

A.I.D. EVALUATION SUMMARY - PART I

1. BEFORE FILLING OUT THIS FORM, READ THE ATTACHED INSTRUCTIONS.
2. USE LETTER QUALITY TYPE, NOT "DOT MATRIX" TYPE.

IDENTIFICATION DATA

A. Reporting A.I.D. Unit: Mission or AID/W Office <u>BELIZE</u> (ES# _____)		B. Was Evaluation Scheduled In Current FY Annual Evaluation Plan? Yes <input checked="" type="checkbox"/> Slipped <input type="checkbox"/> Ad Hoc <input type="checkbox"/> Evaluation Plan Submission Date: FY <u>91</u> Q <u>3</u>	C. Evaluation Timing Interim <input checked="" type="checkbox"/> Final <input type="checkbox"/> Ex Post <input type="checkbox"/> Other <input type="checkbox"/>
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D. Activity or Activities Evaluated (List the following information for project(s) or program(s) evaluated; if not applicable, list title and date of the evaluation report.)

Project No.	Project /Program Title	First PROAG or Equivalent (FY)	Most Recent PACD (Mo/Yr)	Planned LOP Cost (000)	Amount Obligated to Date (000)
505-0016	Toledo Agricultural Marketing	'88	6/92	1,950	1,803

ACTIONS

E. Action Decisions Approved By Mission or AID/W Office Director	Name of Officer Responsible for Action	Date Action to be Completed
Action(s) Required		
1. Halt all sales of paraquat derivatives at MSCs;	VITA	7/31/91
2. Initiate exchange with Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE) on Hilly Land Sustainable Agriculture (HLSA) technology;	VITA	8/15/91
3. Increase the flexibility of the Improved Milpa Integrated Cropping System (IMICS) technical package to include technologies which provide client farmers with immediate returns, and to include nitrogen fixing trees other than Leucaena;	VITA	8/31/91
4. Develop a clear tracking system of response to technologies and of project activities impact;	VITA	8/31/91
5. Phase out cacao transport support to encourage privatization of transportation;	VITA	8/31/91
6. Divest the San Jose and San Antonio Multi-purpose Service Centers (MSCs), consolidate inventories, work on marketing efficiency at the Big Falls MSC;	VITA	8/31/91
7. Accentuate farmer training in cacao management, incorporate Integrated Pest Management (IPM), and renew training in the safe use of agrochemicals;	VITA/USAID	9/31/91
8. Increase technical assistance in the design of low-cost post-harvest storage devices for basic grains, and measure their economic impact;	VITA	9/31/91
9. Farmers to assume all direct costs of operations;	VITA	9/30/91
10. Increase training in communication and technical skills for the Farmer Technicians (FTs).	VITA	9/31/91

APPROVALS

F. Date Of Mission Or AID/W Office Review Of Evaluation: _____ (Month) _____ (Day) _____ (Year)

G. Approvals of Evaluation Summary And Action Decisions:

Name (Typed)	Project/Program Officer	Representative of Borrower/Grantee	Evaluation Officer	Mission or AID/W Office Director
	Jeffrey H. Allen	Rodney H. Neal	Winston Bennett	Barbara Sandoval
Signature	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
Date	8/26/91	28 August 1991	8/27/91	8.29.91

A B S T R A C T

H. Evaluation Abstract (Do not exceed the space provided)

The project was designed to accelerate the transition from slash and burn agriculture to permanent cropping systems in the Toledo District of Belize. Also included was the improvement of yields and post-harvest management of subsistence crops for the food security basic to the production of higher value commodities.

An interim evaluation of the private sector component of the project was conducted from April 10-13, 1991. The VITA contract was in its 30th month of operation and scheduled for completion by December 1991. The evaluation was designed to support needed modifications through the PACD and substantiate any possible extension under the USAID/Belize Mission's new Natural Resources Management Project.

A team composed of personnel from USAID, Peace Corps and VITA conducted 24 person days of field visits, interviews and review of project documentation and 12 person days were used to analyze data, discuss findings and complete a first draft. The major findings and conclusions are:

1. The VITA team has performed well and enjoyed consistent client farmer satisfaction with the type and quality of technical assistance offered.
2. Project documentation was not available to permit a quantification of project impact to substantiate the enthusiasm expressed by local farmers.
3. Cacao yields and area planted increased dramatically in the project area during project implementation.
4. A new cropping system to provide farmers with low-cost technologies to conserve soil and enhance crop production has met with limited adoption.
5. The structure to assemble and market cacao and supply agricultural inputs is faced with financial and organizational insolvency.
6. Post-harvest technology devices to reduce subsistence-crop loss during storage appear to be too expensive for wholesale adoption.
7. Extension efforts to promote the proper use and safe handling of agrochemicals were inadequate and need to incorporate IPM.

Lessons learned included: 1) Project activities should be planned and supported so that they could be carried out independently of supposedly complementary activities by other organizations; 2) Imported technologies need to be tested and adapted to local conditions before dissemination; and, 3) there is a need for adequate baseline data and project implementation records to quantify project impact.

C O S T S

I. Evaluation Costs

1. Evaluation Team

Name	Affiliation	Contract Number OR TDY Person Days	Contract Cost OR TDY Cost (U.S. \$)	Source of Funds
Dave Gibson	USAID/Washington	6	1,500	Project No.505- 0016
Jeffrey Allen	USAID/Belize	6		
Fred Hunter, Jr.	USAID/Belize	6		
Deborah Crooks	Consultant	6		
Frank Gorrez	VITA	3		
Ken Turk	VITA	3		
Karen Fauss	Peace Corps	3		
Wade Bacon	Peace Corps	3		

2. Mission/Office Professional Staff

Person-Days (Estimate) 18

3. Borrower/Grantee Professional

Staff Person-Days (Estimate) 12

A.I.D. EVALUATION SUMMARY - PART II

SUMMARY

J. Summary of Evaluation Findings, Conclusions and Recommendations (Try not to exceed the three (3) pages provided)
 Address the following items:

- | | |
|--|--|
| <ul style="list-style-type: none"> • Purpose of evaluation and methodology used • Purpose of activity(ies) evaluated • Findings and conclusions (relate to questions) | <ul style="list-style-type: none"> • Principal recommendations • Lessons learned |
|--|--|

Mission or Office: USAID/Belize	Date This Summary Prepared: 7/17/91	Title And Date Of Full Evaluation Report: Joint USAID-VITA Evaluation of Toledo Agricultural Marketing
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Purpose of Activity Evaluated: The purpose of the project was to establish a viable export-oriented industry among small landholders in the Toledo District, through the promotion of the production of cacao as an alternative export cash crop. Other objectives of the project were the acceleration of the transition from traditional "slash and burn" to settled agricultural systems, the technology transfer of improved postharvest practices for subsistence and cash grain crops, and the establishment of a viable marketing/input-supply system.

Purpose and Method of the Evaluation: The primary objective of this evaluation was to identify issues requiring pre-PACD attention and those of direct relevance to ongoing Natural Resources Management Project design work. As the activities under TAMP come to an administrative close, the Evaluation Team attempted to identify those traditional areas of host country and contractor performance, input-output equivalency and working relationships that appear to have contributed to the success of the project and those that did not.

The final evaluation was undertaken in close collaboration with the VITA team. The team conducted 24 person days of field visits, interviews and review of project documentation in Toledo District. The team had an additional 12 person days to analyze data, discuss findings with VITA and USAID staff and complete a first draft of the evaluation.

Findings and Conclusions:

The project has done a good job setting up infrastructure and operations and developing links with farmers in Toledo District. The VITA contract team has performed well, particularly given operational realities of Toledo District. The Chief of Party took enormous levels of personal responsibility for activities and forged excellent relations with GOB counterparts and local residents. The project also received significant support from several highly qualified Peace Corps volunteers which bodes well for similar cooperation in the future.

The evaluation noted consistent farmer satisfaction with the type and quality of technical assistance offered and compared efforts favorably with those of more mechanized/high-input programs of the GOB. However, available project documentation did not permit a rigorous evaluation of project outputs and farm-level impact up to this point. Evaluators were unable to substantiate the success and enthusiasm expressed by local farmers and project staff.

Thus far the project has made tangible progress toward improving cacao yields and more limited success in developing marketing avenues for produce. Cacao yields and area planted in Toledo District have increased dramatically since the start of project implementation

SUMMARY (Continued)

although it is uncertain how much of this increase is attributable to individuals versus associations and private firms. VITA's subcontract with a Belizean NGO, BEST, for strengthening organizational capabilities to assemble and market produce failed. Although the VITA team moved quickly and correctly to dissolve contractual obligations with BEST no replacement staff or capability was made available through VITA. Transport of the increasing volume of cacao still poses significant problems.

Post-harvest technology activities have developed several devices which appear to reduce crop loss during storage. However, most of these technologies appear to be too expensive for wholesale adoption. The evaluation team questioned the adequacy of VITA's technical assistance support for this activity.

The supply and management of agricultural inputs, originally to be handled through the Belizean NGO BEST, met with a variety of problems which resulted in financial and organizational insolvency. Overbuilt structures, poor sales and insufficient training for store managers are cited. Furthermore evaluators identified the inadequacy of extension materials for proper use and safe handling of farm chemicals, and the need to incorporate integrated pest management practices, as further areas requiring attention.

As an unscheduled fourth activity, TAMP has developed and initiated extension of a new cropping system - IMICS - which seeks to provide farmers with low-cost, remedial technologies to conserve soil and enhance crop production. While hedgerow intercropping has been proven successful elsewhere, the IMICS package seems to be poorly adapted to local land and labor availability and have met with limited adoption. However, it is still too early to make any definitive statements. IMICS has not been adequately tested, and appears to have a number of technical problems which will limit performance. They are also perceived as being available only as packages, further limiting validation. The addition of this activity quite possibly reduced human and financial resources available for scheduled activities. AID/Belize never officially sanctioned this additional component.

Principal Recommendations:

Given the short amount of time and resources remaining in this first phase, it is recommended the project undertake several steps to consolidate gains made in cacao production and marketing, and extension of modified milpa practices. In addition the project will need to begin immediately extricating itself from the MSCs and remaining agrochemical inventories. These recommendations should be accomplished prior to the present PACD and further support to TAMP and/or VITA during the NRMP project should be gauged by success in carrying out the following recommendations:

- a. Cacao Marketing and Organizational Development
- * Develop a substantiated baseline survey and useful benchmarks to serve as the basis for measuring and reporting project impact in cacao production;
- * Initiate a phase out of cacao transport support immediately;
- * Reinitiate extension training emphasizing the safe use and handling of agrochemicals and tangible IPM alternatives;

S U M M A R Y (Continued)

b. Post-Harvest Technology Generation and Dissemination

- * Increase technical assistance in design and construction of low-cost technologies;
- * Initiate limited and applied research to determine the impact of devices on post-harvest economies.

c. Input Supply Management

- * The satellite MSCs should be divested and all inventories consolidated at the Big Falls MSC;
- * Immediately halt sales of Gramoxone and other paraquat derivatives;
- * Improve the training and incentive structure of the Big Falls MSC storekeeper;

d. Alternative Production Practices

- * Farmers should assume all direct costs of technologies after the current planting season;
- * Increase the flexibility and responsiveness of IMICS by diversifying the contents and technical rigidity of the "mini-packages";
- * Make a major effort to develop permanent registers to record farmer participation;
- * Elicit assistance from CATIE through the RENARM project to assist in identification and adaptive testing of alternative IMICS components;
- * Increase emphasis on NFTs other than Leuceana and assure that all future planting occurs using proper inoculants;
- * Accelerate training of F/Ts to improve their communication and technical skills;

Lessons Learned:

1. One lesson to be considered in future project design is that implementation of project activities should be planned to be carried out with or without the support of activities of other entities over which USAID has no control.

The TAMP should have been implemented alongside the Toledo Small Farmers Development Project (TSFDP) funded by the International Fund for Agricultural Development (IFAD) and administered by the Belize Ministry of Agriculture and Fisheries (MAF). The TSFDP has been delayed by two to three years in the implementation of many of its activities on which, in turn, TAMP implementation was dependent. These include the farmer credit program and the integration of the marketing/input-supply system.

2. Another lesson highlighted by the TAMP during the promotion of the IMICS package was the need to test imported technologies and compare them with local, related, and perhaps better adapted technologies before dissemination. It is not enough to know that a technology can be of benefit, it is necessary to determine if it is the best available for that place, that time and those people.
3. Adequate baseline data should be in place against which to measure project successes/failures or impact. With the TAMP, successes were either unquantifiable or impossible to attribute directly to project activities.

XB-2000-200-11
1/2/91

JOINT USAID-VITA EVALUATION

TOLEDO AGRICULTURE MARKETING PROJECT
(TAMP)

Project 505-0016

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April 1991

6'

ABBREVIATIONS & ACRONYMS

BEIPU	Belize Export and Investment and Promotion Unit
BMB	Belize Marketing Board
BEST	Belize Enterprise for Sustained Technology
CAC	Commercialization of Alternative Crops
CATIE	Tropical Agricultural Research and Training Center
EOP	End of Project
GOB	Government of Belize
IFAD	International Fund for Agricultural Development
IMICS	Improved Milpa Integrated Cropping System
IPM	Integrated Pest Management
MPTs	Multi-Purpose Trees
MSC	Multi-purpose Service Center
LOP	Life of Project
NFTs	Nitrogen Fixing TreesNGO
NGO	Non-Governmental Organization
NRMP	Natural Resource Management and Protection Project
ODA	Overseas Development Administration (United Kingdom)
PACD	Project Assistance Completion Date
PIL	Project Implementation Letter
PP	Project Paper
PVO	Private Voluntary Organization
R&D	Research and Development
RENARM	Regional Environmental and Natural Resource Management
ROCAP	Regional Office for Central America and Panama
TA	Technical Assistance
TAMP	Toledo Agricultural Marketing Project
USAID	United States Agency for International Development
VITA	Volunteers in Technical Assistance

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I. EXECUTIVE SUMMARY

A joint USAID/Belize-VITA evaluation of the private sector component of the Toledo Agriculture Marketing Project was conducted from April 10-13, 1991. The VITA contract is in its 30th month of operation and is scheduled for completion by December 1991. As such the evaluation was designed to support needed modifications through the PACD and substantiate any possible extension under the USAID/Belize Mission's new Natural Resources Management Project.

The project was designed to accelerate the transition from slash and burn agriculture to modified cropping systems in the culturally diverse Toledo District. The project design maintained that improvement of yields and post-harvest management of subsistence crops would favorably support improved production of selected commodity crops. To accomplish this the project design called for activities to: 1) improve the organizational structures and management practices required to increase cacao production; 2) develop and disseminate technologies for reducing post-harvest loss of subsistence crops; and, 3) improve the supply and management of agriculture equipment and agrochemical inputs. As with many similar projects, the individual components were designed to achieve a certain level of synergy for the project to become completely successful. Since this did not occur isolating causal relationships was difficult for evaluation team members.

Generally speaking, the project has done a good job setting up infrastructure and operations and developing links with farmers in Toledo District. It can be said that the VITA contract team has performed well, particularly given operational realities of Toledo District. The Chief of Party took enormous levels of personal responsibility for activities and forged excellent relations with GOB counterparts and local residents. The project also received significant support from several highly qualified Peace Corps volunteers which bodes well for similar cooperation in the future.

The evaluation noted consistent farmer satisfaction with the type and quality of technical assistance offered and compared efforts favorably with those of more mechanized/high input programs of the GOB. However, available project documentation did not permit a rigorous evaluation of project outputs and farm-level impact up to this point. Evaluators were unable to substantiate the success and enthusiasm expressed by local farmers and project staff.

Thus far the project has made tangible progress toward improving cacao yields and more limited success in developing

marketing avenues for produce. Cacao yields and area planted seem to be increasing dramatically although it is uncertain how much of this increase is attributable to individuals versus associations and private firms. VITA's subcontract with a Belizean NGO, BEST, for strengthening organizational capabilities to assemble and market produce failed. Although the VITA team moved quickly and correctly to dissolve contractual obligations with BEST no replacement staff or capability was made available through VITA. Transport of the increasing volume of cacao still poses significant problems.

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The supply and management of agricultural inputs, originally to be handled through the Belizean NGO BEST, met with a variety of problems which resulted in financial and organizational insolvency. Overbuilt structures, poor sales and insufficient training for store managers are cited. Furthermore evaluators identified the inadequacy of extension materials for proper use and safe handling of farm chemicals, and the need to incorporate integrated pest management practices, as further areas requiring attention.

As an unscheduled fourth activity, TAMP has developed and initiated extension of a new cropping system - IMICS - which seeks to provide farmers with low-cost, remedial technologies to conserve soil and enhance crop production. While hedgerow intercropping has been proven successful elsewhere, the IMICS package seems to be poorly adapted to local land and labor availability and have met with limited adoption. However, it is still too early to make any definitive statements. IMICS has not been adequately tested, and appears to have a number of technical problems which will limit performance. They are also perceived as being available only as packages, further limiting validation. The addition of this activity quite possibly reduced human and financial resources available for scheduled activities. AID/Belize never officially sanctioned this additional component.

Given the short amount of time and resources remaining in this first phase, it is recommended the project undertake several steps to consolidate gains made in cacao production and marketing, and extension of modified milpa practices. In addition the project will need to begin immediately extricating itself from the MSCs and remaining agrochemical inventories.

These recommendations should be accomplished prior to the present PACD and further support to TAMP and/or VITA during the NRMP project should be gauged by success in carrying out the following recommendations:

a. Cacao Marketing and Organizational Development

- * Develop a substantiated baseline survey and useful benchmarks to serve as the basis for measuring and reporting project impact in cacao production;
- * Initiate a phase out of cacao transport support immediately;
- * Reinitiate extension training emphasizing the safe use and handling of agrochemicals and tangible IPM alternatives;

b. Post-Harvest Technology Generation and Dissemination

- * Increase technical assistance in design and construction of low-cost technologies;
- * Initiate limited and applied research to determine the impact of devises on post-harvest economies.

c. Input Supply Management

- * The satellite MSCs should be divested and all inventories consolidated at the Big Falls MSC;
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d. Alternative Production Practices

- * Farmers should assume all direct costs of technologies after the current planting season;
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alternative IMICS components;

- * Increase emphasis on NFTs other than Leuceana and assure that all future planting occurs using proper inoculants;
- * Accelerate training of F/Ts to improve their communication and technical skills;

II. EVALUATION BACKGROUND

1. Project Goal and Purpose

The Toledo Agricultural Marketing Project (TAMP) was designed by USAID/Belize in FY 87. The project's goal was to increase the real income and improve the standard of living of small farmers in the Toledo District of Belize. To do so, the project intended to accelerate the transition from traditional "slash and burn" agriculture to modified cropping systems by introducing improved post-harvest practices and establishing a viable marketing system. This would lead to the establishment of a viable export-oriented industry, the primary purpose of the TAMP.

Project sustainability was predicated on the establishment of a local marketing organization and assumption of the extension operation by local extension agents. This strategy was based on two important assumptions: 1) a reduction in post-harvest losses in grain (corn, rice and beans) would improve real income and on-farm standards of living and would make more land and labor available for investment in cash crops like cacao; 2) as cacao production increased and additional processing was incorporated to increase value added, a more competitive and profitable product could serve as basis for meeting the recurrent cost of continuing the project.

Volunteers in Technical Assistance (VITA) was to provide technical assistance under the private sector component of the TAMP. The purpose of this component was to help individuals and local collectives improve production, reduce post-harvest loss and extend alternatives to milpa systems. The activities for which VITA was responsible were:

- 1) to broaden the small farmer's cash crop base, (currently limited to rice), through encouraging development of cacao and other crop alternatives;
- 2) to improve on-farm post-harvest systems for both subsistence and cash crops; and
- 3) to develop an effective marketing and input supply system in Toledo working through indigenous farmer organizations.

VITA sub-contracted the institutional development aspects of commodity marketing development to the Belize Enterprise for Sustainable Technology (BEST).

In order to carry out the private sector activities, the project funded two technical advisors: a Chief-of-Party, also serving as a specialist in enterprise and organizational

development, and an agronomist with significant experience in cacao production and processing. Three local field technicians were also to be hired.

A complementary set of public sector activities, comprising support to the Government of Belize and focused on upgrading the rice mill and storage complex at Big Falls, Toledo, was carried out under a contract with Kansas State University (KSU). This contract was let with KSU to facilitate the GOB's privatization of the rice milling facilities and rice price stabilization/liberalization program through assistance to the Belize Marketing Board (BMB) for identification and implementation of structural reforms. This second component met with mixed success due to the GOB's reluctance to undertake necessary reforms prior to the completion of the contract. The public component was not addressed during this evaluation.

2. Description of Project Activities

Private Sector Activity #1: Developing Cash Crop Alternatives - Cacao, Rice and Others (Spices)

Under this activity, technical assistance focused on two areas:

- 1) Direct assistance to the growers to improve cacao production practices, and
- 2) Development of farmer organizations to efficiently manage the collection, processing and marketing of the cacao crop.

The approach emphasized the need for a comprehensive program of workshops, field demonstrations, and regular farm visits to convey the necessary husbandry practices for proper plant development. As advances were achieved with cacao, other appropriate and complementary crops, such as spices, were to be incorporated into the package of assistance provided the Toledo farmers.

By the end of the project, the technical, organizational and management capabilities of the farmer organizations were to be sufficiently strengthened to permit:

- 1) coordination of harvest, collection and processing of cacao production in Toledo;
- 2) administration of the fermentation and drying of cacao and efficient operation of an appropriate number of input supply centers;
- 3) collection of sufficient revenue to pay for the services of two to three field agronomists to provide continuing technical assistance to cacao producers;

- and
- 4) identification and evaluation of alternative marketing opportunities, with determination of which are more advantageous to producers.

Private Sector Activity #2: Post-Harvest Technology Improvements

Under this activity, the project was to support research and extension of more efficient post-harvest storage and handling technology. Preference was to be given to those farmers involved in cacao production and project funds were to be made available to finance the appropriate model storage and handling systems. By the end of the project, post-harvest losses of basic grains were to be reduced by an average of 20 percent.

Private Sector Activity #3: Marketing/Input Supply System

This activity was designed to address the constraints facing farmers interested in expanding production of existing crops or in establishing new ones. This included the lack of marketing facilities, collection points, dryers, packing sheds, adequate transportation arrangements and agricultural production inputs and the knowledge of their use.

Farmer Advisory Boards (FABs) were to be established with the assistance of the Organizational and Enterprise Development Specialist/Chief-of-Party. These boards would encourage farmers active in cacao and rice production to participate more directly in marketing and input supply. The intention was to establish supply centers in strategic locations to serve as wholesalers to community groups or private vendors, complemented by route sales during peak periods. The centers would be appropriately staffed to also serve as training facilities for integrated pest management techniques and proper storage and handling of agricultural chemicals. From these centers, marketing and input supply systems would evolve.

With experience, it was expected that permanent facilities would be established. By the end of the project, not only would cacao production and sales have increased, but the management capabilities of the Farmer Advisory Boards should have been sufficient to coordinate assembly efforts and offer custom services for drying, storage and transport. At this time, the Big Falls rice mill was to be divested and turned over to the Farmer Advisory Boards under the public sector component.

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3. Purpose of Evaluation

The primary objective of this evaluation is to identify issues requiring pre-PACD attention and those of direct relevance to ongoing Natural Resources Management Project design work. As the activities under TAMP come to an administrative close, the Evaluation Team has attempted to identify those traditional areas of host country and contractor performance, input-output equivalency and working relationships that appear to have contributed to the success of the project and those that did not. Thus, the Evaluation Team sought to:

- i. assess the methodology with which alternative cash crops (ACCs) and markets were identified;
- ii. determine the effectiveness and replicability of the extension system developed for farmer access and participation and adequacy of extension materials used;
- iii. analyze the management information system for project impact at the local/farm gate level;
- iv. assess the probable long-term sustainability of the Multi-purpose Service Centers concept, of the farming systems technologies promoted by TAMP, and suggest ways that long-term research can be incorporated.

4. Evaluation Methodology and Team Composition

The final evaluation was undertaken in close collaboration with the VITA team. The team conducted 24 person days of field visits, interviews and review of project documentation in Toledo District. The team had an additional 12 person days to analyze data, discuss findings with VITA and USAID staff and complete a first draft of the evaluation. Given the level of confusion between original project activities and those that actually occurred, and the lack of solid documentation linking inputs with outputs, the time allotted was insufficient. The team was also hampered by the inaccessibility of extension records located on a disabled computer. The evaluation team was composed of the following individuals:

Dave Gibson, Team Leader/Agroforester, USAID/Washington
Jeffrey Allen, Agricultural Economist, USAID/Belize
Fred Hunter, Jr., Financial Analyst, USAID/Belize
Deborah Crooks, Consulting Anthropologist
Frank Gorrez, Agronomist, TAMP Chief of Party
Ken Turk, TAMP Project Agronomist
Karen Fauss, Peace Corps/Belize
Wade Bacon, Peace Corps/Belize

III. COMPONENT FINDINGS AND CONCLUSIONS

1. Developing Cash Crop Alternatives - Cacao

The Project Paper established cacao production targets amounting to 800 acres of rehabilitated or newly established cacao, and an increase of 25% in cacao sales from the Toledo District during the LOP.

Promotion of cacao as an alternative cash crop soon became the main activity of the field extension team. The project Agronomist trained the three Belizean Field Technicians and the three Peace Corp Volunteers in cacao production and post-harvest processing technology through training sessions at Hummingbird Hershey's farm and in the field in Toledo. Support from the COP and short-term consultants helped develop field activity schedules and training aids for the field technicians. These included a reporting system for the farm visits made, farmers contacted and technology adoption rates. However, this system was not impact-oriented and failed to disaggregate activities so that trends could be delineated.

The Agronomist and the extension technicians set out to systematically visit as many farms as possible and arrange field demonstration workshops to demonstrate cacao planting, husbandry, harvesting, fermentation and drying techniques. Experience at Hershey's farm had shown that yields could be boosted by improving management of the trees and beans without the use of too many costly inputs.

The extension team managed to contact at least half of the 1800 estimated farmers in the district during the first two years of the project. These included the approximately 157 farmers owning the 527 acres of cacao trees in existence at the beginning of project activities. By the end of 1990, there were 401 farmers owning 920 acres of cacao participating. Sales of dried beans to Hummingbird Hershey Ltd. (HHL) increased from 5,781 lbs. in 1988, the year when the project started, to 14,355 lbs. in 1989 and 31,739 lbs. in 1990, an increase of 549% over the two years of project activities. The exact type and level of effort provided to these farmers from the project is impossible to ascertain from available project records.

Sales have been comprised of fermented, dried, cacao beans; a process carried out by the farmers themselves. The fermentation and drying has been done using low scale but effective technology that the farmers can afford. Quality delivered to Hershey has been consistent, and the value added has been retained by the farmers themselves.

The following table is a thumb-nail sketch of crop-specific extension activities. There was a good deal of confusion, e.g., the 115% level of effort shown below, as to what constituted farm visits and demonstrations and to what extent this information guided follow-up extension efforts.

		<u># Extension Actions</u>	<u>% Level of Effort</u>
1.	cacao	1,158	68.3
2.	citrus	514	21.8
3.	annato	53	2.0
4.	corn	96	4.2
5.	beans	40	1.6
6.	rice	125	5.5
7.	vegetables	248	11.9
8.	other	49	1.9
TOTAL		2,305	115.0

2. Post-Harvest Technology Improvements

Reducing the post-harvest loss of subsistence crops through improved storage formed the TAMP project's second pillar for inducing farmers to improve production of cash commodities. In effect, reducing loss of subsistence crops would free-up land and labor for production of commodity crops. Post harvest technologies also included improved drying, storage and fermentation of cacao. This reduced losses significantly, and was to have led to the identification of appropriate technologies for other cash crops.

A consultant was brought and held a month-long workshop to address the post-harvest technology needs of the Toledo farmers. Since corn was the main subsistence crop, the consultant focused on post-harvest processing and storage of corn. It was decided that the best approach to decreasing post-harvest loss was early harvest of corn, followed by immediate air-drying in cribs. This would avoid infestation of the corn by weevils. Once dry, the corn would then be shelled and placed in a storage bin.

Since farmers were not thoroughly convinced that this technology would work, the project undertook 7 trials at various MSCs. Corn has been stored for 1-1/2 years with good results.

However, the cost of the containers constructed from 55 gallon drums was prohibitive at \$BZ125.00 each. Farmers simply do not have that much available cash for a single outlay. Therefore,

R&D is continuing, with emphasis on reducing costs. Two ferro-cement structures are currently being built at the San Jose MSC at a projected cost of \$60-70 for a 100-gallon model, and \$160 for a 500-gallon container.

In the meantime, 12 of the original 25 metal drum containers are on trial at individual farm sites in San Jose. Two containers have been purchased by farmers for their own use. Two other farmers are currently using corn cribs.

Many farmers have adopted post-harvest technologies in fermenting and drying their cacao, rather than delivering pods or wet beans. The majority of farmers, however, continue to use local technologies, i.e., heap fermentation and drying, but with greater success after instruction on proper fermentation and drying schedules. This component of post-harvest technology has been very successful in that farmers report a much reduced incidence of rejection of their cacao from Hershey.

3. Marketing and Input Supply System

a. Background and Description of Activities

The Project Paper identified the marketing of produce and availability of agrochemical inputs as major constraints to increasing commodity production in Toledo. This activity was focused on cacao but was intended to address other commercial crops as interest and markets became evident. Inadequate collection facilities, drying technologies and transportation of processed or raw produce were identified as other key issues. In response the project was to establish a marketing/input supply system as outlined above ("Private Sector Activity No. 3.").

The Chief of Party was to assist, initially, in the formation of an advisory/supervisory group of farmers from the relevant farmer organizations, i.e., the Grain Growers' Association, the Toledo Cocoa Growers' Association and the San Antonio Cocoa Growers' Association, and private firms. This group was to develop a wholesale supply center at Big Falls Village from which the marketing and input supply system would evolve. VITA, in their technical proposal, also envisioned one main center with smaller subsidiaries or a supply truck being added on later during project implementation. Much of this activity was to have been accomplished through VITA's sub-contract with the Belize Enterprise for Sustained Technology (BEST), a Belizean NGO.

VITA negotiated with BEST what can be described as a very loose agreement to perform a variety of services which lacked specificity and identification of deliverable outputs. No BEST work plans were made evident to the evaluation team. It must be assumed that USAID/Belize selected the VITA contract and proposed personnel based on their confidence in BEST's ability to deliver the organization and supply management outputs.

b. Achievement Toward Expected Outputs In Marketing

The project was able to make only limited initial advances with regard to marketing and input supply management. VITA failed to wait for BEST to begin baseline work for the siting of collection and processing centers. That, coupled with BEST's failure to develop local organization management capabilities dealt a blow from which the project never recovered.

It is fair to say that while cacao marketing has proceeded in an ad hoc manner which appears to be functioning, none of the formalized institutional channels originally foreseen have been developed. It is also accurate to say that the centers (MSCs) were improperly placed, overbuilt for their intended functions, and have not imparted adequate management skills and business incentive structures to storekeepers. Finally, with the possible exception of the Big Falls MSC, the MSCs have not developed an adequate volume of input sales to warrant their continued operation.

An important evaluation finding was that, without additional support from VITA or elsewhere, the marketing and input supply management activity was not adequately addressed. The addition of this activity to project management's already ambitious initiatives simply meant that it did not receive adequate attention. Reduced management support for marketing and supply systems development had significant implications for the project to achieve production and post-harvest loss goals.

c. Operations of Multipurpose Service Centers

After three months of project implementation, following the Rapid Appraisal Farm Survey, identical centers were built in the Villages of Big Falls, San Antonio and San Jose. These were completed and began operations in September of 1989. BEST was hired in June of 1989 to manage the centers and train three Farmer Advisory Boards (FABs), made up of seven individuals each, including village leaders and local representatives of the aforementioned organizations.

BEST managed the day to day operations of the MSCs while training the three storekeepers in their operation and the FABs

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in their management. However, BEST had problems with VITA when it came to submitting billings and reports. Billings were usually not clear nor itemized in the manner that VITA required to meet USAID accounting standards. Furthermore, reports were late and incomplete, despite various requests by VITA for BEST to correct these two points. By February of 1990, VITA correctly terminated their sub-contract with BEST, hired a manager and assistant manager for the MSCs and the VITA COP assumed responsibility for the development of the marketing component directly.

d. Input Supply Inventories and Management Systems

An initial store inventory fund of Bz\$120,000 (US\$60,000) had been provided under the contract with VITA. From the time that the centers started operations in September 1989 up to the end of March 1991, the fund is reported to have grown to Bz\$158,714.72, or an average of Bz\$2,037.62 per month. However, an analysis of the monthly sales reports over the last thirteen months, from March of 1990 to March of 1991, shows an average monthly profit of only Bz\$655 per month. 63 percent of these profits were generated by the Big Falls center, with San Antonio and San Jose doing 19 and 18 percent, respectively.

At this level of performance, only the Big Falls center can afford to pay its storekeeper. Sales at the San Antonio and San Jose centers are sporadic and in small quantities, of small values. Our impression is that farmers only use these two centers to buy items that were forgotten on the normal Saturday market day in Punta Gorda Town. The opinion of all members of the VITA field staff is that the stores in Punta Gorda Town, especially the farm supply shop operated by the Mennonite, are the main source of farm inputs for farmers along the Punta Gorda to San Antonio-San Jose route.

The centers offer five broad categories of inputs, which include herbicides, fertilizers, vegetable and corn seeds (no rice), miscellaneous tools, small equipment and hardware, and pesticides, with some minor veterinary supplies. Sales of tools, equipment and hardware, herbicides and pesticides make up the bulk of the value of sales and profits, in that order. Fertilizers and seeds are low earners. In the case of fertilizers, project staff have explained that the mark-up was purposely left low to encourage farmers to use them. Total value of fertilizer sales accounted for approximately 20% of sales value, but only 12% of profits.

Finally, it appears that during the first year of project implementation training workshops/demonstrations in the safe use of chemicals were held, and the field technicians assisted

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some of the farmers in the actual applications. This seems to have lapsed in the last year of activities, however, since there is some evidence that MSCs have been dispersing agrochemicals without adequate extension materials to assure their proper and safe use. This situation requires immediate rectification.

Average monthly sales over the last 13 months was Bz\$4,156.82 ranging from \$1,506.55 to \$7,378.25. Of these 63% were through the Big Falls Center, with 18% and 19% coming from San Antonio and San Jose respectively. Inventory value at March 31, 1991, was Bz\$52,861.79.

MSC's MONTHLY SALES
(in Belize \$)

1990 March	1,506.55
April	1,749.75
May	5,969.58
June	7,378.25
July	6,213.15
August	4,428.33
September	4,073.25
October	4,883.71
November	4,196.95
December	3,779.63
1991 January	4,420.84
February	3,011.20
March	<u>2,428.50</u>
TOTAL	\$54,038.69

Profits from sales for the same period were Bz\$8,515.84 for a \$655.06 monthly average and were distributed almost in the same manner, as follows:

Big Falls	63%	\$412.43
San Antonio	19%	126.43
<u>San Jose</u>	<u>18%</u>	<u>116.20</u>
Total	100%	\$655.06

As is evident from direct salary and indirect support costs calculated below, the profitability of the centers is clear.

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MSC's monthly Salary Expense
(in Belize \$)

Manager	1	2,000.00
Assistant Manager	1	1,000.00
<u>Storekeepers</u>	<u>3</u>	<u>1,500.00</u>
<u>Total</u>	<u>5</u>	<u>4,500.00</u>

Cost per Center:	Management	1,000.00
	<u>Labor</u>	<u>500.00</u>
	<u>Total</u>	<u>1,500.00</u>

4.. Modified Cropping Systems

a. Background

TAMP's mission was to increase yields and reduce post-harvest loss of subsistence crops; and to increase production, marketing and inputs management of commodity crops. Neither the PP, the RFA or the VITA RFA response identified sustainability of either traditional subsistence or commercial commodities within the context of natural resource management as part of its purpose.

The novel notion that stabilizing milpa subsistence farmers might be accomplished by introducing improved soil management practices piggy-backed on commercial tree crops has provided the TAMP and the upcoming NRMP project with invaluable insights into alternative practices to traditional milpa, resource management interests and extension methodologies. While there remains much to do regarding technical "fine tuning" and exploring alternative extension avenues, the TAMP/VITA deserve much credit for having identified and begun vigorously addressing the need to diversify crop production within more sustainable systems.

It is important to note that project movement toward low-input or "remedial" IMICS technologies for subsistence and "other" commercial crops represented a dramatic shift away from the project's basic tenet of high-input management of cacao. Although this ambitious reorientation was not necessarily inconsistent with the stated purpose of "accelerating transition from traditional slash and burn agriculture," it

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may have created an entirely new group of beneficiaries for the project, since the broader IMICS audience is more often interested in other aspects of the package than simply cacao production. This has put considerable strain on delivery of scarce project resources.

Project records indicate that extension visits over 1989 and 1990 were distributed per crop as indicated on page 10. It should be noted that activities were not broken down according to IMICS and non-IMICS participants and there is substantial confusion as to how "participating farmers" were defined in reporting. What constituted the primary reporting categories - extension farm visits, demonstrations, training workshops and farmers reached - were equally vague and obviated the teams ability to link specific extension activities with results.

b. Institutionalization Of IMICS

The project has undertaken a phased, three-step approach to accessing farmers. The indications are that the project presently allocates at least 25 percent of staff time and an undetermined but significant portion of operational resources to the IMICS.

The procedure uses a demonstration approach which helps to select project extension agents from the local farmers. These individuals will then extend TAMP IMICS to other farmers in the village. Schematically the system looks like:

- 1) 110 Cooperating Farmers -> 11 Demonstration Farms ->
- 2) 11 Demonstration Farms -> 7 Farmer Technicians (F/Ts) ->
- 3) 7 Farmer Technicians (F/Ts) -> 70 Cooperating Farmers (C/Fs)

The project initially selected approximately 110 "Demonstration Farmers" who participated in the establishment of the first 11 IMICS on cooperatively run demonstration farms. These farmers and farms were intended to galvanize adjacent farmers into undertaking their own IMICS. The selection criteria for the demonstration farmers was opportunistic, using interested individuals and ad hoc channels of authority. Interviews suggest that, as is often the case, primarily progressive "risk takers" were almost exclusively selected in this initial phase. While not problematic in the initial stages of any program, some local farmers have criticized the selection process, claiming they were "left out."

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The actual demonstration farms were developed on individually leased property outside of the reservation system, or reservation land held in usufruct by individual farmers, or in one case, on property donated to the project by the school. All benefits have accrued to individual farmers, with the exception of the school-donated property. In this case, benefits have been divided among the farmers and the school, itself. In addition to in-kind labor assistance from cooperating demonstration farmers, the 11 demonstration farms were supported by TAMP through generous provision of fertilizer, pesticides, vegetable seeds and cacao seedlings. In at least one case, the cooperating demonstration farmers were also paid for part of their labor during the planting process as additional incentive.

During the recent second phase of IMICS extension development, seven of the original 11 Demonstration Farm operators (cooperating demonstration farmers) were selected to become "Farmer Technicians" (F/Ts). They will be responsible for selection and extension of IMICS technologies to at least 10 C/Fs each. The F/Ts were selected from the original groups based on how well they carried out their own IMICS program, and if they showed an interest in teaching others. Each F/T selects his own C/Fs by describing the program to friends and neighbors. The F/T's choose people who, they feel, will stay with the program, and, ideally, are situated within walking distance of his own farm.

The F/T's are paid \$BZ 75 for three days service per week. C/Fs receive a one-time subsidy of the IMICS "mini-package" consisting of \$BZ 150 worth of seeds, fertilizers and pesticides. The F/Ts are expected to spend approximately one year with each group of C/Fs, although very preliminary results suggest this period may be shortened or additional C/Fs can be added to the initial list of 10. The original plan called for a decreasing expenditure in dollars and time by the project over the three-year period, with a corresponding increase for the farmers, themselves. By phase 3, farmers should be carrying the majority of the costs of this part of the project. It must be noted that this second phase of IMICS extension development began in March 1991. It is, therefore, impossible to make operational conclusions at this time.

c. Adoption Trends and Impact of IMICS -
Technical Considerations

TAMP's IMICS have innovatively attempted to incorporate elements of other systems to entice farmers with low-input, high-yield incentives. This included contour hedgrowing and the addition of inorganic soil amendments. With this strategy,

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IMICS has attempted technological responses to a wide array of interests and farmer situations.

Hedgerow technologies typically need substantial labor for establishment and normally require at least five years to noticeably increase yields and decrease erosion. For these reasons they are rarely, if ever, adopted by farmers as packages. Instead farmers will choose the components which offer the quickest and most tangible benefits with the least risk acceptable for them. Where labor is not a constraint and land is, individual farmers may eventually adopt and adapt the entire technological package, but they will do so in stages .

d. Technical Performance of IMICS

Evaluation of the performance of the technologies being fostered through TAMP is problematic as no baseline agroecological characterizations or household surveys of participant farmers were ever completed. The mid-term evaluators failed to address performance of IMICS and project management has not used scarce human resources to track localized impact or adoption trends. Site visits and discussions with project participants anecdotally confirm decline in soil loss though accretion of mobile soil at the base of contour hedgerows. Two flat land sites visited further indicated improved soil structure and permeability through incorporation of biomass. Thus far there have been no indications of increased fertility either through soil analysis or measured yields. It is expected IMICS will take at least an additional three years before providing confirmation or exception to anticipated results if monitoring systems are in place.

The most important finding about IMICS is that they are almost exclusively based on conditions found outside of Belize and little attempt has been made to incorporate other experiences elsewhere or validate them either qualitatively or quantitatively. IMICS has evolved without the benefit of information available through regional agroforestry networks. The lack of CATIE's involvement in backstopping the project is as surprising as the seeming disconnect of VITA's nearly legendary consulting and information base on agroforestry management. Improved interaction with and support from either of these institutions could have helped project management select the most promising species and management practices and reduced costly duplication. Specific technical findings addressed in the general recommendations are located in Annex A.

Other information from similar efforts elsewhere strongly support the need to base management goals on very local needs.

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Since fuelwood and construction materials seem to be rather abundant in most parts of Toledo, particularly San Jose, management regimes should focus on soil conservation and provision of stakes for some agricultural crops (a benefit identified by San Jose farmers). The former requires that hedgerows be managed to maximize foliar biomass while limiting unusable woody growth. Production of poles from hedges requires just the opposite management. The point here is simple: in order to keep farmers "on-board" until we can prove to them the technical merits of improved management they need to be given management practices commensurate with their immediate needs, not the technicians. The flexibility of the technicians to non-technical management concerns helped bring about the design of IMICS in the first place and must not be abandoned now.

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IV. SOCIAL CONSIDERATIONS

1. Marketing Issues

The Mayan Indians of Toledo are undergoing a process of social differentiation resulting from development and increased participation in a cash economy. This inevitably leads to a breakdown of the social system, with subsequent alteration to newer forms. The various Maya villages in Toledo are in different stages of this development. Consequently, traditional and modern social institutions may overlap, obscuring lines of authority and avenues of assistance for the program. TAMP personnel have attempted to identify the institutions relevant to this project and pursue implementation of the project through the proper channels of authority. This is not always easy under conditions of social change.

The attempt to establish FABs on the foundations of existing institutions should have enhanced the success of this activity. Unfortunately, during times of extreme social stress, these organizations may not be easily conjoined. We have seen this among other groups as well (e.g., women's groups). This is not to say that it is impossible, only that it requires hard work and much time. Unfortunately, BEST's early withdrawal from this project undermined the potential success of this activity from the start.

2. Adoption Trends - IMICS

Rapid cultural change led by accelerating exposure to a cash economy, has resulted in an ever-increasing desire for cash to take advantage of those commodities and services offered by development, and an increasing need to find sources outside of subsistence agriculture for that cash.

Among the Maya of Toledo, social differentiation is occurring, and many villagers no longer feel constrained by traditional institutions which effectively level wealth, i.e., participation in reservation land systems, communal planting of land, fiesta sponsorship, etc. These individuals are accumulating wealth, and often have the ability and desire to participate in development activities that require cash outlay, either for product or additional labor.

At the same time, however, all Mayan Indians are not willing to forego many of the cultural traditions and values which rest on a technological base of subsistence farming. Like all populations undergoing change, individuals accept innovation at different rates. Therefore, to be successful, development programs must be flexible, addressing a somewhat mixed "traditional-to-modern" audience.

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Adoption of new technologies is predicated on "perceived need." The advantage or benefit must be apparent. In areas of land shortage and abundant labor, the "benefit" of intensification efforts are apparent. But, the TAMP project's IMICS concept has experienced problems associated with labor and land availability. While labor is generally abundant, it may not be so for the types of work required during the seasons it is required (i.e., adult male labor during the planting AND growing seasons). Even though the Maya population is in the midst of their demographic transition (i.e., high birthrates, coupled with reduced morbidity and mortality, resulting in increased population), education is leading to a reduction in the labor force. Children are now required to attend school until the age of 14, and many are attempting to remain in school beyond that age. In addition, educated young adults are foregoing traditional agriculture as a means of subsistence, and migrating to the towns and cities in search of other employment.

Beyond the labor question, land is not generally perceived to be in short supply at this point in time. The size of the field is still controlled by the availability of labor groups and not the availability of land. Therefore, population pressure is not a problem (albeit there is some recognition of the possibility of future land shortages as a result of increasing distance to field as population increases). Under these two conditions, i.e., seasonal availability of agricultural labor, and little population pressure on the land, the advantage to the farmer of the IMICS program may not be apparent.

3. Gender Issues

Women are part of the agricultural process among the Maya, with separate functions in the harvesting and processing of plantation commodity crops. They also appear to maintain some ownership of permanent trees. For this reason, new technologies, particularly, post-harvest technologies which may involve redistribution of time and labor, should be discussed with women as well as men.

Women are also traditionally responsible for home gardens. While these have not been of recent importance among the Toledo Maya, the TAMP program has sparked a renewed interest in vegetable gardening for home consumption, and as a source of additional income. This appears to have been a serendipitous occurrence, sparked by the work of a single PCV. We have anecdotal evidence that interest in vegetable growing, and IMICS, is spreading from the women to the men in at least one village. This avenue of technology transfer should be explored further.

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4. Implications for Acceptance of Innovation

It needs to be stressed that the Maya of Toledo are changing and that they have chosen to take a strong and active position in directing that change. Any project, to be effective, must involve them throughout planning and implementation stages. Choices must be given after imparting knowledge to the widest group possible.

Time and time again, when asked about the TAMP program, responses were "I know nothing about it, I wasn't invited." This may be a potential barrier to acceptance. There is some contention among village farmers who are not in the program that the selection process was not thorough enough. In other words, they "were not included." This is not to say that they were purposely excluded from those initial introductory meetings, but, perhaps, their participation was not actively sought. Feelings generated from this type of program error have been instrumental in undermining other development programs in the past. Therefore, greater efforts must be made to include as many villagers as possible in the initial introductory phases of any program.

Related to the above, the selection of one villager as the F/T is also highly problematic, especially since this individual is paid for his services and has the potential to hoard knowledge, from which he may benefit monetarily. Money is an extremely sensitive issue in the villages. Singling out an individual for this special attention may place him in a very difficult position with respect to other villagers. In other projects and programs, feelings of intense jealousy over money issues have resulted in extreme actions taken against the individual. The selection process must be sensitively managed, involving input from the villagers, themselves. This can be obtained through existing institutional channels, e.g., town meetings.

Recognizing important institutional channels and utilizing them, where possible, will enhance the success potential of the project. As an example, it appears that where communal labor groups follow traditional institutional patterns, i.e., immediate family, close relative (first cousins) and fictive kin, there exists a greater likelihood that they will remain in the program. 11 demonstration farms were established within the last 18 months and those cooperating demonstration farmers who remain in the system appear to have formed their work groups from traditional labor pools.

Finally, the comment is often heard, "We are tired of outsiders telling us how to live our lives - this is our village." Following this, to be successful, any program must be their program. A strong impetus to the success of the program will be TAMP's ability to turn over the activities of the program to the farmers, themselves, in a timely fashion.

V. RECOMMENDATIONS

Given the short amount of time and financial resources remaining in this first phase it is recommended the project undertake several steps to consolidate gains made in cacao production and marketing, and extension of modified milpa practices. In addition the project will need to begin immediately extricating itself from the MSCs and remaining agrochemical inventories. These recommendations should be accomplished prior to the present PACD and further support to TAMP and/or VITA during the NRMP project should be gauged by success in recommendation implementation.

1. Cacao Marketing and Organizational Development

Three major sets of marketing and and institution development actions need to be completed prior to project PACD. In order to consolidate the project's significant but likely understated gains in cacao production, it is recommended that the project:

- a. Develop a substantiated baseline survey and useful benchmarks to serve as the basis for measuring and reporting project impact in cacao production. This should include average yields, total acreage and factory gate (HHL) deliveries disaggregated by produce size and location. These statistics should be based on whatever means are practical for management information and impact reporting requirements. It is suggested the project consider making this type of reporting part of F/Ts and MSC managers' job descriptions;
- b. Phased out cacao transport support should begin immediately. It is recommended that the project vehicle be made available for transport of produce only between San Jose and San Antonio and Big Falls and only through the present season. Project management will need to carefully monitor privatization of transportation and report on developing trends in subsequent quarterly reports;
- c. Reinitiate a substantial training effort (a final blitz campaign) to improve local farmers' knowledge for improved cacao management techniques with a new emphasis on the safe use and handling of agrochemicals and tangible IPM alternatives to present systems (see III.2.d below).

2. Post-Harvest Technology Generation and Dissemination

In order to capitalize on TAMP's demonstration experience in post-harvest crop management, two efforts need to be undertaken prior to PACD. These include:

- a. increasing technical assistance in design of low-cost technologies through VITA-supplied specialists. As interest seems to be good but storage costs of developed alternatives remain unrealistic, the project may want to explore credit schemes for purchase, alternate fabrication sources as well as devises. Project experience should be consolidated in a final publication;
- b. Initiation of limited and applied research to determine the impact of devises on post-harvest economies. It is highly recommended the project concentrate remaining resources on devises adapted to maize and rice only.

3. Input Supply Management

Completion of this activity essentially involves reducing stock inventories and working out acceptable homes for the MSCs. While this consolidation of project assets must be done carefully to not alienate local farmers and community leaders there seems few alternatives.

- a. Divestiture of MSCs and consolidation of all inventories to the Big Falls MSC should begin in earnest after management has discussed this inevitability with the San Jose and San Antonio Village Councils. In the event small retailers need supplies, they should be provided through the cacao transport system until it ceases (after the present production season);
- b. Immediately halt sales of Gramoxone and other paraquat derivatives. It is suggested, since the GOB allows these products use, that they be wholesaled to larger distributors, but only after the project can provide proper didactic materials for safe handling and use. USAID/Belize should request immediate assistance from IPM Advisor Dr. Angel Chiri to identify a strategy and support requirements for incorporating IPM through PACD. It is the evaluation team's feeling that all project staff, and particularly the F/Ts, should receive extensive training in IPM as soon as possible;
- c. Improve the training and reward structure of the Big Falls MSC manager to increase his incentives for marketing and efficient management. A base salary plus

commission is suggested and intensive introduction to marginal costs and sales procedures are recommended. Inventories should be reduced to those items that are profitable and other "luxury" or enticement goods should be considered as customer lures. Project management must ensure that the Big Falls MSC adheres strictly to wholesale markets and does everything possible to encourage secondary and informal market development.

4. Alternative Production Practices

TAMP has been unable to entice significant numbers of farmers to adopt the IMICS package for various reasons including:

- 1) the land and labor conditions endemic to target communities which act as disincentives;
- 2) the method in which extension outreach was developed; and
- 3) several technical drawbacks to the promulgated package.

To consolidate and amplify success during the upcoming growing season, the project needs to reemphasize the basic premise that increased yields in corn, rice and beans will grant the food security which will encourage farmers to undertake expanded initiatives in higher value commodities. While this does not mean that expressed interest in hedgerow technologies should go unanswered, it does recommend that the project should concentrate on technologies and components which provide client farmers with immediate returns. Specific recommendations include:

- a. Farmers will assume all direct costs of operations after the current season and that only "starter mini-packages" will be made available on a one time basis in subsequent years providing there is follow-up;
- b. Increasing the flexibility and responsiveness of IMICS by modifying the contents and technical rigidity of the "mini-packages." Permutations should include a mix of cash crop and hedgerow alternatives and should make non-commodity crops the primary focus. It is recommended that much of the remaining fertilizer inventories be made available in small packages with hybrid maize and extension materials to illustrate to farmers short-term gains;

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- c. Make a major effort to develop permanent records as to which farmers participate in which technologies and/or components. A clear and comprehensive tracking system of response to technologies and extension messages should be developed quickly. F/Ts should be evaluated and rewarded according to their ability to effectively monitor and report on adoption rates;
- d. Elicit assistance from CATIE through the RENARM project to assist in identification and adaptive testing of alternative IMICS components, particularly promising nitrogen-fixing trees and establishment of performance trials. The VITA COP should initiate exchange with CATIE immediately. VITA should also make available to TAMP the services of an expert soil conservation expert (Fred Weber suggested) to identify and develop alternative soil conservation packages and impact monitoring techniques;
- e. Increase emphasis on NFTs other than Leuceana and assure that all future Leuceana planting occurs using proper inoculum and that Calliandra seed orchards and demonstration trials are established this season;
- f. Accelerate training of F/Ts to improve their communication and technical skills. A performance-based sliding salary should be investigated immediately and introduced accordingly.

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Additional Technical Observations

Species Selection and Management

Three species (Leuceana leucocephala, Gliricidia sepium and Desmodium spp.) have been introduced under one establishment regime consisting of either dense (1-2 inches apart) direct seeding or vegetative propagation along established contours of fixed, slope-independent intervals. Post-establishment management has been even more elemental with a single cutting height proffered 3-4 week intervals, which does not account for seasonality of growth.

The issue here is that the system could biologically fail and reduce crop yields through competition, introduction of unforeseen pest build-up, or simply die off. In the case of TAMP, for example, it was found that Leucaena was failing to nodulate on nearly every site inspected. This has significant and deleterious impacts on nitrogen availability for crop growth. Other demonstration farms showed signs of premature cutting, and one farmer was cutting at extremely long intervals. Nearly all sites were too densely planted and the common lament of inadequate seed for replication indicates wider direct sowing and the leaving of seed trees to mature to seed bearing size are both important. All of this has been learned elsewhere, repeatedly, and should not have been replicated by the TAMP project.

1. Other field observations, based on experience elsewhere, included:

within row planting density is often excessive due to high germination rates and direct seeding techniques. This may also be resulting in stunting and high stemwood production. It may also increase post-cutting mortality. Spacing in similar situations usually ranges from 10 to 25 centimeters;

cutting heights are were often too high which is probably resulting in excessive shading on adjacent crops. Depending on slope cutting height usually varies between 25 and 50 cm;

inter-line plantings (alley widths) are set at approximately six to eight meters regardless of slope. As farmers become more interested, biological efficiency and effectiveness in reducing soil erosion usually dictate moving the contour plantings closer together (3-5 meters);

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Calliandra calothyrsus, a well recognized multi-purpose tree capable of fixing and making available to crops up to 250 kgs of nitrogen per hectare, was observed on several of the visited sites. Calliandra is native to Toledo with a local vernacular name and some history of use and should be considered as a substitute for Leuceana.

2. Specific Problems Requiring Attention

Several specific problems were identified which need immediate addressing by project personnel. These include:

Infestation of Leuceana hedgerows by at least two arthropods was identified as a major cause of seasonal dieback and stunted post-cutting regrowth. Evidence of a viral disease was often apparent in conjunction with the insect problems. Neither type of infestation were accurately identified and no management practices offered to reduce frequency;

Lack of Nodulation in Leuceana was consistently observed. The project introduced 250 pounds of Leuceana of an unknown Phillipine provenance. No mychorizae was introduced during planting and plants often looked stunted, chloritic and had a high proportion of stemwood to foliage.

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ANNEX B.

VITA CONTRACT BUDGET

<u>Description</u>	<u>Contract Budget</u>	<u>Expenses as of 12/31/90</u>	<u>Available as of 12/31/90</u>
Salaries & Allowances	412,823	379,414	33,409
Travel & Related Costs	112,938	62,083	50,855
Consultants	97,320	86,879	10,441
Equipment & Construction	303,250	225,773	77,477
Other Costs	210,850	197,133	13,717
Office Support Costs	46,471	43,439	3,031
Other Direct Costs	17,762	11,658	6,104
Inventory/Loans Fund	60,000	52,125	7,875
Marketing/Supply Centers' Management	111,865	45,375	66,490
Overhead Expenses	306,722	263,631	43,092
Award Fee	<u>20,000</u>	<u>0</u>	<u>20,000</u>
Total Costs	1,700,000	1,367,510	332,490

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PRIMARY SOURCE DOCUMENTS REVIEWED

- Abt Associates et al. 1990. Belize Natural Resources Policy Inventory. Tech Rpt. 110. Washington. 91 pp.
- U.S. Agency for International Development. 1987. Toledo Agricultural Marketing Project Paper. Belize City. 49 pp. + append.
- Volunteers In Technical Assistance. 1988. Toledo Agricultural Marketing Project (response to RFA). Arlington. 51 pp. + append.
- VITA. 1987-1990. Quarterly implementation reports. Belize.
- VITA. 1988. Special Progress Report July-December 1988. Belize. 11 pp. + append.
- VITA. 1990. Aide Memoire on coordination meeting of TAMP and TSFDP project. 18 pp.
- Gorrez, F. 1990. Plants protecting plants and against insects and other methods of control. Belize. 30 pp.
- IFAD. 1985. Report and recommendations of the president to the Board of Directors. Rome. 20 pp.
- IFAD. 1985. Preliminary version - Appraisal report on the Toledo Small Farmers Development Project/Belize. Rome. 43 pp.
- IFAD. 1989, TSFDP Annual report. Min. Agriculture and Fisheries. Belmopan. 15 pp. + append.
- King, R. et. al. 1986. Land resource survey of Toledo District. Land Resources Development Centre. Surrey, UK. 60 pp. + append.
- USAID. 1991. Natural Resources Management Project. Belize City. 56 pp. + append.
- Belize Enterprise for Sustained Technology. 1988. Sub-Contract Proposal for TAMP project. 7 pp.
- Overseas Development Administration. 1989. Belize Tropical Forestry Action Plan. London. 270 pp.

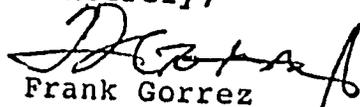
155

The second and third operational goals based on the Project Paper, as in the first goal, does not provide designs or suggest models as to what types of post-harvest technology improvement or multi-purpose service centers should be constructed. Instead, USAID/Belize and the TAMP/VITA project maintained a very close liason and an open channel for continued monitoring, visits, communication and reporting system before any operation is sanctioned.

Enclosed is the main text of the project's January 1991 through March 1991 Quarterly Report relevant to be considered in describing specific activities that were misunderstood as reported in the Evaluation Draft Report.

I am not ready to discuss the above issues at this time except to share with you our collective reaction. We recognized the writer of the report and team leader, Mr. David Gibson is not sufficiently familiar with the project itself given only three days to view about 20% of the field and limited discussion with people involved. Visiting in the dry season when everything in the farms are bone dry with out existing crops can be misleading in describing agronomic performances of recommended technology. What Dr. Ken Turk and I shared with Mr. Gibson were not at all reflected in the evaluation draft report.

Sincerely,


Frank Gorrez
Chief of Party

c:c Dr. Ken Turk
Mr. Fred Hunter
Mr. Mohammad Shah

TOLEDO AGRICULTURAL AND MARKETING PROJECT
VOLUNTEERS IN TECHNICAL ASSISTANCE
(TAMP/VITA)

PROJECT NO. 505 - 0016
TOLEDO, BELIZE, CENTRAL AMERICA

QUARTERLY REPORT
JANUARY THROUGH MARCH, 1991.

TOLEDO AGRICULTURAL AND MARKETING PROJECT
VOLUNTEERS IN TECHNICAL ASSISTANCE
(TAMP/VITA)

PROJECT NO. 505-0016
TOLEDO, BELIZE, CENTRAL AMERICA

QUARTERLY REPORT JANUARY THROUGH MARCH, 1991

PROGRESS TOWARD OBJECTIVES

Overview

On February 2, 1991 TAMP/VITA sponsored a half-day workshop/conference in Punta Gorda on IMICS - sustainable agriculture systems and soil conservation. Toledo District farmers from several villages have participated in a TAMP/VITA hands-on training and demonstration program for the past two years. This wrap-up meeting was designed to bring the participating farmer leaders together to discuss their experiences of setting up and managing their IMICS-Sustainable Agriculture production module. We distributed a bound manual at the end of the workshop (Annex 1).

The meeting was attended by 45 participating farmers from seven villages and 24 visitors that included the United States Agency for International Development (USAID), the Ministry of Agriculture, the Toledo Small Farmers Development Project (TSFDP), Toledo Community College (TCC), and Government Officials.

The demonstration on the use of storage bins and fermentation and drying of cacao has been an on-going effort of the project. Two ferro-cement storage tank of 100 gallons and 500 gallons capacity at a much cheaper price compared to the metal bins are now under construction.

Facilitating the transportation network and delivery of cacao to Hummingbird Hershey in Belmopan has become a problem since all cargo trucks are no longer passing through the same route.

Project Component #1: Technology Transfer

The Project Agronomist and three Field Technicians joined the Ministry of Agriculture after completion of contract on February 28, 1991. Replacing the three Technicians are selected farmers who were active participants of the IMICS the past two years and henceforth, will be addressed as Farmer Technicians (F/Ts). This is the second phase of the TAMP/VITA program which started in August 1988 with three full time Agricultural Field Technicians. The three AFTs were living in the villages of San Jose, San Antonio, and Big Falls. Seven Farmer-Technicians (F/Ts) will replace the AFTs as the village based extension arm of the project. The F/Ts will be progressive farmers that the TAMP project has worked closely with during the first 2 years of implementation. They will be assisted by the TAMP technical staff and Peace Corps Volunteers, and will be supervised by the Agronomist/Consultant. The seven F/Ts will be hired to work 3 days per week. Each F/T will find 10 farmers living in his village or immediate area that want to establish an IMICS production model of two task (1/4 acre). The proposed seven farmer F/Ts are as follows:

- | | | |
|----|---------------|-------------|
| 1) | Rayford Arzu | Punta Gorda |
| 2) | Marvin Lambey | Punta Gorda |
| 3) | Regino Cowo | San Antonio |
| 4) | Dionicio Teck | San Jose |
| 5) | Alejandro Cho | San Jose |
| 6) | Emeterio Sho | Na Luum Ca |
| 7) | Cayetano Ico | Laguna |

IMICS was established as a tool of extension (visits, training/workshops and demonstrations) and a place for demonstrating production practices to achieve the first project goal in developing alternative cash crop; aside from cacao. It addressed directly the Project Paper stated purpose of accelerating the transition from traditional slash and burn agriculture to a modified cropping system in the culturally diverse Toledo farming district. Standard operational extension techno-transfer activities revolved around farm visits, training/workshops and demonstrations outside of IMICS model farm. The consultant Agronomist and one Agricultural Field Technician continue this function in a limited manner.

The last tally of cacao acreage, village location, farmer, classification of varieties/acreage was completed on December 19, 1990 (Annex 2). This survey started in 1988 and were verified almost every six months. The project believed that there must be at least 1,000 acres of cacao in the Toledo District instead of the 919.6 acres on record.

The Agronomist's End of Project Report covering extension activities and post-harvest technology improvement are presented in Annex 3.

Project Component #2: Postharvest Technology Improvements

The Project continued its effort in demonstrating post-harvest equipments and facilities for cacao, rice, corn and beans. Construction of ferro-cement all-purpose storage container with 100 gallons and 500 gallons capacity were constructed for demonstration at the San Jose MSC.

The project has showed in 7 trials how to control infestation of stored grain insects in corn that was stored for 1 1/2 years. At present, 12 of the 25 drum containers are utilized by individual farmers in San Jose MSC for further demonstration on corn and beans.

The technology recommended for post-harvest improvement is acceptable and effective. Unfortunately, the cost of construction and materials are so expensive that farmers resorted to merely copying the technology instead of buying any unit. The same thing happened with the cacao fermenting and drying facilities where farmers through project demonstration succeeded in almost eliminating rejection of their cacao sold to Hummingbird Hershey. Its a fact that almost all material products in Toledo are imported and very costly.

Project Component #3: Marketing/Input Supply Distribution

The Project Paper addressed the constraints facing farmers interested in expanding production of existing crops or in establishing new ones in Toledo, these constraints include the lack of marketing facilities (collection points, dryers, packing sheds, adequate transportation arrangements, etc.) geared to small farmer crops, and the lack of production inputs and knowledge of their use.

The establishment of the MSCs in San Jose, San Antonio and Big Falls was decided through a series of meetings with the IFAD/Toledo Small Farmers Development Project, interview with Lands Department, consultation with farmers and agreement reached with the District Coordinating Committee and the National Coordinating Committee.

As reported by Dr. Carolyn McCommon, TAMP/VITA's Rural Development Consultant Specialist (August 15, 1988 through February 21, 1989), the existing cacao acreage along with the potential for future development were major factors contributing to TAMP decisions to locate the Multipurpose Service Centers

(MSCs) in San Jose, Big Falls, and the San Antonio/Crique Jute Area. In consultation with the IFAD/TSFDP monitoring and Evaluation Specialist, the TAMP main service areas for the 3 MSCs show present holdings of cacao to be 610 acres and by comparison, the IFAD/TSFDP main service areas show existing cacao to be only 34 acres as seen in Annex 4. The two main depots (stores) for IFAD/TSFDP are to be located in Santa Cruz and Blue Creek (which was later decided to be erected in Punta Gorda).

Main areas of lease land potential drawn from interview with Land Officers, Lands Department, Toledo District, January 1989 by Dr. McCommon came out with the following data.

The main areas of leasehold land which hold the most potential for TAMP agricultural activities are located near the Jimmy Cut area along the Crique Jute-San Jose road (see Annex 5). Within this area over 12,000 acres have been dereserved for leasehold by Indians with 7,000 allocated to San Antonio and 5,000 set aside for San Jose. Of the total acreage set aside for San Antonio, 2,500 acres has been allotted to Na Luum Ca in fifty 50-acre blocks. These lands are in the process of being surveyed and mapped. Once official lease papers are issued, farmers will have up to 5 years to comply with individual development plans defined by each farmer. These plans should include the cultivation of permanent crops. At that point, if the farm has not been developed according to the plan, the land will be considered defaulted.

Of the remaining portion of the San Antonio block, 4500 acres still remain to be surveyed. Some is already considered rocky and unsuitable for farming. Usable land will be eventually surveyed 'sometime' over the next few years and made available to farmers. It is not clear exactly where the lands sought by the San Antonio Cocoa Growers, whom TAMP is assisting in cocoa fermenting and drying, are located.

The locations of the MSCs would cater to potentially 12,000 acres agricultural land in the future taking into consideration all other services included in the design of the building like dryers, packing shed, collection point, arrangement of transportation network, training room, office and chemical store.

Problem in transporting Cacao to HHL. The project wrote a letter (Annex 6) to the Minister of Agriculture requesting transportation assistance to deliver cacao to Hummingbird Hershey and he phoned back the TAMP/COP asking how we go about the process of collection and delivery of cacao. This was explained but no commitments were made from the ministry's side. Cacao farmers were thoroughly informed of the situation that after 1 1/2 months delivery by TAMP pick-up to HHL of their cacao, the project will no longer be able to continue this service and that the Minister of Agriculture was made aware of the situation.

The March 31, 1991 MSCs financial statement is shown below:

FINANCIAL STATEMENT AS OF MARCH 31, 1991

Gross Sales & Other Income Deposited in Bze Bank	BZ \$ 86594.16
MSCs Chemical Credit Sales	2650.67
MSCs Seed Loan Credit Sales	12212.78
MSCs Stock Inventory	52861.79
Fund Remaining from In-Kind Support to Farmers	3913.32
Misc. (Stock in Office)	482.00
	<u>\$158714.72</u>
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