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COCOA DEVELOPMENT PROJECT OF BELIZE



Pan American Development Foundation
1889 F Street, N.W., Washington, D.C. 20006 USA
(202) 458-3969 Cable: FUPAD Telex: 64128



Volunteers In Technical Assistance
1815 N. Lynn St., Suite 200, Arlington, VA 22209 USA
(703) 276-1800 Cable: VITAINC Telex: 440192 VITAU

Accelerated Cocoa Production Project: Final Report

Prepared by Dr. J. Corven, Project Director



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Executive Summary

The Accelerated Cocoa Production Project began implementation in October 1984 with OPG funding from USAID/Belize and the Government of Belize. Pan American Development Foundation (PADF) and Volunteers In Technical Assistance (VITA) jointly implemented the project with key support from Hummingbird Hershey Limited (HHL) and the U.S. Peace Corps.

The objective of the project was to establish the capability for improved small-scale cocoa production in Belize. Project strategy included establishing cocoa farmers at two sites, Ringtail Village and Valley of Peace, developing a technical package of cocoa extension, and training Ministry of Agriculture extension officers in improved cocoa production technology. Community development aspects were integrated to support agricultural efforts which included an innovative long-term cocoa loan program established with Development Finance Corporation (DFC) as well as agronomics.

At project completion there are fourteen farmers with nearly 100 acres of intensively managed cocoa along with many other crops established at Ringtail. Valley of Peace had an equal number of farmers but less than fifteen acres of cocoa. Additionally, twenty-five farmers established 50 acres of new cocoa in Stann Creek and 400+ acres were established in Toledo district during project life.

Technical training was provided in three phases: first, five 5-day short courses at HHL, second, a series of three 2-day field workshops in Toledo, Stann Creek, and Cayo districts, and finally, a comprehensive 9-day course at HHL. A total of 14 MCA extension officers received over 800 hours of combined classroom and field study in all aspects of cocoa technology. More than 120 individual farmers participated in all three training phases along with 36 representatives of local NGOs and farmer organizations. International trainees came from Grenada, St. Vincent, Barbados, and Honduras.

In addition to the training program, the technical package included three major publications. The 133-page Cocoa Guidebook And Training Guide is a manual for extension officers and trainers. It is moderately technical and suitable for persons with a basic understanding of agricultural principles. Chapters cover high and low input management systems, site assessment, soils and nutrition, nursery practices, shade, pest management, pruning, rehabilitation, post-harvest processing, and economics. The training section provides ready-to-use lesson plans for workshops and field demonstrations for extensionists.

Growing Cocoa In Belize is a 26-page basic field reference for small-scale commercial cocoa growers. It covers the same materials as the Guidebook but is much briefer. Illustrations, charts, tables, and farm record forms complement the text. Both Growing Cocoa and the Guidebook are available throughout Belize from the Ministry of Agriculture and the Toledo Cocoa Growers Association.

The third publication is the Cocoa Farm Economic Report And Development Models that provides a detailed analysis of cocoa establishment and management costs and returns under high and low input systems. Tables includes specific labor requirements, cash flow projections. and two development models.

Community development was a major aspect of the work at Ringtail Village including community information resources, economic activities for women, social infrastructure (e.g., housing, roads, water, and community center), and institutional support for self-reliance. In conjunction with numerous contributions from HHL a village association and credit union were established, elected officers trained, and relevant inter-organizational linkages made. Housing and community center funds and technical assistance were obtained from Cooperative Housing Foundation (CHF) and HHL. Combined with existing resources for schooling, transportation, and health care, these accomplishments made Ringtail, under its own leadership, a dynamic, self-reliant agricultural community.

Upon request by the farmers of Toledo and in cooperation with the MOA, the project also assisted in the formation and initial funding of the Toledo Cocoa Growers Association (TCGA). This has grown so that by the end of 1987 it had over 100 dues paying members, participated in project and HHL training, opened a small input supply store, and was benefiting from a series of Belize Institute of Management (BIM) courses in management and marketing sponsored by the cocoa project.

The cocoa project concluded field work in October 1987 confident that cocoa development in Belize can now continue with support from the Ministry of Agriculture and Development Finance Corporation. The capability for improved cocoa production, centered at Hummingbird Hershey Limited, also exists within the Ministry of Agriculture, Toledo Cocoa Growers Association, several local NGOs, and most critically, within the diverse farming groups of Cayo, Stann Creek, and Toledo districts.

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I. PROJECT DESCRIPTION

A. Background

The Accelerated Cocoa Production Project (referred to as the Cocoa Project in this document) was officially approved by USAID/Belize on July 31, 1984 with field implementation beginning October 10, 1984. Funding was provided through OPG No. 505-0023 (\$615,000) to the Pan American Development Foundation (PADF) a supplemental grant of \$65,000 from the Balance of Payments Loan No. 505-K-001. PADF and Volunteers In Technical Assistance (VITA), both private nonprofit organizations, implemented the project with support from Hummingbird Hershey Limited (HHL) and the U.S. Peace Corps.

Overall project administration was the responsibility of PADF. Field staff included the PADF Chief of Party, the VITA Community Development Adviser provided under PADF subgrant to VITA, and five Peace Corps Volunteers (PCVs). Reports included monthly financial and narrative field reports, quarterly financial reports, semi-annual evaluation reports, and annual project retreat reports. Yearly workplans were produced following the annual retreats.

B. Objectives

The overall objective of the Cocoa Project was to accelerate the rate at which small farmers in Belize establish cocoa with improved practices. Specific objectives during the life of the project were the following:

1. Establish 600 acres of improved cocoa.
2. Train 60 farmers in improved cocoa practices.
3. Train 6 Government Extension Officers (E/Os) in improved cocoa practices and extension methods.
4. Assist additional training of another 20 Extension Officers in improved cocoa practices.
5. Adapt, document, institutionalize, and replicate the methodology developed for general use in Belize.

Complementary to the above agricultural objectives were the following objectives for community development beneficial to cocoa producers:

1. Establish community information and outreach capability.
2. Support women participation in economic activities.

3. Develop basic social infrastructure including health, water, housing, education, and transportation.
4. Provide institutional support for self-reliance.

C. Sites

Project activities in cocoa establishment and extension were concentrated at the two sites of Ringtail Village (RV), located at mile 41 of the Hummingbird Highway, and Valley of Peace (VOP), located about 9 miles north of Belmopan in Cayo District. Training of farmers and extension officers was conducted initially at the HHL farm and later at Ringtail Village. During the technical package testing and replication phase, workshops were held in Cayo, Stann Creek and Toledo Districts for extension officers, local farmers, and NGO representatives.

D. Cooperating Agencies:

- 1) Ministry of Agriculture was the key governmental participant coordinating activities with the extension department and other governmental ministries.
- 2) Hummingbird Hershey Ltd., the Hershey demonstration farm in Belize, for technical information, the training & demonstration site, and marketing.
- 3) U.S. Peace Corps provided a total of five PCVs over the life of the project. Four worked as agricultural extension officers (Cayo-3, Toledo-1) and one coordinated the credit and housing program.
- 4) Development Finance Corporation (DFC) received a subgrant for and managed the VOP cocoa loan fund and provided CDB funds for the cocoa loans at Ringtail Village.
- 5) Cooperative Housing Foundation (CHF) provided loan funds and technical assistance for the housing and grant funds for the community center building at RV.
- 6) Toledo Cocoa Growers Association (TCGA) provides financing, supplies, and technical assistance in Toledo District.
- 7) Help for Progress provided cocoa loans and technical assistance to farmers in Stann Creek District.
- 8) Ministry of Natural Resources, Dept. of Lands and Survey was responsible for surveying the Ringtail site and is completing land title transfers to farmers.
- 9) Cocoa Advisory Board (CAB) serves a coordinating and advisory role for the Ministry of Agriculture. Membership is from the MOA, HHL, DFC, USAID, Cocoa Project, and a private cocoa farmer.

E. Beneficiaries

- 1) Ringtail Village farmers are all employees of HHL who have applied for a lease fiat on their land from the Government of Belize.
- 2) Valley of Peace farmers are Salvadoran refugees and Belizians who hold a lease fiat for their land from the Government of Belize.
- 3) Ministry of Agriculture extension officers from Cayo, Stann Creek, and Toledo districts received technical training and extension support.
- 4) Toledo farmers are mostly Mayan with mixed subsistence farms on "reservation" lands. Members of the TCGA are cocoa farmers from throughout the district.
- 5) Maya Mopan and San Roman farmers are Mayan with mixed subsistence farms on leased government lands in the Stann Creek District.
- 6) Non-governmental organization (NGO) representatives (Help for Progress, Toledo Cocoa Growers Association, CARE, Big Falls Cooperative, and BEST) received technical training and extension support.

II. PROJECT STATUS BY OBJECTIVES

A. Establish 600 Acres of Improved Cocoa.

1a. Ringtail Village Land Acquisition

Background and constraints: HHL employees who conceived the original idea of developing their own small cocoa farms did not have land on which to plant tree crops and were accustomed only to annual leases for milpa crops. Steps to assure land were expected to be difficult: (1) Location of suitable land was difficult because it required a knowledge of how to assess land for cocoa plus time and resources to actually conduct field assessments. (2) Securing identified land involved satisfying Department of Lands and Survey leasing requirements and paying for a legal survey. Both issues were viewed as nearly impossible for inexperienced individuals to accomplish because of the terrain and conditions.

Project plan: The original project design called for the acquisition of 1,000 acres of agriculturally suitable land along the Hummingbird Highway near HHL for 30 new farmers (employees of HHL) and the identification of another 30 farmers already located on farmland in VOP to begin cocoa farms. HHL staff identified an area at mile 41 adjacent to the Blue Hole National Park which met the criteria of being accessible and near HHL. This was land privately owned that could be titled to the Government of Belize in lieu of back property taxes and then leased to project participants with the option to buy following development.

The Ministries of Agriculture and Natural Resources, USAID/Belize, and PADF accepted the site and surveying was begun. It was expected that 40 25-acre parcels would be surveyed and that at least 30 would be suitable for cocoa. Community property for a center, roads, athletic fields, etc. were planned for the remaining land.

Results: Following initiation of the government land survey and an assessment by project and HHL staff, it became apparent that less than 50% of the site would be suitable for cocoa production due to inadequate topsoil depth and rocky conditions. Fourteen farm plots of 22 to 26 acres each were surveyed and assigned to participants by lottery in March 1985. Remaining surveyed parcels of less than 10 acres of suitable land each will be community property that can be annexed to residents' farms by application to the Dept. of Lands and Surveys. A revised perimeter of Ringtail (about 500 acres) was registered after the final survey in 1987 with the government excluding unusable land from Ringtail which will be retained by the original owner.

Progress on the legal acquisition of the RV land has been extremely slow and transfer of the title to government had not been completed as of October 31, 1987. Announcement of GOB intent to acquire had been officially published one of the two required times in the Gazette paper. The Dept. of Lands has provided a certificate of intent to each RV participant which served as an interim title acceptable to DFC for loan security.

An extensive search for additional suitable land was conducted by project and HHL staff resulting in three sites (all owned by the same private landholder as the RV site) being recommended to the Ministry of Agriculture (MOA) through the CAB. Although these sites satisfied all the agronomic criteria and were recommended by the Ministry of Agriculture for the project, the Ministry of Natural Resources declined to proceed with acquisition.

Conclusions: Fourteen farmers at Ringtail Village have official documents anticipating firm land titles. Although the delay in getting actual titles from the GOB has been cause for concern, the RV farmers feel confident that the process will eventually be completed and they all have established cocoa with mixed crops and nine houses were begun. The plans to expand to the original thirty were frustrated by the unwillingness of the Ministry of Natural Resources to acquire the necessary suitable lands in recommended alternative sites.

The original problem with the RV land suitability was a result of an unsatisfactory site assessment before the project work began. Based on this and similar experiences elsewhere in Belize (with cocoa and other crops), increased emphasis was placed on the importance of a comprehensive land assessment in training programs and a methodology was included in extension materials. There remains, however, a need to develop recommendations for alternative cropping systems for those marginal areas in which many cocoa farmers are located.

1b. Ringtail Agricultural Development

Background and constraints: The RV site was all secondary forest re-growth following lumbering operations before 1974. It required clearing or underbrushing for agricultural development. There were no roads or survey lines present. Participants were selected from HHL applicants who indicated an interest and capability in developing their own commercial cocoa farms.

Project Plan: Development plans called for establishing about 10 acres of cocoa over a period of 3-4 years. Financing with a 12 year DFC loan would fund costs of establishment and the first years of maintenance. Mixed subsistence crops, other cash crops, and a permanent residence on site were planned for each participant.

Results: Each farmer identified the areas he would use for various purposes (cocoa, housing, milpa, citrus, etc.) and began land preparations in March 1985. Most participants began with 2 or 3 acres of cocoa in the first season and added equal amounts annually. HHL coordinated procurement of hybrid seeds from Costa Rica and the Dominican Republic. Cocoa nursery space and access to potting soil was provided by HHL adjacent to its own nursery, about 4 miles from HHL. RV nurseries were maintained in 1985 on an informal cooperative basis until underbrushing was completed and plants transferred to participants' farms for transplanting. The 1986 and 1987 nurseries were located on RV farms using natural and artificial shade, thus saving the transportation costs and damages of carrying them from HHL to RV.

Cocoa was established using selected existing shade trees (e.g: allspice, native legumes, and hardwoods) as natural shade. Cocoa was planted at 10' x 10' spacing for an average of 435 trees per acre. The land was initially underbrushed and shade adjusted to 75%. After transplanting, shade was reduced to about 50%. A regular management program including fertilization and pest control was recommended. Intercrops and windbreaks were later established using plantain, banana, coconut, soursap, avocado, golden plum, etc. Agricultural problems were minimal and successfully resolved by the participants. For example, an outbreak of cocoa stem borers in March 1986 that caused significant damage to recently transplanted cocoa was controlled with insecticide application recommended by project extensionists. More importantly, it was determined that most borer damage could be prevented with earlier transplanting and timely systemic insecticide application. Farmers adopted the improved recommendations for the following year and this information was incorporated into the extension materials.

Milpas were cleared by traditional slash and burn methods and planted with a crop of corn followed by beans. Secondary crops included cassava, plantain, papaya, pineapple, and yams. Following harvest, citrus was established in these fields as the permanent tree crop. Household gardens typically contain tomatoes, peppers, squash, okra, watermelon, herbs, and flowers. Additional trial crops introduced included annatto, vanilla, and cardamom. All residents had poultry and one apiary was established in 1987.

The project purchased large quantities (100,000 annually) of plastic nursery bags in order to get low wholesale prices from a Guatemalan manufacturer. Duty free importation was legally allowed but the process was not clearly established until after working with the Customs Department for two years. The bags were then resold, at cost, to cocoa farmers in Ringtail, Valley of Peace, Toledo, and Stann Creek. Arrangements were made for this to continue after the project with the Toledo Cocoa Growers Association and Stann Creek cocoa farmers.

Most of the establishment and early maintenance labor was done manually using machetes, axes, and chain saws. Some local "contractors" were hired for time consuming jobs such as filling bags, underbrushing, and transplanting.

Soil nutrient quality at RV generally is excellent but rocky areas occur on all farms. Cocoa was planted in the prime areas in terms of soil depth and grew very well producing initial flowers and fruits within 24 months in several cases. The extended dry season of 1986-87 illustrated the need for adequate shade and nutrition management but recovery in the rainy season was very good.

Severe losses occurred in May 1987 from uncontrolled fires set to clear new milpa fields in the vicinity. The loss of young cocoa was nearly complete in areas burned (total losses were over 6,000 cocoa trees) with serious damage done to the natural shade trees and intercrops as well. Replanting began with the 1987 rainy season (June) using seedlings donated by HHL.

Conclusions: All fourteen RV farmers have established cocoa along with varying amounts of intercrops and milpa crops. Except for the 1987 fires, agricultural progress has been excellent with participants adopting improved practices with

great enthusiasm. Harvests in 1986 and 1987 included corn, beans, vegetables, plantain, papaya, cocoyam, and cassava.

Families who established early residence on their farms clearly had an advantage and made the best progress. They had much better contact with farm activities on a day to day basis and benefited from regular work being shared by all family members. A breakdown of the division of labor is as follows:

Men: Underbrushing, shade adjustment, digging planting holes, weed control, insect control.

Women: Nursery establishment, transplanting cocoa, pruning.

Children: Carrying seedlings to planting holes, fertilizing.

Family: Nursery care, intercrops, gardens.

Participants limited to farming in the evenings after work at HHL and weekends were often hard pressed to accomplish all tasks which included cocoa establishment, milpas for subsistence crops, house construction, and community work on the roads and community center building. The use of minimal equipment such as backpack sprayers and chain saws along with hired labor for selected jobs proved essential to realize satisfactory progress.

2a. Valley of Peace Land

Background and constraints: The settlement in VOP was established previous to the cocoa project by the United Nations High Commission for Refugees (UNHCR) and the GOB. Each of about 100 Belizian and Salvadoran families were provided leases on 25-50 acre parcels for farms plus a house plot in the community area. The leases were acceptable as security for DFC loans. VOP has been administered as a government-managed project through the Refugee Office. Plans to reduce government responsibility as the area becomes a community have been developed.

The Ministry of Agriculture selected VOP as a second site for the cocoa project to help develop income generating opportunities in agriculture. However, because VOP was administered by the Ministry of Home Affairs until early 1985, inter-ministerial difficulties with MOA made progress impossible until 1986.

Access to VOP and to individual farms was very difficult through 1985 since the main road crossed the Belize River by hand powered ferry and internal access roads were not completed until 1986. A new road to VOP completed in 1986 also depended on a ferry to cross the Belize River, so that access continues to be very unreliable during the rainy season (June-December).

Project Plan: The project called for the establishment of 30 cocoa farms on the already surveyed lands. Interested farmers were to be recruited, land assessments completed, and field extension to begin with the spring 1985 planting season.

Results: The difficulties between the Ministries of Home Affairs and Agriculture, coupled with an extended delay in obtaining DFC required land papers for security on the cocoa loans, postponed project activity for one year. Site assessments were completed previous to the 1986 planting season, leading to DFC loans approvals for fourteen farmers in the first season.

During the 1986 and 1987 assessments, particular attention was given to soil depth and proximity to future slash and burn areas. Recommendations for perimeter firebreaks were given and several farmers located their cocoa fields away from neighboring areas that were to be burned. Some farms were rejected as unsuitable due to shallow soils or poor drainage characteristics. Despite an informal community agreement to inform neighbors before burning, the 1987 dry season was so unusually severe (6 versus the normal 3 months) that numerous burns spread out of control across firebreaks and roads destroying various crops such as cocoa, citrus, pineapple, coconut, etc. Farmers are justifiably reluctant to incur further expenses for their established cocoa given the proximity of slash and burn areas, and new cocoa is not advised. A request from VOP farmers for the designation of a separate fire-free tree crop zone for cocoa and coffee received no response from the responsible officials in the Office of Immigration and Nationality (Ministry of Foreign Affairs).

Conclusions: All VOP project participants have official land papers and continue mixed farming activities including cash crops such as corn, beans, and vegetables. Access to VOP and farm sites is reasonably reliable now that the new roads have been completed, although the Belize River ferry will continue to limit traffic during the rainy season.

Technically, it must be noted that the shallow soils with heavy clay subsoils are not highly suitable for repeated annual crops and significant deterioration can be expected if current agricultural practices continue. Alternative farming systems including appropriate permanent crops and livestock must be introduced if the VOP economy is to improve and stabilize. Further development of cocoa is not recommended, however, until suitable fire-free land is designated.

2b. Valley of Peace Agricultural Development

Background and Constraints: Farmers in VOP were developing traditional subsistence crops (corn, beans, fruits, and vegetables) using slash and burn land clearing and rapidly removing all forest cover in the area. There was a need for better land use and for viable cash crops to support the families in VOP.

Efforts to increase cash crops were made in two main areas. Annual field crops such as corn and beans were sold in modest quantities but on-farm income was very limited and unreliable for most. Increased production of vegetables (tomatoes, green peppers, and cucumbers) was successful but experienced serious difficulties with transportation and marketing. VOP farmers needed a crop that was agronomically suitable for the area, nonperishable and easy to transport, and had a reliable market.

Project Plan: Project design called for the establishment of up to 10 acres of cocoa on 30 farms. Project staff planned to coordinate extension work through the MOA and to work with one or more of the farmer groups beginning activities.

The original plan was to provide short-term cash crop loans through a subgrant of US \$25,000 to DFC to help cocoa farmers through the establishment period. In 1985 the United Nations High Commission for Refugees (UNHCR) approved a similar loan fund to DFC for VOP. To avoid duplication, the project's fund was modified to provide long-term cocoa loans under terms similar to the Ringtail loans.

Results: A small demonstration/training nursery of about 400 plants was established for the 1985 planting season. Seven interested farmers cared for the nursery cooperatively and eventually were given equal shares of the seedlings to transplant to their own land. During the 1985 season participants' land was assessed and prepared. Additional farmers were identified for the 1986 season.

Farmers who received their lease papers were able to apply for the DFC cocoa loans to begin cocoa in 1986. Fourteen loans were approved for 2 acres each at Bz \$800/acre to be disbursed over the four year establishment period. Loans were initially limited to 2 acres per farmer to assure sufficient funds for the originally projected number (30) of farmers.

Thirteen farmers purchased cocoa seeds and established nurseries in early 1986. Two individuals encountered personal difficulties and sold out, one abandoned farming in favor of lumber milling, and ten farmers established 1-3 acres of cocoa each under natural shade similar to Ringtail. A system of procurement was set up with input suppliers and DFC so farmers could readily obtain fertilizers, pesticides, and equipment using purchase orders charged to their loan accounts.

In 1987 seventeen farmers (7 new participants) were prepared to establish an additional 25 acres of cocoa pending DFC loan approvals. Only three loans were approved due to difficulties the others had with repaying their UNHCR short-term loans. Two farmers purchased seeds and maintained nurseries to expand their cocoa acreage. Small quantities of shade tree (leucaena, madre cacao, fruits, etc.) planting materials were provided by the project and established where needed.

During the May 1987 fires, four farmers lost all their established cocoa (8 acres) and shade, most of which was in excellent condition. Although general field practices had been very good by VOP farmers, including establishments of firebreaks, the fire losses completely discouraged them from purchasing more inputs (fertilizer, pesticides, etc.) and even labor investments became minimal. The prospect of future fires destroying remaining cocoa continues to discourage farmers from continuing with cocoa and other tree crops.

The DFC loan program was modified to accommodate the losses and future prospects for VOP cocoa development. Farmers who lost their cocoa to fire had interest obligations permanently suspended and payments on the principle indefinitely suspended until they are able to resume repayments, perhaps through other cash crop development. Loans for these farmers discontinued so that funds committed to individuals but not drawn down as of May 1987 could be returned to the cocoa loan fund. Finally, the restriction limited the cocoa loan fund to VOP was removed to allow it to be used in areas where cocoa development will be more beneficial.

Project plans to assist in the development of a small cocoa growers association were discontinued following the fires due to lack of interest. Future efforts with tree crops will need to consider this since VOP lacks a suitable agricultural organization.

Governmental extension service for VOP was negligible. During most of the project there was no officer assigned to the zone all the way from VOP to Ringtail Village. The only known two visits to VOP were made when project staff invited and transported the extension officer to a workshop and for the agricultural census in late 1987.

A minor effort was made by the project in 1986-7 to introduce sesame as a short-term cash crop for cocoa farmers to use as an interim income source. The Caribbean Agricultural Research and Development Institute (CARDI) in Belmopan was encouraging sesame trials and offered technical assistance and seed to get VOP farmers started. A secure market was arranged with Operaciones Internacionales (O.I.) of Guatemala who offered to provide field assistance and post-harvest processing (cleaning and bagging). CARDI-recommended varieties were not available when planting time arrived (November) but similar varieties of multipurpose (oil and confectionery) sesame were obtained at no charge from O.I. The growing season was exceptionally dry, insect damage (ants) was severe, and the results were very discouraging. Field trials in other districts had similar experiences and indicate that additional research is needed to develop practical recommendations for small farmers.

In summary, a total of twenty-one farmers applied for DFC cocoa loans to establish an initial 42 acres of cocoa. Only thirteen were approved with ten actually establishing 21 acres of cocoa. Fires destroyed 8 acres and another 4 have been abandoned leaving 9 acres (3,900 trees) established.

Conclusions: The selection of VOP as a project site was justifiably based on developmental needs but did not give sufficient consideration to agronomic suitability for cocoa (shallow, clay soils), infrastructural constraints (poor road, no bridges), and political issues (local social tensions and national policies led to delays in government support). Since the cocoa project was limited in community development resources and unable to effectively address either infrastructural or political aspects, hindsight suggests that the VOP was probably an inappropriate site in which to work at this time.

Despite the failure to establish viable cocoa production in VOP, the project did provide significant assistance in general agricultural extension and community development. As the only group regularly present and working in VOP, the project acted as a liaison with the Department of Lands, DFC, Refugee Office, Cooperative Housing Foundation, Ministry of Community Development, Ministry of Health, and the Belize Marketing Board (BMB).

B. Train 60 Farmers in Improved Cocoa Practices.

Background and constraints: Cocoa production in Belize has been limited to traditional backyard cultivation for home consumption and several moderately large commercial enterprises focused on export production. With the exception of Hummingbird Hershey Ltd. (HHL), there were no active sources of technical information or training for prospective cocoa farmers.

Traditional cultivation methods for cocoa throughout Central America have not taken good advantage of the research and development work conducted since the 1950s. Farmers typically establish cocoa under improper shade and apply minimal management inputs and practices other than harvesting. Experience in Belize with improved methods that can increase yields from 200-300 lbs./acre up to over 1,000 lbs./acre was limited to HHL staff and did not benefit independent small farmers.

The first major effort to assist farmers and extension workers came when HHL and the Ministry of Agriculture sponsored a 2-week course in cocoa production technology in late 1984. This training provided the foundation for the project's training program over the next three years.

Project plan: Training of farmers was planned to be conducted by the project with support from HHL, through both technical workshops and regular field visits. Beneficiaries were the participating farmers from Ringtail Village and Valley of Peace. Workshop subjects were scheduled to correspond with seasonal field activities such as nursery establishment, land assessment, lining and transplanting, etc. Workshop formats included an introductory discussion followed by practical field demonstration in which participants gained hands-on experience with specific tasks.

During the final project year the training program was greatly expanded to include a series of workshops offered in Cayo, Stann Creek, and Toledo districts as part of the field testing and replication of the technical package.

Results: Ringtail farmers had the advantage of work experience at HHL and were able to begin cocoa farming without extensive training. After several initial training sessions conducted by HHL and project staff, most technical support came as individual field extension visits. Small, informal groups of 2 or 3 farmers would work together with staff to learn specific methodologies such as shade adjustment, lining, pruning, etc.

A workshop that focused on self-evaluation was particularly helpful in identifying farmer-perceived needs and solutions. Farmers criticized their own results and offered suggestions for others' questions. Successful and unsuccessful variations in practices were discussed and recommendations agreed upon.

Farm management was the subject of a key workshop that discussed the importance of financial records for budgeting, planning, and tax reporting. This subject was completely new to most participants who had little experience with record keeping or tax requirements and proved to be very valuable.

Table B-1. Training Participation.

Training Session	Location	No. Farmers/NGO reps	Extension Officers	TOTAL
<u>5-Day Courses</u>				
1. October 1985	HHL	0	3	3
2. November 1985	HHL	0	8	8
3. December 1985	HHL	0	6	6
4. August 1986	HHL	1	4	5
5. November 1986	HHL	3	9	12
<u>2-Day Workshops</u>				
1. March 1987:				
Site assessment & nursery establishment	Cayo	9	4	13
	Stann Creek	28	2	30
	Toledo	2	5	7
2. June 1987:				
Nursery management, fertilization, & shade adjustment	Stann Creek	37	2	39
	Toledo	27	5	32
3. August 1987:				
Field establishment, pest & disease control, & intercrops	Stann Creek	36	4	40
	Toledo	52	4	56
<u>9-Day Course</u>				
Sept.-Oct. 1987: Comprehensive	HHL	6	5	11

Technical workshops in VOP followed the seasonal activities including workshops in nursery establishment and care, underbrushing, shade adjustment, transplanting, care of young trees, and multipurpose intercrops (for both shade and secondary crops). Discussions were conducted in Spanish and considerable time was spent on field demonstrations. Some workshops were conducted at Ringtail Village or HHL in order to clearly illustrate practices and results.

Expanded training during 1987 was coordinated with Ministry of Agriculture (MOA) programs in Cayo, Stann Creek, and Toledo districts in order to reach cocoa farmers outside the two project sites. A schedule was set up for each district based on appropriate seasonal topics for the first year of cocoa establishment. Based on the experience of these workshops a training guide for extensionists was compiled and is included in the Cocoa Guidebook and Training Guide. Table B-1 summarizes the training program.

A total of 148 farmers from the districts in addition to the 24 project participants received technical training from the project workshops. All trainees attended classroom discussions of the principles and practices of cocoa production and participated in hands-on field demonstrations.

Conclusions: The training program was extremely successful both for farmers within the original project sites and in extending the technical package throughout Stann Creek and Toledo districts. Sustained efforts were made to integrate Belizian and external experts into training efforts. Adoption of improved practices was confirmed by follow-up field visits including the following key areas: use of improved hybrid seeds, intensive nursery care, site assessment, use of proper natural shade, establishment of permanent shade, intensive lining and transplanting, fertilization, pruning, weed and insect control, and introduction of intercrops.

C. Train 6 Government Extension Officers (E/Os) in Improved Cocoa Practices and Extension Methods.

Background and Constraints: The long-term objective of this project to accelerate cocoa development required improving the extension capability to support farmers to establish and manage small-scale commercial cocoa farms. Extension officers usually have a general agricultural background, many graduated from Belize College of Agriculture (BCA), but had negligible experience with cocoa production.

Project plan: The agreement between USAID and the Ministry of Agriculture (MOA) called for training six extension officers to serve as the main source of technical support to farmers. This would allow two officers assigned to each of the southern districts where cocoa development is likely. In turn, these six officers would train twenty other extension officers over a period of time as the need developed.

Given the shortage of available personnel in MOA three Peace Corps Volunteers (PCVs) were to be trained at HHL and assigned to the project as extension officers and trainers. It was also

determined that local NGOs were a potential valuable source of extension service for cocoa farmers and should be included in training programs.

A series of five 5-day training workshops at HHL was prepared for Belizian and foreign extension officers to be conducted in 1985-6. The curriculum included major aspects of cocoa production and was prepared for both classroom and practical field presentations.

Following completion of the Cocoa Guidebook and Training Guide, a comprehensive training and field visit program was developed in coordination with the MOA's annual workplan for 1987. This included a series of three seasonal 2-day workshops to be held in Cayo, Stann Creek, and Toledo districts followed by staff district visits to assist extension officers with application of the materials.

Finally, an extensive 2-week course was set up to train new extension officers and NGO extensionists in improved cocoa production technology and extension methods.

Results: MOA extension officers were not able to be assigned to the project as planned. Working in conjunction with MOA and USAID, alternative training and support strategies were developed. The following training program was strengthened with an expanded schedule of field visits in which project staff worked along with extension officers to assist cocoa farmers in the districts.

Five 5-day courses were offered in 1985-6 using HHL as the training center and site of most field trips. A comprehensive curriculum was presented at a technically appropriate level (see Table C-1 for the complete syllabus). Classroom discussions by project and Hershey staff local and expatriate specialists were followed by practical field demonstrations presented by HHL senior staff responsible for specific technical areas (e.g: nursery management, field nutrition, pest control, post-harvest processing, etc.). Daily study questions were given after the field study and discussed the following morning for review. A final examination including both a written and practical section was administered for MOA staff and results reported to the MOA for inclusion in personnel records. Other participants included extension officials from St. Vincent, Grenada, Barbados, and Honduras.

Following the five 5-day courses at HHL, a series of three 2-day in-district workshops was designed to reinforce extension officers capabilities in cocoa production technology and extension methods. Extension officers who completed one of the introductory 5-day courses were provided advance copies of the Cocoa Guidebook and Training Guide and given responsibility for conducting portions of the workshops with farmers.

The final 9-day course for new MOA extension officers was centered at HHL with numerous field trips to other cocoa farms and a series of presentations by development resource agencies. (See Table C-2 for the complete program) Although the course was developed upon request of the MOA to further strengthen their extension capability in cocoa, actual participants also included agricultural loan officers from Development Finance Corporation, field staff from CARE, Peace Corps, and Toledo Cocoa Growers Association in addition to new extension officers. This course was designed to provide: 1) a comprehensive introduction to the principles and practices of improved cocoa production, 2) hands-on field application of the

Table C-1. 5-Day Cocoa Production Course, Syllabus.

Day 1.	7:00 AM:	Overview of seminar program. Introduction to cocoa. <ul style="list-style-type: none">- history of cocoa- botany & ecology of cocoa- breeding & reproduction- soils & nutrition
	9:00 AM:	Breakfast.
	10:00 AM:	Welcome & opening activities/introductions. <ul style="list-style-type: none">- Ministry of Agriculture- Hummingbird Hershey Ltd.- Cocoa Development Project
	11:00 AM:	Overview of Cocoa Development Project. <ul style="list-style-type: none">- Agricultural objectives- Community development
	12:00 PM:	Lunch.
	1:00 PM:	Site Selection & Land Preparation. <ul style="list-style-type: none">- location & climate- soils & topography- vegetation, access, labor, marketing- under natural shade - underbrushing- established shade - temp. & permanent
	2:30 PM:	Field Demonstration. <ul style="list-style-type: none">- established shade - Chanona's farm- natural shade - Ringtail Village
	4:00 PM:	Study Questions.
Day 2.	7:00 AM:	Nursery Establishment Practices. <ul style="list-style-type: none">- site selection- shade: artificial & natural- germ material: seed & vegetative- potting soils & planting
	8:00 AM:	Nursery Care Practices. <ul style="list-style-type: none">- fertilization & shade- pest & disease control
	9:00 AM:	Breakfast.
	10:00 AM:	Field Demonstration - HHL Nursery. <ul style="list-style-type: none">- site, shade, soils, etc.- budding demonstration- clonal gardens & selection process
	12:00 PM:	Lunch.
	1:00 PM:	Young Cocoa Tree Care. <ul style="list-style-type: none">- lining & transplanting- fertilization- pest control- pruning & jorquette control- shade adjustment & weed control- grafted tree care- intercrops
	2:00 PM:	Mature Tree Care. <ul style="list-style-type: none">- fertilization & lime- pest & disease control- pruning: formation & suckers- shade adjustment & weed control
	3:00 PM:	Study Questions.

Day 3. 7:00 AM: Field Demonstration - Tree Care.
 - young tree care
 - mature tree care
 9:00 AM: Breakfast.
10:00 AM: Field Demonstration - Pruning.
 - routine sucker (chupon) pruning
 - formation & corrective pruning
12:00 PM: Lunch.
1:00 PM: Field Demonstration - Spraying.
 - equipment
 - handling & storage safety
 - weed control
 - disease control
 - insect control
3:00 PM: Study Questions.

Day 4. 7:00 AM: Rehabilitation of Old Cocoa.
 - objectives & principles
 - pruning & fertilization
 - coppicing & budding
 - underplanting & replacement
 9:00 AM: Breakfast.
10:00 AM: Field Demonstration - Rehabilitation.
 - Caves Branch
 - HHL
12:00 PM: Lunch.
1:00 PM: Harvesting & Processing.
 - production cycles & pod development
 - cutting & breaking pods
 - fermentation: principles & methods
 - drying: principles & methods
 - marketing
2:00 PM: Field Demonstration - Processing.
 - mechanized processing at HHL
 - quality control & testing
3:00 PM: Study Questions.

Day 5. 7:00 AM: Economics of Cocoa Production.
 - market overview
 - establishing cocoa
 - maintaining cocoa
 - high input vs low input
 - financing & credit
 9:00 AM: Breakfast.
10:00 AM: Review & TEST.
12:00 PM: Lunch.
1:00 PM: Test Results, Discussion, & Closing.

Table C-2. 9-Day Cocoa Production Course, Syllabus.

DAY 1

8:30 AM: Welcome & Opening (Corven)
- Introductions & general orientation
9:30 AM: Overview of course
10:30 AM: BREAK
10:45 AM: Introduction to cocoa (Corven)
- History, botany, & ecology
12:30 PM: LUNCH
1:30 PM: Site assessment & selection (Corven)
3:00 PM: Field Study - site assessment (Scott)

DAY 2

8:30 AM: Nursery establishment (Kather)
9:30 AM: Nursery management (Kather)
10:30 AM: BREAK
10:45 AM: Field Study - HHL nursery practices (Willacey)
12:30 PM: LUNCH
1:30 PM: Establishing cocoa (Raisner)
2:30 PM: Field Study - establishment (Raisner)

DAY 3

8:30 AM: Shade & nutrition (Raisner)
10:30 AM: Field Study - shade & nutrition (Scott)
12:30 PM: LUNCH
1:00 PM: Field Study - Tiger Sandy Bay (Downard)

DAY 4

8:30 AM: Pruning cocoa (Corven)
9:00 PM: Field Study - pruning (Raisner)
11:00 AM: Field Study - Blue Mountain Ranch (Chanona)
12:30 PM: LUNCH
1:30 PM: Insect pests, weeds, & diseases (Corven)
2:30 PM: Field Study - pest & disease controls (Scott)

DAY 5

8:30 AM: Rehabilitation & Renovation (Corven)
10:00 AM: Field Study - rehabilitation (Scott)
12:30 PM: LUNCH
1:30 PM: Harvesting, fermenting, & drying (Raisner)
2:30 PM: Field Study - processing beans (Bradley)

DAY 6

8:30 AM: Field Study - Valley of Peace (Kather)
12:30 PM: LUNCH
1:30 PM: Economics of cocoa (Corven)
2:30 PM: Toledo Cocoa Growers Association (Nichols)
3:00 PM: Field Study - intercrops (Raisner)

DAY 7

8:00 AM: Field Study - HHL practical (Scott)
12:30 PM: LUNCH
1:30 PM: Travel to DFC, Belmopan
2:00 PM: Cocoa Development Project (Corven)
2:30 PM: Belize Association for Rural Development (BARD)
3:00 PM: C.A.R.E.
3:30 PM: Belize Rural Womans' Association (BRWA)
4:00 PM: Belize Bank of Commerce & Industry (Pratt)
4:30 PM: Belize Enterprize for Sustained Technology (BEST)

DAY 8

8:30 AM: Field Study - HHL Research programs (Montero)
11:30 AM: HHL operations & policies (Burn)
12:30 PM: LUNCH
1:30 PM: Travel to DFC, Belmopan
2:00 PM: Development Finance Corporation (Bautista)
2:30 PM: Cocoa Advisory Board (CAB) (Smith)
3:00 PM: Dept. of Lands & Survey (Aguilar)
3:30 PM: Help for Progress (Shish)

DAY 9

8:30 AM: Review session (Staff)
10:30 AM: BREAK
10:45 AM: Examination
12:30 PM: LUNCH
1:30 PM: Exam results, discussion, closing. (Staff)

practices, 3) demonstration of alternative farming systems for cocoa, and 4) strengthening of relationships between extension personnel and development resources (e.g: banks, PVOs, relevant ministries, and local projects.)

Conclusions: Participation in the five 5-day courses exceeded expectations and provided an excellent opportunity for technical exchanges between Belizian and foreign extension personnel. The course material provided sound coverage of production technology. The broad experience of participants greatly enriched the whole training effort. Belizians who had attended the 1984 2-week course sponsored by Hershey gained a good refresher of their technical information and a basis for participation in the following 2-day in-district workshops.

In-district workshops were excellent in terms of quality of presentations by extension personnel, farmer participation, and development of improved field practices. (See Table B-1 for summary of attendance and subjects). Follow-up visits by project staff provided additional technical assistance and confirmed of the benefits to extension officers and farmers. Both MOA extension officers and NGO staffs were found to have greatly increased their attention to cocoa. Help for Progress, in addition to providing technical assistance, had approved one loan to a ten-member cocoa grower group and were evaluating two more. Farmers were incorporating improvements into their field practices and realizing excellent results in nursery productivity, field preparation, and rehabilitation of older trees. MOA and NGO capability to continue technical assistance appears to be well established and the farmers have the confidence to continue improving their cocoa production.

The expanded program used in the final 9-day course was clearly an improvement over the original 5-day program in that it offered more time for practical field exposure to management principles and various cocoa farming systems. Time spent actually working along with HHL field teams and at Ringtail farms was especially productive in terms of experiencing the farmers' perspective. The inclusion of trainees from DFC and CARE was an excellent opportunity to broaden the country's capability beyond the public extension service.

D. Adapt, Document, Institutionalize, and Replicate the Methodology Developed for General Application in Belize.

Background and constraints: Technical information on improved cocoa production technology has been developed in Belize by HHL and Toledo Research and Development Project (TRDP). Although experience with germ plasm selection and field practices is limited and significant improvements have been made in Belize, much of this information was neither adapted for nor available to the small-scale commercial cocoa farmer on which this project was focused.

There was a clear need for training and extension materials to support the project activities as well as for long-term development by MOA, NGOs, grower groups, and farmers. The MOA extension service, which has considerable amounts of printed material on most aspects of agriculture, did not have satisfactory resources to provide technical assistance for cocoa farmers. DFC was interested in providing credit for cocoa but lacked adequate information on

crop budgets, development plans, or a financial analysis in order to make sound assessments of proposed projects and to offer appropriate financing.

Project plan: A major objective of the project was to develop "A method to transfer this technology as a package to groups of farmers in other areas...". The technical package was planned to include extension documents appropriate for farmers and extension officers and a training program on both improved production technology and extension methods. Preliminary materials prepared in the first year were to assist in the project's implementation. Testing and improvement in the package was planned for the third project year. The final components of the package would be revised based on the experience of the project and provide a comprehensive resource for continued work after the project's completion.

Results: The project produced three final publications based on research and development by HHL and on-farm experience of the project. During the establishment of cocoa farms at Ringtail and VOP numerous modifications were made in standard recommendations to fit the needs and capabilities of small-scale cocoa farms. Feedback from participants was essential to adapt material to the specific agronomic and economic conditions of diverse small farmers in Belize.

The first documents produced by the project were a series of "fact sheets" each of which focused on specific aspects of cocoa from nursery establishment to cocoa bean grading standards. These were made available to participating farmers, extension officers, HHL staff, and others for evaluation. Revisions were made as information, much of it provided by farmers, was added and updated. Several were in both English and Spanish.

Testing of the package outside the two original sites of Ringtail and Valley of Peace began in early 1987 with the district workshops and field visits to cocoa growers in Cayo, Toledo, and Stann Creek districts. In conjunction with Ministry of Agriculture extension officials, Help for Progress, and BEST, the series of training and extension activities (described fully in sections B and C) was responsible for over 400 acres of new cocoa being established by 200+ farmers outside Ringtail and VOP in 1987. In fact, two established groups in Stann Creek have applied for leases on 1,050 acres to be used exclusively for tree crops (e.g: cocoa, citrus, banana, etc.). Regular monitoring of the progress of farmers by MOA extension officers and project staff provided invaluable information including language clarity and technical improvements needed for production of the package revisions.

Final versions of the fact sheets were compiled with additional information to produce Growing Cocoa in Belize, a 28 page booklet for farmers. It explains specific field practices and recommendations in a brief, "how to" format. Illustrations, record forms, and descriptive tables complement text when possible. The booklet was provided to all participants in the district workshops to use as a study and field guide. A complete distribution list is reported in Table D-1 and contents are summarized in Table D-2.

The Cocoa Farm Economic Report, first edition, was prepared in early 1985 to assist the project and DFC develop the loan program

for Ringtail and Valley of Peace farmers. It was based on preliminary information from HHL, DFC, and local cost sources for inputs and labor. The report was the main reference for information on labor requirements, crop budgets, and development models for extension and the DFC cocoa credit program. A updated and expanded version of the economic report was prepared in 1987 and published as the Cocoa Farm Economic Report And Development Models. Based on nearly three year's experience of the project, figures were updated to more accurately project the costs and returns of cocoa farming. Development plans and recommendations for "high input" and "low input" management were included to offer guidelines for alternative improved production strategies. The table of contents is shown in Table D-3.

The Cocoa Guidebook and Training Guide initially was prepared for the training program and a final revision produced after all courses, workshops, and evaluations were completed during the original 3-year project period. Resources for this manual include Hershey scientists, HHL staff, cocoa project staff, farmers, and other technical references. The text is a significant expansion of the farmers booklet with technical descriptions of the principles and practices of improved cocoa production adapted for Belize. Recommendations for both "high input" and "low input" farming systems are elaborated. A training guide section provides ready-to-use lesson plans for workshops and field demonstrations in specific topics of cocoa production. The complete distribution list is reported in Table D-1 and the table of contents is shown in Table D-4.

Conclusions: The plan to produce preliminary documents that were updated and revised based on the experience of the project proved to serve the objectives very well. Interim extension material was available for early training and extension work while regular feedback and evaluation from these activities provided the practical improvements needed to complete the final publications. The technical materials are comprehensive, satisfy the need for an extension and training reference, and offer appropriate literature for farmers. The economic report was updated and provides sound guidelines for cocoa financing at alternative levels of development.

While project donation supported by the experience of HHL provided a substantial foundation for the technical package materials, they are not technically refined and the documents should be considered preliminary pending further field work, maturation of new plantings, and post-harvest experience. Ongoing research at HHL and other centers will undoubtedly produce improvements in the recommendations. Longer experience with cocoa farmers in Belize is needed to develop the information fully. Hershey is preparing a cocoa reference book for extensionists and researchers that will provide a more technical level.

Naturally, the economic report should be updated periodically to reflect local conditions.

Table D-1. Cocoa Project Publications Distribution List.

Received by:	Cocoa Guidebook	Growing Cocoa in Belize	Economic Report
MOA/Belmopan	3	100	1
MOA/Toledo	7		
MOA/Stann Creek	4	40	
MOA/Cayo	2	20	
USAID/Belize City	1	1	1
PADF/Wash., D.C.	1	1	1
VITA/Wash., D.C.	1	1	1
Belize College Agric. ...	2	2	
Peace Corps/Belize	1	1	
Devel. Finance Corp.	1	1	1
Toledo Cocoa Assoc.	2	235	1
Help For Progress	1	10	1
B.E.S.T.	1	2	
British High Comm.		1	
Hummingbird Hershey	1	2	
P.A.T. School		1	
Global Outreach		1	
CARDI/Belmopan		1	
BEIPU/Belize City		1	
Chamber of Commerce		1	
C.A.R.E./Belize	2		
B.A.R.D./Belmopan		1	
National Library		1	
Santa Marta Coop.		5	

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E. Establish Community Information and Outreach Capability.

Background and constraints: Integration of agricultural with community development was a major feature of this project. It is accepted that the viability of small-scale commercial cocoa farmers depends upon more than agronomic knowledge. It requires participation in many community affairs including local government, physical infrastructure, social services, credit and income opportunities, and leadership development.

Valley of Peace requirements for community development were somewhat more evolved as well as more complicated than at Ringtail Village. The government of Belize was working along with UNHCR and NGO groups to provide roads, housing, schools, health services, and cooperative development in VOP. The project's role, therefore, was more as an adviser to complement ongoing efforts rather than to initiate projects. Ringtail Village, in contrast, was a multi-faceted effort to initiate the development of individual cocoa farms within a new community with both physical and social infrastructure.

The work in VOP and Ringtail primarily involved improving the beneficiaries' capabilities to establish and manage their young communities. This aspect was constrained by the limited experience of the residents. Considerable effort was required to develop information resources and liaison capabilities within local community leadership.

Project plan: Although at different levels in VOP and RV, the planned tasks were to identify resources for community development and to apply them to complement the agricultural aspects of the project. A major goal was to further develop the capability to continue this process within the beneficiaries after project completion.

Results: This objective was characterized by the following four phases in both VOP and RV: 1) compilation of baseline information on participants, 2) organization of participants, 3) development of inter-organizational linkages, and 4) training to satisfy specific identified needs.

Baseline data was collected and studied on Hummingbird Hershey Limited (HHL) employees and later on RV participants to help determine existing capabilities and needs. This information provided guidelines for the project in focusing its plans in both community and agricultural development.

At Ringtail three groups were formed according to expressed needs: (a) The primary group was an informal association of farmers formed to coordinate work on the road, community center building, cocoa nursery care, and to serve as a governing body. This was the beginning of the Ringtail Village Association. (b) Ringtail women developed interests in community and personal income opportunities and formed the RV Women's Group. (c) The final, and perhaps most significant group to form, was the Hummingbird Credit Union. Training and operations of these groups is described in detail under section F and H.

Project work at VOP focused more on strengthening existing organizations rather forming new groups. The Community Development Adviser worked extensively with the village council to help it improve internal operations and to work better with governmental and development agencies. Workshops and speakers were provided to help resolve various issues. Considerable effort was expended with the VOP Young Adults Group in conducting a major census of the VOP. Through organization improvements and assistance with technical skills the census was successfully completed and forms the basis for future work in VOP by the government and UNHCR.

The project coordinated training for the participating groups both for institutional strengthening and to directly benefit their members. The credit union officers participated in seminars on specific aspects of credit union management provided by the Belize Credit Union League (BCUL). These were offered throughout the year focusing on such topics as credit committee, board of directors, and management committee responsibilities, record keeping, and expanding credit union services. Additionally, the project provided one-on-one training with the credit union officers to follow-up BCUL training and to address particular needs.

Training in farm management and record keeping for all RV farmers was of particular value to participants who are entering the world of agricultural finance and commercial production for the first time. This focused on the needs for regular records and planning on the small farm and illustrated its importance for taxation and resource (labor and capital) allocation.

Conclusions: The establishment and support of three groups in Ringtail and the support of existing groups in VOP provided essential complementarity to agricultural development. This was especially important at Ringtail where everything from land preparation to housing was a pioneering effort. Had the project only focused on agricultural aspects it is doubtful that sustainable development could have occurred. The development of organizational resources and inter-relationships was done very effectively and formed the basis for local leadership capabilities.

F. Support Women Participation in Economic Activities.

Background and constraints: The agricultural focus of the project on commercial production of cocoa by family farms implies participation by the women. Further, there were non-agricultural opportunities for community and family income that could be developed by the women. At Ringtail all the men are employees at HHL while only some of the women have, at best, part-time jobs to provide off-farm income. In VOP cultural traditions and home-to-farm distances often limited womens' role in cocoa and other field crops.

Project plan: The role of women in economic activities involved two aspects which developed distinctly. First, the establishment of family cocoa farms would require the participation of wives in initial decision making and planning followed by ongoing farm management. Secondly, project staff encouraged the participation of all affected women in meetings, workshops, and organizational

land surveying, road construction, housing, and access to health, education, and transportation for participants who would be required to live on their farms. (The original MOA policy was that all project participants must establish a permanent residence on the Ringtail land in order to qualify for a lease fiat.)

Fortunately, RV was along the Hummingbird Highway within four miles of HHL. The public school and intermittent health clinic there would serve families of Ringtail settlers who were all employees of HHL, as well as other residents along the Hummingbird Highway. Regular bus service to the north and south was available on commercial carriers.

Project plan: Although it was expected that the project would develop the Ringtail community infrastructure, little specific funding was available and external sources had to be explored. USAID has a rural roads improvement project that would be considered and the Cooperative Housing Foundation had a home financing program. A new USAID "Better Productivity Through Improved Health" project was expected to provide technical assistance for water and sanitation.

Results: The Department of Lands and Survey completed the property survey and cut lines along all internal borders and the perimeter of Ringtail. HHL provided temporary quarters, use of their dining hall, and daily transportation for the survey team.

The Ministry of Agriculture was asked for and provided a bulldozer to open and shape the roadways in early 1985 and again in 1986. Since the USAID roads project could not assist with the road alternative sources were exploited: HHL contributed the use of its equipment to put stone fill on the road. The Peace Corps Volunteer working at Ringtail assisted the village association in obtaining a Peace Corps SPA grant for road funds. The Ministry of Public Works provided weekend use of dump trucks and a front loader for a limited time. HHL granted permission to take fill stone from their property along the Sibun River, for which the grant paid drivers' salary and fuel costs. Significant time and effort were donated by men and women of Ringtail who worked on the road with hand tools to spread stone and fill the road. Four sets of culverts were donated by the USAID roads project and installed by participants working with Peace Corps. Finally, a private truck was hired to complete filling not done by Public Works. Repeated requests to grade and finish the 6,000 feet of road were not answered by the Ministry of Public Works.

Initially, requests to the CHF for housing assistance were unsuccessful because CHF funds were only for urban housing. An expansion of the CHF program, however, did make funds available through the credit union for rural home loans. CHF also provided on-site technical assistance in construction techniques and designs. A CHF grant to the RV village association provided funds for the services of a local builder as an adviser to residents beginning their houses. HHL donated unused worker houses to Ringtailers who dismantled the wood structures and recycled useable materials (e.g., lumber, roofing, doors, etc.) into their own homes at Ringtail. Four participant houses were established in this way. Added improvements made later included new paint, concrete floors, and

membership for community development.

Results: Despite limitations and logistical constraints, the role of women in agricultural and community development activities steadily increased until many of the initiatives began with women who wanted a more active role. Given the limits of a small community, it was essential to mobilize all the resources to the extent possible and women successfully played a very construction role that will be vital to sustain efforts.

While the husbands were working at HHL, the women were often responsible for continuing the farm work. Maintenance of the cocoa nurseries and planting the home gardens by the women proved to be a major advantage for those families to keep up with the agricultural development of their new farms. The Ringtail Village Womens' Group began functioning by assuming responsibility for the annual childrens' Christmas Party from HHL. As Ringtail was established they also developed the following dual purpose: 1) raise money for expansion of the community center building funded by CHF and 2) develop some home-based income generating activities. The first initiative successfully raised the needed funds with a series of bi-weekly video movies shown in the HHL recreation room. Members prepared refreshments (e.g., cookies, pop corn, etc.), advertising posters, and coordinated logistics. By late 1987 the expansion construction was completed and plans developed for some basic landscaping.

The second initiative focused on production of several craft items and Christmas decoration for local use and sale. A number of workshops conducted by an HHL employee got the group started with specific items. Planning for other activities such a roadside produce and refreshment stand continue to be discussed. Discussions with a couple of other national support groups were underway to explore broader marketing possibilities in Belize. For example, in conjunction with Belize Enterprise for Sustained Technology (BEST), a supportive program to strengthen the group through organization planning and goal development partially funded by the project was planned for early 1988.

Conclusions: Despite the small number of members (5) and very limited resources, the Ringtail Womens' Group has taken some successful initiatives and developed plans for future opportunities. Their contribution to the community center building gave them the personal satisfaction of participating in development of the new community. They have seen the fruition of their own efforts in the building and the home crafts and have gained confidence in their capability to sustain more productive projects.

G. Develop Basic Social Infrastructure Including Health, Water, Housing, Education, and Transportation.

Background and constraints: The infrastructural needs of Ringtail Village were the responsibility of the project, whereas at Valley of Peace this was done mainly by the UNHCR and government. RV was established on a completely undeveloped site at which there were no roads, water, or other community facilities. There was need for

additions. Technical assistance was provided in introducing improved cooking stoves (lorena type) following a fire that destroyed one house.

The community center was built with a CHF grant to the RV village association. HHL contributed transportation of cement, concrete blocks, and lumber to the site and the General Manager generously provided on-site supervision of the construction. HHL also donated an unused 4,000 gallon water tank that was dismantled by Youth With A Mission volunteers and Ringtail farmers and reassembled at the RV center to hold rainwater into the dry season. An open-sided addition which doubled the building's size was completed with funds raised by the RV Womens Group. The building was very functional before it was even completed. Ringtailers stored agricultural and construction materials under the roof and inside for security for short periods while building and planting. The housing adviser resided inside while he worked for the residents and training field demonstrations were conducted there.

A groundwater survey was completed by Dr. White, Washington State hydro-geologist doing research in Belize, and confirmed by Central Farm (MOA) technicians. The reports indicated that groundwater was in abundance but because of limestone formations it flows in narrow channels that would be very difficult to locate given locally available technology. It was recommended that well drilling was not feasible in the Ringtail site. Surface water is available in one major and several secondary seasonal streams from June through April. Rainwater is readily available providing one has the capability to catch and sanitarily store from 90 inches of precipitation per year. Most RV farmers set up small interim collection systems and will expand as funds allow. HHL provides a water delivery service during the dry season for Ringtail.

Domestic sanitation was a major concern and several options were developed. The USAID-funded health project built a model "ventilated improved pit" latrine (VIP) at the RV community center. Since this was beyond the budgets of most Ringtailers to build for family use, homes installed basic pit latrines until better units could be afforded.

A joint effort to improve housing, water, and sanitation in VOP with CHF and the USAID health project were frustrated by the unsettled political situation there.

Conclusions: The overall community development component of the project exceeded realistic expectations considering that most funding and technical assistance for surveying, road building, housing, water, and transportation had to be obtained outside of the project. The support of HHL, CHF, and Peace Corps proved to be vital to the success of most of these activities. The key role of the project in the identification and coordination of these and other resources was the basis for this success.

The road construction began as a true grassroots effort by the Ringtailers, gained support from HHL, and was completed with funding through Peace Corps. Except for the initial opening of the roadway by MOA equipment, the Ministry of Public Works provided minimal assistance, even when funding was available to pay for the work.

Housing, which was not realistically expected to begin until after all cocoa was established, began with individual "bush houses"

and then gaining the donation of materials by HHL. The CHF loan program later came in to support construction of permanent homes and strengthened the credit union also. At the end of the project period (October 1987), four families were living on their own farms and seven new homes were under construction.

H. Provide Institutional Support for Self-reliance.

Background and constraints: The situations in Valley of Peace and Ringtail Village must be distinguished as above. In VOP there was really almost no role for the cocoa project to play in this area since the Refugee Office and UNHCR had already been addressing these needs for some time. One exception was to consider organizing the cocoa growers. In contrast, Ringtail had no history and the residents would need to consider all possibilities for a small rural community.

Project plan: The general plan was to facilitate the establishment of participant chosen organizations, enterprises, cooperatives, and social groups and to assure the capability for their continued management and development. It was anticipated that this would focus on groups primarily appropriate to commercial cocoa production and to rural Belize living.

Based on the initial case studies of RV participants and follow-up interviews several needs and interests were to be identified and addressed. The community development adviser explored the resources available in the government and private sector to determine the most practical strategies within the scope of the project. These resources would be enlisted to assist the RV groups, to establish productive linkages, and to provide training for the operation of the groups.

Results: Two needs became immediately apparent early in the establishment of Ringtail Village. First, a new community should have a representative body to speak for the residents and to coordinate development activities. Second, RV residents, and most HHL employees for that matter, lacked knowledge of and access to basic financial services for savings and credit. The only two routes for finances available were either through an informal program of the financial officer of HHL which provided some credit to employees, or through local syndicates that offer their own peculiar form of savings by way of a rotating lottery. In fact, personal savings depended on the time cash could be held in the pocket, offering little for long-term planning or emergencies.

It was unclear how to address the credit need until the opportunity for home loans for rural areas became available from Cooperative Housing Foundation (CHF). The one constraint was that CHF money was being provided to local credit unions through the Belize Credit Union League (BCUL) but no credit union was in the area, not even in Belmopan, the nation's capital city. Fortunately, this opportunity created the idea that a credit union would be the answer to several Ringtail needs.

The credit union began by forming linkages with the Ministry of Cooperatives as required by law and with the Belize Credit Union

League. Additionally, within its first year financial arrangements were established with Cooperative Housing Foundation (CHF) for housing assistance.

The Hummingbird Credit Union is the first new credit union in Belize for several years and was labelled by the Minister of Trade and Commerce at the 1987 annual meeting as the "most promising in Belize because it was founded to encourage production rather than consumption". Training was provided to the officers by a project Peace Corps Volunteer and through representatives from the BCUL at regular seminars for credit unions. Two officers completed 20 hours of specialized training in computer literacy to use their computer donated by the project. Membership, deposits, and loan activity grew from the beginning and continue. Many members have selected to have payroll deductions made by HHL for both savings and loan repayments.

The Ringtail Village Association is legally recognized by the government to represent the RV residents. Elected officers received training in various aspects of public administration and have successfully overseen the acquisition and utilization of the funds for the community center and road construction. They will continue be responsible for developing land use policies, community planning, and obtaining public services available to communities in Belize.

In the Toledo District, the Ministry of Agriculture had coordinated with HHL a program of cocoa seed distribution for farmers until 1985. Discontinuation of that effort brought a request from several farmers for assistance from the cocoa project. Although Toledo was outside the scope of the project, an established Peace Corps Volunteer (PCV) working with cocoa farmers could coordinate activities. The farmers agreed that the most practical strategy for them would be to form an organization of cocoa farmers to support ongoing cocoa development in the district.

Representatives of the new group worked with the PCV and cocoa project director to prepare a terms of reference and constitution. Application for official recognition was submitted to and eventually approved by the government. A proposal for institutional funding was prepared by the project director and team members and submitted to the Peace Corps SPA program. This formed the basis for the Toledo Cocoa Growers Association (TCGA).

Since its inception, TCGA has grown to over 105 dues paying members who have elected officers, participated in training at HHL and in project workshops, opened a small input supply center with a paid manager, and become a capable organization to represent the interests of Toledo cocoa growers. The cocoa project has agreed to sponsor a series of five 2-day training courses at the Belize Institute of Management (BIM) for selected members. These will occur from January through March 1988 and include the following:

1. Effective Business Management
2. Supervisory Management
3. Finance and Accounting
4. Starting and Managing a Small Business
5. Fundamentals of Marketing

Additionally, TCGA will benefit from assistance of advisers from Belize Enterprise for Sustained Technology (BEST) in organizational planning and development.

Conclusions: The institutions at RV are very small and need ongoing contacts to develop and benefit their members. Appropriate government and private agencies were identified and linkages established as the groups developed. The village association, officially linked to the Ministry of Local Government, requested assistance from and began working with the Cooperative Housing Foundation (CHF) on the community center building and with the Peace Corps Special Projects Assistance (SPA) program on the roads. An informal relationship with Youth With A Mission (YWAM) provided voluntary assistance for several farmers in need of help and with the community rainwater storage system.

Hummingbird Credit Union is a clear success in that it has been strongly supported by a growing membership, initiated innovative financial programs for its members, and has developed capable leadership internally to continue performing well. HHL staff support is valuable.

Toledo Cocoa Growers Association was formed by its members out of a need for better coordination and technical assistance in cocoa development. Continued growth of its voluntary membership indicates its appeal and the confidence that Toledo farmers have in its leadership. TGCA will continue to improve its services and undoubtedly will benefit from the new Toledo Agriculture Marketing Project (TAMP) in improved post-harvest processing and marketing of cocoa and from other donor activities benefiting Toledo District farmers.

III. LESSONS LEARNED

1. There were significant advantages in combining the interests and resources of private sector corporation with public and nonprofit development efforts.

The corporate interests of Hummingbird Hershey were compatible with the governments in cocoa development and the implementing PVOs were able to facilitate and enhance the resources of both to strengthen the project. To support the project's infrastructure established by the PVOs, HHL generously contributed use of its facilities, equipment, and personnel to aid project beneficiaries. Similar relationships with other projects clearly would improve development capabilities.

2. The creativity allowed under an Operating Program Grant (OPG) was responsible for several successful inter-organizational linkages that significantly expanded the benefits and assured the sustainability of the project initiatives.

Funding and technical assistance for roads, housing, a community center, a cocoa growers association, and the credit union were not included in the project budget but are major accomplishments. Vigorous exploration of resources with USAID, Cooperative Housing Foundation, and Peace Corps led to creative solutions which were important to project success.

3. The original project design and expectations were unrealistic in terms of the rate at which participants could establish intensive cocoa farms, housing, and community infrastructure while working full-time jobs.

At Ringtail Village farmers faced with labor requirements of 187 man-hours/acre to establish cocoa could not reasonably be expected to plant 10 acres of cocoa plus subsistence crops, build a family residence, and assist with constructing the new road and community center in evenings and weekends after their regular work at HHL. Project plans to establish 10 acres per participant will be realized in four or five years rather than three as became the pattern for the DFC loan program as well.

Valley of Peace farmers generally lack off-farm income and capital to establish cocoa at the same rate. A more realistic program for VOP would have been for them to do a total of five acres in four years.

4. Government capabilities in the key roles of land acquisition and provision of extension personnel were over-estimated and caused basic changes in project strategy. Ministry of Agriculture personnel from all levels should have been much more involved in initial project design and development to assure clarity of roles and interests.

Although project design was sound, Ministry of Agriculture personnel below the Permanent Secretary level did not participate or contribute in its development. Government resources are very limited and the project tended to be perceived as external to the MOA and intruding on their plans. Misunderstandings regarding objectives and resource allocations could have been avoided with a better initial integration in government's activities.

5. The innovation of a continuous evaluation process provided valuable support and criticism when it was needed rather than after project completion.

Final evaluations provide good hindsight and the basis for "lessons learned". The continuous evaluation, performed every six months with annual retreats, provided fresh insights, mid-course corrections, and facilitated project management when and where it was needed.

6. Resolution of the political difficulties in Valley of Peace were outside the scope of the project, directly constrained cocoa development efforts, and should have disqualified VOP from participation.

The lack of a clear public policy on refugees/aliens, inconsistent representations by government officials about immigration, land rights, and local organizations, and the erratic development of the local village council out of the UNHCR refugee project proved to be too disruptive to allow long-term agricultural activities to proceed. It should have been apparent in the beginning that, as refugees, VOP people would require more time and support than were available within the scope of this project.

7. Local leadership capabilities were critical to the success of both agricultural and community development components as demonstrated in the contrasts between Ringtail Village and Valley of Peace.

Ringtail Village began with the recognized dynamic leadership of Patrick Scott, HHL Farm Manager, and with a working comradery that immediately facilitated cooperation and mutual confidence on their farms.

Valley of Peace, which had cultural tensions between Belizians and Salvadorians, divided leadership, and little community direction, could not work well in easy times, much less well in difficult situations. Despite sincere efforts by numerous hard-working, well intended individuals, VOP clearly illustrated the need for community cooperation with local leadership.

8. Land assessments for Ringtail Village and Valley of Peace suitability were unsatisfactory, limited the number of farmers that could participate, and burdened the project with the major responsibility to acquire alternative sites.

The criteria for land selection was not well defined and allowed the Ringtail site to be accepted before it was completely assessed. The services of the Land and Survey Department and Central Farm technicians were not properly included in site identification. The consequences adversely affected the number of farms available, the percentage of land that could be cultivated, and required extensive time to be spent searching for but not obtaining alternative land.

Soils in Valley of Peace proved to be marginally suitable for cocoa with shallow topsoils over heavy clay or marl subsoils.

9. Seasonal training with an emphasis on practical field demonstrations is superior for farmers, while more intensive short courses combining cocoa technology and extension methods is most effective for extension workers.

Technical training in improved practices for a long-term crop such as cocoa includes a lot of new information for farmers used to working on a seasonal basis. Organization of training into seasonal packets gave the farmer manageable amounts of fresh information about relevant activities at times when field demonstrations could show actual materials and examples.

Extension officers who must guide farmers in planning must have, on the other hand, a comprehensive understanding of cocoa technology and require more extensive training including the principles of field practices and special extension methods for tree crops.

10. The incompatibility of permanent tree crops and annual slash and burn cropping systems dictates that fire-free areas be established either by farmers or the government to avoid the unacceptable risk to long-term crops.

Fire damage at Ringtail Village, Valley of Peace, and elsewhere in Belize illustrated the incompatibility of slash and burn agriculture with any kind of permanent crops including cocoa. Separation of land uses must precede establishment of trees and can be accomplished by the farmers

such as was done in Stann Creek, or by enforcement of government restrictions on burning. The risk of lost capital and labor invested is simply unacceptable and should not be borne by farmers pursuing productive, sustainable agriculture that is in the nations and environments interest.

11. The overall economics of small-scale commercial cocoa production are excellent, but proven recommendations for short-term cash crops during the four-year establishment period and for multipurpose intercrops for long-term diversification are limited and need further development.

Preliminary information developed by Hummingbird Hershey and in the project's Cocoa Farm Economic Report indicate that over a 20 year period a very good economic return in cocoa is possible. This, however, assumes the resources to endure the first four years of establishment in which there is no return on labor or capital. Full-time farmers need better recommendations for interim cash crops that can be interplanted with young cocoa and for permanent shade tolerant intercrops to diversify production.

COCOA DEVELOPMENT PROJECT OF BELIZE



Pan American Development Foundation
1889 F Street, N.W., Washington, D.C. 20006 USA
(202) 458-3969 Cable: FUPAD Telex: 64128



Volunteers In Technical Assistance
1815 N. Lynn St., Suite 200, Arlington, VA 22209 USA
(703) 276-1800 Cable: VITAINC Telex: 440192 VITAU1

Accelerated Cocoa Production Project: Addendum to Final Report

Prepared by Dr. J. Corven, Project Director



The Cocoa Development Project was funded by the United States Agency for International Development (USAID/Belize) and implemented by PADF & VITA with support from the US Peace Corps.

ADDENDUM

This report serves as an addendum to the Final Report of the Accelerated Cocoa Production Project and covers all project activities conducted from January 1 until June 30, 1988. Approval by USAID/Belize was given for this no-cost project extension to continue ongoing cocoa project activities funded by OPG no. 505-0023. The following three activities were undertaken in cooperation with the Belize Ministry of Agriculture:

- A. Technical training of farmers and extension officers in Stann Creek and Toledo Districts;
- B. Institutional strengthening of the Toledo Cacao Growers Association through management training;
- C. Organization and implementation of the Belize National Cocoa Forum.

Project extension work in Belize was done during four field trips conducted according to the following schedule:

- March 1-7: Preparations for the technical workshops.
Organization of plans for Cocoa Forum.
- April 4-15: Stann Creek workshop (April 7-8).
Toledo workshop (April 12-13).
Preparations for Cocoa Forum.
- May 9-13: Final preparations for Cocoa Forum.
- June 1-15: Logistics for Cocoa Forum.
Conduct Cocoa Forum (June 8-10)
Compile and distribute Proceedings.

Results and Accomplishments

A. Technical Workshops

The anticipated expansion of cocoa in Stann Creek and Toledo Districts requires that the capability to conduct proper land assessments and to manage cocoa nurseries be well established within the farmer groups and the extension service. Further, post-harvest processing of cocoa beans and rehabilitation were also identified as needed subjects for the 1988 training program. MOA extension officers and farmers participated in selecting these topics and arranging logistics for the workshops.

The Stann Creek District workshop was held in Santa Rosa Village and was attended by 19 farmers from 6 villages and 5 district agricultural extension officers. Specific topics included nursery establishment,

nursery management, and improved field practices. Local extension officers were responsible for specific presentations and provided excellent materials. Field trips were taken to nearby farms to demonstrate field conditions and practices. Participation was very good with farmers joining in presentations, discussions, and asking pertinent questions. The new cocoa established in 1987 appears to be in satisfactory condition with plans for expansion established. As a result of the workshop, farmers placed orders for an additional 10,500 seeds (about 21 acres worth) to be acquired through Hummingbird Hershey in late May or early June. The MOA extension officer will help coordinate the effort and Help for Progress will continue the technical assistance we initiated with them in 1987.

The Toledo District workshop was held in San Antonio Village and was attended by 57 farmers from 9 villages and 6 district agricultural extension officers. Specific topics included site assessment, rehabilitation, and fermenting, drying, grading, and storage of cocoa beans. Local extension officers and the Peace Corps Volunteer accepted responsibility for several technical presentations as well as the field demonstrations, and were very effective. Farmer participation was highly enthusiastic with several offering brief presentations on their own experience in post-harvest processing and other topics. Following the workshop, three farmers who are just beginning production transported 400 pounds of fermented and dried beans to HHL where they received payment.

These workshops served as a continuation of the effort to strengthen the MOA extension officers' capabilities in improved cocoa production and extension methodology. Responsibility for giving the presentations and field demonstrations was gradually transferred to the extension officers over the period from March 1987 until April 1988. It was clear that not only did the extension officers' technical capability increase, but also their confidence and credibility improved significantly. This should be reflected in a more vigorous effort by the districts to promote cocoa production and will secondarily support development of other crops.

B. Institutional Strengthening of TCGA

Arrangements were established between the Toledo Cacao Growers Association (TCGA) and Belize Institute of Management (BIM) for a series of seminars in which TCGA members participated with financial support provided by the cocoa project. The following table summarizes the training completed:

Dates	Seminar	Attendees
Jan. 13-15	Effective Business Planning	1
Jan. 25-27	Supervisory Management	2
Feb. 22-26	Starting a Small Business	3
	Total	6

Proposed training in organizational development to TCGA and the Ringtail Womens Group to be provided by Belize Enterprise for Sustained Technology (BEST) was not approved by the Ministry of Agriculture and the activity had to be cancelled.

C. Belize National Cocoa Forum

The first Belize National Cocoa Forum was held June 8-10, 1988, at the Belmopan Convention Hotel. The official opening was done by Rt. Honorable Manuel Esquivel, Prime Minister of Belize and the Keynote Address was provided by Hon. Dean Lindo, Minister of Agriculture. Special Guest Speakers included Dr. Oleen Hess, Director, PADF Eastern Caribbean Project, Mr. Inge Nordang, IFAD/Rome, and Mr. Peter Lapera, USAID/Belize.

Attendance was better than expected with delegates representing governmental ministries, parastatal institutions, numerous private voluntary organizations and producer groups, private cocoa and agricultural businesses, as well as cocoa farmers from three southern districts of Cayo, Stann Creek, and Toledo.

At least two Ministry of Agriculture extension officers from every district in the country participated with financial support from the Cocoa Project. Ten officers were awarded certificates of participation by PADF in recognition of their professional efforts and contribution to cocoa development in Belize.

The Toledo Cacao Growers Association (TCGA) funded four members to attend the Forum. Other cocoa grower groups in Toledo and Stann Creek selected sixteen representatives to attend for whom the Cocoa Project provided financial assistance for transportation and accommodations.

There was a total of 79 registered delegates with several additional visicers attending selected panels. The following is a breakdown of participants:

Ministry of Agriculture.....	22
Private cocoa farmers.....	15
Private Voluntary Organizations.....	14
Hummingbird Hershey/Hershey Foods.....	7
Government of Belize (non-MOA).....	6
Farmer organization representatives.....	5
International/diplomatic personnel.....	5
Peace Corps.....	3
Private businesses.....	2

Each panel consisted of 3-4 subject experts who presented a selected paper within the topic coordinated by a moderator who previewed and summarized the material. A discussion period followed each panel in which all participants were given an opportunity to ask questions and

offer remarks. In general, questions and remarks were excellent and strengthened the panels' contribution to the Forum. All panelists submitted written copies of their papers, and these along with a transcribed record of the discussions were published in the Forum Proceedings.

The format of the Forum consisted of seven panels organized and conducted as follows:

Panel 1: Policy and Planning. The Ministries of Agriculture, Economic Development, and Natural Resources representatives provided official presentations of public policy and plans regarding general public support, agricultural programs, and land resources. The discussion period focused on issues of land policy with strong concern expressed over land tenure in Toledo the need for better land assessments to identify cocoa areas.

Panel 2: Economics and Marketing of Cocoa. Topics related to agricultural economics and marketing of cocoa were discussed by representatives of Development Finance Corporation, MOA Policy and Planning Department, Cocoa Advisory Board, and PADF. Questions were raised by the audience concerning the dependability of economic projections for Belize and the world market for cocoa.

Panel 3: Cocoa Production Factors. Technical aspects of cocoa production were presented by Hummingbird Hershey Ltd. staff including propagation, management, pest management, and post-harvest technology. Most of the discussion centered on issues of hybrid versus vegetative propagation and their relative cost-benefits for small farmers in Belize.

Panel 4: Scientific Research. Results of field studies were presented by the Ministry of Agriculture station in Toledo, Hummingbird Hershey, Hershey Foods Corporation, and a private cocoa farmer. These papers documented the results of initial research projects involving field trials with fertilizers, shade, intercrops, and fermentation methods. The questions drew attention to the economics of the various recommendations including intercrop revenues and establishment costs.

Panel 5: Extension and Technical Assistance. Experience and programs in extension were discussed by extension officers from Stann Creek and Toledo, Hummingbird Hershey, and the Toledo Cacao Growers Association. These papers documented the efforts and constraints of growing public and private extension programs in Belize. The follow-up discussion questioned plans for expanding the extension service to small farmers.

Panel 6: Development Programs and Resources. Organization representatives provided previews of the planned cocoa-related projects supported by USAID and IFAD. A narrated slide presentation of the Accelerated Cocoa Project was given by PADF. There were questions that clarified details of the new projects.

Panel 7: Conclusions and Recommendations. The moderator of each preceding panel served as a panelist on this final panel summarizing their topics and formulating recommendations based on the papers and discussions. Their reports were supplemented by comments and suggestions and are attached to this addendum.

D. Conclusions

The technical training clearly was of interest to farmers and extension officers as reflected in their enthusiastic participation. The information was practical and relevant for both farmers and extension personnel and complemented material available in the previous workshops and technical guides published under the project. Field demonstrations were not only useful in illustrating field practices but in showing the benefits already realized by farmers incorporating improved practices in their management.

Management training by BIM served to broaden the capabilities of the TCGA officers and to get new leaders started in management level activities. Since the seminars were brief and specific, continued training and support will be necessary to encourage application of the principles involved. TCGA is a growing association (130 members as of June 8, 1988), but is experiencing serious difficulties in defining its goals and responsibilities. Additional guidance in defining its structure and management priorities should be a major priority of the TAMP effort. This must be done so that ultimate responsibility for decisions and actions rests with the TCGA membership and is not pressured to satisfy preconceived concepts of what the group should do.

Remarks following the Forum indicate widespread satisfaction that the important issues were well organized and presented by panelists, the diverse participation from public, technical, and economic sectors provided an integrated perspective on issues, and that the overall knowledge and enthusiasm for cocoa has been significantly advanced by the Forum.

The Forum provided a dynamic format for the exchange of technical information and issues. The participants contributed to and benefitted from the program in a very constructive manner. Although cocoa development has been gradual in Belize, interest in continued growth of the cocoa industry in Belize has never been greater, and the Forum reinforced this atmosphere. An informed and enthusiastic foundation has been established on which the Toledo Agricultural Marketing Project can build.

POLICY AND PLANNING

Conclusions and Recommendations

The papers presented and the subsequent discussion revealed that there is an effective government policy for the development of the cocoa industry, and that this policy is being implemented.

There would seem to be a general understanding of the policy by those most concerned.

One aspect not covered in the papers presented nor raised in the subsequent discussion is that of marketing, and an early policy decision on marketing channels is desirable.

The agriculture policy of the Government of Belize is based on diversification of production, the free play of market forces and with special emphasis on export crops. The development of the cocoa industry has a high priority, having a guaranteed market and being very suited to small farm production. Government has amply demonstrated its commitment to cocoa production by way of development concessions, feeder roads, allocation of lands, etc.

Even more emphatic has been the close co-operation between the Government and the various development agencies in special projects, such as the Ringtail Village, the Accelerated Cocoa Development and with the upcoming Toledo Small Farmers Development Project.

The Prime Minister's opening address emphasized further the Government's commitment to the development of the cocoa industry, and indeed highlighted the progress already made and the close co-operation and effectiveness achieved with the various development agencies in this project in contrast to some others.

During discussions on land availability, it was emphasized that the total land available for allocation was limited and that suitable for cocoa production even more so. Belizeans could readily obtain lands, as could non-Belizeans provided they satisfied certain conditions.

Soil surveys have been carried out in great detail in the Belize River Valley and parts of the Toledo and Stann Creek Districts. More surveys are projected for 1989 through the UK Technical Assistance Programme. Subsequently a land use map will be prepared which will, it is claimed, make the decision to dereserve or enlarge land reserves etc. a scientific one rather than a more arbitrary one, as at present.

One queries too much reliance on such surveys, experience in the banana industry has shown that soils previously considered unsuitable have proven to be fine, although sometimes new techniques have to be employed.

In a discussion on lands, some confusion arose over the procedure to be followed by an applicant for land for a particular development project. It would seem desirable to streamline this process. The problems arising from the communally held Indian reserves was raised -- the problem remains.

Would-be cocoa farmers in Toledo were advised to obtain lands outside of the reserves, thus enabling them to have collateral for loans.

Another matter of concern is the restriction of development concessions to larger scale farmers, thus denying the small farmer of the benefits of duty free entry for project inputs etc. Whilst it would not be administratively feasible to grant small farmers development concessions individually, some of the benefits could be achieved if such concessions were available to growers cooperatives.

Many agricultural inputs such as fertilizers are duty-free, but some such as insecticides and fungicides are not, this is an area where Government could materially assist small farmers by making essential inputs duty free.

A point raised during discussions was that cocoa was by no means a new industry to Belize, that one of the earlier attempts was wiped out by Hurricane Hattie, when in the first years of development. In view of this had any thought been given to insuring the crop. Investigations revealed that the costs of such insurance were prohibitive.

In conclusion, with the possible exception of marketing, the policies of the Government of Belize in respect of the cocoa industry seem adequate. The implementation of the policy is proceeding apace. Thanks to the close cooperation between Government and the various development agencies.

ECONOMICS AND MARKETING

Conclusions and Recommendations

Present Status of Cocoa in Belize

As agriculture has been placed as first priority on the Government's list of industries and as there is a strong determination to diversify and broaden our agricultural base, the production of cocoa has been revived from the 1950's.

Since 1977 cocoa production has been gradually increasing by means of new averages and by rehabilitation of old groves. This has been accomplished by larger farmers averaging in excess of 50 acres of cocoa and small farmers with averages ranging from 1 to 20 acres. There is a renewed interest by farmers to establish and cultivate cocoa as is evident by your participation in field demonstrations carried out over the past several years and also by your participation at this forum.

Cocoa cultivation by small farmers may perform better than larger plantations as this crop is easily intercropped and can use the labour of all members of the household. It is estimated that more than 40% of the world cocoa production is provided by farmers not having more than three acres of cocoa.

Questions have been asked whether or not yields of up to 800 lbs per acre can be achieved. The answer is yes it is. HHL has achieved 800 lbs/acre in some field and has an average over its 400 acres of approximately 500 lbs per acre. This is similar to the Eastern Caribbean.

However, several factors of cocoa production must be addressed in order to achieve those production levels. These factors have been discussed in other presentations during the forum and pertain to the agricultural practices needed to grow cocoa.

Presently the few main components for the success of cocoa production has already been addressed. Some cocoa can be grown in some soils of Belize, the technical know how of cocoa cultivation is available through several public and private organizations, processing facilities and processing know how is available to cocoa farmers and even have already established a market.

Use of the available technical assistance provided by local sources. Learning techniques in fermentation and drying to ensure a relatively high quality cocoa bean.

Economics of Cocoa Production in Belize

To be able to be a successful farmer, one must be able to produce his goods cheaper than the price he is being paid for his goods. This can be achieved by several methods. Lower the cost of your inputs by correct applications for the most economic return, supplementing your income from one crop with the income from another (diversification/intercropping), knowing your capabilities and not over extending your acreage.

Production figures and cost of production has been compiled from data made available to the Accelerated Cocoa Production Project and are consistent with the industry at that time. Lending agencies have also scrutinized these figures and agree that they are realistic.

Cost vary from individual to individual and it is the responsibility of the individual to make his own projection prior to investing in any crop not only cocoa. As is with agricultural practices, a farmer should check to see if his land is suitable for a crop so should he to see if he can make money from what he is about to plant.

Conclusion

Evaluation undertaken on the progress of the cocoa industry from its inception until now, indicate that some success has been achieved in areas such as training, institution building, project awareness, research and production.

It is now necessary for all relevant participating agencies to cooperate and to coordinate their activities for the purpose of continuing the development of a viable cocoa industry.

It is believed that more effort should be made to encourage farmers and other prospective investors to take advantage of the availability of credit and other supporting services.

Loan applications for cocoa production can be made at the DFC Head Office in Belmopan and its branch offices in Dangriga and in Punta Gorda.

Marketing Options and Prospects for Cocoa

There are several options available to the cocoa producer for the marketing of their produce. These being individual sales of wet or dry cocoa to HHL, individual sales of fermented dried cocoa to a Cocoa Growers Association for sale to HHL, or another cocoa buyer such as the New York Coffee Sugar & Cocoa Exchange, sale of wet beans to a Cocoa Growers Association which in turn ferments, dries and sells the bean to cocoa buyers.

Processing of the cocoa bean is another market option but an in-depth market research would be required to establish feasible markets, the technical knowledge required to process the cocoa beans, and the amount of capital required to do such a venture.

At present HHL is committed to purchase all cocoa bean of acceptable quality grown in Belize at World Market prices less handling and shipping costs. This commitment will stand as long as HHL maintains its operations in Belize and should HHL discontinue active operations in Belize, then Hershey Foods Corporation will establish buying representative to continue the cocoa buying function for a minimum of five years beyond that date.

Based on the World Bank 1986 Report No. 814/86, 1986 and as the past is the best indication of the future, it is anticipated that the prices of cocoa will reverse its downward trend. The rise and fall of commodity prices is not restricted to cocoa but to all consumer goods. A farmer would be better off planting cocoa in the years when cocoa prices are down so as to be able to be selling cocoa when the prices are rising and not the reverse.

Recommendations

The marketing arrangement with HHL is good. This arrangement should be kept as long as possible. It would be wise to know at what volume of purchases will HHL deviate from the present policy of buying all beans produced in order to develop alternative marketing arrangements for sale of excess production.

Try to keep the highest quality as our volume of production has little or no impact on the world price.

Develop the Cocoa Growers Association into a strong organization to be able to process a high quality bean and to defend the interests of members. This will involve credit, training and perhaps technical assistance.

Continue to train the growers in better management practices to get higher yields and quality.

Strengthen the extension staffs of Ministry of Agriculture and HHL in cocoa knowledge and experience.

Further effort should be directed at the construction and rehabilitation of feeder roads in the cocoa production areas to allow for all weather passing to facilitate the production and marketing processes.

Cocoa disease management must continue to be a team effort

including Ministry of Agriculture, HHL, CGA, growers and input suppliers, etal.

An integrated crop management system must be encouraged to allow for adequate cash flow situation during the gestation period of the cocoa crop.

COCOA PRODUCTION FACTORS

Conclusions and Recommendations

Panel III, Cocoa Production Factors consisted of four panelists, Mr. Simon Willacey, Mr. Patrick Scott, Mr. Felipe Magana and Mr. Michael Bradley whose respective papers were titled: (1) Cocoa Planting Materials and Propagation (2) Management and Field Practices (3) Pest and Disease Management in Belize and (4) Post Harvest Processing of Cocoa Beans. These papers discussed the various factors influencing the establishment of a successful cocoa plantation in Belize with the eventual objective of obtaining satisfactory levels of productivity and quality of the final product.

Starting with nursery establishment it was pointed out that planting material could originate from either hybrid seeds, rooted cuttings, air layering or budding. The relative successes with each type of planting material tested at Hummingbird Hershey Limited were detailed, with the resulting recommendation that patch budding as a form of vegetative propagation; proves to be the most feasible alternative to the use of hybrid seeds. Arguments for and against the latter two methods were that (1) Hybrid seeds are the cheapest and most easily grown planting material, (2) production from hybrid seeds is inconsistent and unpredictable, (3) it costs more to produce a budded tree than a hybrid seedling (4) budded trees need continuous pruning and staking for at least 2 years (5) budded trees grow less vigorously than hybrids but have a higher and more uniform production. Other important requirements for nursery establishment elaborated on were the need for the availability of an uncontaminated water source, shade, good potting material and control of insect pests and fungal diseases.

Management and Field Practices for cocoa production focused on personnel management skills for developing the right attitude towards work so as to increase efficiency and encourage initiative of the human element, which is an important factor in the labour intensive activity of cocoa production. Proper training in field practices such as pruning, fertilizing, harvesting, weed and pest control, sanitation, machinery maintenance and safety of operations was emphasized. Similarly training was directed at improving the post harvest processing methods to achieve quality cocoa beans for export.

On Pest and Disease Management of cocoa plantations in Belize the panelist emphasized the necessity for the integrated pest management approach to avoid the indiscriminate use of pesticides which could compound the problem. Proper monitoring of pest and disease incidence, good cultural practices and a good understanding of the causative agents of disease were important to reduce cost and increase efficiency of maintaining

a healthy cocoa plantation. The point was stressed that in Belize at this time there are relatively few pests and diseases in cocoa compared to other parts of the world. The most serious disease occurring in Belize is Black Pod (*Phytophthora palmivora*) for which control measures at HHL were explained. Other minor diseases and pests currently found in Belize were mentioned and recommended methods for control were given. The overriding need for quarantine measures was noted to prevent the entry of serious diseases which could endanger our young cocoa industry in Belize.

The final stage of cocoa production by small farmers and by HHL in Belize is the post harvest fermentation and drying of cocoa beans. The panelist explained the chemical reactions taking place during fermentation which are responsible for the development of the characteristic cocoa flavour and indicated that in this process the flavour of the cocoa can be enhanced or destroyed. The use of temperature, time and aeration in the fermentation and drying process for box fermentation and heap fermentation was outlined based on HHL methods, and the importance of the interrelationship of these variables for a quality dried product was emphasized. Factors affecting the quality of the fermented product are (a) ripeness of pods (b) pod diseases (c) type of cocoa (d) climatic and seasonal differences (e) storage of pods (f) quality of cocoa and (g) duration and turning. It was also pointed out that beans extracted by hand are free from foreign agents and the potential for good ferments are therefore better than beans extracted from mechanically broken pods. Good quality dried beans commanding premium price should be free from moulds, extraneous matter and defective beans.

Conclusions and Recommendations

Participants in the forum were particularly concerned that the use of hybrid seed imported from Costa Rica and the Dominican Republic which gave extremely variable yields were too risky to be used as planting material in the small farmer project. Whilst parentage of the hybrid seeds imported are known there are not adequate records of the resultant crosses emerging from the mixing of seeds which was necessary due to self-incompatibility of the hybrids. HHL explained that 500 lbs per acre was the average yield potential of the different hybrids. It was concluded that vegetative propagation of good performance trees was the only way of estimating yields in small farmer holdings with a high level of confidence. In response to questions raised by farmers it was suggested that farmers could identify their non high yielding trees to use as budwood material and HHL would render assistance in training farmers to do budding.

The question was asked whether seeds produced from F₁

hybrids have potential use for production. It was decided that since a 30% reduction in hybrid vigour could be expected from planting of F_2 seeds, these seeds should be used only as rootstocks and not for production.

On fertilizer usage for cocoa at HHL the recommendations were three applications per year using 23:16:16 at a rate of 2 oz./seedling and increasing to 6 - 8 oz./application for the mature tree. Site selection and soil testing were essential to ensure adequate fertility.

For small farmer fermentation HHL recommended heap fermentation for small batches of around 300 lbs and box fermentation if in excess of 1,000 lbs.

The question of pest control in relation to woodpeckers was raised in connection with the potential impact the shooting of these birds could have on the tourism industry. The use of scarecrows in the form of an owl figure or an owl eye design appears to be effective in scaring woodpeckers according to HHL. Price and availability to small farmers was not discussed.

SCIENTIFIC RESEARCH

Conclusions and Recommendations

Research into the selection of good agronomic practices for cocoa production and controlled post-harvest processing of the beans, under local conditions, are underway. Research is being done by a unit in HHL under the supervision of Hershey Food Ltd. and at TREC of the Ministry of Agriculture. Very useful information is also forthcoming from practical farmer field experience. The provision of suitable high yielding practices emanating from these combined efforts will enable us to supplant borrowed technology with that appropriate for cocoa production in Cayo, Stann Creek and Toledo.

A range of trials have been established at Hershey and on farmers' fields. These include the evaluation of fertilizer response, differing shade regime, pest and disease control, evaluation of hybrid lines and the use of offence planing of high yielding plants for mechanical cultivation. In the all important area of bean processing, studies are underway to determine the flavour by controlling the fermentation and drying processes. The studies will attempt to quantify optimum physical conditions for the production of flavour precursors, to reduce seasonal variation in fermentation and drying, to evaluate the contribution of microbes to flavour and to identify the biochemical constituents associated with any particular flavour.

The distribution of bearing trees is not normal in most cases, however, as the environment is made more optimum for the cocoa plant the yield distribution becomes more normal. The fact that a larger proportion of trees are non-bearing can be telling us that the genetic make up of the cocoa planted are not those that would produce high yields. On the other hand, it can be telling us that environmental factors are not suitable for cocoa. A large part of the practice of agricultural research and practical farming is aimed at modifying the agroecosystem so as to improve crop yields and profits.

The fact that farmers often do not obtain more than 25% of the yield potential of hybrids that has been demonstrated in experiment station trials is evidence that the package of agronomic practices is deficient when compared to that used at the experiment stations. This situation is unlikely to change if superior clonal material is distributed to farmers and it is possible that the percentage of genetic potential for yield exploited by farmers may decline even as total yield increase.

The point of all of this is that Agronomic research in its broadest sense must be actively pursued, extension research results to farmers must be vigorous. Communication from the

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farmer through the Extension Service to research must be continuing. If and when this is done there is an excellent chance that the cocoa industry in Belize will be viable in the face of the various problems facing it.

Preliminary results from the field trials have highlighted the need to:

- a. have adequate shade for the young plant.
- b. manage the temporary and permanent shade as crops in their own right. The selection of shade trees with multiple use was advocated.
- c. consolidate use of hybrid seeds and to increasingly depend on vegetative planting material from high yielding plants.

Research will have to play a key role in the development of the cocoa crop in Belize. Several areas require answers such as water use and management, fertilizer requirements for differing soil conditions, fertilizer use and pest control in high density stands and the standardization of fermentation and drying at farmer level.

Concerted efforts are needed to transfer new and known techniques to farmers and to make them aware of the benefits that can accrue. The importance of using good farmers' fields as demonstrations cannot be overemphasized.

EXTENSION AND TECHNICAL ASSISTANCE

Conclusions and Recommendations

Extension Officers from the Stann Creek and Toledo Districts presented papers describing Agricultural Extension activities and training in their respective districts. Their presentations showed that the Ministry of Agriculture was instrumental in promoting the cultivation of cacao in those districts. This activity began in 1983 when the Ministry provided hybrid cacao seeds through Hummingbird Hershey Ltd. to farmers. The seeds were provided on credit to be repaid when the crop was harvested.

Farmers responded positively, particularly after Hummingbird Hershey Ltd. along with the Ministry of Agriculture provided training programs for farmers.

With the commencement of the Cocoa Accelerated Project in 1984, training was emphasized and organized for farmers and Extension Officers. The Cocoa Accelerated Project encouraged the assignment of a Cocoa Officer, a Peace Corps Volunteer, who organized farmers into a Cocoa Growers Association. Peace Corps provided a grant of \$10,000 to be used by this Association to purchase agro-chemicals and seeds.

The Officer from the Cocoa Growers Association also presented a paper explaining how the Association was organized including a brief history of cocoa cultivation in Belize.

The Officer from Hummingbird Hershey Ltd. presented a paper in which he emphasized farmer involvement along with more training required for various groups.

From these presentations and previous panels the following conclusions were made.

1. The Agricultural Extension service will play an important role in the IFAD and TAMP projects where the production of cocoa will be further promoted.

In order to have the desired impact, Extension Officers should be facilitated with proper transportation and housing facilities to be located within the farming communities. This frequent farmer contact, will provide information to justify any modifications required in the implementation of the programs.

2. Training should continue for farmers, Extension Officers and their supervisors particularly in:
 - a. group dynamics
 - b. Extension communication
 - c. coordination with other organizations

- d. involvement of farmers in programme planning and implementation
- e. designing of Extension Programs to include women in the training programs

The Extension Service must undertake some activities in order to accomplish its goals. It must hire female Extension Officers; it must liaise closely with the adaptive research conducted at HHL; it must make use of local values and customs such as the fahina where farmers pool their resources and labour to achieve a target.

One of the main goals of Extension will be to encourage farmers to establish a balance between cocoa and subsistence crops.

The papers clearly showed that much could be achieved by coordinating activities with the private voluntary organizations and Hummingbird Hershey. Farmer involvement will continue to be encouraged to ensure continuity.

DEVELOPMENT PROGRAMS AND RESOURCES

Conclusions and Recommendations

by Inge Nordang

This panelist did not submit a document for publication.

Panel VII - CONCLUSIONS AND RECOMMENDATIONS

Mr. Eric King	-	Policy and Planning and Land Use
Mr. Richard Burn	-	Economics and Marketing
Ms. Francine Hyde	-	Cocoa Production Factors
Dr. Marla Holder	-	Scientific Research
Mr. Eirain Aldana	-	Extension and Technical Assistance
Mr. Inge Nordang	-	Development Programs and Resources

Discussion

Williams: We will make sure that Mr. King's comment on duty concessions will be addressed. It is under analysis now. How do we address Mickey Craig's concern with lead poisoning of woodpeckers?

Chanona: How do we go about obtaining sufficient high quality planting material for 4,000 to 5,000 acres?

Ice: In case of budding, I would suggest we get one farmer in each village to be trained as well as an Extension Officer, so we don't have to run for Extension Officer whenever we need to do budding.

Chanona: Mr. Aldana, do you see problems with training extension officers for 1,000 new farms?

Aldana: We need to get farmers more involved. Not just someone to get the information himself, but to train other farmers in the techniques.

Burn: That opportunity has existed for ten years - we have conducted training sessions on farms. Farmers are housed and instructed. All they need to do is call to set up a time.

Holder: Regarding planting materials, the aim is not to replace hybrid seeds with vegetative material but to raise them in conjunction, since there is a limitation of good vegetative material. Farmers can use propagative material from their own best trees.

Chanona: Extension Service with Government of Belize and Herehey can arrange training for these new farmers. Farmers in Toledo District can be trained to select high quality budding material and in the budding technique. I'd like to ask Mr. King if this information (land surveys) will be available to the farmers and the public.

King: I see no reason for doing these surveys unless they are published and sold or otherwise made available to the public, they have been in the past.

Holder: Both the Belize River Valley Survey and the Charles Wright Survey are not very available. There are copies at the Central Farm Library. Toledo surveys are available from the British High Commission. The Stann Creek report is not published yet but should be by the end of the year by the British High Commission.

Chanona: In regard to conservation impact - do you see problems with 1,000 acres of land being cleared? What recommendations would you make?

Craig: For conservation, farmers must understand the importance of caring for what you have. Land must stay productive not just for your lifetime but for your children and grandchildren. Our neighbours from Central America don't know proper methods for conservation. There will be a real problem in a few years along the Hummingbird. The Pesticide Control Board consist of 14 persons, including the Audubon Society. There will be three categories of pesticide restricted, registered and _____. Farmers don't have time to be on boards, so you need to have confidence in DFC, Hershey, extension people who are on boards. Hopefully, chemicals banned will stay banned. I myself use restricted chemicals for termites.

Franklin: I think the Hummingbird landscape is being raped and needs to be addressed. Not just land, but waterways are being polluted by pesticides, nitrates (fertilizers). It ends up being a risk/benefit thing. Do we die of hunger or put nitrites in our water? Forestry conservation and Audubon Society are working very hard. The business community is working on environment protection and training for safety. They want a good image. We donate pesticides for rat control to the Audubon Society every year. So pesticides do have a place. We need an integrated approach to pest control. HHL has a good IPM (Integrated Pest Management) program research is put into it. The Pesticide Control Board is working hard to come up with a plan to include pesticide safety.

Carlos: On marketing, HHL has done a great job promoting cocoa. But now we are talking about business, about people putting their life savings into cacao. Are you (HHL) prepared to enter into contracts with farmers for a guaranteed price?

Burn: We have contracted with the Government of Belize to buy all cocoa at world market price. I don't know anyone else who offers such an open-ended deal. I don't know of any company that offers guaranteed prices.

Patterson: Yes, we do encourage you to seek other buyers, to

encourage a competitive market. It's the only way you can convince yourself that you are getting a good deal from us.

Burn: I ask Mr. Carlos, would you do that? Offer a guaranteed price for an indefinite time?

Carlos: Is there a negotiated agreement between HHL and GOB? Can it be extended to farmers co-op?

Burn: There is a contract for all cocoa beans grown in Belize, as long as HHL is in Belize and five years beyond date of withdrawal.

Carlos: Will you sign contracts with farmers' coops?

Burn: Our price will go up or down as soon as contract is up.

Ico: We signed a contract in 1971, of which Mr. Aldana knows the story. You have to know exactly what percentage you will get. I'm not in favor of contracts for guaranteed price.

Chavarria: 1928 law for Indian reserves need to be updated. Indians have become budding capitalists, they have been on the periphery but they need to be addressed. Numbers are coming in (Ketchi and Maya) from Guatemala, because of persecution. They need to be given a chance at national lands. I was disappointed to hear there are six official and six unofficial reserves. These need to be defined by Government. Many Indians have decided to relocate.

Downard: Intercropping has been recommended. I've not heard of the disadvantages - mango, avocado, etc. attract insect pests, plantain can damage cacao trees. Is there any other intercrop besides plantain that could be used?

Burn: Cocoa production is an individual business we tried plantains without success but Mr. Chanona tried it successfully. Even shade trees must be handled as a crop. You can't intercrop citrus and cocoa because both require a large area at the same height, however, other combinations, like coconut, do work.

Casteneda: Indian lands need to be resolved as soon as possible so that Indians have lands defined before IFAD and TAMP are started.

Carlos: I'd like to commend BEST, and other private voluntary organizations and a new one, ANDA. We hope this kind of group will gain the recognition from Government that they deserve.

Flowers: We have a committee set up to look at the Indian issue. Probably some Indians will be allowed to live on the reserve, while others will get private lands. Recommendation will be made to the appropriate ministry when they are decided upon.

Chanona: Does IFAD have plans to do marketing research to help in the efforts of the Toledo farmers?

Nordang: We are cooperating with TAMP on marketing research to find additional markets for such things as annatto.

Williams: Regarding the teaching of techniques to farmers, one way is a radio program every Wednesday morning - Mr. Scott could give radio announcements. Also, we could distribute pamphlets through PVO's, and Extension Officers. Make information available.

Patterson: There is an information flow problem with vegetative propagation vs. hybrid seed. There is a severe shortage of vegetative propagation material in Belize. The tree has to show excellence year after year for seed size, yearly for pod bearing. At HHL we have designated 100 trees but they are good trees perhaps only for Hershey farms. They might not perform over time or at other locations.

Chanona: There should be technical work done in the field. There is the obvious need for the Cocoa Advisory Board to be revitalized - a land study. There is also a need for extension agents to be aware of new land being brought under cocoa cultivation and pesticide safety. I still do a certain amount of slash and burn for various reasons. It can be used well but it can also be very destructive. We see the need for a governing agency responsible for cocoa production.