



AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT DATA SHEET	1. TRANSACTION CODE <input type="checkbox"/> A = Add <input type="checkbox"/> C = Change <input type="checkbox"/> D = Delete <input checked="" type="checkbox"/> A	Amendment Number _____	DOCUMENT CODE 3
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2. COUNTRY/ENTITY BELIZE	3. PROJECT NUMBER 505-0006
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4. BUREAU/OFFICE LAC	5. PROJECT TITLE (maximum 60 characters) Livestock Development
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6. PROJECT ASSISTANCE COMPLETION DATE (PACD) MM DD YY 1 2 3 1 8 8	7. ESTIMATED DATE OF OBLIGATION (Under "B." below, enter 1, 2, 3, or 4) A. Initial FY <u>83</u> B. Quarter <u>4</u> C. Final FY <u>84</u>
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8. COSTS (\$000 OR EQUIVALENT \$1 = BZE \$2)						
A. FUNDING SOURCE	FIRST FY 83			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total						
(Grant)	(300)	()	()	(2050)	()	(2050)
(Loan)	(1000)	()	()	(1000)	()	(1000)
Other U.S.						
1.						
2.						
Host Country					1180	1180
Other Donor(s)						
TOTALS	1300	-	-	3050	1180	4230

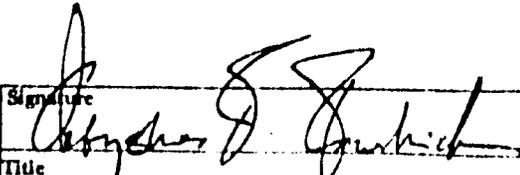
9. SCHEDULE OF AID FUNDING (\$000)									
A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) ARDN	110	078	078	-	-	2050	1000	2050	1000
(2)									
(3)									
(4)									
TOTALS				-	-	2050	1000	2050	1000

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 1 position each) 012 052 334 963	11. SECONDARY PURPOSE CODE
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12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each) A. Code BR TNG XII B. Amount	13. PROJECT PURPOSE (maximum 480 characters) <div style="border: 1px solid black; padding: 10px; margin-top: 5px;"> To improve small and medium farmers' production efficiencies in the rearing of livestock and to expand market outlets for these products, primary through import substitution activities. </div>
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14. SCHEDULED EVALUATIONS Interim MM YY MM YY Final MM YY 0 3 8 5 0 5 8 6 1 2 8 8	15. SOURCE/ORIGIN OF GOODS AND SERVICES <input checked="" type="checkbox"/> 000 <input type="checkbox"/> 941 <input type="checkbox"/> Local <input type="checkbox"/> Other (Specify) _____
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16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment)

17. APPROVED BY	Signature:  Title: A.I.D. Representative	Date Signed MM DD YY 0 7 1 8 3	18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION MM DD YY 0 7 2 0 8 3
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UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON D C 20523

PROJECT AUTHORIZATION

Name of Country: Belize

Name of Project: Livestock Development

Number of Project: 505-0006

Number of Loan: 505-T-003

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Livestock Development project for Belize involving planned obligations of not to exceed One Million United States Dollars (\$1,000,000) in loan funds ("Loan") and Two Million Fifty Thousand United States Dollars (\$2,050,000) in grant funds ("Grant") over a two-year period from the date of authorization, subject to the availability of funds in accordance with the AID OYB/allotment process, to help in financing foreign exchange and local currency costs of the project. The planned life of the project is five years and four months from the date of initial obligation.

2. The project ("Project") will improve production efficiencies of small and medium farmers in the rearing of livestock and will expand market outlets for these products, primarily through import substitution activities.

3. The Project Agreement, which may be negotiated and executed by the officer to whom such authority is delegated in accordance with AID regulations and Delegations of Authority, shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as AID may deem appropriate.

(a) Interest Rate and Terms of Repayment

The Government of Belize ("GOB") shall repay the Loan to AID in U.S. Dollars within twenty-five (25) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The GOB shall pay to AID in U.S. Dollars interest from the date of the first disbursement of the Loan at the rate of (i) two percent (2%) per annum during the first ten (10) years, and (ii) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

(b) Source and Origin of Commodities, Nationality of Services (Loan)

Commodities financed by AID under the Loan shall have their source and origin in Belize or in countries included in AID Geographic Code 941, except as AID may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have Belize or countries included in AID Geographic Code 941 as their place of nationality, except as AID may otherwise agree in writing. Ocean shipping financed by AID under the Loan shall be financed only on flag vessels of Belize or countries included in AID Geographic Code 941, except as AID may otherwise agree in writing.

(c) Source and Origin of Commodities, Nationality of Services (Grant)

Commodities financed by AID under the Grant shall have their source and origin in Belize or in the United States, except as AID 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 AID may otherwise agree in writing. Ocean shipping financed by AID under the Grant shall be financed only on flag vessels of the United States, except as AID may otherwise agree in writing.

(d) Conditions Precedent to Disbursement

(i) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, to finance activities under the swine improvement program, the GOB shall, except as AID may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID: (A) evidence that the Ladyville Abattoir and Meat Packing Plant is technically sound and operationally efficient, (B) evidence that the GOB has established the rotating fund for the provision of in-kind credit, and (C) copies of the operating procedures and borrower eligibility criteria for the rotating fund.

(ii) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, to finance activities under the policy analysis and formulation component, the GOB shall, except as AID may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, evidence (A) of the creation of a new position of policy analyst within the Office of the Minister/Permanent Secretary and (B) that there has been provided a salary incentive sufficient to retain this analyst in government service beyond the life of the in-service repayment period.

(iii) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, to finance activities under the pasture improvement program component, the GOB shall, except as AID may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, evidence of the establishment of an operating expense fund at Central Farm to accelerate disbursements of operating funds required on a short-term basis.

(iv) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, to finance long-term training of swine and/or pasture/forage specialists, the GOB shall, except as AID may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, evidence of the increase, by one, of the number of technical officer positions at Central Farm to ensure appropriate placement of trainees upon completion of long-term training.

(v) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, to finance long-term training of dairy production specialists, the GOB shall, except as AID may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, evidence that the market demand study for fresh milk has sufficiently progressed to where a decision regarding the advisability of investing in this specialized training can be made.

(vi) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, to finance technical assistance under the pork/beef processing component, the GOB shall, except as AID may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, evidence of the provision by the GOB of facilities necessary to serve as a training base for the advisor for this component.

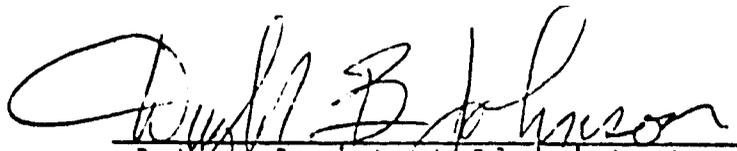
(e) Covenant

The GOB shall covenant that, unless A.I.D. otherwise agrees in writing, it will furnish, or cause to be furnished to A.I.D. and the Ministry of Natural Resources, in form and substance satisfactory to A.I.D., on an annual basis, evidence of the establishment of training plans prepared by the project advisors.

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(f) Waiver

The requirement for nonrestrictive specifications is hereby waived and proprietary procurement from Ford is hereby authorized for four four-wheel drive pick-ups, two compact automobiles and the chassis for two refrigerated milk trucks in an aggregate amount not to exceed \$190,000.


Acting Assistant Administrator
Bureau for Latin America
and the Caribbean

Aug 22 1983
Date

Clearances:

GC/LAC:RBMeighan 8/18 - RM Date 8/18
LAC/CAR:JHoltaway [Signature] Date 8/17
LAC/DR:DJohnson [Signature] Date 6/16/83

LAC/DR:GWinter:atb:7/8/83:0073N:23272

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UNATTACHED ANNEXES

- I. Complete Social Soundness Analysis
- II. An Assessment of the Belize Livestock Sector by Winrock International, October 1982
- III. GOB National Development Plans in Beef, Swine and Dairy Development 1982-1984

List of Acronyms

APC	Agricultural Production Credit Program
BLPA	Belize Livestock Producers Association
BSA	Belize School of Agriculture
CAEP	Caribbean Agricultural Extension Project
CARDI	Caribbean Agricultural Research and Development Institute
CDB	Caribbean Development Bank
CIDA	Canadian International Development Agency
DFC	Development Finance Corporation
GOB	Government of Belize
HPI	Heifer Project International
IDRC	International Development Research Center
LAAD	Latin American Agribusiness Development Corporation
MONR	Ministry of Natural Resources
WD	Western Dairies

I. SUMMARY AND RECOMMENDATIONS

A. Recommendations

1. That a loan be authorized to the Government of Belize (GOB) in the amount of \$1,000,000 with a 25 year repayment period, including a 10 year grace period, at an interest rate of 2% during the grace period and 3% thereafter.
2. That a grant be approved in the amount of \$2,050,000 to be incrementally obligated as follows: \$300,000 in fiscal year (FY) 1983 and \$1,750,000 in FY 1984.

B. Borrower and Implementing Agency

The Borrower and Grantee will be the GOB represented by the Ministry of Finance. The Ministry of Natural Resources (MONR) will be the project's major implementing agency.

C. Summary Rationale and Strategy

This project responds to the repeated assertion that the development potential of the livestock industry in Belize offers one of the greatest opportunities for growth within the country's agricultural sector. This assertion is substantiated by various documents, cited in latter sections of this Project Paper (PP), an assessment of Belize's natural resources which include a vast, largely unused land base ready to be transformed into productive pastures, and, finally, from a need perspective, the amount of scarce foreign exchange Belize must spend on its food import bill of which processed pork, beef and dairy products account for the greatest share.

Based upon the above rationale and the priority assigned by the GOB to the development of Belize's livestock industry, a project strategy has been designed to address production inefficiencies, expand product markets and encourage the full participation of Belize's small and medium livestock producers. With respect to reaching this target group, it became apparent upon further review that the costs associated with raising beef cattle were beyond the economic realm of most small producers. Given the high initial investment costs required, the lagged benefit stream (by five to seven years), and the high cost of credit available from both public and private financial institutions, it was determined unsound on economic and financial grounds to encourage small producers to invest in significant expansion of their herds during the life of this project. Therefore, this component has been scaled back from the level of effort originally envisaged in the PID.

On the other hand, for reasons listed below, development of Belize's swine subsector has taken on greater importance. Unlike beef cattle, pig production is dominated by small producers, requires less costly production inputs and provides an income stream within six months to one year of an initial investment. Furthermore, the import-substitution potential for pork products in Belize is much greater than that for processed beef.

The third major subsector proposed for A.I.D. involvement is dairy production. During the PID review, a number of outstanding questions highlighted the uncertainty and limited knowledge about the potential market demand for fresh milk in the country. As a result, it was decided that approval of large scale A.I.D. financing for the GOB's national dairy industry development plan was not justifiable at this time.

Alternatively, A.I.D.'s strategy under this project will be first to address the potential demand question by establishing a small dairy plant and conducting a market study, and then, contingent upon the results of this study, provide the GOB technical assistance and training on a scale consistent with its findings. During development of the PP, the GOB was briefed on this phased approach and agreed on the need to more fully understand the market forces at work.

In each of these subsectors, at varying levels of effort for the reasons given above, the project purpose will be to improve small and medium farmers' production efficiencies in the rearing of livestock and to expand market outlets for these products, primarily through import substitution activities. Production inefficiencies will be addressed through upgrading the capabilities of the national extension service to assist farmers in improved animal husbandry and farm management practices. Market expansion, particularly with the objective of capturing a significant portion of domestic demand for pork, beef and, eventually, dairy products will be achieved through development of a major processing capability in-country. Both of these objectives will be further served by one final project component to strengthen the competence of the GOB to analyze and formulate policies affecting the status and development of the livestock sector in Belize.

D. Summary Project Description

The project consists of five major components described in the following summaries and in greater detail in Part III, Project Description, of this PP.

Swine Improvement Program: One U.S. technical advisor will work with the MONR extension service, Central Farm (the nation's agricultural research station), and the Belize

School of Agriculture to expand the number of small farmers engaged in improved swine production techniques. During this period, one livestock specialist from Central Farm will be sent to the U.S. for BSc level training in animal science.

Special attention will be given to Toledo, the country's major pig producing district which is also Belize's poorest and most remote region. An advisor will be assigned to work exclusively with the district's population which is predominantly Mayan Indian and practices a traditional form of slash and burn agriculture.

Pasture Improvement Program: One U.S. advisor with expertise in pasture development and forage production will work with the MONR to increase the country's year-round supply of quality pasture land upon which the development of the beef and dairy industries depend. A MONR candidate will receive BSc level training in agronomy, emphasizing forage production, at a U.S. university.

Dairy Industry Development: This component will finance a market demand study for fresh milk which will serve as the basis for formulating a GOB strategy for development of a national dairy industry, establishing guidelines for the appropriate size and location of dairy production and marketing infrastructure and reaching policy decisions related to the effects of imports on the development of this industry. A small milk processing plant will be constructed and operated by a private dairy cooperative that will assist in carrying out the market study.

Pork and Beef Processing: Aimed at reducing the GOB's import bill for these products, this component will develop the domestic private sector's capability to competitively process locally produced pork and beef. Nine months of technical assistance will be financed to demonstrate and teach modern meat processing technologies to interested private sector parties.

Government Policy Analysis and Formulation: This component will strengthen the analytical capabilities of the MONR to make sound policy determinations related to livestock development. Project financing will support advanced degree training of MONR staff in economic theory and quantitative methods as related to agriculture.

E. Summary Financial Plan

Table 1
Summary Financial Plan
(U.S. \$000)

<u>Project Component</u>	<u>A.I.D.</u>		<u>G.O.B.</u>	<u>Private Sector</u>
	<u>Loan</u>	<u>Grant</u>		
Swine Improvement Program	150	620	300	
Pasture Improvement Program	100	360	550	
Dairy Industry Development	340	380	30	30
Pork & Beef Processing	40	90	10	
Policy Analysis & Formulation	120	300	50	
Evaluation	70			
Inflation (6%/year)	100	250	160	
Contingencies	80	50	50	
Total	<u>\$1,000</u>	<u>\$2,050</u>	<u>\$1,150</u>	<u>\$30</u>

F. Summary Findings

The project committee has found the project to be administratively, technically, socially, economically and financially feasible and consistent with the development objectives of the GOB and the objectives contained in USAID's forthcoming CDSS document.

II. BACKGROUND

A. Economic Overview and the Role of Agriculture

1. Overview

Belize, a Central American country about the size of Massachusetts, gained its independence in September, 1981. With some 150,000 people on 5.7 million acres of land, it has one of the lowest population densities in the world. Belizeans are a young population, with estimates of approximately 65% under 21 years of age. Due to the magnitude of out-migration (estimated between 40,000 and 100,000) of the country's prime labor force, a small corp of workers are left to generate the economic growth necessary for the country's maintenance and development. Formerly British Honduras, Belize has an English speaking heritage; but due to its strong social and economic bonds with Mexico, approximately 40% of the population now speak Spanish as their first language.

Belize's historical pattern of economic development has been shaped by its lack of exploitable minerals but plentiful land, forest and marine resources. The basis for development of any type of heavy industry is nonexistent at this time, and for light industry is limited. With more than one third of its land base suitable for agriculture, this sector offers the most development potential. Historically, this potential has not been realized due to a number of constraints including a majority of the population with no tradition of agriculture and hence, little farming know how.

During the late 1970's, Belize's economy performed strongly, with an average annual growth rate of five percent. Since the turn of the decade, however, economic growth has declined sharply. Real GNP grew by only two percent in 1980 and fell to one percent in 1981. Indications are that this downward trend is continuing due to poor agricultural performance, stagnation in manufacturing and the world economic recession. The agricultural sector, which contributes over 20% of the GNP

and represents about 60% of total exports, has experienced the worst deterioration. The sugar crop, which alone accounts for 50% of exports, was largely destroyed by smut disease. This resulted in a sharp decline in production and required the launching of a replanting program with more disease resistant, but lower yielding, varieties of sugarcane. Export earnings have been further reduced by a depressed world market price for sugar. The citrus and banana industries, the second and third largest foreign exchange earners, are currently facing bankruptcy, and the GOB is seeking external bridge-financing to cover operating expenses until export receipts increase. The cattle industry is also facing a grave situation, with production, exports and earnings all in decline.

With respect to meeting internal consumption needs, despite the country's small population, ample fertile land and favorable climate, Belize is not near self-sufficient in food production. Food imports account for 27% of the total import bill, with livestock and dairy products making up the largest portion. The country is taking deliberate steps toward greater self-reliance in food production and away from such a heavy dependence on imports and the costly drain on scarce foreign exchange.

Manufacturing, dominated by processing of agricultural products and the garment industry, contributes 15% of the GNP. This sector has not grown since 1979 and indications are that it will decline through 1983. This is attributed primarily to the low demand for garments on the export market, saturation of the domestic market and underdeveloped capacity in the area of processing of agricultural products.

Tourism exhibits considerable potential, and accounts for about ten percent of foreign exchange earnings. Nevertheless, an effective tourist plan, including marketing approaches and infrastructure requirements, needs to be developed.

Finally, the trade sector contributed over 25% of the GNP in 1981. This contribution of wholesale and retail trade to GNP is much greater than that found in most other developing countries and is largely explained by Belize's heavy involvement in re-export trade. The annual output value primarily originates in the provision of final and intermediary services rather than from indigenous resource-based economic activity. The recent economic crisis in Mexico has had an adverse effect on this sector. For many years Mexico has been Belize's chief partner in re-export trade.

GNP per capita in 1981 was estimated at \$1,055, one of the highest in Central America and the Caribbean. However, the GOB 1982 fiscal year (FY) current account budget registered its

smallest surplus in recent history (\$5.0 million) and GDP is steadily declining. New public sector investment has decreased considerably, with many projects being shelved. During the first half of the Belizean FY 1982, the GOB managed to draw down only seven percent of its assistance pipeline, now placed at about \$35 million. The private side of the economy has also entered a decline, as the consequences of falling agricultural export prices are compounded by diminishing production volumes and the domestic credit market, squeezed by Government borrowings, which cannot adequately finance the new productive investment needed to break the downward trend.¹

2. Agricultural Development in Belize

Agricultural development in Belize came later than in other Central American countries and was based upon a land use pattern substantially different from its neighbors. The first European settlers in Belize were "former buccaneers" who came to cut logwood, and later mahogany, for the Western European market. This early logging industry utilized slave labor and draught cattle to accomplish its purpose and developed Belize's economy along the country's major river systems. The Spanish controlled the region, permitting the logwood crews to extract Belize's timber, but prohibiting the establishment of all plantation agriculture and industry. Only a few indigenous Indians practiced crop agriculture during these times. These early (agriculturalists practiced a method of shifting (or bushfallow) cultivation called "milpa" farming. Today this system of farming is still widely practiced throughout Belize.

Significant changes in the agricultural sector took place during the first half of the 20th century. Unrest in neighboring countries resulted in substantial numbers of Indians moving to Belize. These Indians introduced sugar cane production which was later to become Belize's major agricultural crop. The introduction of mechanized logging techniques in the 1920's caused considerable unemployment and resulted in widespread slaughter of the now "useless" work animal cattle herd. This period of economic depression stimulated interest in the sugar industry and fostered the beginning of the banana industry; much later the potential of a citrus industry was realized. It was not until the mid-1940's, however, that interest in cattle production was revived.

¹/In response, in March 1983, A.I.D. approved financing for a \$5.0 million rediscount fund in the Central Bank, to be administered through the country's four commercial banks, to increase the amount of credit available for private investments in the agricultural sector.

In spite of this meager historical base, agriculture has developed to be the most significant sector of Belize's economy. As stated above, Belize has one of the highest land/population ratios in the world with only 15% of its potentially cultivable land in use and 35% of its workforce employed in agriculture. The country also has a variety of excellent soils and suitable climate that can support the production of a wide range of crops and livestock. The GOB has made agricultural development its priority and has invested in infrastructure development, agricultural research and extension, and expansion of social services into rural areas to reach the country's farm population.¹

B. Development of the Livestock Sector: Rationale and Constraints

Many studies and analyses of Belize's economic potential similarly conclude that high priority should be given to the development of the country's livestock industry. One such report by the British Honduras Land Use Survey Team entitled Land in British Honduras, published in 1959, states: "Next to forests, grass is the most consistently successful crop; long range development must take this into account. Immediate investigational work is needed on the techniques of pasture establishment and management and matters related to livestock. There is nothing in the past or present situation to indicate that this type of farming might fail. Almost every natural factor is in favor in British Honduras." This assessment is further substantiated by later reports which conclude that given the land resources available for pasture development and feed grain production, and the relative freedom from serious cattle disease, Belize offers an excellent potential for an expanded livestock industry.²

¹/In line with the sectoral priority the GOB has assigned to agricultural development the next planned bilateral A.I.D. Development Assistance project will finance construction and upgrading of Belize's rural access roads and bridges.

²/See the following references:

An Assessment of the Belize Livestock Sector, Winrock International, Morrilton, Arkansas, 1982.

Economic Report on Belize, World Bank Report No. 4446-BEL, April 26, 1983; Economic Memorandum on Belize, World Bank Report No. 3823-BEL, April 5, 1982; Current Economic Positions and Prospects of Belize, World Bank Report No. 2423-CRB, April 11, 1979.

The Agricultural Development Potential of Belize Valley, Belize, Report No. 24, Land Resources Division, Ministry of Overseas Development, Survey, England, 1976.

Prefeasibility Study of the Livestock Industry in Belize and the Export Market Potential for Beef and Meat Products in the Caribbean, Thomas H. Miner and Associates, Inc., Chicago, Illinois, 1972.

As great as the potential is as identified in these various studies, actual development of the livestock sector is thwarted by a number of constraints. These constraints occur in the production, marketing and policy arenas. Their combined effects tend to discourage needed investment -- both public and private -- in the livestock industry. Because these constraints are interacting, their resolution will require an integrated systematic approach to productivity improvement, market development and policy changes. A summary of the major factors hindering development of the livestock industry are discussed below by sub-sector - swine, beef cattle and dairy.

Swine

According to the 1980 Pig Census, the total swine population of Belize was estimated at 16,000 animals. The districts of Toledo and Orange Walk accounted for about 56% of the national herd, while the remaining herd were found in Corozal, Cayo and Belize districts. Pigs are primarily a small farmer enterprise. At the time of the Census, 29% of the pig owners surveyed had only one pig on their farm, 68% had less than five, and 87% had less than ten. Only 1.7% of those surveyed had more than 25 pigs.

About 62% of the national swine herd is Criollo. The number of improved stock such as Duroc, Large White, Hampshire, and Crossbreds are increasing but still not common. The Criollo pig is hardy and known for its ability to scavenge for food, but its productivity and feed conversion efficiency rates are low. As scavengers, the pigs consume waste products which are supplemented by some corn and other farm by-products. The 1980 Pig Census indicated that 85% of the producers surveyed fed corn to their pigs whereas mixed feed or protein concentrates, due to high costs and/or inaccessibility, generally were not added to the diet.

This scavenger or extensive production system is practiced widely throughout Latin America. The pigs are allowed to roam freely throughout villages and surrounding fields. Pigs raised under an extensive management system obtain an average slaughter weight of about 100 pounds, depending on age and amount of supplemental feed. Average slaughter age is 11 months; and average dressed weight for these animals is 69 pounds. Occasionally pregnant sows are confined, but farrowing often occurs in the fields. Five to twelve pigs are born per litter with an average weight of two pounds. However, growth rate of piglets to weaning is poor because nutritional deficiencies limit the sow's milk production. As a result of these deficiencies and a general lack of care, only three to five pigs will reach weaning age. Weaning weights vary widely, but are estimated to average about 15 pounds when the animal is 60 to 70 days old.

Only a small percentage of the pigs produced in Belize are raised in confinement or under an intensive management system. The typical farming operation contains only two or three sows and their offspring. Confinement housing and equipment, including automatic feeders and waterers, are simple but adequate. Feed and water are available at all times and well-balanced rations are fed throughout the life cycle. The rations are based on corn, rice bran, sorghum, and a commercial protein supplement in various combinations. The level of sanitation and health on these farms is satisfactory and good husbandry practices are employed. Many of the pigs raised under intensive management are improved stock obtained from the GOB's national research center, Central Farm, or one of the other government multiplication centers. In 1980, pork imports cost \$2.5 million in foreign exchange. This translates into 2.6 million pounds of pork and pork products. Assuming an average dressed weight of 135 pounds, this is equivalent to approximately 19,300 carcasses.¹ Through expansion of intensive swine production in Belize, offtake could be increased in a matter of years to make Belize self-sufficient in pork. The major production constraints to increasing and upgrading the herd are inadequate numbers of improved breeding stock, the cost and unreliable delivery of commercial feeds and imported protein concentrates, lack of knowledge about improved production practices, and a reluctance to change from traditional extensive production techniques, particularly as practiced in Toledo, the largest swine raising district in the country.

On the marketing end, the major constraints are intrinsic to the structure of the swine industry which is characterized by many sellers at the producer level and few buyers at the first sales transaction point (normally the meat vendor of whom there are approximately 65 nationally). Usually, the producer is without the necessary market information to sell on an equitable basis to the more experienced buyer. The swine industry lacks an integrated market structure, but is not presently controlled by government regulations in either production, marketing, or establishing prices. The producer is free to sell to any buyer at a negotiated price and the butcher/meat vendors are free to custom slaughter at the country's largest abattoir, the Iximché plant close to Belize City, or slaughter themselves in the rural districts. Finally, limited domestic processing capacity for pork curing and sausage making keeps Belize from competing with imported pork products.

¹/ Average dressed weight of 135 pounds assumes that the pig is raised under an intensive production system.

Beef Cattle

In the 1700's cattle were imported into Belize from Honduras and grazed about logging camps. Importations of draught and beef animals peaked at about 6,000 head in 1929. The early importations and the national herd up to the 1960's reflected Spanish Criollo (mixed) breeding of either Chino and/or Criollo de Esmeraldas strains from Honduras. This native stock, while very hardy, is small (500-800 lbs.) and slow growing. In 1971 the MONR imported 720 Brahman heifers from Costa Rica, laying the groundwork for upgrading the national herd. Today the total cattle herd is estimated at 51,000 head. The annual extraction rate, cattle removed from the herd, is estimated at 25% or about 13,000 head. Based on an average slaughtered live weight of 750 pounds and an average price of U.S. 44 cents per pound in 1981, beef cattle (live basis) contributed \$4.3 million, or 10% of agriculture's total output value. The marketing system, from live animal to retail, generated an additional \$3.2 million.

There are about 1,400 cattle producers in Belize today of which small producers, those raising cattle on less than 100 acres, total 1,020 and account for 24% of the national herd. A few large ranching operations dominate the sector and own one-half of the herd. Among all producers, however, cattle rearing is generally a sideline to some other activity. The smallest subsistence farmer may own one to a few head as part of his mixed-production system while many small commercial holders may also be sugarcane growers or urban small businessmen. The larger cattle operations are commonly owned by major sugar, bananas or citrus companies which own commercial herds as an offshoot of their main businesses. In fact, few, if any, ranchers make a living from cattle raising alone in Belize. This is particularly true today when many ranchers are facing financial hardships and are liquidating their cattle holdings. The current crisis is the result of a domestic glut of cattle on the market, estimated at 1500 - 2000 surplus head, the shrinking Mexico market since the recent peso devaluation and the generally depressed world economic situation.

The major constraint facing the beef cattle industry is related to the country's major slaughter facility, the Ladyville Abattoir and Meat Packing Plant. The plant was established in 1972 under the ownership and management of Belize Meat Packers Ltd. Some of the plant's original equipment is now outmoded and operational efficiency is far from optimal. Ownership and management of the plant has changed hands four times since 1972. The last change in ownership took place in 1981 when the GOB, for the second time, with financing from the Caribbean Development Bank (CDB), bought the plant for \$750,000. In March 1982, the GOB borrowed an additional \$530,000 from CDB for refurbishing. This latest loan also provides for

support services to the plant, namely training for a plant manager and technical assistance to develop export markets for Belizean beef over a two year period. Neither of these latter inputs have materialized to date.

The total \$1.28 million debt burden, along with the very low livestock throughput, has resulted in serious and continuing financial losses for the GOB which, in turn, has been passed on to the consumer in the form of higher retail prices for beef and to the producer in the form of lower prices. In 1982, it was estimated that 1,855 cattle and 1,495 pigs were slaughtered at the Ladyville Abattoir; this averages six head of cattle and five swine per day. With a carrying capacity of 50 head of cattle per eight hour working day, this plant has never operated near full capacity. A fifty dollar flat rate is charged to slaughter one head of cattle at the Abattoir and is based on calculations that determined, assuming an annual kill of 4,800 head, the GOB could "breakeven" at this fee. However, with an annual throughput of only 1,855 head, it is clear that the plant is in a precarious financial position. This fifty dollar customer slaughter charge represents over 12% of the wholesale carcass value. (In comparison, in the United States a slaughter fee usually represents less than one percent of the wholesale carcass value.)

The operational inefficiencies of this plant partially explain Belize's inability to compete with other foreign suppliers of deboned meat to the U.S. market. The most recent price paid for deboned meat in the U.S. was quoted at \$1.11 per pound. Currently, taking into consideration all costs, Belize could export deboned beef to the U.S. at \$1.16 to \$1.21 per pound.¹ Achievement of greater operational efficiencies at the Abattoir equal to a slaughter fee savings of five to ten cents per pound could make Belize competitive again in the U.S. market.

Due to the mounting financial burden of this plant, the GOB is actively seeking an alternative to its involvement in plant ownership and operations. Currently, the GOB is negotiating with a group of prospective U.S. investors interested in leasing/buying the plant and managing its operations. This particular group has many years of experience in this business and owns eight similar operations in the

¹\$1.16 to \$1.21/lb. is based on the following cost estimates: (a) 38¢/lb. paid for live animals; (b) 100% dressing cost resulting in carcass cost of 75¢/lb. (c) slaughter fee of 17¢/lb.; and (d) deboning, packaging and transportation charges totalling 25¢/lb.

U.S. To date, no agreeable terms have been reached satisfactory to all parties. (CDB is also involved in the negotiations as major financier of the plant). The GOB realizes that the current Abattoir situation is a major obstacle to encouraging ranchers to expand their herds, to becoming price-competitive in the export markets and to reducing the price of beef in the domestic market. Besides providing advice to the GOB about the terms of a contractual arrangement with any party that would assume ownership and/or management responsibility for the plant, there is little direct involvement that would be appropriate for USAID in this matter. Already, there are a number of parties involved, including the CDB, and a consensus that something has to be done. However, because resolution of these problems is so essential to future development of the livestock industry and to achievement of this project's objectives, prior to the disbursement of project funds, the GOB will be required to furnish to A.I.D., in form and substance satisfactory to A.I.D., evidence that the Abattoir is operationally viable. The intent of this condition precedent is to ensure that competent management expertise is in charge of the plant and that the plant is operating at a level of efficiency consistent with similar plant operations in the U.S.

Other constraints affecting development of the cattle industry and Belize's competitiveness in the export market relate to production inefficiencies on the farm. The two major problems are lack of improved pastures and poor management practices among small and medium producers. The Belize cattle industry is almost exclusively based on pasturage, and most operations are cow-calf-finishing. Natural pastures consist mainly of native grasses and are established by first clearing forest growth by either hand or mechanical means and retarding regrowth thereafter. While highly variable, the carrying capacity of natural pasture is estimated to be three to five acres per cow and unless legumes are encouraged or mineral supplements fed, especially phosphorous, low calving rates result.

Improved pastures are found chiefly in Cayo, Orange Walk and Belize districts (see map). The average carrying capacity on improved pasture is one acre per animal, but may reach as high as one acre per three animals on the best managed properties. The cost of fence construction (four strands of barbed wire on forest cut posts) on reasonably large acres is about \$1000 per linear mile or approximately \$35 per acre. Since land clearing costs some \$125 per acre and pasture establishment another \$50, grazing is not cheap. While the technology of improved pastures is readily available in the country, further adaptive research and extension of improved techniques is needed. Considerable opportunity also exists for improvement of management practices through extension services, particularly among the smaller cattle producers. Production management involves the husbandry or day-to-day care of the herd, and judicious handling of overall operations. Since Belize does not have a livestock based history, animal husbandry is a relatively new occupation for most owners, cowboys and managers.

Until recently, certain GOB policies and regulations served as disincentives to increasing cattle production in Belize. Over the past two years, government price controls have resulted in domestic shortages. Restrictions on the slaughter of all females as a means of building up the national herd applied even up to the elimination of defective female animals. Legal minimums on the weight of slaughter stock, set in the hope that an export market could be established, further constricted the domestic market for beef. Requiring all sales and slaughter in Belize district to be made through the Ladyville Abattoir put small and medium sized producers in remote areas outside legal trade channels, and beef consumption lost ground to chicken and pork.

In discussions of this project, the GOB has shown a willingness to reconsider its role and already has lifted all price controls on beef and all slaughter constraints. Furthermore, prohibitions on the export of live cattle have been suspended temporarily as a means of getting rid of the current glut of cattle in the country. This prohibition originally was enforced to promote expansion of breeding herd inventories, but due to the current surplus of cattle, has been lifted temporarily allow 5,000 head of cattle to be exported. With this latest policy reform, currently no major policy-related constraints adversely affect the cattle industry.

Dairy

Cattle have always been milked for home consumption in Belize. However, the marketing of fresh fluid milk has progressed little beyond this stage of development. Imports of dry milk and processed milk products are presently costing the GOB some \$12.0 to \$13.0 million in foreign exchange annually. About \$7.0 million of these imports are in the form of powdered, evaporated and sweetened condensed milk. The remainder is primarily accounted for by cheese and butter. The GOB is intent upon developing a national dairy industry to supplant to the extent possible this major foreign exchange cost.

Farms on which cows are milked are appreciable only in Cayo and Orange Walk districts. Many farmers are using a dual purpose approach in their farm systems. They milk their cows in the morning and leave a calf with the cow the rest of the day. This leads to low daily milk production averages and short lactation periods. Farmers milk by hand only the amount of milk they utilize for home consumption or can sell easily. Some producers indicate an interest in purchasing mechanical milkers and in expanding their herds should a dependable market develop.

Forage production on dairy farms varies as greatly as it does on beef cattle farms. Some producers employ sound management practices, plant good pasture grasses and can maintain up to three animals per acre; although most farmers still utilize only native grass and legumes. Native pasture with some management can handle one animal per 1.5 to two acres. Some farmers chop sugar cane and provide feed to supplement their pastures, particularly in the dry season. The major production constraint facing the dairy farmer, like the beef cattle producer, is the limited development and availability of high quality pasture.

There is only one dairy processing plant, Western Dairies, in Belize which is owned and operated by a Mennonite community. The Western Dairies (WD) plant is constrained by a number of production problems resulting in off flavor or sour milk and shortened product shelf life. Upgrading the quality of the pasturized milk produced by WD

will require procurement of new plant equipment. Other dairy producers have expressed strong interest in establishing another processing plant and have requested assistance for this purpose. However, uncertainties about the present and future demand for fresh milk in-country is major unknown. Insufficient demonstrated consumer demand for fresh fluid milk has been a major deterrent to the development of an integrated market system for dairy products in Belize. Factors shaping a demand pattern largely characterized by consumption of imported milk products include the following:

- o lack of electricity and/or refrigeration and the costs thereof have led to the use of dried and canned milk products. The 1980 Belize Household Expenditure Survey reported that nationally only 34% of private households owned a refrigerator, with great variations between rural and urban populations, 17% and 49%, respectively, and among districts (Belize City - 57%, Cayo - 37%, Toledo - 7%).
- o Consumer tastes for imported milk products are well established, particularly for sweetened condensed milk.

While the attraction of supplanting all or part of the annual \$12.0-\$13.0 million import bill for dairy products can be fully appreciated, the constraints of refrigeration, relative prices and taste preferences demand serious analysis before proceeding too rapidly in developing Belize's dairy industry.

C. Ongoing Activities in Livestock Development

1. Belizean Policies and Programs

The GOB's Agricultural Development Plan 1982-1984 calls for expansion in both production and processing technology in development of the livestock sector. Simultaneously, investigative work will continue on livestock feeds to provide basic support data for expanded production, especially of swine. By subsector, GOB policy statements, objectives and program strategies are summarized as follows:

Swine

The GOB policy statement reads "to encourage the development of the pig industry thereby increasing production and productivity and enabling Belize to narrow the gap between its requirements and its production of pork and pork products." This will be achieved through proposed GOB activities which will establish piggeries in every district for the production of replacement breeding stock, implement

a pig weaner production-fattening program in each district, train the extension service to disseminate improved production techniques to model farmers and/or villages in each district, and encourage the private sector to manufacture pork products including ham, bacon and sausage. This project will assist the GOB directly in all of these efforts.

Beef

The GOB policy objective is "to stimulate the development of the cattle industry enabling Belize to become a major exporter of beef in the Caribbean Basin." This is to be achieved by improving production efficiencies through provision of technical advice on management techniques and pasture improvement, upgrading cattle by increasing the supply of quality breeding animals available at the district agricultural stations, and seeking export markets for surplus beef production. This project will assist the GOB to become competitive in the export market by increasing productivity and decreasing unit production costs through better management practices and establishment of improved pastures.

Dairy

The GOB policy goal reads "to foster the development of the dairy industry enabling Belize to produce an increasingly larger share of its national requirements for milk and other dairy products." The GOB plans to gradually shift the emphasis from beef to dairy cattle production at Central Farm; identify progressive dairy farmers in the Cayo district and provide them with appropriate technical advice through the extension service and establish a milk collection, processing and marketing system in Cayo. This project will assist the GOB in carrying out these activities, however, in a time phased fashion contingent upon the findings of a market demand study for fresh fluid milk to be conducted during the first half of the project.

2. Other Donor Assistance

Belize's major partners in its development efforts have been the British government, the Caribbean Development Bank (CDB), the Canadian International Development Agency (CIDA) and the European Development Fund. Since independence in 1981, the U.S. government has established a bilateral aid program with the GOB. World Bank assistance has concentrated on improving the country's highway system and will be expanded to finance construction of Belize's second port and perhaps provide financing for development of its tourism industry. The Inter-American Development Bank does not have a development assistance program in Belize.

Some projects in support of GOB policies and activities related to livestock development have been financed by the aforementioned major donors and others. The major efforts include:

Belize Livestock Feed/Feeder Pig Project

This project began in 1976 under the direction of the MONR with assistance from Heifer Project International, Michigan State University, University of Wisconsin and Partners of America. Its purpose was to develop economical feed rations for swine and poultry, maximizing inputs of local ingredients. The longer term goal remains of substituting these rations for high-cost imports. The project tested new rations under controlled conditions in Central Farm and then field tested these mixtures among selected producers. In the last phase of the project, a feed mixing plant was established in Belize's capital city, Belmopan, for commercial production of feed and feed supplements. External funding of this project has ended.

A number of other experimental feed projects have been initiated and are in varying stages of implementation, including the Belize Trash Fishmeal Project, financed by Heifer Project International, C.A.R.E. and the Caribbean Agricultural Research and Development Institute (CARDI), which has been experimenting with different rations using mixed feeds and crop by-products. CARDI also has identified five varieties of soybeans and seven varieties of sunflowers which have performed well in Belize. The results of this research have significant implications on the future cost and availability of balanced feed rations in Belize.

International Development Research Center (IDRC) Pasture Program

In 1982, IDRC and the GOB embarked upon the third phase of a pasture improvement program initiated in 1972. This last phase, financed with \$270,000, is introducing adapted forage legumes and grasses and improved pasture management to beef producers. The project is scheduled to terminate in 1985. This project has financed mainly research and has worked only minimally with farmers targeted for assistance under this project.

Caribbean Agricultural Extension Project (CAEP)

Under A.I.D.'s Caribbean regional program, administered out of Barbados, the Belizean Extension Service is receiving assistance to decentralize its operations into rural zones and upgrade the capabilities of its officers. Phase one of this project, carried out from 1980-1982, analyzed Belize's present extension system and developed an improvement plan which is now being implemented under phase two. The project will provide in-country training in extension methodology and, on a limited basis, specific subject matter training to the country's extension officers.

During intensive review, the project development team held extensive meetings with the in-country CAEP advisor and GOB officials to ensure complementarity of inputs and avoid duplication of efforts under CAEP and this project. It was realized by all parties that there existed a real opportunity to build upon the broad methodological training to be provided under CAEP with specific subject-matter training in swine and forage production under this project. Furthermore, the CAEP project does not provide for a mutually agreed upon need for intensive training of back-up technicians at Central Farm in specialized livestock fields, also as planned for under this project. In summary, both projects will be strengthened by the implementation of the other.

Caribbean Development Bank (CDB)

The CDB has been a major source of development financing in Belize. Currently, the CDB is the source of 65% to 70% of the on-lending credit portfolio managed by the country's development bank, the Development Finance Corporation (DFC). The DFC was created in 1961 as a fully owned government statutory corporation to provide medium and long-term development credit to all sectors of the economy. Out of a cumulative loan portfolio of \$24.0 million between 1973 and 1982, agriculture accounted for \$13.0 million or approximately 55%; and livestock and dairy accounted for approximately 15% of total agricultural lending. In addition to assisting DFC, the CDB is the principal lender to the Belize Meats Limited, the quasi-government organization that is presently operating the Ladyville Abattoir and Meat Packing Plant.

D. USAID Country Development Strategy

1. Overview

USAID/Belize is in the process of preparing its first Country Development Strategy Statement (CDSS) for review in AID/W in August 1983. This CDSS will be based on a development strategy which emphasizes short-term economic stabilization support and longer-term development assistance (DA) leading to some measure of sustainable economic growth. Thus far, short-term assistance amounting to approximately \$10.0 million in Economic Support Funds (ESF) has been provided under the Caribbean Basin Initiative (CBI). The first \$4.6 million loan, signed in December 1982 for balance of payments support, was negotiated on the terms that the GOB tighten fiscal management practices with the goal of increasing government savings. The second ESF loan of \$5.0 million, signed in March 1983, contributed to the capitalization of a private sector rediscount fund within the Central Bank. This fund was created as an incentive to increase private sector productive investment in agriculture and

related industry. The Mission anticipates the need for ESF over the medium term given continuing balance of payments shortfalls and budgetary deficits. In 1982 alone, exports fell by 20% and real GNP declined by more than three percent. Adverse conditions are facing Belize's sugar, banana and citrus industries, motivating an urgent request for additional ESF to help salvage the economic lives of these enterprises.

Over the longer term, it is planned that the USAID program will focus on agricultural development. In addition to this livestock project, two other DA projects are planned in the agricultural sector between now and FY 1986. These projects are Rural Access Roads and Bridges and Small Farmer Diversification. Furthering policy dialogue and institutional development of those organizations involved in implementing these projects will be longer term goals of the proposed assistance.

In other sectors, a \$2.0 million Housing Guaranty was signed in September 1982 and a health sector assessment and environmental profile statement have been completed. These latter studies may lead to future project assistance in these areas. By completion of the CDSS, prioritization of other sector activities should be defined.

In addition to the recently initiated bilateral assistance program, Belize will continue to be a beneficiary of A.I.D.'s Caribbean Regional Development Program managed from Barbados and operating through regional organizations including the CDB, CARICOM and various technical groups. To date, Belize has received \$12.5 million in development assistance through these channels.

2. Project Strategy and Relationship to Overall USAID Program

As stated above, the project represents the first DA activity within the agricultural sector. Its goal and purpose are directly complementary of the two other agricultural DA projects planned over the next two years. The Rural Access Roads and Bridges project will facilitate the timely delivery of input required by small and medium livestock producers and improve the internal marketing system constrained by transportation bottlenecks. The Small Farmer Diversification project will promote the production of new non-traditional crops including soybeans, sunflower and other oil-producing seeds. A relevant by-product of this activity will be the production of feed concentrates for livestock which are currently imported. In 1981, some \$2.0 million of feed concentrates were imported by Belize.

Taking into consideration these planned USAID activities and related assistance from other donors, this project will approach the development of Belize's livestock industry by improving production efficiencies of small and medium producers, while simultaneously expanding market outlets for their increased outputs. These parallel efforts are essential to ensure adequate production incentives to the farmer and availability of sufficient supplies to satisfy expanded demand.

On the production end, increased productivity will be achieved by improved animal husbandry practices and pasture improvement activities. Upgrading the facilities and operations at Central Farm as well as the capabilities of the existing extension service to teach and disseminate improved production techniques will be the major means to accomplishing these objectives.

On the marketing end, the project aims to capture a significant portion of the domestic market for beef, pork and, eventually, dairy products through import-substitution activities. This will be achieved by significantly expanding the domestic processing capability for these products. Assistance to improve internal marketing systems, as originally planned at the PID stage, was reconsidered during the intensive review. The initial proposal to address inefficiencies in the national marketing system by (1) establishing six district livestock markets, (2) establishing a market information unit within the MONR, and (3) institutionalizing a system of grades and standards was seriously questioned for the following reasons:

- (1) Establishing six district livestock markets: During separate discussions with the Belize Livestock Producers Association (BLPA) and the major butchers in the country, little interest was expressed on the part of either to participate in trading at the proposed regional centers. The large cattle producers saw little to be gained and additional costs to be borne by transporting large numbers of cattle to these centers without assurances of being able to sell them. The butchers, given their oligopsonistic control over the setting of prices and satisfaction with the existing buying system (whereby each butcher purchases animals through his field agent), also saw little to be gained in their interests to want to participate. Based on these findings, the GOB was advised that unless it was willing to enforce, through regulations, that all trading transactions take place at these centers, it would not be appropriate to invest in this activity at this time.' Given past animosity between producers and GOB over regulatory actions, renewed GOB regulatory involvement along the lines suggested above is considered ill-advised.

The GOB has responded to this recommendation by scaling back its nation-wide plans to establishment of a pilot test center in only Cayo district where facilities are already in place that could be used for this purpose and investment costs would be minimal.

- (2) Establishing a market information unit: Within the present marketing systems, individual agreements are reached between buyers and sellers through personal contacts; a central trading center does not exist which could serve as a source of market information that would be fed into such an unit. Without some central location where buyers and sellers come together, at best, an ad hoc and impressionistic estimate of prices paid for different qualities of meat would be obtained.
- (3) Institutionalizing a system of grades and standards: It was consistently expressed in interviews with meat butchers, vendors and producers that it was premature to initiate a system of grades and standards, eventually to be modelled after the U.S. system, at this time. Currently, meat is bought and sold based on two major classes: 1) steers, heifers and young bulls, 2) old bulls, cows and culls. Satisfaction was expressed with this degree of differentiation for the time being. However, it is foreseeable beyond the life of the project that as retail marketing of meat becomes more competitive, a need for grades and standards will naturally develop.

Finally, both production and marketing constraints will be addressed by project assistance to upgrade the capacity of the GOB to analyze and formulate policies which affect the livestock industry. A number of policy issues related to price controls, import regulations and GOB involvement in marketing have surfaced in discussions with the MONR and producers. At present, the analytical capability within the MONR is limited and, due to budgetary constraints and staff limitations, a policy unit within the Ministry has not been established. Taking into consideration recurrent cost implications, this project will finance technical assistance and training to serve both as a stopgap response to the current situation, and as a basis upon which to expand the in-house capability in agricultural policy analysis and formulation.

Within the livestock sector, this project will assist in developing, in order of priority, the swine, dairy and beef industries of the country. Development of the swine industry is considered to be the most appropriate focus for A.I.D. assistance over the next five years in terms of the potential foreign exchange savings to be generated through import-substitution of fresh and processed pork products, the

clear identification and understanding of the constraints to improving swine production efficiencies and expanding production and the socio-economic characteristics of the target group, the majority of whom are small and medium farmers needy of development assistance.

Development of the dairy industry was ranked second because, like swine, potential foreign exchange savings are substantial through import-substitution activities, and dairy farming is well-suited to small and medium farmers because income generated from investments in production can be realized on a relatively short-term basis, thereby providing a steady and reliable cash flow. However, unlike swine, the GOB does not have an adequate understanding of the constraints to development of the dairy industry which is necessary to determine the scale and timing of GOB investment in this area. Of particular concern is the uncertainty surrounding the effects of the demand constraints. Therefore, conducting a market demand study for fresh milk will be a major activity during the first half of this project. Contingent upon the results of this study, further technical assistance and training may be phased in later years.

Whereas the PID guidance cable states that no assumptions about joint dairy/beef production systems should be made in the design of project activities unless findings from this demand test so warrant, during the intensive review it became evident that raising dual purpose animals is the norm among small and medium producers. It was also determined that this production system should be encouraged because the short-term returns from milk production, even on a limited basis, partially offset the five to seven year lagged returns associated with beef production.

Development of the beef industry was assigned lowest priority, not because of any lack of importance it has to Belize's livestock sector and economy as a whole, but because resolution of the major marketing constraint lies outside the scope of this project and the major cattle producers in Belize lie outside of this project's target group. Given a satisfied, although not saturated, domestic market, substantial expansion of the national herd ultimately depends on competitively exporting Belizean beef. The major bottleneck to reaching this objective is the operational inefficiencies characterizing the Ladyville Abattoir. The problems of the Abattoir have been discussed in Section II.B. of this PP and must be satisfactorily resolved as a condition precedent to disbursement of project funds.

The target group issue also became more evident as further analysis raised serious doubts about the economic feasibility of small farmers raising cattle for beef production only. The relatively costly investments required in raising beef cattle and the delayed benefit

stream generally limit this business to the larger ranchers. This project's target group will be smaller farmers who own cattle and use them as dual purpose animals and/or maintain them to augment farm income under the mixed crop/livestock systems. The main production constraint to improving small/medium farmer cattle operations is the limited amount of improved pastures and limited knowledge about management practices. Therefore, under this project, some technical assistance (approximately 33% of the time of the forage term advisor and ten percent of the time of the livestock (swine) advisor) and long term training of one Belizean in pasture improvement and improved animal husbandry practices will be financed to create the in-country expertise needed to assist small and medium producers improve their production efficiencies.

III. PROJECT DESCRIPTION

A. Goal and Purpose

The goal of the project is to increase agricultural productivity and income among small and medium farmers in Belize. Achievement of this goal will result in an improvement in the country's balance of trade through food import substitution activities and increased exports, and a more equitable distribution of rural income.

The purpose of the project is to improve small and medium farmers' production efficiencies in the rearing of livestock and to expand market outlets for these products, primarily through import substitution activities. The project will finance five major activities to accomplish this purpose. These activities are described in the following section and will be funded by the A.I.D. and counterpart contributions summarized in Table 1 in Part I, Section E of the PP. Each project activity narrative further identifies A.I.D. and counterpart financed inputs, and the Financial Analysis displays A.I.D. expenditures by calendar year (see Part IV, Section E).

B. Project Activities

1. Swine Improvement Program

The objective of this component is to work with the MONR, primarily through Central Farm, the Belize School of Agriculture (BSA), and the extension service, to improve swine production techniques and expand pig production among small and medium farmers who make the vast majority of pig producers in the country. Two long term advisors will be financed under this project to assist the MONR in achieving these objectives as well as training present and future extension staff to carry on the swine improvement program after their

departure. One advisor will be located at Central Farm and will provide training and assistance country-wide over a period of two years. The other will work exclusively in the Toledo district which is situated in the far southern portion of Belize and represents the poorest region of the country. Toledo has traditionally been the major producer of pork and today still holds the distinction of being the country's largest source. Although a general set of constraints pertain to swine production and marketing throughout Belize, the Toledo district brings with it its own particular set of problems due to its remoteness, limited development and large Mayan Indian population. Therefore, special attention has been given to the design of project activities in that district necessitating the assistance of one long-term advisor for a period of three years. A detailed description of this area-specific activity follows a description of the broader project component.

Swine improvement activities under this component were designed to make the GOB's ongoing program more effective and to reach a greater number of farmers. To date, the government's program has had a limited impact because (1) the selling of improved quality pigs has not been complemented by a transfer of improved management techniques due to inadequate training and resources of extension officers, and (2) the MONR has over-emphasized breeding pigs at the expense of promoting feeder pig operations. This project addresses both of these problems.

Upon arrival of the advisor at Central Farm, he will develop an annual training plan to work with extension officers in the field zones, research personnel at Central Farm and provide instruction to students at the BSA which is the country's training ground for all future extension staff. As the only school of agricultural training in the country now and for the foreseeable future, BSA will continue to produce the country's major agricultural experts. Applied field level training will focus on establishing commercial swine fattening demonstration programs in each district. This subject matter training will complement that being provided under CAEP which is directed at improving an extension officer's educational skills and capability to transfer information and new techniques to farmers. The district fattening demonstration programs will be modelled after the demonstration unit to be developed at Central Farm by the advisor and livestock specialists who will serve as his counterparts. At the BSA, two types of courses will be designed. The first will be directed at BSA students and will be integrated into the regular school curriculum; the second will provide short-term instruction to district agricultural and extension officers to provide them with sufficient basic technical background to effectively backstop the zonal extension officers in swine production. These short courses

also will be made available to some "model" farmers from all districts. Funds will be provided under this project to ensure that BSA has sufficient resource materials and training equipment for use by the advisor, as well as other TA, for on campus training and in field demonstrations and instruction. The GOB will provide a small amount of counterpart funds for the construction of one new conference room/classroom to be built from local materials.

In addition to training, the advisor will provide technical assistance (TA) to the MONR in the actual implementation of its swine improvement program. A major strategy objective of this TA will be to encourage the MONR to refocus the emphasis of its program away from breeder pig activities and on feeder pig operations. Presently the demand for feeder pigs in-country outstrips supply. This excess demand is demonstrated by the fact that many farmers are willing to pay the additional cost of purchasing a breeder pig which, in turn, they fatten and sell for slaughter instead of using it to produce improved quality, cross-bred pigs. As long as the market demand for quality slaughter hogs continues at its current level or increases, supply continues to lag behind and the price of breeder pigs remains low enough to realize a return from fattening and slaughter, then most pigs bought from MONR swine units will be treated as feeders by the farmer.

Specifically, the advisor will assist the MONR in responding to farmers' demands by increasing the production of feeder pigs at Central Farm and in the government multiplication centers in the districts.¹ These swine units currently produce less than 1,500 pigs per year. Central Farm now has about 45 sows averaging eight pigs per sow born but six pigs per sow weaned. Because the government's priority has been to produce quality breeding stock, culling rates tend to be high (approximately 20%). Production of feeder pigs has been limited primarily to the culled breeders. Under the present scheme, the supply of feeders will drastically fall short of demand, estimated to reach 24,000 pigs by 1985. By the end of the life of this project, government swine units will have produced 13,500 pigs. In addition to responding to the supply constraints, greater emphasis should be placed on the production of feeder pigs because, at this point in time, there are a limited number of swine producers in Belize who have sufficient background and knowledge to

¹The PID discussed the possibility of working with Heifer Project International (HPI) to assist in further upgrading the quality of breeding stock at the government centers. This would have entailed importing new boars for their breeding operations. Since the focus of this component has shifted to expanding feeder pig production, the MONR will utilize the swine stock now in-country instead of importing more pigs. Therefore, the services of HPI will no longer be needed under this project. At such time that the MONR again focuses on the production of improved breeder pigs, the GOB will explore the possibility of working with HPI.

properly manage improved breeder pig operations. The handling of feeder pigs is more appropriate given the level of sophistication of the extensive production techniques commonly practiced by Belizean producers. By the end of the project it is expected that some farmers will have mastered feeder pig production and graduated into breeding (about 25% of the target group). This project will provide some assistance to this transition, but will focus primarily on the short and medium term need to produce more feeders. The extension officers will work with model farmers in each zone, except in the Toledo district where target group participation will be organized by villages rather than individual farmers (described in the Toledo section below). A total of 850 farmers will have participated in this program by the end of the project. Because a limit will be established restricting producers to purchasing feeder pigs from MONR swine units no more than three times, they will have to seek alternative private sources from which to buy their pigs or produce their own. By the end of the first three production cycles (24 months into the program), 54 farmers will graduate from the government program and will have the capability to either produce their own feeder pigs or access them from private sources.

A revolving fund will be created at Central Farm to ensure that short term GOB budgetary constraints do not interrupt project implementation, as has occurred in the past. It is estimated that approximately \$60,000 will be required to capitalize this fund.¹ This fund will allow the GOB to provide pigs, feed and other inputs on credit to participating farmers in the beginning, who, in turn, would reimburse the fund by the costs of these inputs upon selling their pigs. It is expected that the need for this in-kind credit will diminish as farmers demonstrate their ability to raise quality pigs for which there exists a ready market. Currently, DFC is not extending credit for swine production under its Agricultural Production Credit (APC) Program in the Toledo district, one of this project's major areas of activity, because farmers are having a difficult time selling the low quality and diseased pigs they now produce. Under the APC program, a small farmer can secure credit from the DFC based upon a sound production history without a collateral requirement. Once farmers improve the quality of pigs produced and market them, DFC will make credit available again for swine production to the project's target group based on their improved marketing status.

¹The fund initially will be capitalized by local currency generations under the A.I.D.-financed ESF balance of payments support loan. Reflows from sales of animals and production inputs from Central Farms and other MONR livestock units will maintain the value of the fund.

Toledo District Sub-Program

The Toledo district of Belize is the most remote and least developed region of the country. The majority of the population is composed of Kekchi Mayan and Mopan Mayan Indians, numbering about 7,400, who migrated from Guatemala over the last 100 years. Black Caribs, East Indians, Mestizos, Mennonites and Creoles make up the rest of the population, numbering around 3,000, and are concentrated mostly in the district capital of Punta Gorda on the coast, and in nearby farming villages. The Mayans live in two major zones: the northern, upland area which has been linked to the rest of the country by roads for some time and is predominantly Mopan, and the southern, "edge of the hills" zone which is characterized by a lack of roads and a predominance of Kekchi Mayans. In the southern zone, the Indians are scattered among 16 villages which are connected by foot trails (sometimes impassable in the wet season), and which have varying access to the outside world. Most of these villages are rarely visited by outsiders or extension officers, with the exception of Crique Sarco, with a population of 184, which is accessible by boat from Punta Gorda, and has a government buying center, a police station, clinic, and a zonal extension office.

While both the Kekchi and Mopan are often characterized as 'clannish' and 'traditional', they have shown an eagerness to participate in development activities, and have always responded quickly to market forces and price incentives. Most are actively seeking ways to increase their meager cash income (averaging about \$600/year/household in the northern zone, and about \$330/year/household in the more remote areas). Nevertheless, their social structure and cultural patterns must be taken into consideration in designing any development program if that program is going to be successful. These factors have been very carefully studied and integrated into the design of this project component.

According to the 1980 Swine Census, Toledo has the highest swine population of any district (4,709), as well as the highest number of pigs per farm (over ten in Toledo, compared with about four in Cayo and Belize districts). Since some remote villages in Toledo were missed by this Census, the actual pig population is probably closer to 5,500 or even 6,000. Swine production in Toledo district is presently a low-investment, low technology activity. While a few families in the northern villages keep their pigs penned all the time, the common practice is to let them roam around the village during the day. In the morning and evening they are fed corn in a small thatch-roofed pig pen, where they are kept overnight. While this scavenger practice allows pigs to supplement their diet, especially during periods when feed is short, and requires a minimum of labor, it also leads to high parasite loads, poor medical care and high mortality among the young. Furthermore, the straying of pigs into nearby yards and fields is a common cause of social discord and open conflict, and effectively prevents the cultivation of dooryard gardens.

Even with these constraints on production, Toledo has been a major producer of hogs for sale in the local Punta Gorda market and in the national market in Belize City. At the peak of production in 1973, eight wholesalers regularly purchased hogs in the villages and transported them to Belize City for slaughter. With stricter inspection standards in Belize, price competition from chicken and beef, and changing consumer preferences for better quality pork, this market has steadily diminished, and live-weight prices have risen very slowly (from 30¢/lb. in 1979 to 35¢/lb. in early 1983). Some villages reported not having been able to sell hogs to the Belize City market for over a year. Increasing costs of transportation also have discouraged wholesalers, and now only one person is regularly transporting pigs from Toledo to the Belize City market.

Given the growing national market for higher quality pork and processed pork products, reviving swine production in Toledo will require that better quality hogs be produced through improved rearing methods. This project will develop and establish a system of production of high-quality swine, based on enclosure and stall-feeding using as much locally produced feed as possible.¹

Local zonal extension officers will be trained to introduce and adapt intensive production techniques in their particular zones. Technical assistance and training will be provided in all aspects of swine production, feeding, housing and marketing. Through extension agents and traditional communal organizations, the long-term advisor will help establish local producer groups which will maintain purchasing and marketing arrangements after the life of the project.

The Toledo sub-project is designed to complement the activities proposed in the broader swine improvement program component. The Toledo advisor will coordinate with the long-term advisor assigned to Central Farm. Implementation of Toledo activities will be phased in after project activities at Central Farm have progressed sufficiently to adequately stock the Toledo district agricultural station with enough weaners to initiate district activities. These activities will be implemented in three phases, gradually expanding the number of total participants. Expansion will be accomplished by adding new villages in new zones, enabling the zonal extension officers to improve and adapt the system as each new phase begins. This phasing also will promote a gradual expansion of swine production in the district which should minimize the chances of a temporary surplus of Toledo pigs competing with other district producers for markets.

^{1/} While Toledo hogs will always be relatively expensive to transport to the Belize City market compared to closer districts, corn and other feeds are abundant and cheap in the area, and labor costs are lower than elsewhere in the country. These tradeoffs should enable Toledo to compete with the increasing number of swine producers in the north.

The goal of the first phase will be to set in place the technical aspects of intensive swine production in Toledo, with substantial technical and economic assistance from the advisor and the extension officers. The second phase of the project will establish the production system as an economically viable one, by phasing out economic inputs (i.e., in-kind credit, cement for pens, feed supplements, transportation) in the first two target villages. Further work will be devoted to developing community management groups. In this phase, the project will begin in two new villages in two new zones, and intensive training will begin with the respective extension officers. At the close of this phase a second round of training sessions for all extension officers will be arranged, so that results can be transmitted. Visits between participating villages will also be encouraged and facilitated. The third and final phase is intended to create lasting infrastructure within the extension system and communities for the maintenance of pig production and coordination between villages. This phase also will have a spread effect in which a minimum of two additional villages and zones will be brought into production. Again, training will be provided for extension officers working in new zones. Total life of the three phases is three years.

It should be noted that previous Toledo development projects sponsored by the GOB and other donor agencies have attempted similar objectives with only marginal success. A number of factors surrounding and characterizing the present proposal directly address the shortcomings of previous efforts:

A significantly larger market for higher quality pigs has developed, bringing a higher price per pound than the traditionally produced animals (\$.70/lb. versus \$.35/lb.).

- o The project will be implemented on a community-by-community basis rather than addressing widely dispersed farmers in a number of diverse communities. (See Part IV, Section C, Social Soundness Analysis for a discussion of the cultural justification for the former approach.)
- o By working with communities, economies of scale can be realized in supplying inputs and marketing pigs; and production can be coordinated to avoid a flooding of the market at any point in time.
- o By working with communities in different zones, the project will benefit a wider range of farmers, and will develop a system which is tailored to beneficiaries outside of the larger and more progressive communities closest to the road.
- o By training of zonal extension officers, and encouraging their active participation in project implementation, the project will set in place a system to continue the program beyond the stay of the long-term advisor.

- o In its initial phases the project will emphasize the feeding and finishing of weaner pigs. This will minimize the technical complexity of swine management for project participants, allow them to see a profit within six months, and enable the community to coordinate production. Breeding operations will be introduced to successful producers in later project phases, when technical competence has been established.
- o Through the use of local feedstuffs (including corn, rice bran from the nearby rice mill, cassava, and wild vegetation) less initial cash inputs will be required than in previous projects which depended on unreliable supplies of commercially mixed feed.
- o The project will procure and make available appropriate storage tanks and either pumps or rain catchments to ensure farmers a steady supply of water for swine. In the past, the burden of carrying water from a distant creek three times a day has fallen entirely on women and children, leading to vocal opposition to intensive pig production.
- o During initial project phases, the advisor will assist the communities in marketing their improved hogs in order to assure butchers in Belize City of a steady supply and to dispell the pervasive Mayan cynicism about previous projects in which they have been encouraged to produce but have not been able to market the products.

By the end of the project, the broader component and the Toledo sub-project activity will have achieved the following results:

- o Establishment and expansion of a quality swine production system among at least 850 farmers nationwide.
- o Formulation and provision of feedstuffs from local, home-produced inputs.
- o Annual production of about 2,800 improved pigs per year from the MONR swine units and another 5,000 from farmers trained under the project.
- o Creation of an enduring village infrastructure for swine management in Toledo.
- o Creation of an indigenous private sector pig-breeding industry to supply local demand for weaners with participation by 25% of the households involved in the swine improvement program.

The total cost of this component, including the Toledo program, will be \$1,050,000. A.I.D. will contribute \$150,000 in loan funds and \$620,000 in grant funds; the GOB will provide \$300,000 in counterpart. A.I.D. loan funds will finance two years of university training for one MONR staff (\$40,000), two 4-wheel drive pick-up trucks with spare parts (\$40,000), library resource materials and instructional aides (\$30,000), one

observational visit to the U.S. for nine extension officers (\$20,000) and invitational travel for U.S. livestock specialists to participate in Special events such as annual livestock fairs (\$20,000). Grant funds will finance a total of five person-years of long-term U.S. technical assistance (TA) (\$600,000) and two person-months of TA for a rural sociologist/anthropologist in Toledo (\$20,000). The GOB will provide funding for capitalization of the rotating credit fund (\$60,000),¹ operating and maintenance costs of vehicles (\$15,000), construction of one facility at BSA (\$5,000) and salaries of staff participating in project training and extension activities (\$220,000).

2. Pasture Improvement Program

Development of both the dairy and beef cattle industries is constrained by insufficient improved pasture resources and poor pasture management practices. Although improved pasture management and adapted grass and legume species are available in Belize, systems of pasture improvement have been implemented by only a few producers. There is a particular need for pasture management systems which will provide adequate energy and protein to maintain productive levels of cattle performance during the dry seasons. Frequently during these periods, producers sell their animals at depressed prices because they cannot supply the nutritional requirements. This is particularly prevalent among small and medium producers whose operations depend almost entirely on native pasture for a year-round feed supply.

The International Development Research Center (IDRC) and the Faculty of Agriculture from the University of the West Indies have been assisting the GOB in pasture research since 1972. The program recently has just entered its last phase and is scheduled to terminate in 1985. The GOB has requested that A.I.D. assist in furthering these research efforts and transferring the findings to producers through demonstration and extension activities. This project will provide financing for one long-term advisor specializing in pasture improvement and forage production to render such technical assistance. This advisor, to be assigned to Central Farm for the first three years of the project, will carry out the following functions.

¹ See Part V, Section A (2), Administrative Arrangements, for description of the fund.

Initially, the advisor will work with the staff at Central Farm to upgrade their pasture program. During the intensive review period, a specialist on the PP development team surveyed the pastures at Central Farm and found them to be in variable quality conditions due to inconsistent management practices. Based on this assessment, the GOB was advised that project TA should assist in developing a pasture management plan which will alleviate overgrazing and reorganize current forage activities for the re-establishment of present pastures into production-demonstration units rather than research units. Some of these units will be used to produce seed and vegetative starts for farmers toward improving their own pastures. The GOB will establish a small operating expense fund at Central Farm to ensure that implementation of these activities will not be curtailed or delayed due to temporary shortfalls in resources.

The TA also will work closely with extension officers and farmers in the field zones to develop model improved pasture programs for dairy and beef cattle production. In addition, up to 20% of his time will be devoted to teaching future extension officers at the BSA in forage production and pasture improvement techniques. He will be responsible for developing a curriculum in forage and pasture development utilizing the demonstration units to be established at Central Farm. The pasture/forage specialist's direct counterparts will be the chiefs of the Forage, Dairy and Livestock Divisions at Central Farm. The GOB is in the process of identifying a person to fill the forage position on a permanent basis. Currently this position is staffed by an extension officer who is scheduled to be transferred out to fill a field position under the decentralization plan being implemented under CAEP. The present chief of the Forage Division carries his position with him once he leaves Central Farm, therefore the government will have to create a new position as well as identify a qualified counterpart before project funds are disbursed for this component.

The project also will provide financing for long-term training in the United States of one Belizean counterpart in agronomy with emphasis on forage production and management. Factoring in the two years of study at BSA, it is expected that only two additional years will be required to acquire BSc degree by trainee. Funds also will be provided for short-term applied training at CATIE in Costa Rica and/or CIAT in Columbia. Both of these schools offer short course training in management and production of forage, beef and dairy cattle. CATIE's experiment stations have developed a dairy module based on forage production that has been tried successfully in some Central American countries. CIAT has conducted extensive research on tropical forage production which could be adapted to Belize's situation. Short-term training at these schools will complement long-term academic training of forage specialist and will be made available to up to two students from Central Farm or the extension service.

Total cost of the component is \$1,010,000; with A.I.D. contributing \$460,000 and the GOB \$550,000, A.I.D. will grant finance 36 person-months of long-term technical assistance (\$360,000), and loan finance one BSc degree candidate to receive long-term training in the U.S. (\$40,000), a maximum of six person-months of short-term training at CATIE or CIAT (\$20,000), one observational visit for nine extension officers to observe applied forage development activities in the U.S. (\$20,000) and one pick-up truck with spare parts (\$20,000). The GOB counterpart will finance the salary of the long-term trainee while in school (\$15,000), vehicle operating and maintenance costs (\$20,000), allocation of 20% of all costs related to GOB provision of services in artificial insemination, forage legume research and veterinarian care (\$485,000)¹ and the establishment of a small operating expense fund at Central Farm (\$30,000).²

3. Dairy Industry Development

The GOB has assigned a high priority to the development of a national dairy industry. Their commitment to proceed toward this end is demonstrated by their plans to create new positions within the MONR for personnel trained in dairy production and processing during a period of tight budgetary restraint and a cross-the-board civil service hiring freeze. Furthermore, a shift in emphasis from beef cattle production to dairy production is taking place at Central Farm. The GOB, in its 1982-1984 National Development Plan, lays out a general development scheme, concentrated in Cayo district which currently produces the largest amount of milk in the country, at some 155,000 gallons per year. The GOB has requested assistance in implementing their plan both in terms of increasing production and expanding the domestic capacity to process fresh milk beyond that produced by the only plant now in the country and operated by the Mennonites.

At the PID review, a number of controversial and unresolved questions were raised regarding the potential demand for fresh milk in Belize. As a result of that meeting, it was determined that a market demand study should be conducted prior to major A.I.D. financing for development of Belize's dairy industry under this project. Results of the the study will provide the basis for an industry development plan which is consistent with demand parameters defined during the study. Specifically, the results of such a study are important for (a) formulating and implementing government programs that have the objective of developing or expanding the dairy industry; (b) making public and private sector decisions regarding the size and location of processing and distribution facilities

¹ It is estimated that approximately 20% of these activities will directly benefit this project.

² See Part V, Section B, Administrative Arrangements, for description of this fund.

that will efficiently respond to future national needs for fresh milk; and (c) providing national guidance for developing policies and strategies to reduce current dependence on imported products as domestic dairy production and distribution networks develop.

The PID Guidance Cable stated that different strategies should be explored for carrying out the market study, in particular, investigating the possibility of using the Western Dairies operation as the test base. If this alternative proved not to be appropriate, project funding for a new facility would be approved only to the extent that this investment would produce conclusive findings about the potential market demand for fresh milk. During the intensive review, the possibility of proceeding with Western Dairies (WD) was seriously explored. At first, it appeared as though WD had an excess of milk which could not be sold and was therefore, being made into cheese, which, in turn, also was not readily being sold. Therefore, an excess supply of milk had been identified whose use, if agreed to by the Mennonites, could be diverted for purposes of this study.

Upon a closer examination of the WD operation by the PP development team which included a dairy consultant from Land-of-Lakes, the following findings were revealed:

1. The milk used in making cheese was not always of a quality acceptable for fresh milk processing, but was adequate for cheese making (known as cheese grade milk in the U.S.).
2. Inconsistent quality control of the pasteurized milk had been a constant problem, resulting in off flavoring and souring.
3. The WD plant equipment was not adequate for proper processing and cooling of the present throughput.
4. Additional processing and cooling capacity would be required to accommodate pasteurizing much of the milk currently being made into cheese and any additional milk required to carry out the market study. The cost for renovation of the WD plant to accommodate the market analysis study was estimated at \$60,000 to \$90,000. The lower cost reflects procurement of some used equipment. This renovation still would not guarantee production of a constant quality milk product.

Based on these findings, and in the interest of ensuring, to the maximum extent possible, consistent delivery of a quality product, the team reconsidered the alternative of providing assistance to a newly formed dairy cooperative, the Macal Dairy Coop, for the purpose of expanding their production and substituting their raw milk sales for processing. Discussions with the GOB and Coop members confirmed that this group

offered an attractive alternative through which to conduct a market test. It was made clear during these discussions that a condition for support to the Macal group would be the partial use of plant facilities and output in a research mode to develop data needed to estimate the future domestic market potential for milk.

The research effort consists of three main activities: (1) saturation distribution of fresh milk in major retail marketing channels, (2) school distribution of fresh milk, and (3) variation tests of retail prices of fresh milk.¹ In combination, these activities will indicate the market response to increased availability of fresh milk, to higher use levels and familiarity with milk as a food and beverage product, and to a range of prices. Because most of the potential market for milk lies primarily in the cities and secondary towns, the market testing activities will be carried out in these locations.

The supplies available from the Macal Cooperative will be insufficient to support market testing activities in all of these areas at the same time. Consequently, a staged approach will be employed which accommodates the constraint on available milk supplies and the logistics of milk delivery. Two test sequences will be necessary to provide an adequate basis for estimating the magnitude of the national demand potential. The first phase will be implemented in Belmopan and four secondary towns and the second phase will be conducted in Belize City. The geographic scope of coverage should be sufficient to identify regional differences in the demand for milk in the country. The two market test locations will represent coverage of about 90% of the urban and about 45% of the total population of the country. Coverage of this extent, together with the geographic spread, should be sufficient to produce information of the characteristics of the long-term national demand for milk.

As the focal point for the research activity, it is clear that the participation and performance of the Macal Cooperative will be central to success. Thus, it is important that its production, processing and delivery operations be well established and stable before the research activity begins. It is estimated that it will take up to 18 months from beginning operations to achieve this status. In order to be prepared for potential supply problems, prior arrangements will be made at an early stage with Western Dairies and perhaps Central Farm to augment supplies as necessary at mutually agreeable terms. During the intensive review, WD management was briefed on this scheme and was receptive to cooperating as needs arise.

The operating expenses of the Macal plant will be considerably higher during the market test activities than those of the established operating

¹ These three activities are explained in detail in Annex IX of the PP, Detailed Description of the Research Plan for Determining the Market Potential for Fresh Milk in Belize.

mode before the research effort is initiated. Several study factors will contribute to this increase in operating costs: (a) the requirement to deliver to remote locations and marginal retail outlets in order to accomplish the saturation distribution objective of the study; (b) losses of milk for quality control purposes from inventories at retail establishments where sales response is low (estimated at 15% of the total volume handled); (c) free school distribution of milk that the study requires; (d) direct losses as a result of the experimental pricing phase of the program (e) expenses involved in advertising; (f) cost of maintaining the records for the study and (g) added costs of supervision and control beyond those which would be incurred during usual operations. These costs will be covered by the project and will be made available through a special fund to be established for purposes of this study.

The final and specific formulation of the study will be the responsibility of an expatriate with expertise in marketing research and working knowledge of dairy marketing and supporting distribution activities. As director of the research effort this person will spend considerable time in Belize, but not remain on-site on a continuous basis. An appropriate timetable of in-country participation by this advisor over the life of the study includes: one month to design the study; two months at the beginning of the first study sequence to work through operational details, establish routine procedures and assist a GOB counterpart to develop the capability to direct study activities; one month to bridge the transition from the first to second sequences; four months to analyze results and produce a report; and one month for contingency activities that may arise in the course of the study. Total time in-country amounts to nine months. The project also will provide financing for 15 person-months of technical assistance to supervise installation of the processing equipment and start up activities, and to train a plant manager and two plant operators to be hired by the Macal Coop.

The MONR will designate a counterpart to the study advisor who will have continuing oversight responsibility for project activities in the absence of the expatriate and full authority to act in the interest of achieving the research goal. This counterpart will be a person who either occupies, or is likely to occupy, a position in the MONR related to its dairy development program. Opportunity to gain insight and knowledge of the industry as a result of involvement in this activity will be substantial. In addition, the GOB will donate the land for the plant site and provide housing for the plant management technical advisor.

The Macal Coop will be responsible for hiring the plant manager who will assume supervisory responsibilities after the departure of the technical assistant, two plant operators and two drivers to distribute the milk as the volume of sales increases. The Coop also will be responsible for arranging collection of milk from the farmers and keeping all records concerning sales distribution and payments to farmers. Finally, it will

I/ See Part V, Section B, Administrative Arrangements, for a fuller description of this fund.

assume responsibility for plant and vehicle operating costs and maintenance. During the market demand study, the Macal Coop will lease the plant from the GOB at a fee agreed upon by both parties. Upon study completion, the Coop will have the option to buy the plant from the GOB at the same terms of the original AID - GOB loan agreement.

Towards the end of the research study, if so warranted by its results, a person from the MONR will be sent for long-term training in the U.S. for a BSc in dairy production. It is expected that this person will become chief of the Dairy unit at Central Farm and work closely with dairy farmers in the Cayo district upon his return. Most likely, the MONR counterpart who will work on the market demand study will be the prime candidate for long term training.

By the end of the project, the following outputs will be realized:

- o Dairy plant constructed, producing a minimum of 400 gallon per day.
- o Dairy plant manager and two plant workers trained.
- o Distribution and sales of milk equal to plant capacity.
- o Market demand study completed.
- o Central Farm dairy specialist returned from long-term degree training in the U.S., and working with Cayo dairy farmers.
- o Decision made regarding advisability of expanding dairy plant to 1000 gallon capacity plus installing cheese making capability.

Total costs of this project component will be \$780,000. A.I.D. will finance \$380,000 in grant funds for the following costs: fifteen person-months of long term TA (\$150,000), nine person-months of short-term TA (\$90,000), and establishment of research expense fund (\$140,000).¹ Loan funds totalling \$340,000 will be provided for the following expenses: construction and equipping of processing plant (\$160,000) with potential expansion capacity (\$30,000), one pick-up truck (\$20,000) and two refrigerated milk trucks (\$70,000), and if results of the study warrant, in the fourth year of project implementation, long-term training in dairy production for one MONR staff (\$40,000) and an observational visit to a U.S. dairy operation by nine extension agents (\$20,000).² The GOB will finance the salary of long-term trainee (\$10,000) and counterpart assigned to study (\$15,000), operating and maintenance costs of advisor's vehicle (\$5,000) and the Macal Coop will contribute (\$30,000) to finance up-front operating costs of the dairy before returns on investment are realized.

¹ See Annex V, Section 2(c) for detailed breakdown of costs of fund.

² If the results of the study do not merit using funds as stated above, they will be reprogrammed to finance additional short-term training or observational visits, and/or to import breeder stock during the last couple of years of the project.

4. Pork and Beef Processing

The meat processing industry in Belize is just beginning to awaken to the import - substitution potential this area of activity holds for the private sector. In 1980, Belize imported 2.6 million pounds of pork which is equivalent to about 19,300 animals.¹ Presently, about 80% to 85% of the pork consumed in Belize is imported; most of which is in processed form. It is estimated that approximately 24,500 animals or 3.3 million pounds of pork will be needed to satisfy the domestic demand in 1985. If it is necessary to import about 80% at \$1.00 per pound in 1985, \$2.7 million in foreign exchange will be required to pay this bill. Development of the domestic capability to process the increased number of improved pigs under this project could supplant approximately 33% of imported pork products.

Whereas the foreign exchange savings in the pork industry potential are substantial, import substitution implications of domestically processing beef products are more limited. This is because the vast majority of imported beef products is in the form of canned corned beef. In order to be cost competitive with imported products, a canning operation of sufficient size would have to be established to take advantage of economies of scale. The smallness of the domestic market would not support the establishment of such a plant. The possibility of marketing corned beef packaged in retorte pouches may provide a cost competitive alternative to canning, although development and acceptance of this product will require much attention. The technical assistance to be contracted under this project will explore the potential of introducing this packaging technique.

Great private sector participation in meat processing has been constrained to date by the limited knowledge and availability of modern processing technology in country and poor or inconsistent quality of local production, particularly of swine, which limits competitiveness of domestic products vis-a-vis imports. Both of these constraints will be addressed by this project. Production constraints associated with the extensive system of pig raising common in Belize will be directly dealt with under the swine improvement program component. Simultaneously, this component will improve and expand the domestic processing capability within the private sector.

¹ Assumes an average dressed weight of 135 pounds per pig.

Nine persons-month of technical assistance, to be provided on an intermittent basis during the first two years of the project, will be grant financed to demonstrate and teach modern meat processing techniques to all interested parties. This TA will be assigned to the MONR and will provide training under the auspices of the GOB. During the intensive review period, about half of the twelve major butchers in the country requested TA and training in order to expand their operations into processing. The national Belize Livestock Producers Association (BLPA) also expressed a strong interest in processing their own products. The BLPA recently leased a modern processing facility, owned by a consortium of Belizean investors, as a first step. Due to limited operating funds and the sudden departure of a former USDA meat technician/Peace Corp volunteer, who was to provide technical assistance to the BLPA, start-up of processing activities has been stalled. Recently, however, the Latin American Agribusiness Development Corporation, S.A. (LAAD) has made available to the BLPA up to \$600,000 to finance proposals, which has revitalized interest and enthusiasm processing activities. The BLPA has requested some assistance under this project to help them initiate the plant operations. Finally, the Belize City district chapter of the BLPA has asked for technical assistance to aid in its processing efforts at its new retail store in Belize City. The GOB is anxious to respond to these requests with technical assistance to be provided under this project. The MONR has agreed to provide adequate demonstration and teaching facilities for the processing advisor. The government is keen on actively promoting processing activities in order to curb the costly importation of processed pork and beef products.

Component costs total \$140,000. A.I.D. will provide \$90,000 in grant funds for nine person-months of TA and \$40,000 in loan funds to procure one vehicle with spare parts (\$20,000) and finance one observational trip for private sector participants to observe processing operations in the U.S. (\$20,000). The GOB will contribute (\$10,000) for vehicle operating and maintenance costs (\$5,000) and rent for a training site (\$5,000).

5. Government Policy Analysis and Formulation

There are unique features of the economic setting in Belize that make policy determination and implementation a matter of singular importance. The total economy is relatively small and is sensitive to changes on either the supply or demand side of the production and consumption equation; the country is dependent on markets abroad to absorb a significant share of national output consisting primarily of agriculturally products; there is substantial reliance on foreign supply sources for raw materials and a wide variety of consumer goods; and the country has persistent difficulty in generating sufficient revenue to meet internal public service needs and to address the problem of sustained deficits in balance of payments. These conditions amplify the need for a high level of skill and for substantial care in the process of national policy formulation and execution.

In this setting, agriculture constitutes a major source of current economic strength and a major focal point for future economic development. Primary responsibility for identifying agricultural policy issues and developing strategies for dealing with these issues rests with the (MONR). The MONR has very limited expertise to which it can look for support and assistance as it copes with the onflow of events that demand policy decisions and administrative actions. The following examples are illustrative of the need of the Ministry in the area of policy analysis.

- o Currently, MONR is contemplating the acquisition of a major sugar manufacturing plant that might otherwise cease operations with profound adverse effects on both cane farmers and a sizeable labor force. The economic ramifications of this policy decision in terms of the viability of the operation over the long term, the financial exposure of the government, and the feasibility of the planned transfer of ownership into the hands of cane farmers are only some of factors requiring analysis as the basis for a policy decision.
- o The government operates a price support program for a number of crops. The response to price support levels has produced a burdensome surplus of several products, taxed storage capacity, resulted in large scale diversion into secondary uses or losses, and exceeded the fiscal capacity of the country to fully meet obligations to the producer to provide a cash payment at the support price level. This represents a clear indication of the need for better understanding of the potential effects of price on production.
- o There is high level national concern about the amount of imported processed dairy and meat products and the consequent drain on foreign exchange resources. The development of policies that will effectively address this concern and the appropriate strategy for implementation of these policies are complex questions that the MONR and the government in general are currently ill equipped to deal with from an analytical standpoint.
- o Availability of feed and input supplies is a major constraint to increased plant and animal production in the country. National initiative to overcome these constraints would appear highly appropriate. Here again, the policy agenda for doing so appears at best to be indistinctly developed. A definition of the dimensions of the problem, identification of policies and strategies for government action, and creation of an appropriate incentive climate for response by the private sector require analysis.

The list of examples could continue, but the foregoing examples should be sufficient to suggest clearly and convincingly that expertise in the policy area is a major and urgent requirement that justifies special government action.

The project will provide financing for training two MONR staff, one to occupy a policy analyst position in the Office of the Minister and the other to function as an agricultural economist under the policy analyst. After taking into account recurrent cost considerations and the difficulties involved in creating new positions in the civil service, there still exists an overriding imperative that the government assure positions for these staff upon return from training. The policy analyst will require training in the field of economic theory as applied to agriculture, macroeconomics and quantitative methods. No person exists in the MONR with this level of competency. It is proposed that Phd. training be provided in a non-degree mode, that is, that the trainee follow an advanced graduate study curriculum omitting the dissertation requirement. This will shorten the training time required to two years and partially obviate the mobility problem that would otherwise develop should the individual obtain the Phd. credential. As a condition for this training support, the government will enter into a contractual commitment with the trainee for a period of at least four years after the training is completed. More importantly, the government must make special exception to existing salary schedules sufficient to provide reasonable assurance that it can retain the services of the trainee beyond the period of obligated employment.

The MONR currently has one position assigned to work in the field of agricultural economics. At present this position is occupied by a temporary employee who will soon depart and be replaced by another with the same temporary status. There are significant disadvantages to the rotational manner in which the MONR uses this position. The person who occupies it has limited incentive to enlarge and refine activities that should fall within the purview of the agricultural economist post to the degree that might be expected from one who occupied it on a permanent basis, and whose status and upward mobility might be more directly related to long-term performance. The lack of motivation has reduced the functions of this position to largely one of producing descriptive statistics relating to agriculture. The MONR sees the need to stabilize the position through employing a person who will make a career commitment and for substantially expanding the analytical activities in

which the agricultural economist would engage. Master degree training, without thesis work, in agricultural economics and statistics will be provided to the individual designated to occupy this position. Also, the trainee will be required to take at least two courses in computer science in order to develop competence in the use of the microcomputer that will be made available for policy analysis work. The MONR will develop a direct organizational linkage between the policy analyst and the agricultural economist. This could take the form of an Office of Policy Analysis and Economics and could be situated in the Office of the Minister or Permanent Secretary. There is no compelling reason for the agricultural economist, particularly in his upgraded status, to be attached to the information office further down in the bureaucracy as is currently the case.

While training of the policy analyst is underway, the project will finance an expatriate to provide policy analysis support to the MONR. This advisor will set the stage for development of an operating mode that can be institutionalized upon the return of the trainee. As proposed for the permanent staff policy analyst, the expatriate serving in the interim will be situated in the Office of the Minister. Either the Minister or the Permanent Secretary will serve as the direct counterpart. The tenure of the expatriate technician will overlap with the return of the trained national for a period of six months to provide for an orderly transfer of duties and responsibilities.

Total project costs for this component are \$470,000. A.I.D. will provide \$300,000 in grant funds for 30 months of long-term technical assistance and \$120,000 in loan funds for four years of long-term training of two MONR staff, two years each, (\$80,000), procurement of one vehicle with spare parts (\$20,000) and one microcomputer with spare parts and some contingency financing for TDYs of programmers to instruct MONR staff in using the computer (\$20,000). The GOB will provide \$50,000 in counterpart funds to finance salaries of employees while in training and the cost of creating a new position for policy analyst.

IV. PROJECT ANALYSES

A. Institutional Analysis

1. Belizean Agricultural Extension Service Within the MONR

In the past the extension system has been plagued with organizational problems including unclear lines of authority, poorly defined job responsibilities, and overcentralization. Due to inadequate logistical support and mobility for field officers, and haphazard shuffling of personnel among field positions, morale has been generally low and turnover of staff has been high. In addition, supplementary training of the extension staff is needed to respond to the problems and needs of the farmers involved in over a dozen distinct production systems. Whereas there is a need to supplement the diploma-level training held by all

extension officers in order to perform and interact more effectively with farmers, the MONR discourages degree-level training due to a major "brain-drain" consequence of such training to the private sector in Belize and to jobs outside of the country.

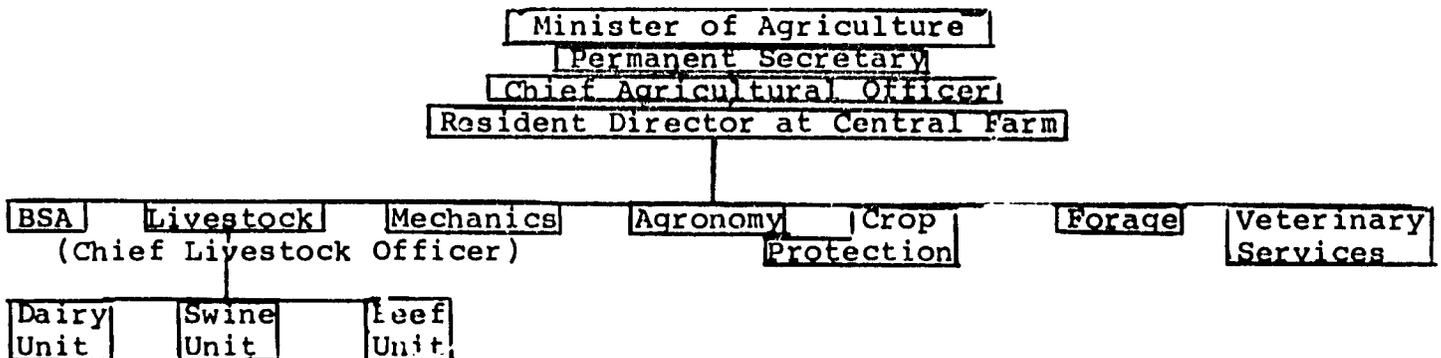
The ongoing CAEP specifically addresses itself to these problems and intends a major reorganization of the extension service. Some of the activities to be implemented under CAEP include: (a) a decentralization of authority and extension activities from the central Ministry in Belmopan to the six district offices and 34 zones. (See Organization Chart in Annex VII.) District agricultural officers will be given greater supervisory responsibilities over extension officers who are being relocated from the district offices to the zones. About 37 of the 52 extension officers have been identified and assigned to their respective districts and zones. The remaining 15 positions are in the process of being filled; (b) the provision of much needed extension methodology training to improve the officer's role as a transmitter of information and educator of improved production techniques; (c) funding for motorcycles for all zonal agents which should dramatically increase their accessibility to farmers; and (d) defining detailed scopes of work and job descriptions to serve as a basis for establishing performance targets and conducting evaluations. (This last exercise was going on in June 1983 while the PP design team was in Belize.) The CAEP, scheduled to terminate in the beginning of 1985, will leave in place a much more organized and qualified extension service to carry out the extension tasks under this project.

Whereas the broad institutional base will be strengthened, it has been determined by the MONR, CAEP advisors and members of this project design team, that additional subject matter training in the various disciplines of livestock will be required for the purposes of this project. Currently, most extension officers Limited training in forage production and pasture establishment, swine, beef or dairy production. If any specialty expertise can be identified within the staff, it most often pertains to crop production. Therefore, building upon the training provided under CAEP, this project will provide in-country training to extension staff in forage and swine production and, to a lesser extent, in dairy and beef production. No out of country training of extension staff will be financed for the brain-drain concerns mentioned above. In-country training by the long-term advisors will be supplemented by some short-term observational trips to the U.S. and other Latin American countries and visits by short-term experts under invitational travel arrangements. This project will address another major weakness also identified during the intensive review related to the limited technical competence of livestock officers at Central Farm. As discussed below, long-term training of three Central Farm personnel at the BSc level will be financed to upgrade their capability to serve as technical resources for field extension officers.

In summary, with the inputs from ongoing CAEP and the inputs from this project, the extension service will be better equipped, trained, mobilized and motivated to successfully work with this project's target group. The MONR, with assistance from CAEP, is making the necessary arrangements to meet staffing and basic extension methodology training requirements for both projects. Based on the priority given by the MONR to upgrade the extension service and its demonstrated commitment to do so in recent workshops held under CAEP to formulate work plans and job descriptions, USAID concludes that the extension service will have the support and capability to carry out its responsibilities under this project.

2. Central Farm/Belize School of Agriculture

Central Farm is the national agricultural and livestock experiment station within the country. Its administrative jurisdiction falls under the MONR and research is directed by an advisory council, known as the National Research Council. The Farm is located 15 miles from Belize's capital, Belmopan, and has a land area of 900 acres. Central Farm was established to serve as a multiplication unit to provide quality livestock (pigs, beef and dairy cattle) to the Belizean farmer and to provide an on-farm laboratory setting for students at the BSA which is housed on the premises. The organizational and administrative structure of the Farm is displayed below.



Central Farm is experiencing a series of administrative and financial problems which are affecting its operational efficiency and effectiveness. The main problems revolve around its staff limitations, both in terms of numbers of people and inadequate training, and limited access to and authority over funds to maintain and expand its operations. The effects have been costly and are visible in the minimal amount of improved pasture on the Farm, the surplus of cattle resulting in overgrazing, and the inadequate amount of time spent on livestock management and production by technical specialists who are overextended with administrative responsibilities.

Many of the staffing problems are related to the employee structure at Central Farm. There are two major types of employees - technical staff and extension staff - who fall under different administrative authorities within the MONR. Due to the insufficient number of technical specialists at the Farm, extension officers have been filling some positions in all the major livestock units on a rotating basis. This has resulted in a steady turnover of staff and unqualified personnel assuming positions requiring specialized technical knowledge. For example, the swine unit is now headed by a non-degree extension officer with little training in swine development. He has been in the position only six months and is scheduled to be assigned to a field zone under the CAEP decentralization plan. The same situation exists in the dairy unit although this particular extension agent demonstrates greater capability to perform the technical tasks of the operation. Finally, the forage division is headed by an extension agent with a technical expertise in rice production. While performing his best, he is not comfortable with his current responsibilities and position. He, too, is scheduled to rotate out and assume a field position in the near future under CAEP.

Given the priority assigned by the GOB to upgrading its extension service under the provision of CAEP, the government is unwilling to shift any positions from the extension service to increase the number of livestock technician positions at Central Farm. Since the GOB does not have sufficient numbers of trained personnel to meet both the needs of the extension service and Central Farm, the ongoing upgrading of the extension service is, at least temporarily, at the expense of strengthening Central Farm. In view of this dilemma, the government will have to increase, by at least one position, the number of livestock technicians and identify counterparts eligible for long-term technical training in order for this project to be implemented effectively. Expanding, even by one livestock specialist, and providing intensive technical training to future chiefs of the livestock units at Central Farm will address a major gap in essential backstopping expertise for extension staff.

The MONR is fully aware of the tug-of-war for more and better trained livestock specialists at Central Farm and better trained extension staff out in the field. Realizing that the effectiveness of one is greatly dependent on the support and capability of the other, the MONR is requesting that an additional livestock specialist position be approved for Central Farm and is identifying current staff that could be made available and is qualified to pursue BSc level training in forage, swine, and possibly dairy production under this project. Action to augment Central Farm's staff will be a condition precedent for A.I.D. funding of long-term training of livestock specialists.

The second major set of constraints relates to the limited financial resources available to Central Farm to carry out its operations. Currently, Central Farm's staff has limited authority in the appropriation and allocation of funds required for operating expenses. Proceeds from the sales of all livestock are returned and deposited in the national Treasury and then reallocated to Central Farm on a restricted and irregular basis. This unreliable and inadequate allocation of funds has hampered the operations of the cattle unit in particular, given the time and working capital required by cattle production. Also, under the existing system, cattle cannot be sold without administrative approval from the Chief Agricultural Officer of the MONR situated outside of the Central Farm organizational structure. This arrangement has resulted in delayed decision-making at the expense of the timely execution of activities. These problems require that actions be taken to decentralize the decision-making authority related to daily operational matters and to increase the financial independence of Central Farm.

This project has been designed to address the above problems by (1) increasing, by one, the number of livestock officers; (2) improving their technical capabilities through subject matter training in the U.S. and in-country; (3) increasing the administrative authority of the Director at Central Farm; and (4) establishing an operating expense fund to respond to short-term financial needs. Assuming sufficient success in implementation of these activities, Central Farm will have in place the administrative and technical capability, and budgetary flexibility to carry out its responsibilities under this project.

The BSA was established in 1977 for the purpose of producing a cadre of trained agriculturists to meet national needs in the applied aspects of plant and animal production. During the first four years of operation, BSA offered a one-year curriculum leading to a certificate in general agriculture. Since the fall of 1981, training has been extended to include a two-year option for the most qualified students, consisting of approximately one-half of the first year enrollment. Specialization in either plant or animal production is provided in the second year curriculum and, upon completion, students are awarded a diploma in agriculture. Diploma level training at BSA is considered sufficient qualification for beginning employment by MONR and other public offices requiring agricultural training.

Teaching facilities and living accommodations for BSA students are located at Central Farm. These facilities can accommodate approximately 30 first and second-year students. The BSA is a coeducational institution with recent enrollment by women. Training at BSA entails balanced emphasis on formal instruction and practical applications using the facilities and equipment at Central Farm. The resident faculty of four is augmented by instructors provided by the professional staff of

Central Farm and from the MONR offices in Belmopan. About half of the graduates of the school have been employed by the MONR in the past, largely in the extension service. Other graduates have moved into self-employed work or other activities in the private sector.

Because Belize is severely constrained by its fiscal situation to make capital investments in the public sector or to assume obligations that entail commitments to increasing levels of recurrent costs, development of another post-secondary institution for agricultural training is highly improbable. Therefore, it is assumed that BSA will continue to be the main training ground for Belize's agricultural expertise for some time to come. It is thus important that BSA have the physical plant, faculty support, and training equipment needed to be effectively responsive to the national needs in agriculture in the years ahead.

The focus of project support to the BSA is on those deficiencies which are considered central operational impediments to the effective performance of BSA as the national agricultural training facility. It is judged that through this project's support including curriculum upgrading and teaching by the long-term technical advisors located at Central Farm, increasing library holdings and supplies of instructional materials and constructing one new facility, BSA will have adequate staff, materials and physical space to effectively carry out its training responsibilities which, in turn, are important to the success of this project.

3. Macal Dairy Cooperative

The Macal Coop was originally formed in 1976 as an agricultural productioni coop for the purpose of participating in a government program, largely financed by CIDA, directed at assisting private cooperatives. Due to a premature termination of the project by CIDA, the Macal Coop had barely begun to function before support was withdrawn. The Coop became inactive between 1977 and 1982. It has been reactivated within the last year by members interested in marketing milk collectively. Although coop members are principally located in and around the town of San Ignacio in the Cayo district, membership is open to farmers from other areas. Membership has grown from its original 20 founding members to approximately 35 since its reactivation in 1982. The Coop is organized and managed similarly to coops in the U.S.A. It has a charter, by-laws, is governed by a board of directors, and is staffed by a president, secretary and treasurer. At least 15 members, including those sitting on the Board of Directors, are also members of the Euri Bee Cooperative which is an affiliate of the larger national Federation of Cooperatives. The Euri Coop is highly respected and has demonstrated its credit worthiness by timely repayment of loans extended to it by the DFC. This same financial integrity and discipline can be expected from the Macal Coop since the same set of actors will establish

similarly high operational and management standards. Besides belonging to the Euri Coop, most of its members belong to several service coops for various commodities. This gives an indication of the diversity of their farming activities and some insight into the highly participatory nature of the group.

Macal Coop members are highly motivated by the potential they see in increasing milk production and processing. Their enthusiasm was expressed in their goal to have the dairy processing plant, to be funded under this project, operating at full capacity by the time the market demand study begins, thereby demonstrating their belief that a ready market exists in the San Ignacio area and need not be evaluated. Sixteen members now have dairy cows or are milking dual purpose animals and selling raw milk door to door in the area. Aggregately the producers are selling 30-50 gallons of milk per day. The other Coop members are either milking just for home use and/or waiting for a market other than their individual door-to-door sales to develop in order to expand their operations. The Coop intends to assist other small farmers in the area to become dairy farmers as the market for fresh milk is secured.

Through their own assessment of their operations, it was determined that individual door-to-door milk sales detracted too much from their production activities. Therefore, the members voted to reorient the function of the Coop from a collective production effort to a collective marketing effort. They have decided to hire someone to distribute the milk, relieving the producers of this daily task and allowing them to focus on expanding production and initiating processing operations under this project. With their own resources, the members have leased a small building and bought a bottle cooler to serve as the central point for collection. They are now considering a collective purchase of a tractor to assist with pasture improvement.

The Coop and the GOB appear to have an excellent working relationship. When the Coop approached the MONR requesting a building site in San Ignacio for a dairy plant, the GOB supplied the site immediately. The MONR has encouraged USAID's participation with the Coop in every discussion related to the dairy component of this project. Although in terms of operational longevity the Macal Coop is a young organization and represents a risk given its short lifespan, all indications are that the Coop has the administrative capability and commitment to carry out its role under this project as well as the potential to serve as the primemover in the development of Belize's dairy industry in the Cayo district.

B. Technical Analysis

1. Research Methodology to Test Fresh Milk Market

Design of the research study to test the demand for fresh milk in Belize is in considerable measure dictated by the unique situation that prevails in the country and which precludes the use of alternative and perhaps less expensive approaches that might have been used under different circumstances. The distinguishing feature of the problem setting in Belize is that, historically, there has been very limited distribution and availability of fresh milk supplies in the form and of the quality to be produced by the new plant to be constructed under this project. Additionally, there is extensive use of less costly canned and dried milk products and the adaptation to using these would appear to be a deeply ingrained matter of taste preferences and use patterns. These circumstances make conjecture by researchers or consumers a high risk undertaking.

Under more conventional and less unusual circumstances, two alternative research approaches might have been applied to address the central question involved.

- (a) An analysis could have been made from existing data sets that extend over time to identify trends in milk consumption, to isolate price and income effects on consumption, and to estimate the substitution effect between fresh milk and imported processed products. Absent any time series data to serve as inputs other than that generated by an exceptionally thin market base involving a single firm, this approach was considered not feasible under this project.
- (b) A consumer survey might have been designed to explore consumer preferences for fresh milk, the perceived substitution potential between fresh and imported milk products, and opinions regarding the uses and quantities of fresh milk that may be purchased under a postulated range of price circumstances. In view of the highly restricted use experience with fresh milk, opinions given by consumers in such a survey would involve conjecture and inferential risks that are considered unreasonable in the given situation.

Unlike the approach proposed under this project, neither of these alternatives obviate the requirement for generating data through action in the marketplace to evoke the consumer responses needed as a means of grappling with the central research question at hand.¹

¹ Reader again is referenced to Annex IX for a detailed description of the research study.

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5C(1) - COUNTRY CHECKLIST

Listed below are statutory criteria applicable generally to FAA funds, and criteria applicable to individual fund sources: Development Assistance and Economic Support Fund.

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FAA Sec. 481. Has it been determined that the government of the recipient country has failed to take adequate steps to prevent narcotic drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? No.
2. FAA Sec. 620(c). If assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) the debt is not denied or contested by such government? No.

3. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities? No.
4. FAA Sec. 532(c), 620(a), 620(f), 620D; FY 1982 Appropriation Act Secs. 512 and 513. Is recipient country a Communist country? Will assistance be provided to Angola, Cambodia, Cuba, Laos, Vietnam, Syria, Libya, Iraq, or South Yemen? Will assistance be provided to Afghanistan or Mozambique without a waiver? No.
No.
5. ISDCA of 1981 Secs. 724, 727 and 730. For specific restrictions on assistance to Nicaragua, see Sec. 724 of the ISDCA of 1981. For specific restrictions on assistance to El Salvador, see Secs. 727 and 730 of the ISDCA of 1981. --
6. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction by mob action of U.S. property? No.

7. FAA Sec. 620(1). Has the country failed to enter into an agreement with OPIC? No.
8. FAA Sec. 620(o); Fishermen's Protective Act of 1967, as amended, Sec. 5. (a) Has the country seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters? No.
- (b) If so, has any deduction required by the Fishermen's Protective Act been made?
9. FAA Sec. 620(a); FY 1982 Appropriation Act Sec. 517. (a) Has the government of the recipient country been in default for more than six months on interest or principal of any AID loan to the country? (b) Has the country been in default for more than one year on interest or principal on any U.S. loan under a program for which the appropriation bill appropriates funds? No.
10. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the amount of foreign exchange or other resources which the country has spent on military equipment? (Reference may be made to the annual "Taking into Yes, taken into account by the Administrator at time of approval of Agency OYB.

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Consideration" memo:
 "Yes, taken into account
 by the Administrator at
 time of approval of
 Agency OYB." This
 approval by the
 Administrator of the
 Operational Year Budget
 can be the basis for an
 affirmative answer during
 the fiscal year unless
 significant changes in
 circumstances occur.)

11. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? No.
12. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget? (Reference may be made to the Taking into Consideration memo.) Current.
13. FAA Sec. 620A; FY 1982 Appropriation Act Sec. 520. Has the country aided or abetted, by granting sanctuary from prosecution to, any individual or group which has committed an act of international terrorism? Has the country aided or No.

V

- abetted, by granting sanctuary from prosecution to, any individual or group which has committed a war crime? No.
14. FAA Sec. 666. Does the country object, on the basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. who is present in such country to carry out economic development programs under the FAA? No.
15. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it transferred a nuclear explosive device to a non-nuclear weapon state, or if such a state, either received or detonated a nuclear explosive device, after August 3, 1977? (FAA Sec. 620E permits a special waiver of Sec. 669 for Pakistan.) No.
16. ISDCA of 1981 Sec. 720. Was the country represented at the Meeting of Ministers of Foreign Affairs and Heads of Delegations of the Non-Aligned Countries to the 36th General Session of the General Assembly of the U.N. of Sept. 25 and 28, 1981, and failed

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to disassociate itself from the communique issued? If so, has the President taken it into account? (Reference may be made to the Taking into Consideration memo.)

- 17. ISDCA of 1981 Sec. 721. --
See special requirements for assistance to Haiti.

B. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria.

a. FAA Sec. 116. Has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, can it be demonstrated that contemplated assistance will directly benefit the needy?

No.

2. Economic Support Fund Country Criteria

a. FAA Sec. 502B. Has it been determined that the country has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, has the country made such significant improvements in its human rights record that furnishing such assistance is in the national interest?

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b. ISDCA of 1981, Sec. 725(b). If ESF is to be furnished to Argentina, has the President certified that (1) the Govt. of Argentina has made significant progress in human rights; and (2) that the provision of such assistance is in the national interests of the U.S.?

c. ISDCA of 1981, Sec. 726(b). If ESF assistance is to be furnished to Chile, has the President certified that (1) the Govt. of Chile has made significant progress in human rights; (2) it is in the national interest of the U.S.; and (3) the Govt. of Chile is not aiding international terrorism and has taken steps to bring to justice those indicted in connection with the murder of Orlando Letelier?

5C(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 Funds, B.2. applies to projects funded with Development Assistance loans, and B.3. applies to projects funded from ESP.

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

A. GENERAL CRITERIA FOR PROJECT

1. FY 1982 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b).

(a) Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the project;
 (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that amount)?

By Advice of Program Change forward to Congress March 15, 1983.

Yes.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,00, will there be

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2. Improved Production Techniques

(a) Swine - The objective of the swine improvement program will be to increase the number of farmers raising pigs under the intensive system of pig production rather than the extensive system now predominantly practiced. These two production techniques are described below.

Extensive System

The extensive system of pig production as practiced in Belize is similar to that observed throughout Central and South America and the Caribbean. Pigs are allowed to roam freely throughout villages and surrounding fields. Although an enclosed and roofed corral is generally available on each farm, it is used only for night housing or confinement of pigs fattened for slaughter. Occasionally pregnant sows are confined, but farrowing often occurs in the fields. Five to twelve pigs are born per litter with an average weight of two pounds. However, growth rate of piglets to weaning is poor because nutritional deficiencies limit the sow's milk production. As a result of these deficiencies and a general lack of care, only three to five pigs will reach weaning age. Weaning weights vary widely, but are estimated to average about 15 pounds when the animal is 60 to 70 days of age.

Young females are generally bred at about 18 months of age, weighing an average of 80 to 100 pounds. Breeding is uncontrolled and depends on the type of boar roaming the village at the time of estrus. Gilts will weigh about 125 pounds at first parturition and will not increase significantly in weight after that time because of poor feeding and nutrition during lactation. Therefore, mature body weight of sows is closely associated with weight at first parturition. It is estimated that sows raised under the extensive system produce an average of only 1.6 litters per year, with a farrowing interval of approximately seven to eight months.

As scavengers, pigs consume waste products. Some corn and other farm by-products are fed. The Pig Census indicated that 85% of the producers surveyed fed corn to their pigs. Mixed feed or protein concentrates are not generally administered under the extensive system. The local breed of swine, which is usually black, is the predominant type raised under the extensive management system. This pig is very hardy and is known for its ability to scavenge for food, but low rates of production and efficiency.

Pigs raised under a extensive management system obtain a slaughter weight of about 100 pounds, depending on age and level of supplemental feed. Average slaughter age is 11 months and average dressed weight for these animals is 69 pounds.

Intensive System

Only a small percentage of the pigs produced in Belize are raised under intensive management systems. The typical farming operation contains only two or three sows and their offspring. Confinement housing and equipment is simple but adequate. Facilities usually include a cement floor, corrals constructed from wood, and roofing of tin, tarpaper, or, most often, palm thatch. Automatic feeders and waterers are common and feed and water are available at all times. Well-balanced rations usually consisting of some combination of corn, rice bran, sorghum, and a commercial protein supplement are supplied throughout the animal's life cycle. The level of sanitation and health on these farms is satisfactory and animal husbandry practices are good.

The origin of most improved swine in Belize can be traced to Central Farm or the other government multiplication centers located in each district. Central Farm has a 45 sow production unit that currently is being expanded to a 60 sow unit. The second largest unit is located in Orange Walk with 30 sows. The rest of the districts have ten sow units. All of these units can be used to provide feeders and breeders to farmers under this project. Heifer Project International (HPI), in collaboration with government programs, has provided stock of Duroc, Hampshire, and Yorkshire breeds to these units. A high percentage of the pigs of the local breed are concentrated in Toledo, Orange Walk and Corozal districts, while the majority of improved breeds are concentrated in Cayo and Belize.

The technology necessary to shift production methods from extensive to intensive systems is available, but transfer of this technology to the farmer has been limited. The project directly will address this constraint through the technical assistance and training to be provided to the extension service and farmers.

(b) Dairy - Presently, Belize is producing about 3.4 million pounds of milk annually with minimal production inputs. The common production system is characterized by farmers milking one to two gallons in the morning and then leaving a calf by the cow's side the rest of the day. The mother cow thereby provides milk to the farmer for home consumption and/or sale to neighbors as well as nurtures the calf which will be sold or used as replacement once grown. Under this system, the farmer is able to milk the cow for about 180 days. The average cost of producing one gallon of milk under this system is \$.60.

By improving the current production system with the provision of grains, minerals and proper health care, the farmer will be able to milk a cow for an additional 60 to 90 days at an estimated production cost of 61¢ per gallon.¹ The farmer also will have raised a calf that will weigh about 400 pounds at the end of eight months. The value of this calf at time of sale will range between \$120 and \$200 depending on its use. Currently, Central Farm sells its weaner breeding stock at 50¢/pound and its slaughter stock at 30¢-40¢/pound. The return from the sale of the calf will provide adequate compensation to the farmer for his labor.

A MONR survey of the Cayo district, the country's major dairy producing region, found that there were 31 farmers producing and selling milk involving approximately 225 cows averaging 1.5 gallons per day. Most of these farmers were practicing a dual purpose system of production as described above. In addition, an extra 200 cows were identified that could come into production if a market for the milk was assured. Assuming improved production techniques were adapted resulting in an average production output of two gallons per day for a minimum lactation period of 240 days, total production could amount to 480 gallons per year. These estimates are conservative in light of the production levels anticipated from improved dairy cows which can produce between four and six gallons per day over an eight to nine month lactation period. As the dairy industry develops, it is expected that more farmers will improve their stock through the artificial insemination (AI) service offered by the MONR.

*This cost is based on the following calculations:

<u>Item</u>	<u>U.S. \$/Year</u>
Cow-valued at \$500, @ 10% interest, 8 year life span	94
Pasture Improvement/Maintenance - \$5/cow/months	60
Feed -2 lbs/cow, twice/day x 8 months @ 12.5¢/lb	120
Minerals - 1.2 blocks/cow @ \$9.00/block	11
Medicines	10
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Assuming that two gallons of milk are produced per day for eight months, a total of 480 gallons will be produced per cow. Dividing total animal cost of \$295.00 by 480 gallons results in 61¢ per gallon cost of production.

During the intensive review, the need for credit by dairy farmers during the life of the project was examined. Based on this examination, it was determined that credit will not be a constraint to achievement of project activities in dairy. By the time the results of the market demand study are known, forage production and pasture improvement at Central Farm will have progressed to the point whereby materials produced by these activities will be available to farmers at a nominal fee; AI services already are provided by the MONR on a subsidized basis; and the Macal Dairy Coop voluntarily has assumed responsibility to work with its members to improve their production systems and to arrange a collection and delivery system for milk. Finally, the transfer of knowledge about improved dairy husbandry and management practices will require limited financial inputs to implement. Since most of the target groups involved in dairy production are also involved in other productive farm enterprises, income earned from these other activities and dairy should be sufficient to cover necessary expenses. In the event credit becomes needed by the project's target group, long term credit is available through the A.I.D. financed Commercial Bank Rediscount Fund project, which has set aside 20% of project funds (\$1.0 million) for loans to small and medium farmers, and short-term credit is available through DFC.

(c) Pastures/Forage - The greatest natural resource with respect to livestock potential in Belize is land and its ability to produce forage. National forage production potential has only partially been realized, and about twelve species of grasses have been introduced and tested in the country to date.¹ These grasses are sufficient to initiate an extensive improvement of the present pasture land. The strategy under this project will be to establish the best suited of these grass species on land that is already cleared before clearing and planting new lands.

The Pasture Census of 1978 indicated that Belize used 112,460 acres of pasture land. Of this amount, 67,580 acres were in natural pasture production and 44,880 acres were cultivated into improved pastures. However, due to overgrazing, long dry periods and poor management practices, the majority of improved pastures has reverted to natural pasture. Therefore, the major problems are related to poor management practices rather than technical coefficients. Based on this identification of the constraints, this project has been designed to provide technical assistance and training to extension officers and farmers to make the most productive use of the technologies now in-country.

¹ These varieties include: Jaragua grass, Guinea grass, Pangola grass, Pare grass, Carib grass, Bermuda grass, Star grass, Buffel grass, Aleman grass, Bahia grass, Green Panic grass and Molasses grass.

C. Social Soundness Analysis

1. National Overview

Belize's small population of 145,000 is ethnically diverse and can be divided into seven major groups: Creole, (39.7%), Garifuna or Black Carib (7.6%), Mestizo (33.1%), Yucatec and Mopan Maya (6.8%), Kekchi Maya (2.7%), East Indian (2.1%), Mennonite (3.3%), and several minor groups including U.S. and U.K. expatriates, Chinese and Lebanese. These ethnic groups are geographically concentrated throughout the country, with Creoles largely in Belize City, Garifuna along the coast and in Dangriga, Yucatec Maya in the north, Mopan and Kekchi Maya in Toledo, Mestizos (many of whom are descendents of the Maya peoples) in the north and western Cayo district, East Indians in Toledo, and Mennonites in their own colonies in Cayo, Orange Walk and Toledo.

The Mennonite colonies and some Maya and Kekchi villages in Toledo are the only single ethnic settlements. Elsewhere, a single group may be numerically dominant, but the rest of the population will be heterogeneous. The multiplicity of ethnic groups, each with its own customs and language, complicates efforts at economic development since each has to be approached differently. On the other hand, there is little ethnic isolation in Belize; most groups are open, intermarriage is common, channels of communication exist and a general Belizean identity is gradually emerging. The relatively unintegrated Mopan and Kekchi Indians are the only exception to this characterization.

Livestock producers in Belize are not easily differentiated by economic functions. Most, if not all, producers are involved in other income-producing activities. This applies to other occupations within the industry including butchers who are involved in the provision credit and transportation, and retailers who slaughter and process meat. This is mostly the result of the small scale of the industry, and a history of fluctuations in markets which encourages economic diversification in order to minimize risk. Most small farmers keep livestock as a means of disposing of crop waste and surplus, "banking" surplus until needed, feeding the family, and as a hedge against the swings in crop prices. Farmers who own sufficient land resources tend to raise cattle, while those with small parcels are more likely to own swine. While there are few large-scale swine production operations in the country, a significant portion of the nation's cattle are maintained on a small number of farms, in large herds on extensive tracts of land. The largest herds are owned by corporations and wealthy individuals who usually have some other economic enterprise and who depend on hired help and/or hired resident managers. It is common for successful shopkeepers, businessmen, and commercial farmers to own a cattle ranch distant from their place of residence. Against this general backdrop,

the following summary analysis defines this project's target group, and assesses the socio-cultural feasibility of its interventions and the potential spread effects within each of the major livestock subsectors: swine, beef and dairy cattle.¹

2. Swine Producers

Pigs are produced in Belize by small farmers as an adjunct to other farms operations. According to the 1980 Swine Census, the average farm size of the 2,900 or so pig farmers was 11.88 acres, with an average of 5.3 animals each. Only 49 farmers in the country (23 of them located in the Toledo district) had more than 25 pigs, and only eight had more than 50. Almost 30% of the farmers surveyed had only one pig. Producers in the country are predominantly Mestizo and Mayan Indian. While Orange Walk has the most pig farmers, and Toledo has the most pigs, Cayo has the highest potential for increasing swine production, having abundant feed resources, greatest access to the Belize City market and progressive farmers interested in increasing and diversifying their income.

At present, most hogs are raised using extensive methods and feed home-grown corn by Mestizo and Maya households; those farmers with higher cash incomes purchase feed supplements. Most farmers are milperos whose main crops are corn, beans and vegetables. Other sources of cash include cattle, honey, peanuts, and chickens. Hogs are largely managed by women, and the continuing diversification of agricultural production and high corn production have enabled them to maintain their income levels over the last few years. Although there is a long tradition of swine production by women in Belize, most past swine improvement programs have been designed based on a male lead role and have directed educational efforts at men. This project will deviate from this course and will encourage rural women's participation from the onset of the swine improvement field activities. Project success will be strengthened through rural Belizean women's extensive experience in swine production, labor availability (hog care does not require any lengthy absence from the home) and motivation to earn cash income. Most younger women are literate and would welcome involvement in an activity which will increase their economic role. For many rural women, rearing hogs represents the only major source of discretionary cash income.

As with most other rural Belizeans, hog producers are quick to grasp and utilize new methods, technologies and markets if the opportunity for a profit exists and can be demonstrated. Demonstration that benefits are to be gained by engaging in improved swine production techniques may require more persuasion among the Kekchi and Mopan Indians in Toledo who have developed a growing disenchantment with development projects, most

¹ The full Social Soundness Analysis is available as a bulk annex in LAC/DR official files in AID/W.

of which have been poorly planned and have not been designed to take into consideration existing social organizations. Even still, they continue to participate, cautiously trying each new effort. They seek a reliable modest increase in their household cash income, staying within limits compatible with the high value placed on an egalitarian social structure. Though some families are accorded higher status by virtue of being village founders or through serving the community, members will unite to punish and even expel one who is conspicuously enriching himself. Development efforts which erode this village unity are resisted by its members. Numerous projects have run afoul by singling out "model farmers" or village "leaders" as the main agents to introduce change. Rather than promoting emulation, villages usually react by rejecting this person, and often the innovation as well. This is the pattern behind the history of failure of most cooperatives in Toledo; they work as long as the leader is a non-Indian, but as soon as leadership is turned over to a community member, factionalism breaks out and disintegration begins.

While these cultural factors present constraints to change, opportunities also exist. Existing communal organizations can be drawn upon to give strength to and invoke community participation in new projects. The requirements are two: (1) involve a significant number of the community households (including women, who hold considerable power in the family structure), rather than selecting "model" individuals; and (2) work through existing authority channels, such as management councils, and rotate leadership positions among different community members to prevent petty tyranny or the perception thereof. This project has been designed to adhere to these socio-cultural "givens."

While there are no anticipated cultural obstacles to the spread of intensive hog-raising techniques in the north; and in fact the spread is already beginning to take place, an effective spread in Toledo will depend largely on the skill and creativity of the advisor to be assigned to that district under this project. For this reason, a short-term rural sociologist/anthropologist, familiar with the area and its inhabitants, will be assigned in the beginning to assist the long-term advisor through a period of acculturation.

3. Dairy Producers

Currently about 90 Mennonite farmers in the Cayo district are responsible for the bulk of fresh milk produced and processed in Belize. They sell their production to the nearby Mennonite-owned and operated processing plant which is the only one in the country. In addition to the Mennonites, a MONR survey conducted in 1982 identified 31 other dairy farmers who are milking mainly dual purpose cows for home consumption and raw milk door-to-door sales. These 31 farmers are a diverse group. About half are large ranchers with 150 to 900 animals. Milk production for these particular farmers would be a

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supplementary income activity carried out by hired labor. Fourteen of the 31 producers are small and medium farmers, three of which are women, with six to 60 head of cattle, and members of the Macal Cooperative. Most engage in mixed farming systems and reside on their farms. These farmers are predominantly Mestizo from Mexican or Guatemalan backgrounds in which milk and cheese production have traditional importance.

During a recent survey conducted by the MONR, much enthusiasm was expressed about moving into regular milk production provided a secure market for fresh milk existed. Dairy production offers the small and medium farmer a steady, reliable income as opposed to beef production where returns are lagged by years. In addition, most households in the area have large numbers of children and extended family members who would be able to assume the extra labor requirements of milk production on a regular basis. However, some cynicism was expressed by these farmers, which has built up over the years as team after team has come through looking at the potential for dairy production with little materializing. The farmers know that milk production is feasible from observing the Mennonites, and the construction and operation of a small processing plant under this project will demonstrate to them that a committed effort is underway. Spread effects within Cayo district will be rapid, as a small dairy operation could be started on most of the small farms in the area. On a national scale, spread effects of project activities will be more limited. Success in Cayo will result in some substitution effect of dairy production and local marketing by farmers in other districts.

4. Cattle Ranchers

The project's target group within this subsector are small and medium size cattle farmers, with maximum herd sizes of about 100 animals. These farmers, numbering just over 1000 producers, are geographically dispersed and diverse in the way they manage their herds and integrate cattle into the rest of their farm systems. Most earn incomes from products other than beef, and it is the size and regularity of this income which largely determine the quality of their herds and pastures. The smallest farmers produce small, low quality animals for the local market with little technical or capital input. They lack the capital to increase herd and pasture size, and find the cost of fencing and capital-intensive pasture improvement techniques prohibitive. They are stuck in a cycle of low productivity, low income, and low investment. In order to expand above this level, a farmer must have another source of capital. Among medium sized producers, cattle ranching is a subsidiary enterprise. Some of these farmers take steps to improve their animals and pasture, but are unwilling to take the risk of investing a large amount of money or labor, particularly under present market conditions for beef.

There are no significant cultural obstacles to the improvement of small beef producer's management techniques or technology. However, given a long history of fluctuations in agricultural markets and prices, and a

long-standing preference for self-sufficiency in food production on the farm, few small farmers will expand or invest heavily in beef production unless the following conditions exist: a steady, reliable demand for animals at a relatively stable price, and consistent and favorable government policies on the marketing and slaughter of animals. Revitalization of the Ladyville Abattoir (a condition precedent to this project), growth of export markets, development of a domestic meat-processing industry (to be assisted by this project), and improved GOB capability in policy analysis and formulation (addressed by this project), should help create conditions favorable to increase small farmer participation.

Extension officers interviewed during the intensive review expressed a desire to work with small cattle producers, though medium and large ranchers have more claim on their time at present. Likewise, small producers expressed great receptivity to working with extension personnel but felt their time was inproportionately spent with the larger ranchers. This allocation of time should shift toward the small farmer under the CAEP decentralization scheme. However, if the improvements in pasture and forage production proposed under this project are to reach the small producer, they must be designed to require minimal capital inputs and should be introduced incrementally. Such improvements and approach would be highly acceptable to a small farmer, would spread rapidly through rural communication networks, would increase stocking levels and calving rates, and could increase income without causing a major change in current mixed farming systems. Small farmers could break out of the cycle of producing small animals for a low price. Also, if decreases in production costs led to a decline in retail prices for beef, the domestic market would demand greater production.¹ Whereas now the local market for beef is satisfied, aggregate consumption has been gradually dropping due to the price competitiveness of pork and chicken.

It is important that the project's long term adviser in pasture/forage production work closely with zonal extension officers to develop innovations and delivery systems which will be practical for and acceptable to small/medium producers with limited capital. Likewise, the MONR counterpart to be trained in the U.S. should be exposed to a general farming-systems program which emphasizes the role of livestock and pasture in a mixed production system. Many capital-intensive forage systems in use in the U.S. are unsuitable to Belizean conditions.

¹ It should be noted that production inefficiencies are not the only cause of relatively high beef prices, and that Belizean retailers historically have responded to lower farm gate prices by holding retail prices constant to increase their profit margins.

D. Economic Analysis

A significant proportion of the proposed project's resources will be used to improve the efficacy of the extension service. As a consequence, a quantitative estimate of potential benefits is highly speculative. However, several modifications of the project as originally proposed in the PID were introduced during PP development in order to improve its cost effectiveness. For example, it is now proposed that almost all short-term training under the project will take place in-country. Additionally, the number of proposed long-term advisors has been reduced to the minimum without compromising the technical viability of the project. Quantitative analyses of costs and benefits have been performed on (1) dual purpose dairy/beef production activities, including dairy processing, (2) beef production activities, and (3) improved swine production activities.

(1) Dual Purpose Dairy/Beef Production

This component consists of financing the construction of a milk processing plant with an initial one-shift capacity of 500 gallons per day, an expatriate plant manager, and technical assistance in dairy production, particularly for pasture improvement. Since some of the activities related to pasture development will also benefit single purpose beef production, it was necessary to allocate costs between activities related to dual dairy/beef cattle production and those strictly related to beef cattle production. Given the proposed plan of work of the TA, two-thirds of the costs of the pasture development TA will be allocated to the dual purpose component; the same proportion was used to allocate training costs.

The data and assumptions used in the estimation of economic benefits and costs are summarized in Table 3. The full costs of supporting dairy production through the extension service were allocated to this activity, although it is possible that other milk producers will benefit from the increased effectiveness of the extension service.

The internal rate of return (IRR) has been estimated at 57%, and the net present value at \$3.3 million. This high rate of return is a consequence of the high prices of pasturized milk which prevail today in Belize. Since the output of the processing plant is expected to double national production in four years (equivalent to a 19% annual growth rate), it is highly probable that even with a substantial shift in the demand curve, prices will decrease.

¹ Switching values are defined as the percentage change in a variable which will reduce the IRR to the opportunity cost of capital (OCC). The OCC is assumed to be ten percent, which is the estimate used in the appraisal of several investment projects in Belize.

TABLE 2
DAIRY COMPONENT: ECONOMIC ANALYSIS
 (in thousand Belizean dollars) BZ.\$2 = US \$1

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8-9	Y10	Y11-14	Y15	Y16-20
PRODUCTION												
Gallons/day (thousands)	-	300	400	500	500	650	800	1000	1000	1000	1000	1000
Gallons/year (thousands)	-	110	146	182	182	237	292	365	365	365	365	365
GROSS VALUE OF PRODUCTION^{a/}	-	715	949	1183	1183	1540	1898	2372	2372	2372	2372	2372
COSTS AT PLANT AND PRODUCER LEVELS												
Investment	372 ^{b/}	-	-	-	.88 ^{c/}	-	-	-	136 ^{d/}	-	136 ^{d/}	-
Fixed Costs ^{e/}	-	37	37	37	37	62	62	62	62	62	62	62
Variable Plant Cost (excluding milk) ^{f/}	-	77	102	127	127	166	204	256	256	256	256	256
Delivery Costs ^{g/}	-	55	73	91	91	118	146	182	182	182	182	182
Milk Production Costs ^{h/}	-	138	182	228	228	296	365	456	456	456	456	456
TECHNICAL ASSISTANCE												
Plant Manager	60	240	-	-	-	-	-	-	-	-	-	-
Dairy Production	12	258	278	210	200	-	-	-	-	-	-	-
NET CASH FLOW WITH PROJECT	-444	-90	277	490	312	898	1121	1416	1280	1416	1280	1416
NET CASH FLOW WITHOUT PROJECT^{i/}	42	42	42	42	42	42	42	42	42	42	42	42
INCREMENTAL NET BENEFITS	-486	-132	235	448	270	856	1079	1374	1238	1374	1238	1374

FOOTNOTES TO TABLE

- a) Price BZ\$6.50 delivered at store in consuming centers.
 b) Plant and building BZ\$704,000; truck BZ\$68,000
 c) Plant expansion: BZ\$52,000; truck BZ\$68,000 x 2
 d) Replacement trucks BZ\$68,000 x 2
 e) Labor: 3 workers x \$20/day x 365 days = \$22,000, doubled with capacity increase. Maintenance 5% of plant costs
 f) BZ\$0.70/gal.
 g) BZ\$0.50/gal.

- h) BZ\$1.20/gal. production costs (including 10% return on investment) plus BZ\$0.05/gal. transportation costs from farm to processing plant.
 i) 50 gal./day x 365 days x (\$3.50/gal. - \$1.20/gal.) \$4.00 price of raw milk delivered, \$0.50 transportation farm to consumer; \$1.20/gal. production costs.

In order to test the sensitivity of the IRR to changes in output prices as well as to other variables, switching values¹ were calculated. The switching values are:

<u>Variable</u>	<u>Switching Value</u> (%)
Price	47
Production (cost of milk production, fixed)	58
Production (cost of milk production, variable)	74
Milk Production Costs	238
Transportation Costs	590
Technical Assistance	555
Investment Costs	1360

The IRR is most sensitive to changes in the wholesale price of milk. A decline in the price by 47% (from \$3.25/gal to \$1.73/gal.) would lower the IRR to ten percent if the increase in consumer surplus generated by the lower price is neglected. To estimate the increase in consumer surplus, information on the shape of the demand function for milk would be necessary. If the costs of producing milk at the farm level were fixed (i.e., not variable), a 58% drop in production costs would be required to lower the IRR to ten percent. If the costs were variable, the switching value would then be 74%. Milk production costs could increase at the farm level from \$.63/gal. to \$2.11/gal. before the IRR would decrease to ten percent; likewise, transportation costs would have to increase from \$.25/gal. to \$1.73 to result in a ten percent IRR.

As the data demonstrate, the capacity of the market to absorb the output is the most significant risk associated with this component and it is exactly that uncertainty which is the subject of the market demand study to be conducted under this project. Since milk will be produced mostly by dual purpose animals, the maximum loss, should this component fail, would be largely represented by the plant investment costs and the associated technical assistance. The present value of this is estimated at \$700,000.

(2) Single Purpose Beef Production

With respect to single purpose beef production, the most important technical constraint is lack of improved pastures capable of supplying sufficient nutrients, particularly during the dry season. A proportion of the TA and training supported by this project is expected to adapt and disseminate technology that will alleviate this constraint. The potential number of beneficiaries are expected to be 1,000 to 1,200 farmers, with a total herd of 28,000 head, and annual offtake of 6,100 animals.

An attainable target for the improved extension service to reach during and after this project will be 50 additional producers per year, or a total of 500 during the next ten years. Under these assumptions, the annual benefit per farmer of \$68 would be required to yield a ten percent IRR. This amounts to four percent of the gross value of production. The unit costs of production of a representative beef producer were estimated and compared to unit production costs that would result if improved management practices were adopted. The figures indicate that it would be possible to reduce unit costs by \$.10 per pound with better management. This translates into an average decrease of \$480 in production costs per farm per year (assuming six animals per farm x 800 lbs./animal x \$.10/lb. cost reduction). Therefore, the potential benefit is approximately seven times greater than the average benefit required to yield an IRR of ten percent.

(3) Improved Swine Production

An estimate has been made of incremental pig production that will result from the project. Projections of this increase are shown below.

Pig Production Projections

Year 1	2,100
Year 2	3,300
Year 3	6,200
Year 4	9,000
Year 5	11,100
Year 6	13,900
Year 7	17,400
Year 8-20	21,700

This analysis attempts to quantify the producer surplus that will be generated at two levels: (1) the pig producer level and (2) the processing level. At the producer level, the surplus per pig, excluding labor costs, has been estimated at \$30.00. Depending on the opportunity cost of labor and average labor requirements, the producer surplus per pig will fall in range of \$15.00 and \$25.00. At the processing level, private sector individuals investing in processing facilities have estimated that the surplus per pig is \$.30/lb. of dressed weight, or about \$40/pig. Although the detailed figures were not made available to the PP development team, the \$.30/lb. was said to be net of all costs including a ten percent return to capital. Hence, the total surplus can be estimated at \$60/pig (\$20 plus \$40)

Based on the pig production projections shown above, the calculated surpluses and the assumption that these surpluses can be attributed entirely to this project, the IRR of these activities exceeds 50%. An

with any extension project, a conceptual difficulty develops in determining which proportion of the economic surplus is actually due to improvements in delivery of extension services and which proportion is due to investments carried out by individual producers and processors. Nevertheless, the switching value for the surplus is 90%. In other words, even if the surplus attributable to extension was only valued at \$6.00, these activities still would yield an IRR of ten percent.

(4) Other Project Activities

In order to assess the economic feasibility of carrying out the market demand study for fresh milk, it would be necessary to compare the costs of the study with the expected value of potential losses. As the costs of the proposed dairy plant and associated TA would be incurred prior to the completion of the study, the certainty of a loss of a net present value of \$220,000 must be compared with potential losses of establishing excess plant capacity and resulting from unsound policy decisions. The benefits derived from this study are described in Part III, Section B, Project Activities. The last component, policy analysis and formulation, does not lend itself to a quantitative analysis. The benefits from this activity also are described in Part III, Section B of this PP.

E. Financial Analysis and Plan

The total cost of the project will be \$4.23 million of which A.I.D. will contribute \$3.05 million (\$1.0 million loan and \$2.05 million grant), and the COB and private sector will contribute \$1.15 million and \$30,000, respectively. A.I.D. will finance exclusively foreign exchange costs, while the GOB and private sector will finance all local currency expenditures. The GOB counterpart contribution represents 27% of total project costs. The project's financial plan is summarized in the following input table and an estimated disbursement schedule of all A.I.D. funds is displayed thereafter. A summary financial plan by project component is contained in Part I, Section E, of this PP.

Table 3
Summary Financial Plan
(U.S. \$000)

<u>Project Input</u>	<u>Loan</u>	<u>A.I.D. Grant</u>	<u>G.O.B.</u>	<u>Private Sector</u>
Technical Assistance				
Long-term		1,410		
Short-term ¹	20	200		
Training				
Long-term	200			
Short-term ²	100			
Equipment/Vehicles	430		10	
Operating Costs				
-Salaries			300	
-Central Farm/Zone Activities			570	
-Vehicle Operation/Maintenance			60	
-Dairy Study and Plant		140		30
Evaluations	70			
Inflation	100	250	160	
Contingencies	80	50	50	
Total	<u>1,000</u>	<u>2,050</u>	<u>1,150</u>	<u>30</u>

¹Grant financed short-term technical assistance includes nine person-months each for processing advisor and milk market research advisor, and two person-months for rural sociologist/anthropologist to assist long-term advisor in Toledo; loan financed short-term technical assistance is for invitational travel of experts in livestock production, marketing and processing.

² Short-term training includes financing for four observational trips for extension staff (one related to each of the major project activities) and two students to receive short-term training at CATIE or CIAT in forage production.

Table 4

Estimated A.I.D. Disbursement Schedule
(U.S. \$000)

	1983	1984	1985	1986	1987	1988
A. <u>Swine Improvement Program</u>						
1. <u>Technical Assistance</u>						
Long-term		120	240	120	120	
Short-term			30	10		
2. <u>Training</u>						
Long-term		20	20			
Short-term				20		
3. <u>Equipment/Vehicles</u>		70				
B. <u>Pasture Improvement Program</u>						
1. <u>Technical Assistance</u>						
Long-term		120	120	120		
2. <u>Training</u>						
Long-term		20	20			
Short-term				40		
3. <u>Vehicles</u>		20				
C. <u>Dairy Industry Development</u>						
1. <u>Technical Assistance</u>						
Long-term		30	120			
Short-term				60	30	
2. <u>Training</u>						
Long-term					20	20
Short-term					20	
3. <u>Research Costs Related Milk Demand Study</u>				90	50	
4. <u>Equipment/Vehicles</u>		180	70		30	

Continued on following page.

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Continued from preceding page.

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Estimated A.I.D. Disbursement Schedule
(U.S. \$000)

	1983	1984	1985	1986	1987	1988
D. <u>Pork/Beef Processing</u>						
1. <u>Technical Assistance</u>						
Short-term		50	40			
2. <u>Vehicle</u>		20				
3. <u>Training</u>						
Short-term			20			
E. <u>Policy Analysis & Formulation</u>						
1. <u>Technical Assistance</u>						
Long-term		60	120			
2. <u>Training</u>						
Long-term		40	40			
3. <u>Equipment/Vehicles</u>		40				
F. <u>Evaluations</u>			10	30		30
G. <u>Inflation</u>		50	100	110	70	20
H. <u>Contingencies</u>		40	30	30	20	10
Total		<u>880</u>	<u>980</u>	<u>750</u>	<u>360</u>	<u>80</u>

Minimization of recurrent costs was an overriding consideration throughout the design of this project. The only major public sector recurrent costs generated as a result of this project will be the salaries for two additional staff positions, one within the Office of the Minister/Permanent Secretary of Natural Resources and one at Central Farm. In the private sector, operating costs of the dairy plant will be financed from revenue generated by milk sales.

F. Environmental Considerations

The PID design team undertook a complete Initial Environmental Examination (IEE) of the project's environmental impact and arrived at a recommendation for a negative determination. The LAC Bureau's Chief Environmental Officer concurred and approved the recommendation on April 25, 1983. The IEE findings are incorporated in Annex VI of this PP.

V. IMPLEMENTATION

A. Implementation Plan

1. Implementation Schedule

The project is presented for FY 1983 authorization with an initial A.I.D. obligation of a \$1.0 million loan and \$300,000 grant. A schedule of target dates for key project events and evaluations is shown below:

<u>Event</u>	<u>Date</u>
Project Authorization (AID/W)	August 1983
Project Agreement signed	August 1983
Request for proposals mailed	October 1983
Contract signed with Title XII University	March 1984
MONR candidate for BSc degree in animal science emphasizing swine production, selected and sent to U.S. university	April-September 1984
MONR candidate for BSc training in agronomy, emphasizing forage production and management, selected and sent to U.S. university	April-September 1984
MONR candidate for Phd. training in economics selected and sent to U.S. university	May-September 1984

MONR candidate for MA training in agricultural economics selected and sent to U.S. university	May-September 1984
LT advisor in pasture improvement and forage production arrives at Central Farm.	May 1984
Meat processing advisor arrives for first three month period	May 1984
LT advisor in agricultural policy analysis arrives in-country	May 1984
Construction of Macal dairy plant begins	May 1984
LT advisor in swine production arrives at Central Farm	October 1984
LT advisor for Toledo District arrives	December 1984
Processing plant supervisor arrives for 15 month period	March 1985
First year evaluation (in-house)	March 1985
Arrival of marketing research expert	April 1986
Initiation of milk market demand study	May 1986
Mid-project review (to be conducted by USAID, MONR, implementing agency and outside firm)	May 1986
MONR candidate for BSc training in dairy production selected and sent to U.S. university ¹	July-September 1986
Final Project review (to be led by outside firm)	December 1988
Project Activity Completion Date (Dairy Trainee returns from LT training)	December 1988

¹ Contingent upon results of market study.

2. Administrative Arrangements

(a) Contracting

In light of the technical assistance and training orientation of this project, stated project objectives can best be accomplished by a Title XII university acting as the lead implementing entity. Contracting with the university will be conducted pursuant to A.I.D. Procurement Regulation 7-4-.57 as follows:

- o USAID, in conjunction with BIFAD in Washington, will prepare a list of Title XII universities to receive a Request for Technical Proposal (RFTP).
- o USAID, working with the MONR, will develop a comprehensive statement of requirements together with selection criteria describing how the proposals will be evaluated. USAID's Regional Contracting Officer will develop the RFTP from these data and will mail the document to the institutions named through step (1) above.
- o After receipt of proposals, an evaluation team composed of the Contracting Officer, USAID staff, and appropriate GOE persons will convene to evaluate the technical proposals against the criteria specified in the RFTP. On-site visits to candidate universities by representatives of the evaluation team may be required before final selection is made.
- o After selection of the institution for negotiations, USAID shall request the selected institution to prepare a detailed cost proposal to match the technical proposal that was presented.
- o Negotiations will begin in Belize once the cost proposal has been received and evaluated. If, after reasonable effort, an agreement cannot be reached with the selected university, the negotiations will be terminated and the second ranked university will be invited to prepare a cost proposal and to enter into negotiations. This procedure will continue until an agreement is reached.

After agreement is reached, the Regional Contracting Officer will prepare the contract and both parties will execute the document.

The lead university contract will cover the entire five years of the project. As indicated above, the contract will cover all TA's assigned to the MONR including the livestock and forage specialists at Central Farm, the Toledo advisor, the milk market research advisor and the agricultural policy analyst and all the training of MONR staff.

This university will subcontract with other universities (other Title XII to the extent feasible) for the above TA and training it will not be supplying itself. In addition, it will subcontract outside of the university community for the technical assistance of a dairy plant manager, most likely from a private corporation such as Land-of-Lakes, and the specialist in meat processing. Finally, the lead university will be responsible for procurement of all imported materials, equipment, vehicles and other tangible commodities.

In addition to the reason stated above related to the project's emphasis on technical assistance and training, contracting with a Title XII university will be appropriate given current limitations on USAID personnel. Mission staffing is clearly unsatisfactory at the present level of one U.S. direct hire to manage project implementation. Even if the FY 1985 Annual Budget Submission (ABS) request for two additional direct hire staff - one each in FY 1984 and FY 1985 - is approved, staff limitations will still be a major constraint during the initial years of this project.

The relationship between the lead university and the MONR undoubtedly will be a deciding factor in the success of the project. The contract will thus go into considerable detail on what will be expected of the lead university as to its relationship with the GOB. The contract also will call for bi-annual reports from the lead university, as well as formal review meetings between it and USAID at least once a year. These meetings will be in addition to what is expected to be a close working relationship between the lead university and USAID. They will also be in addition to the project evaluations, in which the lead university will actively participate. These requirements will be detailed in the RFTP and the contract.

(b) USAID Monitoring

USAID, given its staff limitations, will depend on the Title XII contractor to assume major responsibility for project implementation and monitoring. USAID will participate in this latter task through a committee consisting of a USAID representative, most likely the newly arrived Mission rural development officer, and a Title XII representative. The USAID officer will be assigned Project Manager and will work closely with the MONR and the Title XII technical assistance contract team to ensure that provisions of the Project Agreement and Implementation Letters are honored.

In addition to the three major project evaluations described below, joint annual reviews by USAID, contractor and GOB will be an important feature of project implementation. These reviews primarily will monitor progress of project activities and the adequacy of administrative arrangements and project inputs towards realizing project objectives within the scheduled implementation plan.

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The following reports will be required to assist the Mission in monitoring the project:

1. A quarterly report from the MONR on activities and counterpart expenditures completed and projections of activities and counterpart expenditures for the next quarter.
2. An annual implementation plan from the MONR which will include a projection of project activities for the coming year in addition to an annual operating budget which will include GOB counterpart allocations.
3. Bi-annual reports from the Title XII contractor on activities completed and proposed activities over the next six months.

(c) Establishment/Operation of Special Funds

Three separate funds will be established under this project as follows:

1. Advance Fund for Dairy Study - A.I.D. will provide \$140,000 in grant funds to the GOB for the purpose of establishing a fund to cover operating expenses related to the market demand study. It is anticipated that the operating costs of the Macal dairy will be considerably higher during the market test activities than during their established operating mode before the research effort is initiated. Study factors contributing to this increase, amounting to approximately \$140,000, are broken in Annex VIII (3). At the request of the GOB, A.I.D. will advance up to 90 days of projected expenditures for the fund which will be established in a commercial bank which has a branch office near the San Ignacio area where the Macal dairy coop is situated. The GOB counterpart assigned to work with the expatriate market study and plant advisors will have authority to draw upon this fund to meet short-term operating costs on a timely basis. Smooth functioning of this financing arrangement will obviate any financial burden associated with this research effort having to be assumed by the members of the Macal Coop.

2. Operating Expense Fund at Central Farm

As discussed in the Institutional Analysis section, one of the major bottlenecks to the efficient operation of demonstration and research activities at Central Farm is the lack of accessible funds for short-term expenses. During visits to Central Farm, the PP development team became aware of the cumbersome bureaucratic procedures and delays associated with requests to make even small procurements for seeds or fertilizer for pasture improvement activities. Establishment of this fund, although small in amount, (approximately \$30,000) should go a long way in improving operations and the morale of its staff. During the first three years of the

project, the fund will be capitalized by local currency generations from A.I.D.-financed ESF loans. By the beginning of the fourth year of the project, the GOB will create a specific line item in its budget for the MONR to maintain the value of this fund through normal budget allocations. As a condition precedent to disbursement of project funds to contract the long-term forage advisor, the GOB will agree to establish this fund and provide the A.I.D. Representative with operating procedures to review. These procedures should reflect the newly decentralized system of disbursement and approval authority for use of operating expenses. The GOB will also covenant that by the fourth year of project implementation, its budget will include a line item for this particular expense. MONR quarterly reports on the use and operation of the fund will be submitted for A.I.D. review.

3. Rotating Fund for Swine Improvement Program

Given the current unavailability of credit for small swine producers from financial institutions, a rotating fund will be established under this project to provide animals, feed, materials to build pens, feeders and water systems to farmers as needed to participate in the swine improvement activities to be financed under this project. After selling the pigs, the farmers will reimburse the MONR in the amount of the value of the in-kind loan which will flow back into the fund. Only in the Toledo district, given the unique circumstances justifying a greater "hand holding" approach to our development efforts, will some resources be granted to the farmers, without requiring reimbursement for inputs, other than weaner pigs, necessary to adopt an intensive system of swine production. It is anticipated that in the northern districts of Cayo and Orange Walk, in-kind credit will not be required by many farmers due to their higher levels of income, and their greater socio-cultural receptivity to alternative production techniques.

A condition precedent to the disbursement of project funds associated with the swine improvement component will be the establishment of this fund with procedures and borrowing eligibility criteria satisfactory to A.I.D. This fund will be capitalized with local currency generations from A.I.D.-financed ESF loans estimated at \$60,000. The fund should be established in a local commercial bank which has a branch office in Toledo so that GOB counterparts working with the project advisor assigned to this district can have ready access to operating funds. The MONR will be required to provide quarterly reports to the Mission on the use and operation of the fund.

3. Special Procurement Requirements and Waivers

(a) Request to Allow Procurement of Used Equipment

The Land-of-Lakes dairy specialist who participated on the PP development team recommended that the smallest size plant be constructed and properly equipped for the purpose of carrying out the market demand study under this project. Based on the results of that study, a decision will be made regarding the size and location of processing and distribution facilities that will efficiently respond to future national needs for fresh milk. Until such time that these considerations can be properly assessed, investment in equipment for the Macal plant should be minimized while at the same time comply with Grade A USPH standards. Taking into consideration these criteria, as well as the appropriate level of plant design and equipment sophistication required, the most cost-effective means of obtaining the necessary equipment will be to purchase it used from commercial sources in the United States. It is estimated that the cost of used, reconditioned plant equipment will be \$80,000 which is compared to \$380,000 if purchased new.¹ Probable sources of this equipment include small dairy operations in the U.S. which are expanding and require larger equipment, universities which used to process their own milk for campus needs and are now purchasing it from commercial dairies, and dealers in the U.S. Such dealers are many and used equipment of the kind required under this project is readily available. Many other countries, including Costa Rica and Nicaragua in Central America, have procured used instead of new equipment for their dairy operations due to cost differences and less sophisticated designs which offer operational and maintenance advantages.

Whereas it is A.I.D.'s general policy to finance only new equipment, procurement of rebuilt or reconditioned equipment can be authorized based on certain justifications such as lower cost, quicker delivery and/or operational and maintenance advantages. As discussed above, procurement of used equipment for the dairy plant will not jeopardize or reduce achievement of this component's objective and is justified primarily by the significant cost savings.

Pursuant to Handbook 15, Chapter 5, Section E2(b), procurement of rebuilt or reconditioned equipment which meets the basic requirements set forth in Section E(3) of the same chapter pertaining to buyer application, inspection and appraisal of the equipment, may be approved by the LAC Bureau and SER/COM. Since all of the steps outlined in Section E(3) will be followed to procure the dairy plant equipment, no additional waiver of inspection or appraisal will be

¹ See Annex VIII (2) for detailed cost estimates of plant equipment.

needed. The LAC Bureau Chief Engineer will assume a major role, in consultation with SER/COM, in determining the type and extent of inspection needed.

(b) Waiver of Competition-Proprietary Procurement Waiver

The project includes financing for the procurement of four, four-wheel drive pick-ups for use by the long-term advisors and counterparts in the MONR, two compact automobiles for the policy analyst and processing advisor, and two refrigerated milk trucks for use by the Macal Dairy Coop. The total value of this procurement is \$190,000; \$20,000 per pick-up or car, including spare parts, and \$35,000 per milk truck, including spare parts. The GOB has requested that, in the interest of standardization and servicability, that Ford manufactured vehicles be procured for this project.¹

Currently, the MONR transport fleet is standardized with Ford vehicles. The Ford dealership in Belize City maintains a relatively reliable inventory of spare parts and has a good reputation of responding to GOB needs in a timely fashion. Furthermore, MONR mechanics and maintenance crew located at Central Farm are familiar with servicing Ford vehicles. In discussions with the Ford dealer in Belize City, he demonstrated a commitment to continue working with Central Farm mechanics to assist them with servicing and repairing these vehicles.

In accordance with Handbook 15, Chapter 3, Section B3d(1)(a) formal competition bidding procedures in the procurement of goods may be waived to allow use of the procedures in Section 201.23 of A.I.D. Regulation 1 when "it is necessary to purchase a proprietary product, involving the brand name, design, or distinctive specification of a particular manufacture for such reasons as (i) a requirement for compatibility with equipment on hand or (ii) when substantial benefits can be achieved through standardizing on a particular brand. The proposed procurement from Ford Company meets these criteria. Pursuant to Handbook 15, Chapter 3, Section C3b(4)(b), proprietary procurement may be authorized by the Assistant Administrator for LAC, in consultation with SER/COM.

(c) Procurement of Microcomputer

Project funds have been included under the GOB Policy Analysis and Formulation Component for the procurement of one microcomputer and spare parts (\$15,000) for use by the long-term agricultural policy analysis advisor and the two MONR staff who will assume economic and

1 With respect to procurement of refrigerated milk trucks, the standardization justification is only applicable to non-competitive procurement of the chassis, but the Title XII contractor will have to go out for bids for the procurement of the refrigeration compartment and equipment.

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policy analysis responsibilities. In addition, a small contingency (\$5,000) has been budgeted for short term TDYs of computer technicians from either the computer manufacturing company or A.I.D.'s Mission and Program Services Division (M/SER/IRM/MPS).

The computer will be housed in the MONR and will assist the Ministry in economic data collection and forecasting which, in turn, will serve as the basis for major policy decisions related to development of Belize's agricultural sector. In addition to these functions, the computer will service word processing needs. Operators will be trained to take advantage of this word processing capability in addition to the more technically oriented functions of the computer.

The contracted Title XII university will be responsible for procuring the computer during the first year of project activities. Unless in-house capability already exists, this university will receive training in the use of the equipment in the U.S. prior to sending the computer to Belize. Upon arrival in country, the university contractor will arrange training of GOB counterparts to develop the institutional capability needed to carry on project activities beyond the departure of the TA. Selection of the appropriate computer will be based on the following criteria: (1) compatibility with existing systems in the GOB, (2) availability of parts and servicability in Belize, and (3) ability to perform required functions to carry out project activities. Procurement preference will be given to A.I.D.'s usual manufacturer sources of IBM, Apple or Wang and will be subject to review by M/SER/IRM/MPS and M/SER/COM in AID/W.

B. Evaluation Plan

Evaluation will play a particularly important role in this project given the ongoing reorganization and decentralization of the project's main implementing agency, the MONR extension service, the special design factors built in to work with distinct cultural segments of the population, the market uncertainties surrounding the dairy component and the untested potential of the domestic meat processing industry to compete with imported substitutes.

Three evaluations will be conducted during the life of the project, with the final evaluation coinciding with the project's activity completion date (PACD) of December 1988. The first evaluation will be performed in March 1985, an estimated year after the Title XII university arrives in country. This first evaluation primarily will focus on the progress made by the contracted Title XII institution to get the following personnel, equipment and procedures in place:

- swine, forage, processing, policy analysis technical assistance in-country;
- MONR long-term training participants in animal science, forage, and agricultural economics in university training;
- construction of small dairy plant nearing completion;
- all vehicles and other equipment procured and in-country;
- GOB counterpart funds established.

The evaluation team for this first major review will consist of representatives from the MONR, USAID and the contracted Title XII university.

The second evaluation will be conducted upon completion of the market demand study for milk which is scheduled to end about May 1986. If the demand study is shortened, for example, because of evidence that the Macal Coop has developed firm and sustained markets for an output that is near plant capacity, then the evaluation will be scheduled earlier. By this time, as well, the Toledo long-term advisor should have completed the first phase of the swine improvement program in two communities and evaluation of farmer receptivity to new production techniques, use of local feedstuffs in alternative feed rations, effectiveness of participating extension officers and overall program administration, including the efficiency of the rotating fund, will be appropriate. Finally, at this point, it will be appropriate to evaluate the spread effects of the instruction and technical assistance provided by the meat processing advisor among private sector butchers and meat vendors. An outside firm will be hired to perform this indepth interim evaluation in collaboration with the MONR, USAID and contractor representatives.

The final, end-of-project evaluation will also be led by an outside firm. This evaluation will assess progress made toward achievement of the long-term project goal and success in realizing end-of-project status (EOPS) listed in Annex I, Logical Framework. Since this project represents the first concerted effort by the GOB to develop its livestock industry through a comprehensive approach, much importance will be given by the Mission to ensuring that this evaluation provide a thorough assessment of project performance.

C. Conditions and Covenants

The following conditions are essential to the proper implementation of the project.

1. As a condition precedent (CP) to disbursement of project funds related to the swine improvement component, the GOB will furnish A.I.D., in form and substance satisfactory to A.I.D., evidence that the Ladyville Abattoir and Meat Packing Plant is economically and operationally efficient and financially viable. The intent of this CP is to ensure that competent management expertise assumes charge of the plant and that the plant is operating at a level of efficiency consistent with similar plant operations in the United States. During PP development, the A.I.D. Representative and project design team had lengthy discussions with the GOB regarding the negative effects of the current operating inefficiencies on the development of Belize's livestock industry. The GOB is actively seeking a solution to this problem and currently is involved in negotiations with private individuals to manage and revitalize the plant.

Also, prior to disbursement of project funds related to the swine improvement program component, the GOB will establish a rotating fund for the provision of in-kind credit and furnish A.I.D., in form and substance satisfactory to A.I.D., operating procedures and borrower eligibility criteria for the fund.

2. Prior to disbursement of project funds related to the policy analysis and formulation component, the GOB will create a new position of policy analyst within the Office of the Minister/Permanent Secretary and provide a salary incentive sufficient to retain subject trainee in government service beyond life of in-service repayment period. (In Belize, a two year service obligation for every one year of training is required.)

3. Prior to disbursement of project funds related to the pasture improvement program component, the GOB will establish an operating expense fund at Central Farm to accelerate disbursements of operat. funds required on a short-term basis. Approval authority for drawing funds will be delegated to the Director of Central Farm.

4. Prior to disbursement of project funds for long-term training of swine and/or pasture/forage specialists, the GOB will increase, by one, the number of technical officer positions at Central Farm to ensure appropriate placement of trainees upon completion of long-term training.

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5. Prior to disbursement of project funds for long-term training of the dairy production specialist, the market demand study for fresh milk will have sufficiently progressed to where a decision regarding the advisability of investing in this specialized training at this time will be made.

6. Prior to disbursement of project funds for contracting technical assistance to assist in the pork/beef processing component, the GOB will have to provide the facilities necessary to serve as a training base for the advisor.

7. Prior to disbursement of project funds for in-country training activities by project advisors, annual training plans, prepared by these advisors, will be required to be submitted to the MONR and the A.I.D. Representative.

In addition, the GOB will be expected to covenant the following in the Project Agreement:

1. That it will have established a separate line item in the MONR annual budget for maintenance of an operating expense fund at Central Farm by year four of the project.
2. If the Macal Coop wishes to purchase the processing plant and/or milk trucks upon completion of the market demand study, that the GOB will on-lend funds to the Coop at the same terms provided under the original A.I.D. loan to the GOB.
3. That the GOB will properly maintain and make available to the extension service, for demonstration and training purposes visual materials and equipment to be provided to the Belize School of Agriculture under this project.
4. That the GOB establish a set-aside fund, to be financed from local currency generations from ESF monies, to ensure adequate GOB financing for operating and maintenance expenses of project vehicles.

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**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Life of Project: **Annex I**
From FY 83 to FY 89 page 1 of 6
Total U.S. Funding: \$1,000,000 (L) \$2,050,000 (G)
Date Prepared: JULY 13, 1983

Project Title & Number: Livestock Development # 505-0006

INSTRUCTION: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN AID TO ORGANIZING DATA FOR THE PAR REPORT. IT NEED NOT BE RETAINED OR SUBMITTED.

PAGE 1

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes: (A-1)</p> <p>To increase agricultural productivity and income among small and medium farmers in Belize.</p>	<p>Measures of Goal Achievement: (A-2)</p> <ol style="list-style-type: none"> 1) Increase agricultural national product by 50% in real terms between 1982 and 1990. 2) Increase household income of farmers owning less than 100 head of cattle or less than 30 drove of pigs. 	<p>(A-3)</p> <ol style="list-style-type: none"> 1) National Accounts data. 2) Belize household survey data. 	<p>Assumptions for achieving goal targets: (A-4)</p> <p>Agricultural development continues to be sector priority of GOB.</p> <p>Farmers are convinced of economic benefits to increasing productivity through identification of reliable markets and adequate prices for their products.</p>

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PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Annex I
Life of Project: 83 to 89 Page 2 of 6
From FY 83 to FY 89
Total U.S. Funding \$1,000,000 (L) \$2,050,000 (G)
Date Prepared: July 11, 1981

Project Title & Number: Livestock Development #505-0006

PAGE 2

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Purpose: (B-1)</p> <p>To improve small and medium farmers' production efficiencies in the rearing of livestock and to expand market outlets for these products, primarily through import substitution activities.</p>	<p>Conditions that will indicate purpose has been achieved: End-of-Project status. (B-2)</p> <ol style="list-style-type: none"> 1) Increased efficiencies in beef production and slaughtering sufficient to make Belize competitive in US deboned beef market. 2) Domestic processing capability expanded resulting in a 33% reduction in imported pork and beef products. 3) Extension service upgraded and better trained to assist farmers with improved livestock production techniques 4) Greater technical back-stopping provided by Central Farm to extension service and higher quality research conducted and demonstrated on-Farm. 5) Quality of education and academic resources offered at the BSA in livestock fields improved and number of students enrolled in livestock courses increased. 	<p>(B-3)</p> <ol style="list-style-type: none"> 1) Prices cited at the Abattoir; Annual Trade Reports citing export statistics 2) Annual Trade Reports (NOF); site visits to butcher shops 3) Site visits to recipient farmers demonstrating higher calving rates; cutting rates; 4) Site visits to Central Farm 5) Academic records of enrolled students and graduates; site visits to BSA library 6) Records of field agents; number of improved pigs being marketed 7) Records of field agents 8) Visits to MONR; new computer system being used; more policy actions being taken by MONR 9) GOB National Development Plan; discussions with MONR. 	<p>Assumptions for achieving purpose: (B-4)</p> <ol style="list-style-type: none"> 1) Ladyville Abattoir, the country's major slaughter and meat packing facility, is technically and operationally efficient. 2) Quality of processed product is competitive with imported substitute; import regulations do not preclude price competition by domestic products; retailers willing to promote "Belizean" products 3) GOB priority to strengthen extension service continues; CAEP project successfully decentralizes field staff and GOB provides adequate logistical and infrastructure support to zonal officers. 4) GOB increases livestock officer staff appropriately and makes operational funds available to carry out research/demonstration activities. 5)

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PROJECT DESIGN SUMMARY
 LOGICAL FRAMEWORK

Life of Project: Annex I
 From FY 83 to FY 89 page 3 of 6
 Total U.S. Funding \$1,000,000 (L) \$2,050,000 (G)
 Date Prepared: JULY 13, 1983

Project Title & Number: Livestock Development #505-0006

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Purpose: (B-1)</p>	<p>Conditions that will indicate purpose has been achieved: End-of-Project status. (B-2)</p> <p>6) Number of farmers engaged in intensive swine production increased to about 850.</p> <p>7) Number of farmers engaged in pasture improvement increased by 250 over life of the project.</p> <p>8) Improved capability within the MONR to analyze agricultural policy issues and formulate sound policy actions.</p> <p>9) GOB policies and strategies related to development of a national dairy industry formulated based on a sound analysis of the potential size of the market for fresh milk.</p>	<p>(B-3)</p>	<p>Assumptions for achieving purpose: (B-4)</p> <p>6) Decentralization of extension agents into zones successfully implemented under CAEP; Toledo farmers are receptive to new swine production techniques.</p> <p>7) Decentralization of extension agents into zones successfully implemented under CEEP; technologies to be extended can be affordably implemented by small/medium ranchers.</p> <p>8) GOB creates new policy analyst position within office of the Minister and offers adequate salary incentive to retain qualified personnel</p> <p>9) Project market study successfully completed and findings accepted and used by GOB.</p>

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PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Annex I
page 4 of 6

Life of Project:
From FY 83 to FY 89
Total U.S. Funding \$1,000,000 (L) \$2,050,000(G)
Date Prepared: July 13, 1983

Project Title & Number: Livestock Development #505-0006

NARRATIVE SUMMARY	OBJECTIVELY MEASURABLE INDICATORS	EVIDENCE	ASSUMPTIONS FOR ACHIEVING OUTPUTS
<p>(C-1)</p> <ol style="list-style-type: none"> 1) Extension officers trained in pasture improvement and intensive swine production 2) Dairy processing plant constructed and operating 3) Market demand analysis for fresh milk completed and findings compiled 4) Physical plant and instructional support expanded at BSA 5) Private livestock producers/butchers trained in meat processing techniques 6) Establishment of special fund at Central Farm 7) Policy analysis unit established in office of Minister/Permanent Secretary of MONR 8) Trained MONR staff in specialized livestock subsectors and agricultural economic 	<p>(C-2)</p> <p>Magnitude of Output:</p> <ol style="list-style-type: none"> 1) 34 zonal officers and 16 district officers; 4 ST observational trips taken by groups of 9 during use of project 2) One small plant in Cayo district, Belize's major dairy area. 3) Study conducted in Belize city, Belmopan and 4 secondary towns 4) 1 new conference/classroom; library holdings increased by 25%; supply of teaching materials/equipment increased for use on-campus, Central Farm and in the field 5) About 30 butchers and meat vendors to receive training 6) 1 operating expense fund 7) 1 new policy analyst position created in MONR. 8a) MONR receiving U.S. BSc degrees: <ul style="list-style-type: none"> 1 in animal science/swine production 1 in agronomy/forage production 	<p>(C-3)</p> <ol style="list-style-type: none"> 1) Field inspections 2) Site inspection 3) Final study report; data collections 4) Site visits 5) Visits to butcher shops 6) MONR annual report of revenues and expenditures 7) MONR staffing pattern; 8) Personnel files; academic reports from host U.S. universities 	<p>(C-4)</p> <p>Assumptions for achieving outputs:</p> <ol style="list-style-type: none"> 1) T.A. arrives in country and is made accessible to field staff 2) Equipment arrives in-country 3) T.A. arrives in country Macal Coop cooperates in study and MONR assigns counterpart to work with T.A. 4) Materials arrive in-country 5) GOB furnishes training site 6) GOB agrees to decentralize funding procedures and approval authority 7) Exception made to current GOB hiring freeze 8a-c) GOB grants approval to allow MONR staff to participate in long-term training overseas

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ADB 1022-10 (1-78)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Livestock Development #505-0006

Life of Project:
From FY 83 to FY 89
Total U.S. Funding \$1,000,000 (L) \$2,050,000 (G)
Date Prepared: July 13, 1983

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	ASSUMPTIONS	ASSUMPTIONS FOR ACHIEVING OUTPUTS
Project Outputs: (C-1)	<p>Magnitude of Output: (C-2)</p> <ul style="list-style-type: none"> 1 in dairy production, assuming market study results so warrant. b) 1 MONR staff trained to MA level in agricultural economics c) 1 MONR staff trained to PHD level in agricultural economics d) 2 MONR staff trained in ST programs at CATIE, CIAT. 	(C-3)	Assumptions for achieving outputs: (C-4)

Best Available Document

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PROJECT DESIGN SUMMARY
 LOGICAL FRAMEWORK

Life of Project:
 From FY 83 to FY 89
 Total U.S. Funding \$1,000,000 (L) \$2,050,000 (G)
 Date Prepared: July 17, 1983

Project Title & Number: Livestock Development #505-0006

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS			MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	Implementation Target (Type and Quantity) (D-2)				
Project Inputs: (D-1)	Loan	A.I.D. Grant	GOB	Private Sector	
Technical Assistance					
Long - term		1,410			
Short - term	20	200		Review of project financed records, vouchers, etc.	Inputs are provided on a timely basis; no unanticipated delays in meeting CPs set forth in project agreements
Training					
Long - term	200				
Short - term	100				
Equipment/Vehicles	430		10		
Operating Costs					
- Salaries			300		
- Central Farm/Zone Activities			570		
- Vehicle Operation & Maintenance			60		
- Dairy Study and Plant		140		30	
Evaluations	70				
Inflation	100	250	160	-	
Contingencies	80	50	50	-	
Total	\$3,000	\$2,050	\$1,150	\$30	

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ORIGIN OFFICE LADR-03
INFO AALA-01 LADP-03 PDPR-01 PPPB-02 GC-01 GCLA-03 GCFL-01
STAG-02 STPO-03 SAST-01 AGRI-01 STFA-01 LAB-05 RELO-01
MAST-01 LACA-03 WAB-01 /034 AB

INFO OCT-80 ARA-00 OES-09 /060 R

DRAFTED BY AID/LAC/DR: KPEAKE: ATB
APPROVED BY AID/AA/LAC: OJREICH
AID/LAC/DR: IALEVY
AID/GC/LAC: PJOHNSON (DRAFT)
AID/LAC/DR: CCONNOLLY
AID/PPC/PDPR/RO: ELIJEWSKI (DRAFT)
AID/LAC/DP: DBROOME DRAFT;
AID/ST/AGR: MGDODVIN INFO;
AID/DAA/LAC: MDBROWN
AID/LAC/DR: DBJOHNSON
AID/LAC/ M: JCONNOLLY DRAFT
AID/LAC/DR: RHINOJOSA DRAFT
AID/ST/AGR: MGDODVIN INFO
AID/ST/AGR: MPVARREN DRAFT
AID/LAC/CAR: JFRANCIS DRAFT

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TAGS:

SUBJECT: BELIZE LIVESTOCK DEVELOPMENT PID GUIDANCE CABLE
1. THE SUBJECT PID WAS REVIEWED AND APPROVED AT THE DAEC
REVIEW ON APRIL 22, 1983. THE MISSION MAY PROCEED WITH
INTENSIVE REVIEW TAKING INTO CONSIDERATION THE FOLLOWING
QUESTIONS AND GUIDANCE.

2. PROJECT RATIONALE: THE PID IMPLIES THAT BELIZE'S
GREATEST AGRICULTURAL OPPORTUNITIES LIE IN LIVESTOCK
DEVELOPMENT. THE PP SHOULD DISCUSS THE BASIS FOR THIS
DETERMINATION NOTING STUDIES AND ANALYSES DONE ON
BELIZE'S LIVESTOCK SECTOR AND RELATED ACTIVITIES CARRIED
OUT BY OTHER DONORS AND SOURCES. THE PID STATES THAT
THIS PROJECT WILL ESTABLISH THE BASE FOR IMPORT
SUBSTITUTION AND, OVER THE LONG TERM, THE EXPORT OF
LIVESTOCK PRODUCTS. WHAT IS THE BASIS FOR ASSUMING THAT
THIS OBJECTIVE WILL BE ACHIEVED BOTH IN TERMS OF BELIZE'S
IMPORT-SUBSTITUTION AND EXPORT COMPETITIVENESS AND THE
POTENTIAL DEMAND FOR ITS PRODUCTS IN THE WORLD MARKET?

3. GOAL AND PURPOSE: PROJECT GOAL AND PURPOSE
STATEMENTS SHOULD BE REVISED TO (A) REFLECT THAT THE
PROPOSED FIVE YEAR PROJECT IS PHASE ONE OF A TWO PHASE
EFFORT THE PP SHOULD GENERALLY DESCRIBE WHAT WOULD BE
ANTICIPATED IN THE SECOND PHASE, BUT JUSTIFICATION FOR
THE FIRST PHASE SHOULD STAND ON ITS OWN SINCE FUNDING FOR
PHASE TWO CANNOT BE ASSURED. (B) GENERALLY IDENTIFY THE
INTENDED TARGET GROUP AND THE BENEFITS TO FLOW TO THAT
GROUP (SEE PARA. 8 BELOW); AND (C) FURTHER CLARIFY THE
PROJECT PURPOSE. GIVEN THE NUMBER OF PURPOSES CITED IN
THE PID, THE MAJOR THRUST OF THE PROJECT WAS UNCLEAR AT
THE DAEC REVIEW. PURPOSES SHOULD BE PRIORITIZED.

4. CONSTRAINTS: THE PID STATES THAT "THE
PROJECT WILL ADDRESS THE MAJOR CONSTRAINTS CONFRONTING
THE LIVESTOCK SECTOR." THE INTENSIVE REVIEW SHOULD

ANALYZE WHETHER IT IS FEASIBLE FOR THIS PROJECT TO
ADDRESS ALL OF THESE CONSTRAINTS OR WHETHER A narrower
PROJECT FOCUS SHOULD BE PURSUED. IN PARTICULAR, THE PP
SHOULD RESPOND TO THE FOLLOWING SPECIFICS RELATED TO
IDENTIFICATION AND ANALYSIS OF CONSTRAINTS IN EACH OF THE
LIVESTOCK SUBSECTOR COMPONENTS:

-- A) CATTLE - WHAT FACTORS CURRENTLY HINDER BELIZE
FROM DEVELOPING A DOMESTIC BEEF PROCESSING INDUSTRY? HOW
MUCH FOREIGN EXCHANGE SAVINGS COULD THIS GENERATE THROUGH
IMPORT SUBSTITUTION? IN ADDITION TO THE PROBLEMS
ASSOCIATED WITH THE COUNTRY'S MAJOR ABATTOIR, WHAT OTHER
CONSTRAINTS MUST BE ADDRESSED IN ORDER FOR BELIZE TO
EFFECTIVELY COMPETE IN THE BEEF EXPORT MARKET?

-- IN LIGHT OF THE ABATTOIR'S IMPORTANCE IN THE BEEF
AND PORK MARKETING SYSTEM, ITS TECHNICAL SOUNDNESS AND
OPERATIONAL EFFICIENCY WILL BE A CONDITION PRECEDENT TO
OBLIGATION OF PROJECT FUNDS.

-- IS THERE A LABOR/CREDIT CONSTRAINT TO IMPROVING
PASTURE AMONG SMALL/MEDIUM PRODUCERS?

-- B) SWINE - HOW WILL THE HIGH COST OF COMMERCIAL
FEED, HIGHLIGHTED BY THE WINROCK GROUP AND WORLD BANK AS
ONE OF THE MAJOR FACTORS IN THE DECLINE OF THE SWINE
INDUSTRY SINCE 1972, BE DEALT WITH THROUGH THIS PROJECT
OR OUTSIDE ACTIVITIES?

-- C) DAIRY - WHAT ARE THE CONSTRAINTS RELATED TO THE
LABOR/MANAGEMENT/CREDIT ASPECTS OF SUCCESSFUL DAIRY
FARMING AND MILK COLLECTION, PROCESSING, AND DISTRIBUTION

IN BELIZE?

5. SCOPE AND FEASIBILITY OF DAIRY COMPONENT: IT WAS
DECIDED AT THE DAEC REVIEW THAT A I.D. WAS NOT PREPARED
TO MOVE FULLY INTO FINANCING DAIRY ACTIVITIES UNTIL A
MARKET DEMAND ANALYSIS FOR FRESH PROCESSED MILK IN BELIZE
WAS UNDERTAKEN. THEREFORE, THE PURPOSE OF THE PROPOSED
DAIRY COMPONENT UNDER THIS PROJECT SHOULD BE TO TEST THE
DOMESTIC MARKET IN DIFFERENT AREAS OF THE COUNTRY AND
WITHIN DIFFERENT SEGMENTS OF THE POPULATION TAKING INTO
CONSIDERATION THE FOLLOWING FACTORS: 1, PRESENT AND
PROJECTED PRICE COMPETITIVENESS OF DOMESTICALLY PRODUCED
FRESH PROCESSED MILK VERSUS IMPORTED SUBSTITUTES, 2,
PERCENTAGE OF THE POPULATION WITH REFRIGERATORS TO STORE
FRESH MILK, AND 3; CONSUMER PREFERENCES FOR THE VARIOUS
MILK-PRODUCT ALTERNATIVES, INCLUDING ULTRA HIGH
TEMPERATURE MILK, WITHIN A I.D.'S TARGET GROUP. IN
STRUCTURING A COMPONENT TO TEST THE MARKET, THE PP
DEVELOPMENT TEAM SHOULD EXAMINE THE ALTERNATIVES TO
ESTABLISHING A NEW DAIRY PROCESSING PLANT AS PROPOSED IN
THE PID. ONE SUCH ALTERNATIVE MAY BE TO EXPAND THE
EXISTING MENNONITE OPERATION NOW PROCESSING FRESH MILK
IN-COUNTRY. IF THIS OR OTHER ALTERNATIVES ARE NOT
DETERMINED FEASIBLE DURING THE INTENSIVE REVIEW, PROJECT
FUNDING FOR A NEW FACILITY WILL BE APPROVED ONLY TO THE
EXTENT THAT THIS ACTIVITY LEADS TO CONCLUSIONS ABOUT
POTENTIAL MARKET DEMAND. UNTIL SUCH TIME THAT THIS
MARKET TEST IS CARRIED OUT, NO ASSUMPTIONS ABOUT JOINT
DAIRY/BEEF PRODUCTION SYSTEMS SHOULD BE MADE IN THE
DESIGN OF OTHER PROJECT ACTIVITIES.

6. ECONOMIC ANALYSES: THE ECONOMIC ANALYSIS SECTION
SHOULD EVALUATE THE PROPOSED PROJECT INVESTMENT IN THE
CATTLE AND SWINE COMPONENTS ON TWO LEVELS: (A) IN A
MACROECONOMIC SENSE IN TERMS OF FOREIGN EXCHANGE IMPACTS
AND (B) IN A MICROECONOMIC SENSE BY ANALYZING A FEW
REPRESENTATIVE FARMS AND PROJECTING COSTS AND FUTURE

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BENEFITS TO THE INDIVIDUAL FARMERS GENERATED BY THE ON-FARM IMPROVEMENTS RESULTING FROM THIS PROJECT.

7. PROJECT INPUTS: BASED ON A THOROUGH CONSTRAINTS ANALYSIS, THE PP DEVELOPMENT TEAM SHOULD RE-EXAMINE WHETHER THE TWO MAJOR INPUTS, TECHNICAL ASSISTANCE AND TRAINING, WILL BE SUFFICIENT TO TACKLE THESE CONCERNS OR WHETHER OTHER COMPLEMENTARY INPUTS SHOULD BE DESIGNED INTO THE PROJECT. FOR EXAMPLE, WILL CREDIT BE REQUIRED BY SMALL/MEDIUM PRODUCERS TO FULLY

BENEFIT FROM THE DISSEMINATION OF NEW TECHNOLOGIES AND MANAGEMENT PRACTICES PROPOSED UNDER THIS PROJECT, PARTICULARLY IN RELATION TO IMPROVING PASTURE AND IMPROVING SWINE STOCK? IF IT IS DETERMINED THAT INPUTS OTHER THAN THOSE PROPOSED IN THE PID WILL BE NEEDED, THE PP SHOULD DISCUSS THE PHASING OF THESE INPUTS OVER THE LIFE OF THE PROJECT. IN ADDITION, THE FINANCIAL ANALYSIS SHOULD SHOW HOW THE REQUIRED 25 PERCENT GOB COUNTERPART CONTRIBUTION WILL BE BROKEN DOWN BY MAJOR INPUTS.

8. PROJECT BENEFICIARIES: IT IS UNCLEAR FROM THE PID WHO WILL BENEFIT FROM THIS PROJECT EXCEPT IN THE VERY GENERAL SENSE OF SMALL/MEDIUM LIVESTOCK PRODUCERS. THE PP SHOULD ELABORATE ON THIS TARGET GROUP AND PROVIDE INFORMATION ON THE NUMBER OF BENEFICIARIES, THEIR SOCIO-ECONOMIC PROFILES, AND HOW THEY WILL BE FURTHER INTEGRATED INTO THE LIVESTOCK PRODUCTION AND MARKETING SYSTEMS. FOR EXAMPLE, TO WHAT EXTENT WILL SMALL/MEDIUM CATTLE PRODUCERS BE ABLE TO COMPETE WITH LARGE RAUNCHERS BY IMPROVING THEIR MANAGEMENT PRACTICES AND PRODUCTIVITY THROUGH THIS PROJECT? ALSO, THE PP SOCIAL SOUNDNESS ANALYSIS SHOULD TAKE A CLOSE LOOK AT PAST EFFORTS TO IMPROVE THE LIVELIHOOD OF THE TRADITIONAL INDIAN POPULATION IN THE TOLEDO DISTRICT OF BELIZE, WHICH POTENTIALLY ACCOUNTS FOR A SIGNIFICANT PORTION OF THIS PROJECT'S TARGET GROUP. FINALLY, RELATED TO PARA. 5 ABOVE, WHO WILL BE THE CONSUMER BENEFICIARIES OF THE PROPOSED DAIRY COMPONENT?

9. PRIVATE SECTOR PARTICIPATION: THE ONLY DEFINED PRIVATE SECTOR ROLE DISCUSSED IN THE PID IS THE PARTICIPATION OF THE MACAL DAIRY COOPERATIVE. THE PP SHOULD PROVIDE BACKGROUND INFORMATION ABOUT THIS COOP, AND SHOULD DISCUSS THE POTENTIAL FOR OTHER PRIVATE SECTOR INVOLVEMENT, PARTICULARLY IN MEAT PROCESSING. IF APPROPRIATE, THE MISSION SHOULD SEEK GUIDANCE FROM ORGANIZATIONS SUCH AS LAAD IN DECIDING HOW TO PROCEED WITH THIS ACTIVITY. ONLY WITH A VERY STRONG JUSTIFICATION WOULD FINANCING OF PROCESSING ACTIVITIES WITH PROJECT FUNDS BE APPROVED. FINALLY, THE PP DEVELOPMENT TEAM SHOULD EXPLORE HOW, IF AT ALL, THE BELIZE LIVESTOCK PRODUCERS ASSOCIATION (BLPA) COULD BE INTEGRATED INTO THE PROJECT. WHAT EFFECT WILL THE BLPA HAVE ON THE DEVELOPMENT OF BELIZE'S CATTLE INDUSTRY, INTEGRATED OR NOT INTO THIS PROJECT? TO WHAT

EXTENT COULD THE BLPA SERVE AS A TECHNOLOGICAL RESOURCE FOR SMALL/MEDIUM PRODUCERS?

10. EXTENSION SERVICE: PROJECT SUCCESS WILL LARGELY DEPEND ON THE CALIBER OF THE EXTENSION SERVICE AND THEIR EFFECTIVENESS IN DISSEMINATING NEW TECHNOLOGIES AND MANAGEMENT PRACTICES TO THE SMALL/MEDIUM PRODUCERS. THE INSTITUTIONAL ANALYSIS SHOULD EXAMINE THE CAPABILITIES OF THIS SERVICE TO CARRY OUT ITS ROLE AS ENVISAGED UNDER THE PROJECT AND DEMONSTRATE HOW THIS PROJECT ADDRESSES ITS MAJOR WEAKNESSES AS IDENTIFIED DURING THE INTENSIVE REVIEW.

11. GOVERNMENT SERVICES: EXCEPT FOR GOB POLICY ANALYSIS AND FORMULATION, WHICH CUT ACROSS ALL PROJECT COMPONENTS, ACTIVITIES UNDER THE GOVERNMENT SERVICES COMPONENT SHOULD BE INTEGRATED INTO THE APPROPRIATE LIVESTOCK COMPONENT, I.E., CATTLE, SWINE, AND POSSIBLY DAIRY. THE PP ALSO SHOULD PROVIDE ADEQUATE JUSTIFICATION FOR FINANCING THE EXPANSION AND UPGRADING OF THE BELIZE AGRICULTURAL COLLEGE.

12. TRAINING COMPONENT: THE PP SHOULD CLARIFY WHO AND HOW MANY WILL RECEIVE TRAINING UNDER THIS PROJECT. TO THE EXTENT FEASIBLE, IN-COUNTRY AND THIRD-COUNTRY TRAINING IN OTHER LATIN AMERICAN COUNTRIES SHOULD BE GIVEN FIRST CONSIDERATION AS THE MOST COST-EFFECTIVE APPROACH TO MEETING TRAINING NEEDS.

13. PROJECT EVALUATION: EVALUATION WILL BE A PARTICULARLY IMPORTANT COMPONENT OF THIS PROJECT GIVEN THE EXPERIMENTAL NATURE OF SOME OF THE ACTIVITIES PROPOSED. THUS, BUDGETING SUFFICIENT RESOURCES FOR A PLAN THAT INCLUDES PERIODIC EVALUATIONS OVER THE LIFE OF THE PROJECT SHOULD BE ENSURED.

14. CONTRACT WITH NEIFER PROJECT INTERNATIONAL (NPI); IF IT IS ANTICIPATED THAT A WAIVER OF COMPETITION WILL BE SOUGHT IN ORDER TO CONTRACT WITH NPI, JUSTIFICATION FOR THIS WAIVER SHOULD BE PRESENTED IN THE PP.

15. FYI: ALL LAC MISSION PID APPROVALS ARE SUBJECT TO BUREAU REVALIDATION IF POST-PID PROJECT DEVELOPMENT PROCESS EXTENDS BEYOND ONE YEAR. END FYI. SHULTZ

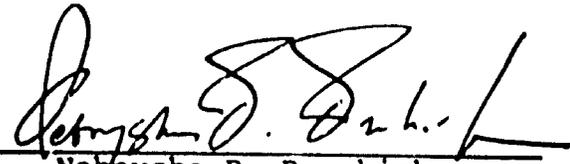
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CERTIFICATION PURSUANT TO
SECTION 611(e) OF THE
FOREIGN ASSISTANCE ACT OF 1981
AS AMENDED

I, Neboysha R. Brashich, the principal officer of the Agency for International Development in Belize, certify that to the best of my knowledge and belief, Belize possesses both the financial capability and human resources to effectively utilize and maintain goods and services procured under the proposed capital assistance loan and grant project entitled, Livestock Production.

This judgment is based on the performance and capabilities of the Ministry of Natural Resources in Belize and the general lending criteria and operating procedures which have been negotiated for this project.



Neboysha R. Brashich
A.I.D. Representative
Belize

July 25, 1983



Press Encls 11/1/83(39)

Office Of The Prime Minister

*Belmopan,
Cayo District, Belize
Central America*

21 July 1983

Mr. Neboysha R. Brashich
A.I.D. Representative
U.S.A.I.D. Mission to Belize
American Embassy
Belize City

Dear Mr. Brashich,

On behalf of the Government of Belize, I hereby request the Agency for International Development to provide a grant of two million United States Dollars and extend a loan of one million United States Dollars, on the most concessional terms possible, to the Ministry of Natural Resources.

This grant/loan will be used to address constraints confronting the livestock sector in Belize, and stimulate production and marketing efficiencies that will result in foreign exchange savings through import substitution activities; employment opportunities through new production and processing activities; and consumer benefits through lower prices for livestock products.

My Government welcomes this assistance from A.I.D., and we look forward to an early negotiation of an Agreement covering this requested assistance.

Sincerely,

(GEORGE PRICE)
Prime Minister

AID HANDBOOK 5, App 5M	TRANS. MEMO NO. 3:43	EFFECTIVE DATE September 30, 1982	PAGE NO. 5M-3
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5C(1.) - COUNTRY CHECKLIST

Listed below are statutory criteria applicable generally to FAA funds, and criteria applicable to individual fund sources: Development Assistance and Economic Support Fund.

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

- 1. FAA Sec. 481. Has it been No.
determined that the government of the recipient country has failed to take adequate steps to prevent narcotic drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?

- 2. FAA Sec. 620(c). If No.
assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) the debt is not denied or contested by such government?

3. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities? No.

4. FAA Sec. 532(c), 620(a), 620(f), 620D; FY 1982 Appropriation Act Secs. 512 and 513. Is recipient country a Communist country? Will assistance be provided to Angola, Cambodia, Cuba, Laos, Vietnam, Syria, Libya, Iraq, or South Yemen? Will assistance be provided to Afghanistan or Mozambique without a waiver? No.
No.
No.

5. ISDCA of 1981 Secs. 724, 727 and 730. For specific restrictions on assistance to Nicaragua, see Sec. 724 of the ISDCA of 1981. For specific restrictions on assistance to El Salvador, see Secs. 727 and 730 of the ISDCA of 1981. --

6. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction by mob action of U.S. property? No.

- 7. FAA Sec. 620(l). Has the country failed to enter into an agreement with OPIC? No.

- 8. FAA Sec. 620(o); Fishermen's Protective Act of 1967, as amended, Sec. 5. (a) Has the country seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters? No.

(b) If so, has any deduction required by the Fishermen's Protective Act been made?

- 9. FAA Sec. 620(g); FY 1982 Appropriation Act Sec. 517. (a) Has the government of the recipient country been in default for more than six months on interest or principal of any AID loan to the country? (b) Has the country been in default for more than one year on interest or principal on any U.S. loan under a program for which the appropriation bill appropriates funds? No.

- 10. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the amount of foreign exchange or other resources which the country has spent on military equipment? (Reference may be made to the annual "Taking into Yes, taken into account by the Administrator at time of approval of Agency OYB.

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Consideration' memo:
 'Yes, taken into account
 by the Administrator at
 time of approval of
 Agency OYB.' This
 approval by the
 Administrator of the
 Operational Year Budget
 can be the basis for an
 affirmative answer during
 the fiscal year unless
 significant changes in
 circumstances occur.)

11. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? No.
12. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget? (Reference may be made to the Taking into Consideration memo.) Current.
13. FAA Sec. 620A; FY 1982 Appropriation Act Sec. 520. Has the country aided or abetted, by granting sanctuary from prosecution to, any individual or group which has committed an act of international terrorism? Has the country aided or

- abetted, by granting sanctuary from prosecution to, any individual or group which has committed a war crime? No.
14. FAA Sec. 666. Does the country object, on the basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. who is present in such country to carry out economic development programs under the FAA? No.
15. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it transferred a nuclear explosive device to a non-nuclear weapon state, or if such a state, either received or detonated a nuclear explosive device, after August 3, 1977? (FAA Sec. 620E permits a special waiver of Sec. 669 for Pakistan.) No.
16. ISDCA of 1981 Sec. 720. Was the country represented at the Meeting of Ministers of Foreign Affairs and Heads of Delegations of the Non-Aligned Countries to the 36th General Session of the General Assembly of the U.N. of Sept. 25 and 28, 1981, and failed No.

to disassociate itself from the communique issued? If so, has the President taken it into account? (Reference may be made to the Taking into Consideration memo.)

- 17. ISDCA of 1981 Sec. 721. --
See special requirements for assistance to Haiti.

B. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria.

a. FAA Sec. 116. Has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, can it be demonstrated that contemplated assistance will directly benefit the needy? No.

2. Economic Support Fund Country Criteria

a. FAA Sec. 502B. Has it been determined that the country has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, has the country made such significant improvements in its human rights record that furnishing such assistance is in the national interest? --

b. ISDCA of 1981, Sec. 725(b). If ESF is to be furnished to Argentina, has the President certified that (1) the Govt. of Argentina has made significant progress in human rights; and (2) that the provision of such assistance is in the national interests of the U.S.?

c. ISDCA of 1981, Sec. 726(b). If ESF assistance is to be furnished to Chile, has the President certified that (1) the Govt. of Chile has made significant progress in human rights; (2) it is in the national interest of the U.S.; and (3) the Govt. of Chile is not aiding international terrorism and has taken steps to bring to justice those indicted in connection with the murder of Orlando Letelier?

5C(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 Funds, B.2. applies to projects funded with Development Assistance loans, and B.3. applies to projects funded from ESP.

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

A. GENERAL CRITERIA FOR PROJECT

- 1. FY 1982 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b).

(a) Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that amount)?

By Advice of Program Change forward to Congress March 15, 1983.

Yes.

- 2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,00, will there be

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- (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? Yes.
- (b) a reasonably firm estimate of the cost to the U.S. of the assistance? Yes.
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? None required.
4. FAA Sec. 611(b); FY 1982 Appropriation Act Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973? (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? --

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.

No.

This project will have little effect on regional development programs.

7. FAA Sec. 601(a). Information and conclusions whether project 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, as exports of beef products to CARICOM and U.S. markets increase.

b) Yes, through training of private meat butchers in processing activities and thereby increasing the number with processing capabilities.

c) Yes, private sector dairy cooperative will be major implementor of dairy component.

d) Yes, through increasing number of butchers with processing expertise and establishing second dairy processing plant in Belize.

e) Yes, through improved production techniques in livestock production

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).

U.S. private sector will participate as source of technical assistance for meat and dairy processing activities.

10/1

- 9. FAA Sec. 612(b), 636(b);
FY 1982 Appropriation
Act 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.

All local currency costs will be
financed by host-country contribution.

- 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 1982 Appropriation Act
Sec. 521. 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.

Yes.

the project or program take into consideration the problem of the destruction of tropical forests?

Yes.

14. FAA 121(d). If a Sabel 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)?

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B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b), 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

- a) Yes, in all production-related activities small and medium farmers in rural Belize will participate fully in implementation of improved production systems for swine, beef and dairy cattle.
- b) Yes, small dairy cooperative will be assisted by one long-term advisor.

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; and (e) utilize and encourage regional cooperation by developing countries?

- c) Yes, Belize's extension service will be primarily responsible for carrying out project activities.
- d) Yes, particularly through their participation in swine production.
- e) This project will have little regional effect.

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, particularly in use of local materials to build one new facility and construct pens, feeders and water systems for swine production. Also, local feeds for pigs will be experimented with.

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.

e. FAA Sec. 110(b).
Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"? (M.O. 1232.1 defined a capital project as "the construction, expansion, equipping or alteration of a physical facility or facilities financed by AID dollar assistance of not less than \$100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character.

No.

f. 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.

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

The project has been designed to take into consideration the particular socio-cultural needs of the various participating ethnic populations in Belize, capitalizes upon capabilities within the Ministry of Natural Resources (MONR) and provides specific technical and economic training of MONR staff in areas of limited capability.

institutional development;
and supports civil
education and training in
skills required for
effective participation in
governmental processes
essential to self-government.

Training and technical assistance
are the two major project inputs.

2. Development Assistance Project
Criteria (Loans Only)

a. FAA Sec. 122(b).
Information and conclusion
on capacity of the country
to repay the loan, at a
reasonable rate of interest.

GOB capable of loan repayment at
25 year term with 10 year grace,
at interest rate of 2% during
grace and 3% thereafter.

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?

--

c. ISDCA of 1981, Sec. 724
(c) and (d). If for
Nicaragua, does the loan
agreement require that the
funds be used to the
maximum extent possible for
the private sector? Does
the project provide for
monitoring under FAA Sec.
624(g)?

--

3. Economic Support Fund
Project Criteria

a. FAA Sec. 531(a). Will
this assistance promote
economic or political

v 11.

- stability? To the extent possible, does it reflect the policy directions of FAA Section 102? Yes.
Yes.
- b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities? No.
- c. FAA Sec. 534. Will ESP funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives? No.
- 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? --

LAC/DR-IEE-83-31

ENVIRONMENTAL THRESHOLD DECISION

Project Location : Belize

Project Title and Number : Livestock Production (#505-0006)

Funding : Loan \$1.75KK, Grant \$2.0KK

Life of Project : 5 years

IEE Prepared by : Gene Miller, LAC/DR/RD

Recommended Threshold Decision : Negative Determination

Bureau Threshold Decision : Concur with Recommendation

Copy to : Neboysa Brashich, Mission Director

Copy to : Karen Peake, LAC/DR

Copy to : Jack Francis, LAC/CAR

Copy to : IEE File

James S. Hester Date *25 April 1983*

James S. Hester
Chief Environmental Officer
Bureau for Latin America
and the Caribbean

INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Belize

Project Title: Livestock Development

Project Number:

Life of Project: 5 years

IEE Prepared by: Gene Miller, LAC/DR/RD

Cleared by: Environmental Officer

Date:

Action Recommended: Negative Determination

Concurrence N. R. Brashich
AID Representative

Date: _____

Initial Environmental Examination

1. Project Description

The purpose of this project is to make maximum use of the agricultural resources, especially the livestock and resource base; provide a means whereby the small landholder can be integrated into the system; upgrade certain facets of the existing marketing system; and provide support and assistance to the GOB to accomplish the purposes listed above. The strategy of the project is to assist and support public and private entities to address critical constraints confronting the livestock industry.

2. Project Environmental Considerations

Environmental considerations under the project will be minimal as the interventions will be manifested in the provision of technical assistance and training. Construction activities are limited to three components of the project. They are: (1) up to 10 small livestock holding pens for assembly and sale of livestock. The facilities are of simple design and will require little site preparation; (2) Some small scale milk cooling/receiving facilities may be established, but they will again have little environmental impact. Along with this project component a small pilot milk processing plant is planned - with little potential negative environmental impact; and (3) Possibly some assistance being provided for on-farm construction of a limited number of village/community demonstration units for swine production.

The chief environmental concerns in Belize are deforestation-reforestation and resettlement. In most areas that are accessible to the logging industry nearly all marketable species of logwood, mahogany, and pine have disappeared. Progress in reforestation has been limited, and hampered by the loss of extensive areas of coastal forest to hurricanes. The relocation of the country's capital city from Belize to Belmopan, and the expected population surge to Belmopan may create an undesirable impact on the environment.

Another potential serious environmental problem will undoubtedly be mitigated by the introduction of modern technology. This combined with the small population base will slow settlement on marginal or unsuitable agricultural lands. Chemical pest control in agriculture could impose a threat on the environment.

Geographical Regions. Belize has three distinct geographical regions which are described as follows:

- 1) the flat northern half, which is the driest, the most densely populated, and the most important for agriculture;
- 2) the southeastern coastal strip, which consists primarily of swamps, and is the second most populous region; and
- 3) the central-southern mountain region which is forested, very sparsely populated, and contains approximately 40 percent of the total land area.

Climate. The climate of Belize is tropical with rainfall that is seasonal and varies considerably from one part of the country to another. Temperature is determined primarily by elevation rather than time of year.

Population. The population in 1980 was estimated at approximately 150,000, with an average density of 6.3 persons per sq. km. About 69 percent of the population lives in rural areas.

Land Use. Land use trends show a decreasing exploitable forest base and an increase in the amount of land under cultivation or permanent pasture. Less than 10 percent of agricultural land is under cultivation.

Water Resources. Water resource data are very incomplete. Water use for irrigation, drinking, industrial supply, hydroelectric generation, or of available groundwater or streams discharge is not known.

Vegetation. Although the flora is still completely known there are possibly 4,000 vascular plant species in Belize; a large number considering the size of the country. Agricultural crops of importance are sugarcane, citrus, beans, banana, rice and corn.

As stated earlier, this project will have little environmental impact primarily because the project is not designed to increase agricultural production per se, i.e., through land exploitation. The project focuses on inefficiencies, primarily at the marketing level. Extension activities also stress improved practices and a better understanding of the production/environmental relationship. A negative determination is therefore recommended.

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Identification
and Evaluation^{1/}

Impact Areas and Sub-areas

A. LAND USE

- | | | |
|--|-------|-------|
| 1. Changing the character of the land through: | | |
| a. Increasing the population | _____ | N |
| b. Extracting natural resources | _____ | N |
| c. Land clearing | _____ | N |
| d. Changing soil character | _____ | N |
| 2. Altering natural defenses | _____ | N |
| 3. Foreclosing important uses | _____ | N |
| 4. Jeopardizing man or his works | _____ | N |
| 5. Other factors | _____ | N |
| Increasing Land Productivity | _____ | M+ |
| _____ | _____ | _____ |

B. WATER QUALITY

- | | | |
|-----------------------------------|-------|-------|
| 1. Physical state of water | _____ | N |
| 2. Chemical and biological states | _____ | N |
| 3. Ecological balance | _____ | N |
| 4. Other factors | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

1/ We use the following symbols:

- | | |
|--|---|
| N = <u>No</u> environmental Impact | U = <u>Unknown</u> environmental impact |
| L = <u>Little</u> environmental impact | + = <u>Beneficial</u> impact |
| M = <u>Moderate</u> environmental impact | - = <u>Negative</u> impact |
| H = <u>High</u> environmental impact | |

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1. Air additives	_____	N
2. Air pollution	_____	N
3. Noise pollution	_____	N
4. Other factors	_____	

D. NATURAL RESOURCES

1. Diversion, altered use of water	_____	N
2. Irreversible, inefficient commitments	_____	N
3. Other factors		
Deforestation	_____	L+

E. CULTURAL

1. Altering physical symbols	_____	N
2. Dilution of cultural traditions	_____	N
3. Other factors		

F. SOCIOECONOMIC

1. Changes in economic/employment patterns	_____	N
2. Changes in population	_____	N
3. Changes in cultural patterns	_____	N
4. Other factors		

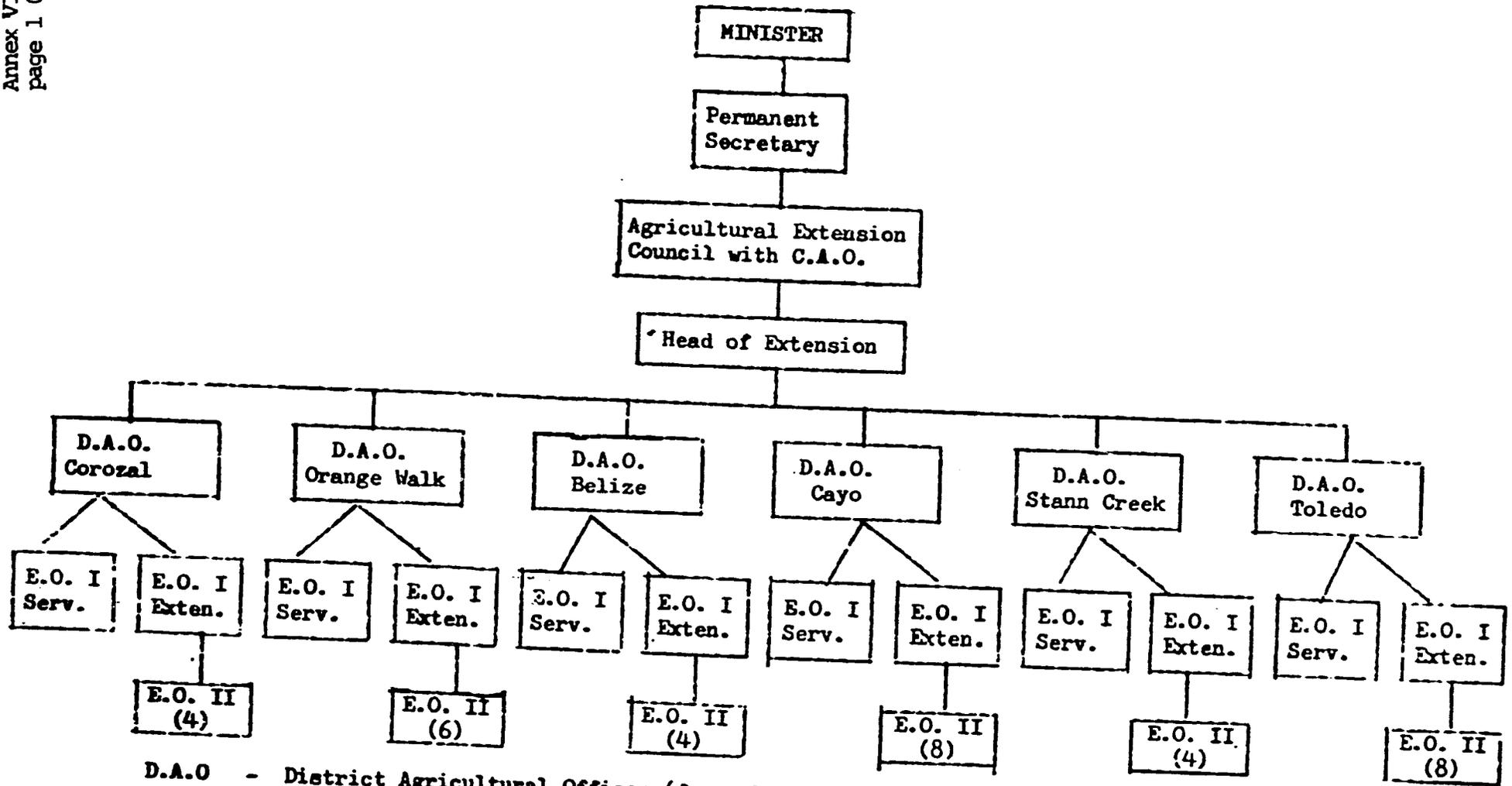
G. HEALTH

- | | |
|---|----------------|
| 1. Changing a natural environment _____ | _____ N _____ |
| 2. Eliminating an ecosystem element _____ | _____ N _____ |
| 3. Other factors | |
| Provide more balanced nutrition _____ | _____ M+ _____ |
| _____ | _____ |

I.- OTHER POSSIBLE IMPACTS (not listed above)

- | | |
|--|----------------|
| 1. Introduction of new plant species _____ | _____ N _____ |
| 2. Agricultural chemicals _____ | _____ -N _____ |
| 3. Other factors | |
| _____ | _____ |
| _____ | _____ |

PLANNED EXTENSION ORGANIZATIONAL CHART



D.A.O - District Agricultural Officer (formerly the i/c District)

E.O. I - Extension Officer I - Extension

E.O. I - Service Extension Officer I, Managing one or more commodity production station (e.g. for plant or animal stock)

E.O. II - Extension Officer II - Field person living in Target Area.

Detailed List of Training Equipment/Educational Materials

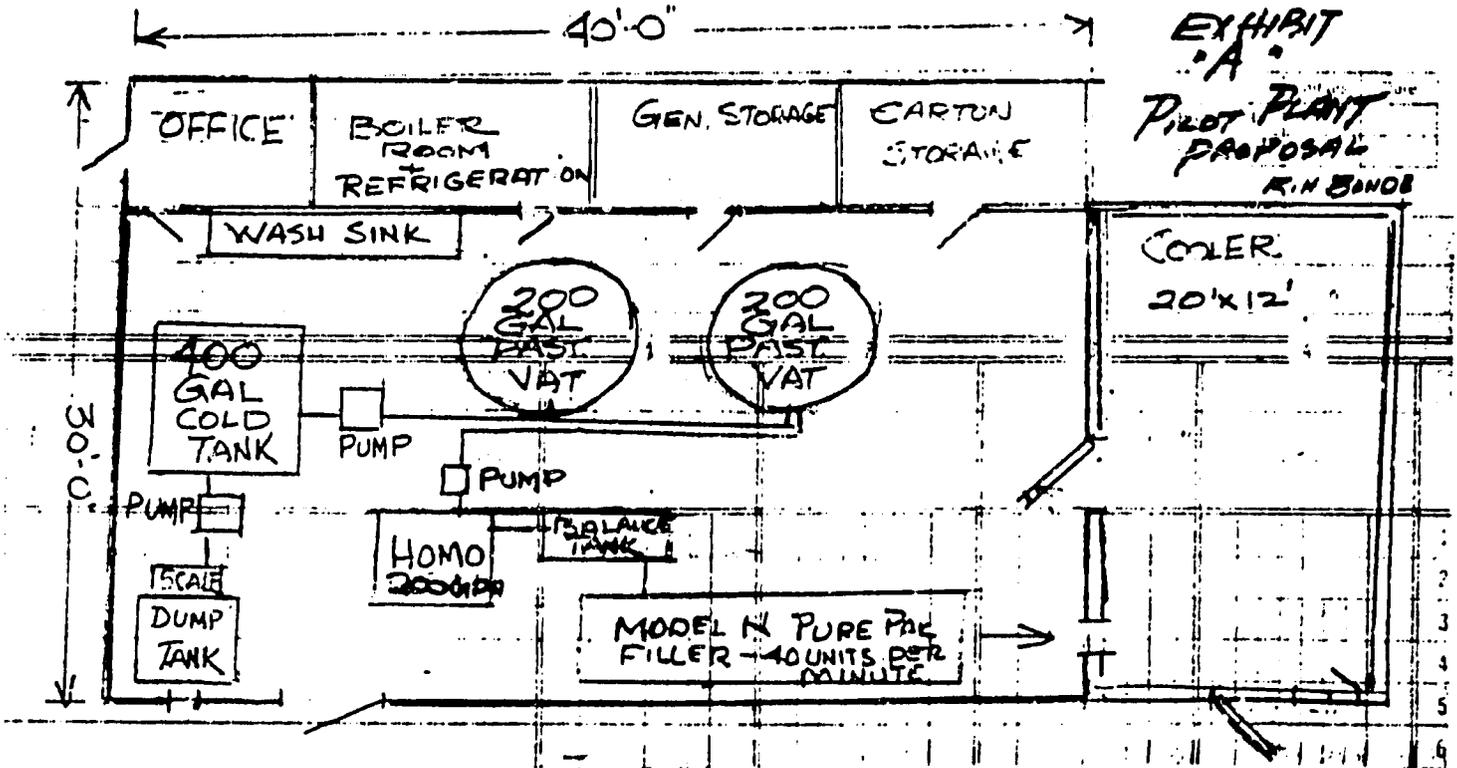
1. Periodicals/References in the following disciplines to be housed at BSA:

Economics and Social Sciences	US\$ 2,000
General Agriculture	2,000
Plant Diseases	1,000
Field Crops	2,000
Animal Science	2,000
Dairy Science	1,000
Scientific periodicals, including back issues of expired subscriptions	<u>3,000</u>
TOTAL (loan financed)	US\$13,000

2. Training Equipment/Visual Aids

Animal models and organ specimens	US\$ 7,000
Plant models	2,500
Plant and animal charts	1,000
Machinery charts and models	2,200
Transparencies and slide sets	1,000
Portable projection screens (3)	300
Overhead projectors (3)	1,000
Slide Projectors (3)	1,000
Portable public address systems (2)	<u>1,000</u>
TOTAL (loan financed)	US\$17,000

DAIRY PLANT AND EQUIPMENT DESIGN AND COSTS



Size of Plant 1200 sq. ft.

Size of 4'' Insulated Cooler 240Sq. Ft.

FOB Belize US\$
 Estimate Cost
 New Used

1 Dump Tank and Scale		\$3,000
3 Milk Pumps		2,000
1 - 400 gal. farm bulk tank	New	8,000
1 - 10 ft. Wash Tank (Pipes & Parts)		1,000
2 - 200 gal. Pasteurizing Vats		4,000
		<u>\$18,000</u>

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Balance Brought Forward	\$18,000
1 -- 100 gal. Balance Tank	500
1 - Model 'N' Pure Pak Filler	22,000
1 - 20 or 25 H.P. Boiler - Gas or oil	6,000
1 - 4 x 4 NH ³ Compressor, Condensor & Receiver or equivalent capacity freon unit	4,000 New
1 - 20' x 12' Pre fab cooler - 4" Urethane	7,000
300 - Ft. 1 1/2" St. St. tubing - valves - Hangers	3,000
500 - Plastic - 12 qt. Milk cases	6,000
2 - Hand Dollies	200
1 Set Office Equipment - 1 desk - 2 chairs, typewriter, adding machine - 2 - 3 drawer files	2,000 New
300 - 5 gal. size milk cans or a mix of 5 ^s , 8 ^s , and 10 ^s	7,500
1 - Babcock BF Tester and sample bottles	1,000
1 - 200 gal. per hr. Homogenizer	<u>3,000</u>
Estimated \$380,000	\$80,200

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1. BUILDING - 1200 sq. ft. 8" block construction

Apoxe paint interior walls

3 Floor drains - 4" concrete floor,

corrugated cement asbestos roof - 6 doors -

3 Pass doors

All plumbing and wiring (1200 ft. @ \$60 ft)
Estimate \$72,000

Building costs est. @ \$60.00 sq. ft. US\$ 72,000

Equipment - Processing and refrig.

(mostly used equipment) 80,200

TOTAL \$152,200

IF ALL THE EQUIPMENT WOULD BE REQUIRED, THE COST OF EQUIPMENT
IS ESTIMATED TO BE \$380,000.

This Pilot Plant would be capable of receiving 400 gals. of
raw milk each day and pasteurizing and packaging (400 gals. equiva-
lent) in 1/2 pts., pts. or qts.

The control of top volume is the Pure Pak Filler which is rated
@ 40 1/2 pts, pts. or qts. per minute or 2,400 units per hour.

A mix of pints and quarts 50 - 50 would require about 2 to 3
hours operating time on the filler.

It would require 2 or 3 plant workers about 8 hours for each
worker to receive the incoming milk, to set up and sanitize the
equipment, pasteurize the milk, dismantle the equipment and wash
up the plant.

All used equipment would meet U.S.P.H. Grade A standards. page 4 of 5

It's contemplated that if an adequate water supply is available the plant could be expanded to handle 1000 gals. per 8 hr. operation by adding or changing the following at an estimated expense of \$26,000.00

1. Install a 1,000 gal. cold wall tank and eliminate the 400 gal. tank	\$10,000
2. Install an additional 300 gal. pasteurizer	3,000
3. Modify homogenizer to 300 GPH	1,000
4. Increase size of cooler by 8 ft. in width	4,000
5. Additional refrigeration capacity	5,000
6. Miscellaneous piping, valves, etc.	<u>3,000</u>
	\$26,000

As a "Pilot Plant" operating at 400 gals. per day, there would be no plan for making cheese.

As an "Expanded Plant" cheese making equipment, additional building space and additional cooler space would be required. Refrigeration and Boiler capacity would not be expanded (other than item 5).

The cooler would have to be expanded 10' wide and 20' long.

The general storage and carton storage area could become the cheese manufacturing area and additional building space to house the proposed general storage and carton storage would have to be constructed.

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The cheese operation would add the following additional costs;

1 - 500 gal. cheese vat (used)	\$ 7,000
1 - Milk Pump	700
1 - set curd knives, hoops, press & Misc.	5,000
Additional building space (20' x 10') 200 sq. ft. @ \$60.00	12,000
Additional cooler space (20' x 10') 200 sq. ft.	<u>6,000</u>
TOTAL.	\$30,700

The total of expenses to increase the 400 gal. per day "Pilot Plant" to a 1,000 gal. per day "Expanded Plant" which would include a cheese operation to take care of surplus milk would be:

Milk pasteurizing and bottling	\$26,000
Cheese making operation	<u>30,700</u>
Total Additional	\$56,700

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COST ESTIMATES OF SPECIAL FUNDS

1. <u>Rotating Fund For Swine Improvement Program</u>	
a) 1000 pigs (including Toledo) X 50 lbs/pig X \$.625/lb.	= \$32,000
b) protein supplements & medicines (only Toledo) (\$2,600 X 3 yrs)	= 8,000
c) cement, waterers, feeders (only Toledo) (\$2,000 X 3 yrs)	= 6,000
d) local feedstuffs trials/transport expenses (only Toledo) (\$3,000 X 3 yrs)	= 9,000
e) miscellaneous/contingency (10%)	= <u>5,000</u>
	TOTAL \$60,000
2. <u>Operating Expense Fund at Central Farm</u>	
a) seeds and fertilizer at \$25/acre X 800 acres	\$20,000
b) fencing for pasture-demo units (\$1,500/mile X 6 miles)	9,000
c) miscellaneous	<u>1,000</u>
	TOTAL \$30,000
3. <u>Advance Fund for Dairy Study</u>	
a) special Milk handling activities	\$15,000
b) advertising/promotional materials	10,000
c) milk loss in marketing saturation activities	50,000
d) school distribution activities	25,000
e) price reduction reimbursements	25,000
f) contingencies	<u>15,000</u>
	TOTAL \$140,000

RESEARCH PLAN
FOR DETERMINING THE MARKET POTENTIAL
FOR FRESH MILK IN BELIZE

A condition for supporting Macal Cooperative dairy processing facilities is that plant operations serve as a basis for generating information useful to identify broader strategies for dairy industry development in Belize. This entails partial use of plant facilities and output in a research mode to develop data that will serve as the basis for estimating the future market potential for milk.

Knowledge of the potential size of the market for fresh milk is important for (a) formulating and implementing government programs that have the objectives of developing or expanding of the dairy industry; (b) public and private sector decisions regarding the size and location of processing and distribution facilities that will be efficiently responsive to future national needs for fresh milk; and (c) national guidance for developing policies and strategies designed to reduce current high levels of dependence on imported products as internal dairy production and distribution is developed with capacity to supplant foreign supplies.

The research necessary to meet these multiple public and private decision needs in the future involves three activities. In combination, these activities will indicate the market response to increased availability of fresh milk, to higher levels and familiarity with milk as a food or beverage product, and the reaction of consumers to a range of price levels.

Because the potential market for milk lies primarily in the urban areas, the market testing activities will be carried out in these

locations. The supplies from the Macal Cooperative will be insufficient to support market testing activity in urban areas on a nationwide basis. Consequently, a staged approach will be employed which accomodates the constraint on available milk supplies and the logistics of milk delivery. Two test sequences will be necessary to provide an adequate basis for estimating the magnitude of the national demand potential. The urban areas involved in each test sequence are as follows:

Sequence I - Will include the towns of Orange Walk, Belmopan, San Ignacio, Benque and Dangriga. Belmopan currently receives limited supplies of milk from the Western Dairy Cooperative. Start-up activities by the Macal Cooperative will create use exposure in San Ignacio, Benque, and perhaps the other two towns. But, in general, familiarity with the use of milk in those towns included in this sequence will be minimal. The geographic scope of coverage involved in this sequence should be sufficient to identify regional differences in the demand for milk in the country.

Sequence II - Will concentrate market test activity in Belize City. This has been the major distribution point for much of the output of the Western Dairy operation. General level of exposure to and availability of milk has been somewhat greater than in the outlying areas, but distribution has been limited in terms of outlet coverage owing to lack of aggressive marketing. Belize City is relatively cosmopolitan in character. It contains the full range of ethnic groups, levels of income, religious affiliations, and occupational categories encountered in Belize.

The two market test locations will represent coverage of about 90 percent of the urban and about 45 percent of the total population of the

country. Coverage of this extent, together with the geographic areas the test encompass, should be sufficient to produce evidence of the characteristics of the long-term national demand for milk.

In each test sequence, three activities are planned. These are explained in sufficient detail to indicate the nature of the activity and performance requirements that must be met in order to produce information required for reliable estimation of the future market potential for milk.

A. Saturation Distribution Activities

Consumers use fresh milk under the peculiar circumstances of limited distribution channels currently employed by Western Dairies, the sole distributor, and may, to a large extent, be a question of product availability. This activity will entail deliberate effort to achieve maximum distribution and availability of fresh milk in major retail marketing channels. These consist of retail food stores, restaurants, hotels and other outlets that have dry refrigeration storage and handling facilities consistent with the requirements for selling milk.

Participation in the saturation activity will be on a voluntary basis, but retailing establishments will be provided incentives in order to ensure maximum coverage. Establishments will be assured of reliable supplies through delivery three times a week. Retailers will be insulated from losses as a result of stocking the product through an arrangement whereby outdated or spoiled milk is automatically replaced with a fresh supply without charge. On-site promotional materials such as placards, menu inserts and other means of calling attention to the fact that participating retailers are a source of fresh milk will be provided. Finally, the distribution activity will be backed by a promotional effort

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using radio, TV and newspaper media calling attention to the availability of fresh milk supplies and, to the extent possible, specifically identifying retail outlets where milk can be purchased.

Competitive market confrontation in retail outlets between Macal and Western Dairies will be avoided. The objective of this phase of the research is to measure the effects of wider milk availability. Consequently, saturation activities by Macal will concentrate on distribution to outlets that are not supplied by Western Dairies. In this connection, it is important that cooperation be obtained from Western Dairies to the extent of providing information on milk sales during the course of the market saturation activity, as well as in subsequent elements of the study.

Arrangements will need to be made accordingly with the Macal cooperative as an integral part of study activity. Integration of Macal and Western Dairies operations in other phases of the market testing activity is also important, and will be discussed subsequently.

The market saturation phase of the test sequence will run uninterrupted for a period of two months before other study variables are introduced. This is estimated to be sufficient time to achieve widespread introduction of milk, and to produce results indicative of consumer purchase response to saturation distribution activities.

B. School Distribution of Fresh Milk

In estimating future dimensions of the consumer market for fresh milk, current low levels of consumption and lack of familiarity with the product attributes must be taken into account. This phase of the research activity is directed to ascertaining the effects of broadening the

national use experience base through school children, the upcoming generation of potential consumers. The latent demand of this group is an important part of the future demand tableau.

In the third month of a test sequence, free distribution will be made of pint samples of milk to the maximum possible school population in the test area. Samples will be distributed at the noon break so that the students can either consume the product in connection with lunch, or take it home for use at other times. Instruction will precede the distribution effort to acquaint students with the value and alternative uses of fresh milk, the importance of storing it under refrigeration, and the need for relatively rapid use if the product is to be kept at room temperature. School distribution activities will take place twice a week on a schedule determined by the availability of milk supplies and which accommodates the logistics involved in the distribution effort. Distribution will continue for a period of four consecutive weeks in order to allow sufficient time for children to acquire a taste for milk. This should also be sufficient for the households to begin translating any effective demand generated as a result of the free distribution activity into higher purchase levels. For a month after school distribution is terminated, market activities will continue without charge in order to provide time to measure any lag that may be involved in household response to school distribution activity.

The milk supply required for school distribution will be in addition to that required for the market saturation, and may place some stress on the capacity of the Macal Cooperative. To cope with this prospect, it is proposed that arrangements be made for fresh milk supplies from Western Dairies to be incorporated into the school distribution activity. This may become especially important in Belize City because of the substantial school population involved.

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C. Variation in Retail Prices of Fresh Milk

Information regarding how consumers respond to different price levels for fresh milk is essential to predicting the long term dimensions of the market. The final phase in each market test sequence will consist of lowering milk prices from established levels in order to measure the consumer response involved. In addition to the base price prevailing during earlier stages of the test, two additional price levels will be required in order to provide the basis for an approximation of the response to lower price levels for milk.

In consecutive three week periods, two downward deviations from the established retail price level will be tested. In the first three week period the retail price of milk will be lowered by 15 percent from the established market level. In the second period the price reduction from the base will be 30 percent. For both pint and quart retail units, the price reductions will be rounded to the closest five cent interval in order to conform with conventional unit pricing techniques. These downward price changes will be given widespread publicity designed to make consumers fully aware of the revised price situation. In addition, supplies will be made available on a request basis to retail establishments that have not earlier participated in the distribution saturation effort, but may become motivated to handle milk on the basis of the lower price levels.

The fact that parallel supply sources may originate at Western Dairies, especially in Belize City, make it important that this cooperative also participate in the pricing tests. Otherwise, the results might partially reflect a shift of buyers away from Western Dairy sources to Macal sources because of price differences. Such behavior would run

counter to the study objective, which is to measure the response to price rather than the degree of substitution between sources owing to a difference in price levels. Negotiations with Western Dairies for cooperation during the pricing tests. Especially with respect to arrangements for compensating this organization for the cost involved in selling milk at lower than established prices will need to be made accordingly. If this cooperation cannot be obtained, pricing test activities should not be carried out in Belize City, or in any other urban market involved in the study where Western Dairies has established a significant supply presence.

There is no way to predict the magnitude of purchase responses to the lower price levels that will be introduced in this phase of the research activity. However, it is of the greatest importance that the research results reflect a response to the price of milk rather than a response that turns on milk availability. Providing adequate supplies to fully measure the purchase response may thus turn out to be a problem of major magnitude. If, in the course of the pricing tests, supplies are rapidly exhausted, adjustment will need to be made in the study design to test response at higher price levels which will not totally clear the market before supplies are replenished.

Over response relative to the quantity of milk available for test purposes can only be determined after the pricing tests get underway. If upward adjustment in prices are necessary as a result of rapid market clearing, the appropriate prices to be employed will be a judgement call at the time. The appropriate differentials to replace those in the initial research plan will depend on the rapidity with which the market is cleared, and the kinds of outlets through which the largest volume of milk

is moving. A change in plans to cope with the problem of rapid supply depletion and the need to establish a new set of differentials will extend the term of the first study sequence. How much the study would need to be extended will depend on how quickly it is possible to recognize that market supplies are inadequate to meet the purchase response that the lower price stimulate. It would appear that any problem of this nature could be picked up in the first test sequence and that a delay would not amount to more than six weeks for the entire study.

In the final two weeks of the test sequence, prices will be reestablished at the original base level to provide for measurement of the downward adjustment in purchases that may occur. In a relative sense, returning to the base price level will represent a substantial increase compared with the immediate preceding situation where the market test called for a price 30 percent below the conventional level.

The foregoing research plan will represent a substantial investment of time and effort to cast light on questions of much importance to the future of the dairy industry in Belize. While it is not a sophisticated research effort, it should be sufficient to lay at rest many controversial questions that turn on the potential demand for milk. The study should provide a basis for an orderly and efficient development of the industry in a fashion consistent with demand parameters that are identified with reasonable certainty. For these reasons there is a compelling argument for carrying out the activity in a fashion that will produce results of unquestioned validity. Achieving this goal entails recognition of and resolution of some basic problems relating to arrangements for conduction the research activity. It is appropriate as a part of the design process to comment on the nature of these arrangements

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and to suggest means of dealing with them in a fashion which will result in equitable treatment for those who participate, and which fosters a spirit of cooperation and understanding that will result in a quality research effort.

As the focal point for the research activity, it is clear that the participation and performance of the Macal Cooperative is central to success. A first order requisite for adequate performance of this cooperative is that it have the ability to supply the base quantity of milk required and the capability to deliver milk when and where it is needed. It is thus important that the operations of the cooperative be well established and stable before the research activity is undertaken. It is estimated that 18 months will be necessary for the cooperative to achieve this status after plant operations initially begin. If more rapid progress is made in achieving stability and organizational integrity, then the research effort can start earlier, but caution is in order to ensure that the plant operations are adequate rather than assuming that further improvement will occur after the research effort gets underway.

In becoming a viable entity in the fresh milk business, Macal will engage in marketing activities that result in established markets which the cooperative will only reluctantly give up in order to be responsive to the need of the research effort. Arrangments will need to be made to accommodate the problem of maintaining continuity in the core market that Macal has established, but it is evident that the cooperative will be unable to meet all ongoing market opportunities and at the same time supply the milk in the quantity and at the place that the market test require. Study Requirements are estimated at about 300 gallons per day.

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Clear understanding should be reached with Macal regarding markets from which it will withdraw in order to be responsive to the supply needs when the study effort is initiated.

In order to prepare for potential supply problems, prior arrangements should be made at an early stage with Western Dairies and perhaps Central Farm to augment supplies and mutually agreeable terms for making milk available will be necessary. With respect Western Dairy, these negotiations could be for either raw or packaged milk since the requirements of the study would be relatively indifferent to brand. The question of adequate supply will in contrast be the matter of overriding concern. Supply arrangements with Western Dairies might appropriately be tied to the returns that farmer members obtain fluid milk marketed through their organization. The incentive for the organization to cooperate would be better plant utilization and higher returns than is possible from cheese operations. As a residual supplier, Western Dairy is likely to acquire at least this level of incentive to support the research project.

The operating expenses of Macal will be considerably higher during the market test activities than those for the established operating mode before the research effort is initiated. Several study factors will contribute to this increase in operating costs, (a) the requirement to deliver to remote locations and marginal retail outlets in order to accomplish the saturation distribution objective of the study; (b) losses of milk for quality control purposes from inventories at retail establishments where sales response is low (estimated at 15 percent of the total volume handled); (c) free school distribution of milk that the study requires; (d) direct losses as a result of the experimental pricing phase of the program' (e) expenses involved in advertising; (f)

cost of maintaining the records for the study and (g) added costs of supervision and control beyond those which would be incurred in a conventional operation where a research activity was not involved.

Resolution of the equity question relating to these costs between the ongoing non-research activities of Macal Cooperative and the research requirement are not an insurmountable problem, but are matters that should be considered and mutually agreed upon before the research gets underway. One approach would be to guarantee members of Macal a return for milk employed in the market test program equivalent to that obtained in an agreed upon base period. Another option would be to tie producer returns to estimated production costs plus a reasonable profit. Still another would be to link producer returns to those of farmers in the Western Dairy operation.

The unusual expense level which Macal will experience as a result of involvement in the research effort will also create a cash flow problem. Some type of cash advance procedure to prevent the organization from running out of funds, or for the necessity of temporarily shifting the financial burden that the research involves to the farmer members of the organization will also need to be developed.

Financial arrangements involved in integrating the Western Dairy activities into the project are somewhat better defined. Aside from the milk that may be supplied to supplement the capacity of Macal as outlined earlier, three questions are outstanding. With respect to Western Dairies participation in the school distribution program, the appropriate procedure would appear to be pricing milk involved at the standing Western Dairy price, delivered to retail outlets with the organization assuming responsibility for delivery and distribution of the milk in conformance with study specifications.

In the price reduction phase, Western Dairies could be compensated on the basis of the number of units sold with no allowance for recalled milk or spoilage losses. Finally, the Mennonite operation would spend some time keeping special records for the study and should be compensated for the time and expense involved. Whether payment to Western Dairy should be made through the Macal organization or directly from central project fund sources supporting the market test is another outstanding question.

The final and specific formulation of the study should be the responsibility of an expert in marketing research with reasonable working knowledge of dairy marketing and supporting distribution activities. As director of the research effort this person would need to spend considerable time in the country, but not remain on-site on a continuous basis.

MNR should designate a counterpart for the study director who would have continuing oversight responsibility for project activities in the absence of the study director and full authority to act in the interest of achieving the research goal. This counterpart should be a person who either occupies, or is like to occupy, a position in MNR relating to the dairy industry of Belize. Opportunity to gain insight and knowledge of the industry as a result of identification with the project would be substantial. The counterpart should have direct access to and operate under the direction of that individual in MNR who has the full and final responsibility relating to the Macal cooperative development effort and the financial aspects of the research endeavor.

An appropriate time table of participation by the expatriate study in the director would be as follows;

- One month permanent location devoted to designing the study activity;
- Two months in Belize making preliminary arrangements for the study;
- Two months in Belize at the beginning of the first study sequence working out operational details, establishing routine procedures and assisting the counterpart to develop capability to direct study activities;
- Two months in Belize bridging the transition from the first to the second study sequence and insuring that operational procedures are established;
- Four months at permanent location for analysis activity and for developing a report depicting and interpreting the results;
- One month for contingency activities that may arise in the course of the study.

An option to the foregoing approach would be for the study director to remain continuously in Belize for the entire period involved. However, the dynamics of ongoing study operations once routines and procedures are established would not appear to justify either the personal commitment or the expense involved.

In undertakings of this type, the question of contingency actions under extreme circumstances is one that always arises and which should be put in the right perspective at the outset. The most obvious and frequently mentioned contingency turns on the question of: "What if the consumer response to the test is far above the resource context in which the research activity is initially cast?" The answer lies in the

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obligation and responsibility of the research director to adjust to the situation that unfolds rather than mindlessly following the specifications for the research endeavor to an illogical conclusion. For example, if the Macal organization has firm and sustained markets for an output that is near plant capacity, then the project design has obviously been miscast. Attention under these circumstances should turn to an assessment of the results of Macal's performance and the ability of the Cayo area to produce larger quantities of milk, the design and construction of a plant with capacity which achieves higher sale economies, as redesign of the entire research effort on market potential would be in order on the basis of new information that has been developed in the course of initial plant operations and clear evidence of a broader market base potential for milk.

If saturation distribution activities place great stress on the available milk supply from all sources and recurrent shortages develop in retail outlets that cannot be explained through spoilage rates, then the study has again been miscast. There is no visible need to proceed further with school distribution or viable pricing phases of the study.

These kind of developments are an integral part of the research environment whenever human behavior is involved. Especially for the situation that exists in Belize, they cannot be predicted in advance, and if they become a reality of the situation, the only logical recourse is to stop when they become clearly visible, assess the in-information at hand and reformulate the research design to effectively deal with the research questions that remain outstanding.

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Illustrative Scopes of Work for Technical Assistance

A. Pasture/Forage Specialist

I. Qualifications

- a) Education - should have acquired a degree in forage/pasture production at the Master of Science or PHD level. A minor in dairy or beef production is preferred.
- b) Experience - should have established a minimum of ten years' extension working experience in pasture production and management. Five of the ten years' experience should have been with tropical forage production, preferably in tropical countries.

II. Job Description Within Scope of this Project

- a) The specialist will work with a Belizean counterpart within the MONR. Together they will develop a plan of forage/pasture activities first for Central Farm and subsequently for the extension districts and zones. The forage/pasture activities at Central Farm will be oriented to establishing as many of the Central Farm pastures with forage production, with those grasses already in country. An attempt will be made to harvest seed and vegetative material for grass multiplication outside of Central Farm.
- b) He/She will develop a forage/pasture development and management curriculum to be imparted by the specialist at the Belize School of Agriculture. The curriculum should consist of both theory and laboratory exercises.
- c) He/She will develop a short course training program in forage/pasture management to be imparted to the extension service personnel at the district and zone level. Some of the short course activities will be complemented by observational visits overseas.
- d) He will strive to expand the pasture establishment activities to as many farmers as possible through the help of the extension personnel.

III. Place of Residence

The specialist will live in Belmopan or San Ignacio, Belize, either of which are located near the main center of operations, Central Farm.

B. Swine Production/Extension Specialist (Toledo)

I. Qualifications

- a) Education - should have acquired a degree in animal science, with an emphasis on swine, and have broad-based training in agricultural systems (and/or cooperative extension).
- b) It is most important that he/she have at least five years of experience working with traditional farmers in a non-western setting, and experience working with a variety of swine production systems. Some experience with rural cooperatives, community development and marketing is preferred.

II. Job Description Within Scope of the Project

- a) The specialist will work closely with extension officers and indigenous Mayan villages in developing and expanding an improved hog production system in the Toledo district.
- b) He/She will train extension officers in swine production and management techniques, and will help establish a district (cooperative) infrastructure for marketing.
- c) He/She will seek to integrate improved swine production with other elements of the existing agricultural system, with special attention to traditional cultural practices.

III. Place of Residence

- a) The specialist will be required to live in one of the villages in the northern part of the district, preferably San Pedro Columbia, which is centrally located to the area of operation.

C. General Livestock Specialist

I. Qualifications

- a) Education - should have acquired a degree in animal science, with emphasis on swine production, at Master of Science or PHD level.
- b) Experience - should have established a minimum of ten years' experience in general livestock production and management, with emphasis on swine production. Five of the ten years' experience should have been in livestock/swine production in tropical countries.

II. Job Description Within Scope of the Project

- a) The specialist will work directly with a Belizean counterpart who will have a special interest in livestock. Together they will develop a plan to improve and expand the swine industry for Belize, using the Central Farm and other GOB multiplication center swine herds as the nucleus.
- b) The specialist will develop a training syllabus on swine production and management for agriculture students at the Belize School of Agriculture. The course of study will consist of theory and laboratory exercises.
- c) The livestock specialist will develop short courses in swine, with minor emphasis on beef production and management, to be imparted to extension personnel at the district and zone level. Allowance will be made for some of these in-country short courses to be complemented by observational visits overseas.
- d) He/She will strive to promote development of the livestock industry via the assistance of the extension service personnel.

III. Place of Residence

- a) The specialist will be required to live in Belmopan, Belize, which will be centrally located and only 15 miles from Central Farm.

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D. Dairy Plant Technician

I. Qualifications

- a) Should have ten years' or more experience working in dairy plant operations, of which five should be with a dairy cooperative.
- b) Should have experience working in a developing country and be personable enough to train host-country nationals on the job.
- c) Spanish language capability is desirable since many Belizeans involved in dairy production in Cayo district speak Spanish as first language.

II. Job Description Within Scope of the Project

- a) Supervise the installation of milk processing equipment at plant where product will be procured for market testing.
- b) Be capable of operating each piece of equipment involved in the receiving, pasteurizing and packaging (bottling) operation, including the boiler operation and all refrigeration equipment.
- c) Be capable of testing incoming producer milk for quality and butterfat content.
- d) Be capable of teaching the skills above to an understudy who would become capable of taking over his duties.
- e) Be capable of operating and maintenance of a Seal-O-Matic or Pure Pak Machine for filling 1/2 pt., pts., and qts.
- f) Keep records of milk deliveries as to weights or volume delivered by producers and making up a producers' payroll for milk.
- g) Check quality of milk, temperature of packaged product at time it is loaded into delivery trucks.

III. Place of Residence

Will reside in San Ignacio in Cayo district where Macal dairy plant will be located.

E. Meat Processing Technician

I. Qualifications

- a) The technician should have at least ten years' experience in meat processing, including practical "hands on" experience.
- b) At least three years of experience in developing countries is desirable, preferably in the Caribbean region.

II. Job Description Within Scope of the Project

Under the auspices of the MONR, the technician will demonstrate and instruct private sector producers and butchers in modern meat processing techniques. This will include demonstrations for preparation of meats such as sausages, ham, hot dogs, and corned beef.

III. Place of Residence

Technician will not reside in Belize, but will perform duties while on TDYs for up to three months each.

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