but from other farmers, some of whom have graduated from the FFS, from DISBUN, or from when they worked on cocoa plantations in Malaysia.

Even fewer farmers apply side-grafting on their gardens with data indicating that as few as thirteen percent of farmers actively use this technique. It can therefore be concluded that side-grafting has not been a common technique.

PFT Side-Grafting Activities

Following the pattern of most SUCCESS Alliance activities, the training of farmers in side-grafting commenced with a TOT. These trainers guided and led activities in the field. TOT was only carried out once in each province.

SUCCESS Alliance partner, WCF, provided funding and technical support to four ACDI/VOCA field technicians to undergo side-grafting training at the farm of side-graft expert, David Lim, in Tawau, Malaysia in June 2003.

Mars Inc. funded Malaysian expert David Lim to assist SUCCESS Alliance to conduct the first series of side-grafting TOTs for twelve days in South, Central and Southeast Sulawesi. In turn, ACDI/VOCA organized four TOT side-grafting workshops and trained ninety-seven farmer leaders, field technicians and government extension agents in three provinces to become trainers for future SUCCESS Alliance-funded PFT on side-grafting. The trainee participants gained training knowledge in selecting and side-grafting ideal genotypes for both high productivity and CPB resistance for farm level testing and gained knowledge on all aspects of side-grafting.

The SUCCESS Alliance had originally proposed to directly train 160 participants. However, team management made a decision to reduce the number of TOT side-grafting participants from thirty to twenty trainees to allow more quality time by master trainers to work individually with each trainee and better control the adoption of training information. Therefore, the target number of trainers originally set at 160 participants in the program document was not fully achieved.

Experts from the cocoa industry (Mars Inc./PT Effem) also participated in one TOT session, and Mars Inc. and ACIAR provided bud wood for the ten genotype testing sites in South, Central and Southeast Sulawesi (see below).

The application of SUCCESS Alliance PFT side-grafting training was divided into two cycles (2003/2004 and 2004/2005) and was carried out in 275 demplots, which were the training locations for FFS activities. The total number of participants involved was 8,328 persons, with 1,528 (eighteen percent) of them being women. The activity covered five

provinces, namely South Sulawesi, West Sulawesi, Central Sulawesi, South East Sulawesi, and Bali.

In Bali, the PFT side-grafting training only consisted of one cycle and commenced in August 2004 with nineteen participants (ten farmers, nine DISBUN extension agents in the TOT). Upon completing the TOT, SUCCESS field technicians and trainers organized fifteen farmer groups (FFS Alumni) attended by 450 farmers and began PFT side-grafting activities in those communities. The Bali based PFT training followed the same sequence of trainings as for Sulawesi.

The field technicians and participants in Bali are working with the Indonesian Cocoa and Coffee Research Institute (ICCRI) in Jember, using improved clonal material as their side-grafting bud wood. The recipients set up trials in their gardens and are monitoring the progress of these clones. The results will be shared with the cocoa research facility.

PFT Side-grafting Cycle One

PFT side-grafting activity in Sulawesi was divided into two cycles. For cycle one, the targets were: 130 demplots and 3,900 farmers.

In the actual implementation, 3,923 farmers were trained, exceeding the initial target.

PFT in Side-Grafting (Period: November 2003 – May 2004)

Location	Number of Demplots	Number of Participants		Total	Number of Bud Wood/Entrees	Average Percentage of Graft Growth				
		Male	Female			1 st Month	2 nd Month	3 rd Month	4 th Month	
SS										
Polmas	20	433	167	600	6,000	Grafting commenced	37%	48%	29%	
Pinrang	10	265	35	300	3,000		57%	47%	36%	
Luwu North	18	429	111	540	5,400		34%	41%	31%	
Luwu	17	472	54	526	5,100		43%	38%	29%	
SS Total	65	1,599	367	1,966	19,500		43%	43%	31%	
CS										
Donggala Parigi	15	748	159	907	4,500	Grafting commenced	42%	44%	37%	
Moutong	15				4,500					
Total CS	30	748	159	907	9,000		42%	44%	37%	
SES										
Kendari Kolaka	35	824	226	1,050	10,500	Grafting commenced	49%	21%	20%	
Total SES	35	824	226	1,050	10,500			49%	21%	20%
Total in Sulawesi	130	3,171	752	3,923	39,000	0%	45%	36%	29%	

Table 1. Locations and Number of Participants in PFT Side-grafting

In cycle one, 752 (nineteen percent) participants were women from a total of 3,923 participants.

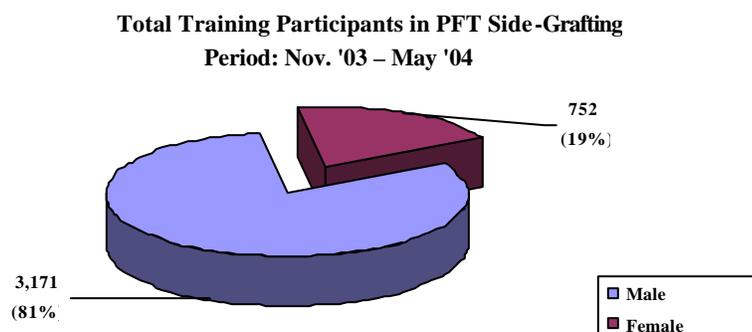


Figure 59: Gender breakdown of side-grafting training, cycle 1

PFT side-grafting Cycle Two

After the completion of cycle one, with several lessons learned, SUCCESS Alliance made some improvements to the training. Frequency of meetings was one key change. During the first cycle, there were only three meetings within the six-month period of training. In cycle two, the meetings would be held every month for the entire six-month training period. This facilitated participants in overcoming problems encountered.

Another adjustment that was made for this cycle was the training period. The first meeting was held in August – with the expectation that side-grafting would be completed before the rainy season commenced.

This change was intended to keep humidity levels as stable as possible to help the growth of bud woods and increase the survival rate of the grafts.

PFT in Side-Grafting (Period: August 2004 – February 2005)

Location	Number of Demplots	Number of Participants		Total	Total Number of Bud Woods	Average Percentage of Surviving Graft					
		Male	Female			1 st Month	2 nd Month	3 rd Month	4 th Month	5 th Month	6 th Month
SS											
Polmas	15				5,923		54%	55%	52%	53%	54%
Pinrang	10				4,511	Grafting commenced	50%	58%	58%	56%	53%
Luwu	20				11,864		36%	35%	32%	36%	33%
North Luwu	20				11,179		53%	56%	55%	55%	58%
Total SS	65	1,615	335	1,950	33,477		48%	51%	49%	50%	49%

This collaborative effort continues to test high yielding and disease resistant new cocoa genotypes that can be disseminated to other cocoa farmers within Sulawesi.

In addition, the SUCCESS Alliance, ACDI/VOCA, and La Trobe University in Australia, agreed in mid-2004 to implement ACIAR funded initiatives to test and screen for resistant cocoa pests and diseases in Indonesia. La Trobe University and SUCCESS Alliance cooperated in their efforts to support local research to control CPB, along with plant diseases such as *Phytophthora palmivora* (black pod) and VSD in Southeast Sulawesi.

Additional genotype trials in South (two), Southeast (three) and Central Sulawesi (one), carried out in collaboration with ACIAR and Mars Inc. began in mid-2004. La Trobe University clonal research specialist, Peter MacMahon, funded by the ACIAR project, visited Indonesia in August 2004 to oversee the coordination and selection of genotypes for testing and multiplication through the second phase of SUCCESS Alliance PFT side-grafting and genotype trials in Southeast Sulawesi.

The first cycle was completed and was handed over to ACIAR and Mars Inc. in May 2004. A second series of six additional trials began in July 2004 with the start of PFT activities and was completed with handover to Mars Inc. in February 2005.

Chupon grafting

A TOT on chupon grafting was conducted in August 2004 in Noling, South Sulawesi in collaboration with the PRIMA project. The TOT was attended by SUCCESS Alliance field coordinators, field technicians, and farmer trainers from Central, South and Southeast Sulawesi, with thirty-six persons receiving training in this alternative graft method.

In September, the alumni from this TOT trained other farmer trainers in their same regions that were unable to be included in the initial TOT training. The technique was incorporated into the PFT side-grafting activity. The participants used their time to not only obtain a new understanding of alternative graft methods, but also to visit the ant research area and the seedling and cocoa collection center located in the PRIMA Project location.

PFT Side-Grafting Results

FFS Activity	Target Area	Target	Achievement
Training of trainers in side-grafting	Sulawesi	160 ¹³	89% (115)
	Bali (additional)	19 trainers trained	100%

¹³ As mentioned earlier in this section, the SUCCESS Alliance management reduced the number of TOT side-grafting participants from thirty to twenty trainees. An adjusted M&E plan, submitted in 2004, reflected the adjusted figures.

Participatory farmer trainings in side-grafting	Sulawesi	260 trainings 7,800 farmers trained (20% women)	100% 101% (7,878) 19% women
	Bali (additional)	15 trainings 450 farmers trained	100% 100%
Maintain and analyze clonal trials on different genotypes selected for testing by farmers	Sulawesi	10 local and non local varieties tested at PFT clonal trial sites	16 varieties studied Research conducted and handed over to Mars Inc.
Identify superior local genotype varieties for clonal side-grafting	Sulawesi	20 different genotypes researched and superior strains identified by 2006	Research handed over to Mars Inc. for analysis and action

As the side-grafting trainings took place in 2004/2005, and the side grafts require nine to twelve months to start to yield cocoa pods, there is no way to directly estimate the benefit in yield or income to the participating farmers. However, the common practice of side-grafting in long-established plantations in other places, particularly Malaysia, strongly indicates the effectiveness and profitability of using this technique for rejuvenating cocoa trees, and transferring the genotypes of the best-yielding trees throughout the garden.

The benefits of the uptake of side-grafting will be seen in the coming years as a significant proportion of root stock in existing gardens begins to age and yields will drop, unless side grafts are added.

With respect to the implementation of the trainings, a number of challenges with survival rates within the trial plots were found. Most of these were attributed to a less than ideal time of year to be carrying out the trials, not receiving all bud wood on time, and delays in the duration of the delivery time, thus decreasing the viability of the bud wood. In addition, a significant amount of the bud wood was infested with VSD and the young grafts were plagued by ants and fungal attacks as the use of pesticides and fungicides are not permitted under the SUCCESS Alliance/USAID agreement.

During the training, each participant was to side-graft ten trees with two to three bud woods for each tree. The total number of bud woods side-grafted by the participants in cycle one was 39,000.

On average, as shown in Table 1, the total percentage of grafts that survived to the last training session (six months later) was only twenty-nine percent [$\pm 11,300$ bud woods]. The graph below illustrates that survival of the grafts throughout the training cycle was poor.

It is believed that the decline was due to faulty timing – side-grafting activity was carried out during the rainy season, especially in the first and second months (November-December 2003) – when humidity was very high. Dull weather and humidity are not recommended for side-grafting. Side-grafted bud woods require dry weather.

Average survival rate of grafts – cycle 1

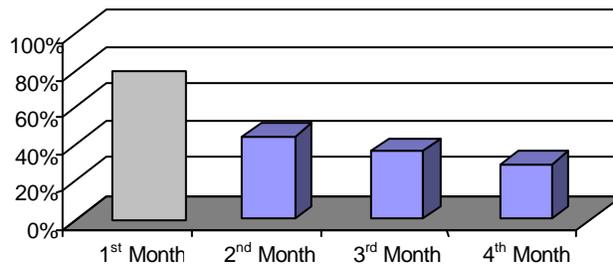


Figure 61: Side graft survival rate – cycle 1

Although the percentage of surviving grafts is relatively low, the enthusiasm of participants during the training was high.

In the second cycle, the average survival rate of grafts was considerably higher. Dry weather during the grafting period and greater familiarity of the method on the trainers' part all contributed to better survival.

Average survival rate of grafts – cycle 2

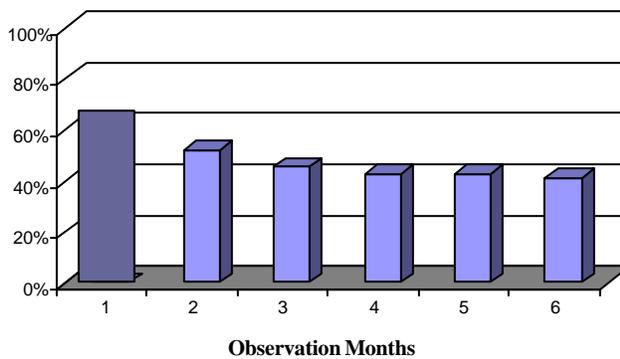


Figure 62: Side graft survival rate – cycle 2

From an initial survival of just over sixty percent, the final survival rate for grafts was thirty-eight percent six months post grafting.

The training in side-grafting proved extremely popular amongst farmers – most participants were suspicious at the beginning of the training, as the concept of cutting back all of the branches of the cocoa tree seems a drastic step, but once they observed the rapid grow-back of the grafts, they became very enthusiastic.

Farmers who have applied side-grafting

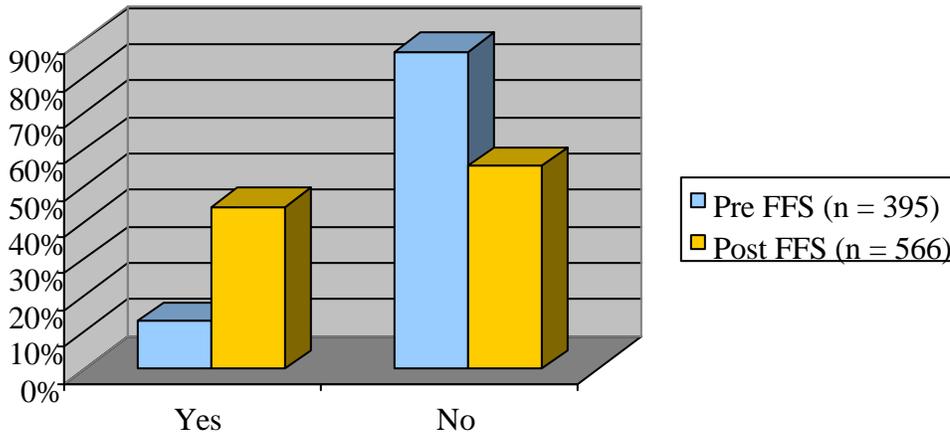


Figure 63: Application of side-grafting pre and post training

As can be seen above, the number of graduates of the FFS who were engaged in side-grafting within six months of the close of the field school more than trebled. Nearly half of farmers are now engaging in side-grafting. It is a difficult process with a survival rate of fifty percent, at best, however seventy-one percent of farmers consider it to be a beneficial activity, up from fifty-six percent before their training.

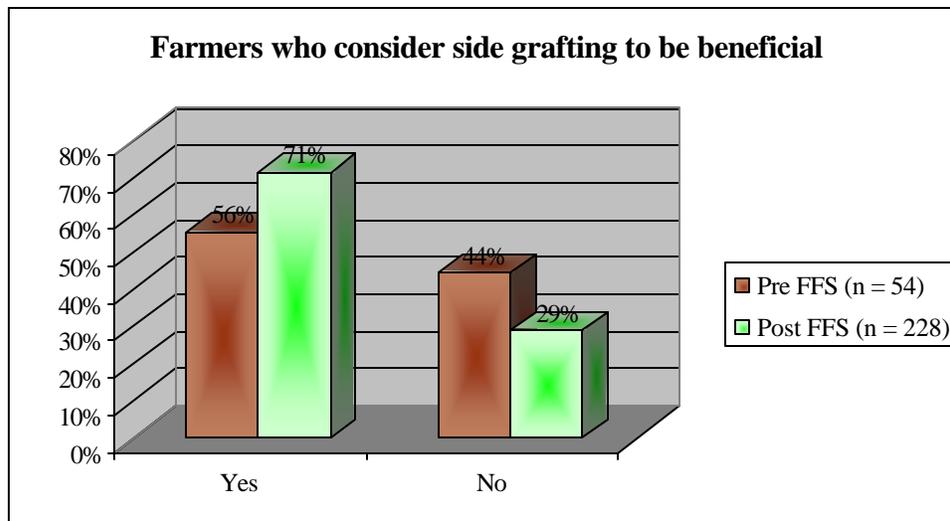


Figure 64: Perceived benefits of side-grafting

The number of side-grafted trees per garden has declined somewhat, however. As can be seen from the graph below, there has been a proportional increase in the number of farmers with one to fifty trees in their gardens that have been side-grafted.

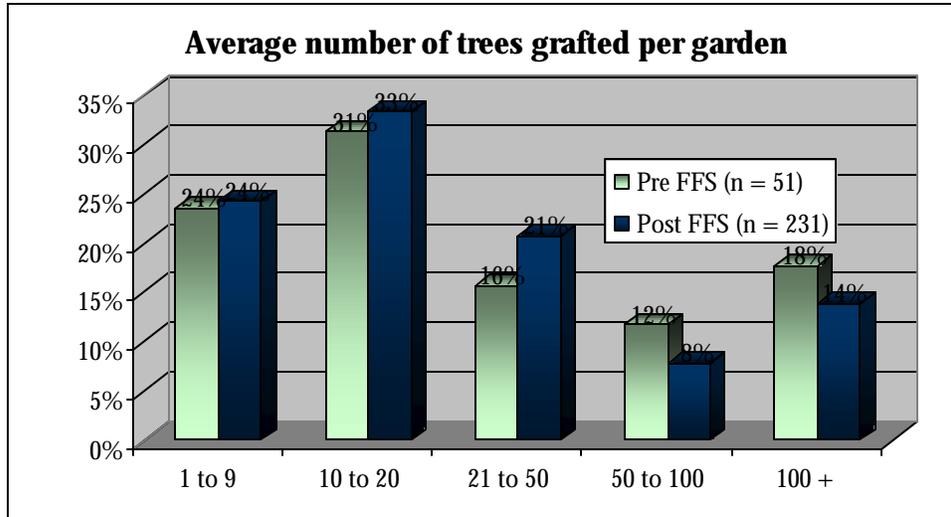


Figure 65: Quantity of side-grafted trees

This proportion is to be expected with many new farmers taking on side-grafting for the first time – farmers would not have the time to graft all of their trees in the time between the baseline and endline data gathering, and would be expected to stagger their grafting in order to have yielding trees at all times.

It is expected that the proportion of grafted trees will increase over the coming years among trained farmers.

The perceived benefits of side-grafting among farmers are clear. Whereas prior to training, most farmers – even those who practiced side-grafting – were unclear of the specific benefits of side-grafting, believing benefit lay in the pods produced, post training the majority of farmers understood that the purpose of side-grafting was to improve the genotype of the cocoa and rejuvenate the tree.

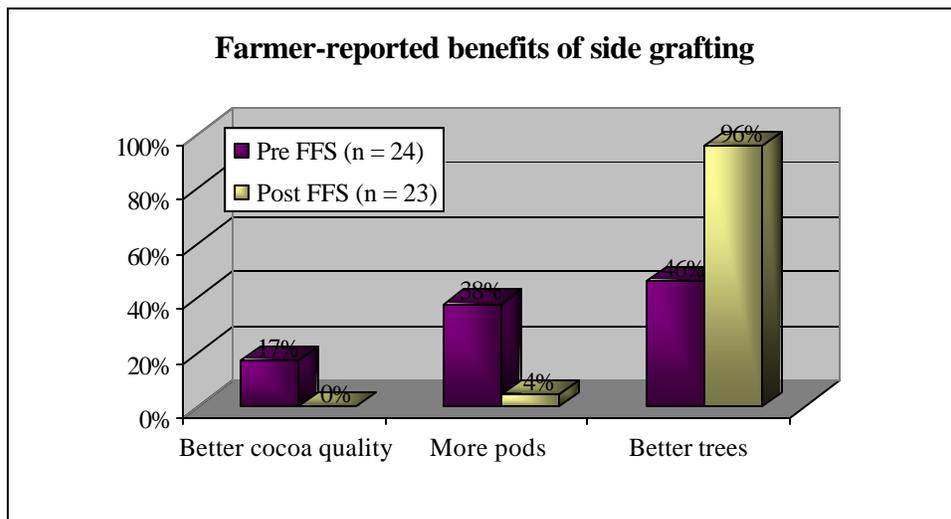


Figure 66: Perceived benefits of side-grafting

Conclusion

Side-grafting is a proven method of rejuvenating aging cocoa orchards, passing on advantageous traits of one tree to another, and indirectly reducing CPB and is a faster method of propagation of trees than growing from seedlings, as well as making trees easier to manage, thus facilitating PsPSP implementation.

Given the age of the majority of cocoa gardens in Sulawesi, either replanting from seedlings or side-grafting will be necessary if yields are to be maintained. Side-grafting offers a faster method of rejuvenation than planting.

Many of those farmers who have practiced side-grafting did so on the basis of experience gained (either first or second hand) working in plantations where it is commonly practiced, primarily in Malaysia.

Farmers without experience of the benefits of side-grafting were seen to be initially suspicious of the process, but enthusiasm was very high once the results of successful side-grafting were seen, and the FFS training has resulted in a substantial increase in the number of farmers practicing the technique. However, it is not an easy procedure, and even in a test setting, with well-trained experts doing the grafting, the survival rate is low.

The following factors contributed to the poor growth rate of side-grafted bud woods:

- **Initial trainings were conducted during the rainy season** – High humidity is one of several contributing factors that negatively affect the growth of grafted bud woods.
- **Colony of ants swarming the grafted bud wood spots** – This was also a result of high humidity. Pesticide would have eliminated this problem, but was not permitted during this project.
- **Large number of bud woods infected with VSD** – From the findings in several locations, it was obvious that the bud woods used had been infected by VSD before being grafted to the trees. A secure and sterile source of bud woods is a prerequisite of successful side-grafting – of course, farmers can always choose grafts from within their own orchard, which will contribute significantly to their chances of success, but the genotypes may not be the most advantageous. The problem of high infection rates of VSD in the bud wood was turned into a learning exercise by trainers, who took the opportunity to teach the farmers the signs of incipient VSD, an emerging problem in Sulawesi cocoa gardens.
- **Poor skill of participants** - Participants' skill in performing the grafting technique is important to success. This may include the way they perform the grafting, and the tools they use.

Recommendations

Based on the challenges encountered during side-graft training in cycle one, the following recommendations are made for future trainings:

- 1) It is advisable to carry out the activity/training at least one month before the rainy season. This is important to facilitate the growth of the newly grafted bud woods.
- 2) Attention must be paid to the quality of bud woods. Preferably the source of bud woods/nursery should be close to the training venue/farms.
- 3) Practices should be intensified to improve the skill of participants. In every monthly meeting, there should be an evaluation and discussion of problems/obstacles in side-grafting. It should be clear to the participants what caused the failure of bud wood growth – was it their skills or because of the disease-infected bud woods?
- 4) The demplots – where training practices take place – should be properly maintained and continuously monitored. By doing so, they function as excellent models for members of the cocoa community who wish to directly see the results of side-grafting activities.

8 Bio-controls

This section covers the activities conducted under Sub-objectives 1.2 and 2.1 – development of Integrated Pest Management (IPM) adjuncts to PsPSP, and sponsorship of local research at collaborating universities on IPM adjuncts and link with Alliance partners and international researchers.

In addition to the best-practice crop husbandry disseminated through PsPSP, SUCCESS Alliance also promoted pest control by using predators/bio-control agents. This is particularly relevant given the difficulty in controlling CPB with existing pesticides.

There are currently no pesticide regimes targeted effectively at CPB control. The life cycle of the insect: the larva living deep inside the cocoa pod; makes current pesticides substantially ineffective.

This method is not only effective in controlling pest propagation, but is also efficient from a *financial* perspective. The increasing pest pressure from CPB results in severe cocoa losses (thirty to eighty percent).

Most farmers attempt to control CPB by using intensive pesticide application, but the resulting improvement in yield often does not cover the cost of the pesticide. In addition, pesticides are less effective at high disease pressures and intensive pesticide use can lead to health/environmental issues. Existing pesticides are not effective and there are few new pesticides in the commercial pipeline.

The SUCCESS Alliance program sponsored research and trained farmers to control CPB through use of bio-control agents to ensure cost effective improvements in quantity and quality of cocoa pods.

It should be noted that this was not a stand-alone technique, but is best used in conjunction with good PsPSP-based husbandry as promulgated through the FFS.

Bio-Controls Background

Ants as bio-control

Black Ants

Black ants [*Delichoderus thoracicus*] are one of the biological agents that are known to control CPB through predation on the larva and eggs. Research has shown dramatic decreases in CPB infestation through use of black ant populations in cocoa gardens, in

addition to reductions in Black Pod fungus infestation¹⁴. The use of black ants as a bio-control was developed specifically as a technique for the control of CPB.

The black ant can typically be found in most cocoa gardens. There are four main elements to be considered when propagating *Delichoderus thoracicus*: environmental factors, other ant populations, mealybugs (*Cataenococcus hispidus*), and natural predators.

In general, farmers have a preference for black ants because of their natural and biological characteristics: they do not have a painful sting, and only attack when their colony is disturbed.

The propagation of black ants and mealybugs is relatively simple. Black ants feed on the honeydew produced by mealybugs, which contains glucose. Mealybugs feed on the sap of their host trees, which, again, contains glucose in great quantity. The production of honeydew by the mealybug attracts ants to the location and at the same time, *Cataenococcus hispidus* is also protected from its natural predators. It should be noted that the presence of *Cataenococcus hispidus* has not been shown to harm the cocoa pod.



Black ant tending *Cataenococcus hispidus* mealybugs

Competition with other types of ants, however, especially during the initial breeding phase, can limit establishment of the colony. Therefore, eradication of rival ants is a necessary measure that has to be done to ensure competitors do not expel the black ant colony.

Black ant colonies are attracted to cocoa trees through the use of coconut leaves and *arenga* palm sugar in a hollow length of bamboo. Research conducted in Malaysia shows that it costs twenty-two US dollars per hectare per year to propagate black ants for thirty

¹⁴ Dr. K.C. Khoo. 'Controlling cocoa pests in Southeast Asia with the Black Cocoa Ant,' 2001. (<http://www.oardc.ohio-state.edu/cocoa/ants.htm>)

months on seven hectares of land. Using pesticide alone to control CPB costs US\$192 per hectare per year.

Red Ants

The red weaver ant, *Oecophylla smaragdina*, is another species of ant that is found in Indonesia and predate on pests that affect the cocoa plant. The red ant, more commonly used as a bio-control for citrus plants, is an aggressive predator and possesses a more painful bite and sting than the black ant – it is therefore not as favored as a bio-control by farmers as the easier-handled black ant. Attraction and propagation of red ants is similar to that for black ants, though usually animal offal or bones are used as the primary attractant.



Other bio-controls

Nematodes

Nematodes in the families of *Steinernematidae* and *Heterorhabditidae* are of potential value as bio-control agents. They infect CPB eggs and larvae and can kill their host rapidly.¹⁵ They are also effective in reducing the damage caused by Cocoa Stem Borer (CSB).

- ♦ In field trials of nematodes on CPB by Hasanruddin University, Sulawesi, Rosmana *et al.* (1999; 2000) indicated that the nematode can reduce CPB damage by fifty to ninety percent depending on the time and frequency of application.

The nematode is produced on a sterile sponge and is applied to the target by using hand sprayers as commonly used in insecticide application – easily applied by farmers in both the dry and rainy seasons.¹⁶ It is motile, which means it can seek and kill the eggs, larvae and pupae.

Nematodes are also persistent – they can survive for two weeks on the cocoa pod surface in dry season, three weeks on cocoa pod surfaces in rainy season and up to six months on the trails left by CSB.

¹⁵ Klein, 1990, cited by Rosmana, A. (2003) 'Persistence and Penetration of Entomopathogenic Nematode *Steinernema carpocapse* on surface of cocoa pod and its infectivity to cocoa pod borer, *Conopomorpha cramerella* (lepidoptera: Gracillariidae).

¹⁶ Ade Rosmana. 'Persistence and Penetration of Entomopathogenic Nematode *Steinernema carpocapse* on surface of cocoa pod and its infectivity to cocoa pod borer, *Conopomorpha cramerella* (lepidoptera: Gracillariidae), 2003.

The major constraint in use of nematodes is the necessity for mass rearing which requires laboratory equipment and settings, not commercially available in Indonesia at present.

Biological Pesticides (Nabati)

Nabati 21 is a commercially produced natural fertilizer and pesticide that is formulated from processed and fermented plants. It can be used as a pesticide for CPB control or additionally sprayed on the leaves for a foliar fertiliser effect.

It is sprayed on the cocoa pods and ground surrounding the tree to kill eggs and larvae, and is used twice per month for maximum effect. The overall cost of the pesticide is considerably less than that of chemical-based pesticides, and has less of an environmental and health impact.

Trials of Nabati 21 are still ongoing in Indonesia, though it is commercially on sale to cocoa farmers.

Fungus (*Beauvaria bassiana*)

Beauvaria bassiana is an entomopathogenic fungus that can be used as a pathogen of CPB. It is most effective where the infestation rates of CPB are greater than twenty percent. When used in this level of infestation, it has been shown in field trials to reduce CPB levels by sixty percent or more.

Spraying a typical volume (approx 250 cc/tree) on a typical smallholding farm with low productivity (approx 600kg/ha) due to CPB, an additional 100kg of cocoa beans have been estimated to be saved. It can be grown on ground maize medium. Each kilogram of the culture can produce twenty-five to thirty grams of dry spores. The spores are mixed with an additive liquid to provide adhesion (usually corn starch solution) and the mix is sprayed on immature cocoa pods (to target eggs and larvae) and on the underside of leaves and horizontal branches (to target pupae and adults).

Regular application of *Beauvaria* has no effect on beneficial insects, such as black ants, mealybugs, spiders etc., although a laboratory study indicated that *Beauvaria* may kill the larvae and pupae of red ants (*Ocoephylla smaragdina*) at certain concentrations, but does not influence the adult.

Plastic Sleeves

The use of plastic sleeves on cocoa pods is an emerging method for the physical control of pests of cocoa. The plastic sleeves are placed over the young pod and protect it from insects – specifically CPB – who would otherwise lay eggs on the pod and infest it.

This method has been endorsed by DISBUN as it is simple to undertake using basic tools, cheap, effective in controlling the CPB, and has a lesser environmental impact than pesticides. Plastic sleeves have been made widely available from DISBUN offices.

The use of these sleeves may impact the life cycle of the CPB but it generates higher humidity conditions in the microenvironment surrounding the pod, thus improving

conditions for infection with fungus (*phytophthora* sp.) that causes black pod disease. In addition, the thousands of plastic bags necessary create an environmental and disposal problem¹⁷. Therefore, this method was not taught by the SUCCESS Alliance program, though research activities were undertaken by industry and academic partners and with the farmers themselves in the demplots that were used for training. Farmers were encouraged to experiment with all methods for reduction of CPB through the SUCCESS Alliance Program.

Baseline Analysis

The data that was used in this report is based on detailed surveys of farmers about to participate in the FFS, and again six months after they had participated. Information was sought on their household economy, their agricultural practices and their agricultural and agronomic knowledge.

Application of biological agents among Indonesian farmers has not been a common practice to date. Less than one percent of the surveyed farmers used any method of bio-controls (ants only). The only non pesticide-based control of pests among farmers was the limited use of ants and the use of smoke to attempt to kill or deter insects. A few farmers surveyed used plastic sleeving, but as the method was not comprehensively taught through the FFS, there was not a significant difference between base and endline results for this method. As the use of ants as a bio-control was taught through the FFS, this method comprises the bulk of the results.

Of the farmers participating in the SUCCESS Alliance program, prior to the FFS, less than twenty-five percent of them were aware that ants were a predator of the CPB. Of these, most believed that red ants were the primary predator species (sixteen percent of all surveyed farmers), closely followed by black ants.

A higher proportion of farmers (forty-four percent) viewed ants as beneficial for cocoa plants, through their predation on insects in general. However, many farmers (twenty-two percent) believed that ants were a pest that actually harmed cocoa plants, although most farmers put much greater significance on CPB (ninety percent) or rodents (eighty percent) as pests on their cocoa farms.

¹⁷ Research is currently being conducted on the use/effectiveness of biodegradable bags.

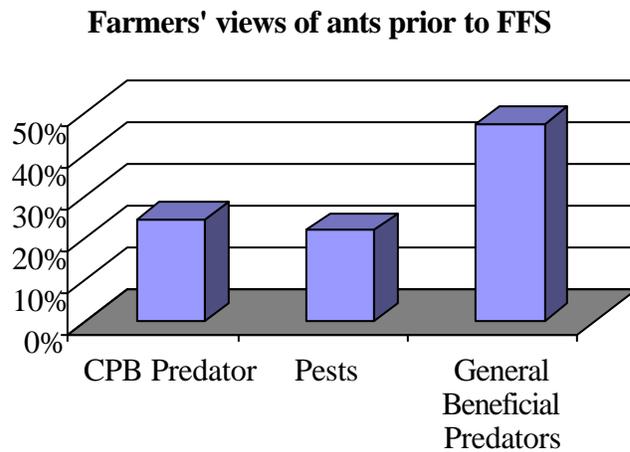


Figure 67: Farmers' views of ants

Farmers do have differing views on the significance of ant species. Most farmers believed that red ants are more effective than black ants or other species, possibly due to the aggressiveness of red ants.

Effectiveness of ant species on CPB predation (pre-FFS)

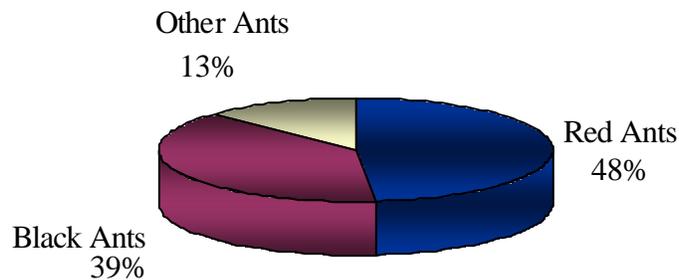


Figure 68: Farmer views on ant predation effectiveness

There was a reasonable general understanding of the potential benefits of bio-controls among farmers prior to commencing the FFS – forty-two percent of farmers believed that bio-controls could be effective in controlling CPB.

This, coupled with the high presence of ants on farmers' farms (eighty-seven percent), provides a good basis for the introduction of concepts of bio-controls, particularly related to ant-based control of CPB.

Presence of ant colonies on cocoa farms

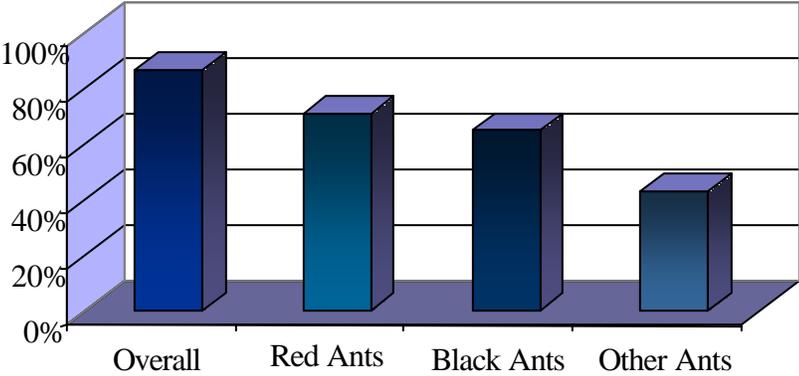


Figure 69: Presence of ant colonies on cocoa farms

Bio-control Activities

The following table summarizes the broad outputs for biological control activities in the SUCCESS Alliance program:

Biocontrol Technique	Target Area	Methodology	Timeline	Target
Black/Red Ants	Sulawesi	Bio-control workshop FFS Farmer-led research Communications University & industry research	2003 2003 – 2005 2003 – 2005 2004 – 2005 2004 – 2005 2004 – 2005	Local & international stakeholders 22,700 farmers through FFS 9 field trials (changed from 18 as per prog. modification) 70,000 farmers through VCD 300,000 farmers through media All stakeholders
	Papua (through Yalhimo & Wima Rawana)	FFS	2003 – 2005	1,400 farmers
	North Sumatra (through YPANSU)	FFS	2004 – 2005	3,500 farmers through FFS
	Bali (through DISBUN and SUCCESS trainers)	FFS	2004 – 2005	2,100 farmers through FFS
Nematode	Sulawesi	University & industry research	2003-2004	Field research conducted and report completed
		Bio-control workshop	2003	Local & international stakeholders
Nabati	Sulawesi	Industry research	2003	Field research results presented
		Bio-control workshop	2003	Local & international stakeholders
Beauvaria	Sulawesi	Industry research	2003	Field research results presented
		Bio-control workshop	2003	Local & international stakeholders
Plastic Sleeves	Sulawesi	University & Industry research	2003 – 2005	Industry stakeholders

Bio-control Workshop

With the goal of encouraging regional and international cocoa research collaboration, SUCCESS Alliance and its partners co-funded a bio-control workshop on June 16 and 17, 2003 and sponsored a field trip to the 'Pest Reduction Integrated Management' (PRIMA) training area on the 18th, 19th & 20th.

The Technical Brainstorming Meeting (TMB) brought together international biological control specialists as well as experts from local Indonesian NGOs, universities and

government departments. Each of the participants was recognized for their relevant knowledge concerning practical methods for controlling CPB using biological means.

The workshop concluded that the best and most promising bio-control for controlling CPB is the use of black cocoa ants, *Delichoderus thoracicus*. Other non-chemical controls to CPB that were to be tested in the PRIMA Project (funded by Mars Inc. and the Dutch Government) for validation included the botanical pesticide Nabati 21, the use of red ants (*Oecophylla smaragdina*), and sleeving pods with paper or plastic covers.

Additionally, efforts were to continue to focus on identifying and selecting cocoa varieties resistant to CPB and demonstrating high yield.

Participants included:

- ACDI/VOCA
- PRIMA
- Mars Inc. Europe
- Hasanuddin University, Makassar
- Koppert Biological Systems (Multinational producer of biocontrol solutions)
- Nutritech Solutions (International alternative fertilizer producer)
- Mars Inc. USA
- London Sumatra Indonesia PT (International Ag. Production and trading company)
- Dinas Perkebunan (Indonesian Government Estates Department)
- CAB International

This technical meeting stimulated ideas for applied research activities in Sulawesi and West Papua and provided an excellent opportunity for networking with Indonesian and international researchers and practitioners. Follow-up meetings were planned to discuss specific applied research activities in support of SUCCESS Alliance activities.

Farmer Field Schools

Bio-control was taught as a part of the IPM curriculum that was delivered to farmers over the three years of the SUCCESS Alliance program. In total 30,655 farmers have been directly trained in the FFS over the three years of the program.

From inception of the FFS, bio-control, specifically using red and black ants, was taught as a key part of the curriculum. The elements of IPM taught were:

- Tree height/canopy management through pruning
- Sanitation of pods and husks
- Complete, frequent and regular harvesting
- Bio-control through usage of ant species
- Agro-ecosystem analysis

Farmer-Led Research

In total, SUCCESS Alliance planned to conduct eighteen field trials of bio-controls, but this target was modified to nine to allow for additional training activities. Of the original trials with nine farmer groups in South, Southeast and Central Sulawesi, four trial areas successfully maintained colonies of black ants and were supported until September 2004.

In addition, bio-control trials were conducted in August 2004 in four villages in Papua province. This activity involved monitoring of the effects of *Bauvaria bassiana*, which was sprayed in several cocoa gardens by personnel of the Manokwari Estate Crops Service's KIMBUN program. Farmers collected CPB larvae as they emerged from the cocoa pods overnight and made cocoons. Cocoons were stored in plastic containers so that the farmers could observe for themselves the effects of this biological agent.

In addition, in order to assess the impact of *Bauvaria* on other pests (*Heliopeltis*) and natural enemies of the CPB, insect zoos – small mesh enclosures – were established around such insects in several cocoa trees and these were directly sprayed with the biological agent. The findings from these activities were discussed in further PLCF meetings for farmers to decide for themselves whether or not it would be worth conducting further trials on this or similar biological control agents.

Farmer led research, university collaboration and field observations in Sulawesi and Papua greatly assisted in helping farmer trainers, facilitators and farmers themselves to better understand the concepts and effectiveness of bio-controls (e.g., insects, fungi and other pathogens), which due to the largely invisible dispersion mechanisms are often extremely difficult for most farmers to properly comprehend without such participation and integration with research.

Communications Initiative

The 2005 CI leveraged exporter relationships, trader networks, and government extension services to send CPB-control messages and other information through the Sulawesi supply chain. A collaborative approach with industry was used to develop informational materials and create messages geared specifically towards cocoa quality improvement.

Information on basic bio-control activities (use of black ants) were included as part of the communications package that was developed and disseminated throughout 2005 to over 270,000 farmers.

University & Industry Research

Ade Rosmana of Hasanuddin University (Makassar) and Pudji Sulaksono of Tadulako University Palu collaborated closely with SUCCESS Alliance staff on the farmer led research component of the program. Both Universities provided direct input to research methodologies and collaborated directly with the participating SUCCESS Alliance farmer groups so that all data collected could be fed into current research programs.

In April 2003, SUCCESS Alliance Team Leader and the ACDI/VOCA Country Representative met with Department Head, Dr. Sylvia Sjam at Hasanuddin University, Department of Plant, Pest and Diseases, to sign a Memorandum of Understanding between the two organizations. The Memorandum of Understanding supported ongoing collaboration and research linkages between Hasanuddin University and SUCCESS Alliance partners on bio-control and genotype research on cocoa and trial studies.

Black ant research was undertaken in 2003 by Dr. Meldy Hosang at STORMA (Stability of Rainforest Margins in Indonesia), Tadulako University, Palu, who conducted ant trials in Central Sulawesi. The main objective of this research was to evaluate the effects of ant communities on cocoa pests and diseases in Central Sulawesi. This trial was funded by WCF. A final report was prepared and submitted to WCF and SUCCESS Alliance at the end of 2003.

Nematode and ant research was carried out by Ade Rosmana of Hasanuddin University, Makassar and completed mid 2004. This research was also funded by WCF.

Bio-controls Results

The table below summarizes the output results of the bio-control program with reference to program targets.

Bio-control Technique	Target Area	Target	Achievement
Black/Red Ants	Sulawesi	Local & international stakeholders 22,700 farmers through FFS 9 field trials (changed from 18 as per prog. modification) 70,000 farmers through VCD 300,000 farmers through media All stakeholders	All stakeholders reached 23,313 farmers taught through FFS All conducted, 4 detailed trials conducted (99%) 69,439 100%
	Papua (through Yalhimo & Wima Rawana)	1,400 farmers	119% 1,664 farmers taught through PLCF
	North Sumatra (through YPANSU)	3,500 farmers through FFS	100%
	Bali	2,100 farmers through FFS	100%
Nematode	Sulawesi	Field research conducted and report completed Local & international stakeholders	Report completed and presented
Nabati	Sulawesi	Field research results presented Local & international stakeholders	Report presented at bio-control conference 2003
Beauvaria	Sulawesi	Field research results presented	22 trials undertaken.

		Local & international stakeholders	
Plastic Sleeves	Sulawesi	Industry stakeholders	Research underway

Bio-control Workshop

The results of the bio-control workshop, which was held in June 2003, were mainly centered on the dissemination of different activities for IPM and bio-controls. Key industry and academic practices were presented and analyzed.

As a result of the workshop, it was clear that the use of ants as a bio-control was one of the simplest and most economical methods to implement, and had been proven to be effective in a number of settings.

SUCCESS Alliance therefore included a component of ant-based bio-control in the FFS curriculum (see below). Further research by partner farmers, industry and academia was planned to assess the effectiveness of use of ants in an Indonesian field context.

FFS

Bio-controls (ants) were added to the curriculum early in the project as research and farmer trials showed these controls to be inexpensive and effective. A specific module of the FFS curriculum was on ant control, with the objectives:

- Participants understand and can identify the impact of black ants on CPB
- Participants understand the procedures for propagation of black ants using locally available materials.



Farmers studying Black Ant nests in a cocoa tree



Bamboo black ant nest

Data from the field school attendees was gathered before the FFS took place, and six months after participants had graduated from the schools. The results of the data show strong changes in farmers' opinions regarding ants and their usefulness.

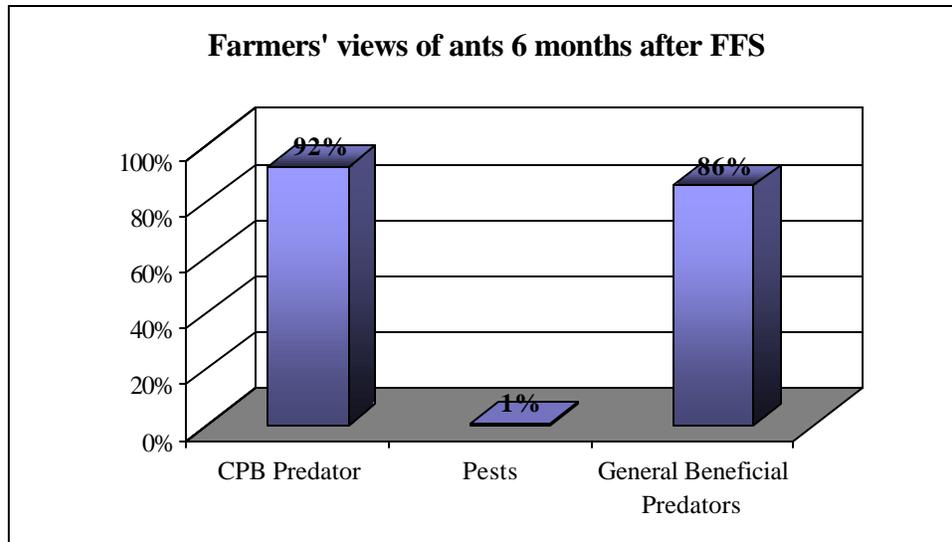


Figure 70: Farmer views of ants post FFS

As can be seen, only one percent of farmers considered ants as pests – compared to twenty-two percent of farmers before they attended the field schools.

The majority of farmers – eighty-six percent – considered ants to be generally beneficial to their cocoa farms (from forty-seven percent pre FFS) and ninety-two percent of farmers were aware of the specific benefits of ants on the CPB, up from twenty-four percent before their training.

Strong results were also seen with respect to farmers' perceptions of the effectiveness of bio-controls in reducing the levels of CPB on their farms – before the FFS twenty-one percent of farmers believed that bio-controls such as ants, parasites, or sleeving had any impact, but post FFS seventy-two percent of them believed that bio-controls provided an effective response to CPB.

Farmers who believe biocontrols are effective against CPB

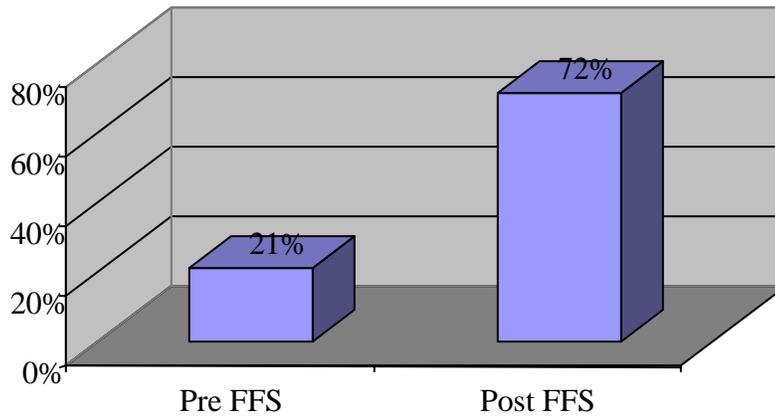


Figure 71: Belief in bio-controls as a CPB control

The results of the FFS certainly showed good uptake of the course material, but of greater importance is the application of the material to the everyday activities of farmers.

Prior to the FFS, the amount of farmers who used some kind of bio-control was negligible – less than one percent used ants, and a small number of other farmers used smoke from leaf litter or burning rubber to try and limit the damage by pests to the cocoa plants.

The total proportion of farmers who used some form of non pesticide-based control was three percent.

Post FFS, however, twenty-seven percent of farmers had taken up the use of ants as a predator to CPB and other pests of the cocoa plant. Farmers valued the ants not just for their predation on CPB, but also on larvae and caterpillars that consumed leaves.

Uptake of biocontrols by FFS farmers

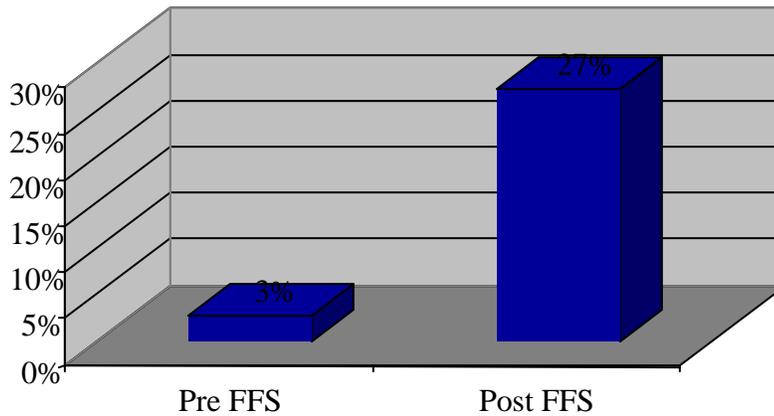


Figure 72: Uptake of bio-control by farmers

Despite the increased uptake, however, the use of ants as a bio-control was still not proven for the majority of farmers – only four percent ranked natural predators in their top four methods of controlling pests. Pesticides, the use of other IPM methods such as pruning, sanitation, and frequent harvesting were still viewed as more effective in reducing pest populations.

The change in attitudes to ants and their increased usage as a natural control for pests also resulted in a small increase in the number of gardens with ant populations – there was an increase in the range of ant types per garden – more varieties were found in each garden.

Proportions of ants in FFS farmer gardens

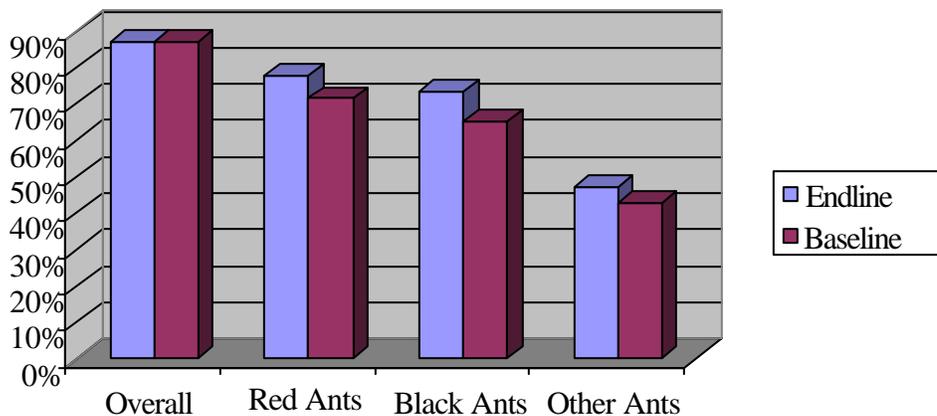


Figure 73: Ant populations in FFS alumni gardens

This may be a result of farmers’ improved attitudes to ants, using them as beneficial tools rather than considering them as, at best, inconsequential, or at worst, pests in their own

right. It is also possible that farmers simply are taking more notice of the ant species that colonize their gardens due to the training they have received.

Farmer-Led Research

Sulawesi

The results of many surveys in different parts of the world have shown the benefits of bio-controls, particularly ants, and the bio-control workshop of 2003 was an opportunity to review many of these benefits. As a result of the proven efficacy of use of beneficial predators, the SUCCESS Alliance included black ant propagation in the FFS curriculum.

In addition, as part of the program plans, farmer-led research into the effectiveness of black ants in the field was undertaken in Sulawesi. This research could be used as an *in vivo* demonstration to farmers participating in the SUCCESS Alliance program of the effectiveness of predatory species on CPB infestation, and also provide additional evidence of the utility of black ants in an Indonesian context.

Farmer led research on black ants took place with nine farmer groups in South, Southeast and Central Sulawesi. Results were mixed as protecting the black ant from predators was more difficult than expected. However, four groups showed positive outcomes and were sponsored for a further six months to continue their research.

This report outlines the impact of use of black ants on CPB infestation through comparison of two demplots. The control plot undertook the PsPSP crop husbandry method only while the experimental plot undertook PsPSP plus black ants as a pest control.

Baseline Status of the Demplots

The FFS alumni group “Bangkit,” located in Southeast Sulawesi, together with the owner who had volunteered his garden, Mr. Akis, chose the specific location of the plots. Initially both plots were sanitized thoroughly. One plot was then to receive the PsPSP method of garden management – this was to act as the control, and the other plot was managed using PsPSP methods and ants. No pesticide application was involved in sanitizing the gardens. The research took place from April 5, 2004 to June 6, 2005; a period of thirteen months.

Quantity – Number of pods harvested

The use of PsPSP had a very definite positive impact on the number of pods harvested by the farmers in the demplots – both plots showed a significant increasing trend in harvest numbers, even when seasonal variation was taken into account.

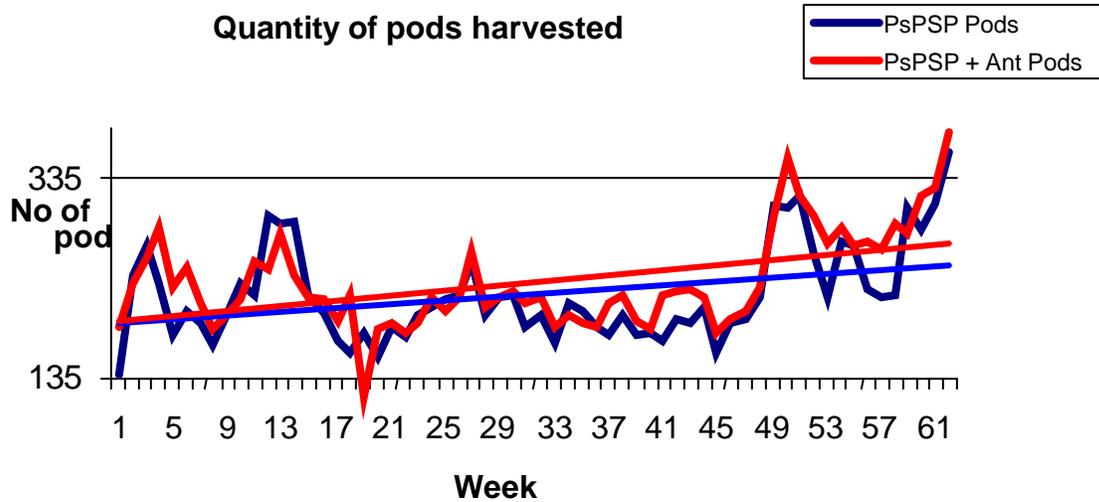


Figure 74: Bio-control impact on pod harvest

It can be seen from the trend lines of the graph above that there was a clear divergence in the quantity of pods being harvested, with the plot using black ants as well as PsPSP management practices giving a greater harvest on average – it is expected that continued use of black ants as a natural bio-control would result in more significant gains over time.

Quality - Pod Count¹⁸ and Clean Pod Count¹⁹

It can be seen from the results that pod yields from both demplots are nearly the same. Both plots resulted in heavier (i.e. healthier) pods over the course of the thirteen months of the trial, indicating that the use of PsPSP in itself contributes to improvements in yield.

There are slightly fewer pods per kg from the test plot (PsPSP plus ants) than those harvested from the control plot (PsPSP only). This indicates a small but significant improvement on the plot using PsPSP and ants as a management tool.

¹⁸ Pod count is the number of pods/kg obtained from the result of random calculation of a hundred pods.

¹⁹ Clean pod count is the number of pods/kg acquired from the result of calculating fifty healthy pods. This figure shows the number of pods/kg if they are healthy and are not infested by pest.

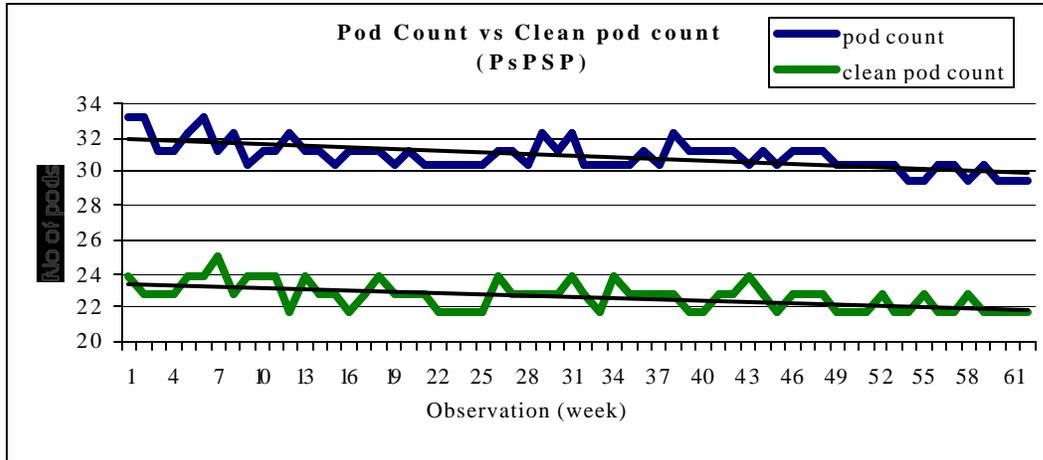


Figure 75: Pod count vs. clean pod count for PsPSP only

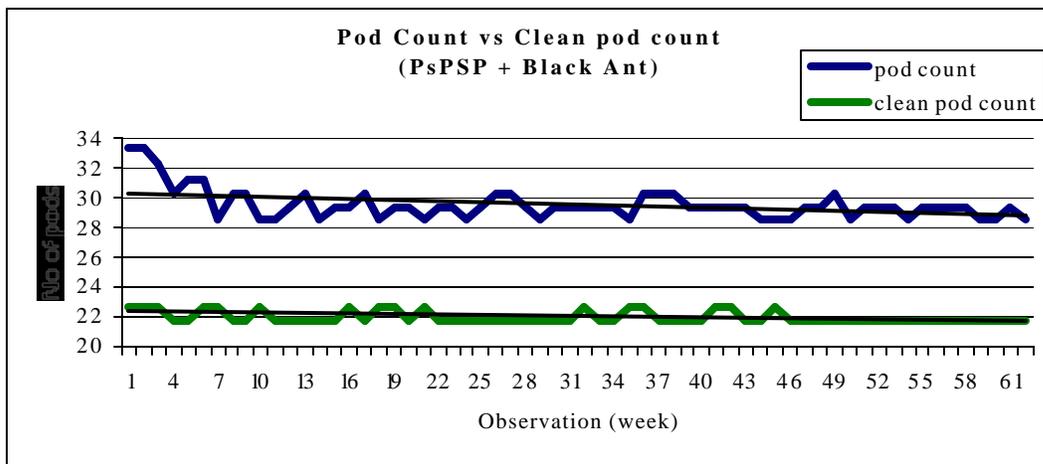


Figure 76: Pod count vs. clean pod count for PsPSP and ants

The trend also applies to a *clean pod count*. The test plot chart tends towards flatness, indicating that the physical condition of healthy pods deriving from the test plot is not deteriorating, and over time, the two lines would converge, as a greater proportion of pods in the total harvest approach the ‘ideal’ (uninfected) pod.

Losses

The degree of losses resulted from CPB infestation, as shown by the following two charts, is considerably lower than the average losses incurred by farmers at this time. This indicates that a well-implemented PsPSP method will reduce the loss caused by CPB infestation. In combination with an additional treatment method the level of loss can be reduced further.

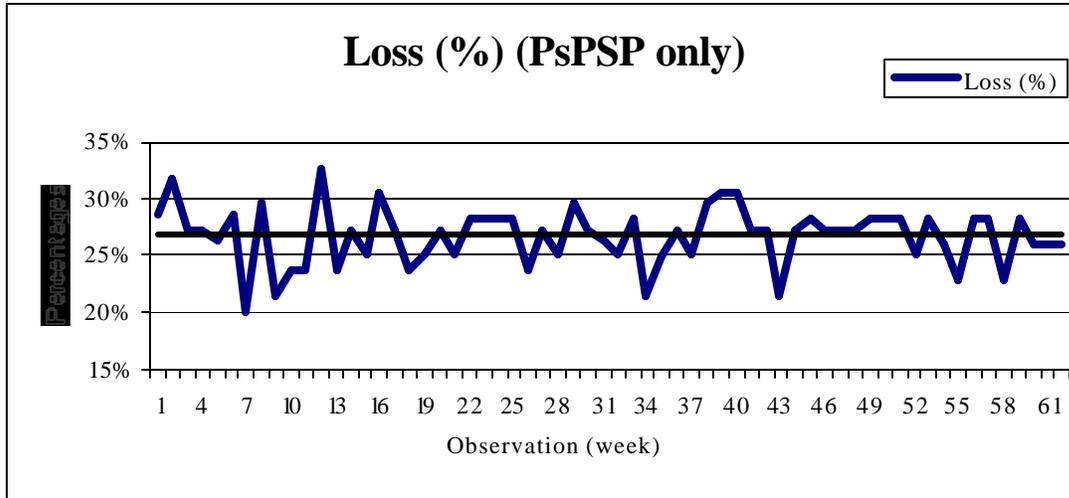


Figure 77: Losses in the PsPSP plot

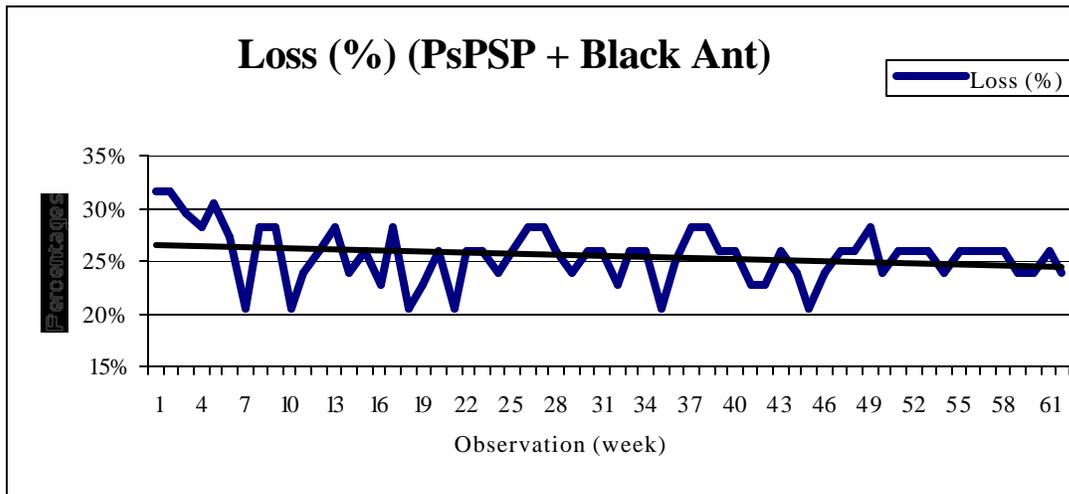


Figure 78: Losses in the PsPSP + Ant plot

Losses from the control plot were approximately twenty-eight percent at the beginning of the study, while those in the test plot were thirty-two percent. Over the duration of the study, losses in both plots reduced as a result of good management practices. However, the percentage loss in the control plot at the end of the study was just over twenty-five percent, while that of the test plot was twenty-four percent, indicating that the combination of PsPSP and black ants could reduce losses further.

West Papua

In August 2004, a bio-control trial was conducted in four villages in Oransbari District in conjunction with the KIMBUN Program. This activity involved monitoring of the effects of the biological (fungal) control agent *Beauveria Bassiana* which was sprayed in several cocoa gardens by personnel of the KIMBUN Program.

Farmers collected CPB larvae as they emerged from the cocoa pods overnight and made cocoons. Cocoons were stored in plastic containers so that the farmers can observe for themselves the effects of this biological agent. Also in order to assess the impact of *Beauvaria Bassiana* on other pests (*Heliopeltis*) and natural enemies of the CPB (insect zoos - small mesh enclosures) were established around such insects in several cocoa trees and these were directly sprayed with the biological agent. The findings from these activities were discussed in further PLCF meetings before farmers decided for themselves whether or not it was worth conducting further trials on this or similar biological control agents.

Farmer led research, university collaboration and field observations in Sulawesi, Bali and West Papua will greatly assist in helping farmer trainers, facilitators and farmers themselves to better understand the concepts and effectiveness of bio-controls (e.g., insects, fungi and other pathogens), which due to the largely invisible dispersion mechanisms are often extremely difficult for most farmers to properly comprehend without such participation and integration with research.

Bali

In early 2005, the Bali SUCCESS team worked with local researchers to look at the efficacy of *Beauvaria Bassiana* in controlling CPB and other problems afflicting cocoa gardens. Demonstrations and trainings were done in twenty-two demplots for all participating farmers. No follow on activities were planned for further use of Beauvaria.

University & Industry Research

The initial target for research activities by academia and industry for the SUCCESS Alliance program was four discrete activities. However, only three activities were conducted as no other research proposals were put forward that were of potential interest to the SUCCESS Alliance members. The three research activities conducted were in relation to natural predators of the CPB and other pests: black ants and nematodes.

The key findings of the research were:

i. Ant research (Dr. Meldy Hosang, STORMA, Tadulako University, Palu, Sulawesi – funded by WCF)

- Different dominant ant species have different effects on the abundance of pests and diseases damaging the pods as well as on leaf damage caused by herbivores;
- While pod damage caused by CPB and the productivity of trees did not differ significantly between the dominant ants, pod damage caused by *Heliopeltis* pest was lessened by Cocktail Ants (*Crematogaster* sp) and Red Ants (*Oecophylla* sp.), but not to the same extent by the Meat Ant (*Iridomyrmex* sp.);
- No significant differences between dominant ants were found with respect to the abundance of pods infected by *Phytophthora*;
- The most prominent difference between dominant ants could be found for how effectively they can act against leaf herbivores. Leaf damage was significantly

lower in trees colonized by Red Ants compared to trees dominated by Black Ants (*Delichoderus*) and Meat Ants;

- The distribution patterns of dominant ants proved to be relatively stable. Artificial colonization by the Black Ant can result in significant and stable expansion of populations in cocoa plantations. This is an important consideration for farmers considering the use of ants to help control cocoa pests.

ii. Nematode research (Ade Rosmana, Department of Plant Protection, Hasanuddin University, Makassar – funded by WCF):

- Between fifty and ninety percent of CPB damage can be prevented by application of nematodes depending on the time and frequency of application;
- Nematodes can survive well on the cocoa pod surface, kill the CPB eggs, penetrate inside the pod, and persist inside the pod to kill the larva and can also kill the pupa. Their persistence on the surface of the pod is up to two weeks in the dry season and up to three weeks in the rainy season in Sulawesi;
- Persistence is longer in rainy season than in dry season, correlated to the higher moisture and humidity during the rainy season;
- The application of nematode three times over two months showed significant effect compared with one and two times application;
- Preparation of nematodes suitable for use in a commercial farming context was, however, a significant constraint in Sulawesi at the time of research.

iii. Ant habitat and dietary research (Ade Rosmana, Department of Plant Protection, Hasanuddin University, Makassar – funded by WCF):

- The optimum foodstuff for attracting Black ants is sugar or cow fat.
- Red ants are more attracted by cow fat and/or chicken offal.
- While Black ants are largely self-sustaining, Red ants perform better when provided with food.

The results of the research conducted illustrated two possible methods of biological control of cocoa pests. Because of the ease of application, low cost and proven effectiveness, the SUCCESS Alliance adopted ant bio-control methods as part of the FFS curriculum (and later the CI) to be taught to all participating farmers.

Conclusions

- The use of various species of predatory and scavenging ants as a biological control of various pest species that affect the cocoa plant (primarily CPB, but also *Heliopeltis* and CSB) has been demonstrated through academic research and also through the field activities of SUCCESS Alliance participating farmers. The *efficacy* of ant bio-controls has long been proven, but the *effectiveness* of the methods in a field setting such as Sulawesi has now been shown.

- Early adoption of bio-control methods into the farmer training curricula, coupled with the use of demonstration plots to show impact of ants on yields has resulted in a significant uptake of these methods among farmers.
- The use of ants as a bio-control will contribute to a reduction in the use of pesticides among farmers, which results in a financial saving as well as environmental and health benefits – farmers in Sulawesi typically use far too much pesticide in a largely ineffective attempt to reduce CPB infestation (the larvae of which are not greatly affected by externally applied pesticides).
- The importance of co-species is also of great importance. The propagation of the Mealybug which provides the Black Ant with food requires consideration in future activities.
- Despite the increased uptake of ants as a bio-control by farmers, their effectiveness is still unproven for the majority of farmers – ingrained belief systems are difficult to change. Pesticides, pruning, sanitation, and frequent harvesting were still viewed as more effective in reducing pest populations. This is not an incorrect view, but the short time period over which the impact was measured (six months after the FFS) also militated against seeing the full potential impact of bio-control methods. These methods are also only an adjunct to other best practices such as PsPSP as taught through the FFS. With more time, allowing ant colonies to spread and establish themselves across gardens, the impact of ants will be greater and more obvious.

9 Trader Training

Buyers, traders and producers were supported in the third year of the program (2005) to build relationships in order to relate production technique improvements to quality, pricing and market demand. Through seven exporter-trader-farmer seminars in four provinces, participants in various cocoa supply chains shared information on purchasing systems; set up direct marketing linkages; and shared knowledge in business management, marketing, and cost control.

Of particular note are the BSC seminars which were launched through the initiative of the industry partners as an effort to strengthen the trading network maintained by PT Mitra Celebes, Continaf's Sulawesi subsidiary, in order to increase sales of good quality cocoa to Blommer. By the end of 2005, Blommer was reporting a high level of satisfaction with the cocoa it was receiving from Sulawesi and credited the education of traders and the strengthening of Continaf's supply chain linkages with SUCCESS alumni farmers.

The seminars were conducted concurrently with the distribution of communication materials through exporter/trader networks and provided an effective medium for introducing the communication program. For more details, see the Farmer Organization section of this report.

Collaboration with Industry

Buying Contracts

A significant portion of the counterpart contribution for SUCCESS Alliance was made up of cocoa buying contracts. Mars Inc., Hershey, ADM, and PT Effem track their cocoa purchases from Sulawesi and reported on them to ACDI/VOCA on a quarterly basis.

PT Effem, the Asian subsidiary of Mars Inc., worked closely with ACDI/VOCA to purchase cocoa beans produced by SUCCESS alumni. PT Effem built up-country buying stations in two locations so that they can purchase beans more directly from farmers and small collectors. This benefits PT Effem because they can ensure that they will receive a more consistent and higher-quality product, and it benefits farmers because they receive a higher price for their beans.

PT Effem worked with ACDI/VOCA to create direct linkages and relationships with SUCCESS alumni and to purchase their beans at the up-country stations. PT Effem tracked and reported to ACDI/VOCA on the amount of cocoa beans purchased from SUCCESS alumni and on the outreach efforts that PT Effem staff undertook to build marketing relationships with the alumni.

The target for the SUCCESS Alliance program industry contributions in buying contracts, cash and in-kind was US\$30,808,000. A summary of these per year over the

duration of the program is given below. As can be seen, the level of industry contributions exceeded the target.

Industry Contributions	Year 1	Year 2	Year 3²⁰	Total
Consultancies	\$72,316	\$40,312	\$34,955	\$147,583
Cash	\$21,200	\$0	\$3,500	\$24,700
Cocoa Contracts	\$28,150,000	\$82,153,714	\$75,674,298	\$185,978,012
Conferences/Training	\$27,000	\$0	\$0	\$27,000
Lab Work	\$28,727	\$10,850	\$0	\$39,577
Local Partner Contributions	\$0	\$20,166	\$0	\$20,166
Total	\$28,299,243	\$82,225,042	\$75,712,753	\$186,237,038

²⁰ Also includes first quarter of FY06

10 Conferences

A number of regional conferences were held during the SUCCESS Alliance program. It was intended that three regional SUCCESS Alliance conferences be held, showcasing the achievements of the SUCCESS Alliance and boosting the profile of Indonesian cocoa. The SUCCESS Indonesia program was to host one conference in Makassar in 2004 and attended two conferences in the Philippines and Vietnam.

In addition to the program sponsored conferences, SUCCESS staff participated in a number of international and regional conferences in order to present program reports, update their knowledge of on-going research and to participate in industry problem solving.

1. International Cocoa Research Conference, October 2003, Accra, Ghana

The Cocoa Farming Systems Analyst (CFSA), Rebecca Branford-Bowd, attended the 14th International Cocoa Research Conference in Accra, Ghana. She presented a paper entitled '*The SUCCESS Project: A Model for the Transfer and Efficient Utilization of Results from Cocoa Research.*'

The paper was well received and served as a catalyst for much constructive discussion on how the SUCCESS Alliance integrated strategy and methods could be replicated/adapted to situations in other cocoa producing countries.

2. Bio-control Workshop, June 2003

On June 16 and 17, 2003 SUCCESS Alliance and its partners co-funded a bio-control workshop and sponsored a field trip to the PRIMA training area on the 18th, 19th & 20th. The Technical Brainstorming Meeting (TMB) brought together international biological control specialists as well as experts from local Indonesian NGOs, universities and government departments.

Each of the participants was recognized for their relevant knowledge concerning practical methods for controlling CPB using biological means. The workshop concluded that the best and most promising bio-control for controlling CPB is the use of black cocoa ants, *Dolichoderus thoracicus*. The outcomes of the conference are discussed in the section on bio-control.

3. SUCCESS Alliance First Annual Regional Conference October, 2004, Makassar, Indonesia

SUCCESS Alliance-Indonesia hosted its planned Regional Conference, called 'Building a Sweeter Future for Farmers', in Makassar. The conference brought together representatives from the world cocoa industry, DISBUN and government officials,

donors, international NGOs, SUCCESS Alliance staff from Washington, Indonesia, Vietnam and the Philippines and cocoa farmers from Vietnam, Philippines and Indonesia to share knowledge, approaches, and experience concerning sustainable farmer training. The delegates had an opportunity to discuss farmer training best practices on problems like CPB, cocoa quality and research. In addition, farmers addressed the conference on their experiences with farmer organization development, and the contribution farmer groups make to improved cocoa farming.

Industry turnout was very high. Teams from Mars Inc., WCF, Cargill, Olam, Continaf and PT Effem contributed to the success of the conference by participating in discussions, breakout sessions, giving presentations, supplying data, donating merchandise and sponsoring events such as the opening dinner and a closing cocktail party.

4. Malaysian Cocoa Board International Cocoa Conference, July 2005, Kuala Lumpur, Malaysia.

From July 18-19, 2005 SUCCESS Alliance team members attended the Malaysian Cocoa Board's International Cocoa Conference where a poster presentation summarizing program activities and accomplishments was presented.

5. SUCCESS Alliance Second Annual Regional Conference, July 2005 Puerto Princessa, Philippines.

A contingent of SUCCESS team members, farmer facilitators and farmer representatives participated in the SUCCESS Alliance Second Annual Regional Conference in Puerto Princessa, Philippines called, "Growth & Competitiveness: Success for Sustainable Cocoa Production".

The conference included representatives from Indonesia, Vietnam, Philippines and Ecuador SUCCESS programs, cocoa industry partners, research scientists and members of the donor community and focused on experience sharing among the assembled programs and cocoa experts. Indonesia team members gave presentations on the SUCCESS program; participating farmer experience and the FaaB training program.

6. SUCCESS Alliance Indonesia Closeout Meeting, December 2005, Makassar, Indonesia

On December 6th, a one day meeting was held to formally closeout the SUCCESS Alliance program in Indonesia. The workshop was split into three sessions. The first session of the meeting was dedicated to sharing and discussing the activities and achievements of the SUCCESS Alliance Indonesia program. The second utilized three parallel breakout groups to serve as forums for the participants to share their experiences and expertise with other members of the cocoa industry. Facilitating these breakout sessions were representatives from the exporters and traders, the research community, the donor community, implementing NGOs and SUCCESS. They assisted in eliciting the group's informed opinions on the subjects of 1) best practice for cocoa garden

management, 2) best practice for dissemination of information to farmers and 3) the limiting factors surrounding the declining quality of Indonesian cocoa and viable steps to be followed in the future to address these problems. During the third and final session of the meeting, the results of the breakout sessions were presented to the larger group and opened up for further discussion.

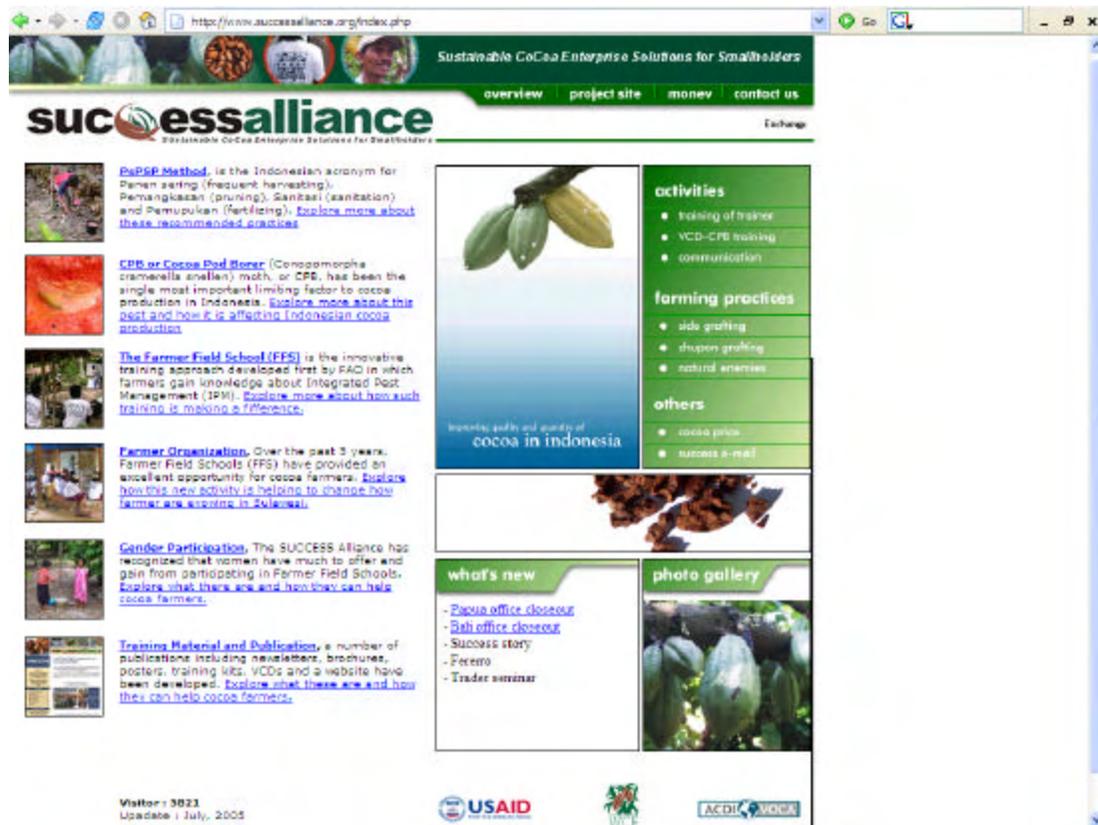
The conference was attended by over 160 participants including SUCCESS Alliance partners WCF and Mars Inc.; SUCCESS alumni farmers, representatives from DISBUN from each of the districts in which SUCCESS has worked, Makassar based industry, ASKINDO, researchers from Makassar (Hasanuddin University), Bogor (Jember) and Australia; other Sulawesi cocoa programs (PRIMA and Cocoa Village Model); donors (IFC-Pensa); implementing partner NGOs including Yalhimo and UNGKAP from Papua, YPANSU from North Sumatra and CARE (carrying out program in Poso) as well as the entire SUCCESS Alliance staff who are now taking on the role of independent service providers.

The meeting was a chance for the entire industry from primary producer to exporter and end product producer to engage in an open dialogue about issues that are affecting the entire industry. With over thirty farmers attending the meeting, this was a significant opportunity for the farmer voice to be heard.

11 Website, Newsletters and Cocoa Library

SUCCESS Alliance Website

As part of the SUCCESS Alliance Program objectives, a website was designed and hosted in order to showcase the program and its activities. The website was set up in early 2004 and was updated on a quarterly basis. ACDI/VOCA plans to keep the website in operation and expand it to cover global cocoa programs for the foreseeable future.



Newsletters

ACDI/VOCA developed a quarterly newsletter that was targeted at its farmer participants. The newsletter was initiated under the SUCCESS Project and continued under the SUCCESS Alliance program, providing its readers with information on cocoa production methodologies, pest control, other cocoa pests and diseases, price information, post harvest techniques, quality issues, farmers' experiences as individuals or within groups and always included some wise words from Pak Koko. A total of sixteen editions were produced over the five years from 2001 to 2005. The Newsletter was received by farmers participating in SUCCESS programming. While aimed at farmers, it was also delivered to all SUCCESS stakeholders including members of the cocoa industry, research community and government bodies.

Cocoa Library

ACDI/VOCA undertook to gather all reports, papers and related documents that came from the regional SUCCESS Alliance program and any other relevant work that was provided by industry or other organizations into one location that could be accessed by stakeholders for their reference. This was the responsibility of ACDI/VOCA and the coordinator of the SUCCESS Alliance program located in the ACDI/VOCA headquarters in Washington, D.C. would devote ten percent of their time to the activity. The library was established in mid 2004, at ACDI/VOCA in Washington D.C. with all relevant material available at the time, and is periodically updated. Post program close out, the library is to be relocated to the WCF headquarters in Virginia, USA.

12 Product Innovation

Fermentation trials

Ferrero Chocolate and SUCCESS Alliance developed a plan to produce samples of fermented cocoa on-farm in South Sulawesi that would be shipped to Ferrero for testing in late 2005. The objective was to produce samples that would allow Ferrero to experiment with producing chocolate products from good quality, properly fermented beans. A successful trial may have led to a project to add value to Sulawesi cocoa by fermentation before export. The samples were to be harvested from a SUCCESS Alliance demplot. The trial would have been carried out over a period of ten to fifteen days, allowing time to ferment and fully dry the samples as illustrated in the calendar table attached.

All of the cocoa beans used in the sample were to be harvested from the same demplot and processed using the same methods and tools. Each step of the process was to be recorded by Pak Syarihuddin, a SUCCESS alumni, and verified by SUCCESS staff.

Unfortunately, the experiment was unable to be implemented as the second harvest from which the beans were supposed to be used was extremely poor in 2005 due to poor rainfall levels, so sufficient beans of the correct quality were unable to be procured to conduct the test.

Ferrero Chocolate will conduct the test in the following season, pending availability of cocoa beans with the support of former SUCCESS staff.

Cost Recovered Extension Services

The concept of providing extension services on a sustainable basis to farmers was an initiative between the SUCCESS Alliance and local industry. SUCCESS Alliance engaged in planning talks with one international trader about retaining a local agronomist who would provide services to local farmers for a fee. However, the industry partners' business situation changed and external funding could not be sourced.

The *concept* of cost recovery of services was retained through the development by the SUCCESS Alliance of the BSPs. Former field staff of the SUCCESS Alliance program set up extension providers in four provinces of Sulawesi servicing the cocoa farmers in those areas. Further information on the BSPs is provided in another section of this report.

■ **Monitoring and Evaluation**

Monitoring Systems

For purposes of tracking SUCCESS Alliance performance and evaluating impact, ACDI/VOCA created a monitoring and evaluation (M&E) system specifically for the SUCCESS program.

The monitoring process gathered and tracked qualitative and quantifiable data to obtain a reasonable ongoing and final assessment of the program's accomplishments. The ongoing monitoring data was measured against proposed targets in order to evaluate the fulfilment of the objectives stated in the project proposal.

Monitoring and evaluation systems of the project took place on the following levels:

- Project Level: Evaluation of impact and accomplishment of objectives;
- Management Level: Performance monitoring on achievement of outcomes;
- Operational Level: Progress monitoring - reviewing timeline of implementation, disbursement schedules and other milestones.

Indicators

The program used a combination of output and impact indicators to measure performance. Overall impact was to be measured in terms of yield improvement, quality improvement (number of pods/kg), estimated losses due to CPB (although this is a subjective measure, depending on the estimation of the farmer), and calculated additional income provided by the additional yield. The impact data was measured for farmers who participated in the trainings and also for a range of demonstration gardens used during trainings which constituted a cohort within the overall population of farm gardens in Sulawesi. These demplots have been tracked for their yield since 2000, so as to provide a strong picture of the longitudinal impact of the PsPSP training, though since they tend to receive greater attention than other gardens, they may not be truly representative of all gardens of participant farmers.

Output indicators reflected the quantity of the trainings held and the numbers of participants who attended the trainings. Uptake of the trainings was also measured across a number of variables to assess the impact of the training on the knowledge, attitudes and practices of participant farmers post training. These indicators can be taken as proxies for improvement of yield, since the efficacy of the crop husbandry methods taught through the program has been established. Quantitative analysis of impact on yield and/or income using the training indicators as proxies was not done, however.

Data gathering tools

Data for the program was gathered using a combination of structured, quantitative tools (baseline and endline questionnaires, logbooks, pre and post training examinations) and less structured qualitative tools used on a regular basis by program monitoring staff.

Secondary data – data collected by other researchers or partners in the project areas – was also gathered and used. The rationale supporting this tiered approach to M&E was designed to promote a rich blend of quantitative and qualitative techniques, enabling project staff to produce comprehensive project reports, journal articles and conference papers that highlight the benefits to smallholder cocoa farmers and capture the lessons learned.

Reports were submitted to management by monitoring teams on a monthly basis. Data was gathered using program staff and independent professional data researchers, as appropriate. Data was entered into specific databases (Microsoft Excel, Access and SPSS) for ongoing and final analysis.

Analysis of Data

The M&E system itself was assessed and reviewed during program implementation in order to determine the accuracy and relevance of the information being gathered. As the program activities changed, so the monitoring system was changed to reflect the new activities. The monitoring system, and the analysis of the data being collected, was modified in order to assess any economic impacts of the program to greater reflect USAID's revised strategic objective SO497-021 for Indonesia.

However, since the contribution of Sulawesi's cocoa producers on the overall economy was not directly measured from inception, a number of proxy indicators (changes in yield, sales) were used to determine the actual economic impact of the program for a representative sample of participating farmers. The actual uptake of the practices as promoted through the SUCCESS Alliance program was measured in comparison to a baseline population to indicate the overall implementation success of the program.

The program, with the aid of independent researchers (Prof. John Mumford of Imperial College, London), successfully analysed changes in cocoa yield to estimate the increased income farmers achieved via uptake of the training. In addition, changes in marketing practices and market outcomes at the farmer group level were measured. From these two core activities the program measured direct impact on farmer practices and extrapolated the impact of these changes on the cocoa sector.

Reporting

ACDI/VOCA submitted monthly progress reports to USAID and cocoa stakeholders as well as quarterly performance reports to USAID, and this final report. The format of the reporting systems reflects the above levels of M&E. In addition, a final program external evaluation was conducted shortly before program close (see below).

Mid term program review

USAID conducted a mid-project review of the SUCCESS Alliance Project on August 19-20, 2004. Art Warman and Firman Aji of USAID/EG met with the project staff Robert Rosengren, Rebecca Branford-Bowd, Jennifer Bielman and others to review the project at the project office in Makassar.

The purpose of the Review was to take stock of where the project was vis-à-vis its original targets – what had been accomplished, what needed to be modified and why, what impacts it had made on the income and livelihood of farmers, on the industry and, to a lesser extent, on the economy. Furthermore, the review examined what would continue to be sustainable after the project ended, what models other activities could learn from the project and what future activities may have been derived from the lessons learned from the project.

Key findings from the review were:

- The program was substantially on target with reference to objectives and activities;
- The program was attempting to address gender issues in a culturally sensitive manner to ensure the maximum female participation in the program;
- Sustainability of the program through the Lembaga SUCCESS Sulawesi was presenting challenges and should be reviewed with reference to its ability to represent stakeholders effectively. The existing community-level groupings of farmers were already operating sustainably and should be further supported;
- The importance of improved marketing of quality was underscored through working with industry and seeking solutions to the price dynamic that does not create a quality incentive within the industry

Value Chain Assessment

In mid 2004 an assessment of the Indonesia cocoa value chain was conducted by a team of ACDI/VOCA staff and consultants to determine constraints and opportunities to growth and expansion of the cocoa sector, and propose strategies to facilitate a more viable and competitive cocoa producing and processing cluster centered in Sulawesi, Indonesia.

The primary objectives of the assessment were to:

- Determine the major constraints and opportunities to growth and expansion of the cocoa sector in Indonesia (primarily Sulawesi);
- Propose strategies to alleviate or at least mitigate those constraints, and;
- Assess current public and private sector investments to support cocoa in Indonesia.

The assessment exercise was also an opportunity to begin testing an approach and methodology for understanding the dynamics and constraints to growth of a given value chain - within a limited level of effort.

Recommendations for possible increased programmatic focus were made in the areas of:

- Increased investments in local value addition. This could be accomplished through the commercialization of improved plant varieties or through more efficient process technologies
- Increased productivity

- Improved quality

Program External Evaluation

An external evaluation of the SUCCESS Alliance program was conducted by two external consultants, Pak Sikstus Gusli PhD. a regional authority on cocoa growing, and Mr. David Neubert, an agricultural consultant with extensive experience in evaluating USAID funded programs worldwide.

The evaluation was conducted in mid November 2005, as the program was coming to a close, and assessed the impact of the program on farmers and the industry as a whole, as well as making recommendations for any future programs.

The broad findings of the evaluation are as follows:

- Education levels correlate positively with farmer group effectiveness and sustainability. In areas where education levels (on average) are lower, project implementers should plan on spending more resources and time to develop effective farmer groups.
- Private sector participation in project design and implementation is necessary to develop activities that deliver positive long-term sustainable change to the cocoa sector.
- PsPSP can be an effective tool in reducing the incidence of cocoa pod borer.
- Training in PsPSP affects farmers in the following ways:
 - Farmers who receive training (in PsPSP and/or agribusiness skills) are twice as likely to employ non-family farm labor than farmers who do not receive similar types of training.
 - Farmers who have undergone SUCCESS training report cocoa yield increases at a significantly greater rate than farmers who have not undergone training.
 - Most farmers prune their cocoa, but farmers who undergo SUCCESS training are able to articulate how and why they prune at much higher rates than non-SUCCESS trained farmers. This better understanding of the farming system translates into higher yields.
 - Farmers who carry out pod sanitation are three times more likely to be SUCCESS-trained than not.
 - Farmers who report that they bury their pods are five times more likely to be SUCCESS trained than not.
 - Farmers who report that they abandon their pods (in the orchard) are five times more likely to be not SUCCESS trained..
 - SUCCESS farmers are nearly twice as likely not to use pesticides in controlling CPB and other insects than non-SUCCESS trained farmers.
 - SUCCESS trained farmers are more likely to change buyers between years and sell to multiple buyers in a given year than non-SUCCESS trained farmers.

- Farmers who report recording their bean sales are five times more likely to be SUCCESS-trained.
- Without an economic incentive to sort beans by quality, farmers will not respond to market requests to deliver higher quality beans.

■ **Conclusion**

In terms of proposed outcomes, impacts and achievements, the SUCCESS Alliance succeeded in the majority of what it had set out to do. In total, more than 100,000 farmers were directly trained in a number of topics, through a variety of methodologies and with a variety of tools – many more, if not the vast majority of Sulawesi smallholders – have been reached indirectly.

In impact terms, the results of the program require interpretation. Some of the key assumptions established at the outset of the program, did not come to pass. The level of rainfall has been highly variable from season to season, resulting in alternately poor and good harvests.

The poor rainfall patterns over the life of the program resulted in an unambiguous result of increased absolute yields and quality being difficult to measure – since the overall harvests were decreasing, irrespective of the quality of the techniques applied, a more accurate measure of program impact was with reference to the yields and quality of harvest from farmers who were not using the methods taught. From this perspective, the program has been successful, achieving all impact targets, and thus contributing to sustaining the livelihoods and household economies of most program participants.

The impact of variable rainfall is not confined to making accurate estimates of the impact of the program on cocoa yields; it can also negatively impact farmers' impressions of the effectiveness of new methods and new technologies. Farmers, particularly poor farmers, are conservative in their habits, and unless a method can be convincingly demonstrated to farmers to work well, they are reluctant to adopt.

The variability of rainfall over the course of the program, added to the increasing damage being done by the CPB pest, and was a challenge to successful program implementation, but it is a credit to the strength of the methodology applied that not only were farmers eager to participate in the trainings, but enthusiastically adopted new techniques. The careful husbandry of the demonstration plots showed the potential impact of the use of PsPSP and other techniques such as bio-control and side-grafting.

One of the key challenges to the SUCCESS Alliance program is that of sustainability. A number of different models of sustainability have been tried over the life of the program. Some, such as the Lembaga SUCCESS Sulawesi, have been dropped as it has been clear from the feedback of farmers and other stakeholders in Indonesia's cocoa industry that the time was not ready for them. Instead, a lower-level approach has been decided upon, with four Business Service Providers adopting a cost-recovery service-provision model in

four of the provinces of Sulawesi, while additional capacity building has been directed at the farmers' groups that are already representing the interests of their members and providing much-needed services.

Whether the CPB infestation will be halted and reversed Sulawesi-wide remains to be seen in the coming years, but those participants of the SUCCESS Alliance program are much better equipped to deal with the problem and to engage in their business with the knowledge and training to maximize their return from an agricultural and business standpoint.

A clear lesson from the program impact is that when provided with the right information and tools, farmers can solve many of the underlying problems that drive the CPB infestation through their own efforts, resources and initiative.

The program has served to prove a model that research results, delivered through appropriate approaches, can be applied to work successfully on a large scale. The following recommendations can be made for the future:

1. Indonesia occupies a strong position as the largest producer of unfermented bulk cocoa beans. Its competitiveness in the global market is to improve and maintain local cocoa productivity. Efforts to improve such productivity must form the basis for any cocoa development initiative in Indonesia. Vertical integration including up-country buying stations can be expanded to introduce more commercial quality-based incentives for cocoa production. Other opportunities for further growth and competitiveness of Indonesian cocoa can involve investment in local value addition, such as in improved plant varieties, more efficient processing technologies, or improving the business and investment climate for cocoa production and its multiplier activities.
2. Although DISBUN and farmer leaders are currently the main providers of extension services, there is potential for other private sector businesses, such as input supply companies, credit institutions, traders, buyers and exporters, to provide some needed extension services, albeit at a less intensive level. The Indonesia cocoa value chain assessment, funded by USAID and carried out by ACDI/VOCA, indicates that there is a potential for broader private sector extension and outreach and the development of embedded services, and this could lead to greater sustainability of extension efforts. Although these activities will not be developed under the current three-year SUCCESS Alliance program, there is strong interest among Alliance partners and other players in the Indonesian cocoa industry in further exploring these possibilities to lead to greater sustainability and private sector involvement in the future.
3. Development of a dedicated research facility for cocoa in Sulawesi, which could develop and provide improved genetic materials to farmers in the future would be of great value. This initiative will require significant planning and support from

many different arenas, but could help fill an important long-term need for increased research and development of improved genetic varieties

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▪ **Appendices**

Appendix 1: Reconciliation of monitoring indicators vs. achievements through the SUCCESS Alliance Program, 2002-2005

The overall monitoring plan for the SUCCESS Alliance program comprises a combination of monitoring plans submitted in 2004 & 2005, reflecting changes/additions to the program.

The overall cumulative impacts from each of the objectives below are an increase in cocoa yield and a decrease in CPB infestation. For farmers implementing the recommended control measures, the target yield increase is twenty percent to thirty percent and a CPB decrease of forty percent.

It is important to note that the targeted increase in yield and decrease in CPB infestation above the *absolute* quantity at the start of the program has not been definitively achieved. CPB continues to spread across Sulawesi, and variability in rainfall over the three years of the program has resulted in erratic harvests, making trends over the relatively short timeframe difficult to measure, although there are some indications that yield is increasing. These possibilities were considered in the program assumptions, discussed further below.

What *has* been measured accurately is the performance of SUCCESS Alliance beneficiaries relative to similar farmers who had *not* received training (much of the baseline data was measured from farmers who were about to enter the training program). The revised program proposal and monitoring plan (2005, pg 23) presents the overall cumulative targets as relative to those farmers who still use traditional farming methods. The achievements related to yield here are presented in this context, where relevant.

Other indicators, specifically related to performance and uptake of improved methods, are directly measured and presented.

<i>Sub-Objective 1.1: Promote greater knowledge among cocoa farmers regarding CPB and adoption among the farmers of effective cultural practice measures (PsPSP).</i>			
Indicator	Final Target	Baseline	Achievement
Farmer Field School (FFS) Training of Trainers (TOT) using PsPSP methods for the control of CPB and TOT for Farming as a Business (FaaB)	388 trainers	0	788 (including FaaB extended training)
Number of farmers, including female participants, completing FFS trainings in Sulawesi, Sumatra, Bali and Papua	29,700 farmers	0 0	30,655
Percentage of farmers adopting and practicing each PsPSP method taught after six months. Projected rates:			
<i>Frequent harvesting</i> - 75% of farmers have increased the frequency of harvesting	<i>75% increase</i>	28%	<i>49% of farmers harvest properly</i> ²¹

²¹ This represents a seventy-five percent increase, and is an average of peak and low season harvesting. This assumes the strictest criterion of harvest at least once per week in both seasons. Harvesting once every two weeks, while not recommended, is considered the threshold of acceptable husbandry.

Pruning - 80% of farmers performing part or all of recommended pruning methods	80% farmers pruning	93%	99% farmers pruning
Sanitation - 50% of farmers treating/burying pod husks and diseased pods	50% of farmers disposing husks	28%	82% of farmers disposing husks
Fertilizer - 25% of farmers carrying out recommended chemical and/or organic fertilizing practices	25% of farmers fertilizing	22% 31%	28% correct freq. 61% correct amount
Increase in the quantity of cocoa produced by farmers utilising the recommended methods with participating farmers increasing the output of their cocoa by 20 to 30 percent	20-30% increase	15% more than untrained farmers	41% more than untrained farmers²² (24% increase)
Increase in the quality of cocoa produced by farmers utilising the recommended methods with participating farmers cocoa achieving an average bean count of 100 to 110 beans per 100 grams. ²³ Equivalent to 30-40 pods/kg	100-110 beans/100g 30-40 pods/kg	33	51/kg (untrained farmers 66/kg)
Number of farmers, including female participants, completing VCD trainings in Sulawesi	70,000	0	69,439
Number of farmers, including female participants actively contributing to the establishment and upkeep of the nurseries	900	0	249
Number of seedlings distributed to participants, including female participants	63,000	0	17,810 (ongoing)

Sub-Objective 1.2: Develop IPM adjuncts to PsPSP that will consist of biological controls

Indicator	Final Target	Baseline	Achievement
One biological control identified and tested as effective	One method tested	0	Use of ants tested
One new IPM adjunct (biological control method) added to PsPSP training curriculum	One method added	0	Ants as bio-control added
Farmers have one cost effective biological control method for decreasing CPB in their gardens without using pesticides	One method available	0	Achieved

Sub-Objective 1.3: Identify genetic resistance to CPB and other pest/diseases by improving the genetic stock and rate of cocoa farm rehabilitation through the selection of pest resistant genotypes by farmers and using side-grafting methods

Indicator	Final Target	Baseline	Achievement
Number of farmers, including number of female participants, completing PFT	8,250	0	8,328 (19% women)
Number of surviving grafts per tree in the demplot	n/a	0	Final 41%
Participating farmers better able to rejuvenate aging and underproductive gardens, lower tree canopy, and improve management of their gardens	n/a	13%	44%
Farmers using the side grafting technique in conjunction with improved genetic material will improve quality and quantity of their cocoa production. ²⁴	n/a	n/a	n/a

²² Although the difference between trained and untrained farmers is on target, the absolute increase of trained farmers over their 2002/03 levels is highly variable, due to harvest fluctuations over the program period, a result of increasing CPB infestation overall and changing rainfall patterns.

²³ This information was not able to be gathered consistently over the course of the program, so pod count, a standard industry quality measure of the # of cocoa pods per kg, was used instead. As quality improves, the # of pods/kg *decreases* reflecting heavier and healthier pods.

²⁴ Due to the short time between the establishment of the grafts and close of program, no data on yields could be gathered – side grafts require nine to twelve months to yield. However, the benefits of side grafting are well proven.

Sub-Objective 1.4: Improve the quality of services to cocoa farmers through the support of better farmer organisations, increase the volume and value of cocoa marketed and promote the establishment of locally managed services for cocoa farmers.

Indicator	Final Target	Baseline	Achievement
15 Forums established, conducting regular meetings, attending industry events and developing member services	15	0	0²⁵
30 groups trained	30	0	32
30 farmer groups formed and legally registered	30	0	32
60 organizational development grants disbursed	60	0	32²⁶

Sub-Objective 2.1. Sponsor local research at collaborating universities on IPM adjuncts (biological controls) and link with Alliance partners and international researchers.

Indicator	Final Target	Baseline	Achievement
One regional conference inviting cocoa farmers and agricultural extensionists from Indonesia, Philippines and Vietnam to discuss the best IPM practices and training methods for controlling pests and diseases as well as improving overall quality and production	1 biocontrol conference 4 research reports	0	Conference held, 3 research trials conducted
20 Indonesian partners and beneficiaries and 8 ACDI/VOCA and/or sub-grantee staff have attended a SUCCESS regional conference by the close of the final SUCCESS Alliance project	Conference attended	0	Conference attended by all partners
Number of research projects or workshops linked with local and international collaboration and SUCCESS Alliance	4 projects 1 bio-control workshop	0	3 projects 1 bio-control workshop
One trial conducted and 20 genotypes tested	1 trial, 20 genotypes	0	Achieved

Sub-Objective 2.2. Build farmer and cocoa industry support for locally managed farm services

Indicator	Final Target	Baseline	Achievement
Local institution disseminating information to 300,000 Sulawesi and possibly Northern Sumatran cocoa farmers ²⁷	300,000 farmers	0	271,000
A local institution in Sulawesi that can independently provide technical information on improving cocoa quality	One local institution	0	4 Business Service Providers
A sustainable cocoa information resource that can be accessed by any member of the cocoa community	Library established	0	Achieved
Website posted on-line (www.successalliance.org)	Website online	0	Achieved

<i>Assumption Indicator</i>	<i>Outcome</i>
Rainfall and other agronomic conditions in target areas remains	Rainfall patterns were variable through the course of the

²⁵ Although fifteen farmer forums were convened, farmer feedback indicated that participants preferred to focus on the establishment and capacity-building of the farmer groups at village level before any higher-level organizations could be established. The resources specified for the forums were therefore channelled into institutional strengthening of farmer organizations and additional training in business development and marketing (Farming as a Business)

²⁶ Seven groups only received one grant as due to time constraints their grants were combined into one.

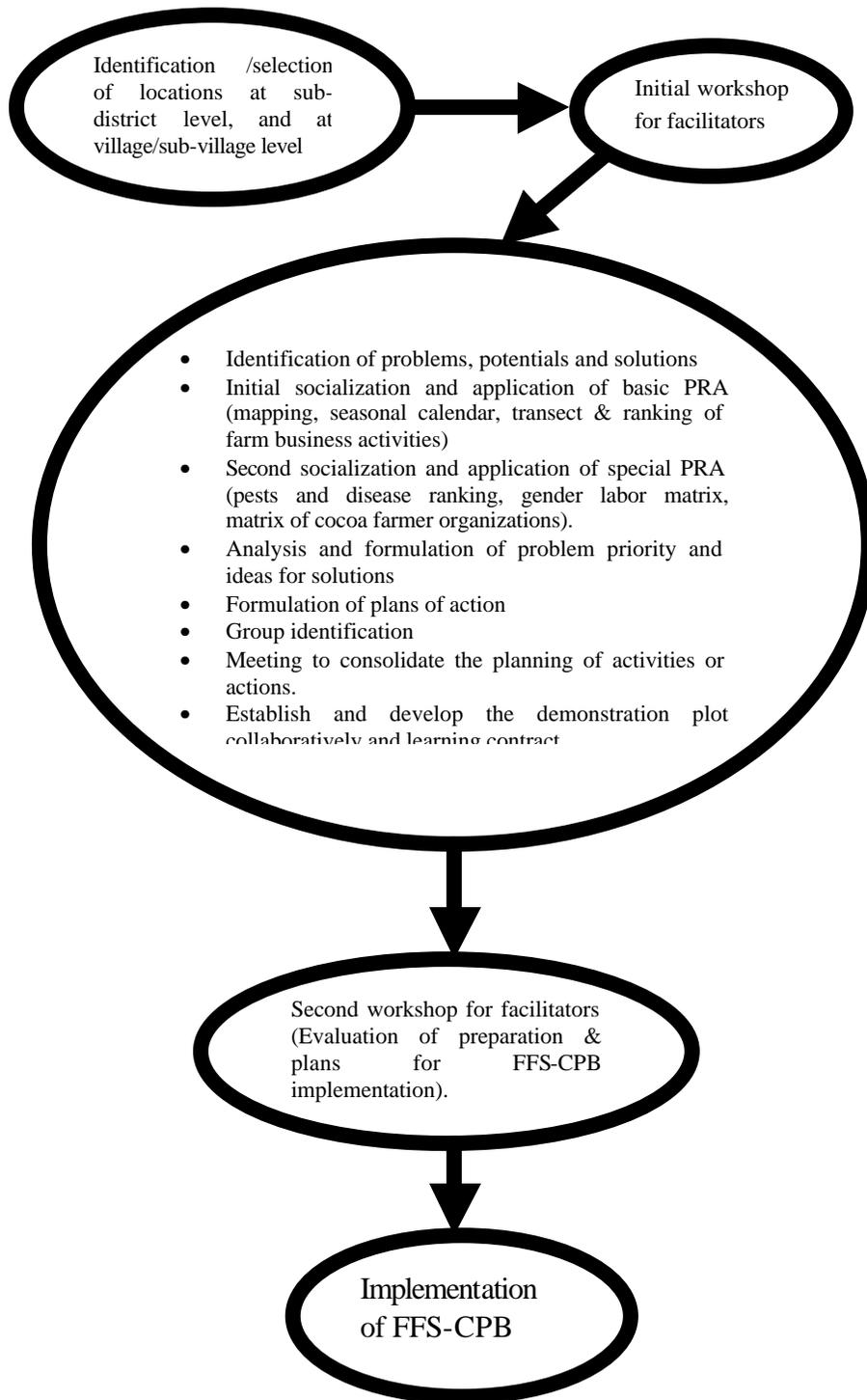
²⁷ The original program proposals had planned for a single locally run and owned organization, SUCCESS Sulawesi, to take over provision of cocoa services, and the organization was set up and registered. The institutional challenges, however, proved this structure to be unsuitable and unlikely to succeed beyond the Alliance lifespan, so a more appropriate model – four Business Service Providers located in separate provinces of Sulawesi – was designed and implemented.

within “normal” parameters.	program, leading to below optimal harvests which distorted impact measurement. CPB infestation also has increased across Sulawesi, further distorting gains made by the program.
Cocoa prices do not fall below economically viable levels or fluctuate sharply as a result of externalities (i.e. conflict in Cote D’Ivoire or currency fluctuations).	No change, although the price for cocoa has been consistently dropping since program start.
Cooperation and capacity of the local agricultural department to properly monitor and track selected qualitative indicators.	No significant change in qualitative indicators, though the reliability of overall production data is unsure.
Recommended methods (PsPSP) of CPB control remains effective at reducing losses to CPB.	No change.
Business opportunities are available that generate sufficient income to cover overhead costs associated with group business activities	No change
Unrestricted travel of A/V staff to monitor site work.	The Poso area of Central Sulawesi Province suffers extensive religious conflict. A/V partnered with CARE international to undertake training in the area, but one area was unable to be covered with the VCD training.
Security remains stable; Political and social situation remains stable.	See above re. Poso.
Cocoa industry and farmers support formation of Lembaga SUCCESS Sulawesi and are willing to pay fees for its services. Lembaga framework is viable and SUCCESS staff carries out required tasks.	Support for the Lembaga SUCCESS Sulawesi was not sufficient to maintain it as an objective. A more appropriate model was developed, see above, and footnote.

Appendix 2: Summary of Farmer Field School Activities & Curriculum

Activity	Duration	Participants	Location
1. Identification of prospective program location at the sub district level	3-4 days	Cocoa farmers, sub-district government apparatus, village government apparatus, community leaders, cocoa traders, extension staff from DISBUN	Sub-district level
2. Identification of prospective location at the village/sub-village level	3-4 days	Cocoa farmers, village government apparatus, farmer leaders, cocoa traders in the village, extension staff from DISBUN	Village level
3. Workshop for facilitators	2 days	Field coordinator & facilitator	Field office
4. Program socialization, problem identification and solution brainstorming – PRA activity <ol style="list-style-type: none"> l. Initial socialization & PRA <ol style="list-style-type: none"> i. Mapping ii. Farm business ranking iii. Cocoa garden transect iv. Seasonal activity calendar m. Second socialization & PRA <ol style="list-style-type: none"> i. Cocoa pest & disease ranking ii. Gender labor division matrix iii. Existing cocoa farmer orgs n. Problem and solution analysis o. Formulating an action plan p. Identifying action groups q. Consolidation meeting r. Establishing the demo plot 	<ol style="list-style-type: none"> i. Mapping ii. Farm business ranking iii. Cocoa garden transect iv. Seasonal activity calendar i. Cocoa pest & disease ranking ii. Gender labor division matrix iii. Existing cocoa farmer orgs Problem and solution analysis Formulating an action plan Identifying action groups Consolidation meeting Establishing the demo plot 	Field facilitators, participating farmers	Community
5. Evaluation of preparation & implementation plans	1 day	All field facilitators, field technician, farmers	Field office/community
6. Implementation of FFS Modules <ol style="list-style-type: none"> s. Basics of ecosystems t. CPB lifecycle u. Frequent & regular harvesting v. Sanitation w. Pruning x. Fertilization (inc. organic fertilizer) y. Biological controls z. Side grafting aa. Post harvest and marketing bb. Standardization & quality of beans cc. Workplans and evaluation 	4/5 months (9-16 mtgs)	Field facilitators/field technicians, farmers	Community (Demplot location)

Flowchart of FFS preparation activities



Parameters of FFS-CPB implementation

- a. Participant criteria
 - Farmers with their primary or only source of income from cocoa.
 - Area of cocoa garden(s) owned 0.5 ha or more.
 - Capable to take part in the learning process for a minimum of eight meetings.
 - Willing to apply the results of the learning process in their own cocoa gardens and disseminate the knowledge to other cocoa farmers.

- b. Criteria for the Demonstration Plot Farmer
 - Influential person within the village.
 - Want to and are willing to apply PsPSP on their own cocoa gardens.
 - Wants to and is capable of harvesting every week during and after the Field School.

- c. Location criteria for demo plot
 - Strategic so that it is visible by many parties (particularly cocoa farmers)
 - The extent of the demo plot has to be approximately 0.5 ha (500 cocoa trees) and the cocoa trees should have some level of infestation by CPB
 - Reachable by all participant farmers

Implementation of FFS-CPB

The implementation of the Field School Cocoa Pod Borer (FFS-CPB) is conducted over four months through fifteen to sixteen meetings, though this is dependent on the learning contract that has been mutually formulated together with the facilitator/FT and the participants. The learning process is concentrated at the demo plot garden.

The total participants in each village/demo plot are approximately fifty people divided into two classes of twenty-five people per class. Learning activities will take place for an entire day, from 8.00am to 4.00pm.

Typical Meeting Schedules (From FFS year 2)

Week I

08:00 – 09:00	Ballot Box (farmers' knowledge is pre assessed)
09:00 – 10:30	Opening
10:30 – 11:00	Group Dynamics
11:00 – 11:30	Basic Ecosystem Practices
11:30 – 12:30	Drawing observation results and group discussion
12:30 – 13:30	Break
13:30 – 14:30	Presentation of Basic Ecosystem
14:30 – 15:00	Demonstration of Food Web
15:00 – 15:30	Pod Slicing/opening techniques
15:30 - 16:00	Daily Review/Reflection

Week II

08:00 – 08:30	Introduction to Study
08:30 – 10:30	Field Practice of Agro-ecosystem Analysis
10:30 – 12:00	Drawing the results of group observations
12:00 – 12:30	Presentation of Agro-ecosystem Analysis
12:30 – 13:30	Break
13:30 – 13:45	Group Dynamics
13:45 – 15:30	Special Topic and Practice: CPB Life Cycle and Actions in the Demplot Farm
15:30 – 16:00	Daily Review/Reflection

Week III

08:00 – 08:10	Introduction to Practice
08:10 – 10:30	Field Practice of Agro-ecosystem Analysis
10:30 – 11:00	Drawing observation results
11:00 – 12:30	Presentation of Agro-ecosystem Analysis
12:30 – 13:30	Break
13:30 – 13:45	Group Dynamics
13:45 – 15:30	Special Topic and Practice: Simultaneous Harvesting & Sanitation and Demplot Actions
15:30 – 16:00	Daily Review/Reflection

Week IV

08:00 – 08:10	Introduction to Practice
08:10 – 10:30	Field Practice of Agro-ecosystem Analysis
10:30 – 11:00	Drawing observation results
11:00 – 12:30	Presentation of Agro-ecosystem Analysis
12:30 – 13:30	Break
13:30 – 13:45	Group Dynamics
13:45 – 14:45	Special Topic: Pruning in the Demplot Farm
14:45 – 15:45	Pruning Practices in the Demplot Farm
15:45 – 16:00	Daily Review/Reflection

Week V

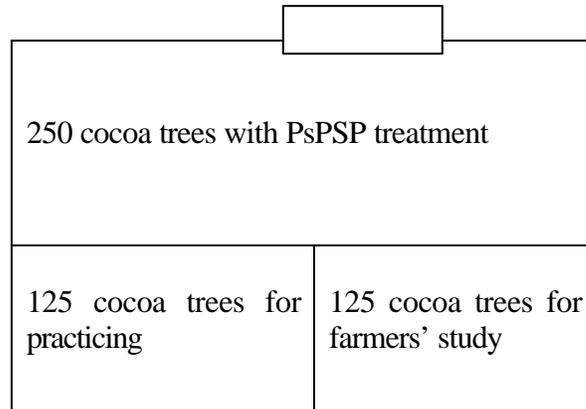
08:00 – 08:10	Introduction to Practice
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08:10 – 10:30	Field Practice of Agro-ecosystem Analysis
10:30 – 11:00	Drawing observation results
11:00 – 12:30	Presentation of Agro-ecosystem Analysis
12:30 – 13:30	Break
13:30 – 13:45	Group Dynamics
13:45 – 14:30	Special Topic: Fertilization and Actions in the Demplot Farm
14:30 – 15:30	Practices of Bokashi Making
15:30 – 16:00	Daily Reflection
Week VI	
08:00 – 08:10	Introduction to Practice
08:10 – 10:30	Field Practice of Agro-ecosystem Analysis
10:30 – 12:00	Drawing observation results
11:00 – 12:30	Presentation of Agro-ecosystem Analysis
12:30 – 13:30	Break
13:30 – 13:45	Group Dynamics
13:45 – 15:30	Special Topic and Practice: PsPSP Plus
15:30 – 16:00	Daily Reflection
Week VII	
08:00 – 08:10	Introduction to Practice
08:10 – 10:30	Field Practice of Agro-ecosystem Analysis
10:30 – 12:00	Drawing observation results
12:00 – 12:30	Presentation of Agro-ecosystem Analysis
12:30 – 13:30	Break
13:30 – 13:45	Group Dynamic
13:45 – 16:00	Special Topic and Practice: Side Grafting
15:30 – 16:00	Daily Reflection
Week VIII	
08:00 – 08:10	Introduction to Practice
08:10 – 10:30	RTL Compiling, Performance Evaluation and Final Test
10:30 – 12:00	RTL Presentation (Group)
12:00 – 12:30	RTL Presentation (Group)
12:30 – 13:30	Break
13:30 – 15:30	Performance Evaluation and Final Test
13:45 – 16:00	Daily Reflection
Week IX	
08:00 – 16:00	Farmer Field Day Exhibition of the FFS-CPB results, Skill Honing Competition, Discussion, etc.

THE DEMPLOT MODEL

←-- Village road -->

The demo plot sign board



Explanation:

1. 125 cocoa trees for practice garden, in that garden, the farmers will practice the various ways of cultivating the cocoa plants, such as, pruning, sanitation, frequent harvesting, fertilization, etc.
2. 125 cocoa trees for farmers' study garden, in that garden various studies concerning the cocoa cultivation will be conducted, such as, frequent harvesting, pruning, fertilization and sanitation.
3. 250 cocoa trees for the PsPSP garden, in that garden the M1 data collection will be conducted every week and to be observed during the course of FFS-CPB process. It is expected that the data collection will be conducted by the garden owner.

The facilitator has made ready all of the already purchased training materials and distributed to all training participants, including the materials/tools for training, fertilizers and other necessities.

It will be better if 250 PsPSP treated cocoa trees at the demo plot have received the treatment of pruning, sanitation and fertilization prior to implementing the FFS-CPB. For that reason, the facilitator has to provide the training schedule to the farmers/participants to implement the said activities all together. And make sure that before applying the PsPSP technique to the garden, the ripen pods have to be first harvested in order to be able to assess the initial condition of the said demplot.

Appendix 3: Impact of Farmer Group trainings by Province

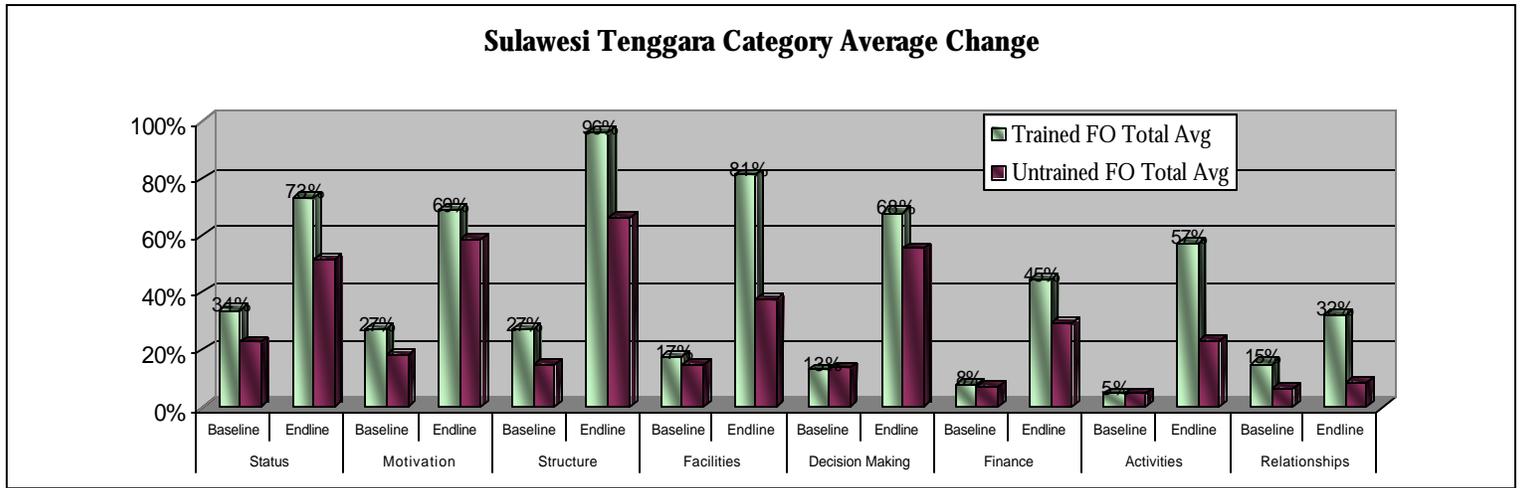


Figure 79: Impact of Training by Category: Southeast Sulawesi

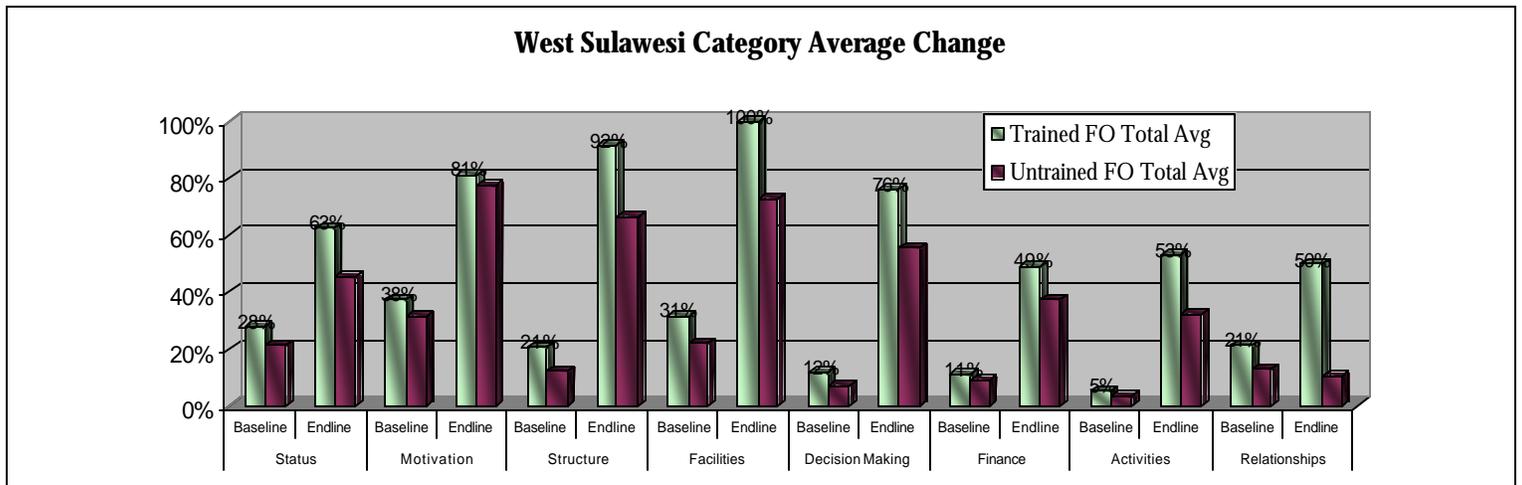


Figure 80: Impact of Training by Category: West Sulawesi

South Sulawesi Category Average Change

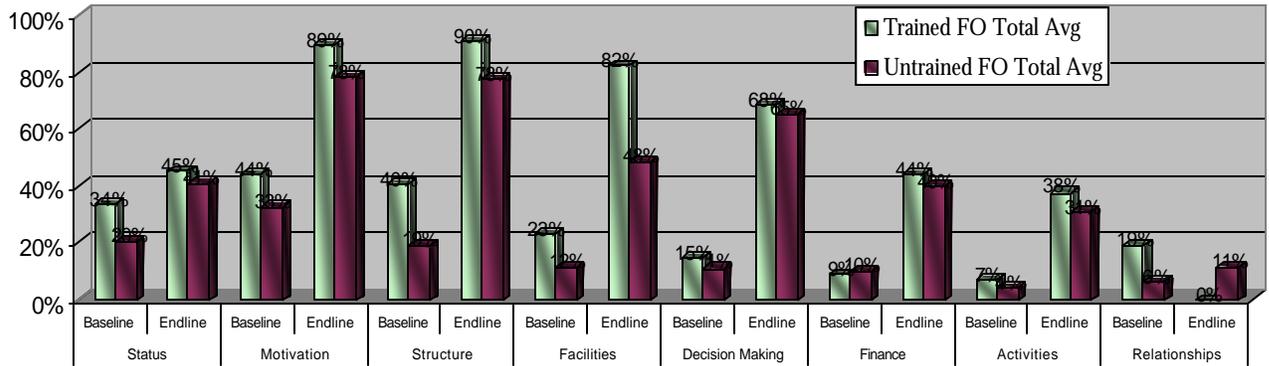


Figure 81: Impact of Training by Category: South Sulawesi

Central Sulawesi Category Average Change

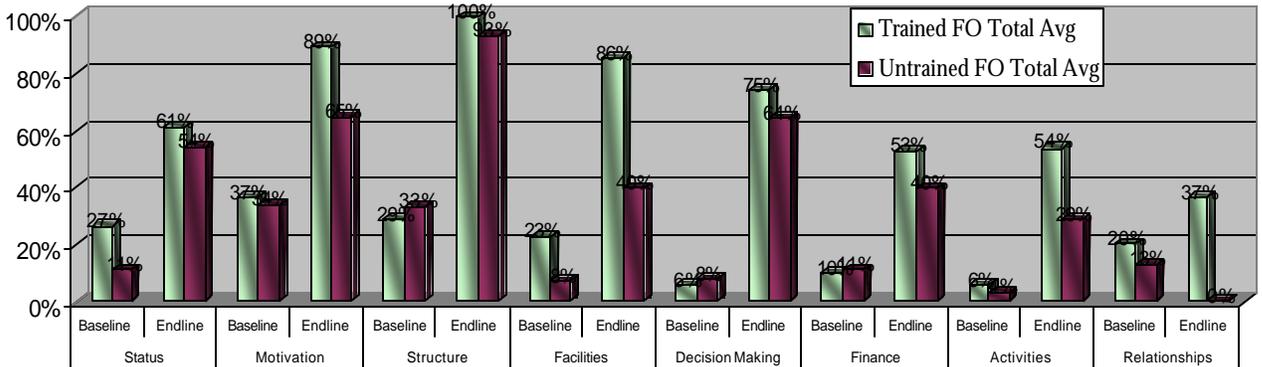


Figure 82: Impact of Training by Category: South Sulawesi

Appendix 4: VCD training locations and beneficiaries

No.	Province	# Trainings	Target	Participants		Achievement
				Male	Female	
South and West Sulawesi						
1	- Pinrang	35	1,750	1,459	291	1,750
2	- Polmas	40	2,000	1,646	354	2,000
3	- Luwu	45	2,250			2,250
4	- Mamuju	90	4,500	3,609	891	4,500
5	- Majene	75	3,750	3,032	718	3,750
6	- Luwu Timur	75	3,750	3,306	444	3,750
7	- Wajo	70	3,500	2,555	939	3,494
8	- Bone	75	3,750		n/a	3,750
9	- Soppeng	60	3,000	2,322	626	2,948
10	- Palopo	35	1,750		n/a	1,750
Sulawesi Tengah						
11	- Donggala	25	1,250		n/a	1,250
12	- Parigi Moutong	25	1,250	1,034	216	1,250
13	- Luwuk Banggai	110	5,500	4,702	798	5,500
14	- Morowali	75	3,750		n/a	3,750
15	- Toli-Toli	55	2,750		n/a	2,750
16	- Poso + Tojo Unau	109	5,450	3,714	1,283	4,997
Sulawesi Tenggara						
17	- Konawe	30	1,500		n/a	1,500
18	- Konawe Selatan	70	3,500		n/a	3,500
19	- Kolaka Utara	50	2,500		n/a	2,500
20	- Buton	60	3,000		n/a	3,000
21	- Muna	70	3,500		n/a	3,500
22	- Bombanna	120	6,000		n/a	6,000
Total		1,399	69,950		6,560	69,439

1 location failed (Poso)

Appendix 5: Farmer Educational Materials Distribution through the Communications Program

First Distribution Included:

31,000 envelopes

One envelope included:

- Introduction to the Communications Initiative/Instructions
- One Pamphlet on CPB
- One fact sheet describing each of the PsPSP methods
- One Farmer Feedback Form

Exporters	Channels	Region/Area	Envelopes
PT Olam PT Socomex PT Mitra Celebes	Collectors, Farmer Groups, Farmers	Palopo Mangutana Kolaka Kolaka Utara Bulukumba Maros	9,000
Processors			
PT Unicom	Village Collectors/Farmers	Masamba	1,000
ASKINDO			
Demplots/Cocoa Village Model/Central Sulawesi Chapter	Farmer groups, village leaders, and farmers on Demplots	Pinrang Mamuju Bone Bantaeng Bulukumba Sinjai Wajo Soppeng Polmas Luwu Luwu Utara Luwu Timor	5,100
Farmer Groups			
APKAI IP2K	Direct to farmers	South Sulawesi, Central Sulawesi Polmas	2,000
DISBUN	Extension Services; direct to farmers, farmer groups, village heads	Majene Mamuju Bone Bantaeng Bulukumba Sinjai Wajo Soppeng Sidrap Maros Central Sulawesi	13,900

		Total	31,000
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Second Distribution Included:

40,000 envelopes

One envelope included:

- Introduction to the Communications Initiative/Instructions
- Three pages of detailed explanation on CPB lifecycle and infestation
- One instructional VCD on PsPSP and CPB
- One Farmer Feedback Form

Exporters	Channels	Region/Area	Envelopes
PT Olam PT Socomex PT Mitra Celebes PT Cargill PT Hakiwa	Collectors, Farmer Groups, Farmers	Palopo Pinrang Mangutana Kolaka Kolaka Utara Bulukumba Maros Central Sulawesi	15,250
Processors			
PT Unicom	Village Collectors/Farmers	Masamba	500
ASKINDO			
Demplots/Cocoa Village Model/Central Sulawesi Chapter	Farmer groups, village leaders, and farmers on Demplots	Pinrang Mamuju Bone Bantaeng Bulukumba Sinjai Wajo Soppeng Polmas Luwu Luwu Utara Luwu Timor	3,650
Farmer Groups			
APKAI IP2K	Direct to farmers	South Sulawesi, Central Sulawesi Polmas	2,200
DISBUN	Extension Services; direct to farmers, farmer groups, village heads	Majene Mamuju Bantaeng Bulukumba Palopo Masamba Maros Soppeng Central Sulawesi	8,400
		Total	30,000

Third Distribution Included:

40,000 twelve-page color booklets

- CI “instructions” to farmers
- CPB lifecycle diagram, bean comparison photos with explanations
- Step by step PsPSP explanation with specific connection to breaking CPB lifecycle
- One SUCCESS Alliance CPB-PsPSP VCD
- One Farmer Feedback Form

Exporters	Channels	Region/Area	Envelopes
PT Olam PT Socomex PT Mitra Celebes PT Cargill PT Tana Mas	Collectors, Farmer Groups, Farmers	Palopo Pinrang Mangutana Kolaka Kolaka Utara Bulukumba Maros Central Sulawesi	16,700
Processors			
PT Unicom	Village Collectors/Farmers	Masamba South Sulawesi	1,800
ASKINDO			
Demplots/Cocoa Village Model/Central Sulawesi Chapter	Farmer groups, village leaders, and farmers on Demplots	Pinrang Mamuju Bone Bantaeng Bulukumba Sinjai Wajo Soppeng Polmas Luwu Luwu Utara Luwu Timor	1,200
ASKINDO Central Sul	Farmer groups and exporters	Central Sulawesi	3,000
Farmer Groups			
APKAI IP2K	Direct to farmers	South Sulawesi, Central Sulawesi Polmas	3,300
DISBUN	Extension Services; direct to farmers, farmer groups, village heads	Majene Mamuju Bantaeng Bulukumba Palopo Masamba Maros Soppeng Central Sulawesi	14,000
		Total	40,000

Fourth Distribution Included:

30,000 sixteen-page color booklets

Sixteen-page color booklet on CPB lifecycle

- CI “instructions” to farmers
- CPB lifecycle diagram, bean comparison photos with explanations
- Step by step PsPSP explanation with specific connection to breaking CPB lifecycle
- Step by step explanation of side grafting technique (tree regeneration technique)
- One CI Cocoa Quality VCD
- One SUCCESS Alliance CPB-PsPSP VCD
- One Farmer Feedback Form

Exporters	Channels	Region/Area	Envelopes
PT Olam PT Socomex PT Mitra Celebes PT Cargill	Collectors, Farmer Groups, Farmers	Palopo Pinrang Mangutana Kolaka Kolaka Utara Bulukumba Maros Central Sulawesi	12,500
Processors			
PT Unicom	Village Collectors/Farmers	Masamba	900
ASKINDO			
Demplots/Cocoa Village Model/Central Sulawesi Chapter	Farmer groups, village leaders, and farmers on Demplots	Pinrang Mamuju Bone Bantaeng Bulukumba Sinjai Wajo Soppeng Polmas Luwu Luwu Utara Luwu Timor	1,200
ASKINDO Central Sul Farmer Groups	Farmer groups, exporters	Central Sulawesi	1,500
APKAI IP2K	Direct to farmers	South Sulawesi, Central Sulawesi Polmas	1,600
DISBUN	Extension Services; direct to farmers, farmer groups, village heads	Majene Mamuju Bantaeng Bulukumba Palopo Masamba Maros Soppeng Central Sulawesi	8,000
SUCCESS BSPs	BSPs Formed for post- SUCCESS activities	All four provinces	4,300
		Total	30,000

Appendix 6: CI Radio Programming

CI Radio Programming						# Listeners
No	Radio	Frequency	Time		Ending Date	
1	Suara Simpati 720 Khz AM Pinrang	Monday	5:30	6:00	21-Oct-05	2,000 Farmers
		Wednesday	5:30	6:00		
		Friday	5:30	6:00		
2	Radio Citra Pertanian Palu	Tuesday	10:00	end	31-Oct-05	10,000 Farmers
		Thursday	16:00	end		
		Saturday	10:00			
3	RRI Makassar 476,19 mtr (MW) Makassar	Wednesday	19:30	20:00	11-Nov-05	
		Thursday	5:30	6:00		
		Friday	19:30	20:00		
		Saturday	5:30	6:00		
		Sunday	19:30	20:00		
		Monday	5:30	6:00		
4	RRI Kendari 314 mtr (MW) Kendari	Tuesday	5:00	end	31-Oct-05	15,000 Farmers
		Thursday	5:00	end		
		Saturday	5:00	end		
5	RRI Palu Palu	Tuesday	18:30	19:00	3-Nov-05	50,000 Farmers
		Wednesday	5:00	5:30		
		Thursday	18:30	19:00		
		Friday	5:00	5:30		
		Saturday	18:30	19:00		
		Sunday	5:00	5:30		
6	Radio Kelandka Palopo	Tuesday				
		Thursday				
		Saturday				
7	Radio Swara Alam 99,1 (FM) Kendari	Tuesday	7:30	8:00	31-Oct-05	2,000 Farmers
		Thursday	7:30	8:00		
		Saturday	7:30	8:00		
		Sunday	7:30	8:00		
8	Radio Suara As'adiyah Sengkang	Sunday	11:00	end	27-Nov-05	20,000 Farmers
		Wednesday	11:00	end		
9	Radio Suara Sawerigading Polmas	Monday	13:00	end	21-Nov-05	
		Thursday	13:00	end		
10	Radio Lariang Indah Mamuju	Tuesday	13:30	end	18-Nov-05	10,000 Farmers
		Friday	13:30	end		