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UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

BELIZE
PROJECT PAPER
TOLEDO AGRICULTURAL
MARKETING

AID/LAC/P-366

Project Number: 505-0016

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE

A = Add
 C = Change
 D = Delete

Amendment Number

DOCUMENT CODE

3

COUNTRY/ENTITY
Belize

3. PROJECT NUMBER
505-0016

4. BUREAU/OFFICE
LAC

5. PROJECT TITLE (maximum 40 characters)
TOLEDO AGRICULTURAL MARKETING

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)
MM DD YY
016 | 310 | 9 | 2

7. ESTIMATED DATE OF OBLIGATION
(Under "B" below, enter 1, 2, 3, or 4)
A. Initial FY | 87 | B. Quarter | 3 | C. Final FY | 91 | 0 |

8. COSTS / \$000 OR EQUIVALENT \$1 =

A. FUNDING SOURCE	FIRST FY 87			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FY	F. L/C	G. Total
AID Appropriated Total	900		900	2,500		2,500
(Grant)	(900)	()	(900)	(2,500)	()	(2,500)
(Loan)	()	()	()	()	()	()
Other:						
1. U.S.						
2. Host Country		213	213		267	267
Other Donors)						
TOTALS	900	213	1,113	2,500	267	2,767

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION/PURPOSE	B. PRIMARY CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) ARDM	130	070				2,500		2,500	
(2)									
(3)									
(4)									
TOTALS						2,500		2,500	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)
140 | 020

11. SECONDARY PURPOSE CODE
120

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)
A. Code | BS
B. Amount | 2,500

13. PROJECT PURPOSE (maximum 480 characters)

1. Establish a viable export-oriented industry among small holders in the Toledo District; and

2. Accelerate ongoing transition from traditional "slash and burn" agriculture to modified systems through improved postharvest practices and the establishment of a viable marketing system.

14. SCHEDULED EVALUATIONS
Interim | MM YY | 1 | 1 | 8 | 8 | MM YY | 0 | 1 | 6 | 9 | 0 | Final | MM YY | 0 | 9 | 9 | 1 |

15. SOURCE ORIGIN OF GOODS AND SERVICES
 000 941 Local Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment.)

Payment Verification Procedures approved
Rolland Deschambault
Acting Controller

17. APPROVED BY
Signature: *Neboysna R. Brashich*
Title: Neboysna R. Brashich
A.I.D. Representative
Date Signed: MM DD YY | 06 | 03 | 87 |

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
MM DD YY

ACRONYMS

ADO	Agricultural Development Office
AIDAR	A.I.D. Acquisition Regulation
BEST	Belize Enterprise for Sustained Technology
BIM	Belize Institute of Management
BMB	Belize Marketing Board
CAC	Commercialization of Alternative Crops Project
COP	Chief of Party
DFC	Development Finance Corporation
EA	Environmental Assessment
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization of the United Nations
FAR	Federal Acquisition Regulation
GGA	Grain Growers' Association
GOB	Government of Belize
HHL	Hummingbird Hersey Limited
IEE	Initial Environmental Evaluation
IFAD	International Fund for Agricultural Development
MOA	Ministry of Agriculture
NBCCA	National Bipartisan Commission on Central America
ODA	Overseas Development Agency
OED	Office of Economic Development
OPG	Operational Program Grant
PHL	Postharvest Loss
PID	Project Identification Document
PVO	Private Voluntary Organization
RCO	Regional Contracting Officer
RFTP	Request for Technical Proposal
SSA	Social Soundness Analysis
TA	Technical Assistance
TAMP	Toledo Agricultural Marketing Project
TRDP	Toledo Rural Development Project
TSFDP	Toledo Small Farmers Development Project
UNDP	United Nations Development Program
UNDP/OPE	United Nations Development Program/Office of Program Execution

TOLEDO AGRICULTURAL MARKETING PROJECT

PROJECT PAPER TABLE OF CONTENTS

Project Authorization
Table of Contents
List of Acronyms

	<u>Page</u>
I. Project Recommendation and Summary.....	1
II. Background and Rationale	
A. The Role of Agriculture in the Economy.....	3
B. The Importance of Agriculture in the Toledo District.....	5
C. Agricultural Development in the Toledo District: Constraints and Opportunities.....	6
D. Relation to Agency and Mission Program.....	8
E. Relationship to GOB Agricultural Development Strategy.....	9
F. IFAD's "Toledo Small Farmers Project".....	9
G. Other Donor Activities.....	11
III. Detailed Project Description	
A. Goal and Purpose.....	11
B. Overview of Project Components.....	11
C. Project Components.....	12
IV. Financial Plan and Implementation of Payment Verification Policy	
A. Financial Plan.....	18
B. Methods of Implementation and Financing.....	20
C. Assessment of Contracting/Financial Management Capabilities and Need for Audit Coverage.....	21
V. Implementation Plan	
A. Implementation Responsibilities and Administrative Arrangements.....	22
B. Joint TAMP/IFAD Implementation Arrangements.....	23
C. Implementation Schedule.....	25
D. Procurement Plan.....	28
VI. Monitoring and Evaluation Plans	
A. Monitoring Plan.....	30
B. Evaluation Plan.....	32
VII. Conditions and Covenants	
A. Conditions Precedent to Disbursement.....	33
B. Covenants.....	34

	<u>Page</u>
VIII. Summaries of Analyses	
A. Technical Analysis.....	34
B. Financial and Economic Analysis.....	40
C. Social Soundness Analysis.....	44
D. Environmental Analysis.....	48

Annexes

1. PID Approval/Guidance Message
2. Logical Framework
3. Statutory Checklist
4. Grantee Request for Assistance
5. KSU Marketing, Rice Mill and Input Supply Center Analysis
6. Cocoa Technical Analysis
7. Financial and Economic Analysis
8. Social Soundness Analysis
9. Environmental Analysis
10. Detailed Budget Tables
11. Report and Recommendation of the President
12. Tripartite Meeting
13. Toledo Small Farmer Development Project (IFAD), unattached

PROJECT AUTHORIZATION

Name of Country: Belize
Name of Project: Toledo Agricultural Marketing Project
Number of Project: 505-0016

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Toledo Agricultural Marketing Project (TAMP) involving planned obligations not to exceed Two Million Five Hundred Thousand United States Dollars (US\$2,500,000) in Grant funds ("Grant") over a five year period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/Allotment process, to assist in financing foreign exchange and local currency costs for the project. The planned life of the project is sixty (60) months from the date of initial obligation.

2. The Project ("Project") will provide technical and financial assistance to assist Belize's private and public sectors to support and develop agricultural diversification by promoting the expansion of improved cocoa production, developing improved on-farm postharvest systems for subsistence and cash crops and developing an effective marketing/input supply system through indigeneous farmer organizations that will provide the vehicle for the divestiture and privatization of Belize Marketing Board activities.

3. The project agreements, which may be negotiated and executed by the officer(s) to whom such authority is delegated in accordance with A.I.D. regulations and delegations of authority, shall be subject to the following terms and conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

a. Source and Origin of Commodities: Nationality of Services

Commodities financed by A.I.D. under the Grant shall have their source and origin in Belize or in the United States, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have Belize or the United States as their place of nationality, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Grant shall be financed only on flag vessels of the United States, except as A.I.D. may otherwise agree in writing.

✓

b. Conditions Precedent to Disbursement

(1) First Disbursement

Prior to the first disbursement under the Project Grant Agreement with the Government of Belize or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Grantee will, except as the parties may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D.:

- (a) An opinion of counsel acceptable to A.I.D. that the Agreement has been duly authorized and/or ratified by and executed on behalf of the Grantee, and that it constitutes a valid and legally binding obligation of the Grantee in accordance with all of its terms; and
- (b) A statement of the name of the person holding or acting as representative of the Grantee and of any additional representatives, together with a specimen signature of each person specified in such statement.

(2) Disbursement for the Renovation of the Former Toledo Agriculture Station

Prior to any disbursement for the renovation of the former Toledo Agriculture Station under the Project Grant Agreement with the Government of Belize, or the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Government of Belize shall furnish to A.I.D., in form and substance satisfactory to A.I.D., written assurance that the former Agriculture Extension Station will be made available exclusively for use of the TAMP Project and its support personnel to implement project objectives during the life of the project.

c. Covenants

- (1) The PVO shall covenant that, except as A.I.D. may otherwise agree in writing, ninety days after execution of the Cooperative Agreement, the PVO shall furnish to A.I.D., in form and substance satisfactory to A.I.D., a time-phased implementation plan detailing the first year's activities, including major benchmarks.
- (2) The PVO shall covenant that, except as A.I.D. may otherwise agree in writing, it will furnish to A.I.D., in form and substance satisfactory to A.I.D., annual time-phased, detailed implementation plans for project activities, including financial reports.
- (3) The PVO shall covenant, except as A.I.D. may otherwise agree in writing, to enter into a Memorandum of Understanding (MOU), or other such documentation satisfactory to A.I.D., which provides for its participation in a Project Steering Committee that will consist of representatives of the Government of Belize, IFAD or its designee,

indigenous farmer's organization(s), USAID and other such organizations or individuals which may be determined appropriate in order to carry out the successful coordination and implementation of project activities.

(4) The Government of Belize shall covenant that, except as A.I.D. may otherwise agree in writing, it will make available for upgrading and improvement, over the life of the Project the equipment and facilities of the Toledo Big Falls Rice Mill in order to achieve Project objectives.

(5) The Government of Belize shall covenant to establish and maintain in Toledo an Input/Supply Center, throughout the life of the Project, which shall work through indigenous farmer organizations by (a) establishing institutional and infrastructural arrangements which link the organizations, and (b) building up the organizational and managerial capability of the organizations to assume ownership and control of market depots, service centers and/or other related facilities.



Neoysha R. Brashich
A.I.D. Representative
USAID/Belize

Date June 3, 1987

Drafted:RLA:TCarter/ADO:SSzadek

Clearance:

ADO:SSzadek

Szadek 10 June 87

PDO:PLapera

PL 6/3/87

CONT (Acting):RDeschambault

RDeschambault

I. PROJECT RECOMMENDATION AND SUMMARY

A. Recommendation

USAID/Belize recommends the authorization of a \$2.5 million grant to support the development of an alternative cash crop (cocoa) and related agricultural marketing efforts in the Toledo district to be made by the private and public sectors of Belize.

B. Summary

Belize's relatively small population (170,000 estimated in 1986), its significant reliance on imports and limited agricultural exports, make the Belizean economy extremely vulnerable to shifts both in world markets and to local agricultural production. Modest shifts in world prices can increase the import bill or reduce export earnings, as can bad weather, insects and diseases.

Total exports from Belize represent some 60 percent of GDP. Over 57 percent of exports are agricultural products with sugar, bananas and citrus accounting for most of the total. Equally important, a substantial share of national income and employment are derived from agricultural production (25 percent of GDP, 35 percent of employment).

In 1982, the international economic recession and the declining sugar and citrus prices combined to cause Belize to suffer from severe balance of payments problems. For Belize to meet future challenges, the agricultural base must be broadened, and new crops must be developed for export.

The Government of Belize, in its five year Macro Plan, 1985-89, and its sectoral plan for agricultural development has placed highest priority on agricultural diversification. One of the crops it hopes to develop as a major export is cocoa, which is already being exported and for which the market is guaranteed by Hershey Foods International through a contract with Hershey Foods Ltd. of Belize.

The Toledo District is the least developed region of Belize. Toledo accounts for 8 percent (11,863) of the total population of Belize and 19 percent (1,704 square miles) of its land mass. The population is divided into 31 villages and the town Punta Gorda (pop 2,500). The Maya Indians, who practice traditional milpa farming, make up 64 percent of Toledo's total population and 80 percent of the farming population. This population is the poorest in Belize with the major source of income, farm income, estimated at \$175 per capita.

Agriculture is the main activity of the district, and production with the exception of rice and some citrus, is almost totally for home consumption. Cocoa has been grown for hundreds of years by the Maya Indians and the Maya Indians of today are very interested in increasing cocoa production and adapting technology for commercial production.

The goal of this project is to increase real income and improve the standard of living of small farmers in the Toledo District of Belize. Through achievement of this goal the balance of payments situation in Belize will be strengthened and food security improved.

The primary purpose of the project is to establish a viable export-oriented industry among smallholders in the Toledo District. A secondary purpose, which will enhance the accomplishment of the primary purpose, is to accelerate ongoing transition from the traditional "slash and burn" (milpa) agriculture to modified systems through improved postharvest practices and the establishment of a viable marketing system.

In order to achieve the goal and purpose, the project will consist of four components. All four components, briefly described below, support a major effort in cocoa production.

- 1) Encourage the development of cocoa and other crops as alternative cash crops for the small farmer in Toledo. This will broaden the small farmer's cash crop base and diminish his dependency on rice production, thereby reducing his risk.
- 2) Improve on-farm postharvest systems for both subsistence and cash crops. Postharvest systems for cash crops (cocoa and rice) will be geared toward market acceptance. Reduction of postharvest losses for subsistence crops (corn and beans) of between 20 and 40 percent will release labor and land for cocoa production and other cash generating enterprises.
- 3) Develop an effective marketing/input supply system (focusing on cocoa) in Toledo, working through indigenous farmer organizations by (a) establishing institutional and infrastructural arrangements which link the organizations and (b) building up the organizational and managerial capability of the organizations to assume ownership and control of market depots, service centers and/or other related facilities.
- 4) Upgrade the existing Belize Marketing Board's rice mill and storage complex at Big Falls, Toledo District, to improve product through-put, reduce losses and improve quality. This activity will ensure market acceptability at the domestic level and possibly as an export to Caricom, as well as implement the USAID/GOB strategy to restructure the Belize Marketing Board (BMB) into a price stabilization and market information entity. Together with the development of a marketing/input supply system, this effort will enhance the prospect of eventual transfer of the facilities to private ownership over a three to four year period.

Components 1, 2, 3, and part of 4 will be implemented with the Belizean private sector, through a U.S. Private Voluntary Organization. The fourth component, as well as participant training will be implemented by the GOB with the assistance of a U.S. university or consulting firm.

The Mission will sign a Project Agreement with the GOB and a Cooperative Agreement with a registered U.S. PVO to be selected according to Handbook 13 guidelines and AID/W concurrence.

The total cost of the Project is \$2.5 million. AID will provide \$1.7 million in Grant funds to a U.S. PVO to implement the private sector components of the Project. AID will provide \$800,000 in Grant funds to the GOB to implement the public sector component. The GOB will provide land and buildings valued at \$200,000 and the salaries of extension workers valued at \$67,000. The life of the Project is five years.

II. Background and Rationale

A. The Role of Agriculture in the Economy

1. Export Crop Production

During the eighteenth and nineteenth centuries forestry was the main economic activity in Belize. After a decline beginning early in the twentieth century, forest resources were largely depleted by the end of the Second World War. A transition to an agriculturally based economy started at the end of the nineteenth century with the introduction of banana plantations and later sugar cane. Both of these crops have turbulent histories in Belize, at one time or another nearly disappearing and then experiencing resurgences. Citrus also was introduced in the early nineteenth century, and together with sugar and bananas presently account for a substantial portion of the Belize's GDP.

Total exports represent some 60 percent of GDP. Over 57 percent of exports are agricultural products with sugar, bananas and citrus accounting for most of the total. Equally important, a substantial share of national income and employment are derived from agricultural production (25 percent of GDP, 35 percent of employment).

The country's relatively small population (170,000 estimated in 1986), its significant reliance on imports and limited agricultural exports, make the Belizean economy extremely vulnerable to shifts both in world markets and to local agricultural production. Modest shifts in world prices can increase the import bill or reduce export earnings, as can bad weather, insects and diseases.

In 1982, the international economic recession and the declining sugar and citrus prices combined to cause Belize to suffer from severe balance of payments problems. For Belize to meet future challenges, the agricultural base must be broadened, and new crops must be developed for export.

The Table below presents actual exports for 1985 and projected exports for 2000, according to GOB plans. Cocoa and rice are expected to increase dramatically.

TABLE 1
Projected Changes in Exports, 1985-2000

Product	Bz\$ per ton	1985 Bz\$ million	%	2000 Bz\$ million	%
<u>Principal Products</u>					
Sugar	510	54.6	50	54.6	23
Molasses	70	2.5	2	2.5	1
Citrus	5,500	25.3	23	60.0	30
Bananas	640	6.7	6	10.3	6
Fish/Shellfish ^{a/}	23,000	13.6	12	46.6	24
Timber	920	4.1	4	5.7	3
<u>Other Products</u>					
<u>Meat/Fruit/Veg/</u>					
Honey	Various	2.1(est)	2	4.5(est)	2
Cocoa	4,000	1.0	1	10.8	5
Rice (milled)	550	0	0	1.9	1
Total other products		3.2	3	17.2	8
TOTALS		110	100	197.5	100

^{a/}Actual amount: projected figures were significantly higher
Source: Parsons Brinckerhoff International Inc.

2. Grain Production for Local Consumption

Of the 354,700 acres of land reported under cultivation in Belize, 73,600 acres (20 percent) are devoted to export crop production and some 241,000 acres (about 68 percent) are in pasture to support cattle production. The balance, an estimated 40,100 acres (12 percent of cultivated area) is devoted to basic food production for local consumption.

Most of the food produced in Belize is grown by milpa farmers who practice slash and burn agriculture, planting corn, beans, plantains and root crops primarily for family consumption. Some 6,000 to 8,000 households (19 to 26 percent of the total) engage in milpa production. An average milpa farmer cultivates 4 to 10 acres of corn annually out of a total area of 30 to 50 acres. Few inputs are used, yields are not high and there are significant post-harvest losses.

Approximately eight percent of the land reported under cultivation is planted in corn. Growth in both the total acreage production of corn has been slow but steady as more poultry and livestock are being fed corn.

Rice is a cash crop for the milpa farmer with most of the crop being marketed through the BMB and consumed in the urban areas. While grown throughout the country, it is concentrated in Toledo and Belize districts. In 1981, of the 7,400 acres planted in rice, there were 4,000 acres in Toledo, 2,800 in Belize district (2,500 at Big Falls Ranch), 600 in the Stann Creek District.

Milpa farmers have responded to the relatively high domestic price offered by the BMB by putting more land into rice production. Yields are traditionally low in the milpa production system, but research indicates that yields on milpa farms can be increased significantly through improved varieties and post-harvest loss reduction.

B. The Importance of Agriculture in the Toledo District

The Toledo District is the least developed region of Belize. Toledo accounts for 8 percent (11,863) of the total population of Belize and 19 percent (1,704 square miles) of its land mass. The population is divided into 31 villages and the town Punta Gorda (pop 2,500). The Maya Indians, who practice traditional milpa farming, make up 64 percent of Toledo's total population and 80 percent of the farming population. This population is the poorest in Belize with the major source of income, farm income, estimated at \$175 per capita.

Agriculture is the main activity of the district, and production with the exception of rice and some citrus, is almost totally for home consumption. Approximately 45 percent of the land area is suitable for annual crops, pasture and/or tree crops. The remainder is either forest, swampland or marginal soils of no agricultural value. Some 86 percent of the land is technically owned by the Government, of which 55,000 acres are allocated as Indian reserves and utilized by the the Maya Indians. The Toledo district has only 65 miles of main roads and 70 miles of secondary roads and trails. Rainfall is plentiful, averaging 200 inches per year, so much so that at times transportation is disrupted by flooding.

The following Table demonstrates the importance of grain production for Toledo and the nation.

TABLE 2
Production of Basic Grains in Toledo
As a Percent of National Production (000 lbs)

YEAR	PADDY RICE	CORN	BEANS	PERCENT OF NATIONAL PRODUCTION		
				R	C	B
1979	8,000	5,000	2,000	92	15	62
1980	9,000	7,500	750	75	18	24
1981	8,000	3,800	450	33	8	12
1982	6,500	3,800	450	37	8	11
1983	3,720	3,110	250	41	13	7
1984	3,900	7,280	760	31	20	27
1985 (est)	5,200					

Variations in yearly production levels result from price incentives (an approximate 50 percent increase in the price paid for corn from 1979 to

1981), climatic conditions and marketing availability. Paddy rice is expected to remain at the 5.2 million pound level or increase slightly as the USAID Rural Access Roads and Bridges Project improves and upgrades the roads in the district.

Over the period 1970-1980, the rural population in Toledo increased by some 44 percent. This growing population places increasing pressure on land utilization to which farmers have reacted by:

- reducing the fallow period which, after eight years, greatly reduces fertility and yields, increases labor requirements and causes environmental and ecological complications;
- cultivating land farther away from home, which decreases returns to labor;
- forming new villages which places pressure on the Government to provide social services;
- leasing private land and adopting some form of settled farming which is a change from traditional practices;
- planting other cash crops such as cocoa and citrus; and
- seeking alternate methods of livelihood such as wage earnings, merchandising, trucking, etc. which, again, is a significant change from historical patterns.

Except for the last response, the farmers in Toledo are searching for ways to maintain their farming productivity and/or expand their commodity mix to capture additional revenues with approximately the same labor availability. The opportunities for off-farm employment are very limited. Clearly, the development of the Toledo district will revolve around agriculture.

C. Agricultural Development in the Toledo District: Constraints and Opportunities

Economically, the Toledo district has continually lagged behind the rest of the nation and the GOB places high priority on the development of Toledo. Some of the most critical constraints to development are described below together with opportunities which can be developed to assist the Toledo farmers increase their productivity and generate higher incomes for their families.

1. Inadequate Extension Services

There are a large number of vacancies in the national extension ranks and especially in the Toledo district. To fill the gap, the GOB should train local residents in agricultural sciences both at the Belize College of Agricultural and at the B.S. and M.S. degree levels.

2. Lack of Alternative Cash Crops

As land pressure increases, less and less suitable land will be available for upland rice production. Increasing yields would require increased use of chemical inputs which may not be economical. Wet-tillage cultivation in the lowlands of Toledo district does show promise for expansion and increases in rice production are expected to come in this area. The dependency on upland rice as the major cash crop for the majority of farmers in Toledo must be lessened while other potential cash crops with secure markets are promoted. Already small numbers of Mayan farmers have begun to plant cocoa and citrus as markets have opened up.

3. On-Farm Post-Harvest Losses are High

Grain farmers in Toledo are faced with numerous postharvest problems which contribute to a high level of physical, quality and nutritional losses. Volume losses have been measured at up to 40 percent of production. Postharvest losses are caused by a lack of improved postharvest technology to maintain initial grain quality given climatic conditions and an inadequate marketing infrastructure. If on-farm losses could be reduced, labor and other resources would be more available for increased cash crop production for the farm family.

4. Inadequate Marketing System Geared to Small Farmers

There are a limited number of facilities located in Toledo which market agricultural products. The BMB grain complex in Big Falls is the principal market for small farmer production. It purchases and processes rice, and also purchases corn and beans. Presently it is an inefficient processor due to the poor quality of incoming paddy - inadequate drying and storage facilities and incomplete and inadequate equipment - and losses are high. As there are no other outlets for their grain, farmers have little choice but to sell to the BMB. The GOB has agreed to transform the BMB into a price stabilization and market information entity, divesting their purchasing, milling and storage facilities to private sector groups or organizations. Several farmers' groups in Toledo, the Grain Growers' Association, the San Antonio Cocoa Growers' Association and the Toledo Cocoa Growers' Association are eager to participate more directly in marketing their crops.

5. Limited Availability of Agricultural Inputs

Sales of agricultural inputs are currently made on an informal and irregular basis in Toledo. The BMB formerly sold fertilizers and some agricultural chemicals through the Big Falls grain complex, but this activity was discontinued due to the financial problems of the BMB. The Grain Growers Association attempted to utilize the BMB facilities to sell inputs, but the arrangement did not work. Appropriate, timely and cost effective inputs must be readily available to small farmers for them to adopt new farming practices or new cropping alternatives.

6. Inadequate Transportation Infrastructure to Support Development Initiatives

While this constraint to development presently exists, USAID/Belize is

implementing a project which is upgrading farm access roads to all-weather status. Some 50 miles of roads in the Project area in Toledo will be rehabilitated.

7. Credit Availability

Farmers in Toledo are establishing cocoa and citrus orchards on a small scale apparently with family resources. For cocoa, this includes the purchase of seeds, plastic bags and necessary chemicals to support seedlings through the transplanting stage. Although Maya farmers are traditionally wary of credit, their desire to expand cultivation and use modern technologies (such as insecticides) will necessitate some use of credit. Past credit programs through institutions like the Development Finance Corporation (DFC) have not been very successful in the Toledo district. Credit requirements have been based for the most part on the use of land as collateral, which the typical Mayan farmer cannot or will not risk. Alternative credit schemes need to be developed.

D. Relation to Agency and Mission Program

The AID program in Belize addresses the four major goal areas in the NBCCA Report, i.e. economic stabilization, laying the basis for long-term growth, equity and broad based participation in development, and democratic institutions and human rights.

Currently most of the program, in terms of resources and staff effort, are concentrated on laying the basis for long term growth. AID agriculture and private sector projects address lack of diversification and past dependence on sugar as the predominant foreign exchange earner.

In this context, USAID's FY 88-89 Action Plan includes the following objectives and projects which will lead to their accomplishment:

-Increase agricultural production: Livestock Development, 505-0006, Belize Enterprise for Sustained Technology OPG, 505-0030 and Macal Dairy Cooperative Development, 505-0036

-Promote Exports: Commercialization of Alternative Crops, 505-0008, Toledo Agricultural Marketing, 505-0016, Accelerated Cocoa Production, 505-0023, and Export and Investment Promotion, 505-0027;

-Strengthen the Private Sector: National Development Foundation OPG, 505-0011; Export Investment Credit, 505-0019

-Expand and Improve the Infrastructure: Rural Access Roads and Bridges, 505-0007

By implementing the projects listed above, the AID program aims to develop agricultural sub-sectors appropriate for Belize, and ensure that various geographical areas are adequately developed. The projects constitute an integrated effort. For example, A.I.D. credit activities

will provide financing to farmers who produce winter vegetables and tropical fruit for export under the Commercialization of Alternative Crops Project. While the CAC Project is concentrated in the north, the TAMP will develop the south, by increasing agricultural production and exports.

There are two ongoing efforts directly related to TAMP. One is the Accelerated Cocoa Production Project, 505-0023, which provides for the development and dissemination of improved methods of cocoa production for small farmers. The Hershey Foods Corporation, through Hummingbird Hershey, Ltd., provides research and processing facilities for cocoa. More importantly, Hershey is a major purchaser of cocoa beans and provide a major incentive for producers to begin or expand cocoa plantations. The innovations and techniques for improving cocoa yields under Belize conditions, developed under Accelerated Cocoa Production, will be applied to TAMP.

The second effort directly related to TAMP involves a condition precedent to disbursement under the Economic Stabilization Program, 505-0012. The condition, as part of a program to reduce the burden of parastatals on the GOB budget, required "legal and/or legislative steps to change the Belize Marketing Board's (BMB) functions and responsibilities into that of an institution concerned exclusively with commodity price stabilization." The condition was met and TAMP will continue implementation of this privatization effort by divesting BMB marketing and milling facilities to the private sector, for the benefit of the Toledo farmers.

E. Relationship to GOB Agricultural Development Strategy

The Government of Belize considers the agricultural sector the major industry in Belize and looks to the farming community as the major provider of employment. The GOB has stated priorities of increasing foreign exchange earnings and developing import substitution activities through agricultural diversification. TAMP, by establishing and expanding cocoa production in Toledo, directly contributes to export earnings with the sale of beans on the world market. Additionally, improved processing of rice and price stabilization activities will contribute to higher quality domestically produced consumer products, which will create food security for the Belizean people, as well as reduce foreign exchange expenditures for food. The Project is consistent with GOB's efforts to involve the private sector to the greatest extent possible in facilitating the economic development of Belize. TAMP relies on the private sector to implement major project activities and to provide the basis of organizational structure for divestiture of the BMB's facilities.

F. IFAD'S "Toledo Small Farmers Development Project" (TSFDP)

The Toledo Small Farmers Development Project was developed by IFAD and UNDP missions between April, 1983 and July, 1985. In September, 1985 the

Executive Board of IFAD approved the project as contained in the "Report and Recommendations of the President on a Proposed Loan to Belize for the Toledo Small Farmers Development Project".

The target group consists of some 1,700 Toledo farmers, of which approximately 1,100 are Maya Indians. Direct beneficiaries are those operating holdings not exceeding 50 acres. The aim of the five year project is to "provide financial and technical support for strengthening and promoting appropriate agricultural practices and services to small farmers in the Toledo District". The objectives of the project are: to improve the incomes and standards of living of a group of semi-subsistence farmers; to increase agricultural production and productivity through access to technological packages; to strengthen farmer-support institutions, e.g., GOB agricultural extension; and, to augment the marketing physical infrastructure and improve the handling, processing and marketing of the main crops.

In June, 1985 IFAD approached USAID with the possibility of co-financing its project. The need to coordinate became clear to both USAID and AID/W and, over a one year period, documents were exchanged and several meetings were held between IFAD and AID staff to work out a coordinated program. This process culminated in late August, 1986, when, at the request of USAID, an IFAD team arrived in Belize to work out the final details. IFAD, the GOB and USAID decided that the parallel financed (i.e. separately financed, but completely integrated) projects would consist of complementary components as follows:

IFAD

- Credit Program
- Extension Program
- Market Site Development Program
- Grain Complex Rehabilitation
- Program Management

USAID

- Development of Alternative Cash Crops (Cocoa)
- Improvement of on-farm Post Harvest Systems
- Development of Marketing/Input Supply and Management System
- Upgrading of Big Falls Grain Complex & Rice Mill for Privatization
- Restructuring of BMB into a price stabilization and Market Information Entity

For the most part, the division of components is very clear. Where both IFAD and USAID are involved in the same component, i.e., in Market Development and Grain Complex Rehabilitation, the combined levels of funding are required and the division of labor is clearly defined. The arrangements for coordination are described in Section V, B. Implementation Plan, Joint IFAD/AID Implementation Plan.

G. Other Donor Activities

Over the past five years, the Overseas Development Agency (ODA) financed the Toledo Rural Development Project (TRDP) in the Toledo District. This project focused on two geographic divisions within Toledo, the upland and lowland, with research on transferring appropriate technologies to be adapted within the context of the existing social and cultural parameters of the District.

Considerable research has been conducted to develop alternatives or modifications to the traditional slash and burn practices through the GOB/ODA TRDP. Some of the project's recommendations, such as slash and mulch technology, are acceptable to the Maya and appropriate for wider promotion. TRDP recently developed several promising techniques for lowering the cost of rice production. If such techniques are successfully implemented, rice could be exported to other Caricom countries.

The GOB is transferring the Toledo agriculture extension service station to the TRDP site in order to continue to promote the new technologies. TRDP will be phased out in 1987. TAMP technical advisors will coordinate and work closely with the two remaining ODA technicians until their departure. The Project will draw extensively from the experience of the TRDP, mainly through the district's Chief Agriculture Officer who will provide the linkage between the two projects.

III. DETAILED PROJECT DESCRIPTION

A. Goal and Purpose

The goal of this project is to increase real income and improve the standard of living of small farmers in the Toledo District of Belize. Through achievement of this goal the balance of payments situation in Belize will be strengthened and food security improved.

The primary purpose of the project is to establish a viable export-oriented industry among smallholders in the Toledo District. A secondary purpose, which will enhance the accomplishment of the primary purpose, is to accelerate ongoing transition from the traditional "slash and burn" agriculture to modified systems through improved postharvest practices and the establishment of a viable marketing system.

B. Overview of Project Components

In order to achieve the goal and purpose, the project will promote a development effort to:

1. Encourage the development of cocoa and other crops as alternative cash crops for the small farmer in Toledo. This will broaden the small farmer's cash crop base and diminish his dependency on rice production.

2. Improve on-farm postharvest systems for both subsistence and cash crops. Postharvest systems for cash crops (cocoa and rice) will be geared toward market acceptance. Reduction of postharvest losses for subsistence crops (corn and beans) of between 20 and 40 percent will release labor and land for cocoa production and other cash generating enterprises.

3. Develop an effective marketing/input supply system (focusing on cocoa) in Toledo working, through indigenous farmer organizations by (a) establishing institutional and infrastructural arrangements which link the organizations and (b) building up the organizational and managerial capability of the organizations to assume ownership and control of market depots, service centers and/or other related facilities.

4. Upgrade the existing Belize Marketing Board's rice mill and storage complex at Big Falls, Toledo District, to improve product through-put, reduce losses and improve quality. This activity will ensure market acceptability at the domestic level and possibly as an export to Caricom, as well as implement the USAID/GOB strategy to restructure the BMB into a price stabilization and market information entity. Together with the development of a marketing/input supply system described above, this effort will enhance the prospect of eventual transfer of the facilities to private ownership over a three to four year period.

Components 1, 2, 3 and part of 4 will be implemented with the Belizean private sector, through a U.S. Private Voluntary Organization. The fourth component, as well as participant training, will be implemented by the GOB with the assistance of a U.S. university or consulting firm.

C. Project Components

1. Private Sector Components

a. Developing Cash Crop Alternatives - Cocoa

Small farmers in the Toledo district are already seeking alternatives to their traditional cropping mix of subsistence crops, corn and beans, and their principal cash crop, rice. Recently farmers began limited attempts at diversification which have included modest plantings of cocoa and citrus, crops with relatively secure markets. In the case of cocoa, Hummingbird Hershey Limited (HHL) has agreed to purchase fermented and dried cocoa delivered to their plant at approximately 75 percent of the world market price, revised every six months. The financial and economic analyses demonstrate good returns on cocoa production to the small farm household, after an initial three to four year period required to establish the tree. This should be an attractive enough incentive to stimulate investment. Even with a reliable market outlet secured, there are constraints to rapid development of cocoa: limited knowledge of necessary husbandry practices such as plant spacing, fertilization and pruning to maximize production, and the absence of appropriate collection, fermenting and drying arrangements which are needed to process high quality beans and assure market acceptance.

To attack these constraints, the project will fund two technicians to work with the farmer organizations for four and three years respectively. One technician will be the Chief of Party and be a specialist in enterprise and organizational development. The other technician will be an agronomist with significant experience in cocoa production and processing techniques.

Technical assistance provided by the two advisors under this activity will be focused on two areas: (1) providing direct assistance to the growers in improved cocoa production practices and (2) developing the farmer organizations to efficiently manage the collection, processing and marketing of the cocoa crop. The advisors will integrate their work in these areas throughout other project activities. If other appropriate crops complementary to cocoa production, such as spices, are identified, technical assistance will assist Toledo farmers in this development.

In addition to the two technical advisors, the project will fund three local field technicians for three years. These field technicians will ensure that the farmers have up-to-date production practices available to them during the critical period when cocoa trees are established. Since 80 percent of a tree's productive potential is determined during the first 12 months of growth, cropping techniques cannot be left to chance. Under the guidance of the agronomist, the field technicians will conduct a comprehensive program of demonstrations, workshops and, most importantly, regular farm visits to convey the necessary husbandry practices for proper plant development. As production increases, revenue from an assessment (cess) levied by the farmer organizations developed will cover the costs of maintaining these fieldmen. Project technical personnel will work in a coordinated fashion with the GOB extension agents to maximize the spread of relevant technology.

Improved techniques for the production of cocoa at the farm level are not sufficient to ensure marketability. Fermentation and drying techniques must be effective to produce high quality and acceptable beans. There are two possible strategies which the project could encourage farmers to pursue: (1) on-farm fermentation and drying or (2) selling wet beans to a central processing facility. The advantage to the farmer of the first option would be to gain the value added by processing while avoiding possible logistical difficulties in transporting heavy, perishable wet beans to a facility within 24 hours of "breaking" the pods. The advantage of the second option would be to avoid the expense of building individual fermentation boxes, dryers, and storage facilities, and to eliminate the labor inputs at what might be a very busy time on the farmer's agricultural calendar. Probably the most significant advantage of the second option is that controlled fermentation and drying at a central processing facility produces a high quality product commanding top market prices.

It is difficult to determine at the start of the project whether one or both options will be used by the new cocoa producers after production

begins. Therefore, the project will establish a fermenting and drying facility adjacent to the Big Falls rice mill and integrated with the service center (described below) to provide farmers a local outlet for their wet beans. The technical advisors will also work with smaller subgroups of farmers to set up farm level fermenting and drying units as production warrants. After the third year of the project when production builds, further studies will be made to determine the mix of fermenting and drying facilities most suitable for the project to support. Project resources will assist in establishing these facilities.

By the end of the project, the farmer organization(s), as a result of enhanced technical, organizational and management capabilities, are expected to:

- coordinate the harvesting, collection and processing of Toledo cocoa production;
- administer the fermentation and drying of the cocoa production and efficiently operate an appropriate number of input supply centers;
- collect sufficient revenue from the cocoa production cess to pay for the services of two to three field agronomists who will provide technical assistance to cocoa producers; and
- identify and evaluate alternative marketing opportunities and determine which ones are more advantageous to the producers..

b. Post-Harvest Technology Improvements

Significant losses in grain production are experienced by small farmers in Toledo. The losses appear to be most acute in post-harvest handling and storage methods now employed by most small farmers. The project will support adaptive research and extension of more efficient post-harvest storage and handling technology. A reduction in post-harvest losses in grain production will result in increased availability of land and labor which could be invested in increased cash crop production of cocoa. In the near term, a reduction in post-harvest losses of rice (also a potential export crop) will improve real income and improve farmers' standards of living as well as increase investment in alternate cash crops.

One of the responsibilities of the senior agronomist funded by the project will be to coordinate the adoption and introduction of on-farm post-harvest technology for basic grains. Preference in providing this assistance to farmers will be given to those involved in cocoa production. Short term technical assistance will be provided each year by the project to backstop the agronomist in developing, testing and adapting the post-harvest technology. The Project will finance the appropriate model storage and handling systems. By the end of the Project, post-harvest losses in small farmer grains is expected to be reduced by an average of 20 percent.

c. Marketing/Input Supply System

Constraints facing farmers interested in expanding production of existing crops or in establishing new ones in Toledo 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 marketing channel for Toledo's agricultural production is very shallow, lacking in services and competition. The Belize Marketing Board is the major purchaser of rice (greater than 90 percent of Toledo's production), and cocoa is transported and sold to Hershey Hummingbird Ltd., 130 miles away, by individual farmers. Occasionally itinerant buyers may appear during the harvest of beans, spices, and certain tree crops. Marketing information from outside the district is non-existent except for prices established by the BMB for basic grains and for cocoa by HHL.

Sales of agricultural inputs are currently made on an informal, limited, and irregular basis in Toledo. The BMB, the Grain Growers' Association and the Toledo Research and Development Project and a few of the small stores in Punta Gorda stock limited quantities of chemicals on a seasonal basis. The MOA extension agents assist producers by purchasing chemicals for them on their occasional trips to Central Farm or Belize City.

There are presently three farmers' organizations in Toledo relevant to this project: The Grain Grower's Association, The Toledo Cocoa Growers' Association and the San Antonio Cocoa Growers' Association. These groups have expressed the desire to participate more directly in marketing their crops. The project will support their interest by providing them technical assistance to develop their ability to participate more directly in the operation of rice mill, and to own and operate market/input supply depots in strategically located points in Toledo. The participation of appropriate private sector firms will also be sought.

The marketing/input supply system will be developed around cocoa and rice. The PVO chief of party will assist, initially, in the formation of an advisory/supervisory group of farmers from the relevant farmer organizations and private firms who will develop a supply center from which the marketing and input supply system will evolve. The center will serve as a wholesale supplier making supplies available through community groups or private vendors in strategic locations. Some areas may need to be served by route sales on a periodic basis during times of peak usage. As input usage grows and producer needs and preferences become more clearly defined, the establishment of improved and permanent facilities will be considered.

Project resources will help fund the first center to be established adjacent to and integrated with, the BMB's Big Falls facility. In the initial year the project will assist in supporting a manager and other

necessary personnel to efficiently operate the center. The management of the center will be supervised by the advisory/supervisory group of farmers and project technical assistance personnel.

Two to four months of short-term technical assistance will be provided through the project to train project field agents and personnel of the input supply center(s) in relevant integrated pest management techniques, and proper storage and handling of appropriate chemicals. Ministry of Agricultural field agents and Hershey Farms Ltd. personnel will be invited to attend and assist in these training sessions and seminars.

Financial contributions from the participating growers' groups will be required to assist with the start-up costs of the center. The Project will support a working capital revolving fund of up to US\$35,000 and will purchase the initial inventory of inputs to be sold to the public.

As both retail sales and production of cocoa increase, the center may expand to coordinate product assembly, offering custom services for drying, storage and transport. The expansion will also depend on the growth of the management skills of the groups operating the center. Other centers may be opened based on the demand for services and availability of capital for expansion.

By the end of the project the center will be owned and operated by the formal entity evolving from the advisory/supervisory group, described above.

d. Privatization of the Big Falls Rice Mill

There are two important reasons for carrying out this project component. First, reduction in losses in the grain marketing system will provide greater returns to the Toledo farmer providing him/her with the resources to shift his production into cocoa or other cash crops. Second, this component will assist the GOB to implement its decision to transform the BMB from a commodity procurement and processing agency into a price stabilization and market information entity as expressed in the 1985 ESF agreement.

Rice production is very important to the Toledo small farmer. Toledo's rice production represents a significant contribution to Belize's national production. For a small farmer to risk expansion into other cash crops, some adjustments must be made in the rice production system to allow him/her the time and/or money to diversify. A key adjustment to the rice production system is to increase operational efficiency and product quality at the Big Falls rice mill and grain complex. Reconditioning the rice mill could increase milling yield by 5 or 10 percent. A more efficient rice mill would mean increased returns to the farmer that could be channeled into other cash crops.

Equally as important as increasing the efficiency of the rice mill is the assistance the project can provide the government to transform the Big

Falls rice mill into a thriving private sector concern. The rice mill and its associated facilities will provide significantly greater benefits to the Toledo district if farmers and/or farmers' groups take a controlling interest in the facilities and add activities such as cocoa fermenting and drying, an input supply center and other agribusiness activities. For the GOB, transferring the utilization of its scarce resources from BMB's current grain marketing and processing activities into real price stabilization activities will mean greater efficiency in the public sector.

The Project will direct its resources to two areas to support the privatization of the Big Falls rice mill. One area will involve providing the following to the GOB: technical assistance, commodities and training to assist in the transition of the BMB from grain merchant to price stabilization entity. This is further described below.

The second area, i.e. assistance to the private sector to take over Big Falls rice mill, will include the provision of technical assistance to the farmers' groups in management skills, enterprise development and other business skills to be able to manage some or all of the facilities. This will be integrated with the marketing/input supply activity.

Beginning in the first year of the project but lasting throughout the life of the project, technical assistance in organizational and enterprise development will be provided to the farmers' groups through the farmers' advisory/supervisory group by the PVO chief of party. The technical assistance efforts will be aimed at improving the administrative capabilities of the groups to enable them to partially or totally acquire the grain processing and storage facilities at Big Falls.

2. Public Sector Component

a. Privatization of the BMB

A marketing economist will provide technical assistance to the BMB's central office in Belize City for a three year period. The economist will assist the BMB in restructuring and developing the expertise within the Agency to carry out its new price stabilization and market information functions. Specifically, the economist will carry out the functions summarized below:

--Continually support the GOB BMB Privatization Working Group in following through on the BMB Privatization Program, i.e., implementing the chosen scenario in the Kansas State University report entitled, Alternative Scenarios for Commodity Price Stabilization Programs in Belize which is an unattached Annex to this Project Paper;

--Document the costs of operation and measures of operational efficiency of the Big Falls facility before and after the renovation of the mill with the objective of developing pro forma statements to assist divestiture;

--Assist the BMB in preparing economic analyses of the marketing situation, training personnel in functions relating to price stabilization and market information, and developing strategies to phase out the rice milling and commodity distribution.

Also during the first year, the project will provide the GOB with resources and short term technical assistance to renovate the Big Falls rice milling facilities and turn it into a profitable operation. This will be accomplished through physical facility renovation, training of personnel, market differentiation of products, improved management and operational systems and backward integration into rice acquisition to improve quality. At the end of the second year, the rice mill will have significantly decreased its processing losses and will be in an attractive position for private sector acquisition.

b. Training in Agriculture

The project will also assist the GOB to provide training to selected residents from the Toledo district who want to pursue careers in agriculture. Currently there are four vacant positions of the six in the agricultural extension division in Toledo. It is important to provide educational opportunities to residents of Toledo since they are more likely to return to the area after training and continue to participate in the development of the area. Resources will be provided in the project for training at the technical agricultural level, B.S. and M.S. degrees and international short courses.

IV. FINANCIAL PLAN AND IMPLEMENTATION OF PAYMENT VERIFICATION POLICY

A. Financial Plan

The total cost of the project will be U.S.\$2,767,000 of which U.S.\$2,500,000 (90% of total project costs) will be an AID Grant. The remaining funds will come from ESF local currencies and GOB in-kind contribution. ESF local currencies (US\$ 67,000 equivalent) and in-kind contribution (land and facilities equivalent to U.S.\$200,000) total U.S.\$267,000 and represent 25 percent of total project costs for the public sector component. The estimated life of the project (LOP) is five years from FY 87 to FY 91. Tentative schedule for obligation of AID funding is as follows:

<u>FISCAL YEAR</u>	<u>OBLIGATION</u>
1987	900,000
1988	500,000
1989	300,000
1990	800,000

While Table 3 presents the Summary Financial Plan, Table 4 reflects summary cost estimates according to private and public sector categories. Table 5 presents planned expenditures by year and source of funding.

TABLE 3
SUMMARY GENERAL FINANCIAL PLAN (\$000)

INPUTS	AID Funding		GOB Funding		TOTAL	PERCENT
	FX	LC	FX	LC		
Technical Assistance	\$1,352	--	--	--	\$1,352	48.9%
Local Hire Personnel	--	\$172	\$ 67	--	239	8.6%
Travel & Trans.	84	43	--	--	127	4.6%
Commodities & Equip.	379	130	200	--	709	25.6%
Training	111	35	--	--	146	5.3%
Credit	--	35	--	--	35	1.3%
Other Direct Costs	59	--	--	--	59	2.1%
Evaluation	25	--	--	--	25	0.9%
Contingency	45	--	--	--	75	2.7%
TOTAL	\$2,085	\$415	\$267	--	\$2,767	100.0%

TABLE 4
SUMMARY PROJECT COSTS BY COMPONENT (\$000)

INPUTS	Private Sector		Public Sector		Total
	AID	GOB	AID	GOB	
Technical Assistance	\$978	--	\$374	--	\$1,352
Local Hire Personnel	143	--	29	\$ 67	239
Travel & Trans.	89	--	38	--	127
Commodities & Equip.	340	--	169	200	709
Training	5	--	141	--	146
Credit	35	--	--	--	35
Other Direct Costs	41	--	18	--	59
Evaluation	17	--	8	--	25
Contingency	52	--	23	--	75
TOTAL	\$1,700	--	\$800	\$267	\$2,767

TABLE 5
PROJECTIONS OF EXPENSES BY FISCAL YEAR (\$000)

Year	AID Grant	ESF LC	GOB In-Kind	Total
1987	\$1,011	\$13	\$200	\$1,225
1988	561	14	--	574
1989	537	13	--	551
1990	204	14	--	217
1991	187	13	--	200
TOTAL	\$2,500	\$67	\$200	\$2,767

The largest line item in the Summary Financial Plan is Technical Assistance representing 48.9 percent of total project costs. Of this amount 72.4 percent is allocated to the private sector component and 27.6 percent is allocated to the public sector component. The second largest line item is Commodities and Equipment which accounts for 25.6 percent of the total project costs. Of this amount 48 percent is allocated to the private sector and 52 percent allocated to the public sector. Local hire personnel, travel and transportation, and other direct costs account for 8.6 percent, 4.6 percent and 2.1 percent respectively. Some US\$146,280 is allocated to Training and will provide for training at the Belize College of Agriculture, international short courses and degree courses at U.S. universities. Training under the public sector component accounts for 97 percent of the total Training Budget. Credit (U.S.\$35,000) accounts for 1.3 percent of total Project Budget. This credit will be a revolving fund administered through the service centers. The credit mechanism is explained in more detail in VIII-A Technical Analysis, Section 5.

Funds totalling U.S.\$25,000 have been budgeted for two evaluations. To the extent necessary, this amount will be supplemented by PD&S funds. The first evaluation is planned for the second year of the project and the second for the last year of the project. Finally, U.S.\$74,000 have been budgeted for Contingency.

Annex 10 contains the detailed financial tables, which support the summary tables presented above. These include:

- Table I: Detailed budget for AID Grant funds including unit cost data.
- Table II: Detailed budget for total project by inputs and fiscal year.
- Table III: Detailed budget for public sector component by inputs and fiscal year.
- Table IV: Detailed budget for private sector component by inputs and fiscal year.
- Table V: Costing of project outputs/inputs.

B. Methods of Implementation and Financing

Preferred methods of payment contained in Payment Verification Policy Statements will be used, as outlined in the table below:

<u>TYPE OF ASSISTANCE</u>	<u>METHOD OF IMPLEMENTATION</u>	<u>METHOD OF PAYMENT</u>	<u>AMOUNT (\$000)</u>
-Technical Assistance	U.S. PVO Contractor	LOC/TFCS	978
		Direct Payment	374
-Local Hire Personnel	U.S. PVO Contractor	LOC/TFCS	143
		Direct Payment	29

<u>TYPE OF ASSISTANCE</u>	<u>METHOD OF IMPLEMENTATION</u>	<u>METHOD OF PAYMENT</u>	<u>AMOUNT (\$000)</u>
-Travel and Transportation	U.S. PVO Contractor	LOC/TFCS Direct Payment	89 38
-Commodities and Equipment	U.S. PVO Contractor	LOC/TFCS Direct L/Com	340 169
-Training	Contractor	Direct Payment	146
-Credit	U.S. PVO	LOC/TFCS	35
-Other Direct Costs	U.S. PVO Contractor	LOC/TFCS Direct Payment	41 18
-Evaluation	Contractor	Direct Payment	25
<u>-Contingency</u>	<u>-----</u>	<u>-----</u>	<u>75</u>
TOTAL			<u>2,500</u>

C. Assessment of Contracting/Financial Management Capabilities and Need for Audit Coverage

The Private Sector Components (\$1,701,000) of the Project will be implemented through a major U.S. PVO, already certified and registered by A.I.D. As such, the U.S. PVO will have an AID/W pre-certified contracting/procurement system in place, consistent with Section 1U, Procurement Standards of Handbook 13 and OMB Circular 110, Attachment O. In addition, the U.S. PVO will have a financial management system in accordance with Section 1L, Standards for Financial Management Systems of Handbook 13 and OMB Circular 110, Attachment F.

To ensure sound financial management and procurement practices, USAID will conduct three audits of the Private Sector Components throughout the LOP. These audits will be funded through an ESF LC funded IQC with a local CPA firm, affiliated with an International CPA firm.

For the Public Sector Component (\$1,066,000), USAID will utilize AID direct contracting. One of the responsibilities of the TA contractor team will be to administer and account for funds provided for the Public Sector Component. Again to ensure sound financial management and procurement procedures, USAID will utilize the services of a CPA firm to do audits through an IQC arrangement.

V. IMPLEMENTATION PLAN

A. Implementation Responsibilities and Administrative Arrangements

1. Obligation Arrangements

The \$2.5 million grant will be obligated by means of two grant agreements. The agreement for the Private Sector Components, a cooperative agreement, will be signed with a U.S. PVO. The rationale for utilizing a cooperative agreement is described below in the Procurement Plan. The grant agreement for the public sector component will be signed by the GOB with the Ministry of Agriculture as the primary implementing entity.

2. Implementation Responsibilities

a. U.S. PVO

The U.S. PVO will be the primary implementing entity for carrying out the Private Sector Component as outlined above. The U.S. PVO will be responsible for working directly with Toledo small farmers and appropriate farmers' associations or cooperatives such as the Toledo Cocoa Grower's Association, the San Antonio Cocoa Grower's Association, and the Grain Grower's Association. The U.S. PVO will closely coordinate activities with the GOB/Ministry of Agriculture officials and extension agents and the contractor involved in the implementation of the Public Sector Component, as well as with the United Nations Development Program/Office of Program Execution (UNDP/OPE) advisors to the IFAD Toledo Small Farmer Development Project (TSFDP). The U.S. PVO will be responsible for all procurement actions under the Private Sector Components and will conduct procurement in accordance with HB 13 procurement procedures.

The PVO Chief-of-Party will be responsible for reporting to the USAID Project Manager. The PVO will be responsible for providing USAID with annual workplans and quarterly reports, as well as for clearing all procurement with USAID.

b. Government of Belize/Ministry of Agriculture

The Ministry of Agriculture of the GOB will be the primary implementing agency of the Public Sector Component of the project. The MOA will lead the inter-ministerial working group (involving the Office of Economic Development, the Financial Secretary, and the Ministry of Commerce) which oversees the privatization of the BMB. With project-funded technical assistance and commodities, the MOA will be responsible for renovation of the BMB rice mill, training of its staff, differentiation of its product and improvement of its management. The MOA will also be responsible for providing counterpart personnel for both the private and public sector components, chiefly in the form of extension agents and BMB staff. The MOA and OED will be responsible for coordinating TAMP and TSFDP and for assuring that all GOB inputs are provided on a timely basis.

The Ministry of Agriculture will provide USAID with annual workplans, and quarterly reports. USAID will directly procure all services and commodities required under the Public Sector Component, except for small value locally procurable items, and will rely closely on the MOA and project advisors for identifying procurement needs and specifications.

B. Joint TAMP/IFAD Implementation Arrangements

1. Summary

AID, IFAD, and the GOB have agreed to a parallel financing arrangement between IFAD and AID. Presented below are the activities each is responsible for regarding their respective project:

IFAD

- Credit Program
- Extension Program
- Market Site Development Program
- Grain Complex Rehabilitation
- Program Management

USAID

- Development of Alternative Cash Crops (Cocoa)
- Improvement of on-farm Post Harvest Systems
- Development of Marketing/Input Supply and Management System
- Upgrading of Big Falls Grain Complex & Rice Mill for Privatization
- Restructuring of BMB into a price stabilization and Market Information Entity

Both TAMP and TSFDP will be distinct, yet closely coordinated projects. In the parallel financing arrangement, AID has assumed full responsibility for the rice mill and grain complex rehabilitation, therefore, the closest coordination will be in the area of Market Development, although coordination will be emphasized throughout all project activities.

The GOB, IFAD, and USAID have agreed that TAMP's Chief of Party will be responsible for the overall coordination of the Market Development Activity to ensure integral development of an effective marketing system for Toledo. Shortly after arrival, the TAMP Chief of Party, together with IFAD's Project Supervisor will develop a detailed joint plan for implementation of the Market Development components of each project.

Overall coordination will be achieved through a Joint Policy Committee established through a Memorandum of Understanding (MOU) and comprised of representatives from GOB Ministry of Agriculture, USAID Agricultural Development Office and the UNDP. This committee will meet on a regular basis to resolve major implementation issues and provide oversight. In addition, each project will have a district project committee which will include representation by the other donors. It has been agreed that reports, evaluations, and other documentation, will be shared by USAID, IFAD, and the GOB.

2. Background and Detail

As indicated in the Project Description, the public sector component of TAMP contains elements for the renovation of the Big Falls Grain Complex. TAMP will provide the total financing necessary for technical assistance and renovation. The physical improvements planned for the complex under this arrangement will increase the operating efficiency of the plant, improving the probability of private sector acquisition.

The Marketing System Development Program of TSFDP and the Marketing/Input Supply System of TAMP will be the functional area in which coordination efforts will especially focus. IFAD proposed originally to construct and operate three marketing depots in the Toledo District. However, during discussions with the Mission on a joint effort, it was agreed that at least one center or depot would be included in the USAID Toledo project, leaving IFAD to construct two centers. Coordination will be essential to effectively implement and achieve project goals. Therefore, the GOB, IFAD and USAID representatives have agreed that the TAMP Chief-of-Party (COP) will be responsible for overall coordination to ensure integral development of an effective marketing system in Toledo. The TAMP/COP will coordinate implementation of all marketing centers to assure compatibility of design, inputs and services. The COP will work directly with IFAD's Project Management Unit personnel to develop a relationship between the marketing centers of both projects.

The TAMP/COP will combine the TAMP and TSFDP Market Development Plans into an Overall Plan for Market Development that incorporates the essential design of the project papers of each agency. An advisory group will review the final plan and approve it for implementation. Implementation of the plan will be carried out by the individual project personnel involved in the centers - that is, IFAD personnel will be responsible for implementation of the plan in the centers constructed under the IFAD project and TAMP personnel will be responsible for implementation under the USAID's project.

Both projects will work through a Joint Policy Committee, consisting of one representative each of the GOB/MOA, IFAD's implementing agent UNDP/OPE, and the USAID/ADO. The Joint Policy Committee will meet on a regular basis to resolve major problems arising during project implementation.

Each project will have its own arrangements for project management. The USAID Mission will assign a Project Manager to supervise and monitor the implementation of both the public and private sector components of TAMP. The IFAD project will have a Project Authority at the national level which will assign a Project Management Unit and a Project Council for the actual day to day implementation of the project.

The Project Authority for IFAD will be responsible for the procurement of all services and commodities for TSFDP project. IFAD will use UNDP/OPE as its financial agent as well as its implementation agent. IFAD's own procurement procedures will be used for both services and commodities.

TAMP has been designed as a distinct and separate project, able to be implemented separately in the case of any delays in the IFAD project. The implementation plan will allow for coordination at any point should either project fall behind schedule.

C. Implementation Schedule

The following represents the proposed schedule of major events required in the implementation of the Project.

<u>Major Events</u>	<u>Date</u>
- Project Authorization	05/87
1. <u>Private Sector Component</u>	
- Issue Request for Grant application	06/87
- Issue PIO/T for renovation of MOA Toledo facilities (Housing and Office)	06/87
- Issue PIO/C for commodities to initiate implementation (vehicles)	06/87
- Execute Cooperative Agreement with selected PVO	08/87
- Initial Conditions Precedent to Initial Disburse- ment Met by PVO	09/87
- Arrival of TA team.	09/87
- Hiring of Project Office staff	09/87
- Submission of initial Workplan (First Year)	10/87
- Initial assessment of postharvest needs completed	11/87
- Training program initiated	11/87
- Workshop on Pesticide Use conducted	11/87
- Cocoa technology extension to farmers initiated and fieldmen onboard	12/87
- Fermentation and drying facility established	02/88

<u>Major Events</u>	<u>Date</u>
- Center established and operational and Center staff hired	02/88
- Postharvest technology innovation developed and tested (also social/cultural acceptance study completed)	02/88
- Center revolving fund operational	02/88
- Postharvest technologies extended to farmers	03/88
- First group of trainees completed training	04/88
- Fermentation and drying needs and method of implementation established	04/88
- 200 acres of cocoa established through project auspices	05/88
- Identification of farmer needs and preferences for establishment, if necessary, of other centers.	05/88
- Center activities extended to village level	06/88
- System for delivery of cocoa to Hershey established	09/88
- First evaluation conducted	01/89
- Review first year submission of Annual Workplan for second year	11/88
- Expatriate Agronomist leaves	09/89
- Annual review and submission of Workplan for third year	12/89
- Second evaluation	06/90
- Annual review and submission of Workplan for fourth year	12/90
- Fieldmen supported by revenue of centers	12/90
- Center self sustaining	12/90

<u>Major Events</u>	<u>Date</u>
- 400 acres of cocoa established through project auspices	12/90
- Assessment of reduction on postharvest losses	02/91
- Formal group destined to operate center legally sound and capable of assuming ownership	03/91
- Ownership and operation of marketing/input supply system under formal entity evolving from advisory/supervisory group	06/91
- Third evaluation	09/91
- Expatriate TA leaves	12/91
- 800 acres of cocoa established through project auspices	03/92

2. Public Sector Component

<u>Major Events</u>	<u>Date</u>
- Signing of Agreement	06/87
- Issue RFTP	06/87
- Issue Implementation Letter No. 1	06/87
- Initial Condition Precedent Met	07/87
- Award Contract	08/87
- TA Advisor arrives	09/87
- Hiring of project staff	10/87
- Initiate privatization plan for BMB	11/87
- Prepare designs for rice mill renovation	12/87
- Order equipment/parts for rice mill	12/87
- Train operators at Rice Mill	12/87
- Select candidates for long-term training	02/88

<u>Major Events</u>	<u>Date</u>
- Develop and implement first year plan for reorganization of BMB	02/88
- Renovate mill	03/88
- Initiate price stabilization function of BMB	05/88
- Follow-up with training and short-term consultant work on Rice Mill	06/88
- Renovation of Rice Mill completed	09/88
- First evaluation	10/88
- Submission of Annual Workplan for first year	12/88
- Implement second year plan for reorganization of BMB	12/88
- Review and submit Annual Work Plan for second year	12/89
- Rice Mill operating at optimal conditions	12/89
- Second evaluation	06/90
- BMB reorganized as a Price Stabilization Entity	12/90
- Rice Mill directed to group developed in Toledo	12/90
- Advisor leaves	02/91

D. Procurement Plan

1. Private Sector Components

The activities contemplated under the Private Sector Components are developmental in nature, and therefore do not constitute a set of discrete tasks or accomplishments which could be included in a contract. For this reason, recent discussions involving the Regional Contracting Officer (RCO), and the USAID Agricultural Development and Project Development Offices concluded that obligation will occur through a Handbook 13 instrument. Further, discussion with the RCO concluded that a Cooperative Agreement is the appropriate instrument for obligation. In accordance with HB 13, Chapter 6, Cooperative Agreements, the following conditions indicating substantial involvement and use of a Cooperative Agreement apply:

--review and approval of the substantive provisions of subordinate agreements or contracts;

--involvement in the selection of key recipient personnel;

--monitoring to permit specified kinds of direction or redirection of the work because of interrelationships with other projects (i.e., IFAD).

In Belize 4462, USAID stated that "Authorization of the Cooperative Agreement will be with a PVO to be selected in accordance with Chapter 1BE2 of HB 13. USAID would like to solicit proposals from a limited number of PVOs with track records in cocoa production. AA LAC approval of this procedure will be requested in Septel." AID/W response to this, in STATE 033105 was: "We stand by to assist in procurement requirements for selection of PVO upon receipt of your request as indicated in Reftel." USAID plans to have the RCO administer the selection process. It may be this process will be open to wider field than those PVOs with experience in cocoa production. In all cases, LAC concurrence will be sought.

In terms of procurement of inputs for the Private Sector Components, USAID will rely on the U.S. PVO to administer all procurement in accordance with Handbook 13, Section 1U Procurement Standards and Standard Provisions for U.S. PVOs. However, the early procurement actions of vehicles and living quarters will be undertaken by USAID. Procurement practices of all U.S. PVOs registered with AID/W are certified initially, and presumably are checked on a periodic basis. Nevertheless, USAID will monitor compliance with HB 13 standards through audits and project management.

The following list is a general schedule by item, responsible entity and procurement arrival date:

-PVO Cooperative Agreement, USAID, 8/87

-Project living quarters, USAID, 6/87

-three vehicles (2 for the private sector, 1 for public sector), USAID, 8/87

-U.S. personnel, PVO, 8/87

-local personnel, PVO, 9/87

-travel and transportation, PVO, ongoing

-postharvest and cocoa cultivation supplies, PVO, ongoing

-input loan fund, PVO, ongoing

-equipment for service center, PVO, 2/88

2. Public Sector Component

Privatization of the GOB's Belize Marketing Board and the Big Falls Rice Mill will be activities under a government to government agreement, in accordance with Handbook 3. USAID will utilize AID Direct Contracting according to the FAR and AIDAR for all procurement under the grant agreement with the GOB. Procurement of technical assistance will be effected through a contract with either a U.S. profit-making firm or a U.S. university. The following is a general schedule, according to item and arrival or procurement completion date:

- Signing of Grant Agreement, GOB, USAID, 6/87
- office equipment and equipment to BMB, USAID, 8/87
- U.S. technical assistance, GOB, USAID, 9/87
- local personnel, 10/87
- travel and transportation, ongoing
- training, ongoing
- expendable equipment and supplies, ongoing
- equipment for modernizing rice mill, 3/88

VI. MONITORING AND EVALUATION PLANS

A. Monitoring Plan

1. AID Project Monitoring Arrangements

Project monitoring will be exercised by the project manager assigned by USAID's Agriculture Development Office (ADO). The ADO Project Manager will work closely with the selected PVO and the MOA to assure that project implementation plans and objectives are met.

USAID offices will have the following responsibilities:

- The ADO Office will have responsibility for overall implementation.
- The Program and Project Development Office will monitor project implementation to assure that the terms and conditions of the Project Agreement are met and will assist in carrying out reviews and evaluations.
- The Mission's controller will review disbursement and reimbursement requests for conformity with AID regulations and will ensure that adequate financial controls are exercised.

There are six major points in the project which should be monitored continuously in order to judge the effectiveness of the project. These items are as follows:

- Rate and amount of cocoa and alternative cash crop plantings.
- Rate of reduction of postharvest losses.
- The amount of cess levied by association to support their fieldmen.
- Success of the market/input supply center (measured by profit and growth in volume sales).
- Rate of reduction in losses at the Big Falls Rice Mill.
- Income accruing to women as a result of this project.

The USAID and the PVO will develop a system of continuously monitoring and reporting on each item. This data will be used in scheduled evaluations, as well as for the day-to-day management of the project by USAID, the GOB and the project team.

The PVO will submit the following reports to USAID/Belize, the MOA and the OED:

- Brief Monthly Implementation Reports
- Quarterly Implementation Reports, and
- Annual Implementation Reports.

2. GOB Responsibilities

The Government of Belize will assist in monitoring the project, as well as acting as the coordinating body for this and the parallel IFAD Project.

In monitoring TAMP, both the Ministry of Agriculture and the Office of Economic Development will be represented at quarterly project review meetings. The MOA and OED will designate representative counterparts for this project at the beginning of project implementation.

The GOB's Office of Economic Development has been assigned the responsibility of monitoring the parallel IFAD financed project in Toledo (TSFDP).

In order to assist in effectively coordinating the two projects, all required reports from TAMP will be submitted to the OED as well as the MOA and USAID.

Semi-Annual implementation meetings will be held to assist in coordinating both projects. Representatives will attend from the following: USAID/Belize, MOA, OED, DFC, TAMP, TSFDP and other invited interested parties. The head of the TSFDP Project Implementation Unit will chair this meeting.

3. Review Meetings

Project review meetings will be held quarterly to review and direct

project implementation. Representatives from USAID/Belize, the selected PVO, the MOA and OED will participate in these meetings. The TAMP/COP will chair these meetings.

B. Evaluation Plan

Three evaluations will be conducted during the project life. Two will be in-house, and will evaluate project implementation activities, assess progress in achieving project objectives, identify methods to improve project design and provide specific information necessary to effect key project decisions. The third evaluation, led by an outside firm, will be the final evaluation of the project.

Every effort will be made to coordinate evaluations between TAMP and the IFAD-funded TSFDP. Although the two projects cannot be jointly evaluated, coordinating the timing of evaluations will be valuable in measuring the achievement of project objectives and taking remedial actions.

1. First (In-house) Evaluation October, 1988

The first evaluation scheduled will address the following issues:

- Is the project on track according to the implementation schedule? Identify problem areas.
- Is the implementation schedule still appropriate, given the results of #1? What changes should be made to enhance the project and achieve the objectives?
- Are the stated project results and objectives still realistic? If not, how should they be altered, keeping in mind overall project objectives.
- Specifically examine the results of the work at the Big Falls Grain Complex Rice Mill. Can we still achieve the 20-40 percent targeted reduction in losses by the end of 1989, as scheduled? If not, what actions must be taken to achieve this goal?

2. Mid-term (Formal) Evaluation (June 1990)

The following steps will be taken:

- Evaluate progress to date and make recommendations to improve implementation activities with respect to achieving project objectives.
- Conduct a specific study to determine the appropriate mix of drying and fermenting facilities for project support and make implementation recommendations.
- Conduct a specific study to determine appropriateness of expanding the number of project supported market/input centers. Make implementation recommendations.

-Specifically evaluate the results of the work completed at the Big Falls rice mill. Determine reduction in milling losses, compared to 20-40 percent targeted reduction. Make recommendations for continuing actions to maintain and/or improve mill efficiency.

3. Third (In-house) Evaluation (September 1991)

The following steps will be taken:

-Evaluate project results achieved against targeted outputs, including those that may have been altered during the first two evaluations.

-Identify problems which effected implementation and what happened as a result.

-Make recommendations which could be used in other projects, concerning both the successes and problems of this project.

VII. CONDITIONS AND COVENANTS

A. Conditions Precedent to Disbursement

(1) First Disbursement

Prior to the first disbursement under the Project Grant Agreement with the Government of Belize or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Grantee will, except as the parties may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D.:

- (a) An opinion of counsel acceptable to A.I.D. that the Agreement has been duly authorized and/or ratified by and executed on behalf of the Grantee, and that it constitutes a valid and legally binding obligation of the Grantee in accordance with all of its terms; and
- (b) A statement of the name of the person holding or acting as representative of the Grantee and of any additional representatives, together with a specimen signature of each person specified in such statement.

(2) Disbursement for the Renovation of the Former Toledo Agriculture Station

Prior to any disbursement for the renovation of the former Toledo Agriculture Station under the Project Grant Agreement with the Government of Belize, or the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Government of Belize shall furnish to A.I.D., in form and substance satisfactory to A.I.D., written assurance that the former Agriculture Extension Station will be made available exclusively for use of the TAMP Project and its support personnel to implement project objectives during the life of the project.

B. Covenants

(1) The PVO shall covenant that, except as A.I.D. may otherwise agree in writing, ninety days after execution of the Cooperative Agreement, the PVO shall furnish to A.I.D., in form and substance satisfactory to A.I.D., a time-phased implementation plan detailing the first year's activities, including major benchmarks.

(2) The PVO shall covenant that, except as A.I.D. may otherwise agree in writing, it will furnish to A.I.D., in form and substance satisfactory to A.I.D., annual time-phased, detailed implementation plans for project activities.

(3) The PVO shall covenant, except as A.I.D. may otherwise agree in writing, to enter into a Memorandum of Understanding (MOU), or other such documentation satisfactory to A.I.D., which provides for its participation in a Project Steering Committee that will consist of representatives of the Government of Belize, IFAD or its designee, indigenous farmer's organization(s), USAID and other such organizations or individuals which may be determined appropriate in order to carry out the successful coordination and implementation of project activities.

(4) The Government of Belize shall covenant that, except as A.I.D. may otherwise agree in writing, it will make available for upgrading and improvement, over the life of the Project the equipment and facilities of the Toledo Big Falls Rice Mill in order to achieve Project objectives.

(5) The Government of Belize shall covenant to establish and maintain in Toledo an Input/Supply Center, throughout the life of the Project, which shall work through indigenous farmer organizations by (a) establishing institutional and infrastructural arrangements which link the organizations, and (b) building up the organizational and managerial capability of the organizations to assume ownership and control of market depots, service centers and/or other related facilities.

VIII. SUMMARIES OF ANALYSES

A. Technical Analyses

1. Developing Alternative Cash Crops - Cocoa

(a) Current Technology and Production Levels - Toledo

Cocoa bean production in Toledo can be described at three levels. First, there are an estimated 200 acres of native species grown for home use and limited trading. These trees receive minimal input and are not very productive in commercial terms. Fermentation and drying techniques utilized are inappropriate for bean acceptance on the commercial export market. Second, with promotion by Hummingbird Hershey Ltd. and the Ministry of Agriculture, 300 additional acres of hybrid cocoa in smallholdings have been established. Third, a few large farms planting

cocoa are using large scale state-of-the-art techniques. At present, there are no facilities established for fermenting and drying the wet beans for commercial market acceptance in the district.

(b) Environmental Factors

The environmental factors which directly affect the agronomic feasibility of cocoa production are within normal acceptable limits. These include the seasonal temperature ranges, diurnal temperature variations, the absolute maximum and minimum temperatures, the mean annual rainfall, the annual distribution of precipitation, and wind conditions.

(c) Site Selection

Approximately 40,000 acres in the central and southern uplands have satisfactory soil depth and fertility for cocoa production. Access to the southern uplands area will be a constraint and the project should initially focus on accessible areas. Sites with good drainage should be selected.

(d) Site Preparation

The natural vegetation allows for the establishment of cocoa by the "underbrushing" method. The project will promote this technique. Complete clearing of the vegetation will be discouraged in order to maintain soil quality and make use of the existing shade some of which yield secondary products (allspice, madre del cacao, etc.).

(e) Pests and Diseases

Experience in Belize indicates no unmanageable problems with pests and diseases. Small farms have an advantage as smaller, dispersed fields of cocoa are less vulnerable. The project will promote an integrated strategy of plant protection emphasizing prudent biological and management practices with chemical controls as a last resort.

(f) Husbandry Practices

There is a need for training in improved cocoa production. Together with improved agricultural practices, farm management practices such as credit management, quality control, and marketing strategies will be emphasized under the project. The project will focus on an effective system of extension which should include a comprehensive program of demonstrations, workshops, written literature, and, most importantly, regular on-farm visits. The project will draw on the experience of the Accelerated Cocoa Project and the experience and services of Hummingbird Hershey Ltd. of Belize.

(g) Integrating Cocoa Into the Existing Farming Systems

Cocoa production can be complimentary to traditional milpa activities as conducted in Toledo and can be incorporated without sacrificing basic food need production. Acreage per farm will depend on the individual farmer's situation. Careful planning must be given to those activities which coincide during the production season. The enlistment of

additional family labor for the nursery and processing cocoa beans could satisfy the needs of most small producers cultivating 10 acres or less. Alternatively, if the farmer has reasonable access to a processing facility, it might be more economical to sell wet beans. Much of the appeal of cocoa to Toledo farmers is that it meshes well with their existing farming systems.

(n) High Input or Low Input Cocoa Production System

(1) The Hummingbird Hershey's program (high input) is adapted to large scale operations employing external labor, mechanization, and relatively high input levels. The advantages are a more rapid establishment phase followed by high yields (i.e. 1,200 to 2,000 lbs/acre) of good quality cocoa. The objective of this strategy is to maximize return over the long run. The primary disadvantage is the significant negative cash flow situation which must be endured during the establishment period.

(2) The Accelerated Cocoa Project and The Toledo Research and Development Project have modified the high-input system to accommodate the capabilities and priorities of small farmers who need a reasonable return but cannot afford the high initial investment in capital or labor (low input). The main advantage is the reduction in the up-front financial burden and a manageable distribution of labor for a family farm.

The mix of high-input and low-input production systems will be a result of the target farmers capabilities and the access to and ready availability of required inputs on a timely basis. The technical assistance provided by the project will assist the farmer in making a determination as to which system fits his needs and resources best.

2. Postharvest Technology Improvements

a. Basic Grains

Significant postharvest losses in corn, beans, and rice are experienced by the small farmer in Toledo. While the severity of quality and nutritional losses have not been directly measured and documented, volume losses alone may account for 40 percent of total production.

Factors contributing to the development of a conducive environment for harmful insects and mold causing high postharvest losses are: (1) a hot and humid climate, (2) present technology of on-farm handling and storage, (3) inaccessibility and improper utilization of chemicals, and (3) the inability to market their products readily.

On the premise that a reduction in postharvest losses in corn, beans and rice will result in increased availability of land and labor which could then be invested in alternative cash crop production, specifically cocoa, the project will support adaptive research and extension of more efficient postharvest handling and storage technology. Furthermore, reduction of losses and increased market acceptance of rice, a cash crop,

will improve real income which could be used to improve a farmer's standard of living as well as providing capital for investment in cocoa.

The project agronomist will coordinate the introduction and adaption of improved on-farm postharvest technology for basic grains. Short-term technical assistance will be provided to backstop the agronomist in developing, testing, and adopting this technology. Resources will be provided to purchase and assemble the required model storage and handling systems.

b. Cash Crops - Cocoa

The proposed expansion of cocoa in Toledo as a cash crop geared to commercial production and international markets require that improved postharvest handling be introduced to assure that a high quality product will be produced that can receive top market prices.

There are two strategies which the project will encourage farmers to pursue: (1) on-farm fermentation and drying and (2) selling wet beans to a central processing facility. The project will initially establish a fermenting and drying facility adjacent to the BMB's Big Falls facility integrated with the service center to provide farmers a local outlet for their wet beans. Technical assistance provided by the agronomist will also be provided to farmers to establish farm or village based facilities as production levels warrants. At the end of the third year a review will be conducted to determine the mix of fermenting and drying facilities most suitable to support farmer production levels.

3. Marketing/Input Supply System

The marketing system in Toledo is dominated by the Belize Marketing Board (BMB). Farmers interested in expanding production of existing crops or in establishing new ones are constrained by the lack of marketing facilities such as collection points, dryers, packing sheds, adequate transportation arrangements, and inputs.

At present the BMB purchases 96% of Toledo's agriculture production, primarily grain. Cocoa is transported and sold to Hummingbird Hershey Ltd, 130 miles away, by individual effort.

Sales of agricultural inputs are currently made on an informal, limited, and irregular basis in Toledo. The BMB, the GGA, the TRDP, and a few small stores in Punta Gorda stock limited quantities of inputs on a seasonal basis.

The project will develop an effective private commercial marketing/input supply system utilizing the concept of service centers. An advisory/supervisory group will be formed comprised of representatives from established farm groups, associations, and private firms. From this advisory/supervisory group will evolve the formal entity that will eventually own and operate the market/input supply service centers and other related facilities.

An initial service center will be located adjacent to the BMB's rice mill and grain complex. This center will be the base from which the marketing/input supply system is developed.

Other centers may be opened based on the demand for the services, availability of capital for expansion, and the development of the management skills of the Advisory/Supervisory group.

In summary, there is more than adequate evidence that an effective commercial marketing/input supply system needs to be established in Toledo. Project resources will assist in making the transition from a subsistence orientation to a market orientation in a socially and culturally acceptable manner.

4. Privatization of the Toledo Big Falls Rice Mill

The BMB owns and operates the Big Falls Rice Mill and storage facility in the Toledo District. The BMB has broad jurisdiction and a long history of initiating direct interventions in the country's grain market by providing subsidized services, regulating competition, fixing market prices, and acting as credit collector for related government loan programs.

The GOB in February of 1985 agreed with USAID/BELIZE to initiate a program of economic stability under the Belize Economic Support Project (ESF No. 505-0012). The GOB agreed to reorganize the BMB into an entity that is concerned exclusively with commodity price stabilization.

This reorganization of the BMB into a price stabilization entity will be a gradual process. The project will assist in the transition by allowing for financial improvement of the BMB rice mill and eventual divestiture to the private sector while simultaneously developing a private marketing system to fill the gap left by the BMB in its withdrawal from direct intervention in the markets in Toledo.

During the short to medium term the Project will transform the grain handling and milling complex of the BMB in Toledo into a profitable operation. Actions taken to complete this will be (a) facility renovation, (b) training of personnel, (c) market differentiation of products, (d) improved management and operations, and (e) backward integration into purchasing of high quality paddy (rice).

Over the long term the project will provide assistance to organize and develop a producer group(s) to manage and operate the facility in a cost efficient manner and assure long term successful survival of the enterprise.

5. Agricultural Credit Needs

As demonstrated in the Financial and Economic Analysis, the proposed cocoa development activity is profitable from the individual grower's

perspective. However, the grower will need to invest considerable resources during the first three to four years to establish the trees. This can be done either through existing cash resources or the financing of inputs with credit.

The potential cocoa grower in the Toledo district in most cases is a subsistence farmer who has no outside source of income and does not meet minimum criteria for loans from commercial lending institutions.

The Mayan farmers in the Toledo District who have begun planting cocoa have relied solely on their cash resources to finance production inputs. The repayment history of Toledo farmers in previous and existing Development Finance Corporation (DFC) and Ministry of Agriculture loan programs has been poor. The Social Analysis indicates that Mayan farmers are adverse to using credit in agricultural production primarily because a collateral of land is usually required.

Nevertheless, credit may prove to be an important development component if Toledo is to become a commercially viable cocoa production region. Increased fertilization is a profitable economic decision over the long run because of the favorable yield impact per dollar cost of fertilizer. Mayan farmers are beginning to understand the importance of fertilizer for improving their trees' productivity, and some have used fertilizers in establishing cocoa, investing income received from rice production to finance the added inputs.

Pest and disease control is an area where farmers in Toledo have indicated the need for credit. During site visits in the project design, farmers noted with concern that some trees were lost during the first year after establishment for lack of financing source to enable them to purchase the proper chemical to control pests.

Project analysis indicates that major credit program for cocoa establishment in Toledo is not needed at this time. Modest sums of short term credit should be made available for emergency pest and disease control to prevent the loss of trees. The project will provide the establishment of a \$35,000 revolving credit fund to be administered on commercial terms through the marketing/input supply center. This fund will be monitored by the advisory/supervisory group and the technical assistance team. Procedures and criteria developed will assure that funds are made available on a timely basis to control pest and diseases.

Accountability for the Revolving Fund will be the responsibility of the advisory/supervisory group and the technical assistance team. During the first two years of the project, further reviews will be carried out to monitor agricultural credit needs of cocoa adopters. The technical assistance team will review current policies of the DFC and other public lenders, and recommend changes in lending policies to tap these resources if credit demand rises. The team will also establish contacts with private sector lenders to determine whether any of their programs could

be utilized if demand warrants. The IFAD program contemplates a substantial credit program for the district. If the program materializes, USAID will encourage IFAD to structure the lending policies to make the resources accessible to cocoa producers without the constraints to access identified under previous programs.

B. Financial and Economic Analysis

1. Financial Analyses

(a) Cocoa Development and Postharvest Loss Reduction Activities

For this analysis it was assumed that a Mayan farmer with a typical cropping pattern of main season corn, matahambre corn, upland rice and red beans decides to plant cocoa.

Cost and return data for cocoa production were obtained from reports published by TRDP, Hummingbird Hershey Ltd. and the Pan American Development Foundation. Realistic cocoa budgets were constructed using these data for low-input and high-input cocoa production. Most of the published budgets reflect the high-input alternative. During project design, discussions with Mayan farmers who have planted cocoa revealed that they use very few inputs on their trees investing only cash on the cocoa seeds and plastic bags. There have been few expenditures on pesticides, fertilizer and equipment. Mayan producers recognize the potential benefit of these expenditures but their lack of liquidity and reluctance to risk substantial resources on non-traditional enterprises have led them to spend less on these types of inputs.

TRDP has estimated that some 40-60 percent of the corn crop is lost due to mold and insects. The financial impact of reducing postharvest losses by utilizing improved postharvest techniques was calculated assuming a typical farmer will be able to reduce corn losses from 40 percent to 20 percent and eliminate the first bean crop. The farmer will incur expenses of \$100/year for a dryer/storage unit during the first two years.

The appropriate net cash flows for the analysis are generated by subtracting the net returns to the farm without the new investment from the net returns to the farm with cocoa production. These net returns represent the negative or positive return attributable to the investment in each year of the planning period, which is assumed to be 12 years for this analysis.

Annex 7 presents the data used for calculating the internal rate of return for the cocoa investment using low-input production practices. It was assumed the grower plants one acre of cocoa the first year, an additional acre in the second year and two more acres in the fifth year. Cocoa yields were adjusted for this phased planting and costs of production were calculated based on the age of each set of trees. Total net revenues with and without the project were calculated for two

scenarios: (1) adoption of cocoa without any change in postharvest systems and (2) adoption of cocoa with changes in postharvest systems.

Net benefits to the producer are higher for adoption of cocoa with changes in postharvest systems. One important observation is that in the postharvest loss (PHL) scenario net cash flows are positive in the third year instead of the fourth year. This implies that cocoa production combined with a reduction in postharvest losses may generate a positive cash flow earlier than only planting cocoa. Therefore, these two activities are financially complementary.

Over a 12 year period, the financial internal rates of return for the low-input alternative were 50 percent and 54 percent for the reduced postharvest losses with cocoa production. If the planning horizon is reduced to five years this investment would not be profitable.

The results of the high-input alternative (see Table 6B, Financial and Economic Analysis, Annex 7) proved to be less profitable over the 12 year planning horizon. Financial rates of return of 42 percent and 55 percent were generated for the non-PHL and PHL options. This result is somewhat misleading since the grower may conclude that the low-input option is the better investment. In the long run (15+ years) the high-input option will be the superior investment because of the yield advantage over the low-input option relative to the production costs.

A sensitivity analysis was performed in order to gain an understanding of the effect price variability has on financial profitability. Only downside price movements were analyzed because this is the most important risk to the grower. At an assumed cocoa price of \$.40 per pound, financial rates of return for the various options were:

Low-input Production	
cocoa/no PHL reduction	0.34
cocoa with PHL reduction	0.39
High-input Production	
cocoa/no PHL reduction	0.23
cocoa with PHL reduction	0.27

From the sensitivity analysis it can be concluded that significant reductions in prices will not make cocoa investment unprofitable. However, lower prices will discourage adoption because of the additional lag in generating positive cash flows, particularly with the low-input option.

(b) Renovation of the Big Falls Rice Mill

The processing, storage and marketing of rice is an important economic activity in the Toledo District. By supplying approximately 60 percent of the rice for Belize, the Big Falls mill plays a critical economic role

both locally and nationally. The project plans to renovate the Big Falls Toledo Facility. Of interest for this analysis is the estimated payback period for the proposed renovation costs.

Estimates are that an investment of \$150,000 for machinery and equipment combined with some technical assistance and training, would raise the milling yield by between 4 and 7 percent to between 65.4 and 68.4 percent. This would put the Big Falls mill into the normal efficiency range for a rice mill, 65 to 70 percent. A four percentage point increase in milling yield would produce an additional 157,500 pounds of rice. If this milled rice is valued at the Belize Marketing Board support price of \$25.00 per hundredweight, the value of this rice to the Board is valued at \$39,380. The payback period on the \$150,000 investment would be less than four years, which is a reasonable period for a capital investment of this nature.

(c) Marketing/Input Supply Center

An analysis of the potential net income of the center was conducted by estimating the value of inputs required by new cocoa producers and present rice farmers, and assuming these requirements would be met by the center. For purposes of this analysis, it was assumed that fifty new producers establish cocoa production in each of the first three years of the project. In years four and five 100 and 150 farmers, respectively are assumed to plant cocoa. The adoption rate declines in the following years to five percent per year.

In order to project the demand for inputs, it was assumed that 50 percent of the cocoa adopters plant two acres, 40 percent plant six acres and 10 percent plant 20 acres. These projected acreages are assumptions and are a conservative estimate of potential cocoa acreage. In addition, it was assumed that 80 percent of the new cocoa was low-input cocoa and 20 percent was high-input cocoa.

The total acres of low- and high-input trees by tree age was multiplied by the estimated cash input costs generated in the cocoa budget tables to obtain total cocoa-related sales. Rice-related sales were estimated by multiplying the \$11 per acre cost of herbicide by the number of rice acres in the Toledo District. This estimate of total Center sales is conservative because it does not account for citrus production or potential input demand by corn and bean producers.

Net income for the Center starts at a low level and gradually grows for three to four years. By year five the Center is generating approximately \$20,477, enough "profit" to cover the costs of its staff and operating expenses.

2. Economic Analysis

A. Economic Benefit-Cost Analysis

A conventional economic benefit-cost analysis was undertaken to determine the economic feasibility of the proposed Project. The major economic and social benefits arising from the Project include: (a) increased cocoa production which should lead to additional income for the small farmers in Toledo, and increased foreign exchange earnings for the country; (b) a reduction in postharvest losses for corn which should further augment the income of the Toledo farmers, as well as result in higher domestic corn production and/or supply; (c) an improvement in the milling yield at the Big Falls facility which increases local milled rice production; (d) improved technical capabilities of the farmers and government personnel in the production and processing of agricultural commodities; and, (e) a general improvement in the social conditions in the Toledo District. The first three items can be quantified by valuing the incremental increase in production or income using economic prices. Given the difficulty of measuring the last two types of benefits with a reasonable level of accuracy, an economic quantification of the Project's social impact is not attempted.

The net economic returns associated with cocoa production are based on the rate of adoption of farmers and the age of the trees. Farm labor was valued at \$5.00 per day and land was valued at \$1.00 per acre which is the lease rate for land managed by the government's Lands Department. The net benefits from reducing post-harvest losses and increasing the efficiency of the Big Falls facility are based on assumptions used in the financial analysis section. However, shadow prices were used for estimating the economic worth of the increased rice and corn production/supply since the Belize government supports rice and corn farm prices well above world market prices. For the analysis, corn and milled rice were valued at \$.06 per pound and \$0.16 per pound, respectively (compared to the prevailing farmgate support price of \$.08 per pound for corn and \$.25 per pound for milled rice in Belize).

Aside from the costs involved with cocoa production, the economic costs of the Project include all investments for technical assistance, commodities and equipment, salaries of local personnel, and other direct costs valued at constant 1986 prices. These are the estimated costs of resources necessary to realize the level of economic benefits expected from the Project.

The results of the economic analysis are presented in the Financial and Economic Analysis, Annex No 7. Over a 15-year period and at a social discount rate of 10%, the proposed Project has a benefit-cost ratio of 1.17. The 10% social discount factor compares reasonably with the economic cost of capital in Belize, which the World Bank estimates to fall between 10% to 12%. At a 12% social discount rate, the Project's economic benefit-cost ratio is 1.09. The results imply that the Project

is socially feasible even with high internal support prices and should be considered a viable development effort under the given assumptions. Moreover, these benefit-cost ratios can be considered to be understated since the non-quantifiable economic and social impact are not taken into account. The inclusion of these social benefits should further enhance the Project's economic feasibility.

B. Sensitivity Analysis

Using the 10% social discount rate, tests were performed to determine the sensitivity of the Project's economic benefit-cost ratio to changes in various key parameters. This is done to measure the impact of possible lower prices for the main crop (cocoa), lower (or higher) than expected yields, delays in project implementation or other factors which may lead to cost overruns, or some savings in project investments. A sensitivity analysis was undertaken assuming (a) a 25% drop in the cocoa price from \$0.70 to \$0.53 per pound; (b) a 10% increase in total project investments; (c) a 10% reduction in total project costs; (d) a 10% decline in total benefits; and (e) a 10% increase in total benefits. The results are as follows:

<u>Scenario</u>	<u>Benefit-Cost Ratio</u>
(1) Base Case	1.17
(2) Cocoa Price 25% Lower	1.07
(3) Project Costs up 10%	1.07
(4) Project Costs down 10%	1.30
(4) Project Benefits down 10%	1.06
(5) Project Benefits up 10%	1.29

The Project's economic benefit-cost ratio is slightly more sensitive to variations in benefits than in costs. However, the benefit-cost ratio remains greater than 1.0 in all the alternative scenarios, indicating the Project remains feasible from an economic standpoint even with reduced benefits or increased costs.

C. SOCIAL SOUNDNESS ANALYSIS

The Social Soundness Analysis, (SSA) Annex No. 8, provides a comprehensive review and analysis of the cultural and social factors to consider for project implementation in the Toledo district. The analysis raises several issues and makes recommendations. For each component the analysis considers the target groups, specific social issues, and where relevant, an analysis of institutional issues. The following is a summary of relevant issues and recommendations.

1. Development of Alternative Cash Crops - Cocoa

(a) Work Schedules and Labor Availability Considerations

Issue:

Cocoa production will place further burdens on farm labor at the busiest

times of the agricultural calendar. Farmers can respond by (1) composing new work groups to work fields in rotation, and (2) recruit household labor.

Project Action:

Cash income and conducive cultivation practices associated with cocoa production are strong incentives for Toledo farmers to invest scarce labor for the expansion of the crop. Active participation of household labor (women and children) in cocoa bean production and efficient scheduling of scarce labor such as group efforts will be promoted by the project in a culturally acceptable program with the assistance of an applied sociologist/anthropologist.

(b) Constraints on Credit, Borrowing, and Savings

Issue:

Given the proper incentives, both Kekchi and Mopan are quite willing to borrow money. Cocoa production will require cash to purchase inputs in the first few years and will provide surplus cash in the following years. There are no banks in the district and the DFC lending policies do not fit the needs of the farmers entering cocoa production. How should the financial needs of prospective cocoa farmers be met?

Project Action:

Any proposed loan program should focus on short and medium term production credit. To facilitate savings, the establishment of village credit unions should be a priority. The community itself is in the best position of any social group to pressure farmers to repay their loans. The project proposes a revolving fund to provide for emergency pest and disease problems.

(c) Impact on Womens' Economic and Social Positions

Issue:

The traditional pattern within Kekchi and Mopan society allowed women access to income from sales of pigs and livestock, though it gave them very little public role of authority. Men do most of the marketing and present the public face of the household. Nevertheless, the ethic of sharing income within the household is very strong, and it is unlikely that women will be left deficient when cacao income flows into the households. Both male and female can inherit the rights to land and groves of trees and they remain the property of that man or woman after marriage. Male ownership of land is much more common than female ownership. It is essential that the equity within the household be maintained during project implementation.

Project Action:

The project will make sure that women have equal access to project services and facilities. This can be accomplished by requiring that the household, rather than the individual male, be taken as the unit for

interaction in providing credit, extension services, and technical assistance. A sociologist/anthropologist will be part of the Technical Assistance Team and will develop a program that will assure the participation of women into the production, processing, management and ownership of cocoa acreage that is developed under project auspices.

(d) Land Tenure and the Reservation System

Issue:

Because of the mobility of the population and changing land use patterns, the areas claimed and administered by each village is different from the legally defined Reservation boundaries as established in a 1936 survey. In the Non-reservation areas many Indians have acquired or are in the process of acquiring leases on land that they have been using. If farmers must have a lease on land in order to obtain credit the demand for lease land will increase drastically, and those Indians living in more remote areas and on reservations will be at a disadvantage. Secondly the issue of how willing farmers will be to plant a permanent crop such as cocoa if they do not have secure ownership over the improved land will be extremely germane.

Project Action:

Based on the expertise of the Indians of San Antonio Reservation, the Village Councils will be encouraged to allow individual farmers to plant a specified acreage in cocoa under a program developed by the sociologist and assisted by project TA. This is in fact a "de facto" recognition of permanent tenure by the reservation itself since cocoa is a permanent tree crop. The issue of regularizing land tenure is complex and highly political and will not be a focus of any project activities.

(e) Cultural and Social Constraints to Innovation

Issue:

Toledo farmers are open to new technologies and crops if they offer an increase in cash income and improved standard of living. The values that govern the interaction of villagers with agents of "outside" institutions are: (1) access to and benefits of innovation that are equitable, (2) traditional leadership is the proper avenue for decision making on and implementation of innovation, (3) consensus of or at least airing of opinions should be obtained from the community before any action is taken, and (4) individual initiative is a dangerous force that must be constrained and shaped by community concerns. Many developmental projects have run afoul of these values and have consequently failed. For example, individuals, "Model Farmers", have been singled out for project participation with the result that they are eventually "frozen out" by their community.

Project Action

The project will provide for consensus building to ensure successful project implementation. The sociologist will develop a program of group

acceptance as requirement for project success in the long term. The people will be adequately informed and educated about the project before the project is implemented, so they are fully cognizant of project activities and ramifications. In developing long-term positive relationships with the Kekchi and the Mopan, the project will endeavor to implement its activities in accordance with values and morals acceptable to the target group.

(f) 1. Farmers' Groups Cooperatives and Associations

Issue:

Several observations emerge from the history of collective action in Toledo. Those groups that have succeeded exhibit the following characteristics:

- The group is small, less than 50 members,
- The core should be an indigenous group, such as a labor group of related farmers,
- The focus is narrow with one or two objectives,
- Does not require full-time management or paid staff, and all members should be from a single community.

Project Action:

The project sociologist will develop and test a criteria based on the social analysis that will provide for well-defined group participation for project implementation.

2. Renovation of the Rice Mill and Grain Complex at Big Falls, Toledo

There are no major social soundness issues raised by the upgrading of the milling facility.

3. Improvement of PostHarvest Crop Storage and Handling

Issue:

All household members participate in harvest, storing, and transportation. Much of the labor devoted to crop processing and storage is contributed by women and children. These difficult and time consuming tasks could be substantially reduced by better methods of technology. Groups of women could cooperate in managing a single drying and storage facility, though women have little cash to invest and would be reluctant to take out loans.

Project Action:

The project sociologist will develop a program related to crop storage and processing activities which will focus on women and womens' groups and will provide technical assistance to accomplish this.

(b) Issue:

There are some cultural constraints on crop storage technology. For example seed corn is ritually important in Kekchi life. Many farmers like

to leave their corn stored in the field so that others do not know how much they have. When crops are brought in the fields they change from being the property of males to being the property of females and the household in general.

Project Action:

Project interventions will take these and other cultural factors into account. An assessment will be conducted of present crop handling by a postharvest specialist and the sociologist, in order to identify the most effective and acceptable innovations.

4. Development of a Marketing/Input Supply System.

Issue:

There is a lack of an adequate marketing/input supply system. The project will establish Marketing/Input Supply Centers owned and operated by indigenous farmer groups. The existing farmer groups and "associations" may not be the most favorable institutional frameworks for establishing the centers.

Project Action:

The project does not advocate the control of marketing/input supply centers to any one group or association. An Advisory/Supervisory Group comprised of relative farmer's groups, associations, private firms, etc. will be formed early in the project to provide oversight to project implementation. It is anticipated that this collective "corporation" or a derivative thereof will eventually own and operate the Centers and other project facilities developed. Farmer associations at the village level will also be used as the conduit for providing an organized framework for the delivery of needed inputs as well as marketing and technical services. It is recognized at the design stage that village based groups must be incorporated into the overall implementation of the project.

The project will provide a technical assistance team who will be responsible for establishing the marketing/input supply center. Sound business criteria, taking into consideration relevant cultural requirements, will be developed when establishing a center and identifying its management. Management will be trained as required by the technical advisor and using other AID project resources available in Toledo such as BEST and BIM.

D. ENVIRONMENTAL ANALYSIS SUMMARY

General Findings

The IEE contained in the PID recognized that the handling and application of agricultural chemicals was anticipated as a part of project activities particularly related to cocoa development and post harvest loss reduction. The on-farm management system which will be incorporated into the project for cocoa has been developed under the Accelerated Cocoa Project (No. 505-0023) financed by A.I.D. and implemented over the past

three years. The proposed system uses chemicals on a very limited basis and only for the area affected. The PID therefore recommended that an environmental assessment be conducted during project design.

An environmental assessment (EA) was carried out in accordance with A.I.D. requirements. The EA was prepared by Dr. George A. Schaefer, Chairman, Department of Entomology, Cornell University under the Consortium for International Crop Protection, College Park, Maryland.

The environmental analysis performed for the project concludes that "while new agricultural land will be opened during the life of the project, only minimal environmental impacts are expected to result". In the opinion of some, successful cocoa plantings remain part of the forest ecosystem.

The use of agriculture chemicals in project activities require the application of 22CFR Part 216 of A.I.D.'s environmental procedures during project implementation. The details for this recommendation are contained in the environmental assessment, Annex 9.

Mitigating Measures

In accordance with State 260582 (Annex 14) AID/W provided additional guidance to be incorporated into the PP design. In summary, AID/W requested that technical assistance and training be provided for the safe use and handling of pesticides. In addition, residue tolerance data should be collected where US/EPA or FAO standards do not exist.

The Mission responded in Belize 4354 (Annex 15) which outlined the procedures the project will initiate to protect farmers and the environment in accordance with the draft EA submitted for approval to AID/W.

The mitigating measures proposed by the Mission for implementation under the project are:

- Promotion of alternative crop protection methods
- Use of educational materials in safe pesticide use awareness
- Provide training to pesticide users and applications at farmers and extension agent levels
- Monitoring of human and environmental exposure to pesticides
- Collection of residue tolerance data
- Annual review to evaluate pesticide practices

AID/W responded to the Mission's proposed mitigating measures in State 003156 which provided the LAC/DR Chief Environmental Officer's approval for the EA and the Mission's proposed project activities.

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E.O. 12356: N/A
 TAGS: N/A
 SUBJECT: TOLEDO AGRICULTURAL MARKETING PROJECT NO.
 505-0016

THE DAEC REVIEWED AND APPROVED THE PID ON JUNE 4.
 AUTHORITY TO APPROVE PP AND AUTHORIZE PROJECT IS
 DELEGATED TO MISSION SUBJECT TO PROVISIONS OF PARAS 4
 AND 7 BELOW. GUIDANCE FOR PREPARATION OF PP FOLLOWS.

1. IFAD PROJECT: IN VIEW OF THE CLOSE RELATIONSHIP OF
 THIS PROJECT WITH THE TOLEDO SMALL FARMERS DEVELOPMENT
 PROJECT PROPOSED BY IFAD; THE PP SHOULD PROVIDE A
 COMPLETE DESCRIPTION OF THE IFAD EFFORT WITH PARTICULAR
 ATTENTION GIVEN TO ANY INVOLVEMENT OR ASSISTANCE IFAD
 PLANS FOR CITRUS ACTIVITIES. AID/W APPROVAL OF PARALLEL
 FINANCING WITH IFAD IS PREDICATED ON THE FACT THAT
 CITRUS RELATED ASSISTANCE INCLUDED IN THE IFAD PROJECT
 WAS DEVELOPED PRIOR TO AND SEPARATE FROM USAIDRS
 PROPOSAL, AND THAT NONE OF A.I.D.RS ASSISTANCE WILL
 DIRECTLY OR SECONDARILY ENHANCE CITRUS CULTIVATION OR
 PROCESSING IN BELIZE.

2. IMPLEMENTATION: TO AVOID POSSIBLE OVERLAP OR
 DUPLICATION OF EFFORT, THE MISSION AND IFAD SHOULD

DEVELOP A JOINT IMPLEMENTATION PLAN (TO BE INCLUDED IN
 THE PP) WHICH CLARIFIES THE MANAGEMENT ROLES AND
 COMPONENT RESPONSIBILITIES OF EACH. THE PP SHOULD ALSO
 DESCRIBE IFADRS ARRANGEMENT FOR PROJECT IMPLEMENTATION
 (I.E. PARTICIPATION OF UNDP) AND EVALUATE THE CAPACITY
 OF THE MNR TO CARRY OUT THE IFAD PROGRAM; WHAT
 COUNTERPART RESOURCES WILL BE PROVIDED; AND ANY MNR
 RESOURCES THAT MIGHT BE NECESSARY TO IMPLEMENT THE USAID
 PROJECT. THAT IS, TO THE EXTENT THAT THE ACHIEVEMENT OF
 A.I.D.RS PROJECT OBJECTIVES ARE DEPENDENT UPON RESOURCES
 OR ACTIVITIES UNDERTAKEN BY IFAD, THE UNDP OR MNR, THE
 PP SHOULD DEMONSTRATE THEIR RESPECTIVE INSTITUTIONAL
 CAPACITY TO SO PROVIDE. A JOINT AID-IFAD MONITORING

WOULD ALSO BE DEVELOP. TO ENSURE THAT THE DESIGN COMPLEMENTARITY IS FOLLOWED THROUGH ON DURING IMPLEMENTATION.

3. PROJECT DESIGN: GIVEN THE RELATIVELY SMALL SIZE OF THE PROJECT AND LIMITED AREA OF TARGET ACTIVITY, THE PROJECT DESIGN SHOULD BE KEPT AS SIMPLE AS POSSIBLE. THE ESTABLISHMENT OF COCOA AS THE CASH CROP ALTERNATIVE SHOULD BE THE FOCAL POINT AROUND WHICH AGRICULTURAL CREDIT, IMPROVEMENT OF POST HARVEST SYSTEMS AND DEVELOPMENT OF A MARKETING SYSTEM ARE DESIGNED. THE PP SHOULD DESCRIBE THE FACILITY AND MECHANISM FOR PROVISION OF IN-KIND CREDIT FOR COCOA PRODUCTION (E.G. COCOA CO-OP, NATIONAL DEVELOPMENT FOUNDATION). THE OWNERSHIP AND MANAGEMENT OF FACILITIES FOR COLLECTION, PROCESSING, HOLDING AND MARKETING HARVESTED COCOA CROPS SHOULD ALSO BE DESCRIBED. AT THE REVIEW, THE MISSION ADVISED THAT IT INTENDS TO CARRY OUT THE COCOA ACTIVITY THROUGH A PVO.

PROJECT ACTIVITIES SHOULD BE LIMITED TO THE COCOA ACTIVITY AND PERHAPS A LIMITED EFFORT TO IMPROVE AND PRIVATIZE THE RICE MILL. THESE ACTIVITIES SHOULD NOT PLAN TO CALL ON THE MNR FOR SUPPORT GIVEN THE MNR'S COMMITMENT TO A NUMBER OF DEVELOPMENT PROJECTS AT PRESENT.

4. BMB GRAIN COMPLEX AND RICE MILL: IF ASSISTANCE FOR THIS PURPOSE IS INCLUDED IN THE FINAL DESIGN, A JUSTIFICATION FOR PROVIDING ASSISTANCE TO A PARASTATAL MUST BE INCLUDED IN THE PP, AND THE MISSION SHOULD DEMONSTRATE HOW THE PROJECT IS CONSISTENT WITH THE MISSION'S OBJECTIVE OF PRIVATIZATION SET FORTH ON ESF RELATED CONDITIONALITY. SOME MOVEMENT TOWARDS PRIVATIZATION (E.G. SALE OR LEASE OF THE RICE MILL, CONCESSION FOR ITS OPERATION) WILL BE NECESSARY. THE MISSION'S STRATEGY FOR REFURBISHING THE MILL AND

PRIVATIZATION STRATEGY SHOULD BE TRANSMITTED TO AID/W FOR CONCURRENCE PRIOR TO PROJECT APPROVAL.

5. PROJECT FEASIBILITY: THE PP SHOULD CONTAIN IN DEPTH ECONOMIC AND SOCIO-CULTURAL ANALYSES TO ADDRESS SERIOUS CONCERNS OF PROJECT FEASIBILITY THAT HAVE BEEN RAISED IN THESE TWO AREAS. THE OBVIOUS GOVERNMENT INTEREST IN, AND POLITICAL EXIGENCY FOR, HELPING THE SMALL SUBSISTENCE FARMERS IN TOLEDO DISTRICT IS DULY NOTED. HOWEVER, THE PP WILL NEED TO DEMONSTRATE, USING A TRADITIONAL BENEFIT-COST ANALYSIS, THAT THE PROJECT IS VIABLE IN ECONOMIC TERMS. THE ECONOMIC ANALYSIS SHOULD ALSO NOTE THE CLOSE RELATIONSHIP OF THE USAID AND IFAD PROJECTS AND, THE EXTENT POSSIBLE, ASSESS THE BENEFIT-COST LINKAGE BETWEEN THE TWO.

A FINANCIAL ANALYSIS, BASED ON A FARM BUDGET ANALYSIS SHOULD BE CARRIED OUT TO DEMONSTRATE THE VIABILITY FOR PARTICIPATING FARMERS. THIS ANALYSIS SHOULD BE BASED ON

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SEPARATE CALCULATIONS FOR NEW AND FOR RENOVATION OF EXISTING COCOA PLANTINGS. AS WELL, A FINANCIAL ANALYSIS TO SHOW THE IMPACT OF THE PROJECT ON ANY INTERMEDIARIES WHO SELL INPUTS OR BUY AND RESELL COCOA SHOULD BE CARRIED OUT. THESE ANALYSES SHOULD DEMONSTRATE THAT PLANNED OPERATIONS WILL PROVIDE SUFFICIENT FINANCIAL RETURNS TO PROVIDE AN INCENTIVE FOR FARMERS AND INTERMEDIARIES TO PLAY THE ROLES ENVISIONED FOR THEM.

THE SOCIAL SOUNDNESS ANALYSIS SHOULD ADDRESS LAND USE ISSUES INVOLVING MILPERO FARMING, INCLUDING AVAILABILITY OF LAND FOR COCOA PRODUCTION, USE OF NATIONAL LAND RESERVES, POTENTIAL LAND TENURE COMPLICATIONS AND WILLINGNESS OF THE TARGET GROUP TO CONVERT FROM SLASHAND-BURN TO ORCHARD FARMING. A GENDER ANALYSIS SHOULD BE INCLUDED TO ADDRESS THE IMPACT OF THE PROJECT ON WOMEN IN DEVELOPMENT.

6. GRANT-LOAN SPLIT AND COUNTERPART. IF A PVO IMPLEMENTS THE COCOA ACTIVITY, THEN AN ALL GRANT PROJECT MAY BE APPROVED. IF THE GOB WILL IMPLEMENT THE ACTIVITY, THEN LOAN FUNDING SHOULD BE USED FOR ALL ACTIVITIES EXCEPT TRAINING AND TA. MISSION IS REMINDED THAT THE 25 COUNTERPART SHOULD BE CALCULATED ON THE BASIS OF TOTAL PROJECT COST, NOT THE AID INPUT.

7. PP APPROVAL DELEGATION. MISSION IS AUTHORIZED TO APPROVE THE PP SUBJECT TO PARTICIPATION OF AN APPROPRIATE LAC/DR OFFICER IN THE PROCESS OF COMPLETING AND REVIEWING THE FINAL PP. ABSENT THIS, THE PP WILL BE

REVIEWED IN AID/W. ARMACOST

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PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

<u>NARRATIVE SUMMARY</u>	<u>OBJECTIVELY VERIFIABLE INDICATORS</u>	<u>MEANS OF VERIFICATION</u>	<u>IMPORTANT ASSUMPTIONS</u>
<p><u>Goal</u></p> <p>To:</p> <p>1. Increase real income and improve the standard of living of small farmers in the Toledo District.</p>	<p>1. Increased and expanded production of participating farmers.</p> <p>2. Increase in earning of small farmers in Toledo.</p> <p>3. Increase in purchases of agricultural inputs in Toledo.</p>	<p>1. MOA Annual Trade Production Reports, GOB Census Data.</p> <p>2. Project monitoring.</p> <p>3. Evaluation of various components of project.</p>	<p>1. GOB develops and maintains policy of commodity price stabilization.</p> <p>2. Substantial reduction of post-harvest losses on subsistence crops is accomplished.</p> <p>3. Price incentives for export crops remain favorable to producers.</p> <p>4. Market for cash crop continues to be available and expands.</p>
<p><u>Purpose</u></p> <p>To:</p> <p>1. Establish a viable export-oriented industry among small holders in the Toledo District; and</p> <p>2. Accelerate ongoing transition from traditional "slash and burn" agriculture to modified systems through improved postharvest practices and the establishment of a viable marketing system.</p>	<p>1. Cocoa is being established produced and exported.</p> <p>2. Postharvest innovations established.</p> <p>3. Private producer group(s) established and operational.</p> <p>4. Private and public sector cooperating to improve market system(s).</p>	<p>1. BMB Rice Mill accounts.</p> <p>2. Hummingbird Hershey Ltd. records.</p> <p>3. Grower Association records.</p> <p>4. Agriculture service center accounts.</p> <p>5. Export Statistic Reports.</p>	<p>1. World price of cocoa beans maintain favorable level for producers.</p> <p>2. In-country market outlet(s) continue to purchase cocoa beans.</p> <p>3. Transport links continue to be maintained and improved.</p> <p>4. Improved postharvest technology accepted and used.</p>

<u>DESCRIPTIVE SUMMARY</u>	<u>OBJECTIVELY VERIFIABLE INDICATORS</u>	<u>MEANS OF VERIFICATION</u>	<u>IMPORTANT ASSUMPTIONS</u>
<u>Inputs</u>			
<u>A. Private Sector</u>			
1. AID Grant.	1. \$1.7 Million.	1. AID Controller Records.	1. Project Conditions are met by GOB.
2. Farmers Associations.	2. \$50 Thousand.	2. Farmers Association Records.	2. Sufficient funds available on a timely basis.
			3. Timely availability of inputs.
<u>B. Public Sector</u>			
1. AID Grant.	1. \$800 Thousand.	1. AID Controller Records.	
2. GOB Contribution.	2. \$267 Thousand.		
<u>Output:</u>			
<u>A. Private Sector</u>			
1. Diversified export crop - cocoa established.	1. Establishment of 800 acres cocoa.	1. Grower Association(s) Records.	1. Producer accept improved technology for production and post-harvest loss reduction activities
2. Reduction of crop losses through improvement of postharvest system for cash and subsistence crops.	2. Increase of cocoa sales by 25%.	2. Service Center Records and Reports.	2. Farmers willing to organize Association.
3. Improved marketing and input supply system operated by private producers.	3. Postharvest loss on subsistence crops reduced 25%.	3. Project Monitoring.	3. Qualified and responsible individuals available to organize and operate service center, private sector entity.
4. Development of private sector entity(ies) capable of acquiring and managing facilities.	4. Improve in sales of specialty export crop of Annota, Allspice, etc.	4. GOB Reports.	4. Legal and legislative actions taken by GOB to establish PSB.
	5. At least one market center operational with established mechanisms to deliver inputs and market services.	5. BMB Accounts.	5. MOA willingness to undertake required changes for commodity price stabilization program and divestiture of BMB Big Falls Toledo facilities.
	6. Big Falls Toledo facilities purchased by private sector.	6. PSB Reports.	6. Implementation activities are accomplished in a timely manner.
		7. Bilateral Committee Reports.	

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
B. <u>Public Sector</u>			
1. Reorganization of BMB to administer Price Stabilization Program.	1. Price Stabilization Board established and functioning.		
2. Renovated and efficiently operated (BMB) Big Falls Toledo facilities.	2. Big Falls Toledo Rice facilities operating under optional conditions.		
3. Private sector acquisition of (BMB) Big Falls Toledo facilities.	3. Price Stabilization Board divests Big Falls Toledo facilities to private sector.		
4. Increased technical capabilities of MOA and processing of agriculture commodities.	4. Five residents of Toledo District will provide technical assistance for improving agriculture production of small farmers.		

3M (2) PROJECT CHECKLIST

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A. includes criteria applicable to all projects. Part B. applies to projects funded from specific sources only:

B.1. applies to all projects funded with Development Assistance loans, and
B.3. applies to projects funded from ESF.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT

1. FY 1985 Continuing Resolution Sec. 525; FAA Sec. 634A.

Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the project.

A congressional notification has been issued and the waiting period has expired.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$500,000, will there be (a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

N/A

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

N/A

4. FAA Sec. 611(b); FY 1985 N/A
Continuing Resolution Sec. 501. If for water or water-related land resource construction, has project met the principles, standards, and procedures established pursuant to the Water Resources Planning Act (42 U.S.C. 1962, et seq.)? (See AID Handbook 3 for new guidelines.)
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project? N/A
6. FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. This will use the Resumes of Regional and Multilateral Institutions. The project is to be paralled financed with IFAD. The project will have little effect on regional development programs.
7. FAA Sec. 601(a). Information and conclusions whether projects will encourage efforts of the country to:
 (a) increase the flow of international trade; (b) foster private initiative and competition; and (c) encourage development and use of cooperatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.
 (a) Yes, by increasing the export of cocoa.
 (b) Yes, by supporting the Privatization of the BMB, and using private farmers organizations to acquire ownership of state owned enterprizes.
 (c) Yes, project will worked directly with farmers' organization.
 (d) Yes, privatization of state owned enterprizes which will allow market forces to determine prices.
 (e) Yes, by training in improved production and postharvest techniques.
 (f) No effect is anticipated.

8. FAA Sec. 601(b). Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).
- A private voluntary organization and a private sector firm or a title XII institution will encourage participation of U.S. firms. Hersey Foods International will participate in the project.
9. FAA Sec. 612(b), 636(h); FY 1985 Continuing Resolution Sec. 507. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.
- Local currency costs will be financed by host country contribution and ESF.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?
- No.
11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?
- Yes
12. FY 1985 Continuing Resolution Sec. 522. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?
- No

13. FAA 118(c) and (d). Does the project comply with the environmental procedures set forth in AID Regulation 16. Does the project or program take into consideration the problem of the destruction of tropical forests? Yes
14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)? N/A
15. FY 1985 Continuing Resolution Sec. 536. Is disbursement of the assistance conditioned solely on the basis of the policies of any multilateral institution? No
16. ISDCA of 1985 Sec. 310. For development assistance projects, how much of the funds will be available only for activities of economically and socially disadvantaged enterprises, historically black colleges and universities, and private and voluntary organizations which are controlled by individuals who are black Americans, Hispanic Americans, or Native Americans, or who are economically or socially disadvantaged (including women)? Plans call for a private voluntary organization and private or Title XII institution to implement the project. Participation of HBCO, 8 (a) will be encouraged in AID's advertising

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance
Project Criteria

a. FAA Sec. 102(a), 111, 113, 281(a). Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status, (e) utilize and encourage regional cooperation by developing countries?

(a) Yes, in all production and postharvest activities small and medium farmer in rural Belize are targeted to participate fully in the project and receive technical assistance for the production of crops;
(b) Yes, farmers association will be strengthened to assume responsibilities for direct participation in market channels;
(c) Yes, this program directly supports the Government of Belize objective of Agricultural Development. Women will be encouraged to participate through a specific program developed by the technical team;
(d) Yes, a Sociologist/Applied Anthropologist will be primarily responsible for involving women in production and postharvest activities;
(e) The project will utilize the resources of the regional institutions.

- b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used? Yes
- c. FAA Sec. 107. Is emphasis on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)? Yes
- d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed country)? Yes, the Government of Belize will provide 25% of the Public Sector component of the project.
- e. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth? Yes, expansion of cocoa will contribute to economic development and the earning of foreign exchange.

f. FAA Sec. 128(b). If the activity attempts to increase the institutional capabilities of private organizations or the government of the country, or if it attempts to stimulate scientific and technological research, has it been designed and will it be monitored to ensure that the ultimate beneficiaries are the poor majority?

Yes

g. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.

The project will provide host country agricultural producers an opportunity to increase farm income and expand the agricultural fare to assist small Belizean farmers to increase their economic standing through agricultural diversification.

66

2. Development Assistance Project
Criteria (Loans Only)

- a. FAA Sec. 122(b). Information an conclusion on capacity of the country to repay the loan, at a reasonable rate of interest. N/A
- b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan? N/A

3. Economic Support Fund Project
Criteria

- a. FAA Sec. 531(a). Will this assistance promote economic and political stability? To the maximum extent feasible, is this assistance consistent with the policy directions, purposes, and programs of part I of the FAA? Yes
- b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities? No
- c. ISDCA of 1985 Sec. 207. Will ESF funds be used to finance the construction of, or the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified No

that such country is a party to the Treaty on the Non-Proliferation of Nuclear Weapons or the Treaty for the Prohibition of Nuclear Weapons in Latin America (the "Treaty of Tlatelolco"), cooperates fully with the IAEA, and pursues nonproliferation policies consistent with those of the United States?

- d. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?

N/A

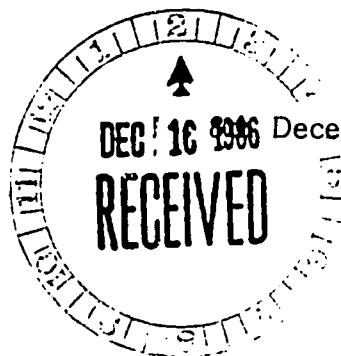


Office of Economic Development
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Belize, Central America

Reference2003/1/3/6/86(2)



December, 1986.

Mr. N. Brashich
AID Representative
U. S. A. I.D.
6 Gabourel Lane
Belize City

Dear Mr. Brashich:

Please regard this letter as a formal request for an AID Grant in the amount of US\$ 2.5M to assist the Government of Belize in its efforts to increase real income and improve the standard of living of small farmers in the Toledo District of Belize. The achievement of this goal will aid in the improvement of the balance of payments situation for Belize and in food security.

As discussed, the project will engage in the following activities:-

- a) The development of alternative cash crops for the small farmers in toledo with the emphasis being on those with export potential (e.g. cacao).
- b) The improvement of on-farm Post Harvest Systems for both subsistence and cash crops.
- c) Development of an effective marketing/input supply system in Toledo in cooperation with indigenous farmer organizations.
- d) The upgrading of the existing Belize Marketing Board's, rice mill and storage complex at Big Falls to improve product throughput, reduction of losses and improve quality.

It is felt that this project will make an important contribution to the economic development of Belize.

Yours faithfully,

D. O. BARROW
Minister of Foreign Affairs
and Economic Development

THE TOLEDO AGRICULTURAL MARKETING PROJECT
A WORKING PAPER

Prepared by
Richard C. Maxon
Cornelius Hugo
Ulysses A. Acasio

for the

AGENCY FOR INTERNATIONAL DEVELOPMENT
UNITED STATES DEPARTMENT OF STATE

AID/DAN-4144-A-00-5095-00
Postharvest Grain System R & D

at the

FOOD AND FEED GRAIN INSTITUTE
Kansas State University
Manhattan, Kansas 66506

Charles W. Deoye, Director

Complete report on file at USAID/Belize, AID/Washington and KSU/FFGI

CONTENTS

	<u>Page</u>
LIST OF TABLES	v
LIST OF FIGURES	vii
EXECUTIVE SUMMARY	ix
 <u>Section</u>	
A The National Marketing Infrastructure	1
F Government Programs and Intervention	1
C Agricultural Production and Marketing in Toledo.	5
1. Basic Grains	5
a. Production levels.	5
b. Production costs and returns	6
c. Off farm sales	6
d. Postharvest conditions	8
e. Commodity marketing.	11
2. Input Marketing.	11
3. Tree Crops	12
a. Cocoa.	12
b. Other tree crops	12
D Summary.	13
E Proposed Agricultural Marketing Project.	14
1. Marketing Scope.	14
a. Farm level marketing	15
b. Community level marketing.	18
c. Big Falls rice mill.	19
d. Agricultural inputs.	20
2. Organization Structure and Project Management.	21
a. Project Area	21
b. General Management Structure	21
c. Project Management Office.	24
3. Marketing Office	24
a. Training and development	27
b. Supply service center.	27
4. Project Budget	28
5. Project Implementation Schedules	28

67

LIST OF TABLES

<u>Table</u>		<u>Page</u>
I-1	Agricultural Marketing Infrastructure	2
I-2	Marketing Institutions in Belize.	4
I-3	Production Levels of Basic Grains in Toledo	6
I-4	Purchases of Basic Grains in Toledo by BMB.	7
I-5	Personnel and Logistical Support.	26
I-6	Tentative Project Budget.	29

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
I-1	Proposed On-Farm Storage and Dryer	16
I-2	Proposed Community Storage and Dryer	17
I-3	Map of Project	22
I-4	Organizational Plan.	23
I-5	Project Implementation Schedule.	31

EXECUTIVE SUMMARY

Background

Toledo is the most remote and least developed district in Belize. The available physical and human resources in the area offer a very high development potential, but any development program must proceed cautiously to conform with existing social values and the existing ecological systems.

The target group of the project consists primarily of Mayan and Kekchi subsistence farmers. Increasing population pressures are shortening the traditional milpa (slash and burn) farming cycle, with accompanying losses in productivity and resource degradation.

The Toledo Agricultural Marketing Project

The objective of the project is to improve the income of the target clientele through developing a viable marketing infrastructure, providing access to improved technology and inputs, and a reduction of current high levels of postharvest losses. These objectives provide the means and incentives to make the transition from a subsistence to a market orientation in a socially and culturally acceptable manner.

The project has four major components:

1. Establishment of an effective marketing system in Toledo including provisions for developing indigenous organizational and managerial capability to assume ownership and control of the marketing institutions.
2. Strengthening the existing Extension Service to deliver the technology for new crops in which assured markets are available (primarily cocoa) and to improve the market quality of existing crops: rice, corn, and beans.
3. Upgrade the existing Belize Marketing Board rice mill and warehouse at Big Falls to improve product quality and reduce operating expenses. The facility will be converted to a regional marketing center, with eventual transfer to private ownership.
4. Reduce postharvest losses of grains and other crops now estimated to exceed 40 percent. Appropriate technology is to be introduced that will permit some marketing functions to be shifted to the community from the farm level and release farm labor for more productive activities.

Project Personnel

The Toledo Agricultural Marketing Project will require three long-term technical assistance team members:

The Project Administrator will be located at project headquarters in Toledo and oriented to marketing and management. This person will give leadership for developing institutions capable of assuming control of the marketing facilities to be developed and/or renovated.

The Training and Development Coordinator will be responsible for introduction of the appropriate technology in new cash crops and postharvest loss reduction. The Coordinator will work closely with counterparts from the Extension Service and input supply center to be established under the Project.

The Marketing Economist will be stationed within the Belize Marketing Board for coordination of the BMB's marketing with respect to the Toledo area, to facilitate the renovation of the Big Falls complex. The Marketing Economist will also assist the BMB in developing market intelligence and analytical capabilities, and consult on programs for assumption of the Price Stabilization role under the ESF commitments.

Budget

The project is scheduled to start January 1, 1987 with a duration of seven years. The last two years would consist of training and a credit program under local USAID and GOB supervision with the expatriot personnel components phased out by the fifth year.

<u>Component</u>	<u>Estimated Cost</u>
Project Administration	\$917,000
Training and Development	488,500
Marketing Assistance	460,600
Supply/Service Center	416,000
Big Falls Facility Renovation	198,300
Credit Program (after year two)	<u>214,600</u>
Total Budget	\$2,695,000

The GOB could contribute existing facilities to the project to reduce initial capital outlays by \$160,000, for a project total of \$2,535,000. The GOB will be meeting the counterpart funding requirements by assignment of counterpart personnel and additional logistical support.

Project Issues

Three important issues must be addressed before and during the implementation of this project. First, the Mayan culture and social organization must be considered when introducing new technology and tree crops. Second, the timing and scope of the IFAD project must be coordinated with this project. In a sense, the Toledo Agricultural Marketing Project is a prerequisite for the IFAD project. The demarcation between the TAMP and IFAD will have to be carefully negotiated with the respect to the training and credit components. Third, a commitment is needed from the GOB to privatize the BMB facilities that the project will up grade.

COCOA TECHNICAL ANALYSISSUMMARY

Based on the technical assessment made it appears that in the Toledo District there is no less than 40,000 acres of land suitable for small scale cocoa production. This analysis examined the environmental factors (climate, soils and vegetation) and infrastructural factors (information, transportation, history, market, and labor). The methodology included direct observation, discussion with knowledgeable people, and a review of relevant literature.

The environmental factors of Toledo are within the normal ranges acceptable for cocoa. This includes the seasonal temperature ranges, diurnal temperature variations, and the absolute maximum and minimum temperatures. The mean annual rainfall is well above the minimum required for cocoa and the annual distribution of precipitation is satisfactory. Excessive winds appear to be of no concern with the exception of the moderate risks of hurricane damage in unprotected lowlands.

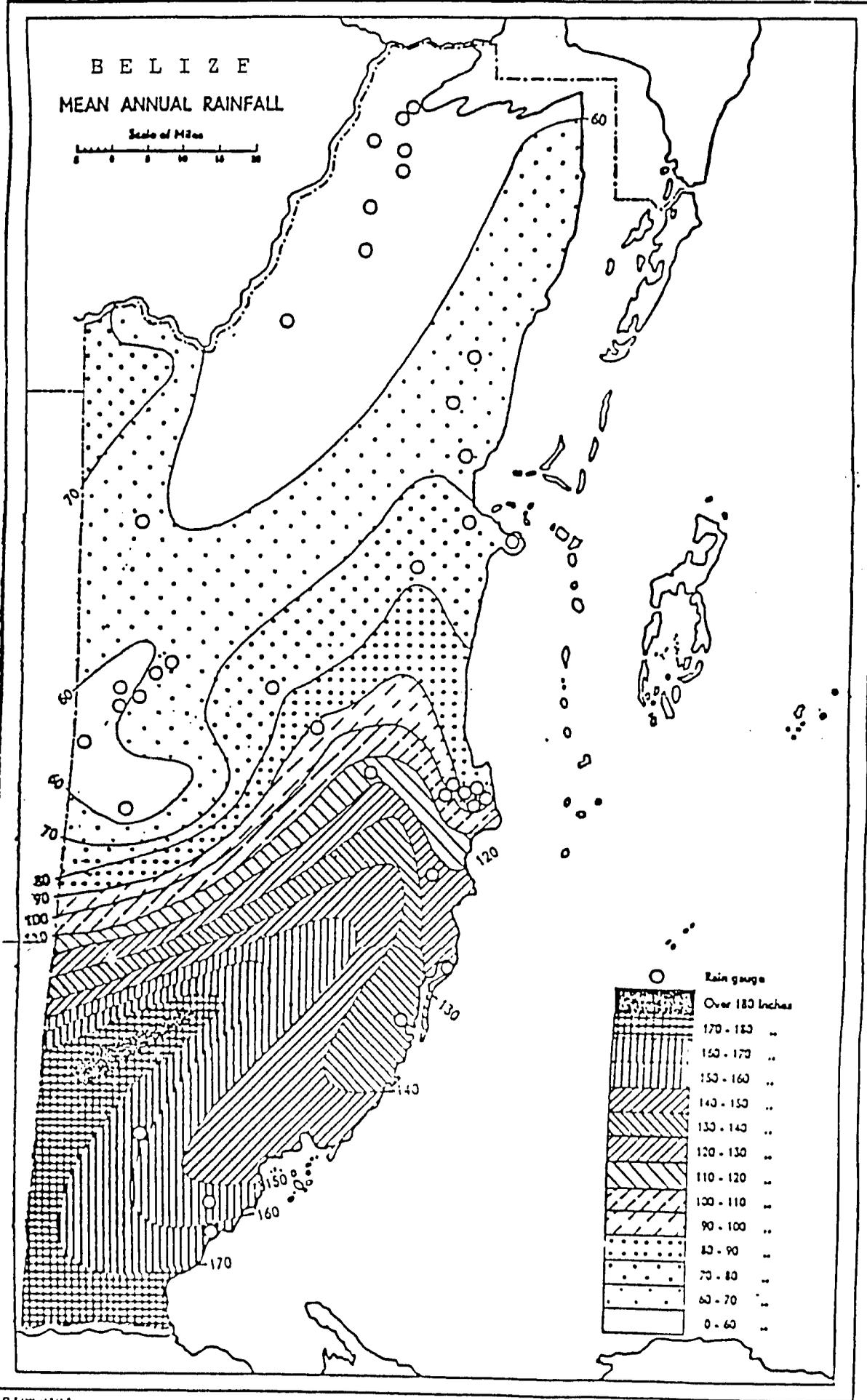
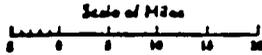
Although soil quality and depth are highly variable in Toledo and many areas are not suitable for cocoa, or even agriculture in general, there are acceptable lands located in the lowlands, foothills, and uplands of the central and southern regions to justify development. Many of these areas are in the vicinity of villages where farmers have already initiated cocoa establishment. The natural vegetation of the area provides excellent protection of the soils and would be very satisfactory as permanent or temporary shade for cocoa.

The agricultural history of Toledo indicates a sincere interest and need for alternative, sustainable cash crop opportunities for the small farmers. Given the demand for development of an appropriate enterprise, it is apparent that the two major constraints are technical information and access to marketing facilities both for inputs and as an outlet for farm production. Other issues which should be addressed through the

project include the effective use of credit and the need for an organizational structure through which farmers can operate and benefit. This latter issue may be important in resolving difficulties of transportation, processing, and marketing for cocoa producers.

Although successful commercial cocoa production requires effective management of the orchards to realize a satisfactory return through the market cycles, small farmers with limited resources can modify the typical high input strategies and still realize a good longterm income. A brief overview of two options available for cocoa is presented in the text for consideration. The basis of both systems is that practical technical assistance will be provided and that a sustainable marketing institution can be established.

BELIZE
MEAN ANNUAL RAINFALL



Rain gauge	
	Over 180 inches
	170 - 180 "
	150 - 170 "
	130 - 160 "
	140 - 150 "
	130 - 140 "
	120 - 130 "
	110 - 120 "
	100 - 110 "
	90 - 100 "
	80 - 90 "
	70 - 80 "
	60 - 70 "
	0 - 60 "

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Suitability - Worldwide cocoa is produced successfully between 20°N and 20°S latitude at low altitudes due to its requirement for minimal temperature variations and moisture requirements. Temperature tolerances are an absolute maximum of 32°C and minimum of 10°C. The recommended range of 18°C up to 27°C with a maximum diurnal variation not exceeding 10°C is within the climatic conditions of Toledo. Toledo is at 16°N latitude and possesses appropriate lowlands for cultivation. Minimum recommended rainfall is sixty inches per year and upwards depending on a combination of factors. The precipitation in Toledo is clearly sufficient with the only possible concern being for site drainage during the wet season. The dry season in Toledo is not generally severe and may be beneficial in reducing moisture loving diseases. Cocoa is not tolerant of excessive drying winds but this appears to be of no concern in Toledo where the inlands are well protected by the hilly terrain and high vegetation.

B. Soils and Topography:

Toledo has considerable variability in soils and topography. The region may be divided into the following four categories:

1. Siliceous Maya Mountains in the north central area.
2. Karst uplands and foothills in the west.
3. Lowlands and swamps in the northeast and south.
4. Sandstone foothills and uplands in the south.

The soil parent materials include calcareous sandstone, limestone, shale, mudstone, and siltstone. Fertility is highly variable but under natural vegetation is high with good structure and aeration. Cleared and burned upland soil oxidizes rapidly and becomes highly erodable with severe loss of nutrients. The lowlands also oxidize readily plus develop a clay pan with poor aeration following clearing. The organic content is generally satisfactory under natural vegetation or after a fallow period. Soil depth also varies greatly with deeper topsoils found in the lower foothills and lowlands.

Suitability - The selection of good soils for cocoa includes assessment of fertility, depth, aeration, and drainage. Soil depth is very site specific and may be limited by rock beds, clay pan, water table, or chemical barriers (i.e., pH, AI, etc.). All prospective cocoa growers should complete a chemical analysis as well as a direct examination of soil depth and texture before proceeding.

In the above list of regions in Toledo, numbers 1 and 2 should generally be considered unsuitable for cocoa because of unacceptable soil fertility and depth. Additionally, areas of coastal marshes, swamps, and flat lowlands included in number 3 are unsuitable for cocoa. The most desirable areas are located in the central and southern uplands where fertility and soil depth is satisfactory. District-wide this probably represents over 40,000 acres of land suitable for cocoa. The central uplands contain most of the villages already active in cocoa development (e.g., San Antonio, San Jose, Laguna, San Pedro Colombia, Big Falls) and expressing a strong interest in expansion. The southern uplands include several villages (e.g., Barranco, Crique Sarco, Otoxha) with an expressed interest in cocoa development but access in and out of this area will be a constraint. Also the river basins of the Monkey River and Swasey River represent potential cocoa areas in the northeastern section. The known characteristics of these areas and recommendations for cocoa are summarized in Table 1

Table 1:

Criteria for Cocoa and Toledo Suitability (1)

Criteria	Recommended	Toledo Uplands(2)	Acceptable?
Soil pH	5.5 - 7.5	5.3 - 6.5	Yes
% N	2.0	.19-45	Yes
% Org. C	1.75	2.0 - 3.1	Yes
C/N ratio	9.0	8.6 -11.4	Yes
P (ppm)	20	14.2 -20.7	No (3)
K (ppm)	100	248 - 352	Yes
Rainfall	60 in/yr	140 - 160+	Yes
Temp. range	18 ⁰ - 27 ⁰ C	15 ⁰ - 26 ⁰ C	Yes
Min. Temp.	10 ⁰ C	15 ⁰ C	Yes

(1) Source: Accelerated Cocoa Project data.

(2) Based on analysis of 10 farm soils by Central Farm lab.

(3) Can be economically improved with fertilizers.

78

C. Vegetation:

Although cocoa is grown with various intercrops to provide shade, wind protection, soil improvement, and secondary crops, the natural vegetation is usually very important during the initial establishment period of the desired companion species along with cocoa itself. It is also a rough indicator of soil fertility and drainage properties. The role of shade is considered essential for young cocoa and existing vegetation can serve this purpose very well minimizing the need for

establishing shade at the same time that the heavy labor demands for cocoa are occurring. The maintenance of selected natural vegetation is also important in minimizing soil damage (excessive oxidation, erosion, and illuviation) and nutrient loss often associated with traditional slash and burn practices. This is particularly relevant on the uplands slopes where most cocoa is likely to be planted.

The uplands and foothills of central and southern Toledo are characterized by deciduous seasonal broadleaf forests (i.e., sapote, mahogany, ramon and allspice). The coastal regions and swamps have mixed herbaceous marsh species (i.e., sedges, calabash, and palmetto) and high swamp forests (i.e., cocoplum, pucte, bribri and caway) respectively. Much of the areas of interest to the project are former milpa sites in varying stages of fallow regrowth ("guamil") which includes fast growing species typical of early succession.

Suitability - Assuming that the soils are suitable for a particular site, the natural high vegetation of the uplands, foothills, and lowlands is quite acceptable for the establishment of cocoa using the "underbrushing" method. Complete clearing of the vegetation should be discouraged in order to maintain the soil quality and make use of the available shade. Several native species are especially attractive for permanent shade since they yield secondary products (allspice, madre del cacao, etc.) and these should be identified for maintenance. Guamil vegetation may be used as a temporary shade during cocoa establishment if it has sufficient height and is gradually replaced with permanent species. The unsuitability of marsh and coastal swamp lands is determined more by the soil and topography than vegetation.

D. Agricultural History:

Historically it is believed that the Maya have successfully cultivated various species of cocoa in the Central American lowlands for many centuries. Belize is reported to have

included over 10,000 acres of cocoa distributed through all its districts including Corozal. The Cramer Estate established significant acreages of cocoa in southern Toledo during the late 1800's using imported Mayan labor. Many of these plantings still survive as wild trees despite lack of care. In 1984 and 1985 a cooperative program between the Ministry of Natural Resources (now Ministry of Agriculture) and Hummingbird Hershey Ltd. (HHL) provided improved hybrid seeds to interested farms in the Toledo District. Estimates are that over 300 acres of cocoa were established through this program until its termination due to lack of funds in 1985. Because payment for these seeds was not required upon delivery and future obligations for reimbursement remain unclear the follow-up care, and investment in these trees has been irregular. In contrast, a project initiated by farmers with the assistance of the PCV cocoa extension agent in which advance payment was required resulted in enthusiastic participation and excellent nursery care of the trees.

The present agricultural systems are correlated with the various ethnic groups of Toledo as described in the 'Social Soundness' section. While the East Indian people typically engage in rice and pasture production in the flat lowlands, the Kekchi and Mopan are more often dependent upon mixed milpa farming in the uplands and foothills. Rice is the dominant cash crop and their experience with permanent tree crops for cash or subsistence is relatively limited.

Suitability - Experience indicates that the farmers of Toledo, particularly the Maya, will participate in a cash enterprise if an accessible market can be demonstrated. Given the agricultural capabilities of the farmers and this historical perspective it is reasonable to expect a positive response to the project. However, efforts to modify the indigenous farming system from subsistence to market oriented production are not new to Toledo and have had varying degrees of success. If we accept that the farming system of a culture is a reflection of their social system we can observe that previous efforts have focused on introducing improved technologies and infrastructure while ignoring the existing social structures and processes. This project will need to be very sensitive to the established social systems in Toledo if it is to effect sustainable changes in traditional farming strategies and improvements in the local agricultural economy.

E. Information and Extension:

The management of a commercial production system is substantially distinct from a subsistence farm regardless of

scale or crop. A great inventory of traditional and "modern" knowledge currently exists in the farmers of Toledo but is generally restricted to locally adapted subsistence farming. Rice may be the only notable exception. The failed attempt to apply attempt to apply traditional husbandry practices to commercial pig production in the 1950s and 1980s demonstrates the constraints involved. Recent extension work with new cocoa farmers throughout Toledo shows a serious lack of technical familiarity with basic field practices like pruning, shade adjustment, fertilization and processing. Cocoa has been grown as a backyard crop without any real care resulting in very low yields and poor plant vigor.

Present information regarding cocoa production is limited to traditional technology (perfectly appropriate to traditional production needs) and the following training efforts:

1. Ministry of Agriculture extension officers received an extensive two-week course at Central Farm sponsored by HHL. Only two of the participants are currently stationed in Toledo and one is expecting a transfer by late 1986.
2. One extension officer from Toledo attended a one-week training course at HHL sponsored by the Pan American Development Foundation (PADF) and the extensionists mentioned in No. 1.
3. One Peace Corps Volunteer works as a cocoa extension officer for the Ministry of Agriculture. He is due to complete service in November, 1986.
4. HHL is preparing a technical reference publication for extension officers and researchers to be available in 1987.
5. The Accelerated Cocoa Project (ACP) is compiling a farmers training manual to be used by extension officers and technicians.
6. PADF and HHL have scheduled a one-week training course in cocoa for mid-August, 1986 available to extension officers.

Suitability - Although the general agricultural capabilities of Toledo farmers are good, there is a serious need for training in the improved cocoa practices (use of hybrids or improved varieties, shade and pruning methods, etc.) and in commercial farm management (effective use of credit, quality control, marketing). This project will need to focus on an effective system of extension such as developed under the ACP and adapting it to Toledo. This should include a comprehensive program of demonstration, workshops, written literature, and

91

most importantly, regular on-farm visits. Particular difficulty may occur in gaining acceptance of the new, more intensive, methodologies and this project should base its strategy on the experience of the ACP which has researched and developed effective means for cocoa extension. The experience and services of HHL also will be vital to the technical support of this effort.

F. Labor:

Most cocoa worldwide is produced on small family farms using manual labor and it is assumed that Toledo farmers will do likewise. (The notable distinction being in the improved practices developed by HHL and promoted through the Accelerated Cocoa Project). Time requirements for cocoa are seasonal but extend throughout the year making it practical for the family operation. The labor requirements for establishing and maintaining cocoa are discussed in the Financial Analysis and Social Soundness section and have been thoroughly documented by the Toledo Research and Development Project (TRPD), HHL, and in the ACP economic model. The specific tasks which require intensive labor at particular times include (a) nursery establishment, (b) underbrushing, (c) transplanting, and (d) harvesting and processing. The latter will vary depending upon whether fermentation and drying is completed on farm or the cocoa is sold as wet beans to a processing facility. By selling wet beans the farmer could save the thirteen days needed for the fermentation and drying (five days and eight days respectively) and the associated labor depending on the quantity of cocoa beans ready for processing at any one time and the distance to the processing facility. Other work such as shade adjustment, pruning, fertilization, and weed control can be somewhat adjusted to the farmers overall program without detriment to production.

Suitability - Cocoa management does not require excessively hard labor and much of the work can be complimentary to traditional milpa activities seen in Toledo. Depending on an individuals priorities, varying acreages of cocoa can be incorporated into the existing operations without sacrificing subsistence production. Careful planning must be given to those activities which coincide at particular seasons such as milpa clearing and cocoa nursery establishment and harvesting, all of which take place in the months of March through May. The enlistment of additional family labor for the nursery and processing cocoa beans at the house could satisfy the needs of most small producers with under ten acres. Alternatively, if the production is very small or the farmer has reasonable access to a processing facility it might be more economical to

22

sell their wet beans directly and save time. This would be particularly practical during the maturation phase of cocoa or during future heavy harvests in April and May. For these reasons, it is believed that much of the appeal of cocoa to Toledo farmers is that they feel it does fit their existing farming systems (and social history) and will not impose a hardship regarding labor.

G. Pests and Diseases:

Cocoa is an indigenous plant to the American tropics and consequently has a host of native pests and diseases which the farmer must manage in order to get a satisfactory return. As with most crops, many such infestations are actually secondary to physiological stress which should be the primary focus of plant protection. For example, the major insect (thrips) and the major disease (black pod) of cocoa are both best managed through cultural practices and chemicals are only used to treat acute situations. The notable exception to this may be in the nursery where a high concentration of valuable plants are maintained together and the economics are clearly different from the field. In nurseries it is generally recommended that regular treatment with fungicide and insecticide proceed in addition to fertilization and close shade control.

Recent experience in the area has revealed only relatively minor problems but there was generally a lack of understanding of (a) whether a control response was warranted? and (b) what are the most appropriate measures? Visits to farms always elicited numerous typical requests for information such as (a) what is causing this damage to the cocoa plant? (b) is it serious? (c) what should be done to control/prevent it? and (d) how can we obtain the needed pesticide or tools? The farmers also demonstrated great concern about their cocoa and were eager for technical assistance.

Suitability - Although pests and diseases are inevitable with any intensively cultivated crop the experience in Belize does not indicate that any unmanageable problems will arise. Actually small farmers in Toledo may have an advantage over HHL in that smaller, dispersed fields of cocoa should be less vulnerable to serious attacks or infestations. The project should emphasize an integrated strategy to plant protection which includes resistant varieties, nutrition, shade adjustment, pruning, as well as direct cultural and chemical controls. This can be justified for both economic and agronomic reasons. For example, it has been found that use of certain insecticides (e.g., persistent chlorinated hydrocarbons like dieldrin, endrin, DDT, and lindane) can actually allow

normally non-pest species (e.g., bag worms and shield bugs) to flourish in the absence of their insecticide-sensitive parasites and become economic pests of cocoa. As cocoa farmers are making a long-term investment it is essential that they begin pest and disease management correctly through a program of practical technical assistance specifically adapted to the local conditions and their capabilities.

TABLE 2
PESTS AND DISEASES OF COCOA

Name	Recommended Controls	
	Cultural	Chemical
<u>Insects</u>		
- Thrips (<u>Selenothrips</u> spp.)	N, S	1, 2
- Leafcutter ants (<u>Atta</u> spp.)	B, T	3, 2
- Red ants	T	2
- Loopers (caterpillars)	P, B	1, 2
- Borers (<u>Xyleborus</u> spp.)	P	5, 4
- Weevils (in storage)	-	6
<u>Nematodes</u>		
- All species	-	5
<u>Diseases</u>		
- Phythopthora (black pod)	H, S, Y, P	7
- Ceratocystis	H, S, Y, P	7
- Die back	N, S	1, 2
<u>Abbreviations</u>		
Cultural:	Chemicals:	
N - nutritional improvement	1 - malathion	
S - shade adjustment	2 - carbaryl (sevin)	
Y - pruning	3 - mirex	
P - physical removal	4 - gamma HCH/lindane	
B - biologicals	5 - carbofuran (furadan)	
H - resistant hybrids	6 - phostoxin	
T - traps or barriers	7 - fungicides	

H. Cocoa Processing:

Cocoa beans are the raw material for a wide variety of intermediate and finished products. The most important are confectionary chocolates, cocoa beverages, and cocoa butter (oil). There is a longstanding disagreement regarding the main determinants of quality but it is clear that proper fermentation and drying play a major role and indicators are checked by buyers to determine acceptability and grades of cocoa.

These two initial steps following cocoa harvest are often performed by the farmer and inconsistent processing can have significant effects on the price received. Characteristics which negatively affect cocoa are summarized in Table 3. Since none of these can be effectively eliminated during manufacturing any one can render the cocoa unacceptable for marketing. Standard methods for sampling and testing (i.e., "cut test") are used to check cocoa and to grade its degree of fermentation and are summarized in Table 4. Beans are purchased and stored by HHL at 7 percent moisture. Beans with excess moisture will be re-dried and purchased according to new weight.

TABLE 3

UNACCEPTABLE COCOA QUALITY CHARACTERISTICS AND CAUSES

Name	Cause
- Acidic off-flavors	Faulty fermentation or drying
- Bitter off-flavors	Faulty fermentation
- Moldy beans	Incomplete drying or poor storage
- Smoky flavor	Faulty drying or storage
- Weevils	Faulty storage

TABLE 4

COCOA GRADING STANDARDS (1)

Grade	Description
1	- under 3% with internal mold or insects - under 3% slatey (gray) beans - under 3% germinated or flat beans
2	- up to 4% with internal mold or insects - up to 8% slatey (gray) beans - up to 6% germinated or flat beans

(1) Source: Hummingbird Hershey Limited

As discussed in section F, the farmers have the option of (a) on-farm fermentation and drying or, (b) selling wet beans to a central processing facility. The advantage of the first option is to gain the value added by the grower rather than the processor and to avoid possible logistical difficulties (and expenses) in transporting heavy, perishable wet beans to a facility within twenty-four hours of "breaking" the pods. The advantage of the second option would be to avoid the expense of building ones own sweat boxes, dryers, and storage facility and to eliminate the labor inputs at what might be a very busy time on the agricultural calendar. The decision must be based on the specific economics and locality of each farmer.

26

I. Transportation:

The access to transportation affects any developmental activity and Toledo has severe limits regarding its roads and bridges. Commercial production of any commodity including cocoa will depend upon timely inputs and marketing. Reports of difficulty with handling the relatively nonperishable rice are an indication of potential problems for cocoa producers.

Suitability - The United States Agency for International Development (USAID) Rural Access Roads and Bridges Project will upgrade some important routes in the near future but the southern villages will still have to depend on the rivers or walking and this might be their limiting factor for development. Careful consideration must be given to this issue before engaging isolated villages in cocoa development even though they may well be the ones most in need of the assistance.

A partial solution to the problem may be through the present cocoa growers associations and the operation of farm service center(s) to decentralize the resources and improve access to marketing. Specifically, this would be important in making available basic agricultural inputs (e.g., fertilizer, pesticides, seeds, etc.) and the establishing of strategically located processing depots along in areas of major cocoa production to which farmers could deliver their wet beans in a timely manner. Cocoa farms in areas without access to roads will be restricted to on-farm processing so that a lighter weight, less perishable product can be handled.

J. Marketing:

This is obviously critical to this project and has been discussed in the Financial Analysis. Although HHL has a policy of buying properly fermented and dried cocoa beans at a fair price small producers with limited quantities may find it hard to transport their product reliably and economically approximately 140 miles to the HHL facility. Recent sales from Toledo to HHL have had limited success for an established grower with over twenty mature acres but most project participants will not have this quantity planted. Quantity control is the primary difficulty encountered by Toledo growers thus far and is a vital facet of commercial marketing which will require considerable attention.

Suitability - There is every reason to have confidence that HHL will maintain its present buying policy and will increase its technical assistance to producers. Further, the Big Falls Farm (owner Charles Kern) has plans for 500-600 acres of cocoa for which they will incrementally build primary processing facilities and buy wet (fresh) beans from local farmers. These two operations could provide the major outlets for Toledo growers in the future when production has expanded.

As an interim measure there may be a need for local, small scale depots with fermentation and drying capabilities to accommodate the initially low levels of production of immature cocoa fields. The project might address this need through a coordinated effort with the cocoa associations with technical assistance from HHL and incorporate it under the farm service center component. This would facilitate establishing a consistent level of quality control at the same time of developing a long-term marketing system for Toledo. Farmers without ready access to the depots should be provided extra technical assistance in on-farm processing in order to produce good quality cocoa for the market.

COCOA MANAGEMENT SYSTEMS FOR TOLEDO

Cocoa is a long-lived native understory tree of the American tropics which can be effectively managed to generate a very good return on investment for the small farmer. In fact, it appears that the small-scale grower can out perform large mechanized operations in both unit costs and yields. This may be possible due to external labor costs for plantations and the more judicious application of inputs on small farms.

Given proper conditions, newly established cocoa becomes productive within 3-4 years, matures at 10 years, and remains economically productive for up to 40 years. A variety of field practices have been developed over time to improve productivity and two options are described in Table 5 as guidance for the project. Both systems have identical objectives but utilize different inputs where cash purchases are involved.

A. High-Input System:

Hummingbird Hershey Limited has pioneered research in Belize building on the experience of workers around the world. Their program is adapted to the larger scale operation employing external labor, mechanization, and relatively high input levels. Small farmers can use this system if they have access to financing and occasional external labor. The advantages are a more rapid establishment phase followed by high yields (i.e., 1,200 to 2,000 lbs/a) of good quality cocoa. The objective of this strategy is to maximize return over the long run. The primary disadvantage is the significant negative cash flow situation which must be endured during the 3-4 years establishment period.

B. Low-Input System:

The ACP and TRDP have modified the high-input system to accommodate the capabilities and priorities of small farmers who need a reasonable return but can not afford the high initial investment in capital or labor. This system emphasizes the effective application of nonpurchased until production begins. The main advantage is the reduction in the up front financial burden and a manageable distribution of labor for a family farm. The objectives of this strategy are to minimize costs and to realize a reasonable, stable income.

Experience indicates that upto 80% of the productivity of a cocoa tree is determined by the time that it is planted in its permanent site, i.e., by the time it is only 3-6 months old. The factors involved are: (a) germ plasm, (b) nursery care, and (c) transplant site. It stands to reason that if a plant is of a good germ line, receives good nursery care, and is properly located it is well on its way to a fruitful career. This is the basis for the low input system's appeal which focuses on starting strongly, coming into production, then increasing inputs as the economy supports it.

Table 5

HIGH AND LOW INPUT SYSTEMS FOR COCOA

Objective	Methodology	
	Lo-Input	High-Input
1. Germ plasm	Hybrid seeds	Hybrid seeds
2. Nursery protection	Syst. insecticide Manual removal fungicide	Syst. insecticide Spray insecticide fungicide
3. Nursery nutrition	Foliar fertil. granular fertil.	Foliar fertil. granular fertil.
4. Land preparation	Manual underbr. Manual shade adj.	Manual underbr. Mech. shade adj.
5. Field protection	Spray insectic. manual removal tolerate loss	Spray insectic.
6. Disease control	Resist. hybrids shade adjust. pruning tolerate loss	Resist. hybrids shade adjust. pruning fungicides
7. Field nutrition	Legum. intercrp. fertilize 1/yr.	Legum. intercrp. fertilize 4/yr.
8. Weed Control	Manual removal	Manual removal herbicides
9. Harvest	Manually	Manually
10. Fermentation	Piled together	Sweat box
11. Drying	Passive dryer	Artificial heat
12. Yields/acre Yield size	600-800 lbs. 3-10 acres	1,200+ lbs. 10-30+ acres

FINANCIAL AND ECONOMIC ANALYSIS

FINANCIAL ANALYSIS

Introduction:

Agricultural producers in the Toledo District of Belize are diverse in their cultural backgrounds, cropping patterns and management practices. Creole, East Indian, Mestizo, Kekchi and Mopan growers produce approximately 60 percent of Belize's rice and the region is self-sufficient in corn and red kidney bean production. The Creole and East Indian growers are located along the district's sparse road system and use mechanized rice production practices. These farmers are also the major borrowers of production credit from the Development Finance Corporation. The Mayan farmers are located in the upland areas and use slash-and-burn or slash-and-mulch production techniques in their traditional milpa farming systems.

Toledo district farmers respond to price incentives. This statement applies to the Mayan growers as well as to the more cash crop-oriented Creole and East Indian producers. Supply response to profitable prices for rice, allspice, cocoa and cannabis has been significant in recent years. This response has a favorable impact on the region if marketing channels are well developed and can handle the increased production (e.g., allspice and cocoa). In some years the increased rice production has overwhelmed the grain handling, milling and cash resources of the Belize Marketing Board's Big Falls rice mill. Poor responsiveness on the part of the rice mill has acted as a disincentive to the rice producers and they have reduced their planted rice acreage accordingly.

Toledo agricultural producers attempt to maximize their cash incomes subject to risk, labor, land and market constraints. Relative net income from alternative crops is continually evaluated and numerous growers have incorporated profitable cash crops into their traditional milpa agriculture. Risk considerations are important since the Mayan farmers are essentially subsistence producers. Most of their cash income is generated by upland rice and pig sales. New enterprises must demonstrate compatibility with present cropping practices and a relative low probability of crop failure. Even with these assurances, the farmer is slow to adopt the new crop.

Failure in new activities can have disastrous consequences on the farm family's well-being and dreams for the future.

Adjustments in cropping patterns are limited by the labor constraints faced by the farm family. Since milpa agriculture is labor intensive, only an average of nine to twelve acres of crops can be cultivated in one year. Any new crop must be evaluated in terms of its demands on the farm family's labor resources and how these labor demands fit into the existing labor profile. Any adjustment also must be compatible with the land resources of the farmers. Not all farmers have appropriate soils or field location for crops such as rice or cocoa. Quantity of land is less of an economic constraint since land is readily available within and outside the Indian reservations. There is some question as to the acceptability of putting permanent crops (e.g., cocoa) on reservation land for social and economic reasons. However, there have been no efforts to date to restrict land use by the village alcaldes.

The economic development of Toledo is constrained by the size of the local and Belize markets. It is difficult to develop any economies of size in production and marketing when the local market and the entire country represent approximately 11,000 and 160,000 people respectively. Therefore economic interventions should be scaled to the size of the domestic market or oriented to export markets. Also of critical importance is the transportation link between the Toledo District, Belize City and export shipping facilities. Although Punta Gorda is only 150 miles by air from Belize City, the trip by road can take seven to nine hours under favorable conditions. Bridges may flood or be washed out during the rainy season (June-August) which can cut the road link to and from the district for a period of time.

Present Agricultural Production Practices:

The Toledo Research Development Program (TRDP), supported by the British government, has served as the major agricultural research and extension institution in the district for seven years. Although recent activities have focused on mechanized rice production, TRDP has completed a number of analyses on the farming practices in the region. This financial analysis builds on the TRDP experience and draws additional material from the Accelerated Cocoa Project in the Cayo District, Hummingbird Hershey Ltd. and the Development Finance Corporation.

A comparison of crop values, labor days, cash costs and the value of labor for traditional milpa enterprises is presented in Table 1 (See Attachment 1 for more detailed information). Crop value is determined by multiplying the crop price by the expected yield. It is notable that the production of both corn crops is largely consumed by the farm household, fed to pigs or used for seed for the next year's crop. Surplus corn is sold for cash to local traders or to the Belize Marketing Board. Upland rice is the major cash crop in this farming system producing a net crop value of \$149.00 per acre. Rice is the only production activity which uses cash inputs, in this case, herbicide. The first red kidney bean crop is planted as a seed crop for the second bean crop because high levels of humidity and poor storage practices make long-term storage very difficult.

Matahambre corn and upland rice are the most profitable crops in terms of value produced per day of labor at \$6.00 and \$5.62 respectively. However, in the milpa farming system diversification is important to spread risk and the cropping pattern is structured to minimize risk and yet generate some cash for the farm family. A typical cropping pattern is presented in Table 1 and is used to calculate the returns to the whole farm. A gross crop value of \$1,149.25 is produced with \$22.00 of cash inputs. Approximately 249 days of labor are utilized with this crop mix. Labor is valued at \$4.53 per day which is comparable to the wage rate for part-time agricultural labor of \$5.00 per day.

This traditional cropping pattern requires approximately 60 acres of land assuming a seven-year fallow for the slash-and-burn production practices. These figures are representative of a typical Mayan farm in the Toledo District. As is the case with all efforts to generalize, many Mayan farmers cultivate more acres, use a longer fallow period and have a different crop mix. However, the data in Table 1 does reflect the relative profitability of the different crops, how the crops fit into the farming system and the value of the farmer's labor.

Several alternative crops should be discussed briefly in relation to the cropping pattern. Non-mechanized and mechanized lowland rice is an important crop in the region. As mentioned before, the Creole and East Indian communities cultivate the majority of the mechanized rice while the Kekchi and Mopan farmers produce a large percentage of the non-mechanized lowland rice. Much of this rice production capacity has been developed in recent years as a result of the availability of a willing buyer and marketing outlet, the Belize Marketing Board's Big Falls milling and storage operation.

Table 1

Traditional Milpa Enterprise and Whole-Farm Budget¹

Cropping Activity	Value of Crop Production	Labor Days Per Acre	Cash Costs	Value per Day
Main Season Corn	\$112.00	25.0	\$0	\$4.48
Matahambre Corn	108.00	18.0	0	6.00
Upland Rice	149.00	26.5	11	5.62
Red Kidney Beans (1st Crop)	240.00	56	0	4.29
Red Kidney Beans (2nd Crop)	135.00	52	0	2.60
Whole Farm ²	1,149.25	249	22	4.53

¹Source: Toledo Research Development Project

²Cropping Pattern:

Main Season Corn	5	acres
Matahambre Corn	1	acre
Upland Rice	2	acres
Red Kidney Beans #1	.25	acres
Red Kidney Beans #2	.75	acres

Cocoa and citrus production have had similar histories. Although these crops have existed on a minor scale for many years, recent market developments have induced a supply response which is noticeable in the Toledo District. Hummingbird Hershey Ltd. has offered to buy all the cocoa beans produced in Belize at 75 percent of the world market price adjusted for grade and quality. Cocoa sales to Hershey from Toledo have increased by 400 percent in 1986 over what they were in 1985. Freezes in Florida have created a similar situation in the citrus markets. Favorable citrus prices have encouraged new citrus plantings and the rehabilitation of existing citrus orchards. Even an isolated number of Mayan farmers have planted or are considering planting a few acres of citrus as part of their crop mix.

Crop acreages, production levels and yield per acre figures for the Toledo District are presented in Table 2. Although the Ministry of Agriculture data is inadequate to make any firm conclusions, these figures do illustrate the acreage adjustments over time attributable to price incentives and other factors. Production and yield figures between the last five years are variable and do not demonstrate any identifiable trend or pattern. Yield per acre for each crop demonstrates a high degree of variability thereby illustrating the climatic and managerial risks associated with agricultural production in Toledo.

Commodity prices fluctuate less than crop yields but price variability is still an important source of risk for the agricultural producer (Table 3). The Belize Marketing Board controls the domestic price of corn, beans and rice by offering to buy these commodities at established prices. A specific price can vary from year to year and by quality of the product. Of particular importance for this project is the historical trend of cocoa prices. Cocoa prices have varied considerably in recent years from a high of \$1.12 in 1979 to a low in 1982 of \$.57. Cocoa prices are very sensitive to the world economy which was in a recession in the early 1980s. As the world economy has strengthened, particularly in the United States and Europe, cocoa prices have demonstrated some upward movement from the low in 1982.

95

Table 2

Basic Grain Production Figures for Toledo District, 1980-1984

	RICE			CORN (Matahambre)		
	Acreage	Production (lbs.)(000)	Yield/A	Acreage	Production (lbs.)(000)	Yield/A
1980	5,000	9,000	1,800	1,500	N/A	-0-
1981	4,015	8,000	1,992	1,000	800	800
1982	3,500	6,500	1,857	1,000	800	800
1983	2,416	3,720	1,540	1,000	N/A	-0-
1984	2,600	3,900	1,500	1,090	1,090	1,000

	CORN (Main Season)			BEANS		
	Acreage	Production (lbs.)(000)	Yield/A	Acreage	Production (lbs.)(000)	Yield/A
1980	3,500	N/A	-0-	1,500	760	507
1981	2,000	3,000	1,500	1,500	250	167
1982	2,000	3,000	1,500	1,500	450	300
1983	3,110	N/A	-0-	500	450	900
1984	5,155	6,170	1,197	190	750	-0-

Table 3

Price Series for Selected Commodities Produced
in the
Toledo District (US\$ per pound)

YEAR	C R O P			
	CORN 1/	R.K. BEANS 1/	PADDY RICE 1/	COCOA 2/
1978	.06	.23	.07	1.08
1979	.07	.23	.08	1.12
1980	.08	.30	.09	.90
1981	.10	.40-.35	.095-.105	.65
1982	.12	.50	.12-.13	.57
1983	.09	.45	.07-.12	.60
1984	.08	.35-.25	.07-.12	.77
1985	.08	.25	.07-.12	.71

1/ Sources: Belize Marketing Board and Ministry of Natural Resources.

2/ Price is estimated as the New York spot Accra Cocoa Bean price adjusted by Hummingbird Hersheys Ltd.'s marketing fee and transportation cost.
Source: United States Department of Agriculture.

Labor Profile:

Labor is the most important production constraint in milpa agriculture. Supplied mostly by the male head of household, agricultural labor on a representative farm uses 249 person days a year. Table 4 illustrates the timing of labor needs for the representative farm presented in Table 1. Main season corn, upland rice and the second red kidney bean crop demand more total labor time than matahambre corn and the first bean crop. At 125 days of labor, main season corn is the principal crop in the milpa system.

The monthly profile of labor demands illustrates the critical times of the crop year. Land preparation and planting during the February to May period and harvesting in October through December are the peak periods. In fact, during March, April, May and November the grower must rely on family, work group or hired labor to complete the necessary tasks. These labor bottlenecks are lessened to the greatest extent by the communal labor sharing discussed in the social analysis.

Women will play a major role in the agricultural labor force if cocoa or other alternative crops are to be incorporated into the Mayan cropping pattern. Although cocoa harvesting will occur all year long with mature trees, the largest harvest period occurs in the months of April and May. As noted in Table 4, this period already places a binding constraint on one person's labor. Indications are that women will become involved in harvesting, breaking the pods, drying and fermenting the cocoa crop. Since breaking the pods, drying and fermenting activities occur near the farm house, these activities are logical extensions of the women's household chores. Economic incentives will encourage women to take a more active role in cocoa harvesting and processing activities.

Table 4

Labor Profile of a Traditional Milpa Farm (days)

CROP	TOTAL	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Main Season Corn	125	7.5	15	15	10	20	5	5	5	2.5	10	15	15
Latahambre Corn	18	2	1	2	5	2	2	0	0	0	1	1	2
Upland Rice	53	1	2	4	4	5	5	4	4	8	8	8	0
R.K. Beans #1	14	0	0	0	0	0	0	0	0	5	0	7	2
R.K. Beans #2	39	7.5	3	9	9.75	.75	0	0	0	0	0	0	9
Total Farm	249	18	21	30	28.75	27.75	12	9	9	15.50	19	31	28

29

PROJECT COMPONENTS

Expansion of Cocoa Production:

Cost and return data for cocoa production was obtained from reports published by TRDP, Hummingbird Hershey Ltd. and the Pan American Development Foundation. Realistic cocoa budgets were constructed using this data for low-input and high-input cocoa production. Most of the published budgets Table 4 reflect the high-input alternative. Discussions with the Mayan farmers have revealed that they use very few inputs on their trees. Most producers have only spent cash on the cocoa seeds and plastic bags for the seedlings in the nursery. There have been few expenditures on pesticides, fertilizer and equipment. Mayan producers recognize the potential benefit of these expenditures but their liquid cash flow positions do not give them the necessary resources to purchase these inputs.

Table 5 illustrates the costs, returns, labor use and profitability levels for low- and high-input cocoa production. Table 5A presents the low-input option for cocoa. Crop yields are assumed to be lower under this alternative because few purchased inputs are used, especially fertilizer. One hundred pounds of fermented and dry beans are produced the fourth year, increasing to 200, 400, 600 and 800 pounds in the fifth, sixth, seventh, and eighth year respectively. It is assumed that the grower establishes a nursery and uses a limited amount of fertilizer and Furadan on the young trees. Cocoa seeds are purchased from Hummingbird Hershey and planted in plastic bags. All costs are covered by the grower's own financial resources.

The farmer realizes a negative return on one acre of cocoa the first three years. The first year's investment is particularly large and could be a disincentive to the adoption of the cocoa enterprise. However, the rewards realized after year 4 are attractive to an investor who can raise the necessary cash in the earlier years. The returns per day of labor are less than the opportunity cost of capital (\$5.00) for the first four years but rise to two times the current cash wage level by year 7.

Table 5B presents the high-input option for cocoa production. The farmer begins to harvest a small crop in year 3 as compared to a smaller harvest (100 versus 200 pounds) one year later with the low-input option. With the high-input alternative yields increase gradually until the tenth year where they peak at 1200 pounds of fermented and dried beans per

Table 5A : Cocoa Enterprise Budget for Low-Input Production (Per Acre)

	YEAR											
	1	2	3	4	5	6	7	8	9	10	11	12
Gross Returns												
Yield (lbs.)	0	0	0	100	200	400	600	800	800	800	800	800
Price (\$/lb.)	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70
Total	0	0	0	70	140	280	420	560	560	560	560	560
Costs:												
Labor Days	23	12	12	18	21	29	40	45	45	45	45	45
Labor (\$5/day)											0	0
Seeds/Bags	87.5	3.5	3.5									
Pest and disease control	29	11.25	11.25	11.25	11.25	11.25	11.25	11.25	11.25	11.25	11.25	11.25
Fertilizer	10.5	21	21	21	21	21	21	21	21	21	21	21
Equipment (Depr. & Int.)												
Other												
Interest												
Total	127	35.75	35.75	32.25	32.25	32.25	32.25	32.25	32.25	32.25	32.25	32.25
Net Revenue	-127	-35.75	-35.75	37.75	107.75	247.75	387.75	527.75	527.75	527.75	527.75	527.75
Net Revenue/Day	(\$5.52)	(\$2.98)	(\$2.98)	\$2.10	\$5.13	\$8.54	\$9.69	\$11.73	\$11.73	\$11.73	\$11.73	\$11.73

Table 5B : Cocoa Enterprise Budget for High-Input Production (Per Acre)

	1	2	3	4	5	6	7	8	9	10	11	12
Gross Returns												
Yield (lbs.)	0	0	100	200	400	600	800	900	1000	1200	1200	1200
Price (\$/lb.)	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70	\$0.70
Total	0	0	70	140	280	420	560	630	700	840	840	840
Costs:												
Labor Days	30	18	27	28	26	34	39	48	53	57	57	57
Labor (\$5/day)												
Seeds/Bags	87.5	3.5	3.5									
Pest and disease control	43.5	18	18	18	18	18	18	18	18	18	18	18
Fertilizer	38	56.25	56.25	56.25	56.25	56.25	56.25	56.25	56.25	56.25	56.25	56.25
Equipment (Depr.)	20	20	20	20	20	20	20	20	20	20	20	20
Other (postharvest)								4.5	5	6	6	6
Interest	7.44	7.44	7.44	7.44	7.44							
Total	196.44	105.19	105.19	101.69	101.69	94.25	94.25	98.75	99.25	100.25	100.25	100.25
Net Revenue	-196.44	-105.19	-35.19	38.31	178.31	325.75	465.75	531.25	600.75	739.75	739.75	739.75
Net Revenue/Day	(\$6.55)	(\$5.84)	(\$1.30)	\$1.37	\$6.86	\$9.58	\$11.94	\$11.07	\$11.33	\$12.98	\$12.98	\$12.98

acre. This is an increase of 400 pounds over the maximum expected yield associated with the low-input alternative. The pesticide and fertilizer costs are taken from the recommended rates and costs published by the TRDP and increased somewhat to reflect application rates used by the accelerated cocoa project and Hummingbird Hershey Ltd. It is also assumed that the Table 5A grower purchases additional equipment (a backpack sprayer) and this sprayer is depreciated over five years using straight-line depreciation. This entry could also be considered a cash cost for renting a sprayer. Interest is calculated at a rate of 12 percent of cash costs above those expected to be covered by the typical farmer, in this case cash costs above what the low-input producer uses.

Again, negative returns are realized in the first three years. These values are quite high relative to the annual cash income of Mayan farmers in Toledo. Without available credit, equity will be needed to adopt the high-input cocoa option. Positive net returns are earned in the fourth year with the high-input option, the same pattern as with the low-input option. In years 10-12, the net return per day of labor is two and a half times the present opportunity cost of labor.

There is a high degree of uncertainty concerning the cocoa technology which will be adopted by the Mayan farmer. The hybrid cocoa established in Toledo in the last two years has followed the low-input alternative sometimes with even less inputs applied. In fact, some farmers have used less labor than recommended amount in Table 5A by not underbrushing the entire area to be planted but instead planting the cocoa trees along a cleared eight foot strip in the bush and letting the existing vegetation serve as shade for the young trees. TRDP has found through their experiments that this planting technique may be a viable option for the farmer. In addition, most of the Mayan producers have not used fertilizer on their trees. But it is important to remember that these same producers have purchased seeds, plastic bags and Furadan to establish their nurseries which was radical behavior compared to their traditional management practices. Therefore, as cash income begins to grow in the fourth and fifth years, the cocoa producers may begin to shift to more input-intensive production methods.

102

Reduction in Post-Harvest Losses:

The climatic environment in Toledo makes it difficult to store commodities. High humidity and insect damage reduce the value of the harvested crops. The climatic environment and post-harvest losses are discussed in detail in the technical and environmental analysis of this project paper. This section attempts to place an economic value on the reduction in post-harvest losses which can be realized through appropriate handling and storage practices.

TRDP has estimated that 40-60 percent of the corn crop is lost due to mold and insects. Some of this damaged grain is fed to pigs but a large percentage is completely lost. The economic impact of reducing post-harvest losses can be approximated using the cost and return figures used to develop Table 1. Suppose the farmer experiences a loss equal to 40 percent of production. Instead of realizing a net return per acre of \$112.00, the value of the crop declines to \$67.00. Now suppose that through appropriate storage and handling practices these losses can be reduced to 20 percent. Crop value is now \$90.00 which is a \$23.00 increase over the 40 percent post-harvest loss case. Growers should be willing to invest some cash in adopting technologies for reducing post-harvest losses given these incremental returns.

Two crops of red kidney beans are produced in the milpa farming system because of the difficulty in storing beans for even relatively short periods of time. The first red kidney bean crop is produced for seed to sow the January crop. Harvested beans from the January crop (harvested and marketed in March and April) cannot be stored economically for nine months. Weevils and mold attack the beans stored in plastic containers and reduce the value of the beans as food and as seed. By efficiently storing a portion of the major bean crop, the first bean crop could be eliminated from the cropping pattern and the labor days saved could be applied to corn and cocoa production.

Financial Profitability:

Capital budgeting techniques are normally used to project the financial profitability of an investment. Net cash flows attributed to the project are discounted using the opportunity cost of capital to arrive at the present value of the proposed investment. Or, the present value of the net cash flows can be set equal to zero and the internal rate of return of the investment can be calculated. This latter technique generates a number that can be compared to market interest rates to determine the desirability of the investment.

The net cash flows attributable to an investment are calculated by comparing the cash flow with and without the investment. For this analysis it was assumed that a Mayan farmer with the cropping pattern presented in Table 1 decides to plant cocoa. The appropriate net cash flows are generated by subtracting the net returns to the farm without the new investment with the net returns to the farm with cocoa production. These net returns represent the negative or positive return attributable to the investment in each year of the planning period which is assumed to be 12 years for this analysis.

Table 6A presents the data for calculating the internal rate of return for the cocoa investment using low-input production practices. The grower plants one acre of cocoa the first year, an additional acre in the second year and two more acres in the fifth year. This adoption process seems to be typical among the Mayan growers with only a strong commitment made to the crop after surplus cash is generated from the initial planting. Cocoa yields are adjusted for this phased planting and costs of production are calculated based on the age of each set of trees. Total net revenues with and without the project are calculated for two scenarios: no post-harvest losses and with post-harvest losses (PHL). As before, the reduction in PHL is assumed to be a reduction from 40 percent to 20 percent in corn and the elimination of the first red kidney bean crop.

Net benefits to the project are higher for the reduction in PHL scenario because of the net crop savings associated with the important main season corn crop. One important observation is that in the PHL scenario net cash flows are positive in the third year instead of the fourth year. This implies that cocoa production combined with a reduction in PHL may generate a positive cash flow earlier than only planting cocoa. Therefore these two activities are complementary in an economic sense.

The internal rates of return are 53 percent and 79 percent for the no PHL and the PHL scenarios respectively. These high rates are not uncommon among high-value tree crops when the planning horizon is over ten years. Most orchard crops such as pecans, pistachios, and citrus as well as wine grapes generate a cash-flow profile similar to cocoa. If the planning horizon were reduced to five years this investment would not be profitable.

Table 6A - The results for the high-input option are presented in Table 6B. The high-input alternative is less profitable over the given planning horizon. Rates of return of 42 percent and 55 percent are generated for the non-PHL and PHL options.

Table 6A : Internal Rate of Return for Cocoa Adoption

Low-Input Production	YEAR											
	1	2	3	4	5	6	7	8	9	10	11	12
Acres of Cocoa	1	2	2	2	4	4	4	4	4	4	4	4
Cocoa Yield Per Acre												
Year 1 Crop(1 acre)	0	0	0	100	200	400	600	800	800	800	800	800
Year 2 Crop(1 acre)	0	0	0	0	100	200	400	600	800	800	800	800
Year 5 Crop(2 acres)	0	0	0	0	0	0	0	100	200	400	600	800
Total Production	0	0	0	100	300	600	1000	1600	2000	2400	2800	3200
Gross Revenue from Cocoa@price \$0.70	0	0	0	70	210	420	700	1120	1400	1680	1960	2240
Less Costs of Production	0											
Year 1 Crop(1 acre)	127	35.75	35.75	32.25	32.25	32.25	32.25	32.25	32.25	32.25	32.25	32.25
Year 2 Crop(1 acre)	0	127	35.75	35.75	32.25	32.25	32.25	32.25	32.25	32.25	32.25	32.25
Year 5 Crop(2 acre)	0	0	0	0	254	71.5	71.5	64.5	64.5	64.5	64.5	64.5
Total Costs	127	162.75	71.5	68	318.5	136	136	129	129	129	129	129
Net Revenue from Cocoa Production	-127	-162.75	-71.5	2	-108.5	284	564	991	1271	1551	1831	2111
Net Revenue Main Season Corn	560	560	560	560	560	560	560	560	560	560	560	560
Net Revenue Matahambre Corn	108	108	108	108	108	108	108	108	108	108	108	108
Net Revenue Upland Rice	298	298	298	298	298	298	298	298	298	298	298	298
Net Revenue Red Kid. Beans #1	60	60	60	60	60	60	60	60	60	60	60	60
Net Revenue Red Kid. Beans #2	101.25	101.25	101.25	101.25	101.25	101.25	101.25	101.25	101.25	101.25	101.25	101.25
Total Net Revenue with the Project												
cocoa/no P.H.Losses	1000.25	964.5	1055.75	1129.25	1018.75	1411.25	1691.25	2118.25	2398.25	2678.25	2958.25	3238.25
cocoa with PHL (20%)	806.65	770.9	862.15	935.65	825.15	1217.65	1497.65	1924.65	2204.65	2484.65	2764.65	3044.65
Total Net Revenue without the Project												
no cocoa/no P.H.Losses	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25
no cocoa with PHL (40%)	860.05	860.05	860.05	860.05	860.05	860.05	860.05	860.05	860.05	860.05	860.05	860.05
Net Benefits to the Project												
cocoa/no P.H.Losses	-127	-162.75	-71.5	2	-108.5	284	564	991	1271	1551	1831	2111
cocoa with PHL (20%)	-53.40	-89.15	2.10	75.60	-34.90	357.60	637.60	1064.60	1344.60	1624.60	1904.60	2184.60
Internal Rate of Return												
cocoa/no P.H.Losses	0.531965											
cocoa with PHL (20%)	0.788119											

105

This result is somewhat misleading since it might lead the grower to conclude that the low-input option is the better investment. In the long run (15+ years) the high-input option will be the superior investment because of the yield advantage over the low-input option relative to the production costs.

A sensitivity analysis was performed in order to gain an understanding of the effect price variability has on financial profitability. Only downside price movements were analyzed because this is the most important risk to the grower. From Table 7 it can be concluded that significant reductions in prices will not make the cocoa investment unprofitable. Relative high rates of return are realized at \$.40 per pound (B\$.80). However, lower prices will discourage adoption because of the additional lag in generating positive cash flows, particularly with the low-input option. The high-input option, because of its higher and more timely yields, will be protected to a relative degree from adverse price movements but will still have high cash costs in the early years.

Financial Feasibility:

Financial profitability and financial feasibility are not synonymous concepts. The proposed cocoa investment is profitable from the individual grower's perspective. However, the financial feasibility is on a more precarious footing due to the cash demands in the early years of the investment. The grower must obtain cash in order to become a cocoa producer. This can be done either through existing cash resources or money can be borrowed to finance the inputs until the cocoa trees begin to produce a marketable crop. This latter approach is the technique being used in the Accelerated Cocoa Project in the Cayo District. The Development Finance Corporation (DFC) serves as the credit institution, loaning money at 12 percent interest to cocoa producers. These loans have a four-year grace period and a 12 year repayment period.

The Mayan farmers in the Toledo District who have planted cocoa have relied solely on their cash resources to finance inputs (seed, plastic bags, pesticide). No loans have been made by the DFC for cocoa. In fact, as is discussed in the social soundness analysis, the Mayan farmers are adverse to using credit in agricultural production. Also, the repayment history of Toledo farmers has been poor in previous and existing DFC and Ministry of Agriculture loan programs.

106

Table 6B : Internal Rate of Return for Cocoa Adoption

High-Input Production	YEAR											
	1	2	3	4	5	6	7	8	9	10	11	12
Acres of Cocoa	1	2	2	2	4	4	4	4	4	4	4	4
Cocoa Yield Per Acre												
Year 1 Crop(1 acre)	0	0	100	200	400	600	800	900	1000	1200	1200	1200
Year 2 Crop(1 acre)	0	0	0	100	200	400	600	800	900	1000	1200	1200
Year 5 Crop(2 acres)	0	0	0	0	0	0	100	200	400	600	800	900
Total Production	0	0	100	300	600	1000	1600	2100	2700	3400	4000	4200
Gross Revenue From Cocoa: Price \$0.70	0	0	70	210	420	700	1120	1470	1890	2380	2800	2940
Less Costs of Production												
Year 1 Crop(1 acre)	196.44	105.19	105.19	101.69	101.69	94.25	94.25	98.95	99.25	100.25	100.25	100.25
Year 2 Crop(1 acre)	0	196.44	105.19	105.19	101.69	101.69	94.25	94.25	98.95	99.25	100.25	100.25
Year 5 Crop(2 acres)	0	0	0	0	392.88	210.38	210.38	203.38	203.38	188.5	188.5	197.9
Total Costs	196.44	301.63	210.38	206.88	596.26	406.32	398.88	396.58	401.58	388	389	398.4
Net Revenue from Cocoa Production	-196.44	-301.63	-140.38	3.12	-176.26	293.68	721.12	1073.42	1488.42	1992	2411	2541.6
Net Revenue Main Season Corn	560	560	560	560	560	560	560	560	560	560	560	560
Net Revenue Malahambre Corn	108	108	108	108	108	108	108	108	108	108	108	108
Net Revenue Upland Rice	298	298	298	298	298	298	298	298	298	298	298	298
Net Revenue Red Kid. Beans #1	60	60	60	60	60	60	60	60	60	60	60	60
Net Revenue Red Kid. Beans #2	101.25	101.25	101.25	101.25	101.25	101.25	101.25	101.25	101.25	101.25	101.25	101.25
Total Net Revenue with the Project												
cocoa/no P.H.Losses	930.81	825.62	986.87	1130.37	950.99	1420.93	1848.37	2200.67	2615.67	3119.25	3538.25	3668.85
cocoa with PHL (20%)	737.21	632.02	793.27	936.77	757.39	1227.33	1654.77	2007.07	2422.07	2925.65	3344.65	3475.25
Total Net Revenue without the Project												
no cocoa/no P.H.Losses	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25	1127.25
no cocoa with PHL (40%)	860.05	860.05	860.05	860.05	860.05	860.05	860.05	860.05	860.05	860.05	860.05	860.05
Net Benefits to the Project												
cocoa/no P.H.Losses	-196.44	-301.63	-140.38	3.12	-176.26	293.68	721.12	1073.42	1488.42	1992	2411	2541.6
cocoa with PHL (20%)	-122.84	-228.03	-66.78	76.72	-102.66	367.28	794.72	1147.02	1562.02	2065.6	2484.6	2615.2
Internal Rate of Return												
cocoa/no P.H.Losses	0.424366	0										
cocoa with PHL (20%)	0.546754											

101

Table 7

Internal Rate of Return for Milpa Farming with
Low-Input and High-Input Cocoa Production
Under Alternative Cocoa Prices (12 Year Planning Horizon)

	<u>Cocoa Price</u>			
	<u>(US\$ Per Pound at Hershey)</u>			
	<u>.40</u>	<u>.50</u>	<u>.60</u>	<u>.70</u>
<u>Low-Input Production</u>				
Cocoa no/postharvest losses	.39	.44	.49	.53
Cocoa w/postharvest losses (20%)	.60	.67	.73	.79
<u>High-Input Production</u>				
Cocoa no/postharvest losses	.23	.30	.37	.42
Cocoa w/postharvest losses (20%)	.32	.41	.48	.55

1/82

Nevertheless, credit may prove to be an important development component if Toledo is to become a commercially viable cocoa production region. Increased fertilization is a profitable economic decision over the long run because of the favorable yield impact per dollar cost of fertilizer. Some Mayan farmers are slowly beginning to understand the importance of fertilizer for improving their trees' productivity. As a result, a credit program should be phased in to the cocoa promotion effort and designed and scaled to the social realities of the target group.

Renovation of the Big Falls Rice Mill:

The processing, storage and marketing of rice is an important economic activity in the Toledo District. By supplying approximately 60 percent of the rice for Belize, the Big Falls mill plays a critical economic role both locally and nationally. The problems and proposed solutions of the rice milling operation are discussed in detail in other sections of the project paper. Of interest for this analysis is the estimated payback period for the proposed renovation costs.

During the last six crop years the Big Falls mill has milled an average of 3,903,376 pounds of paddy rice. The yield from the milling process has been an average of approximately 2,395,292 pounds. These figures translate into an average milling yield of 61.4 percent (Source: Food and Feed Grain Institute, Kansas State University). Estimates are that an investment of \$150,000 for a clipper and several classifiers, combined with some technical assistance and training, would raise the milling yield by between 4 and 8 percentage points to between 65.4 and 69.4 percent. This would put the Big Falls mill into the normal efficiency range for a rice mill of 65 to 70 percent. A seven percentage point increase in milling yield would produce an additional 273,236 pounds of rice. If this rice is valued at the Belize Marketing Board support price of \$10.00 per hundredweight, the value of this rice to the Board is valued at \$27,324.00. The payback period on the \$150,000.00 investment would be a little over five years which is a reasonable period for a capital investment of this nature.

Toledo Agricultural Service Center:

The Toledo District lacks a dependable source of agricultural inputs, particularly inputs such as pesticides and fertilizer.

109

The proposed Center will fill this void by providing the necessary inputs that cocoa and rice producers need. The Center also will provide technical assistance and training to cocoa producers at the Center and in the field. A mobile sales/delivery system of agricultural inputs may originate from the Center and travel to the villages in area. Of particular concern for this analysis is the projected demand for the Center's products.

Table 8 presents the estimated number of farmers who will adopt cocoa production as a direct result of the proposed project. Fifty new producers are added in each of the first three years. In the fourth year of the project existing cocoa plantings will begin producing relatively large quantities of beans which will be sold for cash. It is expected that this demonstration effect will induce more farmers to plant cocoa. Therefore, in years four and five 100 and 150 farmers respectively plant cocoa. The adoption rate declines in the following years to five percent per year. This rate of adding new producers follows the typical logistical curve for adoption of new technologies in other areas of the world.

Not all growers will plant just two or four acres of cocoa. Depending on their economic and labor profiles, some farmers may only plant two acres while others may plant twenty or more acres over the life of the project. In order to project the demand for inputs, it was assumed that 50 percent of the adopters plant two acres, 40 percent plant six acres of cocoa and 10 percent plant 20 acres of cocoa. These projected weights are only educated guesses but they do generate a conservative estimate of cocoa acreage. In addition, it was assumed that 80 percent of the new cocoa was low-input cocoa and 20 percent was high-input cocoa.

The total acres of low- and high-input trees by tree age was multiplied by the estimated cash input costs in Table 5 to obtain total cocoa-related sales. Rice-related sales were estimated by multiplying the \$11.00 per acre cost of herbicide by the number of rice acres in the Toledo District. This estimate of total Center sales is conservative because it does not account for citrus production or potential input demand by corn and bean producers.

As noted in Table 8, net income for the Center starts at a low level and gradually grows for three to four years. By year five the Center is generating enough "profit" to cover the Table 8 costs of its staff and operating expenses. Potential credit demand is calculated for the project by multiplying projected input sales by a percentage of the producers. Over \$68,000.00 of credit will be demanded in the fifth year of the project if 50 percent of the adopters use borrowed funds. The figures assume that hybrid seeds are purchased by the grower with his own money. The sales and credit values would be considerably higher if the Center sells and finances seed.

	YEAR											
	1	2	3	4	5	6	7	8	9	10	11	12
Cocoa Adopters	50	100	150	250	400	420	441	463	486	511	536	56
Acres Attributable to Project	270	540	810	1350	2160	2268	2301	2500	2625	2757	2855	303
Percent Low-Input Acres	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent High-Input Acres	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Acres (Total)	420	690	960	1500	2310	2418	2531	2650	2775	2906	3044	318
10+ Year Trees	50	50	50	50	50	50	50	100	150	420	670	960
9 Year Trees	0	0	0	0	0	0	50	50	270	270	270	540
8 Year Trees	0	0	0	0	0	50	50	270	270	270	540	810
7 Year Trees	0	0	0	0	50	50	270	270	270	540	810	1080
6 Year Trees	0	0	0	50	50	270	270	270	540	810	1080	1350
5 Year Trees	0	0	50	50	270	270	270	540	810	1080	1350	1620
4 Year Trees	0	50	50	270	270	270	540	810	1080	1350	1620	1890
3 Year Trees	50	50	270	270	270	540	810	1080	1350	1620	1890	2160
2 Year Trees	50	270	270	270	540	810	1080	1350	1620	1890	2160	2430
1 Year Trees	270	270	270	540	810	1080	1350	1620	1890	2160	2430	2700
Projected Ag. Center Sales												
Cocoa Sales												
10+ Year Trees	\$2,233	\$2,233	\$2,233	\$2,233	\$2,233	\$2,233	\$2,233	\$4,465	\$6,698	\$18,753	\$30,807	\$42,861
9 Year Trees	\$0	\$0	\$0	\$0	\$0	\$0	\$2,233	\$2,233	\$12,056	\$12,056	\$12,056	\$24,111
8 Year Trees	\$0	\$0	\$0	\$0	\$0	\$2,233	\$2,233	\$12,056	\$12,056	\$12,056	\$24,111	\$26,167
7 Year Trees	\$0	\$0	\$0	\$0	\$2,233	\$2,233	\$12,056	\$12,056	\$12,056	\$24,111	\$26,167	\$4,822
6 Year Trees	\$0	\$0	\$0	\$2,233	\$2,233	\$12,056	\$12,056	\$12,056	\$24,111	\$36,167	\$4,822	\$5,045
5 Year Trees	\$0	\$0	\$2,233	\$2,233	\$12,056	\$12,056	\$12,056	\$24,111	\$36,167	\$4,822	\$5,045	\$5,313
4 Year Trees	\$0	\$2,233	\$2,233	\$12,056	\$12,056	\$12,056	\$24,111	\$36,167	\$4,822	\$5,045	\$5,313	\$5,581
3 Year Trees	\$2,233	\$2,233	\$12,056	\$12,056	\$12,056	\$24,111	\$36,167	\$4,822	\$5,045	\$5,313	\$5,581	\$5,849
2 Year Trees	\$2,233	\$12,056	\$12,056	\$12,056	\$24,111	\$36,167	\$4,822	\$5,045	\$5,313	\$5,581	\$5,849	\$6,117
1 Year Trees	\$14,013	\$14,013	\$14,013	\$28,026	\$42,039	\$5,605	\$5,885	\$6,180	\$6,489	\$6,813	\$7,154	\$7,511
Total Cocoa-Related Sales	\$20,711	\$32,766	\$44,822	\$70,890	\$109,014	\$108,747	\$113,849	\$119,187	\$124,811	\$130,717	\$136,707	\$143,421
Total Rice-Related Sales (2500A)	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500
Total Projected Sales	\$48,211	\$60,266	\$72,322	\$98,390	\$136,514	\$136,247	\$141,349	\$146,689	\$152,311	\$158,217	\$164,497	\$170,921
Cost of Goods Sold (85%)	\$40,779	\$51,226	\$61,473	\$83,632	\$116,037	\$115,810	\$120,147	\$124,686	\$129,465	\$134,484	\$139,745	\$145,281
Net Income	\$7,232	\$9,040	\$10,848	\$14,759	\$20,477	\$20,437	\$21,202	\$22,003	\$22,847	\$23,733	\$24,661	\$25,639
Potential Credit Demand												
75% of Total Sales	\$36,158	\$45,200	\$54,241	\$73,793	\$102,386	\$102,185	\$106,012	\$110,017	\$114,233	\$118,663	\$123,395	\$128,191
50% of Total Sales	\$24,105	\$30,133	\$36,161	\$49,195	\$68,257	\$68,123	\$70,675	\$73,344	\$76,156	\$79,108	\$82,203	\$85,446
25% of Total Sales	\$12,053	\$15,067	\$18,080	\$24,598	\$34,129	\$34,062	\$35,337	\$36,672	\$37,078	\$39,554	\$41,102	\$42,719

ECONOMIC ANALYSIS

Introduction:

Private and social profitability are not interchangeable concepts from an economic standpoint. Private profitability considers the costs and returns, primarily cash, associated with a project from an individual's point of view. The prices used in this analysis are the prices actually paid for outputs and inputs. Social profitability is an aggregated analysis which compares the social benefits and costs associated with the project. Benefits and costs are valued at the opportunity cost of the items in question. These prices then reflect the true social profitability of the project.

The prices used in both the private and social analyses would be identical in an open, free-market economy. However, most countries subsidize their agricultural producers, consumers and businesses to some degree. The economic analysis attempts to value goods and services at their true economic value and not at their distorted value. Economic development projects may have a positive economic impact on an individual farmer but represent an unprofitable decision from the society's perspective. Cost-benefit analysis is the traditional analytical technique for measuring social profitability.

Shadow Prices:

The Government of Belize (GOB) is actively involved in supporting agricultural commodity prices through the activities of the Belize Marketing Board. The Food and Feed Grain Institute of Kansas State University has documented the past and present impact of GOB price-support policies. Authority to import agricultural chemicals and fertilizers also is vested in select businesses in Belize City and these prices may be higher than the prices farmers would pay if their would be more competition in the wholesaling sector.

Belizean food policy supports corn, bean and rice prices at close to twice the world market price. These high prices encourage illicit border trade with Guatemala and Mexico. An over or undervalued exchange rate can also distort relative prices within and outside the country. Belize has a fixed (B\$2=US\$1) exchange rate which may over value the local currency relative to a floating rate.

11/2

For the present analysis, corn, beans and rice were valued at \$.06, \$.24, and \$.06 per pound respectively. Agricultural labor was valued at \$5.00 per day and land was valued at \$1 per acre per year which is the lease rate for land managed by the GOB's Lands Department. Capital markets were assumed to be efficient so no adjustment was made in interest rates. These prices were substituted into the crop budgets in Attachment 1 to obtain costs and returns for each crop.

Table 9 presents the results of the economic analysis. Costs and returns associated with cocoa production again are related to the rate of adoption and the age of the trees. Benefits from reducing PHL and increasing the efficiency of the Big Falls rice mill are also included. These aggregated benefits and costs are totaled for each year and discounted at the social opportunity cost of capital. A ratio of discounted benefits to discounted costs is computed with a ratio greater than one reflecting a social profitable project.

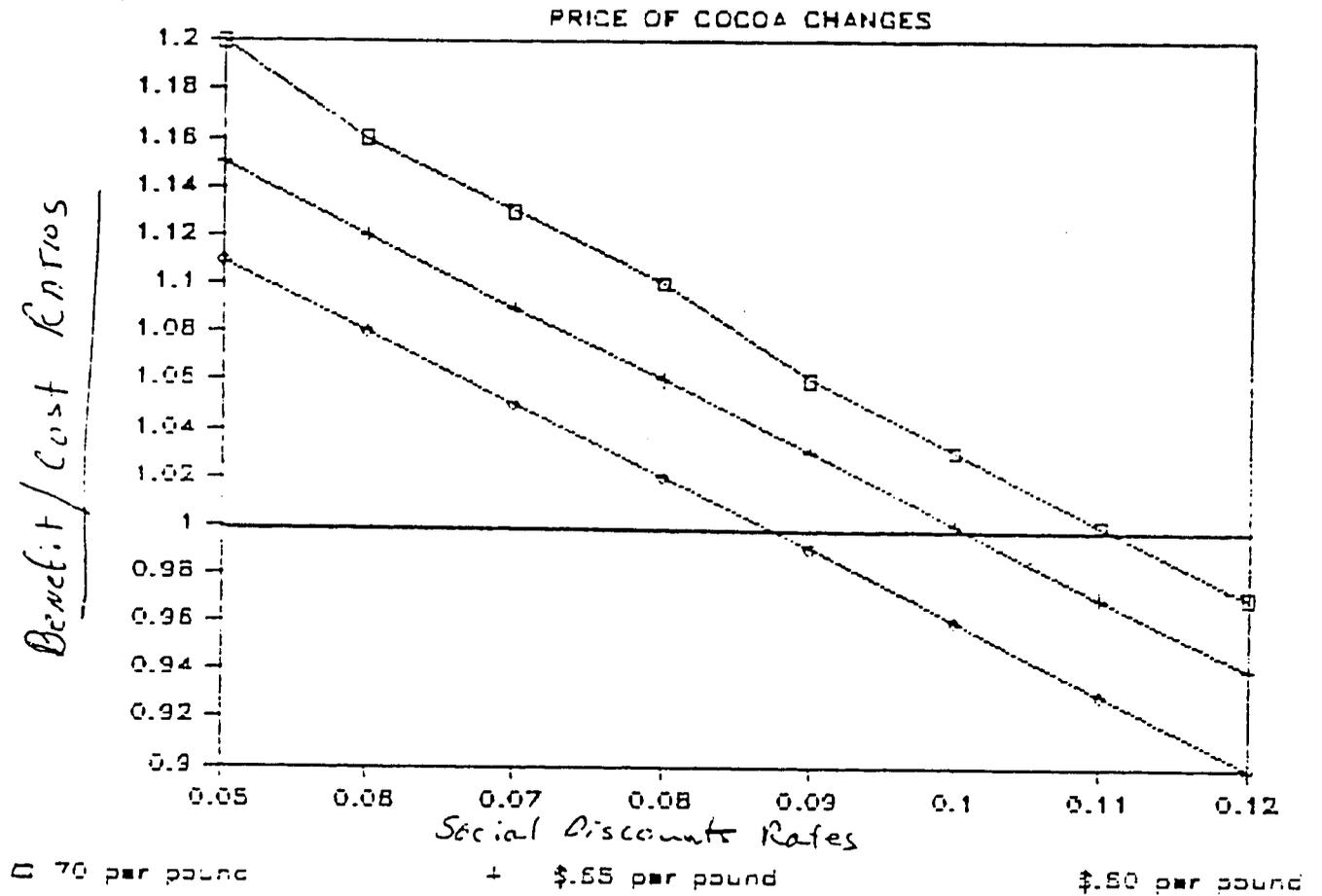
The results of the economic analysis are as follows:

Social Discount Rate	\$.05	.08	.10	.11
Benefit - Cost Ratio	\$ 1.20	1.10	1.03	1.00

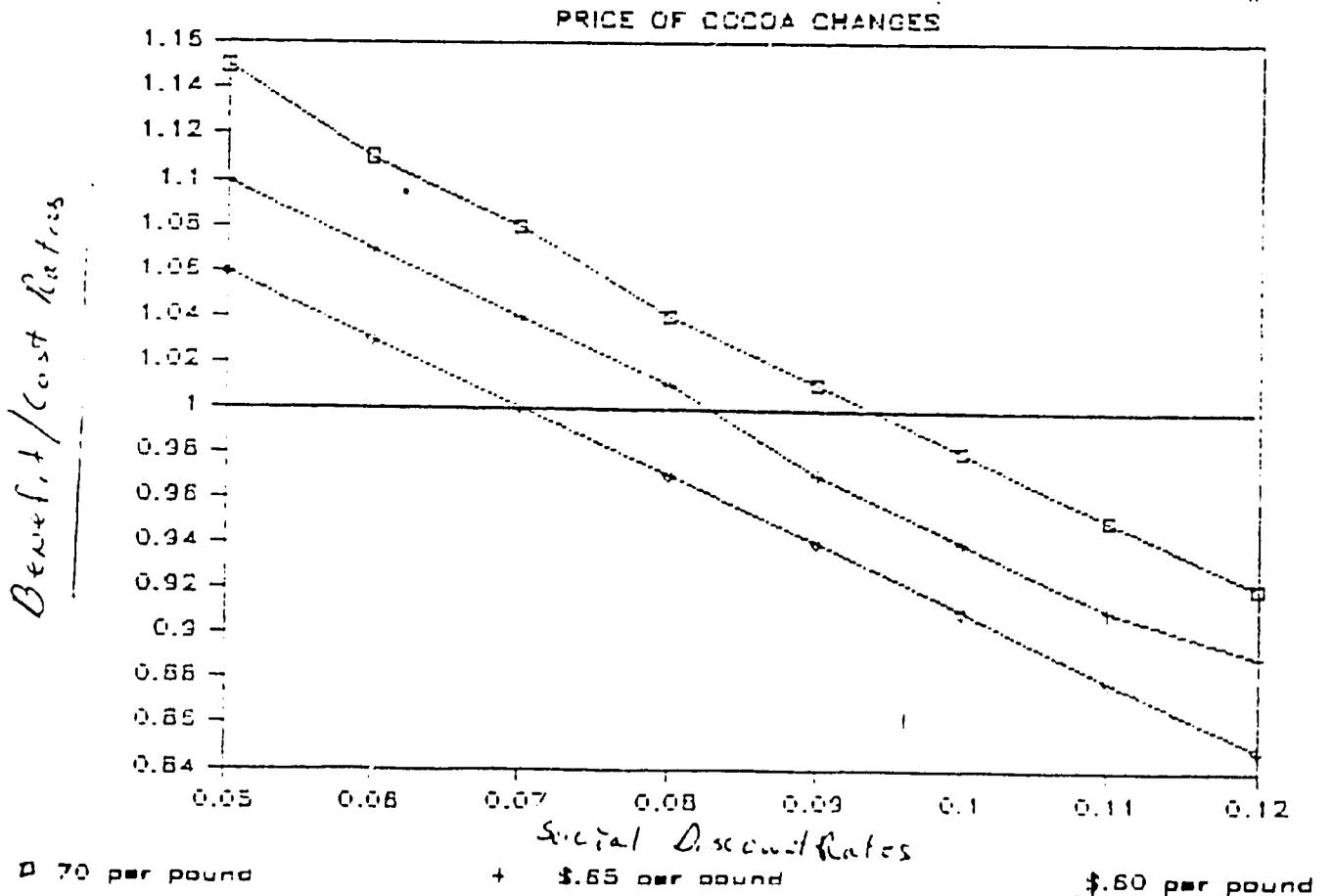
The proposed project has a benefit-cost ratio greater than or equal to one for each of the selected discount rates. These results imply that the project is socially profitable even with high internal support prices. The proposed project should be considered as a viable development effort under the given assumptions.

	1	2	3	4	5	6	7	8	9	10	11	12
Cocoa Adapters	50	100	150	250	400	420	441	465	486	511	526	563
Increase Attributable to Project	270	540	810	1250	2160	2268	2381	2500	2625	2757	2895	3039
Percent Low-Input Acres	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Percent High-Input Acres	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Acres (Total)	270	540	810	1250	2160	2268	2381	2500	2625	2757	2895	3039
10+ Year Trees	0	0	0	0	0	0	0	0	0	270	540	810
9 Year Trees	0	0	0	0	0	0	0	0	0	270	540	810
8 Year Trees	0	0	0	0	0	0	0	0	270	540	810	1080
7 Year Trees	0	0	0	0	0	0	0	270	540	810	1080	1350
6 Year Trees	0	0	0	0	0	270	540	810	1080	1350	1620	1890
5 Year Trees	0	0	0	0	270	540	810	1080	1350	1620	1890	2160
4 Year Trees	0	0	0	270	540	810	1080	1350	1620	1890	2160	2430
3 Year Trees	0	0	270	540	810	1080	1350	1620	1890	2160	2430	2700
2 Year Trees	0	270	540	810	1080	1350	1620	1890	2160	2430	2700	2970
1 Year Trees	0	270	540	810	1080	1350	1620	1890	2160	2430	2700	2970
Yield												
10+ Year Trees	0	0	0	0	0	0	0	0	0	237600	475200	712800
9 Year Trees	0	0	0	0	0	0	0	0	226800	453600	680400	917600
8 Year Trees	0	0	0	0	0	0	0	221400	442800	664200	885600	1123200
7 Year Trees	0	0	0	0	0	0	172800	345600	518400	691200	864000	1036800
6 Year Trees	0	0	0	0	112800	225600	338400	451200	564000	676800	789600	902400
5 Year Trees	0	0	0	0	64800	129600	194400	259200	324000	388800	453600	518400
4 Year Trees	0	0	0	32400	64800	97200	130000	162800	195600	228400	261200	294000
3 Year Trees	0	0	5400	10800	16200	21600	27000	32400	37800	43200	48600	54000
2 Year Trees	0	0	0	0	0	0	0	0	0	0	0	0
1 Year Trees	0	0	0	0	0	0	0	0	0	0	0	0
Total Production	0	0	5400	37800	102600	226800	457400	741960	1068220	1429660	1754620	1995620
Gross Revenue	0	60	93.780	125.460	171.820	215.760	260.180	319.372	374.754	430.090	485.226	541.134
Costs of Cocoa Production												
10+ Year Trees	0	0	0	0	0	0	0	0	0	976.640	1953.279	2929.919
9 Year Trees	0	0	0	0	0	0	0	0	975.536	1951.072	2926.608	3899.478
8 Year Trees	0	0	0	0	0	0	0	974.129	1948.257	2922.386	3892.511	4863.011
7 Year Trees	0	0	0	0	0	0	866.056	1732.111	2603.167	3474.222	4345.277	5216.332
6 Year Trees	0	0	0	0	852.826	1705.651	2558.477	3409.532	4260.587	5111.642	5962.697	6813.752
5 Year Trees	0	0	0	0	442.427	884.854	1327.281	1769.707	2212.134	2654.561	3096.987	3539.414
4 Year Trees	0	0	0	324.727	649.454	974.181	1300.907	1627.634	1954.361	2281.087	2607.814	2934.541
3 Year Trees	0	0	540.922	1081.844	1622.766	2163.688	2704.610	3245.532	3786.454	4327.376	4868.298	5409.220
2 Year Trees	0	671.492	1342.984	2014.476	2685.968	3357.460	4028.952	4700.444	5371.936	6043.428	6714.920	7386.412
1 Year Trees	671.250	1342.500	2013.750	2685.000	3357.000	4028.500	4700.000	5371.500	6043.000	6714.500	7386.000	8057.500
Total Costs	671.250	1342.742	2013.664	2685.441	3357.811	4028.801	4700.051	5371.216	6043.582	6714.631	7386.962	8057.685
Benefits from Reducing Post-Harvest Losses	448,050	896,120	1,344,180	1,792,240	2,240,300	2,688,360	3,136,420	3,584,480	4,032,540	4,480,600	4,928,660	5,376,720
Reduced Costs at Big Falls Rice Mill (Benefits)	627,324	627,324	627,324	627,324	627,324	627,324	627,324	627,324	627,324	627,324	627,324	627,324
Project Costs (not including credit)	671,250	1,342,742	2,013,664	2,685,000								
Total Social Benefits Present Value of Benefits	671,250	1,342,742	2,013,664	2,685,000	3,357,000	4,028,500	4,700,000	5,371,500	6,043,000	6,714,500	7,386,000	8,057,500
Total Social Costs Present Value of Costs	671,250	1,342,742	2,013,664	2,685,000	3,357,811	4,028,801	4,700,051	5,371,216	6,043,582	6,714,631	7,386,962	8,057,685
Benefit/Cost Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Social Discount Rate	0.10											

TAMP SENSITIVITY ANALYSIS AT COST=\$2.5



TAMP SENSITIVITY ANALYSIS AT COST=\$2.7



TOLEDO AGRICULTURAL MARKETING PROJECT

LOTUS WORKSHEET FILES (.WKS) USED TO GENERATE FINANCIAL AND ECONOMIC ANALYSIS:

MILPA	Attachment 1 - Traditional Milpa Whole-Farm Budgets for corn, matahambre corn, upland rice, etc.
TKCOCOA	Tables 5A and 5B, Cocoa Enterprise Budgets for Low and High Input Production (per acre).
TKIRR	Tables 6A and 6B, Internal Rates of Return for Cocoa Production, Low and High inputs.
TKEXPAND	Table 8, Projected Input Sales and Credit Demand for Agricultural Service Centers.
TKECCOCO	Same as TKCOCOA except that labor, land costs were added to compute ECONOMIC production costs.
TKMILPA	Same as MILPA (Attachment 9) except it was modified to allow change in prices of crops easier than what Wilson designed.
TKSENSGR	Data from Table 9 (TKECON) to develop sensitivity analysis and to produce three graphs. Graphs are saved on this worksheet.

11/1

SOCIAL SOUNDNESS ANALYSIS

1. Introduction

This social soundness analysis is divided into sections relating to each of the major project components. For each component the analysis considers the target groups to be affected, a number of specific social issues raised by the component, and where relevant, an analysis of institutional issues. Finally, recommendations are offered for dealing with social impacts of the project. At the time this analysis was written, many specific aspects of the project remain undefined. A general discussion is therefore offered of some of the options open in project design.

1.1 General Discussion of Toledo and the Target Groups: Toledo is the least developed area of Belize. It has historically been isolated from the rest of the country because of distance and poor transportation infrastructure. Historically the area has served as a refuge region for Garifuna and Maya from neighboring countries, filling the void left when the indigenous Chol Maya inhabitants were eliminated by the Spanish in the 17th century. The Garifuna arrived in the early 1800s, working in logging camps and settling the coastal zone, where they continue to practice small scale subsistence farming, fishing, and migratory wage labor. The Mopan Maya entered as refugees in 1889 from San Luis in Guatemala and established several settlements in the northern hill zone (including the large village of San Antonio) where they remain today. The Kekchi Maya, a distinct mayan group with a language very different from Mopan, were first brought into the district as plantation workers at about the same time. The Cramer estate, where they worked, produced large amounts of coffee, cacao, rubber, plantains, nutmeg, allspice and other crops during the period from 1890 to 1914. When the plantation closed down, the laborers dispersed and founded small subsistence farming communities in the southern half of the district, usually on a watercourse close to limestone hills. Other Kekchi immigrants from Guatemala entered voluntarily, settling edge-of-hills villages in an arc to the south and east of the Mopan uplands between the 1890s and the 1930s. Kekchi migration into Belize has continued, with a large influx in the 1970s. These people moved mainly into the northern zone along the northern highway, and they have been joined there by migrants from the southern part of the district who have been seeking better access to markets, government services and other

infrastructure. The area along the southern highway north of Dump has been a major growth area for population, and some Mopan and Kekchi have even moved northwards out of the Toledo District into Stann Creek in search of land and markets for their crops.

The other major population groups in Toledo are the Creole population that is concentrated in Punta Gorda town on the coast, where they work in commercial establishments and for government. Along the highway west from Punta Gorda there are many East Indian small farmers who first entered the district as indentured laborers on small sugar plantations in the 1860s and 1870s. Today they are merchants, truckers, wage laborers, and mixed farmers, who grow a good deal of mechanized lowland rice, keep cattle and have subsistence plots. One final addition to Toledo's unique ethnic mix are several hundred 'Spanish' mestizo farmers who came to Toledo from Honduras in the 1920s, and settled on the outskirts of the Kekchi village of San Pedro Columbia in the northern zone. They still form a cohesive and distinct community with several hundred members, though there has been intermarriage with the Indians.

The present ethnic composition of the district is depicted in table 1, the data taken from the 1930 census and TRDP estimates. It is important to note that the rural population of Toledo comprises 80 percent of the population, a far higher proportion than in the rest of the country, where the balance is closer to 50/50.

These census figures probably under represents the total number of Kekchi present in the district today. When census errors and continuing immigration are taken into account the total number should probably be inflated to 4400, and the Mopan population enlarged to 3200. Present population growth rates for the Indian population are about 3.0 percent per annum, and continuing rapid growth is to be expected.

1.2 Historical Patterns of Development:

Toledo has always been peripheral to the economy of Belize, but that does not make it an untouched wilderness. On the contrary, the area has been continuously exploited for over 150 years by means that have left behind little in the way of infrastructure or permanent improvement. Figure 2 is a time-line chart of the many economic activities that have taken place in Toledo over the years. Whenever opportunities for wage labor or cash crop export have been open, the Mopan, East

Table 1

Group	Year 1980	Population Percent of Total
Punta Gorda Town	2396	20
Rural Areas	9366	80
Creole	1400	11.9
East Indian	1012	8.6
Mopan Maya	2988	25.4
Kekchi Maya	3705	31.5
Garifuna	1494	12.7
Mestizo	694	5.9
White/Chinese/other	469	4.0
TOTAL	11762	100.0

Indian, Garifuna and Kekchi have taken advantage of them. When markets for bananas and other crops have been absent, or wage labor has been hard to find, farmers have returned to subsistence farming, selling pigs (fed on surplus corn) and small amounts of cacao in order to obtain the cash needed for basic household supplies.

The most recent economic activities are a product of government policies formulated in the 1950s to cut down on national food imports. The farmers of Toledo were encouraged to produce rice and red kidney beans, the staple foods of the urban population. The marketing board was established in Toledo in order to provide for the purchase, processing, and marketing of these products. In the northern portion of the district, where roads provide access to the marketing board, farmers have added these cash crops to their existing subsistence system. Rice has not

been an ideal cash crop because it competes for both land and labor with food crop production (rice is not eaten by most Kekchi and Mopan), being grown by the same slash and burn methods as the main wet season corn crop under the same time constraints. Red kidney beans also present a problem because of disease problems due to the high rainfall in the area; yields are very low and a separate seed multiplication crop is required in order to preserve the viability of seed.

In the southern part of the district, where all transport has been by river or footpath until very recently, rice has never become an important crop because of its low value per unit of weight. Instead, pigs were raised by primitive but efficient methods, and then walked to market. The declining demand for these small, low quality hogs has hurt farmers in the southern area and has driven them to seek alternative crops. Some beans are grown in the south, and there has always been a small, but steady production of cacao (an average of slightly less than an acre per household), some of which is consumed by the household, with the surplus sold to travelling Cobanero (Kekchi) traders from Guatemala. Copal incense is also gathered from wild trees for sale to Cobaneros.

1.3 Existing Social and Economic Conditions:

In general the farm population of Toledo is open to innovation and new cash crop opportunities. All except the Garifuna (who see farming mostly as a subsistence, preferring wage labor as a source of cash), have a good record of responding to markets in the past, showing a willingness to grow what they can sell. In general both Mopan and Kekchi hold a number of strong cultural values that affect their decisions about innovation and economic change. They have a very strong egalitarian ethic, being very wary of any change that might enhance social and economic differences between rich and poor. In general, action as a group is preferred over individual action, and this means that a consensus must be achieved (and that can be a time-consuming process that requires many meetings and discussions). Those who break with this ethical system, seeking to leave behind the constraints of the community and improve their own lot, can be ostracized and may have to leave a community. Innovation can therefore become a divisive issue unless it is approached very carefully.

The present estimated per capita income in Toledo is US \$175, but this includes the urban population. Average household incomes for the farming population are probably closer to US \$400 (less than \$100 per capita) in the northern zone near

the roadside, and about US \$100 in the southern and more remote areas. A number of studies assess the demand for basic and luxury goods among the Indian population (TRDP Final Workshop Report, Ann Osborn TRDP Report) and conclude that most farmers seek to increase their income. When farmers do have a larger cash income they tend to spend it on improved housing, imported food, and other consumer goods. Saving institutions are almost totally lacking in Toledo, and this makes it very difficult for farmers to save towards a long term goal. While some cash is available for re-investment in farming, the tendency is to spend cash from crop sales quickly, rather than to save it for crop inputs in the future.

The nutritional status of the Indian population is lower than in the rest of the country, with about 49 percent of children showing low degrees of malnutrition. Infant mortality rates are 66.5 per 1,000 (much higher in more remote areas), compared to the national average of between 20 and 40 per 1,000 (different authorities give different figures). Problems with nutrition may come about through decreasing diversity of diet attending the expansion of cash crop production, and because of the limited range of foodstuffs available for purchase in local shops. Heavy parasite loads due to poor sanitation practices are also a major problem.

Cultural and Social change has increased in rate in the last twenty years for the Mopan and Kekchi. The Mopan have had close contact with Belizeans and other outsiders, and have produced for the market for longer than the Kekchi, and in many ways present a more 'modern' appearance. Educational standards have also been higher in the Mopan and northern Kekchi areas for some time. Community institutions (for example, the annual cycle of Fiestas and the religious hierarchy of offices) have been weakened or have disappeared altogether, and village factionalism and political rivalry has increased. Nevertheless, the northern zone Mopan retain their own language and ethnic identity, and increasingly identify themselves as a separate and distinct ethnic group. The reservation system of landholding and the Alcalde system of elected rotating leadership have become important symbols of ethnic and community identity. A number of Mopan have become teachers, civil servants, and professionals. The northern area around the Mopan town of San Antonio is the economic center of farming in Toledo, and most educational, religious and government attention has been focussed there.

The southern portion of the district and the Kekchi population of the north has remained more closed to innovation, and has participated much less in the national economy and society. The Kekchi came to Belize mostly as refugees from an oppressive plantation economy in Guatemala where they had been deprived of most of their ancestral lands, and had been used as forced labor in a system very much like European serfdom. This legacy results in a more suspicious attitude towards outsiders and a mistrust of government authority. They tend to be slower to take up new economic enterprises, though communal and village institutions tend to be stronger and more coherent than among the Mopan. Traditional crafts, ancient religious beliefs, and social networks based on kinship are much more important among the Kekchi than among the Mopan.

The basic social unit for both Kekchi and Mopan is the household, consisting of a nuclear family and dependents. In the northern Kekchi villages these households often form themselves into small clusters based on kinship; a typical cluster is a married couple with young children, and the households of one or more married sons with their wives and children. These household clusters are important economic units, as the members cooperate daily in child care, food preparation, savings, care of domestic animals, and agricultural labor. The next larger important social unit is the agricultural labor group composed of men who work together regularly. Most agricultural tasks in the agricultural cycle are performed by these groups, working a day in each member's fields in rotation. Large villages may have as many as five of these groups with fairly stable membership, as the men in the group are usually related to each other. Both Mopan and Kekchi have a strong preference for work in such groups, and when the large group is not engaged, men will form smaller labor groups of three to eight for smaller tasks like planting root crops, weeding small fields, or building corn storage sheds. Each person in the group keeps track of how many days of work he owes each of the other members. The labor groups within the village often reflect the networks of kinship that tie the various households together into alliances and factions.

Other social units within the villages include religious groups (a number of protestant sects have converted the traditionally Catholic Indians in the last fifteen years), an informal council of elder males that discuss and debate important political and social issues, and the village football team, which includes most young males. Government is managed by a long-standing system of elected village leaders called *alcaldes*. Paid by the government, *Alcaldes* have authority to levy small fines, manage the land tenure system within the

122

reservation (settling disputes and deciding issues of rights and territory), and act as the spokesman for the village in its dealings with the government and outsiders. The Alcalde has an assistant and a few village policemen, but generally makes decisions by consensus during public meetings instead of acting autocratically. During the 1960s the government established elected village councils in a number of villages, intending to replace the Alcalde system. In some villages the councils remain active as a parallel structure, composed mainly of younger men that deal with community development projects, while in most communities the councils died out and the Alcalde system survived.

Both Kekchi and Maya society are marked by sharp gender divisions. Men and women have very different spheres of activity in day to day management of the household. Women prepare food, care for children during the day, gather wild foods in the forest, tend the livestock, and manage most of the household's cash income. Men undertake the main agricultural tasks of corn production, hunt, fish, and produce cash crops. Both women and men share in child care during the mornings and evenings, gather firewood, and tend the many minor food crops that are either interplanted with corn or kept in a permanent garden plot (the most important of which are plantains and cassava). A married couple considers the household to be a joint enterprise; they each consult with the other before making important decisions in their own spheres of authority, and they administer a common cash fund that is apportioned to household expenses. Men and women also have their own property and cash (that is not held in common) which they spend as they like and can leave to children of either sex upon their death.

In the public sphere there are even sharper divisions in roles, for men handle all significant contacts with outsiders except those having to do with children's health. Men, for instance, will handle the actual sale of a pig, even though the pig was raised by his wife, and he will later hand over the money to her. To outsiders it often appears that women have no power in the community, but this is far from true. Their power, however, exists in the private realm of kinship, the household, and village factions. Economically, women have suffered somewhat from the advent of rice cultivation. When pigs are a major source of cash, women have access to cash to spend on themselves and their children. They have much less claim to rice income however, and have less control over it, and their relative economic independence has suffered accordingly. Womens' lack of a public role in Kekchi and Mopan society is reinforced by the lack of any social groups or organizations that bring women together socially, economically, or

politically, outside of the family network. Women who do seek education or who take jobs outside the village have great trouble, upon their return, in finding a role within the community, being treated with suspicion.

1.4 Agricultural Production:

Many good summaries of agriculture in Toledo are available in TRDP reports and documentation from other development projects. The major components of the subsistence system are a wet-season slash-and-burn cornfield (cleared in February and March, planted in May and harvested in September), and a dry-season short-fallow slash-and-mulch corn field which is planted in December or January. Many other food crops are planted in between. Rice is produced by slash-and-burn during the wet season, and beans are planted in the corn field after the wet season corn is harvested. Many farmers have small permanent plots distant from the village where they grow tree crops, including fruits and cacao. A limited range of crops are grown around house lots in the village because foraging pigs make planting difficult there.

1.5 Land Use and Title:

Shifting cultivation is mainly limited to rolling land and hill slopes (up to 60 degrees), while semi-permanent dry-season farming is done on fertile river levees, and the wetter pockets of the more fertile upland areas. Wet season cultivation is land-extensive. With an average field size of 2.5 ha on a 15 year fallow cycle a farm household would use 37.5 ha just for corn production. As the population density increases, farmers react by shortening fallow cycles (reducing yield because of weed competition and fertility decline), or by cultivating fields at a greater distance from the community (resulting in lower effective yield because of greater travel time to work and to carry crops home). In the most densely settled areas around San Antonio and San Pedro Columbia in the northern zone fallow cycles have shortened to less than five years, and erosion has become a danger. Farmers there have responded by intensifying their dry-season farming further, and by innovating with leguminous cover crops and slash-and-mulch instead of burning. In most areas a simple measure of land pressure is not possible because of the complicated land tenure system, which allows a mix of communal tenure and private leases in different areas.

110

As mentioned above, the reservation system has cultural and social significance as well as being a system of regulating land use. While many farmers want to obtain lease rights to reservation or non-reservation land in order to have security of tenure, many others favor the reservation system because it ensures relative equality of access to land, and makes sure that nobody becomes landless. Most Kekchi and Mopan remember their past situation in Guatemala when many communities lost their land after it was broken up into private holdings, that were then bought up by outsiders. In San Antonio and on some other reservations in the 1970s many of the more prosperous and educated Indians, who had access to surveyors and legal advice, sought to claim the best (and most accessible) land on the reservations through leases. This confirmed, to many community members, the idea that converting the reservation to private land was going to be to the advantage of a few large farmers, while it disinherited the majority. This stiffened opposition to private tenure and support for the continuation of the reservations, and led to the involvement of political factions in the land issue. Now that the land issue has become politicized, positions have become polarized and the whole issue of land tenure has become more complex than ever. The government has recently appointed a panel of experts to investigate the land tenure system in Toledo and to make recommendations for the future of the reservations.

Roads and communications are the major factor in determining the value of land in Toledo District, followed closely by drainage properties and fertility. Land close to roads can be cultivated much more profitably than land far off in the forest. Rice cultivation has expanded, historically, following the expansion of the road network, or the movement of people to settle along existing roads. The long-standing cultural divisions between the northern and southern portions of the district has been based on presence of roads in the north. In the last year major changes which will have far-reaching consequences have begun as a result of an ODA and AID road construction projects. A new road is reaching south from Santa Theresa to Otoxha on the Temash River. Rapid cultural and economic change will follow, including a major increase in cash crop production, consumption of imported goods, and population pressure on land resources. It is possible that there will be some immigration into the area too.

PROJECT ACTIVITIES

1. Rice Mill Rehabilitation

This activity will be aimed at upgrading the efficiency and operations of the Big Falls Rice milling complex, the major buyer and processor of grains from the population of Toledo. The total farm population of the district is about 10,000 people (an estimated increase of 650 from the 1980 census), amounting to 1925 households using an average household size of 5.2. If we assume that the benefits of the activity will primarily benefit rice farmers, and therefore exclude those in remote areas, about 8,800 people, or 1690 households of potential rice producers remain. According to the TRDP report on Toledo rice production (Seager 1983), in the 1982/3 rice season, production can be broken down as follows:

Table 3
Rice Purchases in Toledo 1982/3

<u>GROUP</u>	<u>Lbs. Paddy</u>	<u>Percent Total</u>
Mopan and Mopan/Kekchi slash and burn	710,490	17%
Kekchi slash and burn	602,945	14%
Kekchi/other slash and burn and some mechanized	1,173,959	28%
East Indian and Creole slash and burn	383,425	9%
East Indian and Kekchi mechanized	755,633	18%
Miscellaneous and Stann Creek mechanized	572,149	14%
TOTAL	4,198,149	100%

While these figures are not broken down adequately, it is clear that the benefits from rice mill improvement will be felt by all of the ethnic groups in the District, and in all areas except the most southern (although with new road construction even the furthest villages will soon be major rice producers).

12/4

On a per capita basis, mechanized producers of East Indian and Kekchi origin will benefit the most, while slash and burn farmers produce much less on a per capita basis. In the future, it is expected that production of Milpa rice will decline rapidly because of population pressure on land, declining productivity of existing land, and switching into other crops.

There are no major social soundness issues raised by the upgrading of the milling facility. Farmers have always found the slowness and inefficiency of the mill highly aggravating. Delivering rice can be an expensive and difficult proposition for a small farmer, for whom the cost of transportation to the mill is often the major cash outlay during the year. Waiting for an extra day, while paying rent on the vehicle can reduce his margin substantially. Getting paid for their crop in a timely fashion is also a high priority for farmers, who have often had to wait for many months in the past.

2. Improvement of Post Harvest Crop Storage and Handling

It is recommended that this activity focus on reducing post-harvest food crop losses, especially the main subsistence crop of corn. Labor is a major constraint to cacao production in Toledo district because it is harvested at the same time of year that the main corn crops are being planted. In the initial stages of cacao production, when farmers are still attempting to produce corn for their own needs, this labor bottleneck will limit the scope of cacao planting. With post-harvest corn losses estimated at between 40 and 60 percent (TRDP), there is a strong possibility that improved storage and handling could reduce the amount of labor required to grow corn for household needs, allowing farmers to expand their cacao production.

Post-harvest storage is also a major problem in the production of beans, a major cash crop in the hilly upland zone west of San Antonio. In 1982/3 farmers in Toledo sold over 300,000 pounds of beans to the Marketing Board and consumed a roughly equal amount themselves. The TRDP found that there was potential for expansion of bean production (Belize imports large quantities) in Toledo, and cited post-harvest storage problems as a major constraint to expansion. The main problem is that seed beans do not keep for an entire year, requiring farmers to grow a separate seed multiplication crop. Beans have the additional advantage of requiring no additional land (they are grown on cornfields following the harvest) and requiring labor at an otherwise slack time in the agricultural cycle.

2.1 Target Group:

Virtually all farmers in Toledo would benefit from improvements in post-harvest technology. Improved storability of food crops would give households greater security in food supply by allowing them to store crops for longer periods. This in turn would allow farmers more flexibility in scheduling their annual food and cash crop production, and would reduce the amount of labor devoted to growing subsistence crops.

2.2 Social Soundness Issues:

At present the mode of harvesting and storing crops depends on the distance of the fields from the village. If the fields are close, the crop is harvested as time allows, and is stored both in the house and in an attached storage structure. Where fields are more distant, a storage house is built in the field and the crop is neatly stacked there, being brought back to the house as needed. All household members participate in harvest, stacking, and transportation. Draft animals (horses and mules) are very expensive in Toledo (over US \$500), but are highly desired because they cut down the amount of labor required to transport crops to home or market.

Much of the labor devoted to crop processing and storage is contributed by women and children. Women, for example, shell corn in the home, pick out the damaged corn and feed it to animals. Women also dry corn, beans, sesame and other crops on sheets of tin or plastic on racks around the house, and must constantly move/tend the crops and bring them in when it rains. These difficult and time-consuming tasks could be substantially reduced by better methods or technology. It may be that groups of women could cooperate in managing a single drying and storage facility, though women have little cash to invest and would be reluctant to take out loans. It is recommended that any crop storage and processing activities focus on women and womens' groups in providing technical assistance.

There are some cultural constraints on crop storage technology. For example, seed corn is ritually important in Kekchi life and is stored hanging from the rafters of the house after harvest, and then on or under the household altar before planting. Many farmers like to keep their corn stored out in the field so that others will not see how much they have, arousing envy, contempt, or requests for loans from their neighbors. When crops are brought in from the field they are change from being the property and province of males, to being the property of females and the household in general. Interventions should take these and other cultural factors into account.

113

Within this system there are a number of points where losses could be reduced. At this point in time, however, it is impossible to pinpoint the exact methods and techniques that would be technically and culturally feasible in the contexts of different farming systems in Toledo. It is therefore strongly recommended that an assessment be conducted of present crop handling, in order to identify the most effective and acceptable innovations.

3. Cocoa Development and Improvement

Cocoa is a traditional cash crop among the Maya and many East Indians grow it as a garden crop as well. Large scale cocoa production in Toledo probably extends back over 1,500 years, with a historical pattern of trade to the adjacent highlands of Guatemala where cocoa will not grow. Many Kekchi entered Toledo in order to work on a cocoa plantation, and afterward they began to grow the crop themselves for home consumption and for sale to the traveling traders who still come down from Guatemala in search of cacao. A survey in 1936 by the Forestry Department found an average of slightly less than one acre of cacao per household, though some had as many as eight acres, and this has probably increased slightly over time. Today the largest acreage of cacao are found in long-established villages in the southern and western part of the district. In addition to cocoa (*Theobroma cacao*), farmers also grow small amounts of pataxte (*Theobroma bicolor*) a close relative that yields beans with a preferred flavor. Cacao forms a regular part of the diet of both Kekchi and Mopan. It is prepared by drying, roasting, and grinding the beans, and then boiling the paste with either corn meal and sugar or black pepper as a drink. It is drunk as a traditional gesture of hospitality, at important ceremonial and religious occasions, and at meals prepared for agricultural work groups. For this reason there is also indigenous trade in cacao, as farmers with a surplus exchange with those who have no yielding trees.

3.1 Definition of Target Groups:

Almost the entire farming population of 1925 households stands to benefit from increased cacao production. Given a steady market and the availability of crop inputs and technical assistance, the majority of farmers with access to suitable land will plant varying amounts of cacao. The issue of land suitability is an open one, as the potential of the many different soils and terrains in Toledo have not been assessed, though it is likely that the upland region around San Antonio will prove the best (TRDP).

Many of those farmers who do not get into cacao production for market will be indirect beneficiaries. Some will become involved in processing and transportation. As cash incomes in the area increase, there will be increased demand for consumer goods, and commercial opportunities of various kinds will emerge. Also, some farmers will begin to cut back on their food crop production, and a greater demand for food crops in local markets can be expected.

In the initial stages of cacao expansion, those farmers in the northern zone who have better access to education, extension, cash, and markets will benefit disproportionately. There is a tendency for all development projects in Toledo to concentrate in the northern zone because it is so much more accessible and because the population seems more open to innovation. This merely perpetuates the relative disadvantage of the Kekchi who live south of the Moho River. It is recommended therefore, that this project make the southern portion of the district a priority area, to provide additional assistance to those farmers who need it the most.

While in the long term there will be major disparity in income between farmers and areas because of differences in cacao production, in the short run these differences will not be major and the benefits of the project will be well spread out. The larger farmers in Toledo, including several expatriates who own thousands of acres, and East Indians who own hundreds, can be expected to expand cacao production far beyond the scale of any Indian farmers. They have the means to purchase their own inputs and market their own crop, and this expansion would take place with or without the present project.

Further descriptions of the social and agricultural aspects of the target groups can be found in TRDP reports and in the IFAD project identification report.

3.2. Project Issues:

3.2.1. Work schedules and Labor Availability:

The agricultural calendar of most Toledo small farmers is a full one. Most of the major tasks like clearing, planting, and harvesting are handled by rotating labor groups, but most of the daily small tasks of weed and pest control, minor crop planting and harvesting, transportation, and processing are done by household labor or through cooperation among the members of a household cluster.

173

The TRDP (Final Workshop p.122) estimates that an average farm family that grows small quantities of rice and beans for sale, as well as producing wet and dry season corn for food and livestock feed, uses 237 days of field labor per year. This does not count labor in minor food crops, in tending animals, or in other enterprises. Ann Osborn provides the following figures on the use of labor time for two areas:

Table 4

Percentage of Annual Labor Time Spent in Different Activities

ACTIVITY	LOWLAND	UPLAND
Maize production	35	35
Economic (marketing, and shopping)	8	4
Domestic (hunting, home maintenance and construction)	18	15
Rice Production	12	10
Bean Production	1	9
Other Crops and Animals	3	7
Social and Leisure	23	20

The seasonal distribution of labor is uneven. The period from February to the end of May is the busiest of the year, when fields are cleared for both corn and rice, and then both crops are planted by hand. Another bottleneck occurs in September through November when corn and rice are harvested and fields are prepared for the first bean crop and for the dry season matahambre corn crop. Farmers presently meet these bottlenecks by organizing into large labor groups, which get the bulk of the job done in each farmer's field in rotation.

Cocoa production will place further burdens on farm labor at the busiest times of the year, with main harvest period occurring in March and April. Farmers will most likely

approach this bottleneck with two strategies; composing new work groups to harvest fields in rotation, and recruiting household labor. At present women and children do much of the processing of cacao, including washing and drying the beans. In the future, farmers will probably cut back on rice production in order to have more time to work cacao, and the subsistence crop of corn will eventually come under pressure as well. The TRDP estimates that under the present system of labor allocation there is only enough labor available for two to three acres of cacao per household. As the trees begin to bear and if high prices for cocoa hold up, the shape of the entire agricultural cycle will begin to change, with perhaps greater emphasis on dry season corn production, which the TRDP identifies as an environmentally and agronomically sound option. It is important to note that women and children will be increasingly important in the production of cocoa as time goes on, though they will not necessarily share in the cash income derived from sales.

3.2.2 Constraints on Credit and Borrowing:

It is common to hear the assertion that the Indians of Toledo are averse to taking out loans and becoming indebted. The East Indian, Garifuna and Creole population of the district has long familiarity with credit institutions, as many of them have been involved in mechanized farming and with various commercial enterprises. They also live closer to Punta Gorda, where the district office of the DFC is located.

It is probable that the Indians remember well the system of debt-servitude that they had been caught in while living in Guatemala in the 1800s and the early 1900s. Farmers were given, and sometimes forced to take cash advances which ensured permanent indebtedness and the eventual loss of any property that was owned. On the other hand, when the Agriculture Department offered crop loans for rice production in the late 1970s and early 1980s, hundreds of Kekchi and Mopan farmers applied for them. Payment was deducted from the proceeds of crop sales. This suggests that given proper incentives and the prospect of an increase in cash income, both Kekchi and Mopan are quite willing to borrow money for the short term. They are cautious, but not unreasonably so, except when it comes to offering their land as collateral. Where land is at risk, caution tends to prevail. For this reason, and others mentioned below in the section on land tenure, it is recommended that any loan program offer short term credit secured by crops, rather than long term credit secured by land.

134

In the initial stages of cocoa planting, before the crop comes into production, farmers will be averse to taking out any kind of loans and probably should not be encouraged to do so.

A more serious problem than credit for most small farmers in Toledo is savings. Simply, there is no bank in the district, and the postal savings account are difficult to use, and poorly understood. What will farmers do when large amounts of cash begin to flow into their hands from sale of cacao? Unless there are savings institutions close by which make some effort to attract this money, little capital accumulation will take place, and immediate expenditure on consumer goods will become the pattern.

For these reasons it is strongly recommended that the establishment of village credit unions be a priority of the project. For various reasons the Cocoa Growers Associations are not suitable channels for such a program. Rather, villages themselves, with some training and technical assistance, are the natural social unit for the formation of credit unions. Legally no more than ten members are required to establish a credit union. Village secretaries, who are chosen by the village each year to assist the alcalde with paperwork, are in the ideal position to become managers of small credit associations, and to deposit village savings in bank accounts. Eventually these associations could take on the major task of administering loans to cocoa farmers, though means would have to be found to ensure repayment. The community itself is in the best position of any social group to pressure farmers to repay their loans.

3.2.3 Impact on Womens' Economic and Social Positions:

The traditional pattern of division of labor within Kekchi and Mopan society allowed women some access to external sources of income through sales of pigs and livestock, though it gave them very little public role or authority. Men do most of the marketing, unlike other Maya groups in Yucatan and Guatemala, and they present the public face of the household to the village and the outside world. New income from rice and beans has sometimes been equitably distributed within households, at other times husbands and sons have kept much of it for reinvestment in farming or for the purchase of consumer goods. Women's income, on the other hand, is often spent on food, clothes, and medical supplies for children. Nevertheless, the ethic of sharing income within the household is very strong, and it is unlikely that women will be left powerless or

12/1

helpless when cacao income begins to flow into households. In the more prosperous villages, where large amounts of cash from the cultivation and sale of cannabis have entered the domestic economy in the last five years, the new income has been invested in the improvement of houses and the purchase of furniture, automobiles, clothing for all household members, and luxury goods. This would suggest that income from cacao will also enter the domestic economy rather than being the sole property of the males who sell the crop. On the other hand, in some Mestizo settlements in central Belize there has been a problem with women being progressively excluded from the financial side of cacao planting, even though they do much of the work in production.

In the subsistence farming economy, access to land is gained through membership in the village. The ties that bind people to the village are reckoned through both male and female lines; men gain access to land through both their parents and their in-laws. Women therefore play a pivotal role in the inheritance of access to prime pieces of land, and this gives them a position of power within the household, though it varies from family to family. Traditionally, wet season milpa land is communal property with individual usufruct rights recognized by the community. Prime plots on the river bank, as well as groves of fruit trees and cacao, were considered the actual property of an individual, though this ownership would lapse if the land or trees were abandoned. Both male and female could inherit the rights to levee land and groves of trees, and they remained the property of that man or woman after marriage. Women are therefore said to be the owners of particular trees and property (though this ownership is not recognized by Belizean law -- only by custom). This too gives them some economic base, and the prospect of deciding who will inherit that property. However, male ownership of such property is much more common than female ownership. As cacao groves are established in the coming years, inheritance practices will play a crucial role in determining the economic position of women within local society, though such an intervention is far beyond the scope of this project. In Toledo the fact that women will play a crucial role in harvesting and processing the cacao crop, because it occurs at a time of labor shortage, they will have considerable bargaining power within the household. The key role that the project itself can play is to make sure that women will have equal access to project services and facilities. This can be accomplished by requiring that the household unit, rather than the individual male be taken as the unit for interaction in providing credit, extension services, and technical assistance.

12/1

or so. The Alcaldes have made sure that nobody accumulates or monopolizes large areas of reservation land, ensuring equity, and the system has prevented foreigners or outsiders with better access to legal and surveying services from acquiring the land used by Indians.

The disadvantage of the system has been that it fails to respond well to changes in settlement patterns and land use, especially as many Indians and East Indians have moved into new areas as road construction has proceeded. In addition, it offers little security to either communities or individuals, because in essence, there is no land tenure - the Reservations remain Crown Land and the Indian communities have few legal rights to manage the land as they see fit.

The Government has responded to changes in settlement patterns and emergence of new villages in two ways. They have recognized new "de facto" reserves in the more remote areas where survey would be expensive, and have begun to grant individual male Indians, Creoles, and East Indians leases on parcels of up to 100 acres in the more accessible areas. They have also added "de facto" reservation territory to existing reserves where land pressure has been extreme.

Over the years a number of plans have been publicized to break up the reservations into individual landholdings. In 1966 the Government began to grant individual leases on the San Antonio Reservation, giving out twenty-four leases totalling 1,200 acres by 1985. These were some of the best lands on the reservation, which had been claimed under traditional tenure rules by others, and they went to some of the wealthiest and most politically astute residents. Many of the other residents of this and other reserves saw this as the beginnings of a 'land grab' in which those with the best political connections would get private title to the best lands. The response was the formation of 'Traditional' Indian Identity movements that politically fought the breaking up of the reserves as an attack on Indian communities. The Government responded by halting the leasing program, making a policy statement to the effect that the reserves would remain intact until a majority of community members voted for individual tenure, and convening a study committee to make recommendations for the long term future of the system.

In the meantime, in the non-reservation areas, many Indians sought to get leases on 50 acre parcels that they were using in order to have continuing rights to that land. Rather than being motivated by a desire to have ownership, most were afraid

It is recommended that husbands and wives be required to co-sign all loans, contracts, and marketing agreements. In addition, the lands office should be encouraged to make married couples the co-lease holders of land that is leased specifically for the purpose of growing cocoa.

3.2.4 Land Tenure and the Reservation System:

When Indians first entered the district in the nineteenth century, almost all the land in the district belonged to foreign absentee owners, or to the Crown. Initially, farmers were allowed to take out individual leaseholds on crown land, though most people in remote areas just squatted without any legal arrangements. By the 1920s almost the entire Toledo district was Crown land because private owners had defaulted on the minimal land tax and their parcels had been repossessed. While Carib and East Indian families close to Punta Gorda were able to continue to establish leases and eventually freehold title to land, the Colonial authorities found it almost impossible to regulate and administer land tenure and use in the remote areas inhabited by Indians. They therefore established Indian Reserves, defined areas around existing Indian communities in which farmers from those communities could use land each year upon payment of a \$5 (BZ) fee. The Alcaldes were made responsible for collecting fees and settling disputes within the reservation, while disputes between villages were adjudicated by the District Officer. Because of the mobility of the population and changing land use patterns, the areas claimed and administered by each village came to be very different from the legally defined Reservation boundaries, but no re-survey of reservation boundaries has been done since 1936.

The reservation system has had a number of advantages for both the Government and the Indian communities. It allows flexibility without cumbersome and expensive legal machinery, and it has spared everyone the considerable expense of surveying actual boundaries in remote areas. It has allowed the communities autonomy in regulating their own land use practices, and a fairly complex system has emerged within the reservations for allowing different degrees of individual rights to different kinds of land. At the same time, nobody has been excluded from access to land for farming, though the best pieces of land tend to be in the hands of earlier settlers in a community, because of the general rule that the person who first clears land from virgin forest has continuing rights to that property as long as he continues to use it every ten years

that if they did not get a lease on the land, someone else would, and they would be driven off. Several incidents occurred in the late 1970s and early 1980s in which Indians who had been using prime land along the highway were forced off by East Indians and Creoles who paid to have the land surveyed and then obtained a lease. The demand for leases that resulted has far outstripped the Land Office's ability to survey, and many of the recent leases have been granted without survey, a practice sure to cause problems in the future. At the same time, even though many Indians in these areas are seeking to get leases on 50 acre parcels near the road, they continue to use Crown lands further from the road for slash-and-burn farming. The presence of large foreign land holdings in the northern part of the district blocks further Indian expansion, as does the large area of Forest Reserve in the northern, hilly parts of Toledo. This means that in the future, despite continuing Indian immigration out of the district into the Stann Creek District, there will be increasing population pressure on a limited land base. Some immigration into the southern part of the district can be anticipated as roads are built, but this will not ameliorate the pressure. The chaotic land tenure system in Toledo will have to be regularized at some point, though it is likely to be a difficult and highly political process.

This project will affect land tenure in two major ways. The first is that if farmers must have a lease on land in order to obtain credit (as DFC requires in other areas of Belize) the demand for lease land will increase drastically, and those Indians living in more remote areas and on reservations will be at a disadvantage. It is therefore recommended, as mentioned above, that credit be offered against crops rather than land. Second, is the issue of how willing farmers will be to plant a permanent crop such as cocoa if they do not have secure ownership over land that has been permanently improved in this way. On the San Antonio Reservation, where land pressure is highest, and political feeling over the land issue runs high, the Alcalde and Village Council have decided that individual farmers can plant no more than two acres of cacao on reservation land. This is a "de facto" recognition of permanent tenure by the reservation itself, and should offer enough security for farmers to proceed. Other reservations will probably follow this lead and allow members to plant cacao, and recognize their right to pass that land on to their children. Those who want to plant larger areas will have to go off the reservation. The greatest problems will most likely occur in the areas of "de facto" reservation, and areas where farmers are actively competing for leases; there the uncertainty of the system, and the lack of community control of land use (comparable to that found on the reservations) is likely to give farmers some caution and will lead them to seek to speed up the process of leasing and surveying.

137

The most recent estimates of the total amount of land under different kinds of tenure in Toledo are as follows:

Table 5

Current Status of Land In Toledo (1980, IFAD)

Status	Acres	Percent
Forest Reserves	501,823	46
Official Indian Reserves	54,957	5
De Facto Indian Reserves	12,595	1
Surveyed Leases	30,750	3
Privately Held Estates (est.)	70,000	7
Other Crown Land	420,335	38

A number of studies have made detailed recommendations for regularizing the land tenure system in Toledo (Osborn 1982, IFAD). Due to the complexity of the issue, and its highly political nature, it is strongly recommended that this project should not get involved in the land issue in any way. We can anticipate a need for technical assistance in surveying and titling land in the future, and the reservation system will have to be legalized and regularized, but such activities are outside the scope of the project.

3.2.5 Cultural and Social Constraints to Innovation:

Past developments have demonstrated that Kekchi, Mopan, and East Indian farmers are open to new technologies and crops if they offer an increase in cash incomes and standards of living. They have proved themselves to be flexible and adaptable farmers who are always seeking out and experimenting with new crops. While experience has taught them to be

238

skeptical of government and other institutions (they have been involved in many crop improvement and development schemes that have had short lives, or which have failed to live up to commitments), they continue to respond readily when projects are explained clearly and are consistent with deeply-held cultural values.

These values govern the interactions of villagers with agents of outside authority, and are based on long, and not always positive experience with outsiders. They include (1) the belief that the benefits of any innovation should be equitable, that all should have equal access and the chance for equal benefit; (2) that traditional leadership based on age, experience, and position within the village hierarchy is the proper avenue for decision making in regard to innovation; (3) that consensus of all members of the community should be obtained, or at least that all opinions should be aired, before any actions are taken; and (4) that individual initiative is a dangerous force that must be constrained and shaped by community concerns.

Many development efforts in Toledo over the years have fallen afoul of these values. Often, individual farmers who have little authority in the community have been singled out as 'model farmers', and have received training and help under the assumption that others would observe their success and emulate it. On the contrary, others see this as one person benefiting at the expense of the rest, and respond by socially 'freezing' that person out, and rejecting the innovations. Many people who have worked in Toledo find it cumbersome and time consuming to attend endless community meetings, explaining the project over and over again while the consensus-building process goes on, but this kind of group acceptance is an absolute requirement for project success in the long term.

Traditionally, the Kekchi and Mopan deal with the problem of consensus and leadership by rotating people in and out of offices, making sure that nobody can use a leadership position to enrich themselves or take advantage. This makes western-style management (with a permanent cooperative manager for example) highly problematic in the village context. Suspicion is aimed at those who act as agents between village and outside authority, and the project must not act to make this worse by appointing leaders or choosing participants without community consent. A general rule of thumb in Toledo villages is that anybody who independently comes to volunteer for a project or position is the wrong person. They are generally going to be someone very marginal to the village, a recent immigrant or someone with a bad public reputation, and are therefore unlikely to serve as a good example to others or to be emulated.

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Another cultural factor that needs to be taken into account in working in Toledo is the suspicion that most Indians feel towards agreements with outsiders. People have had many bad experiences with loans, shopkeepers, agricultural extensionists and government officials, in which they have signaled agreement to a project without understanding all of the things required of them in advance. They need to be adequately informed and educated about a project BEFORE it is implemented, so there are no surprises later on, and this responsibility rests on those who implement this project. In building up long-term positive relationships the Kekchi and Mopan are unforgiving when they have been let down; if the promises made to them are not kept to the letter they will often withdraw from the project or agreement rather than offer a second chance.

3.2.6 Farmers' Groups, Cooperatives and Associations:

The history of farmers cooperatives and groups within Toledo has not been a bright one. Partially this has been through a lack of follow through and appropriate planning on the part of the government agencies and PVOs that have stimulated those organizations, but there are social causes as well. Some projects were started by churches or groups in such a way as to serve as a focus for village factionalism; they were perceived by villagers as a threat to the solidarity of the community and undermined or attacked.

The history of the Mopan Coop in San Antonio is instructive. It was started in order to facilitate the collection and marketing of Honey in the late 1960s, with the impetus provided by a PCV and a local Catholic Priest. The cooperative was successful in its technical goals, obtained a grant from a PVO to build a processing facility, and eventually split over leadership issues. Today it is defunct and honey production in the district has stagnated. The major cause was that the managers of the cooperative used it as a vehicle for their own political ambitions, and the membership became increasingly suspicious and then hostile towards management. Every other major cooperative or farmers' association in Toledo has suffered from the same problems and has ultimately failed.

More recently the Agriculture Department has encouraged the formation of Grain Grower's Groups, and twenty-seven had formed by 1983. The groups formed in response to government's offer to provide mechanized services for rice production to any group that laid claim to seventy-five acres of suitable land. They seem to have been successful as organizations, though the

government did not always provide the required services on time or as planned. Government has dealt directly with other similar small voluntary groups in extension work on beans and cacao in the San Antonio and San Jose areas. Other small voluntary groups have been formed in various areas either through churches or village councils in order to pressure government for some action or service, or to undertake a single project such as obtaining a village truck or building a fence.

Several lessons emerge from looking at the history of collective action in Toledo. Those groups that succeed have the following characteristics:

1. They remain small, under fifty members.
2. Their core is an indigenous group such as a labor group of related farmers used to working together.
3. Their focus is narrow; they are formed for a specific purpose.
4. They do not require or employ a full-time manager or any paid staff. Their activities are voluntary.
5. All members are from a single community.

It is strongly recommended that any groups formed as part of project implementation conform to these characteristics as much as possible. Anything larger or more complex is liable to lead to the same kinds of political and management difficulties that have plagued other cooperatives and associations.

4. Development of Alternative Cash Crops

Many crops have been produced by farmers in Toledo over the last century. The problems in commercialization have never been in production, but in marketing. Toledo farmers have shown that if there is a market for a crop, they will find a way to produce it, even if it is not well suited to the climate or their own subsistence system (e.g., rice and red kidney beans). Included in the long list of things they have produced for cash sale in the past are nutmeg, allspice, annato, plantains, black-eye beans, black beans, bananas, cattle, coffee, coconuts, eggs, and chickens. Some farmers continue to bring small quantities of vegetables and root crops into Punta Gorda for sale on market days, but the demand there is very limited and often they cannot dispose of their produce.

149

Good candidates for alternative crop development are likely to be those that can be interplanted with cacao as shade crops (e.g., allspice, black pepper, plantains), crops which are already produced for home consumption (e.g., various fruits, root crops, anatto), and plants for which a secure market already exists within the country (citrus).

4.1 Target Groups:

All farming households in Toledo should be considered as possible participants in producing new cash crops. In particular, the Garifuna coastal communities are desperately in need of new crops that can be grown in low-lying and sandy soils. In those communities agricultural production is largely in the hands of women, and a significant rise in family standards of living would attend any new cash income.

4.2 Constraints on Production and Innovation:

Ideally, new cash crops should not compete with subsistence crops for household labor. Special attention should be focussed on crops that are planted or harvested during the June/August slack period (TRDP has investigated several crops from this perspective). Crops that can be planted and managed by communal labor groups would also be preferred by the Kekchi and Mopan.

Given these few constraints, any crop that offers a secure market and a reasonable net income would be readily accepted. Farmers have had a number of bad experiences with the marketing board over the years with delayed payment and inconsistent prices, and strongly prefer to have cash payment at time of sale at a posted price. At times the marketing board has given public notice that they would purchase particular crops (e.g., annato, black beans, allspice) and has been flooded with those commodities the following year, ending up refusing to purchase or offering scrip instead of cash. Given the high cost of transporting crops to market in Toledo, farmers would much prefer to sell the crop at the farmgate, but these examples show that they will go to great lengths when they have to, to get their crop sold. Often groups of farmers will cooperate in pooling their crop and renting a truck together.

4.3 Impacts on Women:

In the absence of specific data on particular crops it is difficult to define what the impacts will be on womens' roles

and well-being. Today the petty marketing of surplus food crops is sometimes handled by women, and provides them with an independent source of income. If such a crop is commercialized and marketed through more formal arrangements, it is possible that women might lose access to even this small source of cash. A more likely scenario is that women will become more involved in cash crop production in the domestic economy because of increased labor demands, as new cash crops are added. In this case the crucial issues become the distribution of the proceeds from the sale of cash crops within the household.

5. Institutional Analysis of Farm Service Centers and the Cocoa Growers Associations

Major constraints to cocoa production in Toledo are the lack of marketing centers where crops can be sold, lack of retail outlets where farmers can purchase crop inputs, and lack of information on proper cultivation, harvesting and processing methods. It is recommended (following the IFAD project document) that these functions be centralized in Farm Service Centers within the district. This section contains some brief notes on how this might best be accomplished, including a discussion of the inadvisability of using the existing growers associations as institutional frameworks for establishing the centers.

5.1 The Growers Associations:

With assistance from a Peace Corps Volunteer, farmers in ten villages began, in 1985, to organize small groups within each village that would pool money and labor in order to purchase seed as a group from Hershey. Some of these same groups had previously been involved with an Agriculture Department program that distributed seed and technical assistance to those interested in cacao. Under guidance from the PCV, these village groups have formed a central organization, the Toledo Cocoa Growers Association (TCGA), which now intends to acquire legal status as a growers group and pursue other activities such as coordinating marketing, providing credit for seed purchase, and bulk purchase of crop inputs. Most of the farmers in this association intend to plant cocoa on leasehold land, and they seem to be using the association as a vehicle for helping them to obtain these leases.

Following this development, other groups quickly responded. Farmers in San Antonio who do not want to see the reservations

broken into leasehold, and who want to plant cocoa on reservation land, quickly formed their own group, the San Antonio Cocoa Growers Association. The new association also has political overtones, being identified closely with the leadership of one political party. In addition, a third group has recently formed in Big Falls village through the efforts of BEST. This group is also interested in planting cocoa (as well as citrus), and is also seeking to purchase seed and crop inputs and to provide credit to members.

This rapid "balkanization" of cocoa production in Toledo is a response to a huge unmet demand for services, but it presents many dangers. If associations begin to build rival facilities and continue to be vehicles for political action, they run the dangers of disintegration that have plagued other producers groups in Toledo. There is a possibility that the goal of increased cocoa production could be lost in the competition between different groups for control of the industry. In fact there is no need for any association to control the industry, and while there is certainly a role for farmers associations, they should probably stay out of the business of selling fertilizer and providing credit to farmers.

The roots of these organizations are the village-based labor groups of related farmers who want to cooperate with each other in getting seed, crop inputs, and information. These village-based units are essential to the success of any cocoa production project in Toledo and must be worked with.

5.2 Farm Service Centers:

It is vitally important that services of various kinds be close to the farm communities. Very few Indians own vehicles and there is no public transportation to or from most villages. The ideal situation would be to have three service centers in the district. One at Santa Cruz village would serve the upland region, including San Antonio and San Jose. A second one at Santa Theresa would serve the lowland villages to the south by way of the new road to Otoxha. A third center at Big Falls would serve the roadside villages, and farmers along the highway going to Punta Gorda. If only two centers were possible, Crique Sarco and San Pedro Columbia would provide the best coverage, while if only one were constructed (and this would hardly meet the needs of farmers), Dump is the most central locale.

The Kekchi and Mopan are avid readers of any informational literature they can obtain. Farm service centers should provide publications and information to farmers, as well as

farming supplies. In this way information would also reach women involved in farming. Some provision should be made within the project design for funding the production, translation, and distribution of materials and manuals on cocoa and other crops. In particular, agricultural calendars which include the traditional agricultural cycle (marked by saints days, equinoxes, fiestas and the lunar cycle) and recommended times for particular agricultural tasks in cacao, should be distributed.

5.3 Management:

The major unresolved issue about the Farm Service Centers is the best mode for the construction and management of the facilities. The ideal situation would be to have private individuals running them as businesses, though it is unlikely that this could be initiated in the short term. An option during project design would be to train individuals in farm store management through internships in working stores, and then to employ them on a commission basis in the Toledo facilities. The bookkeeping alone would be beyond the capabilities of most people in Toledo. The Belize Institute of Management may be able to assist in this activity, as could other groups like BEST.

145

ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL ASSESSMENT AND ANALYSIS OF PESTICIDE USE
TOLEDO AGRICULTURAL MARKETING PROJECT 505-0016
USAID/BELIZE

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LIST OF ACRONYMS AND ABBREVIATIONS

BACPP	Belize Accelerated Cocoa Production Project
BMB	Belize Marketing Board
CATIE	Central American Institute for Research and Training in Tropical Agriculture
EA	Environmental Assessment
EPA	Environmental Protection Agency
GOB	Government of Belize
HHL	Hummingbird Hershey Ltd.
IFAD	International Fund for Agricultural Development
IITA	International Institute for Tropical Agriculture
IPM	Integrated Pest Management
LAC	Latin America and the Caribbean
LOP	<i>Life</i> Length of Project ✓
MNR	Ministry of Natural Resources
MOA	Ministry of Agriculture
MRL	Minimum Residue Limit
PADF	Pan American Development Foundation
PID	Project Identification Document
PP	Project Paper
ST/AGR	Science and Technology/Agriculture
TA	Technical Assistance
TAMP	Toledo Agricultural Marketing Project
TDMI	Tropical Development and Research Institute
TRDP	Toledo Research and Development Project
USAID	United States Agency for International Development
VITA	Volunteers for International Technical Assistance
WHO/FAO	World Health Organization/Food and Agriculture Organization

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
I. SUMMARY AND RECOMMENDATIONS	
II. PROJECT DESCRIPTION	
A. Purpose and Goals	
B. Environment Affected	
C. Population	
D. Relationship to Other Projects and Activities ..	
III. PURPOSE OF THE ENVIRONMENTAL ASSESSMENT	
IV. PESTICIDE USE ASSESSMENT	
A. Basis for Selection of Pesticides	
B. Registration Status of Requested Pesticides Table Pesticides Basd on US/EPA Registration and/or FAO Maximum Residue Limits	
C. Relationship of Proposed Pesticide Uses to an Integrated Crop Protection Program	
D. Proposed Methods of Application and Availability of Equipment and Protective Clothing	
E. Acute and Long-term Toxicolclogical Hazards	
F. Effectiveness of the Selected Pesticides for the Proposed Use(s)	
G. Compatibility of Pesticides with Target and Non-Target Organisms	
H. Conditions Under which the pesticides are to be used	
I. Availability and effectiveness of other pesticides or control methods	
J. Ability of GOB to regulate distribution, storage, use, and disposal of pesticide	
K. Provision made for training pesticide users and apliatiors	
L. Provision made for monitoring the use and effectiveness of the pesticides	
V. REASONABLY FORSEEABLE IMPACT ON THE HUMAN ENVIRONMENT .	
VI. ALTERNATIVES TO THE PROPOSED ACTION	
VII. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS	
VIII. RELATIONSHIP BETWEEN SHORT-TERM AND LONG-TERM EFFECTS OF PROPOSED ACTION	
IX. APPENDIX	

LIST OF TABLES

<u>TABLE</u>	<u>PAGE</u>
1. Pesticides Considered for Project Use	
2. Authorized Crops Uses of Approved	
3. Toxicity of Pesticides to Non-Target Organisms ...	
4 Training Pesticide and Applicators	

149

I. SUMMARY AND RECOMMENDATIONS

While new agricultural lands will be opened during the life of this project, only minimal environmental impacts are expected to result. New plantings will be cocoa, which in contrast to the milpa system is a slash/mulch modification. In the opinion of some, successfully established cocoa plantings remain part of the forest ecosystem.

Pesticides, which represent the principal environmental concern, will be used minimally in cocoa during the length of the project. At maturity, there will exist an increase in useage to protect the fruit. Pesticide will also be used under supervision for the protection of rice before and after milling and for the protection of dried cocoa beans during storage and to reduce severe losses of on-farm storage of maize and red kidney beans. Because the proposed use and promotion of pesticides was the principal factor leading to the preparation of this E.A., a detailed Pesticide Use Assesment is provided, in accordance with AID Regulations (Section 216.3 (b) 1.(i)).

The E.A. begins with an overview of the project purpose and goals, a description of the environment and population affected and the relationship of the project to other activities in Belize.

Pesticide use aspects in the E.A. include a listing of pesticides approved for use in the project, their EPA registration status and their effectiveness for the proposed use; the availability of alternative crop protection methods, the relationship of the project plan to an integrated pest management approach, anticipated application methods and conditions of use; acute and long term toxicological hazards and need for monitoring human and environmental exposure to pesticides, effects on non-target organisms; requirements for equipment and protective clothing, training needs for uses and applications, measures for controlling distribution, handling, storage, and disposal; provisions for monitoring pesticide use and effectiveness; and the regulatory capabilities of the Government of Belize.

Specific actions needed to place the project in conformity with 22 CFR Part 216 on cnvironmental procedures follow.

- A. Only those pesticides so indicated in Table 1 are authorized for use within the project.

- B. Only those uses listed in Table 2 are authorized for on-farm programs or commercial storage protection within the project.
- C. Pesticides identified for use subsequent to the preparation of the PP and EA will require amendment of the EA and are subject to procedures dictated according to the regulatory status of the compound. Actual procurement or use must be approved in writing by the Mission Director and the AID/LAC Bureau Environmental Officer.
- D. The above actions do not apply where the pesticides are to be used for limited field evaluations or for demonstration. However, requirement declared in Section 216. 3(b) 2(iii) must be approved.
- E. Pesticides, particularly those labeled as highly toxic to fish in Table 3 do present significant hazards to fish and other aquatic organisms, and should not be used in a manner which will lead to contamination of the many surface waters of Belize.
- F. Technical assistance should be attained for crop protection specialties, for pesticide use and safety training and, as needed for monitoring human and environmental exposure to pesticides.
- G. The project should be reviewed annually (by crop protection specialists) to evaluate pesticide practices within the project and to advise on any observed or potential hazards being promoted within the project. For the purpose of this review, pesticide use records should be maintained by project personnel.
- H. Storage of pesticides used by project personnel and cooperating farmers must meet the following conditions:
 - 1. Pesticides should be stored in a dry, secure area, protected from water and extreme heat.
 - 2. The area must be separated from living quarters and stored food products.
 - 3. A sign (in English and Spanish) indicating "Danger - Poison" should be posted outside the building.

157

4. Pesticides should be dated upon receipt and stored in non-corrodable containers.
 5. Pesticides should be stored in their originally labeled containers. If repackaged, the container must carry a label including the product name (local trade name), names and concentrations of active ingredients, directions and precautions for use (including crop uses and re-entry and pre-harvest intervals) and appropriate warning words in English and Spanish. The label must be securely fastened on the container.
 6. Disposal of pesticides and/or containers should conform to label instructions. Empty containers should be collected and destroyed to prevent reuse.
- I. Handling and use of pesticides by project personnel and cooperating farmers must meet the following conditions.
1. All pesticides must be used with strict adherence to label directions, including crop-use registrations, field re-entry intervals and pre-harvest intervals.
 2. Appropriate, properly maintained equipment and protective clothing must be made available and its use ensured.
 3. Precautions must be taken to prevent pesticide contamination of drinking water.

154

II. PROJECT DESCRIPTION

A. Purpose and Goals

The purpose of the Toledo Agricultural Marketing Project (TAMP) is to establish a viable export-oriented industry among small holders in the Toledo District and to more rapidly facilitate transition from "slash and burn" to modified agricultural systems. The ultimate goal is to increase real income and improve the standard of living of small farmers in the Toledo District of Belize. Through this goal, the balance of payments situation will be strengthened and food ~~security~~ ^{Security} augmented.

As discussed in the PID the project will have several major areas of focus. It will be seeking cash crops as alternatives to the traditional upland rice and red kidney beans. TRDP, in their research and economic analysis, identify cocoa as being a viable alternative to the crop. In addition to its compatibility to modified agricultural systems, incentives include Hershey Chocolates' commitment to purchase all or the domestic cocoa production, the high value relative to weight and volume, its "non-perishability", and the low cost methods of establishment. The project will also emphasize improvement of post-harvest systems. Pest problems cause high but unspecified losses in storage systems in the Toledo District. The project will address pest management, drying technology, and improved aeration in small storage structures. It is proposed that the project provide TA and other necessary resources to develop, test, and extend appropriate post-harvest technology and management systems. Other areas of focus involve marketing development, a limited credit facility, and renovation of the BMB grain complex and rice mill. Training exists as a major component in the project. Special courses and field days in pest management including pesticide handling are anticipated.

five It is expected that the project will be implemented over a ~~seven~~ year period. The Project Agreement will be signed with the GOB. Principal participants at this writing include MOA, the Toledo Branch of the Grain Growers Association, the BMB, the Toledo Cocoa Producers Association, and the Technical Assistance Team.

Details on the above foci, pertinent to crop protection are discussed elsewhere in this report.

B. Environment Affected

Located south of the Yucatan Peninsula, Belize includes 22,963 Km² (8,860mi²) of land area. It is bordered on the south

15

and southwest by Guatemala and on the east by the Caribbean. At 15-19° N. latitude, it is in the subtropics with typical temperature regimes. The country is divided into six districts, of which Toledo is located furthest south. Rainfall in the affected district exceeds 4,000 m/y (160 inches).

Mangroves represent most of Belize's coastline and can be found inland where there is salt water influence. Coastal lagoons provide feeding grounds for near-shore fish species and habitat for wildlife such as the manatee and crocodile. Mariculture is a new undertaking with industries located in districts immediately north of the Toledo District.

Belize geology is based largely on limestone, but the Mayan Mountains in the Toledo and Cayo Districts represent an exception. They consist of large upfaulted and sedimentary rocks.

Major cities utilize surface water for their domestic needs. Smaller villages are located near creeks and water is dipped. Pollution is not yet considered to be a serious problem, although contamination poses a real risk.

Belize encompasses a considerable area of undisturbed or little disturbed wilderness. It has good to excellent populations of many wildlife species that are endangered in neighboring countries. Included are Jaguar, Puma, Ocelot, Jaguarundi, Margay, and Baird's tapir. Rare birds include Ocellated turkey, American Sungrebe, and Boat-billed Heron. Solitary eagle, orange-breasted Falcon, and Agami Heron still live in Belize's wilder areas. Pest species include Ricey's', which are rice eating finches, and brown rats. Invertebrate pest are serious problems in agriculture while biting flies and malaria transmitting mosquitoes plague the populace.

The Maya Mountains are the prominent physiographic feature in the Toledo District. With a granite core they are low in minerals capable of providing plants and nutrition. Soils remain fertile after repeated milpa cycles and suffer little erosion. The climate is wet sub-tropical. To the east topography changes in rolling foot hills, undulating lowland and flat coastal plains. The foothills are of only moderate fertility. Soil nutrients decline and sheet erosion occurs after only a few milpa cycles.

C. Population

The population of Belize approximates 160,000. The population density averages 6.3 people per Km² characterizing Belize as a "sparsely" populated country. Over 90 percent of the

124

population congregates in places of over 50 people and 51 percent live in towns larger than 2,000. Such clustering thus gives a density of less than one person per Km². Population in the Toledo District is estimated at 14,100. Fifty seven percent are Mayan, 13 percent Garifuna fishermen, and 30 percent Creole, East Indians, Mestizo, and Whites. Nutrition is generally inadequate. Farmers practice milpa, slash-burn farming. Upland rice, maize, and beans are grown for local consumption while sugar, citrus, bananas, mangoes and the proposed cocoa are grown as cash crops.

In terms of direct beneficiaries of the present project, it is anticipated that of 1,700 upland farmers in the Toledo District 400 units will become involved in the production of cocoa.

D. Relationship to Other Activities

The TAMP relates directly to at least three other active or pending projects. The U.K. supported Toledo Research and Development Project (TRDP) also aims to improve the utility of upland farms. Focus has been on rice production, both upland as well as lowland. Work with cocoa began in 1983 with a number of establishment trials. With emphasis on a shift to lowland rice, as well as enhanced cocoa production there could be a significant lessening of land pressure from the milpa system. The IFAD, Toledo Small Farmers Development Project, is essentially a "co-proposal" with the TAMP. This project also emphasizes the Toledo District. It aims to strengthen agricultural practices on small farms with alternative to slash/burn with the dangerously shortening fallow periods of four to seven years. Relief from subsistence farming is needed to reduce this environmental threat. IFAD proposes a significant strengthening of extension in the district. They anticipate one extension/310 farmers. Depending on the level of training these personnel could provide an important linkage in pesticide use training. The Belize Accelerated Cocoa Production Project (BACPP) was initiated in 1984 with a USAID grant to PADF and a sub-grantee VITA. Objectives of this project include the acceleration of cocoa production nationwide using improved technology, establish 60 small farms, and to train six extension workers from the MNR in the technology of cocoa production. Establishment of new cocoa plantings at Ringtail Village and the Valley of Peace Village is well underway. Much of the assistance and guidance for these latter efforts have come directly from Hummingbird Hershey Ltd. which already is farming about 350 acres of producing cocoa. Experience in crop protection including pesticide use has emanated from HHL to small cocoa producers as far as the Toledo District.

While the TAMP concentrates on cocoa, activities in maize, beans, and rice play a major role. It is clear, that in order for a farmer to have time for the establishment of cocoa and to wait out the production lag it will be essential that he not only maximize production in these subsistence crops, but provide post-harvest protection as well. Pesticides are not widely nor wisely used during the production and storage phase of these commodities. Sixty percent losses are common and in rarer case 100 percent of maize may be lost during storage. Proper storage and pesticide use is essential if these losses are to be reduced. Finally, citrus is outside the scope of this project but is widely grown in the Toledo District. Insect and disease problems on this commodity require pesticide use. The use of these chemicals in other commodities is not only possible but highly likely. Frequently, availability becomes the selection principal rather than suitability. For this reason it becomes essential that pesticide use on citrus in the Toledo District receive close scrutiny.

III. Purpose of the Environmental Assessment

The purpose of the E.A. is to examine the foreseeable positive and negative impacts of the proposed project on the human and natural environment, propose measures to reduce or eliminate any such negative impacts, and to assure that any environmental protection subcomponents are adequately incorporated into the project. All of this analysis is done in conformance with AID's Environmental Procedures (22 CFR Part 216).

The PID indicates that pesticide use, while not extensive is anticipated at various times during the LOP. Pesticide inputs for cocoa would be minimum but adequate levels for commercial quality would be supported within the project. On-farm postharvest management is necessary to reduce losses due to pests and diseases. Pesticide use will be essential if these losses are to be significantly reduced, not only in cocoa, but in maize, beans, and rice as well. Finally, it is anticipated that some pesticides will be used for protection of rice and cocoa at postharvest assembly points. The PID and the AID/W review called for an evaluation of pesticide practices within the project. It is this assessment of pesticide use aspects of this project that will form the bulk of the E.A. It is carried out as an integral part of the Project Paper development and shall be appended to that Paper. The purpose of this analysis is to identify appropriate and safe pesticides which can be procured or used under the project, the Integrated Pest Management (IPM) research needs, review GOB's pesticide policy, training requirements, technical assistance needs, and procedures for packaging, distribution, storage, and disposal of pesticides.

IV. PESTICIDE USE ASSESSMENT

A. Basis for Selection of Pesticides

The guiding principles underlying the selection of pesticides to be used in association with any AID project include: conformity with AID and Host Country regulations, effectiveness for demonstrated crop protection needs under prevailing environmental conditions, minimization of human and environmental hazards, and promotion of the IPM approach. These concerns are addressed in detail in the following sections of this E.A.

The approach taken for the purposes of this E.A. is to evaluate the acceptability of a number of pesticide products. The selection of pesticides for project use can seldom be finalized during PP development. Thus, pesticides reviewed include those currently recommended and used on the pertinent commodities and those which may be used purely on the basis of availability. Also, additional pesticides will be authorized on the assumption that they will be of value to the project based on the range of crops proposed and the nature of the pest problem reported on these crops in the Toledo District.

Information on pesticide availability and current and projected pest problems came primarily from interviews with local agrichemical dealers and project personnel at HHL, TDRP and the BACPP. Particularly helpful were the 1984 TDRI report by A. Ward, several reports from the Agricultural Information Unit at Belmopan, the disease listing by D. Mertly in 1985, and Report 106 from the Food and Feed Grain Institute at Kansas State University in 1985.

The principal crops being considered in TAMP include cocoa for export, maize largely for home use, and upland rice and red kidney beans for home use and as local cash crops. The major insect and disease problems known to or expected to exist on these crops in the Toledo District include: on cocoa; black pod disease (Phytophthora palmivora) and witches broom, the pinhole borer (Xyloborus), as well as thrips (Selenothrips), leaf feeding moth larvae and leaf cutting ants; armyworm (Spodoptera frugiperda) attacks both rice and corn plants, occasional rice pests are planthoppers (Sogatodes), stinkbug (Oebalus insularis) and froghoppers (Aeneolamia), on bean; are bruchids (Zabrotes subfasciatus), seed corn maggot (Hylema cilicror), and the bean beetle (Epilachna borealis) as well as a host of diseases such as "web blight", rust, anthracnose, root rots, damping off, etc. Other than armyworm only stemborer (Diatrea

191

lineolata) and leaf cutter ants (Atta cephalotes) are occasionally important in maize. While losses during the growing season are significant, often more severe attack occurs during postharvest storage. Stored cocoa beans are subject to attack by the warehouse moth (Cadra cautella) and the flour beetle (Tribolium). Similar pests attack stored rice as does the Sitophilus weevil. The weevil (S. zeamais) also causes severe losses to stored maize.

The principal products being used at this time to control insect pests on cocoa include carbofuran (Furadan) carbaryl (Sevin) malathion and monocrotophos (Nuvacron). No insecticides are used in maize while monocrotophos or proprospur (Baygon) are occasionally used in rice. Only malathion is used in beans. Fungicides include copper hydroxide (Kocide), metalaxyl (Ridomil) and the dithiocarbamate, manzate. Principal herbicides include 2,4-D, glyphosate (round up) and paraquat (Gramaxone).

The list of project approved pesticide materials which follows in the next section should be reviewed as flexible. The list is to be modified as needed in response to changes in AID or GOB regulations or policies, or in the occurrence of unforeseen insect, disease, or weed problems. Project management may request that additional products be authorized; such requests will be evaluated on a case-by-case basis by USAID/Belize and the AID/LAC Bureau Environmental Offices. If necessary, based on new regulations or information, AID may also remove a product from the authorized list.

As a rule, pesticides should be used only on those crops for which residue tolerances have been established by the EPA or for which maximum residue limits have been recommended by the WHO/FAO joint expert meeting on pesticide residues. Adherence to EPA registrations is critical in the case of cocoa intended for export to the U.S., as failure to do so may lead to rejection of the product by U.S. officials at the port of entry. For crops intended for domestic use, the existence of WHO/FAO recommended MRL's and/or registration for the same or similar use in selected other countries (such as EEC countries) may be considered sufficient.

The products authorized in this E.A. for project use is based on the assumption that they may eventually be adopted and applied, without direct supervision or special training by a number of individual farmers. For this reason, products which

are restricted to use by certified pesticide applicators, and which can only be used safely with extensive safety precautions or specialized equipment and protective clothing, are not authorized for general use.

A.I.D. regulations permit the use of restricted use products "for research or limited field evaluation by or under the supervision of project personnel". The EPA restricted products may therefore be used in this project for research purposes under the conditions described in Section IV H of this E.A. They should not be used with the expectation that they may be extended as a crop protection recommendation to the farmer. Products which have been cancelled by the EPA for agricultural uses should not be used in this project even for experimental purposes.

B. Registration Status of Requested Pesticides

The pesticides listed in Tables 1 and 2 are either presently used on the pertinent commodities, are generally available in Belize, or are judged as likely to be requested by project management during the LOP. In accordance with AID Regulation 16, Table 1 indicates whether each material is registered by US/EPA for General Use (G), Restricted Use (R) by certified applicators or Cancelled (C) for uses related to this project. The relative toxicity (LD₅₀) and WHO toxicity classification is provided for each product. Only those products indicated by a "t" in the column headed "Project Authorization" are approved for use in the TAMP.

Table 2 indicates the currently approved uses for authorized products. The table may be updated as additional information becomes available and/or additional crops are added. Uses not presently authorized in Table 2 may be approvable if a special need is demonstrated. In such a case ST/AGR is prepared to advise and assist project management in an effort to gain special need or minor use clearances from regulatory agencies and to encourage manufacturers to provide needed data for this purpose. It should be noted, however, that this procedure can entail some cost which may have to be borne by the project. In most cases it will prove more cost effective to seek suitable alternative pesticides already registered for that use. Project management should request specific guidance from ST/AGR on a case-by-case basis. None of the chemicals authorized for project are currently under special review by EPA on the basis of exceeding risk criteria.

IVB. Explanations on Specific Recommendations Accompanying
Tables 1 and 2.

The US/EPA has ruled that aldrin registration has been cancelled for all agricultural uses. It may be used for below ground insertion for termite control only. The GOB has declared it a prohibited insecticide, however, and its use is not permitted in the project.

Carbofuran is a restricted pesticide by EPA. Higher concentrations are considered significantly hazardous to the uses, while lower concentration granular formulations are restricted primarily on the basis of hazard to wildlife. The GOB restricts its use as a soil insecticide only. At this time, carbofuran is authorized for use in the project only as a granular formulation containing five percent or less of the active ingredient for use as a soil insecticide in cocoa nurseries.

Chlorpyrifos, Diazinon, and Propoxur are considered to be moderately hazardous materials, and while registered for general use by EPA are restricted in use by the GOB. The use of these materials present a significant hazard to untrained users. It is critical that label requirements regarding protective clothing and application practices be enforced when these products are used. It is also recommended that low-toxicity formulations of these products be used whenever possible. Seed treatments and granules with low concentrations of active ingredients are preferable to emulsifiable concentrates and are recommended whenever they can be used. Great care should be taken to ensure that mixing and application are never done with bare hands. Project's personnel may contact ST/AGR for recommendations concerning preferred formulation of specific compounds.

Phostoxin is used as a fumigant for rice and cocoa bean storage. Its use is restricted by EPA and GOB thus requiring training and certification of applicators. In the present project its use is authorized only in the larger rice mill at Big Falls and in cocoa bean collection centers as needed in later stages of the project.

Leaf cutting ants are a serious problem in cocoa plantings. Of the two effective materials, aldrin is prohibited by GOB and Mirex is prohibited by EPA. It is evident that alternative materials will have to be identified for the control of this pest.

11/20

Table 1

PESTICIDES CONSIDERED FOR PROJECT USE

<u>NAME</u> 1.	<u>PROJECT AUTHORIZATION</u>	<u>EPA REGISTRATION STATUS</u> 2	<u>LD50 mg./Kg. Oral/Dermal</u> 3	<u>WHO TOXICITY CLASSIFICATION</u> 4
<u>Insecticides</u>				
Aldrin	- 7	C	98/	Ib
Aluminum phosphide (Phostoxin)	+/- 6	R	1 STEL	High Hazard
Bacillus thuringiensis (Dipel)	+	G	nil/nil	IV
Carbaryl (Sevin)	+	G	500/	II
Carbofuran (Furadan)	5	R	11/10,200	Ib
Chlorpyrifos (Dursban)	+	G 8	135/ 200	II
Dichloros (DDVP)	+/- 6	R	56/ 75	Ib
Diazinon	+	G 8	300/ 3,600	II
Malathion	+	G	1,375/ 4,100	III
Methamidophos (Tamaron)	-	R	30/	Ib
Methoxychlor	- 7	G	6,000/	IV
Mirex	?	C 8	300/	II
Monocrotophos (Nuvacron)	-	R	14/	Ib
Permethrin (Ambush, Pounce)	+	G	4,000/	V
Pirimiphos-M (Actellic)	+	G	2,000/ 4,592	III
Propoxur (Unden)	+	G 8	95/	II
Pyrethrum (Pyrethrins)	+	G	1,500/ 1,800	II
Trichlorfon (Dipterex)	+	G	560/	III
M. Parathion (Folidol)	-	R	14/	Ia
<u>Fungicides</u>				
Copper-based (Kocide)	+	G	400-1,000/	II-III
Maneb	+	G 8	6,750/	IV
Metalaxyl (Ridimil)	+	G	699/ 3,100	III

161

Herbicides

Atrazine (Gesaprim)	+	G	1,780/	IV
Chloramben (Amiben)	+	G	5,620/	IV
Chlorthal dimethyl (Dacthal)	+	G	10,000/10,000	IV
2,4-D	+	G/R 8	375-800/	II
Dalapon (Dowpon)	+	G	970/	IV
Diphenamid (Enide)	+	G	1,000/	III
Diuron (Kaymex)	+	G	3,400/	IV
Glyphosate (Round Up)	+	G	4,300/	IV
Paraquat (Gramoxone)	-	R	150/	II
Propanil (Stam)	+	G	1,348/4,830	IV
Trifluralin (Treflan)	+	G	10,000/	IV

Footnotes:

1 Trade names (parentheses) are provided for convenience and do not imply endorsement of a particular product.

2 G = General Use, R = Restricted to use by certified applicators, C = agricultural uses cancelled.

3 Based on technical product. (Farm Chemicals Handbook, 1984, Meister Publishing Co., Willoughby, Ohio, U.S.A).

4 Ia = Extremely Hazardous, Ib = Highly Hazardous, II = Moderately Hazardous, III = Slightly Hazardous, IV = Unlikely to present acute hazard in normal use. Classifications based on technical product.

5 While a restricted chemical, granular formulations containing no greater than 5 percent active ingredients may be used.

6 See section IVB of E.A.

7 Use prohibited in Belize by Pesticides Control Act of 1985.

8 Use restricted in Belize by PCA-1985.

1/21

Table 2

AUTHORIZED CROP USES OF APPROVED PESTICIDES BASED
ON US/EPA REGISTRATION AND/OR FAO MAXIMUM RESIDUE LIMITS

<u>NAME</u>	<u>COCOA</u>	<u>BEANS</u>	<u>CORN</u>	<u>RICE</u>
<u>Insecticides</u>				
Aluminum phosphide + dry beans				
Bacillus thuringiensis	exempt.....		
Carbaryl		+	+	+
Carbofuran			+	+
Chlorpyrifos			+	
Dichlorvos	non-crop-fumigant only.....		
Diazinon		+	+	
Malathion		+	+	+
Permethrin			+	
Pirimiphos-M	+ dry beans	stored product use		
Propoxur				
Pyrethrum	+ dry beans	+	+	+
Trichlorfon		+	+	
<u>Fungicides</u>				
Copper based				
Maneb		+	+	
Metalaxyl				
<u>Herbicides</u>				
Atrazine			+	
Chloramben		+		
Chlorthal dimethyl				
2,4-D			+	+
Dalapon		+	+	
Diphenamid				
Diuron			+	
Propanil				
Trifluralin				+

Monocrotophos, methamidophos, and parathion are restricted use on the basis of high to extreme hazard to the applicator. Their use by small farmers in the project is not warranted thus they are not authorized for use in the project.

The herbicide 2, 4-D while registered for general use by EPA is in a restricted category in Belize. Its use is restricted to use "against broad leaf weed crops by registered users".

Because of the toxicity hazards involved in the use of paraquat its use is restricted in the U.S. as well as by GOB. The product is not authorized for use in the project and it is recommended that Diuron and Glyphosate be considered as alternative materials.

Table 2 lists the authorized crop uses of the approved pesticides. Cocoa has no registered use by US/EPA and MRL's are yet to be established by FAO. Materials requested for use in cocoa are authorized as follows. Carbofuran is authorized for use in the soil for protection of seedlings against pinhole borer. The time between treatment and fruit production precludes any residue hazard. Carbaryl has a wide registration and with its short residual and low mammalian toxicity should present an extremely low risk as a foliar spray on the crop. Pod treatments utilize malathion for thrips on a sporadic basis and Kocide or Ridomil for routine spraying for protection against black pod disease. The later extraction of cocoa beans for processing should present no risks. Similarly, use of the herbicides round-up and 2, 4-D are not expected to produce unacceptable residues in the final product. It is recommended, however, that the use of any of the above authorized pesticides by participating farmers be made known to the broker (buyer). Thus, it becomes the responsibility of the processor to assure that pesticide residues are below detectable levels in the product.

C. Extent to Which the Proposed Pesticide Uses are Part of an Integrated Pest Management (IPM) Program

It is anticipated that new cocoa plantings in the Toledo District will develop slowly over the LOP and in five years may not exceed 1,600 acres in four acre plots. The scattered cocoa plantings with the expected low technology inputs by the Mayan farmer clearly indicates that there will be no seriously disruptive pesticide use patterns not only in cocoa but in the subsistence crops as well. By the end of the project it is possible that sufficient income from the sale of cocoa beans will stimulate increased inputs including pesticides.

With proper planning, it is hoped that the problems following the introduction of insecticides into Malaysia cocoa in 1959 can be avoided.

Use of the broad spectrum materials, dieldrin and DDT not only proved less than satisfactory against the target pests but resulted in outbreaks of secondary pests as well. The acceptance of low levels of injury and the use of selective pesticides in 1961 to favor natural enemies however, brought the system back into balance by 1962. A knowledge and appreciation for the IPM approach by project personnel will provide a means to avoid the early mistakes in Malaysia.

Because the TAMP is a marketing project, there is no research component included in the PP. At this point it is assumed that any research on cocoa will be conducted within the parameter of IFAD's Toledo Small Farmer Development Project and incidentally during the remaining time of the BACPP. IFAD will be taking over the TDRP station and with a temporary extension of time for TDRP personnel and some trained extension personnel may be conducting some limited research. Such research is as yet undefined but should include certain aspects identifiable with the IPM approach. The following needs are suggested for consideration by BACPP personnel and extension personnel.

1. Identification of economically significant diseases and pest species;
2. Crop loss assessment studies, including the establishment of approximate control thresholds;
3. The development of pest density scouting methods appropriate for use by farmers with minimal training and limited time and resources;
4. The development of appropriate disease diagnostic methods;
5. Research related to biological control methods, including identification and bionomics of endemic natural enemies of key pest species, and investigation of potential introduced control agents;
6. Investigation of cultural control methods including crop rotation, field sanitation, planting schedules;
7. Varietal screening for disease and pest resistance;

165

8. Efficacy testing of narrow-spectrum pesticides which are most compatible with an IPM approach;
9. Investigation of optimal methods and timing for pesticide applications; and
10. Pesticide resistance management.

The BACPP is scheduled for expiration in 1987. This project has benefitted from the HHL resources including pesticide recommendations. Their recommendations originate from the parent U.S. company and are not part of an IPM program. BACPP personnel are aware of potential problems with pesticide use and favor non-pesticide programs where indicated. Concerted development of an IPM approach is lacking, however, some effort to obtain witches broom resistant seeds is undertaken.

Other than cocoa the greatest need for crop protection research is in the area of pest management for on-farm and holding or processing centers for post-harvest storage.

All commodities pertinent to this crop are of concern. These include cocoa, corn, rice, and red kidney beans. An IPM approach to stored product protection is clearly warranted. While pesticides can be used to advantage, their use must be supplemented with cultural and sanitation improvements as well as frequent inspections. Because of the serious consequences of pesticide misuse around stored food products, selection of low risk pesticides is essential. Research is needed on newer and potentially more effective materials such as the newly approved Dow chemical product, chlorpyrifos-methyl (Reldan). This material of promise for small grain has acute oral toxicity of 1,090-5,000 mg/ks compared to 2,050 for pirimiphos methyl (actellic). Other products recommended for comparative evaluation include aluminum phosphide (certified users), pyrethrins with synergist, dichlorvos (no pest strips), malathion, pirimiphos methyl, Dipel on corn, and mineral oil on corn and beans.

If IFAD does not undertake a study on protection of stored products it is strongly recommended that this need be fulfilled within TAMP. In that instance, AID/ST/AGR can assist the project in several ways: by helping to prepare appropriate Requests for Proposal for crop protection sub-contractors, by recommending possible long-term sub-contractors, by providing short-term consultants in specific crop protection areas (e.g., entomologists, plant pathologists, nematologists, etc.) and by reviewing proposed research plans. These services can be obtained through a Mission buy-in to the centrally funded pest management project.

16/4

IVD. Proposed Methods of Application and Availability of Equipment and Protective Clothing

Pesticide applications in the Toledo District, presently and in the foreseeable future will be limited to the use of backpack sprayers. A variety of these sprayer, e.g., Solo, Gloria, and CP-3, are available for sale or rent in Belize. Because of their cost \$150-\$300 U.S. they are often rented by the day or ownership is shared by several farm units. Such equipment places the applicator in close proximity to the pesticides. While the authorization of pesticides with low mammalian toxicity will lessen the risks of accidental poisoning, a concerted program on the appropriate use of protective clothing is strongly recommended. Thus, all participants should wear long sleeves, long pants and shoes or boots when applying pesticides in the field and rubber gloves and face shields when handling granulars or concentrates. Handling and application should be confined whenever possible to the early morning or later afternoon, when the cooler temperatures will encourage users to wear appropriate clothing. The clothing should be washed regularly.

Granular furadan is used for the protection of cocoa seedlings against pinhole borer. Rubber gloves must be used when handling this material.

No fumigants whose use requires specialized equipment are authorized for use in the project. Protective equipment including masks and gloves are available to pesticide applicators at the Big Falls rice mill. The use of aluminum phosphide fumigation in cocoa is done at night in open buildings. It is essential that dry rubber (neoprene) gloves be used when handling the pellets since they react to moisture on the land or in the atmosphere.

E. Acute and Long-Term Toxicological Hazards

Whenever pesticides are used there is the risk of excessive exposure resulting in toxicological effects, both to individuals directly involved in handling the materials and to the general public through residues on foods and contamination of drinking water.

With the exception of aluminum phosphide for specialized commercial use, all the pesticides including designated formulations of carbofuran and dichlorvos are registered for General Use in the U.S. This classification, based on studies of both acute and chronic toxicity indicates that they have

been judged not to present an unacceptably high, short-or-long-term health risk to a user who understands and follows all label instructions, including the required interval before re-entry into a treated field.

All pesticides should be handled and used in such a way as to prevent contamination of drinking water. Contamination can occur through pesticide run-off from fields, through spills, through washing equipment or clothing in or near farm water supplies, or through simple dumping of excess materials. Cautions against such practices should be an important part of the training for project participants. If there is any indication that water contamination may have occurred, water samples should be analyzed immediately.

Project personnel should make cooperating farmers and local health officials aware of general symptoms of pesticide poisonings and of any particular symptoms known to be frequently associated with specific materials being used. In each area where the project is active, a public health official should be designated and given instructions and medical supplies for dealing with poisoning cases.

The most effective way to reduce the risk of toxicological hazards due to pesticide residues in foods is to ensure that label instructions, particularly specific registered crop uses and pre-harvest intervals, are followed completely.

For crops intended for the domestic market there is presently no system in Belize for monitoring or control of residue levels in foods. The GOB Pesticides Control Act allows for the establishment of residue limits, but the government will not have resources to enforce this legislation for some time. Although this project will not address this important problem, it will seek to promote proper pesticide use practices and increase growers' awareness of residue problems by producing educational materials on these subjects in sufficient quantity to disseminate in the ensuing years to all interested parties.

F. Effectiveness of the Selected Pesticides for the Proposed Use

Pesticides approved for use in this project were selected in part on the basis of their effectiveness for known disease and pest problems under the environmental conditions of the Toledo District. While there are materials more effective than those

125

authorized, the absence of specialized protective clothing, the use of backpack sprayers, and the lack of pesticide use training prohibits their use. It is hoped that limited adaptive research in IFAD's Toledo Project will demonstrate the relative effectiveness of the recommended materials.

G. Compatibility of Pesticides with Target and Non-Target Ecosystems

Many of the pesticides selected for use in this project on the basis of their relatively low mammalian toxicity nonetheless present significant potential hazards to non-target organisms. In the short term, due to the limited scope of the project, the primary concern will be effects on beneficial insects (including both natural enemies of pest species and honeybees) and on fish and other aquatic organisms in the vicinity of field trials. The toxicity of project-approved pesticides to these organisms is indicated in Table 3.

Honeybees are an important resource for Belizean farmers both as pollinators and in the honey industry, which is steadily gaining importance as a source of cash income in the targeted districts (see the MNR Agricultural Development Plan, 1984-1990). There are now an estimated 10,000 domestic hives in Belize, and exports of honey total approximately \$200,000 per year. Protecting honeybees should therefore be a significant priority in this project. Similarly, parasitic and predatory arthropods are essential elements of any agro-ecosystem, providing a significant check on pest populations. One of the most frequent and devastating effects of overuse and misuse of agricultural pesticides is the destruction of these natural enemies and the resulting rebound in pest populations.

To protect bees and other non-target insects it is important to use narrow-spectrum, specific pesticides whenever possible. Bacillus thuringiensis and other biological pesticides are ideal in this regard. However, many of the most useful pesticide products are broadly toxic to insects, and when these are used it is essential that precautions be taken to reduce exposure of non-target species. This involves utilizing alternative control methods whenever possible, establishing action thresholds (knowledge of when to apply pesticides based on field monitoring of pest populations), reducing the area of exposure through careful application, reducing frequency of applications, and timing applications to coincide with the most susceptible stages of the pest species. Applying pesticides early in the morning or late in the evening, when bees are least active, is also recommended.

Perhaps the most important factor in protecting beneficial insects is raising awareness among farmers so that they will take the appropriate precautions. It is not uncommon for farmers to confuse beneficial species with pests and to spray when they see them in the fields. Educating farmers as to the importance of beneficial insect species should be made an integral part of the pest and pesticide management training courses to be provided to participating farmers. Educational materials should be developed to assist this effort.

Contamination of water resources by pesticide runoffs is a significant concern, particularly in later stages when acreages planted increase. Such runoff presents a human health hazard because much of the population relies on surface water, and is a hazard to fish and other aquatic organisms. The growing importance of mariculture in Belize underlies the importance of preventing such contamination. Where contamination of water resources is judged to be a significant hazard, pesticides which are highly toxic to fish and other aquatic organisms should not be used.

Finally, Belize is favored with an abundance of wildlife, a number of which represent rare or endangered species. These include 15 species of mammals, such as the Jaguar, the Black Spider Monkey and Baird's Tapir; two birds, the Harpy Eagle and the Peregrine Falcon; and several reptiles including the Crocodile, River Turtle and Iguana. Fortunately, these are mostly located in areas remote from those locations judged suitable for agronomic crops, and crop protection practices are expected to have no or minimal impact on their survival.

H. Conditions Under which the Pesticides are to be Used

Cocoa production in Toledo District is estimated at 1,600 acres by the completion of the five year TAMP. Presently there are about 100 producing acres in place with approximately 300 non-producing acres. With three to four years required from seedling to first production it is evident that majority treatments for LOP will be on non-bearing trees. In terms of pesticide use this means one gram of five percent granular carbofuran per seedling four weeks after germination, and a second treatment eleven weeks after control. Carbaryl is used optionally for leaf feeding insects. Treatment for the remaining pests will not be effected until fruiting begins and cash flow has started. Cocoa plantings are scattered and essentially part of the forest ecosystem. Carbofuran, at the quantities indicated is expected to have a minimal or nil

TOXICITY OF PESTICIDES TO NON-TARGET ORGANISMS

<u>NAME</u>	<u>BEEES</u>	<u>BIRDS</u>	<u>FISH</u>
<u>Insecticides</u>			
Aluminum phosphide			
Bacillus thuringiensis			
Carbaryl	T		
Carbofuran	T	T	T
Chlorpyrifos	T		T
Dichlorvos			
Diazinon	T		T
Malathion	T		T
Permethrin			T
Pyrimiphos-M			T
Propoxur	T	T	T
Pyrethrum			
Trichlorfon			
<u>Fungicides</u>			
Copper based			T
Maneb			T
Metaxyl			
<u>Herbicides</u>			
Atrazine			
Chloramben			
Chlorthal dimethyl			
2,4-D			
Dalapon			
Diphenamid			
Diuron			
Propanil			
Trifluralin			

T = Highly Toxic

effect on the system. Because leaf feeding insects can be mechanically removed and are seldom threatening in seedling survival, it is likely that even less carbaryl will be used by the milpero.

As discussed previously the more hazardous stored product materials such as aluminium phosphide will be limited to the Rice Mill and possibly to one or a few cocoa bean collection centers.

Critical to the success of the project is the reduction of crop losses in the milpa farmers subsistence crops, primarily corn and red kidney beans. It is only through a significant increase in consumable products that time can be made available for the establishment of the cocoa plantings. On farm protection of stored maize and beans for some use and the protection of the cash crop portion of the beans with appropriate pesticides should be encouraged. It thus becomes the responsibility of the TAMP to provide for the extension of proper pest management strategies to the milpera.

I. Availability and Effectiveness of Other Pesticides or Control Methods.

Presently a wide variety of pesticides, effective for use in pest management programs, are readily available on the open market in Belize. Many of these possess acute toxicological characteristics which result in unacceptable risks to the untrained user however. These pesticides are being purchased and used particularly by farmers entering Belize from Guatemala, Honduras, El Salvador, etc. These are areas with a history of pesticide use and misuse, particularly with more toxic materials such as Parathion, Methamidophos (Tamaron) and Ethoprop (Mocap). It is regrettable that as agriculture develops in Belize it may tend to follow the misdirected lead of these immigrant farmers. Every effort must be made to curtail these practices.

The major pesticide inventory in the Toledo District resides with the store of a Mr. Mendez. He sells only Bayer Chemical Products. The restricted herbicide, paraquat is available from a "Pennels" Hardware Store. Pennels also sells backpack sprayers. Other than these two outlets some pesticide have been made available from TDRP and the Rice Mill. Clearly, it will become critical to the project that an adequate inventory of the recommended materials be readily available at one or more distribution points in the Toledo District. It is understood that several such options will be contained in the

PP. A centralized distribution system could provide a means for extension to make recommendations on the safe use of the appropriate pesticides. Alternative control measures are not much evident in the District. Some seed selection for resistance to cocoa witches broom are purchased from Equador. Costa Rica (CATIE) seeds are avoided because of their propensity for this disease. Cocoa resistance to other diseases such as black pod is known. However, there exists some contrary opinion as whether it is wise to clone rather than use hybrids. The hybrid choice would seem to lessen the chances of catastrophe loss due to a single agent. Other than resistance some of these disease problems can be reduced by thinning of the shade elimination of damaged pods, and frequent harvesting of healthy pods. Effective control can only be accomplished with supplemental fungicidal sprays, however. TDRP personnel have evaluated bruchid "resistant" beans from the IITA program with little success.

J. Ability of GOB to Regulate Distribution, Storage, Use and Disposal of Pesticides.

In December of 1985, the GOB Pesticides Control Act (No. 32 of 1985) was enacted. The Belizean legislation, modelled on the Jamaican pesticide law, provides for the establishment of a Pesticides Control Board which will have a wide range of responsibilities including:

1. to register pesticides;
2. to licence persons to import or manufacture, pesticides;
3. to authorise persons to sell restricted pesticides;
4. to register premises in which a restricted pesticide may be sold;
5. to authorise pesticide applicators to use restricted pesticides;
6. to classify any pesticide as a registered pesticide, restricted pesticide or a prohibited pesticide;
7. to consider and determine applications made pursuant to this Act and to deal with all aspects of the importation, manufacture, packaging, preparation for sale, disposal and use of pesticides and to advise the Minister on all matters in relation thereto.

Shortcomings in the act include the provision that applications do not require special authorization to use "restricted" pesticides if such use is within his own house or on their own farm for non-commercial purposes. The classification of various registered, restricted, or prohibited are not necessarily in agreement with those of the US/EPA. Example include the restricted classification of Diazinon, Mirex, and the prohibition of methorychlor. Wisely, this act recognizes the constraints in enforcing safety measures and prohibits the use of highly toxic compounds (restrictive in the U.S.) such as aldicarb, demeton, parathion, and endosulfan.

A major problem with the act is the inability of the GOB to monitor and enforce its compliance. This problem is exacerbated by the openness of Toledo District border with Guatemala and the ready availability of pesticides from the country.

The act allows for prescribing of permissible residue levels, the taking of crop samples, and their analysis. Under a previous project, AID assisted the GOB to equip and staff an analytical laboratory for meats. This laboratory is based at the Central Veterinary Investigatory Laboratory and Clinic in Belize City. The residue laboratory is now functional and could be pressed into service for analysis of domestic and export food crops in the future.

K. Provisions Made for Training Pesticide Users and Applicators

Two programs of pesticide use can be identified within the project. These include protection from stored product pests and that associated with protection of the standing crop. Different technologies are involved for each area but both can benefit from an IPM approach. The question of training relates to all stages of the project. Such provisions must include training of key personnel in this and related projects in both of the above areas. These individuals should then be provided with adequate resources to extend the necessary information to participating farmers.

Stage I training could take many forms but it would seem most appropriate to have an extensive (3-4 weeks), intensive, hands-on training program within the country. Funding for such a program should be allocated in the project budget, both for short-term technical assistance to present the course and for travel and expenses for the participants. An illustrative budget for such an undertaking is provided in the Appendix.

174

Stage II training would take place at the farmer level and could be administered by extension personnel, staff from this (and other) projects, and perhaps Peace Corps. This interaction could be one-on-one, village meetings, or regional commodity field days.

For Stage I, AID/ST/AGR can provide experienced trainers and course materials in Spanish and English through a buy-in to its centrally-funded pest management program. Alternatively, the project can contract with a local organization, such as the Belize School of Agriculture, to present these courses. The use of in-country expertise is strongly recommended, with back-up from out-of-country and regional expertise where necessary. Project funds could be allocated for the preparation or printing of course materials. It is important to select influential, credible individuals as program participants. In addition to being active participants, area agricultural extension agents and local retailers of agricultural products could help identify these individuals. In view of the growing predominance of Central American refugees in Belizean agriculture it would be highly advisable to include some prominent members of these communities as participants in the program.

It is beyond the scope of this report to identify the contents of such a training program. However, it will explain the IPM approach, explore pesticide use and safety, and demonstrate the pest protection aspects of on-farm and commercial storage of agricultural commodities. In the latter instance it would be highly appropriate to construct a variety of storage systems at one or more central locations as field demonstrations, for example, at the TRDP station. These could continue to be used over the LOP and might provide an opportunity for some adaptive research by extension or Peace Corps for pesticide evaluation. In anticipation of such future needs, these and other educational/instructional materials will be produced during the LOP. Such materials will include printed manuals on pesticide use and safety, the significance of pesticide residue levels, and the principles of pest management.

L. Provisions Made for Monitoring the Use and Effectiveness of the Pesticides

Because this is a market-driven project there exists no provision for the monitoring of pesticide activity. In the absence of effective enforcement of the Pesticides Control Act, and the ready availability of restricted pesticides both within the country as well as across borders, it will be difficult if

115

not impossible to monitor their use. If, as anticipated, an agricultural supply center is established in the Toledo District, it may be possible to effect some limited monitoring of buyers of pesticides. In addition, pesticide effectiveness could be followed by alerted extension officers. Currently, pest management recommendations in cocoa flow from HHL to the cocoa grower. HHL, in such an instance, would be essentially monitoring effectiveness at its own farm. Ideally, reported pesticide failures would be promptly investigated and a determination made as to the reason for failure, i.e., poor application, timing, or quality of pesticides versus possible development of resistance in pest population. Where a history of pesticide resistance is known for a particular product, special tactics should be developed to delay its onset.

V. REASONABLY FORSEEABLE IMPACT ON THE HUMAN ENVIRONMENT

Any pesticide added to the environment will have at least a marginally disruptive impact on that environment. In the Toledo District where pesticides have not been widely used, it may be reasonably expected that a successful cash crop such as cocoa will lead to their increased use. Such an activity will lead to increased background levels. These increases and potentially disruptive impacts on the human environment will be minimized if selective, minimum risk pesticides are used on a sound, as-needed basis, alternative management strategies are utilized where feasible, and proper training in the safe use of pesticides is provided.

Secondarily, the project may result in a positive impact on the human environment through an increase in living standards and through a reduction of the adverse effects of the Milpa slash/burn system. In the latter instance increasing pressure on the land due to shifting agriculture is resulting in increasing longer fallow periods. Cocoa production provides an escape from this constraint.

VI. ALTERNATIVES TO THE PROPOSED ACTION

The purposes of the project include; (i) the establishment of a viable export oriented industry, i.e., cocoa, in the Toledo District, and (ii) accelerate the transition from traditional slash/burn agriculture by means of improved post-harvest practices. Pesticide use represents a pest management strategy essential to the attainment of both goals. While traditional, non-chemical methods of crop protection will be utilized in specific crop/pest situations, there remains no satisfactory alternatives to the use of chemicals in the pest management

176

program. It is thus vital that the crop protection component, via the M.O.A. Agriculture Extension implement the agromedical approach to pesticide management as proposed by USAID/SI/AGR. (Davies et. al., 1982)

VII. Unavoidable Adverse Enviromental Affects

Unavoidable affects of pesticides include increased risks for accidental human exposure and effects on other non-target organisms as previously discussed. However, if proper training is provided for within the project, these potentially disruptive effects can be reduced to an acceptable level in the risk/benefit ratio.

VIII. Relationship Between Short-Term and Long-Term Effects of the Proposed Action

The short-term risks involved in the use of the proposed pesticides have been detailed in the above sections. It is anticipated that as research in related projects here and elsewhere demonstrates the utility of alternate control strategies and that a viable integrated pest control program will evolve, further reducing dependence on chemical control methods.

The benefit of pest control within the project are evident. In the absence of control losses of 60 percent and more have occurred in on-farm storage. Losses in cocoa seedlings due to pinhole borer easily reach 20 percent. Reduction of their losses is essential to the success of the project. Beneficiaries by the completion of the project are expected to be about 500 farm families in the Toledo District. These farmers have suffered the stresses of subsistence agriculture for their lifetime. The success of the present project will provide employment and an opportunity for their people to benefit from the production of a readily marketable cash crop and thus to improve their living standards. Such long-term effects of the project would appear to more than offset the short-term and largely manageable risks involved in the use of pesticides within an integrated pest control program.

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APPENDIX

I. ILLUSTRATIVE BUDGET: CROP PROTECTION TRAINING AND DEMONSTRATION

A. <u>Experts</u>		14,000
Training program coordinator- (4mm at \$15,000)	60,000	
Operational expenses	10,000	
Storage Systems Coordinator (4 mm at \$15,000)	60,000	
Operational Expenses	10,000	
B. <u>Training Program</u>		84,000
Participant's per diem (50 at 1,000)	50,000	
Organized Travel	2,000	
Site Costs	3,000	
Trainers expenses-		
In country trainers-(5 at 1,000)	5,000	
Out of country trainers-(3 at 6,000)	18,000	
Materials	5,000	
 TOTAL		 <hr/> \$224,000 <hr/>

Detailed Project Budget for Toledo Agricultural Marketing Project

Line Item	YEAR 1			YEAR 2			YEAR 3			YEAR 4			YEAR 5			TOTAL EST. COST
	P/M	Rate	Est. Cost	P/M	Rate	Est. Cost	P/M	Rate	Est. Cost	P/M	Rate	Est. Cost	P/M	Rate	Est. Cost	
I. Salaries																
A. Personnel																
None Office Support																
Project Supervision	2	4000	8000	2	4000	8000	2	4000	8000	2	4000	8000	2	4000	8000	840,000
Field - Long Term																
Enterprise Dev./Organiz. Spec	12	4500	54000	12	4500	54000	12	4500	54000	12	4500	54000	12	4500	54000	6270,000
Agronomist/Multiculturalist	12	4000	48000	12	4000	48000	12	4000	48000	0	4000	0	0	4000	0	648,000
Marketing Economist	12	4000	48000	12	4000	48000	12	4000	48000	0	4000	0	0	4000	0	614,000
Field - Short Term																
Postharvest Engineer	3	4000	12000	2	4000	8000	2	4000	8000	1	4000	4000	0	4000	0	832,000
Social Sci./Community Dev.	2	3500	7000	1	3500	3500	0.5	3500	1750	0	3500	0	0	3500	0	812,250
Other	5	4000	20000	1	4000	4000	1.5	4000	6000	2	4000	8000	2	4000	8000	651,000
	197000			181500			173750			71000			70000			
		48			44			42			17			16		
B. Local Personnel																
Service Center																
Manager	12	750	9000	12	750	9000	12	750	9000	0	750	0	0	750	0	827,000
Asst. Manager	12	500	6000	12	500	6000	12	500	6000	0	500	0	0	500	0	819,000
Fieldman No.1	12	600	7200	12	600	7200	12	600	7200	0	600	0	0	600	0	821,600
Fieldman No.2	12	600	7200	12	600	7200	12	600	7200	0	600	0	0	600	0	821,600
Fieldman No.3	12	600	7200	12	600	7200	12	600	7200	0	600	0	0	600	0	814,600
Project Office (Toledo)																
Secretarial & Other	12	450	5400	12	450	5400	12	450	5400	12	450	5400	12	450	5400	827,000
Project Office (SMB/Belize)																
Stat. Assistant	12	600	7200	12	600	7200	12	600	7200	0	600	0	0	600	0	821,600
Rice Mill / Postharvest																
Local Contract	2	1000	2000	1	1000	1000	1	1000	1000	1	1000	1000	0	1000	0	85,000
	44000			50200			50200			4400			5100			
		74			1			1			1			0		
		1	241000		1	231700		1	223950		1	80400		1	75400	8852,450
II. Fringe Benefits																
US Personnel																
US Personnel	0.18	197000	35160	0.18	181500	32670	0.18	173750	31275	0.18	71000	12780	0.18	70000	12600	8125,325
Local Personnel	0.1	44000	4400	0.1	50200	5020	0.1	50200	5020	0.1	4400	440	0.1	5100	510	815,620
		11	39660		11	37690		11	36295		11	13180		11	13110	8140,945
III. Overhead (Base + Sal + Fringe)																
US Personnel																
US Personnel	0.36	232160	83685.6	0.36	214170	77101.2	0.36	205025	73809	0.36	87320	31435.2	0.36	82600	29736	8295,767
		111	83685.6		111	77101.2		111	73809		111	31435.2		111	29736	8295,767
IV. Travel & Transportation																
A. US Travel																
Field LI Orientation	3	600	1800	0	600	0	0	600	0	0	600	0	0	600	0	81,800
B. International Travel																
None Office	3	450	1350	3	450	1350	2	450	900	2	450	900	2	450	900	85,400
Field Long Term																
To Post (one way)	6	300	1800	0	300	0	0	300	0	0	300	0	0	300	0	81,800

167 AH

8

BIR (Basic Round Trip)	0	350	0	4	350	2100	4	350	1400	2	350	700	2	350	700	81,900
Home Leave (round trip)	0	450	0	0	450	0	2	450	900	0	450	0	0	450	0	1700
End of Tour (one way)	0	300	0	0	300	0	4	300	1200	0	300	0	2	300	600	81,820
Field Short Term (round trips)																
Regular	2	450	900	2	450	900	2	450	900	1	450	450	0	450	0	83,150
Specialized	2	450	900	2	450	900	2	450	900	2	450	900	2	450	900	84,530
	4730		5250			4200			2950			3100				

C. Local Travel																
Vehicle Fuel			7000			7000			7000			2800			2800	826,600
Vehicle Maint./Ins./Lic.			2500			2500			2500			1000			1000	89,500
Vehicle Rental (if req.)			1000			1000			1000			200			200	83,400
Fares (taxis, buses, etc.)			1000			1000			1000			200			200	83,400
	11500		11500			11500			4200			4200				

D. Transport/Storage																
Sea Freight	Lbs.	Rate		Lbs.	Rate		Lbs.	Rate		Lbs.	Rate		Lbs.	Rate		
Unaccompanied baggage	22500	0.86	19350	0	0.86	0	15000	0.86	12900	0	0.86	0	7500	0.86	6450	838,700
Excess Baggage	1350	1.23	1660.5	0	1.23	0	900	1.23	1107	0	1.23	0	450	1.23	553.5	83,321
Long Term	Trips	Rate		Trips	Rate		Trips	Rate		Trips	Rate		Trips	Rate		
Short Term	4	50	200	4	50	200	4	50	200	3	50	150	2	50	100	8500
Storage of H&E	Months	Rate		Months	Rate		Months	Rate		Months	Rate		Months	Rate		
Priv. Owned Veh.	No.	Rate		No.	Rate		No.	Rate		No.	Rate		No.	Rate		
	3	1000	3000	0	1000	0	2	1000	2000	0	1000	0	1	1000	1000	86,000
	27390.		3080			19387			1210			19183.5				
	IV.	SUBTOTAL	45640.5	IV.	SUBTOTAL	19830	IV.	SUBTOTAL	37087	IV.	SUBTOTAL	8360	IV.	SUBTOTAL	16463.5	8127,381

V. Allowances																
Post Differential @ 25%	%	Base	Est. Cost													
Temporary Quarters Education	0.25	150000	37500	0.25	150000	37500	0.25	150000	37500	0.25	150000	37500	0.25	150000	37500	819,500
Education Travel (round trips)	Days	Rate														
Long Term	90	50	4500	0	50	0	0	50	0	0	50	0	0	50	0	84,500
Specialized	Trips	Rate														
Regular	2	450	900	2	450	900	2	450	900	1	450	450	1	450	450	83,600
Specialized	150	88	13200	90	88	7920	75	88	6600	30	88	2640	0	88	0	830,360
Home Office	150	88	13200	90	88	7920	45	88	3960	60	88	5280	60	88	5280	835,640
	30	88	2640	15	88	1320	15	88	1320	15	88	1320	15	88	1320	87,920
	V.	SUBTOTAL	75330	V.	SUBTOTAL	58950	V.	SUBTOTAL	53178	V.	SUBTOTAL	24828	V.	SUBTOTAL	22180	6238,920

VI. Other Direct Costs																
Expendable Supplies	P/M	Rate	Est. Cost													
Communications	12	250	3000	12	250	3000	12	250	3000	12	100	1200	12	100	1200	811,400
Physical Exams/ Shots (trips)	Trips	Rate														
Regular	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	500	6000	12	500	6000	12	500	6000	12	200	2400	12	200	2400	822,800
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Home Office	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,900
Specialized	12	130	1560	4	130	520	4	130	520	4	130	520	4	130	520	83,

	P/R	Rate		P/R	Rate		P/R	Rate		P/R	Rate		P/R	Rate	
ST Field (mm)	10	25	250	6	25	150	4	25	100	3	25	75	2	25	50
	VI.	SUBTOTAL	16609.9	VI.	SUBTOTAL	15316.05	VI.	SUBTOTAL	14799.12	VI.	SUBTOTAL	6350.0	VI.	SUBTOTAL	6219

VII. Commodities and Equipment	No.	Rate	Est. Cost	No.	Rate	Est. Cost	No.	Rate	Est. Cost	No.	Rate	Est. Cost	No.	Rate	Est. Cost
A. Project Office / Living Quarters															
Renovation of MDA Facilities			96000			0			2000			1000			1000
Supplies			5000			5000			5000			2000			2000
Equipment			12000			2000			2000			500			500
B. Service Center															
Facility			50000			0			25000			0			0
Equipment			15000			2000			2000			1000			1000
Inventory			25000			2000			2000			0			0
C. Rice Mill															
Equipment			156000			2000			2000			0			0
D. Postharvest															
Cocoa Equipment & Supplies			10000			5000			2000			2000			2000
Grain Equipment & Supplies			10000			5000			2000			2000			2000
E. Vehicles															
1 ea. 4x4 F-250 Supercab	1	13000	13000	0	13000	0	0	13000	0	0	13000	0	0	13000	0
3 ea. F-150 Supercabs	3	9000	27000	0	9000	0	0	9000	0	0	9000	0	0	9000	0
4 ea. 175 c.c. Motorcycles	5	1200	6000	0	1200	0	0	1200	0	0	1200	0	0	1200	0
	VII.	SUBTOTAL	425000	VII.	SUBTOTAL	23000	VII.	SUBTOTAL	44000	VII.	SUBTOTAL	8500	VII.	SUBTOTAL	8500

VIII. Training	Months	Rate	Est. Cost	Months	Rate	Est. Cost	Months	Rate	Est. Cost	Months	Rate	Est. Cost	Months	Rate	Est. Cost
Belize College of Agriculture	04	210	17640	04	210	17640	0	210	0	0	210	0	0	210	0
International Short Course	3	1500	4500	3	1500	4500	2	1500	3000	2	1500	3000	0	1500	0
Long Term (BS Degree)	6	2000	12000	24	2000	48000	18	2000	36000	0	2000	0	0	2000	0
	VIII.	SUBTOTAL	31140	VIII.	SUBTOTAL	70140	VIII.	SUBTOTAL	39000	VIII.	SUBTOTAL	3000	VIII.	SUBTOTAL	0

IX. Credit															
Center Revolving Fund			35000			0			0			0			0
Loan Fund															
	IX.	SUBTOTAL	35000	IX.	SUBTOTAL	0									

GRAND TOTAL			998,266	GRAND TOTAL		653,727	GRAND TOTAL		632,610	GRAND TOTAL		6176,826	GRAND TOTAL		6171,639

192

Line Item	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	LOP TOTAL
I. Technical Assistance						
A. Salaries						
1. US Personnel						
Long Term Staff	\$8,000	\$8,000	\$8,000	\$8,000	\$8,000	\$40,000
Enterprise Dev./Organiz. Spec						
Agronomist/Horticulturalist	\$54,000	\$54,000	\$54,000	\$54,000	\$54,000	\$270,000
Marketing Economist	\$48,000	\$48,000	\$48,000	\$0	\$0	\$144,000
Short Term Staff	\$48,000	\$48,000	\$48,000	\$0	\$0	\$144,000
Postharvest Engineer						
Social Sci./Community Dev.	\$12,000	\$8,000	\$8,000	\$4,000	\$0	\$32,000
Other	\$7,000	\$3,500	\$1,750	\$0	\$0	\$12,250
2. Local Personnel	\$20,000	\$12,000	\$6,000	\$8,000	\$8,000	\$54,000
Service Center						
Manager	\$9,000	\$9,000	\$9,000	\$0	\$0	\$27,000
Asst. Manager	\$6,000	\$6,000	\$6,000	\$0	\$0	\$18,000
Fieldmen (3)	\$14,400	\$21,600	\$21,600	\$0	\$0	\$57,600
Project Office (Toledo)						
Secretarial & Others	\$5,400	\$5,400	\$5,400	\$5,400	\$5,400	\$27,000
Project Office (BMB-Belize City)						
Stat. Assistant	\$7,200	\$7,200	\$7,200	\$0	\$0	\$21,600
Rice Mill/ Postharvest						
Local contract	\$2,000	\$1,000	\$1,000	\$1,000	\$0	\$5,000
Ministry of Agriculture						
Extension Agents	\$13,400	\$13,400	\$13,400	\$13,400	\$13,400	\$67,000
B. Fringe Benefits						
US Personnel	\$35,460	\$32,670	\$31,275	\$13,320	\$12,500	\$125,225
Local Personnel	\$4,400	\$5,020	\$5,020	\$640	\$540	\$15,620
C. Allowances						
Post Differential	\$37,500	\$37,500	\$37,500	\$13,500	\$13,500	\$139,500
Other	\$37,830	\$21,450	\$16,170	\$11,320	\$8,630	\$95,400
D. Overhead (Salaries & Fringes)	\$83,686	\$77,101	\$73,809	\$31,435	\$29,736	\$295,767
II. Travel and Transportation						
A. US Travel	\$1,800	\$0	\$0	\$0	\$0	\$1,800
B. International Travel	\$4,950	\$5,250	\$6,200	\$2,950	\$3,100	\$22,450
C. Local Travel	\$11,500	\$11,500	\$11,500	\$4,200	\$4,200	\$42,900
D. Transport/Storage	\$27,391	\$3,090	\$19,387	\$1,210	\$9,164	\$60,231
III. Other Direct Costs	\$16,610	\$15,316	\$14,799	\$6,331	\$6,219	\$57,295
IV. Commodities and Equipment						
A. Project Office/ Living Quarters	\$313,000	\$7,000	\$9,000	\$3,500	\$3,500	\$336,000
B. Service Center	\$90,000	\$4,000	\$29,000	\$1,000	\$1,000	\$125,000
C. Rice Mill	\$156,000	\$2,000	\$2,000	\$0	\$0	\$160,000
D. Postharvest	\$20,000	\$10,000	\$4,000	\$4,000	\$4,000	\$42,000
E. Vehicles	\$46,000	\$0	\$0	\$0	\$0	\$46,000
V. Training						
A. Belize College Of Agriculture	\$17,640	\$17,640	\$0	\$0	\$0	\$35,280
B. International Short course	\$4,500	\$4,500	\$3,000	\$3,000	\$0	\$15,000
C. Long Term (Degree)	\$12,000	\$45,000	\$36,000	\$0	\$0	\$93,000
VI. Credit						
A. Loan Fund	\$0	\$0	\$0	\$0	\$0	\$0
B. Revolving Fund	\$35,000	\$0	\$0	\$0	\$0	\$35,000
SUBTOTAL	\$1,209,666	\$547,127	\$536,010	\$190,226	\$185,039	\$2,668,068
VII. Evaluation /Monitoring		\$12,367			\$12,367	\$24,733
VIII. Contingency/Inflation	\$14,840	\$14,840	\$14,840	\$14,840	\$14,840	\$74,199
GRAND TOTAL	\$1,224,506	\$574,334	\$550,850	\$205,066	\$202,245	\$2,767,000

ABWC 3

(Illustrative Financial Budget for Toledo Agricultural Marketing Project (Public Sector))

Line Item	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	ILOP TOTAL
I. Technical Assistance						
A. Salaries						
1. U.S. Personnel						
Home Office Support	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$12,000
Long Term Staff						
Marketing Economist	\$48,000	\$48,000	\$48,000	\$0	\$0	\$144,000
Short Term Staff						
Postharvest Engineer	\$6,000	\$4,000	\$4,000	\$2,000	\$0	\$16,000
Other	\$2,000	\$1,200	\$600	\$800	\$800	\$5,400
2. Local Personnel						
Project Office (GMB - Belize City)						
Stat. Assistant	\$7,200	\$7,200	\$7,200	\$0	\$0	\$21,600
Rice Mill / Postharvest						
Local Contract	\$2,000	\$1,000	\$1,000	\$1,000	\$0	\$5,000
Ministry of Agriculture						
Extension Agents	\$13,400	\$13,400	\$13,400	\$13,400	\$13,400	\$67,000
B. Fringe Benefits						
US Personnel	\$10,512	\$10,008	\$9,900	\$936	\$576	\$31,932
Local Personnel	\$920	\$820	\$220	\$100	\$0	\$2,660
C. Allowances						
Post Differential	\$12,000	\$12,000	\$12,000	\$0	\$0	\$36,000
Other	\$11,349	\$6,435	\$4,851	\$3,396	\$2,634	\$28,635
D. Overhead (Salaries & Fringes)	\$24,808	\$31,777	\$31,059	\$6,667	\$5,433	\$100,000
II. Travel and Transportation						
A. US Travel	\$540	\$0	\$0	\$0	\$0	\$540
B. International Travel	\$1,435	\$1,575	\$1,840	\$885	\$900	\$6,735
C. Local Travel	\$3,450	\$3,450	\$3,450	\$1,260	\$1,260	\$12,870
D. Transport/Storage	\$8,217	\$924	\$5,916	\$363	\$2,749	\$18,069
III. Other Direct Costs	\$4,983	\$4,575	\$4,440	\$1,905	\$1,844	\$17,788
IV. Commodities and Equipment						
A. Rice Mill	\$156,000	\$2,000	\$2,000	\$0	\$0	\$160,000
B. Vehicles	\$9,000	\$0	\$0	\$0	\$0	\$9,000
C. MOA Former Ag. Station	\$200,000					\$200,000
V. Training						
A. Belize College Of Agriculture	\$17,640	\$17,640	\$0	\$0	\$0	\$35,280
B. International Short course	\$2,000	\$2,000	\$3,000	\$3,000	\$0	\$10,000
C. Long Term (Degree)	\$12,000	\$48,000	\$36,000	\$0	\$0	\$96,000
SUBTOTAL	\$555,904	\$218,424	\$191,796	\$38,112	\$32,273	\$1,036,509
VII. Evaluation /Monitoring		\$3,710			\$3,710	\$7,420
VIII. Contingency/Inflation	\$4,452	\$4,452	\$4,452	\$4,452	\$4,452	\$22,260
GRAND TOTAL	\$560,356	\$226,586	\$196,248	\$42,564	\$40,435	\$1,066,189

150

xii 4

Illustrative Financial Budget for Toledo Agricultural Marketing Project (Private Sector)

I. Technical Assistance						
A. Salaries						
U.S. Personnel						
Home Office Support	\$5,600	\$5,600	\$5,600	\$5,600	\$5,600	\$28,000
Long Term Staff						
Enterprise Dev./Organiz. Spec	\$54,000	\$54,000	\$54,000	\$54,000	\$54,000	\$270,000
Agronomist/Horticulturalist	\$48,000	\$48,000	\$48,000	\$0	\$0	\$144,000
Short Term Consultants						
Postharvest Engineer	\$6,000	\$4,000	\$4,000	\$2,000	\$0	\$16,000
Social Sci./Community Dev.	\$7,000	\$3,500	\$1,750	\$0	\$0	\$12,250
Other	\$18,000	\$10,800	\$5,400	\$7,200	\$7,200	\$48,600
2. Local Personnel						
Service Center						
Manager	\$9,000	\$9,000	\$9,000	\$0	\$0	\$27,000
Asst. Manager	\$6,000	\$6,000	\$6,000	\$0	\$0	\$18,000
Fieldmen (3)	\$14,400	\$21,600	\$21,600	\$0	\$0	\$57,600
Project Office (Toledo)						
Secretarial & Others	\$5,400	\$5,400	\$5,400	\$5,400	\$5,400	\$27,000
B. Fringe Benefits						
US Personnel	\$24,948	\$22,662	\$21,375	\$12,384	\$12,024	\$93,393
Local Personnel	\$3,480	\$4,200	\$4,200	\$540	\$540	\$12,960
C. Allowances						
Post Differential	\$25,500	\$25,500	\$25,500	\$13,500	\$13,500	\$103,500
Other	\$26,481	\$15,015	\$11,319	\$7,924	\$6,076	\$66,815
D. Overhead (Salaries & Fringes)	\$58,877	\$45,324	\$42,750	\$24,768	\$24,048	\$195,767
II. Travel and Transportation						
A. US Travel	\$1,260	\$0	\$0	\$0	\$0	\$1,260
B. International Travel	\$3,465	\$3,675	\$4,340	\$2,065	\$2,170	\$15,715
C. Local Travel	\$8,050	\$8,050	\$8,050	\$2,940	\$2,940	\$30,030
D. Transport/Storage	\$19,173	\$2,156	\$13,571	\$847	\$6,414	\$42,162
III. Other Direct Costs	\$11,627	\$10,721	\$10,359	\$4,446	\$4,353	\$41,506
IV. Commodities and Equipment						
A. Project Office/ Living Quarters	\$113,000	\$7,000	\$9,000	\$3,500	\$3,500	\$136,000
B. Service Center	\$90,000	\$4,000	\$29,000	\$1,000	\$1,000	\$125,000
D. Postharvest	\$20,000	\$10,000	\$4,000	\$4,000	\$4,000	\$42,000
E. Vehicles	\$37,000					\$37,000
V. Training						
B. International Short course	\$2,500	\$2,500				\$5,000
VI. Credit						
A. Loan Fund	\$0	\$0	\$0	\$0	\$0	\$0
B. Revolving Fund	\$35,000	\$0	\$0	\$0	\$0	\$35,000
SUBTOTAL	\$653,762	\$328,703	\$344,214	\$152,114	\$152,766	\$1,631,558
VII. Evaluation /Monitoring	\$0	\$8,657	\$0	\$0	\$3,657	\$17,313
VIII. Contingency/Inflation	\$10,388	\$10,388	\$10,388	\$10,388	\$10,388	\$51,939
GRAND TOTAL	\$664,149	\$347,748	\$354,602	\$162,501	\$171,811	\$1,700,811

ANNEX 11

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Twenty-Fifth Session
Rome, 3 - 6 September 1985
Agenda Item 5(d)(i)

BELIZE

Report and Recommendation of the President

to the Executive Board

on a

Proposed Loan

to

BELIZE

for the

TOLEDO SMALL FARMERS DEVELOPMENT PROJECT

TABLE OF CONTENTS

	<u>Page No.</u>
CURRENCY EQUIVALENTS	ii
WEIGHTS AND MEASURES	ii
ABBREVIATIONS AND ACRONYMS	ii
MAP OF THE PROJECT AREA	iii
LOAN SUMMARY	iv
I THE ECONOMIC AND SECTORAL CONTEXT	
A. The Economy	1
B. The Agricultural Sector: Structure, Policies and Institutions	3
II THE PROJECT	
A. Background	5
B. The Project Area	6
C. The Target Group	8
D. Project Strategy and Objectives	9
E. Project Description and Components	10
F. Project Costs and Financing	13
G. Procurement and Disbursement	15
H. Project Implementation, Organization and Management	16
I. Production, Marketing and Prices	19
J. Benefits and Beneficiaries	19
K. Financial and Economic Analysis and Risks	21
L. Justification of Lending Terms	22
III LEGAL INSTRUMENTS AND AUTHORITY	22
IV RECOMMENDATION	23
ANNEX Summary of Important Supplementary Assurances Included in the Negotiated Loan Agreement (to be tabled at the session)	
APPENDICES	
I The Country	
II Summary of Project Costs	
III Organization and Management	
IV Benefits and Beneficiaries	

107

CURRENCY EQUIVALENTS

Currency Unit	=	Belize dollar (BZ)
Official Rate	=	BZ\$ 1.98 = US\$ 1.00

WEIGHTS AND MEASURES

1 kilogramme (kg)	=	2.201 lb.
1 000 kg	=	1 metric ton (mt)
1 kilometre	=	0.62 mile
1 metre	=	1.09 yards
1 square metre (m ²)	=	10.76 Square feet
1 acre (ac)	=	0.405 hectare (ha)
1 hectare (ha)	=	2.47 acres

ABBREVIATIONS AND ACRONYMS

BMB	Belize Marketing Board
CDB	Caribbean Development Bank
CIDA	Canadian International Development Agency
DAO	District Agricultural Officer
DFC	Development Finance Corporation
EEC	European Economic Community
GDP	Gross Domestic Product
GGA	Grain Growers' Association
GNP	Gross National Product
GOB	Government of Belize
IFAD	International Fund for Agricultural Development
MED	Ministry of Economic Development
MNR	Ministry of Natural Resources
TRDP	Toledo Research and Development Project
UNDP	United Nations Development Programme
UNDP/OPE	United Nations Development Programme/Office for Projects Execution
UN/ECLAC	United Nations Economic Commission for Latin America and the Caribbean
UNICEF	United Nations International Children's Fund
USAID	United States Agency for International Development

GOVERNMENT OF BELIZE

Fiscal Year

1 April - 31 March

182

BELIZE

TOLEDO SMALL FARMERS DEVELOPMENT PROJECT

Loan Summary

<u>Borrower:</u>	Belize
<u>Executing Agency:</u>	Ministry of Natural Resources
<u>Total Project Cost:</u>	US\$ 3.9 million
<u>Amount of IFAD Loan:</u>	SDR.....(equivalent to approximately US\$ 2.15 million)
<u>Terms of IFAD Loan:</u>	20 years, including a grace period of 5 years with an interest rate of four percent (4%) per annum
<u>Cofinancier:</u>	To be determined
<u>Amount of Cofinancing:</u>	US\$ 1.0 million
<u>Terms of Cofinancing:</u>	To be determined
<u>Contribution of the Borrowers:</u>	US\$ 0.75 million
<u>Appraising and Cooperating Institution:</u>	United Nations Development Programme, Office for Projects Execution (UNDP/OPE)
<u>Previous IFAD Loan:</u>	None

139

REPORT AND RECOMMENDATION
OF THE PRESIDENT OF
INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT
TO THE EXECUTIVE BOARD ON A PROPOSED LOAN TO
BELIZE
FOR THE
TOLERDO SMALL FARMERS DEVELOPMENT PROJECT

I submit the following Report and Recommendation on a proposed loan to Belize for SDR(equivalent to approximately US\$ 2.15 million) on intermediate terms to help finance the Toledo Small Farmers Development Project. The loan would have a term of twenty years, including a grace period of five years, with an interest rate of four percent (4%) per annum. It would be administered by the United Nations Development Programme, Office for Projects Execution (UNDP/OPE), as IFAD's cooperating institution.

PART I

THE ECONOMIC AND SECTORAL CONTEXT^{1/}

A. The Economy

1. Belize is located on the eastern side of Central America. By mid-1983 the total population was 154,000 (growing at a rate of 2% per annum) in an area of nearly 23,000 km². The country is endowed with rich land resources and its population density, at six persons per kilometre, is one of the lowest in the world. Belize became independent in 1981 and is a member of CARICOM.

2. The economy is highly dependent upon agriculture, with some light industry and tourism. While economic activities are mostly export-oriented, there is a heavy reliance on imports to satisfy a sizeable part of domestic consumption. The latest GNP per capita reported was US\$ 980 (1983), lower than in 1982.

3. The main economic activity is sugar production. It accounts for approximately 20% of GDP. Citrus, bananas, fishing and livestock are also important components of the primary sector which as a whole accounts for about 40% of GDP.

4. The economy of Belize expanded steadily during the 1960s and most of the 1970s. Real GDP grew by 4.5 to 5.0% per annum, or about 2.5% in per capita terms. This development resulted from several factors such as the expansion of the sugar industry, the re-establishment of the banana industry, the

^{1/} See Appendix I for additional information.

implementation of several infrastructural works and the establishment of a number of new industries. However, during the last five years, Belize's economic growth has slowed. Underlying this slowdown are factors associated with the international economic environment and especially the steady deterioration in the terms of trade since 1980. Another factor was an outbreak of smut disease, which necessitated the replanting of sugarcane in the early 1980s.

5. A major structural constraint in the country's development has been and continues to be the lack of adequate port, road, communication and electricity facilities. This has impeded the further development of production activities.

6. The balance of payments has been adversely affected by the world-wide decline in sugar prices experienced since 1980. The current account deficit amounted to 7% of Gross National Product (GDP) in 1979 and increased to 16% in 1982. The volume of sugar exports, however, reached a record level in 1983 and this resulted in some improvement in the balance of payments position. The level of international reserves is nevertheless still very low. The net official reserves have been declining and now account for only three weeks of retained imports.

7. The finances of the public sector are extremely weak. Savings accounted for more than 4% of GDP in the late 1970s and 1980. In recent years it has become negative reaching a level of -4% in 1983. Although the reasons for this deterioration are in part due to factors beyond the control of the authorities at the domestic level, they can also be traced to inadequate measures to control the growth of expenditures. As recently as 1984, new tax measures were introduced. However, the problems of high current expenditures and the inefficient management of public enterprises continue to be a delicate issue that the Government must confront in order to improve public finances.

8. In 1984, the World Bank estimated that domestic inflation in 1983 was approximately 3%, while the estimates of the United Nations Economic Commission for Latin America and the Caribbean (UN/ECLAC) were in the range of 9.3% - 10.3% for 1982.

9. The public and publicly guaranteed debt of Belize has increased rapidly in recent years from US\$ 45 million in 1980 to US\$ 70 million at the end of 1983. The debt service, although still relatively small, has also increased rapidly. The external debt accounts for 40% of GDP and debt service payments for 4% of total exports.

142

10. Belize's economic prospects are fair. The economy was expected to have a modest growth in 1984 of around 2%, but this growth is projected to accelerate to around 4% per annum over the next ten years as a result of the continued expansion of non-sugar agriculture and agro-processing activities. The per capita GDP is projected to grow by approximately 2% per year.

B. The Agricultural Sector:
Structure, Policies and Institutions

11. Belize has total land area of 2.3 million hectares, much of which is either virgin or regrowth forest. About one million hectares are suitable for agriculture, half for cropping and half for grazing. But not more than 15% is used for either purpose. Of the non-agricultural land, sizable areas are either permanent marsh or subject to flooding.

12. There is an abundance of good soils in Belize, scattered among the various areas where drainage and elevation do not pose serious problems.

13. Of the approximately one million hectares of land suitable for agriculture, 56% is owned by the Government and the remaining 44% by private farmers or other interests.

14. Land ownership is very unevenly distributed. About 90% of the farms are under 40 ha. However, the area occupied by these farms represents less than 6% of the total land area. Conversely, about 95% of the land is owned by 7% of the landholders.

15. Agriculture is the most important economic sector, contributing about 28% to GDP (see paragraph 3) and accounting for one-third of the labour force. The main crops of sugar, citrus, bananas and mangoes account for 60% of exports. In addition, a number of traditional crops for the domestic market, including rice, maize and beans, are grown mainly by the smallest farmers, most of whom are of Indian descent. Despite its rich land resources, the country is still not self-sufficient in food production.

16. The agricultural sector is divided into two distinct production patterns. The first supplies maize, rice, red kidney beans, fruits, vegetables and livestock products for domestic consumption. The second produces crops mainly for export (see paragraph 15).

17. Within these two patterns, there are four main groups of farmers responsible for generating Belize's agricultural output:

- (a) the "milpero" farmers - concentrated in the Toledo District. They practise shifting slash-and-burn agriculture and produce mostly maize, rice and kidney beans;
- (b) the small farmers on fixed farms - producing about 60% of the sugarcane and 20% of the citrus as well as quantities of rice, maize, beans, vegetables, pork and poultry;
- (c) medium farmers - consisting almost exclusively of Mennonite settlers who are efficiently organized and practise modern farming on fixed holdings. They produce the major portion of Belize's poultry products and fresh milk;
- (d) large farmers and ranchers - holding a number of extensive properties, of which only relatively few are developed and actively producing.

Agricultural Institutions:

18. The Department of Agriculture of the Ministry of Natural Resources (MNR) is the major institution responsible for agricultural development. It provides extension services and conducts research.

19. The Belize Marketing Board (BMB) is the major instrument of agricultural marketing. BMB has been used as a tool to stimulate the production of rice paddy, maize and red kidney beans. It offers an assured market at guaranteed prices for these commodities. It has been experiencing management and administrative difficulties which in turn have contributed to its financial problems.

20. The Development Finance Corporation (DFC) is a statutory government corporation offering medium to long-term development loans and making equity investment in selected cases. About 41% of the institution's loans are in agriculture.

Internationally Funded Projects:

21. In all there are forty-three internationally funded projects in Belize for a total cost of US\$ 73 million. The Canadian International Development Agency (CIDA), United Nations Development Programme (UNDP), World Bank, United Nations International Children's Fund (UNICEF), United States Agency for International Development (USAID), European Economic

1971

Community (EEC), Caribbean Development Bank (CDB) and the United Kingdom are all involved. About forty other new projects for an estimated total of US\$ 218 million are in the pipeline. Thirty percent (30%) (US\$ 66 million) are intended for the agricultural sector.

PART II

THE PROJECT

A. Background

22. The Toledo Small Farmers Development Project was identified by an International Fund for Agricultural Development (IFAD) mission as deserving high priority in April, 1983. In March, 1984 an IFAD preparation mission visited the country and produced a final report in July of the same year. The United Nations Development Programme/Office for Projects Execution (UNDP/OPE) conducted an appraisal mission on behalf of IFAD from April to June, 1985. While at early identification stage the project also called for a social and community development component as well as a physical infrastructure component, the latter to include construction of feeder roads and rehabilitation of roads. It was concluded that the initial proposal would involve too many local institutions in its implementation, thus making coordination difficult among government agencies. Later, other sources of funds became available to finance the two supporting components mentioned under other projects and the proposed project was scaled down to provide for a much simpler approach thereby reducing implementation risks in helping to solve the basic constraints of the target group.

23. The request for funds to assist Mayan Indians and other small farmers indicated the willingness of the Government to alleviate poverty and to reduce present income and welfare disparities. During project identification, IFAD had a constructive dialogue with the Government which resulted in increasing attention to the most depressed sector of Belize's population; there is a commitment to the project on the part of the Government which has also drawn other donor agencies in financing complementary investments serving the same group. IFAD will assure that this dialogue is maintained to further support the poor and in order to reach a wider number of potential beneficiaries.

195

B. The Project Area

Location and Physical Characteristics:

24. Toledo is considered a priority area in the context of Government of Belize's (GOB's) overall development plans and existing action programmes. It has a great potential for expanding and developing agriculture and for the integration of its indigenous population in the overall development of the country.

25. The project area is formed by flat coastal plains, gently rolling foot-hills, undulating lowlands, and the relatively high Maya Mountains which reach about 1,000 metres in elevation. Four main rivers cross the area from west to east and all its rivers are noted for their rapidly rising water levels during the rainy season from June to November. The climate in the uplands can be classified as wet sub-tropical, with a rainfall of 3,000 - 4,500 mm per year; in the lowlands it is wet tropical with a rainfall of 2,000 - 3,500 mm per year.

26. No sizeable areas suitable for the milpa system (shifting cultivation) remain under-exploited in Toledo. This, combined with the steep rise in population, has led to increased pressure on the land available for milpa.

Population:

27. The total population of 14,100 in Toledo District consists of 2,710 households, of which 78%, or 2,110, are in villages and settlements of 12 to 430 people. The population is made up of several ethnic groups. In 1982 it was estimated that 57% was of Mayan origin consisting almost entirely of farmers. The Garifuna (about 13% of the total population) are mostly fishermen. The remaining 30% (Creole, East Indian, Mestizo, White and others) is engaged in a variety of occupations.

28. Most of the Maya Indians live on reservation lands, maintaining many of their customs and their traditional Cabildo (council of elders) system of authority and land allocation.

29. The Government owns about 20% of the total land resources, but land tenure in Toledo District differ from the national norm as 86% of the land is technically owned by the Government. This land, excluding Indian and Forest reserves, is available for sale to farmers at relatively low prices provided that development is undertaken as part of a coherent programme. In recent years, increasing number of Indians have

been claiming land outside the reserves. However, many still do not have legal title to the land they occupy, although the Government is encouraging the acquisition of individual lease titles. When titles have not been provided, annual licenses are issued against an annual permit fee. Within the Indian reserves, usufruct rights on lands are administered by the Alcaldes (Town Mayor)

Health:

30. There is evidence that inadequate nutrition prevails in Toledo District. The child mortality rate is 66.5 per 1,000, much higher than the national average of 40 per thousand. About 49% of Toledo children suffer from some degree of malnutrition as compared to 32% for the district with the next highest incidence. Anaemia is found in nearly all pregnant women and in 45% of school children.

Women in Agricultural Production:

31. Women play an important role in agricultural production. They actively participate in farm work during the planting and harvesting periods. Most of the post-harvest crop processing and a substantial part of marketing is undertaken by them. They are the exclusive cultivators and handlers of certain crops including fruit and are also responsible for rearing domestic fowl and pigs, which constitute a major source of food and cash for women, providing them with some financial independence. In addition, women dispense funds for food purchases for the family.

Agricultural Support Services:

32. The Development Finance Corporation which operates a small office in Punta Gorda makes loans to small farmers of the project area. There is only one field officer and given the large area to be serviced, this is insufficient.

33. Another serious constraint is the lack of financing for short-term and particularly long-term working capital for the development of permanent crops.

Extension:

34. The Department of Agriculture of the (MNR) has the primary responsibility for most extension activities in the Toledo District. The ratio of extension workers to farmers is 1:310 as compared to the national ratio of 1:183. At the present time only three of the five extension officers are outposted due to housing difficulties.

Marketing:

35. The Belize Marketing Board provides a limited but important service through the operation of the Big Falls Grain Complex and Rice Mill. Paddy is purchased from farmers in the district and is milled, polished and bagged for domestic distribution. The BMB also purchases maize and beans from farmers but does not substantially trade in other crops. BMB has had a problem with high operating costs and further losses due to its policy of price subsidization. This has led to the present attempt to restructure the Board.

Infrastructure:

36. While internationally-aided efforts are providing some relief, the very poor existing infrastructure means that Toledo farmers are at a serious disadvantage in getting crops to the markets of Belmopan and Belize City. They encounter serious problems even in getting their produce to the BMB purchasing outlet at Big Falls.

Inputs:

37. The only nearby depot where farm inputs can be purchased is located at Big Falls and operated by the BMB. Milpa farmers increasingly use herbicides and improved inputs and supplies which are not always available. MNR and the Toledo Research and Development Project (TRDP) supply some improved seed for cocoa, beans, maize, cowpeas and rice but availability is less than demand.

Crop Production System:

38. The Maya live mainly in the uplands, where they cultivate maize, upland rice and beans as rainy season crops in May-November, under slash-and-burn agriculture (with increasingly short fallows), and smaller quantities of "matahambre" maize^{2/} (December-April) under continuous mulch cropping on river levees; many other crops of lesser importance are grown for subsistence, including plantain, cassava, cocoyam, tree crops, vegetables and herbs.

C. The Target Group

39. The target group would consist of approximately 1,700 farmers in the Toledo District, out of which some 1,100, mostly

^{2/} Literally, "hunger-killing" maize.

Maya Indian together with a few East Indian Farmers operating holdings not exceeding fifty acres (20.2 ha) would directly benefit by the project. They are the poorest people in the country with an estimated average per capita income of US\$ 175. Some are located in the lowlands, where they grow rice but the vast majority, in particular the Maya Indians, are located in upland villages. These isolated groups are finding it increasingly difficult to maintain their villages as communities and derive subsistence from agriculture as their present system of production does not allow them to establish settled agriculture. Their society evolves around the concept of village alcaldes, a combination of formal and informal authority usually vested in a village elder, who convenes village meetings which in turn control the use of land and decide on their affairs by consensus. Such an enclosed society has been able to keep its identity in its language, culture and behaviour. Nevertheless, however traditional, it accepts changes that enhance village cohesiveness and call for cooperation. Its members thus respond best to innovations which fit into their system and that would at the same time also bring them into the cash economy.

D. Project Strategy and Objectives

Project Strategy:

40. Toledo is considered a priority area in the context of GOB's overall development plans and existing action programmes. The district has a great potential for the expansion and development of its agriculture and for the integration of its indigenous population into the national development. Unless this is done, these people, who are already at a serious disadvantage compared to farmers in other districts, will find it impossible even to maintain their present low standard of living in an economy which is becoming more developed and sophisticated.

Project Objectives:

41. The general aim of the project would be to provide financial and technical support for strengthening and promoting appropriate agricultural practices and services to small farmers in the Toledo District. The technological improvements expected to be adopted offer an attractive milpa system with its dangerously shortened fallow periods (4 to 7 years) and their threat to the environment. These improvements also offer

147

relief to the problem of subsistence farming. Their introduction and utilization are expected to generate increased food consumption in general and higher productivity, as well as improved nutrition for the small farmer and his family.

42. The basic objectives of the proposed project would be to:
- (a) improve the incomes and consequently the standard of living of group of semi-subsistence farmers, mostly Maya Indians, now living in isolation, by bringing them into the mainstream of agriculture;
 - (b) increase their agricultural production and productivity by providing them with access to technological packages leading to permanent agriculture as well as their involvement in the economic and social life of the country;
 - (c) strengthen the institutions which provide support to the farmers, including agricultural extension and credit;
 - (d) augment the marketing physical infrastructure and improve the handling, processing and marketing of the main crops.

E. Project Description and Components

43. The components of the project would include:
- (a) strengthening of Agricultural Extension;
 - (b) provision of Farm Credit;
 - (c) development of Marketing System;
 - (d) improving the Big Falls Grain Complex;
 - (e) monitoring and Evaluation;
 - (f) support to Project Management.

Strengthening of Agricultural Extension:

44. The project would strengthen the existing extension service in the project area by providing for:
- (a) three additional extension workers (of which two would be women) recruited by MNR, to be posted in the extension zones;

- (b) one counterpart officer to the farming system specialist and one counterpart officer to the livestock specialist, both for a duration of five years;
- (c) technical assistance, i.e., one internationally recruited farming systems specialist and one livestock specialist recruited in the region, each for a duration of three years;
- (d) buildings, including construction of ten houses, four for technical assistance officers at project headquarters and six for the extension agents; and repairs to four existing extension staff houses and to the office of the District Agricultural Officer (DAO);
- (e) equipment including audio-visual aids, extension kits and a generating set;
- (f) vehicles, including two four-wheel drive pick-ups and eight 185 cc motorcycles;
- (g) procurement of office materials, demonstration inputs and the operation and maintenance of vehicles, equipment and buildings.

The total cost of this component is estimated at US\$ 700,000.

Provision of Farm Credit:

45. The project would promote the increased use of credit by:
- (a) providing US\$ 0.75 million to be used exclusively for requirements in the project area. The DFC would use the resources for crop production loans as well as loans for medium and long-term development;
 - (b) providing for one credit officer to be recruited by DFC. He would be responsible for the supervision of the credit programme;
 - (c) making available one clerk/typist to assist the credit officer;
 - (d) providing one truck for the use of the credit officer; and
 - (e) bearing the operation and maintenance costs of the said vehicle.

The total cost of this component would be US\$ 800,000.

201

Development of Marketing System:

46. The project would promote the development of market channels by providing for:
- (a) three depot centres for the collection, processing and marketing of produce and for the sale of farm inputs. It is expected that the depots would handle 20% of the marketable surplus of maize and other grains, 70% of tree crop production and 50% of rice paddy;
 - (b) equipment including office supplies, mechanical tools, storage bins, generator, platform scales, hand dollies and equipment for the conditioning and classification of crops, and one mill for processing reject grain into animal feed;
 - (c) technical assistance (one internationally recruited marketing specialist for a period of eighteen months).
 - (d) one pick-up truck for the use of the marketing specialist;
 - (e) the recruitment of the marketing manager of the depots, one mechanic, three store keepers and three operators;
 - (f) office supplies and operation and maintenance of vehicles and the generating set.

Big Falls Grain Complex Improvement:

47. The project would improve the Big Falls Grain Complex area by:
- (a) supplying eight roof vents, eight grain spreaders, nine silos, one propane burner and undertaking improvements to grain grading and drying and the rehabilitation of the truck scale;
 - (b) renovation of the rice mill through the provision and installation of length grader, gravity separator, magnet separator, Satake huller bush aspirator, central dust system, packing system, three bucked elevators and miscellaneous equipment;
 - (c) providing the technical assistance services of a rural engineer for eighteen months;
 - (d) the purchase of one four-wheel pick-up;

- (e) providing for the employment of the grain complex manager; and
- (d) providing for office supplies as well as the operation and maintenance of vehicles.

The total cost of this component is estimated at US\$ 800,000.

Monitoring and Evaluation:

48. The Planning Unit of the Ministry of Economic Development (MED) would be responsible for the systematic collection, processing and analysis of information about the project's progress with respect to its specific objectives. It would also carry out the base-line study. It would function independently of the Project Management Unit of the project and the executing agencies. It would be responsible for ongoing monitoring in order to measure the impact of the project on the beneficiaries. Special additional monitoring and evaluation would be carried out by the rural engineer consultant to the Grain Complex during the first four years of the project. The unit would report to the Project Authority. US\$ 50,000 would be provided by the project towards local Monitoring and Evaluation.

Support to Project Management:

49. The project would finance construction of housing and office facilities and office equipment, vehicles and operating costs. A Project Director, one accountant, and two clerk/typists would be employed to staff the Project Management Unit. Improved communications would result from the two-way radio system connecting the Project Management Unit (and Extension Headquarters) with the six zones of project activities. Activities in support of management are estimated at US\$ 430,000.

F. Project Costs and Financing ^{3/}

Costs:

50. Total project costs over its five-year implementation period are estimated at US\$ 3.90 million, including a foreign exchange cost of US\$ 2.73 million or about 70% of project costs.

^{3/} For further details see Appendix II.

203

51. Cost estimates are based on current international and national prices for imported and locally processed goods and services respectively. Price contingencies on total project costs are provided at a rate of 5% per annum. Physical contingencies of 10% were applied on all capital investments (i.e., civil works, equipment) and 5% on all recurrent costs. The total cost of contingencies is estimated at US\$ 314,156. The estimated project costs are summarized in Table I.

Table I.
Summary of Project Costs
(US\$ million)

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>% of Total Base Cost</u>
Credit Programme	0.04	0.77	0.81	23
Agricultural Extension	0.34	0.39	0.73	20
Market Development	0.28	0.33	0.61	17
Grain Complex	0.10	0.75	0.85	24
Management Unit	0.25	0.13	0.38	11
Monitoring and Evaluation	0.05	0	0.05	1
Project Preparation	—	<u>0.15</u>	<u>0.15</u>	<u>4</u>
Total base cost	1.06	2.52	3.58	100
Contingencies	<u>0.11</u>	<u>0.21</u>	<u>0.32</u>	
Total Project Costs	<u>1.17</u>	<u>2.73</u>	<u>3.90</u>	

Financing:

52. An IFAD loan of US\$ 2.15 million would be made to the GOB. It would cover 55% of total project costs, and 79% of foreign exchange expenditure. The Government would finance US\$ 0.75 million, equivalent to 64% of local costs. Other sources of financing are required for the remaining US\$ 1.0 million. The GOB would provide assurances to IFAD regarding the securing of these required funds. The financing of the project is given in Table 2.

204

Table 2.

Project Financing
(US\$'000)

<u>Item</u>	<u>Total Cost</u>	<u>IFAD</u>	<u>Other Sources</u>	<u>Government</u>
Buildings	345.0	0	276.0	69.0
Equipment	758.8	455.3	303.5	0
Vehicles	88.4	88.4	0	0
Salaries	531.4	0	0	531.4
Technical Assistance	615.2	307.6	307.6	0
Programme Operations	206.8	123.8	0	83.0
Monitoring & Evaluation	50.5	50.5	0	0
Depot Supply Inventory	80.8	80.8	0	0
Credit Fund	757.6	757.6	0	0
Project Preparation	150.0	150.0	0	0
Contingencies	<u>315.5</u>	<u>136.0</u>	<u>112.9</u>	<u>66.6</u>
Total Project Costs	<u>3,900.0</u>	<u>2,150.0</u>	<u>1,000.0</u>	<u>750.0</u>

53. The IFAD loan would be disbursed over a five-year period and finance 60% of all equipment, 100% of vehicles, 50% of technical assistance, 60% of programmes operations, 100% of the monitoring and evaluation budget, 100% of the funds required for depot supply inventory and the entire credit fund of the project.

G. Procurement and Disbursement

54. The purchase of all goods and the carrying out of works to be financed by the project would be carried out in accordance with procedures consistent with those established in the Procurement Guidelines of IFAD. Procurement of items not financed by the Fund would also be subject to these guidelines unless otherwise agreed upon by the Borrower and the Fund.

Contracts for construction of buildings and provision of equipment for the grain complex and rice mill and vehicles for the project in excess of US\$ 100,000 equivalent would be awarded on the basis of international competitive bidding procedures. Other goods and equipment would be grouped in appropriate bidding packages where possible and procured by local competitive bidding procedures. Small equipment and goods required for sub-loans would be provided through normal commercial channels. Consultants or experts would be selected, following written proposals by the Executing Agency, from a short list of firms and/or individuals. IFAD approval in the selection of consultants or experts would be required.

55. IFAD loan would be disbursed over a five-year period. The Cooperating Institution's disbursement procedures would be followed. In order to facilitate disbursements, the Borrower would establish a Special Account to be used exclusively to cover expenditures for goods and services financed under the IFAD loan. Funds advanced and deposited in the Special Account would be disbursed according to IFAD's rules and regulations pertaining to Special Account.

H. Project Implementation, Organization and Management

56. The project would be implemented over the period of five-years. The MNR would be the principal implementing agency and responsible for the overall coordination of project activities.

57. A Project Authority would be created for purpose of coordination, and headed by the Permanent Secretary of MNR with representatives from the MED, BMB, DFC and the Grain Growers Association (GGA). The latter would be represented at district level, that is, on Project Council, by three farmers, including at least one woman farmer. The role of the Project Authority would be to bring together the participating agencies and the beneficiaries to plan and implement the project and assess progress. It would meet on a quarterly basis.

58. The various departments of MNR would coordinate with the project and to this effect, the Government would provide assurances that its efforts to solve land tenure problems would continue, particularly in regards those affecting small farmers in Toledo District.

59. The responsibility for the execution of each project component would belong to the specialized agency concerned: DFC for Credit, BMB for the Grain Complex, and the GGA for the

Market Depots. Following a five-year implementation plan to be prepared by the Project Director, the participating agencies would formulate annual work plans to be submitted for approval to MNR and the Project Authority.

60. The DFC and the GOB would enter into a subsidiary agreement, acceptable to IFAD, whereby the definition of beneficiaries and conditions qualifying them as subjects of credit under the project will be included. The agreement would also include inter-alia the following re-lending condition:

Farmers qualified as project beneficiaries would be required to enter into an agreement with DFC to follow technical advice given by extension officers with respect to agricultural practices and cropping patterns. Loan installments would only be made on the basis that such advice was being positively implemented.

61. Under the credit programme, sub-loans would be made for viable agricultural operations including the following:

- (a) land clearing and land preparation;
- (b) development of short-term crops such as rice, maize, and peas;
- (c) establishment and initial maintenance of permanent and semi-permanent crops;
- (d) agricultural inputs;
- (e) tools and small equipment;
- (f) purchase of livestock and pack animals; and
- (g) small constructions and installations.

Loan Limitations:

62. The minimum loan would be US\$ 250. The loan amount would differ according to the type of enterprise, up to some US \$1,800 per family. The maximum outstanding loan for an individual borrower and for farmers organizations would be determined in the subsidiary agreement between DFC and the Government .

Interest Rates:

63. Interest rates to be paid by farmers would be 12% per annum for short-term loans and 11% for medium and long-term loans. Such rates are positive and consistent with the policies of the Government and DFC. They would be reviewed from time to time to ensure that they conformed to the policies of the Government and IFAD.

267

Security Requirements:

64. Every borrower would provide security satisfactory to DFC. DFC would, at its discretion, accept the best security available to the borrower in keeping with sound credit principles.

65. Under certain circumstances, development loans would be made to farmers not yet in possession of land titles or leases and with no other acceptable form of security but with a clearly demonstrated intent to obtain a lease fiat.

Interest Spread:

66. The IFAD loan would be made to the GOB at 4% and the Government would in turn on-lend to DFC at the same rate.

67. Re-lending by DFC would be at 12% and 11% for short and development loans respectively, providing DFC with a spread of 7-8% to cover administrative expenses and financial risks resulting from the expansion of the re-lending operation of the DFC.

Use of Repayments:

68. Interest payments by borrowers would go to DFC to cover the cost of their loans. All repayments of principal would be placed into a Special Revolving Fund to be established under terms and conditions acceptable to the Cooperating Institution and IFAD, and which would be used only for new loans on the same conditions as those originally applied.

Beneficiary Loan Agreement:

69. In all loans made to beneficiaries, the following conditions would be included:

- (a) the right of DFC, the Cooperating Institution and IFAD to inspect investments, sites, works and crops developed with the proceeds of a loan;
- (b) a commitment by the beneficiary that the goods and services to be financed by a loan would be used exclusively for the purposes for which it was approved;

208

Role of Farmers in the Implementation of the Project:

70. The farmers' association (Grain Growers Association) would be represented on the coordinating committee Project Authority at both the district level (project Council) and the national level Project Authority (see para. 69).

I. Production, Marketing and Prices

71. The three market depots to be constructed by the project would contribute to improved marketing arrangements. The rice mill would produce better quality grain at lower cost. Total rice production would be easily absorbed by the domestic market and make possible the resumption of rice exports. Other grain would be disposed of locally and to the feed processing mill to be operated by the depots. All of the orange crop not consumed in the project area would be sold to the two processing factories in the adjoining Stann Creek District, while cocoa would be sold to Hershey Humming Bird Limited at prices linked to world market prices. Approximately 20% of annatto production would be disposed of on the local market with the remaining 80% being exported to the United States and Mexico. Poultry and egg production would substitute imports into the project area.

J. Benefits and Beneficiaries

72. The target group of the project would comprise 1,700 small farmers of Toledo District, mostly Maya Indians. They are the poorest people in the whole country, with an estimated average per capita income of US\$ 175. They live in virtual isolation and under extremely difficult conditions and engage mostly in slash-and-burn shifting cultivation.

73. The adoption of farming practices and systems recommended under the project is expected to take place gradually to extend to a total of 1,100 farm households by the end of project implementation.

Farming Systems and Technical Packages:

74. The recommended technical packages would build and improve upon current practices rather than introduce completely new techniques. The project would adopt and further expand the legume mulch fallow system which has been developed by the Maya Indians themselves for matahambre maize and improve and substitute it for the currently practiced milpa system

(slash-and-burn) which has short fallow periods of four to seven years. Efficient paddy rice production would supersede dry mechanized rice in the lowlands. Permanent tree crops, which are widely accepted, would considerably increase production and the return to labour.

Employment:

75. As a result of improved practices and less walking distance to the fields there would be a reduction in per crop labour requirements, allowing for expanded area under cultivation. Farm models were derived on the basis of availability of family labour. Requirements in excess of family labour available, mostly during harvesting periods, would be provided by the communities themselves, well accustomed to work in groups. Labour required for the implementation of the proposed farm models would reach a total of 323,000 mad-days. This would be equivalent to some 300 mad-days per farm family. The estimated incremental labour input required by the project amounts to 95,000 man-days per year.

Family Farm Income:

76. The average family income of beneficiary farmers would reach US\$ 5,000 per year, equivalent to a per capita income of US\$ 700, as compared with US\$ 175 at the present time (see para. 72).

Impact on Environment:

77. Although non-critical levels of soil erosion occur under the present milpa system, the substitution by legume mulch cropping in the uplands would reduce soil degradation. Most importantly, it would eliminate wasteful burning by utilizing nitrogen-fixing legumes for mulch which ensures high nutrient recycling and reduces the need for fertilizer. Moreover, permanent cropping with legume mulch has the important environmental advantage of allowing over 75% of existing bush fallow land to remain as a reserve for fuelwood and eventual expansion, with only the most productive soils being exploited. In the lowlands, permanent rice paddies would eliminate the existing continuous clearing process for dry mechanized rice. The herbicides and insecticides foreseen are rapidly bio-degradable and would be quickly inactivated by the surface organic mulch.

210

Role of Women:

78. The project would seek that women who qualify as beneficiaries would have equal access opportunities to production credit and related farming services. They would participate in the decision-making process of the project and in the functioning of the marketing depots and continue to play a major role in the production and sale of certain products. Female extension officers would provide technical assistance to them, particularly in production of small livestock and training in marketing and processing of foods in order to promote their financial security. The capacity of women to participate more actively in community decisions and take a greater share of responsibility in community affairs would also be enhanced. The baseline study to be carried by the project would provide the indicators required to measure changes in the role of women in the development of their society. Training opportunities would be offered to women applicants and the extension services as well as the Marketing Board would continue to open managerial and technical job opportunities to women.

K. Financial and Economic Analysis and Risks

79. The financial analysis of the various crop models and livestock enterprises shows rates of return above 50%, with the exception of cattle enterprises which show a rate of return of 31%.

80. The project would contribute significantly to the national economy by generating sizeable surpluses for import substitution and export.

81. The economic rate of return of the project as a whole has been calculated at 23% over a twenty-year period. Total incremental value of production (at financial prices) generated by the project would increase from US\$ 13,000 in Year One to US\$ 600,000 in Year Five, reaching about US\$ 4 million annually from Year Twelve onwards. At full development, this incremental value would be derived from the production of maize (0.7%), peas (5%), rice (10%), cacao (53%), annatto (4%), oranges (21%), eggs (5.9%), beef (0.5%), milk (0.3%), honey (0.4%) and poultry (0.1%).

82. The economic analysis of the project shows that the rate of return is not highly sensitive to unfavourable factors, including reductions and delays in project benefits. From the agricultural viewpoint, conditions in the project area may be

21

considered as favourable, with low climatic risks (with the exception of hurricanes occurring at intervals of fifteen to twenty years). Project risks are related to the high dependency that the project is creating on crops to be exported, particularly tree crops. Although the present outlook is promising, in the event of a decline in prices or reduced foreign markets, the beneficiaries would have to ensure that the eventual impact of depressed market outlets was proportionately shared with other areas and producers currently having easier access to supporting services. A self-sustaining operation and efficient administration of farm depots, grain complex and rice mill should be attained during project implementation to secure that the marketing services endure thereafter.

L. Justification of Lending Terms

83. Belize's latest recorded per capita Gross National Product (GNP 1983) of US\$ 980 and the present economic trends and indicators clearly suggest the application of intermediate lending terms, and maturity and grace periods of twenty and five years, respectively.

PART III

LEGAL INSTRUMENTS AND AUTHORITY

845. A Loan Agreement between Belize and IFAD constitutes the legal instrument for extending the proposed loan to the Borrower. A summary of the important supplementary assurances included in the negotiated Loan Agreement will be tabled at the session.

85. Belize is empowered under its laws to borrow from IFAD.

86. I am satisfied that the proposed loan would comply with the Agreement Establishing IFAD.

212

PART IV

RECOMMENDATION

87. I recommend that the Executive Board approve the proposed loan in terms of the following resolution:

RESOLVED: that the Fund shall make a loan to Belize in various currencies in an amount equivalent to Special Drawing Rights (SDR) to mature on and prior to and to bear an interest rate of four percent (4%) per annum and to be upon such other terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board in this Report and Recommendation of the President.

Idriss Jazairy
President



THE COUNTRY

A. The Economy

1. Belize is located on the eastern side of Central America, bordering the Caribbean Sea to the east, sharing its northern border with Mexico and its western and southern borders with Guatemala. By mid 1983 the total population was 154,100 (growing at a rate of 2% per annum) in an area of nearly 23,000 km². The country is endowed with rich land resources and its population density is one of the lowest in the world (6 persons/km²). It became independent in 1981 and is the only English-speaking country in Central America, although Spanish is also widely spoken. The country is a member of CARICOM.

2. The economy is highly dependent on agriculture, some light industry and tourism. While economic activities are mostly export-oriented, there is heavy reliance on imports to satisfy a sizeable part of domestic consumption as well as of re-exports, (until recently), mainly to Mexico. The latest per capita GNP reported was US \$ 970 (1983), lower than in 1982.

3. The main economic activity is sugar production which accounts for about 20% of GDP. Citrus, bananas, fishing and livestock are also important components of the primary sector. The service sector accounts for almost half of GDP.

4. The economy of Belize expanded steadily during the 1960s and most of the 1970s. Real GDP grew by 4.5 to 5.0% per annum, or about 2.5% in per capita terms. This development resulted from the expansion of the sugar industry, the re-establishment of the banana industry, the implementation of several infrastructural works, and the establishment of a number of new industries. During the last five years economic growth has slowed, however, due to factors associated with the international economic environment, particularly the steady deterioration in the terms of trade since 1980. Factors peculiar to Belize include an outbreak of smut disease, forcing the replanting of sugarcane in the early 1980s.

5. A major structural constraint for the development of the country has been and continues to be the lack of adequate port, road, communication and electricity facilities. This has

impeded the further development of export-oriented production activities. Agriculture, however, was able to continue to grow, although at a much lower rate than in 1980 when it grew at 9%. It grew at 4.4% and 2.3% per annum in 1982 and 1983 respectively.

6. The balance of payments reflects the major role played by sugar exports. Its position has been adversely affected by the decline in sugar prices experienced since 1980. The current account deficit which accounted for 7% of GDP in 1979 increased to 16% in 1982. This deterioration took place in spite of a steady decline in imports. The volume of sugar exports, however, reached a record level in 1983 and this resulted in some improvement in the balance of payments position. But the level of international reserves is still very low. Net official reserves have been declining and now account for only three weeks of retained imports.

7. Public sector finances are extremely weak. Public sector savings which accounted for more than 4% of GDP in the late 1970s and 1980, have become negative in recent years (-4% in 1983). The reasons for this deterioration can be traced to inadequate measures to control the growth of expenditure, the crisis in neighbouring Mexico, political turmoil in the sub-region and, above all, low sugar prices. All these factors have adversely affected the level of economic activity and hence have had a negative impact upon government receipts. Several new measures have been implemented and a policy of restraint enforced, particularly in government expenditure during 1983. More recently (1984) new tax measures were introduced, but the problems of high current expenditure, particularly in government wages and salaries, and the relative management inefficiency in public enterprises, the operations of which are highly subsidized, continue to be a delicate issue for the Government in its efforts to improve public finances.

8. Given the openness of the economy and the existence of a US dollar pegged foreign exchange system, domestic inflation tends to reflect international inflation, particularly price changes in USA. The World Bank (1984) estimates domestic inflation in 1983 in the neighbourhood of 3%, while the estimates for ECLAC (1984) were in the range of 9.3%-10.3% for 1982.

9. The public and publicly guaranteed debt of Belize has increased rapidly in recent years, from US\$ 45 million in 1980 to US\$ 70 million at the end of 1983. The debt service, although still relatively small, has been increasing rapidly as

215

more commercial loans are contracted. Nevertheless, the bulk of the external debt, about 70% of the total, is still on highly concessionary terms. The external debt accounts for 40% of GDP and debt service payments for 4% of total exports.

10. The country's development is constrained by the size of its domestic market. Hence, it is based mostly on an export-oriented strategy. The country has great potential in agriculture, livestock, fishing agro-processing industry and tourism. These export-oriented activities have been directed to the North American market (USA and Canada), United Kingdom, CARICOM countries and, to some extent, Mexico and Central America. This emphasis will probably continue. Unfortunately, the smallness of the domestic market also seriously limits any attempt to efficiently develop import-substitution industries.

11. Belize's economic prospects are moderate. The economy is expected to grow modestly in 1984, around 2%, but this growth is projected to accelerate to around 4% per annum over the next ten years as a result of continued expansion of non-sugar agriculture and agro-processing activities.

B. The Agricultural Sector: Structure, Policies and Institutions

12. Belize has considerable more potential within the agricultural sector than is presently being utilized. It is estimated that less than 15% of the 2.2 million acres (890,000 ha) of agriculturally suitable land in the country is being farmed and the rest remains under tropical bush, forest or fallow.

13. Agriculture is already contributing about 28% of GDP and accounting for one-third of the labour force. The main crops, sugar, citrus and bananas, account for 70% of exports. In addition, a number of traditional crops, including rice, corn and beans, are grown mainly by the smallest farmers, mostly of Indian descent, for the domestic market. However, the country is not self-sufficient in food production, despite its vast resources. The food import bill grew from US\$ 19 million in 1976 to approximately US\$ 37 million in 1982, and it is projected that food imports will continue to increase over the next ten years, in line with private consumption, although somewhat slower than the growth of GDP.

14. The rural structure of Belize shows two distinctive major subsectors. One is aimed at supplying maize, rice, red kidney beans, vegetables and livestock products to the domestic market.

21

The other provides sugar, citrus, bananas and mangoes for export. There is some duality in marketing. For example, though most cattle are purchased by the domestic market, Belize has recently exported live cattle. Conversely, while the major products of the export-oriented subsector are indeed exported, this same subsector is easily able to satisfy local demand for them.

15. Four main groups of farmers are responsible for generating Belize's agricultural output:

(a) the "milpero" farmers - concentrated in the Toledo District, they practise shifting slash-and-burn agriculture, produce mostly maize, rice and kidney beans, use few purchased inputs and contribute little to the market economy;

(b) the small farmers on fixed farms of the sugarcane areas of Corozal and Orange Walk and in the Stann Creek citrus areas produce about 60% of the sugarcane and 20% of the citrus as well as quantities of rice, maize, beans, vegetables, port and poultry;

(c) the medium farmers - made up almost exclusively of Mennonite settlers who entered Belize in the 1950s from Mexico; though small in numbers (estimated at about 500 families) they are efficiently organized, mutually supporting and practise modern farming on fixed holdings; they use modern inputs and market most of their production. They are responsible for the major portion of Belize's poultry products and fresh milk and are said to virtually control the market for these two commodities; they are also major producers of beans, maize and vegetables and have also constructed and operate their own feed mills, hatcheries, chicken slaughtering and freezing facilities and dairy processing plants; and

(d) the large farmers and ranchers - who hold a large number of properties, although only a few of them are developed and actively producing. Production units are organized along modern practical lines and employ local labour and middle-level technicians and management.

16. Of the approximately one million hectares of agricultural land, about 56% is controlled by the Government and the remaining 44% by private farmers or interests. Nearly 90% of the government-controlled lands is uncultivated; the proportion is even slightly higher (93%) on privately held lands.

17. agricultural research in Belize is reported to be adequate to deal with the major agronomic constraints. In particular, the TRPD operating in the major small farmer area of the south, seems to represent the best hope for finding adequate farming systems adapted to this area, the country's poorest.

18. Despite the major land ownership of the Government, there is relatively minor concern for land resource management in Belize. The only entity dealing with land resources is the Land Office in the MNR, which has not yet established a resource management policy.

19. Agriculture uses relatively few inputs, with the exception of citrus and sugarcane. In general, the present input supply situation has been assessed as adequate for current development needs. There has not been a specific evaluation, however, of the broad needs of the small farmers (milperos).

Agricultural Institutions:

20. The Department of Agriculture is the major institution responsible for agricultural development. It provides extension services and conducts research. Amongst the major research project areas are: crop protection, development of forage legumes, rice research and the already referred to TRDP programme (see para. 17).

21. The Belize Marketing Board (BMB) is the major instrument of agricultural marketing. It has been used as a tool to stimulate the production of rice paddy, maize and red kidney beans. It offers an assured market at guaranteed prices for these commodities. It has been experiencing management and administrative problems which have contributed to its financial problems.

22. The Development Finance Corporation (DFC) is a statutory government corporation that offers medium and long term development loans and makes equity investment in selected cases. DFC's operations include a wide range of activities. About 41% of its loans are in agriculture while housing received approximately 30%, tourism 3%, fishing 4%, manufacturing 7% and services 10%.

C O U N T R Y D A T A

Area: 22,960 km² Population: 154,100 (mid-1983) GNP Per Capita: (1983) US\$ 980 ^{1/}
 Density: 6 persons/km² Rate of Growth: 2.0% (1970-83) Inflation Rate:^{3/} 9.2%-10.3% (1980-82)

Land Use^{2/} (km²)

Total area	22,960
Arable land & permanent crops	530
Irrigated land	20
Forest & woodland	10,120

Gross National Product in 1983^{1/}

	US\$ 000	%
GNP at market prices	168.1	100.0
Gross domestic investment	36.1	21.4
Gross national saving	17.1	10.1
Current account balance	-19.0	-11.3
Exports of goods, NFS	93.8	55.8
Imports of goods, NFS	122.9	73.0

Social Indicators (1980)^{1/}

Crude birth rate (per 1,000)	43.1
Crude death rate (per 1,000)	4.9
Life expectancy at birth (years)	n.a.
Infant mortality rate (per 1,000)	30.2

Social Distribution of GDP

	Value Added ^{1/}	%
	US\$ 000	
Agriculture	43.0	28.0
Industry	28.2	18.3
Services	82.9	53.7

Adult literacy rate	92.0
Primary school enrollment	85.0

Population per physician	2,202
Population per hospital bed	261
Access to safe water (% of population)	
Urban	87.5
Rural	29.5

Production Index (Base: 1974-76 = 100)^{2/}

Agricultural production	142
Food production	142

Government Finance^{1/}

	Central Government			
	BZ\$ 000		% of GDP	
	'81/82	'82/83	'81/82	'82/83
Current receipts	83.7	79.2	23.9	23.2
Current Expenditure	76.2	85.3	21.8	25.0
Current Surplus/def.	7.5	-6.1	2.1	-1.8
Capital Expenditure	31.9	27.6	9.2	8.1
External Asst. (net)	16.5	25.5	7.4	7.4

Main Exports (average 1981-83)^{1/}

	US\$ 000	%
Sugar and molasses	37.5	56.4
Bananas	2.3	3.5
Citrus products	6.8	10.2
Fish products	6.9	10.4
All other commodities	13.0	19.5
Total	66.5	100.0

Balance of Payments^{1/} (US\$ 000)

	1981	1982	1983
Exports of goods, NFS	103.2	88.0	93.8
Imports of goods, NFS	130.2	-126.5	-122.9
Resource gap (deficit = 1)	27.0	-38.5	-29.1
Interest payments (net)	-1.9	4.9	-7.7
Net Transfers	18.5	17.6	17.7
Balance on Current Acct.	-10.4	-25.8	-19.1
Public capital	13.5	17.8	14.6
Disbursement	(9.3)	(13.5)	(9.4)
Amortization	(-1.5)	(-3.1)	(-1.7)
Capital grants	(5.7)	(7.4)	(6.9)
Other capital (net)	-5.4	7.8	-2.3
Increase in reserves (=)	-2.3 *	-0.2	-6.8

Livestock Population (thousands)^{2/}

	1975	1982	Change %
Cattle	47	51	+9
Sheep	3	3	None
Goats	1	1	None
Pigs	19	17	-11

Cereals

	17	29	+70
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External Debt^{1/}

Public debt, including guaranteed outstanding & disbursed	US\$ 70.2 million
Debt service, including guaranteed (1983)	US\$ 6.9 million
as % exports (1984)	4%

Nutrition^{2/}

Calorie supply per person per day (cal.)	2,680
Supply as % of requirements	118.6

Rate of Exchange

Since May 1976	US\$ 1 = BZ\$ 2.00
	BZ\$ 1 = US\$ 0.50

Sources

- ^{1/} World Bank, Economic Memorandum on Belize, Report No. 5244-BEL, 29 October 1984.
^{2/} FAU Country Tables: Basic Data on the Agricultural Sector, 1984.
^{3/} ONU, Economic Survey of Latin America and the Caribbean, Volume II, 1982.

249

SUMMARY OF PROJECT COSTS

Table 1

Project Base Costs by Year ^{1/}
(US\$'000)

	PROJECT YEARS					Total
	1	2	3	4	5	
Agricultural Extension	305	183	155	47	40	730
Market System	220	228	78	43	43	612
Grain Complex	156	626	35	19	11	847
Farm Credit	42	135	363	262	9	811
Management Unit	188	49	49	49	49	384
Monitoring & Evaluation	10	10	10	10	10	50
Total Base Cost	921	1,231	690	430	162	3,434

^{1/} Does not include cost of Project Preparation.

ORGANIZATION AND MANAGEMENT

A. Project Organization

1. The Ministry of Natural Resources (MNR) would be responsible for management and execution of the project. It would create and install the project management unit to be located in the project area.
2. For purpose of the project, MNR would enter into subsidiary agreements with DFC, BMB and MED to define their roles in its implementation.
3. Overall coordination at the highest institutional and financial level would be the responsibility of the Project Authority, chaired by the MNR and comprising representatives from MF, MED, DFC, BMB and GGA. At national level, there would be a coordinating body headed by the Permanent Secretary of MNR, with representatives from MED, BMB, DFC and the GGA. A Project Council would be established at district level, consisting of the District Agricultural Officer (of MNR) and representatives of BMB, DFC and GGA. The latter would be represented by three farmers, including at least one woman farmer.
4. At field level, MNR would establish a Project Management Unit to be located in Toledo. A Project Director will be appointed to head it, reporting to the Permanent Secretary of MNR. The Project Unit will comprise of the Director, three consultants (marketing, farming systems, and livestock) and their counterparts, the accountant and two clerical staff.

Outposted from the Project Management Unit would be:

- (a) three Extension Officers in their respective zones;
- (b) the Rural Engineer, his counterparts and the mechanic residing at the Big Falls Grain Complex;
- (c) a store-keeper and an operator at each of the three Marketing Depots; and
- (d) the Credit Officer and clerk, under the DFC Loan Officer in Punta Gorda.

B. Implementation of Project Components

5. The three main components of the project - agricultural extension, farm credit and marketing (grain processing and storage) - are inter-related and important requisites in the agricultural development of the small farmers.

Agricultural Extension:

6. The project aims to strengthen the Agricultural Extension Service by providing the Extension Officers (EOs) now lacking, so that there would be one in each of the six extension zones. Each EO would have transport (motorcycle), field equipment and use the Community Centre as office; in addition he would have a house and reside in the zone. He would have two-way radio communication (solar power) with Headquarters and the other EOs. The EOs would follow a programme of work designed with the cooperation of the Subject Matter Specialists and the Extension Supervisor (who would train the EOs on-the-job). In addition, two trained women EOs would be assigned to work with women farm workers on home projects, food preparation and nutrition, crop processing and storage, and family health and hygiene.

Agricultural Credit:

7. All agricultural credit in Belize and in the project area in Toledo District would be channelled through the DFC.

The Development Finance Corporation (DFC):

8. The DFC is a fully-owned statutory government corporation with an authorized share capital of US\$ 4 million and with lines of credit from various regional bilateral and international institutions. These include the Caribbean Development Bank (CDB), the European Development Fund (EDF), the Commonwealth Development Fund (CDF), the Canadian International Development Agency (CIDA) and the Government of the United Kingdom. Its primary function is to foster the development of the country in all sectors of the economy, including agriculture.

C. Guidelines for DFC Loans

Size of Loan

9. The normal minimum size of a loan is BZ\$ 400 (US\$ 200) and the normal maximum size is BZ\$ 700,000 (US\$ 350,000) for cooperatives and BZ\$ 400,000 (US\$ 200,000) in other cases.

Security:

10. The normal security requirements for loans are one and one-third of the value of the loan with exceptions made for small-scale agricultural and industrial projects where no other security exists. This amount may be increased, depending on risk nature of the project. The DFC normally accepts first class security including mortgages on real estate and fixed assets, bills of sale on equipment and good third party guarantees. Where government-owned lands are offered as security, the borrower must be in possession of a lease fiat which includes the option to purchase at a specific price.

Repayment Periods:

11. The repayment period for a loan is determined on the basis of the economic life of the assets financed and the ability of the borrower to repay, as reflected in cash flow projections. Except for annual crop loans, the normal minimum period for any loan is three years.

Interest Charges:

12. The interest rate chargeable on loans is determined by the source from which the funds are obtained and the type of activity being financed. Interest on agricultural loans varies between 10% and 13.5%.

Review of Lending Activities in 1983:

13. In 1983, the DFC reviewed 952 loan inquiries and applications of which 693 or 73% were approved. The total value of loans approved was BZ\$ 8.6 million (US\$ 4.3 million). This represented a 100% increase over 1982 or some BZ\$ 4.9 million. The agricultural sector accounted for approximately 78% of total approvals. In both 1982 and 1983 the project area had the lowest number of applications and approvals.

223

Small Farmers Credit Programme:

14. The DFC operation includes a Small Farmers Loan Division set up to deal with the development problems and credit requirements of the smaller farmers.

Analysis of DFC Audited Accounts:

15. An analysis of the audited balance sheets for 1982 and 1983 indicates that the net worth of DFC was US\$ 1.95 million in 1983. This represented an increase of roughly 7.6% over the previous year's figures of US\$ 1.8 million. It can also be deduced that DFC functions more as a window for development funds than a full service bank, since it receives a significant proportion of its resources from other financial institutions. The loans received by the DFC for 1983 amounted to US\$ 12.95 million or 72% of total assets.

DFC Income and Expenses Data:

16. An analysis of DFC income and expenses data, indicates the following:

- (a) Net profit before appropriation in 1983 increased by 307% over 1982, from US\$ 22,206 to US\$ 90,584.
- (b) Net profit was appropriated as follows: 55.6% to revolving funds, 40.4% to revenue reserves and 4.0% to general reserves.
- (c) Total income increased by 23% or US\$ 277,236, from US\$ 1,118,786 in 1982 to US\$ 1,446,023 in 1983. Interest income accounted for approximately 81.4% of all income in 1983.
- (d) Total expenditure in 1983 was US\$ 1,375,438 as against US\$ 1,166,580 in 1982. This represented an increase of some 18%. Interest at US\$ 519,147 accounted for 38% of the total expenditure, while salaries at US\$ 332,661 accounted for 24%.
- (e) Approximately 9% or US\$ 124,354 of total income was earmarked to cover losses on loans, representing a reduction of 2.6% over the amount reserved the previous year.

Eligibility of Participating Farmers:

17. An individual farmer of either sex shall be eligible for receiving loans if he/she meets the following criteria:

- (a) is a resident of Belize;
- (b) is a bona-fide farmer whose income is derived principally from farming;
- (c) operates not more than fifty acres (20.5 ha) of arable land;
- (d) has a net worth not exceeding BZ\$ 50,000 (US\$ 25,000) and a family income not exceeding BZ\$ 10,000 (US\$ 5,000). However, for the purpose of the project, different ceilings will be established and indicated in the subsidiary agreement between DFC and the Government (see para. 60, President's Report and Recommendations).

Eligible Items to be Financed by Loans:

18. Loans would be made for viable agricultural operations including the following:

- (a) land clearing and land preparation, land demarcation and titling;
- (b) development of short-term crops such as rice, maize, beans;
- (c) establishment and initial maintenance of permanent and semi-permanent crops, such as cocoa, citrus, annatto;
- (d) agricultural inputs such as fertilizers, herbicides, insecticides, seeds, vaccines;
- (e) tools and small equipment such as hand tractors and dryers; corn shellers and sprayers;
- (f) purchase of livestock and pack animals; and
- (g) small constructions and installations to facilitate the storage, transportation and marketing of agricultural products; such as fermentation boxes for cocoa and drying slabs.

22

Loan Limitations:

19. Subject to any change to which the Cooperating Institution and IFAD might agree the minimum loans would be for BZ\$ 500 and the maximum amount outstanding at any one time would not exceed BZ\$ 20,000.

Interest Rates:

20. Interest rates to be paid by farmers shall be 12% per annum for short-term loans and 11% for medium- and long-term loans. Such rates are positive (rate of inflation estimated at 5% per annum) and consistent with the policies of the Government and DFC. These rates would be reviewed from time to time to ensure that they remain positive but cannot be changed without FAD approval.

Terms of Amortization of Loans:

21. The terms would be as follows:
- (a) The amortization period of a loan would be determined on the basis of the nature and purpose of the investment of activities for which it would be used.
 - (b) Loans made for working capital would be scheduled for repayment up to sixty days after marketing.
 - (c) For medium- and long-term loans, the amortization period would be established in relation to:
 - (i) the purpose of the investment;
 - (ii) the repayment capacity of the borrower in relation to projected cash flow; and
 - (iii) the useful life of the financed goods.

Security Requirements:

22. Every borrower under the programme would provide security satisfactory to DFC. DFC would, in its discretion, accept the best security available to the borrower having regard to sound credit principles.

The forms of security acceptable would include:

- (a) a lien on short-term crops supported by an irrevocable deduction order on the marketing agency;

- (b) bills of sale on movable property;
- (c) title on the lands on which the investment capital is to be applied;
- (d) lease fiat with option to purchase at a specific price;
- (e) guarantors with sufficient equity to cover loan;
- (f) insurance policy with adequate surrender value assigned to the Credit Institution.

23. Under certain circumstances development loans could be made to farmers who are not yet in possession of title or lease and who have no other acceptable form of security but have clearly demonstrated intent to obtain one or the other. Such cases would include instances where the Government has not yet surveyed the land so that it is impossible to issue a title or lease or where the mechanism for deforestation of lands has not yet been put into operation. DFC would develop guidelines for the granting of such loans and these would be included in the subsidiary agreement to be approved by IFAD.

Interest Spread:

24. The IFAD loan to Belize would be made at 4% and the Government would in turn make a sub-loan to DFC at the same rate taking into consideration that, although the Government would guarantee repayment of the loan, DFC would in fact be responsible for amortization.

Use of Interest Payments and Repayments of Principal:

25. Interest payments would go to cover the cost of a loan. During the grace period of the IFAD loan, all repayments of principal would be placed into a Revolving Fund to be established, which can be used only for granting new loans on the same conditions established in the Loan Contract and the Credit Regulations, unless otherwise agreed to by IFAD. After the period of grace, all repayments except for amounts needed to amortize a loan would be placed into the Revolving Fund.

Use of Interest Surplus:

26. Any surplus occurring on interest would be deposited in the Revolving Fund for the granting of new loans under the same terms and conditions as the original loans.

227

Beneficiary Loan Agreement:

27. In all loans made to beneficiaries, there would be included the right of DFC and the Cooperating Institution of IFAD to inspect the goods, sites, works and crops developed with the proceeds of a loan; and a commitment by the beneficiary to the rules and regulations of the project.

Accounting System and Separate Accounts:

28. The Government would be responsible for ensuring that project and separate accounts of the IFAD sub-loan be kept by DFC. DFC would undertake the following:

- (i) maintain in accordance with consistently maintain appropriate accounting practices, separate accounts to record all amounts disbursed or received;
- (ii) have such accounts audited annually in accordance with sound principles by independent auditors acceptable to IFAD;
- (iii) furnish IFAD and the Cooperating Institution, as soon as available after the end of each related project year, certified copies of such audited accounts and the report of the auditors relating thereto, and;
- (iv) furnish to the Fund and the Cooperating Institution any other information concerning such accounts and the audit thereof as the Fund and the Cooperating Institution may reasonably require.

Role of Farmers in the Implementation of the Project

29. The farmers association (GGA) would be represented on the Coordination Committee at both the district level Project Council and the national level Project Authority. These committees would have representatives from all the agencies involved in project implementation including DFC. The farmers would therefore have the opportunity to comment on and if necessary call for a review of the operation. At district level, legitimate problems being experienced by borrowers can be taken to the Project Council and, if not resolved at this level, referred to the Project Authority at national level.

D. Development of Market System

30. Local marketing and farm-service depots would be developed to provide the required market channels for small-farmer participation in a new commercialized local agriculture. These depots would be operated by the GGA to market farm produce, sell farm supplies and provide specialized services on a fixed-fee basis. The depot network would include facilities for crop collection and storage and livestock feed preparation.
31. Individual depots would be located within the project area to serve the majority of farmers and to become regional market centres with sufficient throughput to justify the estimated depot operating cost.
32. Depots would be constructed at Blue Creek, Eldridgeville and Santa Cruz.
33. The depot at Blue Creek would serve 222 households mostly farm households. The depot at Eldridgeville would serve 815 households including about 202 farmers. The depot at Santa Cruz is expected to serve 687 households and at least 457 farmers.
34. The depot system would be operated as retail outlets for agro-chemicals, seeds, farm equipment, animal health and farm building supplies. They would function as convenient buying centres for crop and limited access to the Big Falls BMB facilities within the project area and the external markets. The depots would provide service at a fixed fee, in grain classification, conditioning and storage.
35. The project would provide an agricultural marketing specialist to supervise market development activities. This position would be filled by a senior technical adviser with extensive project development experience. His counterpart would be the general manager of the depots; he would also provide technical advice to MNR and BMB.
36. Since the GGA would not have the required experience and training in the marketing of produce at the beginning of the project, it is intended initially that the depot system be coordinated with the crop collection and storage services of the BMB operation at Big Falls; but after the second year the GGA would be fully responsible for making their own arrangements.

37. Local staff required for the market development programme would be the management and operating personnel for the proposed depots. The staffing requirements for this operation are as follows:

- (a) One General Manager - to be responsible for the operational and financial management of the market depot network, and to supervise all depot personnel;
- (b) One Chief Mechanic - to be responsible for supervision, maintenance and repair of the depot facilities, technical supervision of the equipment operators and providing the required technical assistance for farm equipment supplies;
- (c) Three Store-Keepers - to manager the depots and operate the depot supply store; to be responsible for the farm supply inventory, the stores operating cost and the depots' financial accounts;
- (d) Three Equipment Operators - to operate depot equipment, manage the depots' crop and livestock handling facilities, and assist the store-keepers as required with general depot management.

Market Information:

38. The project proposes to strengthen the marketing information system which is currently very poorly developed. The Marketing Specialist would be responsible for developing a system which would make it possible to have information relating to prices and market availability in a timely way.

Grain Processing Facilities:

39. Upgrading of the grain processing and storage facilities is included in the project because they would perform an essential service to the small farmers by reducing post-harvest losses, improving quality and providing a ready market for their main crops.

Technical Assistance:

40. The project would include approximately nine man-years of consultant services:

	<u>Man Years</u>
Farming Systems Specialist	3
Livestock Specialist	3
Marketing Specialist	1.5
Rural Engineer	1.5

29

Monitoring and Evaluation:

41. The Project Monitoring and Evaluation Unit to be established at the Planning Unit of the MED, would be responsible for the systematic collection, processing and analysis of information about the project's progress with respect to its specific objectives. It would function independently of the Project Management Unit of the project and the executing agencies.

Support to Project Management:

42. A Project Director, an accountant and two clerk/typists would be employed to staff the Project Management Unit. The project would finance construction of housing and office facilities, office equipment, vehicles and operation costs.

Accounts and Audits:

43. The Project Management, in close collaboration with the Government, would establish a separate system of accounts for the project, acceptable to IFAD and the Cooperating Institution. The project would keep separate accounts for the Marketing Depots until they can be taken over by the GGA. The Grain Complex and Rice Mill would also establish their own records and accounts. The project management, in cooperation with BMB, would supervise the preparation of these accounts in order to insert them into its reporting system.

Annual Work Plans and Progress Reports:

44. Implementation of all project activities would be carried out on the basis of detailed Annual Work Plans and Budgets prepared by the Project Director and approved by MNR and IFAD and the Cooperating Institution. Annual plans and budgets would be prepared in close collaboration with the organizations responsible for implementing specific project components (e.g., Agricultural Credit, Marketing Depots and Grain Complex). The annual plan and budget would be submitted to MNR, IFAD and the Cooperating Institution.

45. The Project Management Unit in Toledo would be responsible for preparing consolidated semi-annual progress reports on all project components and for submitting them to the Government and IFAD and the Cooperating Institution. The Project Monitoring Unit of the MED would be responsible for preparation of the format of reports and for giving advice on report preparation to the relevant agencies.

BENEFITS AND BENEFICIARIES

A. Project Beneficiaries

1. The target group of the project is composed of the 1,700 small farmers of Toledo District, most of them Maya Indians.
2. These are the poorest people in the country (with an estimated average per capita income of US\$ 175) living in isolation under very difficult conditions and mostly engaged in slash-and-burn shifting cultivation.
3. The adoption of farming practices and systems recommended under the project is expected to take place gradually to cover by the end of project a total of 1,100 farm households, as shown below:

Anticipated Adoption Rates

		Project Year					
		1	2	3	4	5	Total
Crop Models							
I	Grain, Cocoa, Annatto	5	45	70	90	90	300
II	Grain, Cocoa, Oranges	5	50	80	110	105	350
III	Paddy Rice, Oranges	2	4	6	10	30	30
IV	Improved Milpa	<u>10</u>	<u>40</u>	<u>60</u>	<u>80</u>	<u>100</u>	<u>290</u>
Livestock Operations							
	Cattle	5	10	15	20	30	80
	Poultry	5	10	15	20	20	70
	Bees	<u>5</u>	<u>15</u>	<u>20</u>	<u>30</u>	<u>30</u>	<u>100</u>
	Sub Total	<u>15</u>	<u>35</u>	<u>50</u>	<u>70</u>	<u>80</u>	<u>250</u>
Total number of "adoptions"		37	174	266	358	385	1,220

232

4. It is anticipated that recommended livestock practices would be adopted by 130 farmers who also adopt crop models. Thus the total of households covered by the end of the project would be 1,100 as explained in paragraph 3.

B. Benefits

Farming System and Technical Packages:

5. The recommended technical packages would build upon and systematize current practices rather than introduce altogether new techniques. The Project would adopt and further expand the legume mulch fallow system which has been developed by the Maya Indians for matahambre corn and improved by the Toledo Rural Development Project, to substitute the current milpa (slash-and-burn) system which, as a result of population pressure, is carried out with dangerously shortened fallow periods of four to seven years. Efficient paddy rice production would supersede dry mechanized rice in the lowlands. Permanent tree crops, which have wide acceptance, would considerably increase production and return to labour.

Yields:

6. Yield level/increases anticipated as a result of improved practices are moderate.

	Tons Per Hectare		
	Without Project	With Project	Increment
Maize	1.57	2.02	0.45
Milpa Rice	1.69	2.47	0.79
Paddy Rice First Crop	0	4.49	(4.49)
Paddy Rice Second Crop	0	382	(3.82)
Cowpeas	-	0.90	(0.90)
Cocoa	0	1.12	(1.12)
Annatto	0	1.69	(1.69)
Oranges	0	16.85	(16.85)

7. Production levels assumed for livestock operations under improved nutrition and husbandry are also conservative.

Production:

8. At full development, the incremental production of the project would reach the following levels:

	<u>Tons</u>
Maize	191
Peas	353
Rice	1,726
Cocoa	1,159
Annatto	220 to 290
Oranges	10,145
Beef (liveweight)	37 to 49
Milk	40
Chickens (liveweight)	17
Eggs (thousand dozen)	208
Honey	29

Man-days Employment:

9. Labour required for the implementation of the proposed farm models and livestock enterprises would reach at full development of the project a total of up to 318,000 man-days for crop models and 5,000 man-days for livestock enterprises, to be shared by all adopting households. This would be equivalent to an average of 300 man-days per family which is well within the labour resources available in the average household of 5.6 persons. The incremental labour input required by the project amounts to 95,000 man-days per year.

10. Annual labour requirement , by model, would be as follows:

Labour	Man-days per Year
Model I	367
Model II	371
Model III	415
Model IV	229
Cattle	20
Poultry	26
Bees	15

Family Farm Income:

11. The average family income of adopting farmers would reach US\$ 5,000 per year, equivalent to a per capita income of US\$ 700, as compared to US\$ 175 at present.

C. Financial and Economic Analysis

12. The financial analysis of the various crop models and livestock enterprises shows rates of return (FIRR) above 50% (except cattle enterprises with 31%), mainly due to the low capital investment required to achieve the increased farm output.

13. The return to adopting households would, it is estimated, be as follows at full development:

	U.S. DOLLAR	
	Without Project	With Project
<hr/>		
<u>Model:</u>		
I	1,000	5,780
II	1,027	5,600
III	1,027	5,410
IV	1,014	1,510
<u>Livestock:</u>		
Cattle	negligible	410
Poultry	negligible	930
Bees	negligible	140

14. The economic rate of return of the project as a whole is 23% over a twenty-year period. All on-farm production costs and all capital and recurrent costs of the project, including those of the grain complex and rice mill, as well as contingencies, have been included in the cost stream. Only benefits from the farming operations of farmers participating in the project were included in the benefit stream, although

225

other indirect and non-quantifiable benefits would accrue to the farming population of the whole of the Toledo District. Benefits arising out of improvements by the project to the grain complex and rice mill have not been included.

15. The project would contribute significantly to the national economy by generating sizable surpluses for import substitution and for export. The total incremental value generated by the project would increase from US\$ 13,000 in Year-One to US\$ 600,000 in Year-Five to stabilize at around US\$ 4 million per year from Year-Twelve onwards.

Sensitivity Analysis:

16. The sensitivity analysis shows that the project's ERR is moderately sensitive to variations in project costs, project benefits and to delays in the occurrence of benefits.



TRIPARTITE MEETING

Held at: Ministry of Finance, Belmopan
Between: Government of Belize,
International Fund for Agricultural Development and
United States Agency for International Development.
On: September 2, 1986.

Attended by: Sir Henry Cain, Financial Secretary, Ministry of
Finance and Defense.

Mr. Rodney Neal, Permanent Secretary, Ministry of
Agriculture, Forestry and Fisheries.

Mr. Liborio Gonzalez, Chief Agricultural Officer,
Ministry of Agriculture, Forestry and Fisheries.

Mr. Cerilo Mahong, General Manager, Development
Finance Corporation.

Mr. R. Schmidt, Office for Economic Development.

Mr. Neboysha R. Brashich, Representative, United
States Agency for International Development.

Dr. Gilbert Canton Ph.D., Project Officer, United
States Agency for International Development.

Mr. K.M. Pelzer and Mr. I. Nordang, representative
for International Funds for Agricultural
Development.

Two distinct projects to be implemented in Toledo District, are in their final preparation stage, namely the TOLEDO SMALL FARMERS DEVELOPMENT PROJECT under International Fund for Agricultural Development (IFAD) and the TOLEDO AGRICULTURAL MARKETING PROJECT under United States Agency for International Development (USAID).

The components of these two projects are respectively:

International Fund for Agricultural Development

Credit Programme
Extension Programme
Market System Development Programme
Grain Complex Rehabilitation
Project Management
Project Monitoring and Evaluation

United States Agency for International Development

Private Sector Component:

- Development of alternative cash crops (COCOA)
- Improve on-farm postharvest systems
- Development of an effective marketing/input supply system including managerial capability.

Public Sector Component:

- Upgrading of the Big Falls Grain Complex and Rice Mill
- Restructuring of Belize Marketing Board (BMB) into a price stabilization and market information entity.

The two projects thus afford clear coordination and parallel financing opportunities, particularly with regard to Market Development and Rehabilitation of the Grain Complex and Rice Mill.

The Cost Plan in Annex 1 presents the financial contributions towards the Toledo Small Farmers Development Project (TSFDP), as agreed upon by Government of Belize (GOB) (US \$750,000), IFAD (US \$2,150,000) and USAID (US \$1,000,000 out of the US \$2.5 million grant to be provided for the Toledo Agricultural Marketing Project (TAMP)).

In view of the parallel financing of the two projects, the organizational structure to be adopted would be as depicted in the tentative organogramme in Annex 11.

The organizational structure of the TSFDP would remain basically unchanged with the Project Authority (or National Coordinating Committee, chaired by the Permanent Secretary of the Ministry of Agriculture (MOA) and formed by representatives of Development Finance Corporation (DFC), Ministry of Finance, BMB, Grain Growers Association (GGA), Office of Economic Development (OED), at the national level; the Project Council (or District Coordination Committee chaired by the District Agricultural Officer (DAO), with representatives of the DFC, Grain Complex, GGA, two small farmers, as well as the Project Managers of TSFDP and TAMP), and the Project Management Unit for day to day administration and execution of the project.

The organizational structure of the TAMP project would be along the following lines:

The USAID Mission with a designated USAID Project Manager responsible for the overall coordination of the project, with inputs of MOA, at the national level; Advisory Group (composed of DAO, with representatives of GGA, Cocoa Grain Association, BMB, various farmer groups, as well as the Project Managers of TAMP and TSFDP); one Private Voluntary Organization (PVO) entrusted with implementation of the Private Sector Component, and a Title XII Institution (University) entrusted with the Public Sector Component of TAMP.

Coordination and linkage between the two projects would be achieved as follows:

At the national level, through a Joint Policy Committee (formed by one representative each of GOB/MOA, IFAD/Office of Project Execution (OPE) and USAID), meeting occasionally to resolve major problems occurring during execution of the joint projects.

At district level, through representation of each project on the other's district level coordination committee.

At the project level, through the Enterprise Organization and Development Specialist (TAMP/USAID Chief of Party) who will be directly responsible for the Market Development component of both projects.

In addition, a joint/simultaneous project inception exercise is proposed, for starting-up execution in a coordinated manner.

Coordination will further be strengthened by sharing of all project reports (quarterly, periodic and annual) and annual work plans, on a routine basis between the two projects.

Technical Assistance would be distributed over the two projects as follows:

Agricultural Engineer (Grain Complex and Rice Mill) provided by USAID:

- Market Specialist function assumed by Enterprise Organization and Development Specialist provided by USAID (who will have the responsibility for all four market depots) supported by interventions of up to twelve person months short term specialists provided by IFAD;
- Farming System Specialist provided by IFAD, working in close collaboration with the agronomist (cocoa) provided by USAID and the Livestock Specialist provided by IFAD.

Procurement of items financed out of IFAD funds will be governed by IFAD Procurement guidelines, while those financed out of USAID funds are governed by USAID guidelines.

Technical specification for equipment items to be procured under each project will be coordinated for compatibility.

24

TOLEDO SMALL FARMERS DEVELOPMENT PROJECT
TENTATIVE COST PLAN (BZE.\$ 000)

ITEM	UNIT COST	IFAD		USAID		GOB		TOTAL
		NBR	Bz.\$	NBR	Bz.\$	IN KIND NBR Bz.\$	IN CASH NBR Bz.\$	
Credit Programme			1547		0	0	60	1607
Capital Costs			15		0	0	0	15
Vehicles			15		0	0	0	15
Pick-up	15	1	15					
Recurrent Costs			32		0	0	60	92
Salaries			32		0	0	45	77
Credit Officer	45						1	45
Typist	32	1	32					
Operations			0		0	0	15	15
Vehicles							15	
Credit Fund			1500		0	0	0	1500

TOLEDO SMALL FARMERS DEVELOPMENT PROJECT

TENTATIVE COST PLAN (Bz.\$ 000)

ITEM	UNIT COST	IFAD		USAID		GOB		NBR	Bz.\$	TOTAL
		NBR	Bz.\$	NBR	Bz.\$	IN KIND	IN CASH			
Extension Programme			842		0		413		194	1449
Capital Costs			68		0		250		79	397
Buildings			0		0		250		79	329
Office (TRDP)	50					1	50			
FSS (TRDP house)	55					1	55			
LS (TRDP house)	45					1	45			
FS CP (TRDP house)	35					1	35			
LS CP (TRDP house)	35					1	35			
Zonal EO (TRDP house)	30					1	30			
New houses in Zones	35							2	70	
Improve Z. houses	3							3	9	
Equipment			4		0		0		0	4
Vehicles			64		0		0		0	64
Recurrent costs			774		0		163		115	1052
Salaries			0		0		163		90	253
FS CP	7.3					1	36.5			
LS CP	7.3					1	36.5			
Zonal EO	6					3	90	3	90	
Tecn. Asst.			690		0		0		0	690
Operations			84		0		0		25	109

242

TOLEDO SMALL FARMERS DEVELOPMENT PROJECT

TENTATIVE COST PLAN (B\$ 000)

ITEM	UNIT COST	IFAD		USAID		IN KIND		IN CASH		TOTAL
		NBR	Bz.\$	NBR	Bz.\$	NBR	Bz.\$	NBR	Bz.\$	
G.C. Rehabilitation			0		711		120		0	831
Capital Costs			0		433		120		0	553
Equipment			0		358		120		0	478
Survey & Drafting					20					
Paddy Sizing					30					
Pre-cleaner (Bz. City)							6			
Magnets (Buck. elev.)					2					
Huller (Spares)					10					
Husk aspirator					12		5			
Paddy separator	deleted									
Polisher (re-surfacing)					10					
Bran aspirator					16					
Length grader (rice)					30					
Cyclone (dust coll.)					16					
Packaging system	deleted									
Bucket elevator (spares)					20		15			
Misc. pipes, flanges					20					
Control panel (wiring)					20					
Structural steel	deleted									
Installation					12					
Installation					10					
Miscellaneous					14					
Rice Mill sub-total			0		222		26		0	248
Dump pit					10					
Grain grader					12					
Truck scale					10					
Roof vent					10					
Grain spreader	deleted									
Pre-cleaner (P.G.)							4			
Add. silos (Belmopan)							90			
Rice mill Furnace					6					
Silo auger (spares)					38					
Grain Complex sub-total			0		86		94		0	180
Audio-visual					30					
Vehicles			0		75		0		0	75
Pick-up	25				3		75			
Recurrent Costs			0		278		0		0	278
Salaries			0		0		0		0	0
Training Program			0		100		0		-	100
Technical Asst.			0		130		0		0	130
Operations			0		48		0		0	48
Consumables, supplies					20					
Vehicles					28					

242

TOLEDO SMALL FARMERS DEVELOPMENT

TENTATIVE COST PLAN (B\$ 000)

ITEM	UNIT COST	IFAD		USAID		GOB		TOTAL	
		NBR	Bz.\$	NBR	Bz.\$	IN KIND NBR Bz.\$	IN CASH NBR Bz.\$		
Market Dev. Programme			730.6		1185.2		42.6	6	1964.4
Capital Costs			304		282.2		3	6	595.2
Buildings			148		150		3	6	307
Land Purchase & Dev.						2	3	2	6
Depots	50	2	100	2	150				
Office & W/Shop	30	1	30						
Stockyard & Fences	6	3	18						
Equipment			134		89		0	0	223
Office	5	1	5						
Depots	16	2	32	2	72				
Grain Classification	5	1	5						
Grain Clean/Store	18	2	36	1	17				
Feed Mill	25	2	50						
Crop conditioning	3	2	6						
Vehicles			22		43.2		0	0	65.2
Motocycles	1.2			3	7.2				
Pick-up	22	1	22	2	36				
Recurrent Costs			316.6		775		39.6	0	1131.2
Salaries (3 yrs)			39.6		180		39.6	0	259.2
Manager	18			1	54				
Asst. Manager	12			1	36				
Storekeeper	7.2	1	21.6			1	21.6		
Operator/Helper	6	1	18			1	18		
Field Worker	10			3	90				
Tech.Asst.(MM.)	16	12	192		550		0	0	742
Operations			45		45		0	0	90
Training			40		0		0	0	
Depot Inventory			110		58		0	0	168
Emergency Rev. Fund			0		70		0	0	70

244

TOLEDO SMALL FARMERS DEVELOPMENT PROJECT
TENTATIVE COST PLAN (B\$ 000)

ITEM	UNIT COST	IFAD		USAID		GOB		TOTAL		
		NBR	Bz.\$	NBR	Bz.\$	IN KIND NBR	Bz.\$		IN CASH NBR	Bz.\$
Prj. Management Unit (Blue Creek)			521		0		221.5		325.5	1068
Capital Costs			121		0		125		95	341
Buildings			0		0		125		95	220
Add. Office space								1	60	
Prj. Dir. (TRDP house)						1	55			
Acct. (TRDP house)						1	35			
Clerks (TRDP house)						1	35	1	35	
Equipment			69		0		0		0	69
Vehicles			52		0		0		0	52
Recurrent Costs			100		0		96.5		230.5	427
Salaries (5 years)			0		0		86.5		172.5	259
Prj. Director	34.5							1	172.5	
Accountant	7.3									
Clerical Staff	5					1	36.5			
Operations			100		0	2	50			
M & E			300		0		10		58	168
					0		0		0	300

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TOLEDO SMALL FARMERS DEVELOPMENT PROJECT

TENTATIVE COST PLAN (B\$ 000)

ITEM	UNIT COST	IFAD		USAID		GOB		TOTAL
		NBR	Bz.\$	NBR	Bz.\$	IN KIND NBR Bz.\$	IN CASH NBR Bz.\$	
Summary by Program (Base Cost)		3641		1896		797	586	6919
Credit		1547		0		0	60	1607
Extension		842		0		413	194	1449
Marketing		731		1185		43	6	1964
Grain Complex		0		711		120	0	831
P.M.U.		521		0		222	326	1068
Summary by Category (Total Cost)		4150		2000		847	653	7650
Capital Costs		508		715		498	180	1901
Buildings		148		150		378	180	856
Equipment		207		447		120	0	774
Vehicle		153		118		0	0	271
Recurrent Costs		1223		1053		299	406	2980
Salaries		72		180		289	308	848
Technical Asst.		882		680		0	0	1562
Training		40		100		0	0	140
Operations		229		93		10	98	430
M & E		300		0		0	0	300
Depot		110		58		0	0	168
Emergency Fund		0		70		0	0	70
Credit Fund		1500		0		0	0	1500
Prj: Preparation		300		0		0	0	300
Contingencies		210		104		50	67	431
Price		90		104			30	224
Physical		120				50	37	207

246

TELEGRAM

 INDICATE
 COLLECT
 CHARGE TO

	FROM	AMEMBASSY BELIZE	UNCLASSIFIED	CLASSIFICATION	
E.O. 11652:		N/A			
TAGS:					
SUBJECT:		TOLEDO AGRICULTURAL MARKETING PROJECT PAPER			
ACTION:		SECSTATE WASHDC	PRIORITY		
		UNCLAS BELIZE			
		AIDAC			
		FOR: LAC/DR			
		REFS: A. STATE 202513, B. BELIZE 3408, C. REVIEW OF DRAFT PP 8/20, D. ZALLMAN/BRASHICH MEMO OF 8/23/86.			
		1. SUMMARY: THIS IS IN RESPONSE TO REFTEL A, WHICH PROVIDED GUIDANCE FOR THE DEVELOPMENT OF THE SUBJECT PP. REFTEL DELEGATED AUTHORITY TO APPROVE PP SUBJECT TO PARTICIPATION OF APPROPRIATE LAC/DR OFFICER IN PP COMPLETION AND REVIEW AND AID/W CONCURRENCE TO PRIVATIZATION STRATEGY FOR THE BELIZE MARKETING BOARD. PREPARATION AND REVIEW OF THE DRAFT PP TOOK PLACE DURING AUGUST, 1986, WITH THE PARTICIPATION OF TOM KING, LAC/DR/RD AND ERIC ZALLMAN LAC/DR/CP. SINCE THE REVIEW OF THE DRAFT ON AUGUST 20, MISSION HAS BEEN			
DIST:					
AID: ADO					
AID: CHRON					
AID: CONT					
CDA					
ECON					
DCM					
CHRON					
DRAFTED BY:	DRAFTING DATE	TEL. EXT.	CONTENTS AND CLASSIFICATION APPROVED BY:		
ADO:GCadon pp/jd	12/16/86	254	Acting AID Rep: PLapera		
CLEARANCES:	ADO:SSzadek (in draft)				

UNCLASSIFIED

CLASSIFICATION

UNCLASSIFIED

Classification

Page 2 of

WRM

ENGAGED IN LENGTHY, DELICATE NEGOTIATIONS WITH THE GOB REGARDING THE RESTRUCTURING OF THE BMB. THE NEGOTIATIONS AND TECHNICAL ASSISTANCE HAVE RESULTED IN THE PLAN FOR BMB RESTRUCTURING AND PRIVATIZATION DESCRIBED IN PARA 2 BELOW. WE HEREIN SUBMIT THE PRIVATIZATION STRATEGY FOR AID/W APPROVAL. SINCE END OF AUGUST MISSION HAS ALSO BEEN FINALIZING PP IN ACCORDANCE WITH ALL GUIDANCE CONTAINED IN REF A AND EXPRESSED IN MISSION REVIEW. MISSION HOPES TO AUTHORIZE THE PROJECT O/A JAN. 15, 1987. ALSO DESCRIBED BELOW ARE THE JOINT IFAD/AID IMPLEMENTATION PLAN AND RESOLUTION OF ISSUES DISCUSSED IN AUGUST 20 REVIEW.

2. PRIVATIZATION STRATEGY:

A. INTRODUCTION: THE CONDITION PRECEDENT TO THE SIXTH DISBURSEMENT UNDER THE GOB/AID ECONOMIC STABILIZATION AGREEMENT REQUIRES THAT THE GOB TAKE LEGAL OR LEGISLATIVE STEPS TO CHANGE THE BMB'S FUNCTIONS AND RESPONSIBILITIES INTO THAT OF AN INSTITUTION CONCERNED EXCLUSIVELY WITH COMMODITY PRICE STABILIZATION. BECAUSE OF WIDESPREAD RESISTANCE TO SUCH LEGAL STEPS AND PRIVATIZATION OF THE BMB, DURING THE PERIOD JULY, 1986 TO THE PRESENT, THE MISSION HAS BEEN CONDUCTING AN INTENSIVE POLICY DIALOGUE WITH THE GOVERNMENT OF BELIE

UNCLASSIFIED

Classification

2/82

(GOB). THIS DIALOGUE HAS INVOLVED THE PRIME MINISTER, MINISTER OF AGRICULTURE, MINISTER OF COMMERCE, INDUSTRY, AND TOURISM, MINISTER OF ECONOMIC DEVELOPMENT AND FOREIGN AFFAIRS, THE FINANCIAL SECRETARY, THE PERMANENT SECRETARY OF AGRICULTURE, THE GENERAL MANAGER OF THE BELIZE MARKETING BOARD (BMB), AND THE GOB WORKING GROUP ON THE BMB. THE GOB WORKING GROUP, COMPRISED OF OFFICERS FROM THE MINISTRIES AND INSTITUTIONS MENTIONED ABOVE, IS CHARGED BY THE PRIME MINISTER AND CABINET WITH PERFORMING THE ANALYSIS

REQUIRED TO RESTRUCTURE THE BMB INTO AN INSTITUTION CONCERNED EXCLUSIVELY WITH COMMODITY PRICE STABILIZATION. TECHNICAL ASSISTANCE HAS BEEN PROVIDED TO THE GOB WORKING GROUP BY KSU/FFGI UNDER THE TA COMPONENT OF THE MISSION'S ESF PROGRAM. THE RESULT OF THIS INTENSIVE EFFORT HAS BEEN CONSENSUS WITHIN THE GOB AT THE HIGHEST LEVELS TO MOVE AHEAD WITH THE PROGRAM TO RESTRUCTURE THE BMB. THE RESTRUCTURING INVOLVES THE DIVESTITURE IN THE NEAR FUTURE OF THE BMB FACILITIES (GRAIN COMPLEX AND RICE MILL). THE SUBJECT PROJECT IS KEY TO THIS PROCESS.

THE MISSION AND GOB AGREED-UPON PRIVATIZATION STRATEGY, WHICH WILL FOLLOW-UP ON THE LEGAL STEPS TAKEN IN SATISFACTION OF THE CONDITION PRECEDENT FOR THE SIXTH

UNCLASSIFIED

Classification

201

UNCLASSIFIED

Classification

Page 4

of

MIN

TRANCHE OF THE ESF PROGRAM, IS DESCRIBED IN PARAGRAPHS B THROUGH E BELOW.

B. IN THE SHORT TERM (2 YEARS) TAMP WILL TRANSFORM THE GRAIN HANDLING AND MILLING COMPLEX OF THE BMB IN TOLEDO INTO A PROFITABLE OPERATION TO ENHANCE THE POSSIBILITY OF DIVESTITURE TO THE PRIVATE SECTOR. THIS WILL BE ACCOMPLISHED THROUGH FACILITY RENOVATION, TRAINING OF PERSONNEL, MARKET DIFFERENTIATION OF PRODUCTS, IMPROVED MANAGEMENT AND OPERATIONS, AND BACKWARD INTEGRATION INTO QUALITY RELATED RAW MATERIAL (PADDY) ACQUISITION. OVER THE LONG TERM (3-5 YEARS), TAMP WILL SET THE STAGE FOR PRIVATIZATION BY ORGANIZING AND DEVELOPING LOCAL FARMER GROUPS TO EVENTUALLY ACQUIRE, MANAGE AND OPERATE THE MILL AND GRAIN COMPLEX. THE POSSIBILITY OF INVOLVING OUTSIDE INVESTORS WILL ALSO BE CONSIDERED DURING THIS TIME FRAME.

THE IMPLEMENTATION PLAN OF THE TAMP PROJECT PAPER CONTAINS THE FOLLOWING ESTIMATED DATES AND BENCHMARKS FOR PRIVATIZATION OF THE BMB GRAIN COMPLEX AND RICE

MILL: -

-ESTIMATED DATE FOR PROJECT AUTHORIZATION IS JANUARY 15, 1987 WITH TECHNICAL ASSISTANCE TEAM ARRIVING ON/AROUND JUNE, 1987.

ESTIMATED COMPLETION DATE OF THE RENOVATION OF THE

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Classification

250

UNCLASSIFIED

Classification

Page 5 of

MRN

FACILITY IS SEPTEMBER, 1988.

--BY END OF 1990 THE NEW OWNERS/OPERATORS WILL HAVE BEEN IDENTIFIED, ORGANIZED, AND STENGHTENED TO BE ABLE TO EFFECTIVELY ASSUME AND OPERATE THE FACILITIES WITHOUT SIGNIFICANT DISRUPTION TO THE GRAIN MARKET AND ECONOMY. AT THIS TIME THE TECHNICAL ADVISORS TOGETHER WITH THE GOB WILL HAVE IDENTIFIED THE MOST APPROPRIATE MECHANISM FOR TRANSFER TO THE PRIVATE SECTOR (LEASE, SALE, ETC.).

--IT IS ENVISIONED THAT THE BMB RICE MILL AND GRAIN COMPLEX SHOULD EFFECTIVELY BE IN THE HANDS OF THE PRIVATE SECTOR BY THE TAMP PACD.

C. TAMP WILL PROVIDE THE BMB WITH THE SERVICES OF A MARKET ECONOMIST FOR THREE YEARS WHO WILL ASSIST THE BMB IN ITS RESTRUCTURING TO A PRICE STABILIZATION FUNCTION. THE ECONOMIST WILL ADVISE THE GOB WORKING GROUP IN FOLLOWING THROUGH ON THE BMB IMPLEMENTATION PLAN FOR RESTRUCTURING AND PRIVATIZATION, ASSIST IN THE COST ANALYSES OF THE TOLEDO FACILITIES OPERATION, ASSIST THE BMB IN DEVELOPING THE CAPABILITY TO GATHER, ANALYZE, AND DISSEMINATE MARKET INTELLIGENCE, AND IN GENERAL, ASSIST IN OTHER FUNCTIONS TO ENABLE THE BMB TO ASSUME THE FUNCTIONS OF A PRICE STABILIZATION ENTITY.

D. IN ITS OTHER COMPONENTS TAMP WILL BE DEVELOPING

UNCLASSIFIED

Classification

UNCLASSIFIED

Classification

Page 6 of

MRN

ALTERNATIVE MARKETING AND INPUT INFRASTRUCTURE IN TOLEDO DISTRICT WHICH IS THE FOCUS OF BMB DIRECT INTERVENTION, THUS PROVIDING THE ENVIRONMENT FOR BMB'S GRADUAL WITHDRAWAL WITHOUT TOO SEVERE DISRUPTION. THIS PROCESS WILL EFFECTIVELY WEAN TOLEDO FARMERS FROM THEIR TOTAL DEPENDENCE ON BMB AS THE MARKET FOR ALL THEIR PRODUCE.

E. CURRENT AND IMMINENT ACTIONS WITH KSU/FFGI TECHNICAL ASSISTANCE, PROGRESS IS STEADILY BEING MADE IN WORKING TOWARDS THE DEFINITION OF AN APPROPRIATE PRICE STABILIZATION PROGRAM FOR BELIZE THROUGH RESTRUCTURING THE BMB. TO DATE, THE STUDY ON THE BMB AND FOUR SCENARIOS FOR COMMODITY PRICE STABILIZATION WAS PRESENTED TO THE GOB WORKING GROUP ALONG WITH RECOMMENDATIONS FOR CABINET ACTION NECESSARY FOR DEVELOPMENT OF ANY OF THE SCENARIOS. AFTER CONSULTATION WITH CABINET, AND FURTHER DISCUSSION WITH AID AND KSU/FFGI THE GOB WORKING GROUP ON NOVEMBER 26, 1986 APPOINTED A SUBCOMMITTEE TO DEVELOP A BRIEFING FOR THE CONCERNED MINISTERS TO BE HELD ON/AROUND JANUARY 15, 1987. THIS BRIEFING WILL CONTAIN THE IMPLEMENTATION PLAN FOR RESTRUCTURING OF THE BMB INTO A PRICE STABILIZATION ENTITY AND ANSWER QUESTIONS THAT THE MINISTERS MAY HAVE ON THE PROGRAM. THE BRIEFING WILL

UNCLASSIFIED

Classification

256

PREPARE THE MINISTERS FOR THE CABINET DISCUSSIONS WHICH WILL AUTHORIZE THE LEGAL AND/ OR LEGISLATIVE STEPS TO IMPLEMENT THE PLAN. ESF TECHNICAL ASSISTANCE IS BEING PROVIDED TO THE WORKING GROUP TO ASSIST WITH THE ANALYSIS OF THE VARIOUS SCENARIOS FOR DIVESTITURE AND PREPARE CABINET BRIEFING PAPERS. THE SCHEDULE DEVELOPED BY THE WORKING GROUP ON 11/26/86 TO PROVIDE CABINET WITH AN IMPLEMENTATION PLAN FOR DIVESTITURE IS: (1) DECEMBER 15 - WORKING GROUP MEETS TO DEVELOP IMPLEMENTATION PLAN. KSU CONSULTANT AND AID WILL ASSIST; (2) DECEMBER 15-18 - BRIEFING PAPER ON DIVESTITURE WILL BE PREPARED BY WORKING GROUP; (3) DECEMBER 18--JANUARY 1 - BRIEFING PAPER WILL BE FINALIZED BY WORKING GROUP; (4) JANUARY 1-15 - MEMBERS OF WORKING GROUP WILL BRIEF THEIR RESPECTIVE MINISTRIES ON DIVESTITURE PLAN; (5) JANUARY 15 - O/A JAN. 15 MEETING WITH PRIME MINISTER, CONCERNED CABINET MEMBERS WILL DISCUSS DIVESTITURE PLAN. OBJECTIVE IS TO REACH CONCURRENCE AND APPROVED DIVESTITURE PLAN; (6) JANUARY 28 - O/A JANUARY 28 OFFICIAL ACTION TO APPROVE DIVESTITURE PLAN WILL BE TAKEN AT REGULARLY SCHEDULED CABINET MEETING.

3. JOINT IMPLEMENTATION PLAN - IFAD/AID
THE MISSION HAS CARRIED OUT EXTENSIVE DIALOGUE WITH

UNCLASSIFIED

Classification

211

IFAD AND THE GOB TO ASSURE THAT TAMP AND IFAD'S TOLEDO SMALL FARMERS DEVELOPMENT PROJECT (TSFDP) ARE TRULY COMPLEMENTARY AS REQUIRED UNDER THE PARALLEL FINANCED OPTION AGREED UPON BY IFAD AND USAID. THE OUTCOME OF THIS DIALOGUE IS A STRATEGY THAT THE GOB, IFAD, AND AID CAN REALISTICALLY IMPLEMENT.

THE MISSION BELIEVES THAT THE POLICY DIALOGUE PROCESS DESCRIBED ABOVE HAS LED TO A FULLER UNDERSTANDING AND GREATER COMMITMENT BY ALL PARTIES TO BOTH TAMP AND THE BMB PRIVATIZATION. THE MISSION IS CONVINCED THAT THE GOB WILL MOVE AHEAD IN A TIMELY MANNER IN BOTH THE BMB AND TAMP/IFAD EFFORTS.

AS REQUESTED IN REF A, ADDRESSED IN REF B, AND DISCUSSED IN REF C, THE PROJECT PAPER CONTAINS A COMPLETE DESCRIPTION OF THE IFAD PROJECT. IFAD'S PROJECT IS REFERRED TO THROUGHOUT THE PP (BACKGROUND AND RATIONALE, DETAILED PROJECT DESCRIPTION, IMPLEMENTATION PLAN, MONITORING PLAN, AND EVALUATION ARRANGEMENTS). ALSO IFAD'S REPORT AND RECOMMENDATION OF THE PRESIDENT TO THE EXECUTIVE BOARD ON THE SUBJECT PROJECT (CONTAINS THE AUTHORIZED PROJECT DOCUMENT) AND THE MINUTES OF THE SEPTEMBER 2, 1986 TRIPARTITE MEETING (IFAD/GOB/AID) ARE INCLUDED AS ANNEXES TO THE PROJECT PAPER. THE MINUTES OF THE TRIPARTITE MEETING CONTAIN

THE OUTLINE OF THE ROLES AND RESPONSIBILITIES OF EACH OF THE THREE ENTITIES IN THE PARALLEL FINANCED PROJECTS. THIS OUTLINE HAS BEEN AGREED TO BY THE GOB, IFAD, AND AID.

AS POINTED OUT IN REF B. IFAD'S PROJECT ACTIVITIES WERE IDENTIFIED APPROXIMATELY 18 MONTHS BEFORE THE DEVELOPMENT OF AID'S PID. THUS IFAD'S CITRUS RELATED ACTIVITIES (ONE COMPONENT IN THE PROPOSED FARMING SYSTEMS) WAS DEVELOPED PRIOR TO AND SEPERATE FROM AID'S PROPOSAL. FURTHERMORE AID'S ASSISTANCE WILL NOT DIRECTLY OR SECONDARILY ENHANCE CITRUS CULTIVATION OR PROCESSING IN BELIZE. AID ACTIVITIES WILL BE LIMITED TO DEVELOPING SERVICE CENTERS FOR COCOA PRODUCTION AND ASSISTING THE GOB TO PRIVATIZING THE BMB.

AS REQUESTED IN REF A, THE MISSION AND IFAD DURING THE PERIOD OF 8/25 TO 9/5/86 DEVELOPED A JOINT IMPLEMENTATION PLAN WHICH CLARIFIES THE MANAGEMENT ROLES AND COMPONENT RESPONSIBILITIES OF EACH. THIS JOINT IMPLEMENTATION PLAN IS INCLUDED IN THE PROJECT PAPER. UNDP'S ROLE IS SPELLED OUT IN THE PLAN.

BRIEFLY, DUPLICATION OF EFFORT IN PRIVATIZATION OF THE BMB RICE MILL AND DEVELOPMENT OF A MARKETING SYSTEM HAS BEEN ELIMINATED. AID WILL BE THE SOLE ENTITY INVOLVED IN THE RENOVATION OF THE GRAIN COMPLEX AND RICE MILL.

73

WITH GOB AGREEMENT, IFAD HAS RELINQUISHED THE IMPLEMENTATION OF THIS COMPONENT TO AID. IN ORDER TO PROVIDE THE NEEDED AMOUNT OF RESOURCES, BOTH IFAD AND AID WILL BE INVOLVED IN THE DEVELOPING OF A MARKETING SYSTEM. IFAD WILL ESTABLISH TWO OF THE THREE ORIGINALLY PROPOSED MARKET DEPOTS. AID WILL INITIALLY ESTABLISH ONE SERVICE CENTER WITH THE POSSIBILITY OF A SECOND LATER. THE GOB, IFAD, AND AID HAVE AGREED THAT TAMP'S CHIEF OF PARTY (COP), THE ORGANIZATION AND ENTERPRISE DEVELOPMENT SPECIALIST, WILL BE RESPONSIBLE FOR THE OVERALL COORDINATION TO ENSURE INTEGRAL DEVELOPMENT OF AN EFFECTIVE MARKETING SYSTEM FOR TOLEDO. UNIFORMITY AND COMPATABILITY OF EQUIPMENT, SUPPLIES, AND SERVICES WILL BE STRESSED. SHORTLY AFTER ARRIVAL, THE TAMP COP, TOGETHER WITH IFAD'S PROJECT SUPERVISOR, WILL DEVELOP A DETAILED JOINT PLAN FOR IMPLEMENTATION OF THE MARKET DEVELOPMENT COMPONENTS OF EACH PROJECT. THIS PLAN WILL BE APPROVED BY AID, IFAD AND GOB AND WILL PROVIDE THE FRAMEWORK FOR DAY TO DAY IMPLEMENTATION OF EACH ORGANIZATION. A JOINT POLICY COMMITTEE COMPRISED OF REPRESENTATIVES (AT THE POLICY DECISION LEVEL) FROM GOB/MOA, AID/ADO, AND UNDP/OPE WILL MEET ON AN AS NEEDED BASIS TO RESOLVE MAJOR IMPLEMENTATION ISSUES AND PROVIDE OVERSIGHT.

256

ESTABLISHMENT OF THE JOINT POLICY COMMITTEE WILL BE THROUGH A MEMORANDUM OF UNDERSTANDING (MOU) AMONG THE PARTIES.

A JOINT AID/IFAD MONITORING AND EVALUATION PLAN WAS ALSO DEVELOPED COLLABORATIVELY WITH IFAD AND IS ALSO INCLUDED IN THE PROJECT PAPER. THE DISCUSSIONS IN THE TRIPARTITE MEETINGS FOCUSED ON THE ROLES AND RESPONSIBILITIES OF THE THREE PARTIES AND THEIR INSTITUTIONAL CAPACITY TO PROVIDE THE RESOURCES AND CARRY OUT THE ACTIVITIES. ALL PARTIES ARE COMFORTABLE

THAT THE INSTITUTIONAL CAPACITY EXISTS. THIS IS ANALYZED IN THE RESPECTIVE PROJECT DOCUMENTS.

4. MISSION REVIEW.

A REVIEW OF THE FIRST COMPLETE DRAFT OF THE PROJECT PAPER WAS HELD ON AUG. 20, 1986, INCLUDING THE PARTICIPATION OF THE AID REP., THE AGRICULTURAL DEVELOPMENT OFFICE STAFF, THE PROJECT DEVELOPMENT OFFICER AND MISSION ECONOMIST, AS WELL AS ERIC ZALLMAN, CHIEF LAC/DR/CP, TED CARTER, RLA, AND TOM KING, LAC/DR/RD. THE ISSUES RAISED IN THIS MEETING AND THEIR SUBSEQUENT RESOLUTION ARE SUMMARIZED BELOW.

A. COLLABORATION WITH IFAD: CONCERN WAS EXPRESSED ABOUT THE LACK OF AN IFAD/USAID IMPLEMENTATION PLAN, STATUS OF IFAD NEGOTIATIONS WITH THE GOB, AND THE

121

UNCLASSIFIED

Page 12

Classification

HRN

POSSIBILITY THAT THE IFAD PROJECT WOULD NOT GO FORWARD.
RESOLUTION: ON AUGUST 25, 1986 AN IFAD PROJECT DESIGN TEAM VISITED BELIZE FOR TWO WKS. THE TEAM WORKED CLOSELY WITH USAID TO PRODUCE A JOINT IMPLEMENTATION PLAN, DESCRIBED ABOVE. THE TEAM ALSO NEGOTIATED ~~THE~~ AN AGREEMENT WITH THE GOVERNMENT. THE PROJECT AND LOAN AGREEMENT IS SCHEDULED TO BE REVISED AND APPROVED BY THE IFAD BOARD IN ROME THE WEEK OF DECEMBER 15, 1986, AND THE LOAN AGREEMENT IS SCHEDULED TO BE SIGNED BY THE GOB BY THE END OF JANUARY 1987.

B. PRIVATIZATION OF THE BMB AND RICE MILL COMPLEX:
THE MISSION HAD BEEN ENCOUNTERING RESISTANCE ON THE PART OF THE MINISTRY OF AGRICULTURE IN THE TAKING OF LEGAL STEPS/LEGISLATIVE ACTION TO CHANGE THE BMB INTO AN INSTITUTION CONCERNED EXCLUSIVELY WITH COMMODITY PRICE STABILIZATION AS REQUIRED BY THE ECONOMIC STABILIZATION AGREEMENT, AND IN COMING TO AN AGREEMENT ON A PLAN TO IMPLEMENT THE PRIVATIZATION OF THE BMB, AS CONTEMPLATED UNDER THE TAMP PROJECT, AS DISCUSSED ABOVE.
RESOLUTION: THE ORDINANCE OF THE BMB WILL BE AMENDED TO FORMALIZE THE BMB'S FUNCTIONS AS REQUIRED BY THE ECON. STAB. AGREEMENT, AND THE MINISTRY OF AGRICULTURE HAS ACCEPTED THE PRIVATIZATION PLAN, SUMMARIZED ABOVE.
C. PROJECT FEASIBILITY: CONCERN WAS EXPRESSED THAT

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THE ECONOMIC ANALYSIS DID NOT INCLUDE ALL REAL COSTS, I.E., GOB AND COUNTERPART COSTS. ALSO, BY BEING AGGREGATED IT DID NOT SHOW RETURNS FOR EACH ACTIVITY (COCOA AND POST HARVEST).

RESOLUTION: THE ECONOMIC ANALYSIS HAS BEEN REWORKED TO INCLUDE ALL COSTS. THE PROJECT'S OVERALL ECONOMIC B/C RATIO IS 1.17 AT A SOCIAL DISCOUNT RATE OF TEN (10) PERCENT IN THE FINANCIAL ANALYSIS, THE COCOA AND POST HARVEST ACTIVITIES HAVE BEEN DISAGGREGATED. THE FINANCIAL IRRS ARE AS FOLLOWS: 50 PERCENT FOR COCOA

PRODUCTION ALONE AND 54 PERCENT FOR COCOA PRODUCTION WITH POST HARVEST ASSISTANCE.

D. SOCIAL: CONCERN WAS EXPRESSED OVER THE INVOLVEMENT OF MAYA WOMEN IN THE PROJECT.

RESOLUTION: THE SOCIAL ANALYSIS ADDRESSED QUESTIONS REGARDING WOMENS' INVOLVEMENT IN THE PROJECT AND RECOMMENDED THAT A FEMALE SOCIAL ANTHROPOLOGIST ASSIST WITH PROJECT IMPLEMENTATION. THE PROJECT DESIGN PROVIDES FOR THE RECOMMENDED TA AND, IN ADDITION, THE PEACE CORPS HAS AGREED TO PROVIDE AN APPROPRIATE FEMALE VOLUNTEER.

E. THERE WAS CONCERN THAT THE PROJECT DESCRIPTION REMAINED VAGUE, ESPECIALLY IN THE RELATIONSHIP BETWEEN THE COCOA AND POST HARVEST ACTIVITIES.

239

UNCLASSIFIED

Classification

Page 14

of

HRM

RESOLUTION: THE PROJECT DESCRIPTION IS BEING REWRITTEN TO CLEARLY SPELL-OUT THE INTERRELATIONSHIPS BETWEEN THE TWO ACTIVITIES. AS SUGGESTED IN THE REVIEW, ASSISTANCE IN POST HARVEST LOSSES WILL BE RESTRICTED TO THOSE FARMERS INVOLVED IN THE COCOA ACTIVITY.

F. OBLIGATION ARRANGEMENTS: DISCUSSION CENTERED ON WHETHER IT WOULD NECESSARY AND BENEFICIAL TO COMPETE THE PROJECT, SOLICITING PROPOSALS FROM PVO'S.

RESOLUTION: USAID PROPOSES TO AUTHORIZE THE TOTAL LOP, INCLUDING A HB 13 COOPERATIVE AGREEMENT FOR THE PRIVATE SECTOR COMPONENT AND A GRANT TO THE GOB FOR THE PUBLIC SECTOR COMPONENT. AUTHORIZATION OF THE COOPERATIVE AGREEMENT WILL BE WITH A PRIVATE VOLUNTARY ORGANIZATION TO BE SELECTED IN ACCORDANCE WITH CHAPTER 1 B e 2 OF HB 13. USAID WOULD LIKE TO SOLICIT PROPOSALS FROM A LIMITED NUMBER OF PVOS WITH TRACK RECORDS IN COCOA PRODUCTION. AA LAC APPROVAL OF THIS PROCEDURE WILL BE REQUESTED IN SEPTTEL.

5. CONCLUSION. USAID REQUESTS CONCURRENCE TO MISSION'S STRATEGY FOR BMB PRIVATION DESCRIBED IN PARA 2, ABOVE AND GUIDANCE REGARDING OBLIGATION ARRANGEMENTS DESCRIBED IN PARA 4F, ABOVE. ONCE CONCURRENCE IS RECEIVED, MISSION WILL AUTHORIZE PROJECT, OBLIGATE GOVERNMENT PORTION AND BEGIN PVO SELECTION PROCEDURES.

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Classification

760

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UNCLASSIFIED

Classification

Page 15

of

MRM

AS BOTH ERIC ZALLMAN AND TOM KING PARTICIPATED IN THE REVIEW, AND TOM KING PLAYED A LEADING ROLE IN PP PREPARATION, WE ASSUME THAT STIPULATION FOR LAC/DR PARTICIPATION IS SATISFIED. RECOMMENDATIONS FROM BOTH ARE INCORPORATED INTO THE DESIGN AND REFLECTED IN THE DISCUSSION PRESENTED ABOVE.

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