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MIDTERM EVALUATION

OF THE

BELIZE LIVESTOCK DEVELOPMENT PROJECT

PHASE-II

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LIST OF ACRONYMS AND ABBREVIATIONS

AI	Artificial Insemination
AID	Agency for International Development
BCA	Belize College of Agriculture
BLDP II	Belize Livestock Development Project-Phase II
BLPA	Belize Livestock Producers Association
CARICOM	Caribbean Community and Common Market
CSO	Central Statistics Office
DFC	Development Finance Corporation
EEC	European Economic Community
GOB	Government of Belize
IRI	International Research Institute
MAF	Ministry of Agriculture and Fisheries
MOU	Memorandum of Understanding
NDFB	National Development Foundation of Belize
PCC	Project Coordinating Committee
TA	Technical Assistance
USAID	United States Agency for International Development

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EXECUTIVE SUMMARY

A. Background

USAID/Belize's Livestock Development Project-Phase II was approved in December, 1988 for a three-year period with a total funding level of approximately four million dollars. The project was designed as a follow-on activity to earlier work and had as its primary objective the improvement of livestock production efficiency, expansion of market outlets, and increased volume of livestock products that are competitive with imports. A project goal was also to improve the ability of the private sector to contribute to livestock development. The Project has five major activities; four financed with project funds and a fifth (credit) under a non-development assistance activity:

- Improved livestock management seeks to improve livestock productivity and enterprise profitability and to lower costs of production through:
  - -- genetic improvement,
  - -- a screwworm eradication program, and
  - -- facilities and training for marketing/processing of livestock and products.
- A pasture/feed management component to strengthen previous efforts and to utilize local feed stuffs;
- A policy and analytical studies component to strengthen the data base and framework of analysis for planning and policy making;
- A laboratory services component to improve services to the livestock sector; and
- A credit component to utilize $300,000 provided under a separate resource to establish a line of credit for livestock producers.

B. Principal Findings

Progress in the livestock and pasture management components and in policy studies was approximately in line with plans and expectations. The screwworm eradication effort was ahead of schedule. Genetic improvement was negatively impacted by previous attempts with A.I. but inputs now in place and the importation

of improved breeding stock promise to achieve planned outputs. The laboratory, marketing, and credit programs have not yet been implemented and lag behind the planned rate of progress.

1. Livestock, pasture, and feed management

The project has improved the genetic base of the livestock sector, providing equipment and training to increase artificial insemination of beef and dairy animals and importing beef and swine breeding stock. Management plans for GOB stations have been established and computerized breeding programs set in place.

The pasture improvement program has stressed farmer training and development of on-farm cost-benefit information of improved pastures. After an evaluation of 37 farms, 13 were selected for cost-benefit analysis, exceeding the number targeted in project planning. Six farms have been selected in a pilot project to produce pasture seeds and to establish nurseries. The project is recommending more intensive use of existing pastures without additional land clearing. Efforts to economically use larger quantities of by-product feeds have not been successful and more attention is being devoted to this area in the last half of the project. There is concern that momentum established under the project will not be maintained after technical assistance ends.

2. Marketing, credit and analytical policy studies

These activities address three identified constraints to livestock development in Belize. A feasibility study, a producer survey and design and drawings have been completed for a pilot central market facility to be managed and operated by the Belize Livestock Producers Association. Failure of GOB and BLPA to agree on financing and management procedures have prevented construction. A finding of the evaluation is that the facility is marginal and highly sensitive to volume changes and an alternative solution is recommended. Technical assistance to improve the ability of domestic meat processors to meet competition from imported products has also not been implemented on schedule. The credit program has not been implemented due to a failure to agree on procedures and a cooperating finance organization. Details have now been agreed and a Fondo Ganadero model that does not use USAID funding is ready for immediate implementation.

The policy studies component has completed four studies, ahead of the planned rate. MAF staff turnover has hampered output and causes concern for long term strengthening.

3. Laboratory services

Project assistance to complete a meats residue lab and to improve an existing soils lab has not been successful because physical conditions at both facilities

have prevented purchasing equipment in the first case and installing equipment in the second. The soils lab is also currently without a chemist to fully use the facility. Identifying additional funds and staff prevent further progress.

4. Contractor performance

Both long term advisors are well respected and their recommendations are generally accepted. A problem has been an overly ambitious project design that has required their services to be spread too thinly over multiple areas of responsibility. The contracting firm recognized this problem and indicated during the request for contract extension that performance would be less than the agreed scope of work.

5. Training

Training has proceeded smoothly and in line with project design. Midway project life, three individuals have been placed in long-term degree training, 26 have received short-term overseas training, and more than 700 have received short-term, in-country training.

6. Project management

In an attempt to integrate decision making in the private sector with government policy, a Policy Coordinating Committee was created. This interface has been partially successful in gaining understanding and in reaching agreement on joint courses of action. There has been frustration at the slowness with which committee decisions are made and a failure of BLPA to fully grasp and understand USAID regulations and operating procedures primarily because of delays in USAID and GOB. Partly as a result, meetings now are less frequent than in the beginning of the project. Project management has also been hampered by a greater than normal turn over of AID project managers, each with somewhat differing management styles. A Project Administrator position was created which has contributed to progress by organizing reporting, logistics and accounting. The evaluation revealed a need to establish a clearer understanding of the duties and responsibilities of this post.

C. Recommendations

- Achieve long-term GOB objectives and to ensure that project achievements are sustained, through the undertaking by the MAF of the following specific actions immediately in support of livestock and pasture improvement:

  -- Utilize funds previously earmarked for the meats laboratory to extend the services (USAID/MAF) of the livestock advisor for an additional six months (total extension of one year) to coincide with the initiation of credit and marketing efforts and to insure program

continuity and sustainability;

- .Employ technicians to support the counterpart staff whose normal work program and training are significantly diluted by current demands. If necessary, contract employment should be used to meet this need;

- Review pricing policies for sale of livestock to insure that disincentives are not created to private sector production of breeding animals and feeder stock;

- Implement monitoring procedures to insure that breeding records and management plans now in place are followed in breeding programs to avoid loss of recently imported purebred lines;

- Present a work plan for pasture improvement including funding and staff assignments; and

- Ensure resources are available to implement and maintain an on-farm seed multiplication and nursery establishment program.

o Ensure that improved marketing opportunities are developed in an economically and financially sound manner and that meats processing training is implemented by doing the following:

- Immediate use of project funds to strengthen BLPA by purchase of computer, printer, related software for Association record keeping, accounting and marketing functions, office equipment and training for marketing and credit operations;

- Immediately begin project team consultation with the Belize meat processors, focussing on rapid implementation of training and support for this target audience.

o Immediately implement the Fondo Granadero credit program for livestock producers as detailed in the signed Memorandum of Understanding.

o Make the hiring of additional staff a priority, including the possible use of temporary volunteers, in order to strengthen the MAF Policy Unit.

o Create under the auspices of the MAF a centralized soils, tissue (plant and animal residues) and veterinary diagnostic laboratory at Central Farm by pooling resources available in existing labs, project funds, and from additional donor support. Legislation modeled after the Pesticide Control

Board would be adopted to enable fee work to be performed for the private sector with GOB funds used to perform public service analysis.

- Implement the following management changes to ensure coordination and to avoid undue delays stemming from the complexity of administering a project with several participating organizations:

  -- MAF and USAID should adopt a policy of written responses within an appropriate number of days to decisions reached in the PCC.

  -- The position of the Project Administrator should be strengthened and clearer lines of responsibility established in the job description.

  -- USAID and MAF should delegate more responsibility to the PCC.

I. INTRODUCTION

A. Background

The Belize Livestock Development Project-Phase II (BLDP-II) is a follow-on activity to Phase I designed to further enhance and increase income and productivity of the livestock sector. Realization of these goals will, in turn, contribute to macro-level objectives of increased employment, food security and an improved trade balance.

Agriculture remains the top priority of national development planning.[1] Livestock development is an important activity in the national development plan because of the relative abundance of undeveloped land areas available for pastures, the number of farm producers actively involved with livestock enterprises, and the large foreign exchange expenditures required to import consumer requirements. Livestock development is also an integral component of USAID's Project Development Strategy consisting of increased crop diversification, improved farm to market roads and increased/improved livestock production.

The purpose of Phase II is to improve livestock production efficiency, expand market outlets and increase the volume of livestock products that are price and quality competitive with imports. The project has five major activities; four financed with project funds and a fifth (credit) under a non-development assistance activity:

- Improved livestock management seeks to improve livestock productivity and enterprise profitability and to lower costs of production through genetic improvement, a screwworm eradication program, and facilities and training for marketing/processing of livestock products;

- A pasture/feed management component will strengthen the Ministry of Agriculture and Fishery's (MAF) capability to promote these efforts and build on previous efforts to improve swine rations and utilize local feed stuffs;

- The objective of the special policy and analytical studies component is to strengthen the data base and framework of analysis for planning and policy making, especially in the livestock sector, and to stimulate policy oriented studies that will impact livestock development;

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[1]Waight, Joe, Permanent Secretary, Ministry of Economic Development, Belmopan, Personal Interview, April 15,1991.

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- The laboratory services component seeks to strengthen capabilities and facilities to assure quality services to the livestock sector; and

- A credit component will utilize US$300,000 provided under a separate resource to establish a line of credit for livestock producers.

Project resources include US$3.0 million from AID and US$1.0 from the GOB and the private sector.[2] Project implementation will stress the ability of the private sector, especially the Belize Livestock Producers Association (BLPA) to assume greater responsibility and an increased capacity of MAF to deliver technology packages for livestock development. The starting date for BLDP-II was December, 1988 and the completion date is December, 1992.

B. Purpose and Scope of Evaluation

The purpose of this midterm evaluation is to determine the progress made towards achieving the project's planned purpose, goal, and defined objectives and the need for any changes in project design. In addition, the evaluation will identify ways, if any, in which to expedite project implementation.

C. Procedure

The time period of the evaluation will cover the period since the March, 1987 evaluation Of Phase I to the present, approximately midway the life of project of Phase II. The evaluation is guided by a detailed statement of work developed by the Agricultural Development Officer, USAID/Belize.

The four-person evaluation team prepared a work plan that was approved by project managers at USAID and MAF. The evaluation work plan included schedules for individual team members, a proposed outline for the final report and a procedure to be followed in seeking answers to questions posed by project managers. A specific time schedule was included for the evaluation that conformed with the requirements of the Statement of Work.

The objective of the evaluation team was to provide management information on the use of project resources in achieving progress toward the outputs, purpose and goals defined in the logical framework of the BLDP-II. This information is expected to be useful to project managers in determining what, if any, changes are needed to improve project performance approximately mid-way of project life.

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[2]USAID, Project Paper, Belize Livestock Development, Amendment No 2, Washington, D.C., Table 5.

To answer these questions and to directly respond to issues raised in the evaluation statement of work, information was sought in interviews with livestock producers in Corozal, Orange Walk and Cayo Districts who were intended to be primary beneficiaries of the project; private sector participants in meat processing; agricultural lenders in the Development Finance Corporation (DFC), the National Development Foundation of Belize (NDFB), and commercial banking; staff of MAF; staff of other Government of Belize (GOB) ministries; members of the Belize Livestock Producers Association (BLPA); the resident technical assistance staff; and project counterparts. In addition, project documents and records were examined, quarterly progress reports reviewed and accounts and financial records discussed.

Information from these sources was distilled into a report focused on project progress thus far, answers to issues and questions posed by Project managers, conclusions drawn from the findings and recommendations for each project component with designated responsibility for follow-up. Judgments were supported where possible by quantitative data and throughout by the evaluation team's experience and training. The evaluation report is intended to be positive in seeking solutions to livestock development problems in the Belizean context and in suggesting alternatives believed to be within the scope of available resources.

II. LIVESTOCK MANAGEMENT

A. Background/Situation

1. Beef Cattle

According to the most recent Census Of Agriculture (1988), beef cattle numbers totaled about 43,815 head distributed among 1,665 farms.[3] Holdings with 10 or less animals accounted for 63 percent of farms with cattle but only 8.6 percent of the cattle population. At the other extreme, 56 farms accounted for 50.6 percent of total beef cattle. Orange Walk and Cayo Districts were the areas of greatest concentration accounting for more than half of the total national herd.

Although annual slaughter figures are considered less reliable and do not include on-farm slaughter, BLPA estimates show a decline from 8,317 head in 1987 to 7,139 head in 1990 (Table 1). Part of the decrease may be explained by the closure of Belize Meats Ltd. and the present lack of beef exports.

Poor husbandry, low genetic quality and poor pasture management continue to be major constraints. Small and medium size farmers who generally use a very low level of technology produce poor calving rates, poor average daily gains, poor pasture utilization and continuous inbreeding. All of these factors are impediments to increasing quality and number of the national herd.

These factors and their consequences were recognized in a study of the costs of producing beef in Belize by BLDP-II consultants.[4] These estimated costs range from 93 cents per pound to more than $1.25 depending on level of technology and the inclusion of management and owner labor. Cost of producing beef relative to prices received indicate the enterprise to be marginal when all resources are priced at market value.

Live animal exports to Mexico contributed to a gradual increase in prices to a 1990 peak of $1.15. This market is temporarily closed because of animal health restrictions. BLPA almost single handedly arranged these sales and is working to have the market restored. The closure of Belize Meats Ltd. means the only plant with USDA certification for meat export is also closed and this export outlet is expected to be more difficult to reestablish.

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[3]Ministry of Agriculture and Fisheries, 1988 Census of Agriculture, Belmopan.

[4]Freeman, Billy G., Cost of Producing Beef in Belize, Belize Livestock Development Project-Phase II, Belmopan, (July 1990), Tables 8,9, and 10.

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2. Dairy

Dairy production has continued a slow increase reaching 5.83 million pounds in 1990. Western Dairies is the major producer with Macal output at about 150 gallons per day. Dairy product imports total about $12 million per year and serve as an indicator of the potential market for domestic producers.

Potential for increased production is directly related to improved marketing especially at the Macal Cooperative. Macal has received recommendations for changes in their marketing program and for improving milk quality, but has done little. Improvements in these areas will translate into a faster rate of growth.

A shortage of breeding stock and quality replacement milking cows also hampers dairy production. Production has been increasing at Central Farm over the past three years. However, herd size remains small and limits the amount of genetic improvement achieved as well as the number of animals that can be made available to dairy farmers.

3. Swine

The national pig population has decreased from 20,570 head in 1987 to 17,816 in 1990 (Table 1). This change compares unfavorably with expected project outputs of a 30 percent increase in numbers over the life of the project. Part of the decrease is in response to two successive poor crop years for corn and subsequent higher prices for this input. Reflecting smaller numbers, swine prices are rising and meat processors are bidding strongly for supplies. BLPA slaughter figures have risen over the same time period from 8,030 head to 9,550.

Favorable consumption combined with the opening of the Mexican market caused a price increase in pigs (up to $1.35). This has encouraged more producers to return to pig rearing. The National Development Foundation of Belize (NDFB) has also contributed to increased interest through a loan scheme which assisted a total of 16 farmers at a total loan value of $46,296.65. There is currently a high demand for breeding and fattening pigs and the MAF has only been able to supply a small portion. The absence of farm records still remains a serious problem to livestock improvement since production parameters cannot be accurately evaluated, cost benefit analysis cannot be done, and breeding programs designed. This problem has now been addressed by the technical staff of BLDP II.

Table 1: Livestock Numbers, Belize, 1987-90
(head)

Item	1987	1988	1989	1990
Beef Cattle				
Number on Farms (hd)	49,962	49,820	51,001	N/A
Slaughter (hd)	8,317	7,285	5,596	7,139
Average Liveweight (lb/hd)	688	710	651	680
Pigs				
Number on Farms (hd)	20,570	21,555	16,417	17,816
Slaughter (hd)	8,030	8,654	7,530	9,550
Average Liveweight (lb/hd)	178	181	214	181

Sources: Annual Report, Ministry of Agriculture and Fisheries, Belmopan, various years (number on farms, and liveweights); BLPA survey of slaughter plants (number slaughtered).

included as a component of BLDP-II. Its objectives are to free Belize of a parasitic disease caused by the presence in warm blooded animals of the larval form of the screwworm fly, to reduce livestock management problems and losses, and to increase livestock productivity in the country.

The program has included a large program of farmer education using written, radio and television media as well as personal contact and meetings. Material has been prepared in English, Spanish, Garifuna, Creole, Maya Mopan and Kekchi. The eradication campaign has used both chemical and biological methods with free distribution of Coumaphos to farmers for wound treatment in the first case and release of sterile flies in the second case.

B. Analysis

1. Beef

BLDP II has made considerable progress in reaching planned targets in genetic improvement. Activities began with a review and evaluation of the national beef herd and Government herds located at Central Farm and Yo Creek Stations. A breeding improvement program and a management plan for Central Farm and Yo Creek Stations was prepared with specific recommendations to increase the calf crops and growth rates.

Efforts to improve the genetics at Government Stations have resulted in the insemination of 244 beef cows and the importation of some 20 brahman heifers and five brahman bulls. This will establish a genetic base for the beef cattle sector. Semen testing for breeding bulls commenced for both Government Stations and the private sector. Existing records were reviewed and analyzed and a sound record system was designed and put in place. The computerization of these records also started. A detailed and well organized plan of work has been developed for the period January-July 1991 with subsequent six-month plans to be developed.

2. Dairy

Genetic improvement of the national dairy herd is proceeding more slowly. Efforts have been focused in Cayo and Orange Walk Districts including the Mennonite communities of Spanish Lookout and Blue Creek. Equipment has been procured and extension officers assigned to these two Districts. A computerized breeding program has been designed for Central Farm and is being used in the breeding program.

On-farm inseminations have been slowed by past experience that has lowered the confidence level of farmers. Training programs are underway to teach farmers the essentials needed to have the inseminator visit on time. The program only got underway in mid 1990 so past records do not adequately reflect accomplishments.

On-farm inseminations have been slowed by past experience that has lowered the confidence level of farmers. Training programs are underway to teach farmers the essentials needed to have the inseminator visit on time. The program only got underway in mid 1990 so past records do not adequately reflect accomplishments. Targets for 1991 are to inseminate 60 dairy animals.

3. Swine

The swine improvement component also began with a review and evaluation. This resulted in the preparation of a swine management plan for Belize, including adequate breeding programs, computerizing of the record keeping system, training in pig management and husbandry and several educational publications prepared and distributed. To improve the genetic base, some thirty-six gilts and eighteen young boars were imported from the USA.

Central Farm reports indicate that both quality and numbers were decreasing at the Station. This was due partially to inbreeding and in some cases, to inadequate selection and culling. The supply of breeding stock sold to small farmers was reduced from 173 animals in 1989 to 97 in 1990. This problem should be improved with the recent importation and by the implementation of the swine improvement plan designed by the personnel of BLDP II.

4. Screwworm Component

The screwworm component is proceeding ahead of schedule. The northern half of the country is already essentially free of infestation. Belize City (dogs and cats) and jungle areas of the south remain as problem areas. An experienced team has been a major asset. The expectation is that Belize will be declared screwworm free by March, 1992. A maintenance plan with staff and funds is in place to maintain this status after that date.

C. Conclusions and Recommendations

1. Conclusions

Progress is being made in the livestock improvement component at a rate about as good as can be expected under prevailing conditions. Most importantly, the basis is now in place for genetic improvement of the national dairy and beef herds. A breeding plan is in place on Government Stations and given monitoring and discipline by administrators, past problems of inbreeding can be overcome. Equipment, vehicles and staff are in place to fully implement the A.I. program. Numbers of all types of livestock on Government Stations is insufficient to supply farmers with adequate breeding stock much less feeders nor should this be a public sector goal. Therefore, a reappraisal is needed of Government pricing policies to insure that private sector

breeders have needed incentive to expand in keeping with MAF objectives.

2. Recommendations

- MAF should ensure that trained counterparts are assigned to the project until completion so as to ensure continuity of the already established program.

- MAF should provide technicians to support the work of counterparts who also have administrative and research/extension responsibilities. Given budget strictures, the feasibility of contract employment for these individuals should be investigated.

- USAID/MAF should extend the services of the livestock technical advisor for an additional six month period (a total extension of one year). Investment already made in livestock improvement activities is now in place and just beginning to bear fruit and the credit program and possibly marketing activities are yet to come on stream. The advisor's services are needed to insure these efforts will be sustained. Funds can be reallocated from those previously earmarked for the laboratory.

- MAF should establish a monitoring system that will insure that breeding records are maintained and the management program now in place will be followed on Government Stations.

- The private sector should be encouraged to contribute to genetic improvement through the use of commercial breeding bulls.

- BLPA should increase its activities in swine production and marketing to better serve this portion of its producer-members.

III. PASTURE AND FEED MANAGEMENT

A. Background/Situation

Cattle production occupies a central position in the Belizean economy. The availability of good natural pastures and the economics of establishing improved pastures offers the opportunity to further develop and improve this sector. Thus, the role of the Pasture Advisor for BLDP II has been clearly established.

Emphasis should be aimed primarily toward pasture development, that is, an increase in carrying capacity as well as animal gain from existing and improved pastures. Pasture management and forage utilization of adapted and improved grasses and legumes are important components of a pasture improvement program.

The number of acres of cleared land in Belize is estimated to be approximately 120,000 acres. With approximately 45,000 head of cattle, this would indicate that adequate land is available for present use as well as the near future. It is believed that about 10 percent of the farmers went out of the cattle business within the last year. Sale of cattle to Mexico, according to some cattle farmers could be beneficial for both the cattle industry and pasture development/improvement.

The BLDP II Pasture Management Advisor has been in Belize since August 1, 1989. He has given technical assistance in the form of pasture evaluation, recommendations and assistance in pasture development, as well as training for the technicians and dairy and beef cattle producers. Work on Central Farm has shown that it is possible to double the production of beef by the use of improved pastures. It is well known that improved nutrition of forage is the key to higher profitability in livestock. A few new forage species have been introduced and established at Central Farm, and several new species/pastures were established for grazing in 1991.

B. Analysis

Several farm evaluations were made during Phase II of the project in order to select representative farms to participate in the cost/benefit demonstration program. Some 37 farms were evaluated in five districts which represents approximately 7,000 acres of land. These on-farm sites were selected in 1990 for cost/benefit demonstrations to begin in 1991. Some 13 selected farms of 120 acres, planted in four Districts with 12 species, will be studied and evaluated.

Although there has been strong emphasis toward the use of improved forage species, emphasis is also being given to the proper management of natural pastures. Promotion in the use of native (improved) tropical legumes has been very evident in several of the reports and interviews. Also, recommendations were made in the use of fertilizer, especially phosphorus and potassium for legumes. Several species and cultivators of improved grasses and legumes have been selected for increase because of their adaptation and performance and for their feeding value in meeting the nutritional requirements of the cattle in Belize.

The project has imported seed to initiate the establishment of improved pastures in the cost/benefit demonstrations. Project records show that over 1,200 pounds of seed of 15 species of grass and legumes were imported from three countries at a cost of US $5,733 plus air freight (Table 2). A pilot pasture seed production program is planned to be initiated in early 1991, with harvesting and processing to begin in 1992. Six farms were selected for evaluation representing approximately 577 acres. This proposal has been approved. The aim would be to make Belize more self sufficient in seed production.

Several pasture treatments have been established at Central Farm. Results from one trial in 1990 indicate the potential for increasing carrying capacity and beef production with different grasses and legumes as compared to native pasture (Table 3). The data also shows that it is possible to more than double the production of beef from the existing natural grasslands in Belize by the use of improved pastures. Results from another trial on Central Farm, carried out in 1990, shows the potential of improved pastures, where daily live weight gains between 1.3 and 1.6 pounds per animal per day were achieved. A third is a demonstration on improved pasture management for dairy cattle. A fourth trial is another cost benefit demonstration of five selected grass and legume species. A proposal for a cow-calf production trial/demonstration has also been made. Data from these demonstrations should be very useful in promoting pasture improvement and livestock production in Belize.

Data to determine the cost of establishment for different pasture systems and forage alternatives in Belize was collected on farms in three districts and from Central Farm in 1990. The data was separated into two categories, one using low input technology and another using high input technology (Tables 4 and 5). The tables compare the cost for low input technology (improving natural pastures with minimum tillage, minimum fertilizer, minimum weed control) with costs for high input technology (replacing existing pastures with land preparation, fertilizer, and chemical weed control). Data was also collected on the cost of pasture establishment of other forage species in Belize. These estimates provide the basis for making cost-benefit evaluations. However, variation in animals and climatic conditions emphasizes the need for several years of data for more reliable information. Results to date are a good start for the project.

Table 2: Importation of Pasture Seeds, 1990

	Species	Origin	Amount (lb)	Price/lb (US$)	Total* (US$)
1.	Guinea grass	Antigua	10	7.04	70.40
2.	Perennial soybean	Antigua	20	3.70	74.10
3.	Rabbit vine	Antigua	100	3.67	367.00
4.	Leucaena	Antigua	100	3.41	341.00
					852.00
5.	Andropogon gayanus	Honduras	309	3.17	979.53
6.	Perennial Soybean	Honduras	26	4.61	120.00
7.	Centrosema	Honduras	88	3.17	280.00
8.	Kudzu	Honduras	26	3.69	96.00
9.	Clitoria ternatea	Honduras	26	2.30	60.00
10.	Lablab purpureus	Honduras	55	1.37	75.00
11.	Mucuna pruriens	Honduras	66	1.37	90.00
					1,700.53
12.	Kleingrass	USA	100	6.50	650.00
13.	Blue Pacific	USA	50	9.00	450.00
14.	Bahiagrass Tifton 9	USA	100	18.	1800.00
15.	Argentine Bahia	USA	100	1.80	180.00
16.	Aeschynomene	USA	100	1.00	100.00
					3,180.00
				Total	5,733,03

Source: "Development of a Positive Seed Production Program for Livestock Development in Belize," Luis Tergas, Ph.D., and Elide Valencia.

* Air freight is not included.

Table 3: Summary Preliminary Results of Fattening Steers on Improved Pastures (215 Days), Central Farm, 1990

Treatment (Pastures)	Stocking Rates animal/ac	Daily Live Weight Gains lb/animal/day	Total Live Weight Gain Animal lb	Total Live Weight Gain Area lb/ac	Increment Over N.P. %
A. Protein Bank					
1. Native pasture	0.50	1.563	337	168.5	----
2. Native pasture C. gyroides	1.11	0,778	167	185.4	10.02
3. Native pasture Leucaena	1.11	0.942	203	225.3	33.71
4. Chrysopogon Leucaena	1.30	1.329	286	371.8	120.65
B. Grass Legume Association					
5. Guinea & Centrosema	1.27	1.133	244	309.9	83.91
6. Humidicola & Kudzu	1.25	0.849	253	316.2	87.65
7. Mixture legumes	1.36	1.181	248	337.3	100.17
C. Grass Fertilized with N					
8. Stargrass & N	0.80	1.245	264	211.2	25.22
9. Stargrass & N	1.00	1.382	293	293.0	73.88
10. Stargrass & N	1.33	1.363	289	384.4	128.13

Source: Central Farm, Annual Report, 1990.

Table 4: Estimated Cost of Pasture Establishment for Different Alternatives in Belize, 1990
(Low Input Technology)

NOTE: TOTAL COST 1: Native Pastures & 20% Legume Bank
TOTAL COST 2: Chrysopogon or Andropogon & Legume (Milpa)
TOTAL COST 3: Chrysopogon or Andropogon & Burning & 20% Legume Bank
TOTAL COST 4: Humidicola & Burning & 20% Legume Bank

Items	Units	Units/ Ac (#)	Cost/ Unit (US$)	See Note Above: Total Cost 1 (US$	Total Cost 2 (US$)	Total Cost 3 (US$)	Total Cost 4
LABOR OPERATIONS:							
Plough	acre	1.00	40.00				
Harrow	acre	1.00	30.00	6.00		6.00	6.00
Sprig-Transport	load	1.00	30.00				24.00
Planting	acre	2.00	15.00	6.00	3.00	3.00	30.00
Apply Fertilizer	man/day	0.33	15.00	1.00	1.25	1.00	1.00
Weed Control	man/day	2.00	15.00	6.00	6.00	6.00	3.00
	Subtotal			19.00	10.25	16.00	64.00
MATERIALS INPUT:							
Fertilizer NPK	lbs	100.0	0.35	3.50	8.75	17.50	17.50
Herbicide	lt	0.25	45.00	11.25	22.50	11.25	5.62
Grass seeds	lbs	5.00	10.00		30.00	40.00	
Legume seeds	lbs	3.00	10.00	6.00	10.00	6.00	6.00
	Subtotal			20.75	71.25	74.75	29.12
OTHER COSTS:							
Contingencies	labor & mater.	10%		3.97	8.15	9.07	9.37
Supervision	labor & mater.	15%		5.96	12.22	13.61	14.06
Land Tax	ac/yr	1.0		2.50	2.50	2.50	2.50
Tools	material	5%		1.98	4.07	4.54	4.69
Interest	per annum	12%		4.77	9.78	10.89	11.24
	Subtotal			19.18	36.72	40.61	41.86
TOTAL COST				58.93	118.22	131.36	134.98
ADDED COST					59.29	72.43	76.05
% INCREASE							

Source: Central Farm, Animal Report, 1990.

Table 5: Estimated Cost of Pasture Establishment for Different Alternatives in Belize, 1990
(High Input Technology)

NOTE: TOTAL COST 1: Andropogon or Guinea (pure stand)
TOTAL COST 2: Andropogon or Guinea & Legume
TOTAL COST 3: Humidicola & 50 lbs N/acre
TOTAL COST 4: Stargrass & 100 lbs N/acre

Items	Units	Units/ Ac (#)	Cost/ Unit (US$)	See Note Above: Total Cost 1 (US$	Total Cost 2 (US$)	Total Cost 3 (US$)	Total Cost 4
LABOR OPERATIONS:							
Plough	acre	1.00	40.00	40.00	40.00	40.00	40.00
Harrow	acre	1.00	30.00	30.00	30.00	30.00	30.00
Sprig-Transport	load	1.00	30.00			30.00	30.00
Planting	acre	2.00	15.00	3.00	3.00	30.00	30.00
Apply Fertilizer	man/day	0.33	15.00	4.95	4.95	4.95	4.95
Weed Control	man/day	2.00	15.00	30.00	30.00	15.00	15.00
	Subtotal			107.95	107.95	149.95	149.95
MATERIALS INPUT:							
Fertilizer NPK	lbs	100.0	0.35	17.50	17.50	17.50	70.00
Herbicide	lt	0.25	45.00	45.00	22.50	11.25	22.50
Grass seeds	lbs	5.00	10.00	50.00	40.00		
Legume seeds	lbs	3.00	10.00		6.00		
	Subtotal			130.00	86.00	28.75	72.50
OTHER COSTS:							
Contingencies	labor & mater.	10%		23.79	19.39	17.87	24.24
Supervision	labor & mater.	15%		35.69	20.09	26.80	36.36
Land Tax	ac/yr	1.0		2.50	2.50	2.50	2.50
Tools	material	5%		11.90	9.70	8.93	12.12
Interest	per annum	12%		28.55	23.27	21.44	29.09
	Subtotal			102.43	74.95	77.54	104.31
TOTAL COST				340.38	268.90	256.24	346.76
ADDED COST				281.45	209.79	197.31	287.83
% INCREASE							

Source: Central Farm, Annual Report, 1990.

It is also believed that some of these establishment costs might be reduced by better planning in land preparation, the use of good planting material, proper seeding rates of good quality seed, and growing a cash crop during the establishment stage to reduce establishment expenses. The production of the planting material in nurseries on the farm will also reduce transportation costs. New legume and grass species adapted to acid, infertile soils, are being evaluated at three sites in Belize. The objectives of these trials are to develop information for the selection of new improved germplasm for pasture establishment and improvement of the natural grasslands in the pineridge areas. The need for dry season feed supplementation was addressed by the project as it relates to meeting the requirements of dairy cows. Strategies for the implementation/use of a supplementation program were presented to farmers. The types of supplementation covered by the project were energy, protein, minerals, vitamins and bulk forage. Farmers were receptive to the use of supplemental feed.

The basic principles for the management and control of weeds in pastures have been well addressed by BLDP II. Two short courses, one demonstration and one seminar were carried out in May and June 1990 to provide the basic elements of weed control to the MAF technical personnel and several farmers in Belize. The technicians should be more aware of the problems, the effects of weeds on pasture production, the control methods, and correct use of herbicides.

During the evaluation, an effort was made to analyze the effect of the pasture development program on the overall agricultural ecosystem in the country. The program does not recommend further land clearing, nor the broad overall use of pesticides and herbicides in pasture development. Varieties with natural resistance to pests are being evaluated and put into the program. The only recommendation on the use of herbicides is for selective control of weeds in already developed/established or improved pastures. All of these project objectives contribute to an improved environment.

There is a strong interest towards conservation and land use practices in the pasture development and improvement program. Since there is already an adequate amount of land cleared for pasture development/improvement, further clearing is not recommended. The present ratio of land already cleared for pasture use to numbers of cattle is probably about three to one. The use of appropriate technology for pasture development, management and utilization has been put forth and well documented by the project. Emphasis has been on the use of adapted species to specific soils, establishment of improved grasses and legumes in existing degraded pastures, use of forage legumes as cover crops and protein banks, establishment of improved pastures and reduced erosion under the "milpa" systems of farming, the establishment of a seed multiplication program, and finally the dissemination of information through short courses, seminars, workshops, field days, etc.

Considerable effort has been expended by the Pasture Advisor in training of extension agents and farmers. Concentration has been in making decisions related to pasture utilization and grazing management. However, the greatest level of success must be achieved in pasture establishment as it is the basic step in livestock development. The publication of brochures and technical bulletins is also essential to transfer the technology of pasture improvement to the farmer.

The project has made good progress in formal training. Three students are presently in long-term overseas training under BLDP II. Twenty-six MAF officers and farmers completed a total of 325 man-days of short-term overseas training. Short-term, in-country training was also accomplished for 347 participants in 15 meetings throughout Belize between 09-25-89 and 7-23-90 on the subject of improved livestock management. Short-term, in-country training was also accomplished for 369 participants (farmers and technicians) in ten (10) meetings between 10-19-89 and 6-14-90 on the subject of pasture management, weed control, feed supplementation, legumes, and production economics. Three additional training programs are at the planning stage.

Several publications, covering the areas of varietal recommendation (grasses and legumes), utilization, feed supplementation, weed control, etc. were prepared and distributed to farmers; twelve of these were reviewed. Seven (7) manuscripts in livestock management have been published for distribution to farmers. Some have been prepared in Spanish.

C. Conclusions and Recommendations

The major objectives of the pasture improvement component of the project have been to promote the use of improved pastures and good pasture management practices. Pastures improvement will continue to be very important in cattle production, as it is the least expensive source of nutrition and adequate cleared land is available in Belize. However, further development of the livestock industry continues to be hampered by the lack of improved pastures and poor pasture management.

From contacts with farmers, it was very evident that they were satisfied with the efforts put forth by the program. The interest in improved pasture development should expand as more information is developed on profits in producing livestock. Cost benefits of forage production must be achieved not only at Central Farm and other government stations, but also on-farm sites. Increasing seed production is essential to increasing on-farm nurseries. The seed multiplication program and further expansion of nurseries on the government stations and selected farms will greatly enhance the program.

It appears that considerable delays were encountered on a number of activities. Some which affected the pasture improvement program were:

- Availability of counterpart and the lack of continuity/consistency of the counterpart staff;

- Delays in approval of some candidates for specific training programs; and

- Availability of machinery for timely land preparation, quality animals at Central Farm available for use on trials, and reliable transportation for counterparts.

It also appears that there was a need to look further down the road on the overall scope of the project--where we hope to be in four or five years.

The pasture improvement/feed management program has made an excellent start towards improving the nutritional needs of the livestock in Belize. The program of work has been well designed by the project pasture advisor. The field staff in the Ministry of Agriculture are being trained and the information is being delivered to a large number of farmers in Belize. New legume and grass species adapted to acid infertile soils, are being evaluated at three sites in Belize. The objectives of these trials are to develop information for the selection of new improved germplasm for pasture establishment and improvement of the natural grasslands in the pineridge areas. The use of appropriate technology for pasture development, management and utilization has been put forth and well documented by the project. Emphasis has been on the use of adapted species to specific soils; establishment of improved grasses and legumes in existing degraded pastures; use of forage legumes as cover crops and protein banks; establishment of improved pastures under the "milpa" systems of farming; the establishment of a seed multiplication program; and finally the dissemination of information through short courses, seminars, workshops, field days, etc.

More emphasis also needs to be given to the technical and economic possibilities for using by-product feed materials. The project team made an attempt previously but MAF felt sufficient work had already been completed and the results should be published. One ingredient that should be given high priority is the feeding of cane juice to swine.

Future emphasis should be on increasing the carrying capacity as well as animal gain from existing pastures as well as improved pastures. Pasture management and forage utilization of adapted improved grasses and legumes will be the important components of a pasture improvement program.

Training of government staff, as well as farmers, in both overseas as well as in-country programs, has been very extensive and well carried out. During the

remainder of project life, in-country training programs will need to be expanded using seminars, workshops, field days, etc. Training needs for the technical and extension staff in promoting the improved packages of technologies will need to be continued. As the new packages of pasture improvement/management are developed, the information will need to be prepared into brochures/bulletins for both the government technical staff and the farmers. The use of audio-visual presentations at on-farm seminars and demonstrations has also been very useful. Communication with the farmer will be greatly enhanced through the use of more publications.

IV. MARKETING, CREDIT, AND POLICY STUDIES

A. The Situation

Three constraints to the further expansion of livestock development are well documented in all assessments of Belizean agriculture: (1) markets, (2) capital availability, and (3) erratic policy changes that inhibit long-term investment. Recognizing these constraints, Phase II planning provided for specific components to address each of these problems. Livestock marketing was to be improved through a program that would design and construct a central market facility and provide training in meat processing. The capital constraint would be alleviated through the provision of short-term credit to producers and funds were made available to complete analytical policy studies that would provide the basis for sound long-term policy actions to strengthen the livestock sector.

B. Marketing/Meat Processing

1. Background

a. Pilot Central Market Facility

Lack of access to market facilities and the generally low perception of market organization and performance is a major deterrent to investment and expansion of the industry. Costs of marketing services for livestock products tends to be unusually high in the country because of the small volume handled and inadequate transport facilities. Recognizing these constraints, Phase II planning provided for a feasibility study and possible construction of a central livestock market facility in cooperation with the private sector.

Both tangible and intangible benefits to the livestock industry were anticipated. A first consideration was the provision of a physical facility where buyers and sellers would assemble for the purpose of exchange. The underlying assumption was that the facility would contribute to improved communication between buyers and sellers, a more equitable bargaining position between livestock producers and a limited number of buyers and more efficient and widely known price information. These gains would in turn be translated into the intangible benefits of increased confidence on the part of livestock producers to increase investment and would strengthen the image of BLPA by increasing the range of services offered to its producer-members.

An initial budget allocation of project funds in the form of a host country contract of Bz$394,000 was provided for design and construction of the central facility and Bz$100,000 for equipment and a vehicle/trailer. Additionally, the GOB is providing a site (approximately 40 acres) for the facility. Considerable progress has been made

thus far on meeting project objectives of this component. Achievements to be highlighted are: (1) completion of a central market concept paper, (2) a study tour to visit and observe livestock auction facilities in the United States, (3) formation of a coordinating committee composed of representatives of BLPA, MOA and USAID and the contractor, (4) completion of a livestock market assessment study, (5) completion a feasibility study of the central market, and (6) completion of specifications, plans and blueprints and bids received.

Despite these accomplishments, the market facility is still in limbo with no clear direction for the future. The causes of the past delay and present uncertainty appear to be continued doubts that the proposed facility will alleviate the constraints, the addition of a number of objectives and conditions beyond those foreseen in the project paper and disagreement between BLPA as the market operator and GOB on the method of financing the facility.

b. Meat Processing

An objective of Phase II was to continue training and technical assistance to butchers and meat processors to improve meat quality, enhance consumr acceptance, lower costs and provide safer and more wholesome products. Achieving these objectives would, in turn, make domestically produced products more competitive with imports, reduce foreign exchange expenditures for imported meats, increase investment and employment in agro-industry, and shift outward the demand function for local products.

Although considerable momentum had been established in this activity in Phase I and meat processors eagerly awaited further cooperation, the project technical team supported by the GOB made the decision to delay implementation of this activity until an assessment could be completed. For various reasons the assessment has not been initiated and all meat processing technical assistance has been suspended at this midway point in the project.

2. Analysis

a. Pilot Central Market Facility

The constraints described above continue to impede national livestock development. However, the conditions that prevailed at time of project design have changed and have altered both the opportunities for cattle sales and the probability of success of a central facility.

The project design anticipated both an increase in the transparency and efficiency of domestic marketing and an increase in beef exports of 10 percent per year. On the domestic market, beef slaughter has decreased an average 4.7 percent per year between

1987 and 1990[5]. Pig slaughter has increased 6.3 percent per year (although estimated numbers on farms declined over the same period).

There has been an accompanying structural change in production with numbers of beef animals decling on smaller farms and increasing in the Mennonite Community. Some Mennonites also perform an important assembly/transport function for animals in Cayo and Orange Walk Districts.[6] Further, a single Cayo meat processor slaughtered 32 percent of the District's total cattle and 27 to 34 percent of the total pigs in 1990 (excluding home slaughter).[7] This volume is increasing (some contracting is used) and is unlikely to flow through a central market. Belize City processors utilize procurement agents who slaughter in San Igancio and Orange Walk and purchase on the basis of best price. These trends are all consistent with livestock marketing in other countries where the functions of central markets tend to be supplanted by buyer-seller arrangements.

The 10 percent per year export expansion foreseen in the project paper has not been realized and, in fact, all exports have been halted. A major change has been the closure of Belize Meats Ltd., the only facility with export certification required for U.S. and CARICOM entry. A second change has been the temporary closure of the Mexican market to imports of Belize-origin live animals because of Blue Tongue disease.

A feasibility study completed in 1989 when export prospects were brighter, reached a positive conclusion regarding constructing the central market[8]. But the changes listed above combined with the continued disadvantages of relatively high production and shipping costs make problematic the successful penetration of U.S. and CARICOM markets. The Mexican market is dependent upon disease eradication and appears more solvable. In either instance a central market is not likely to remove existing constraints to expanding beef exports.

The feasibility study focused on financial returns to the operator-management (BLPA) and concluded that conditions were extremely favorable for proceeding with

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[5]Computed from BLPA slaughter estimates.

[6]Joe Friesan is the single largest farm purchaser--cattle hauler and supplies two of the larger Belize City meat processors.

[7]Present volume at Running W reported by A. Bedran and percentage computed from GOB slaughter data, Telephone conversation, 4/9/91.

[8]Kary Mathis, Livestock Market Assessment Report-Belize Livestock Development Project, Phase II (Stamford, Conn. IRI Research Institute, 1989) p. 7.

construction under the study assumptions.[9] The study is still considered by USAID as incomplete and the inclusion of additional costs of land clearing, fencing, and pasture seeding were requested. The study did not attempt to perform an economic analysis that includes the time value of money as an factor in project feasibility.

Therefore, as part of the evaluation an internal economic rate of return analysis was computed. Five scenarios were considered primarily to test sensitivity to volume of cattle marketed and changes in cost of the facility.

In the base case all assumptions of the feasibility study were accepted. The major assumptions were cattle volume marketed equal to 50 percent of Cayo District volume (approximately 1900 animals per year) and weighing an average 800 pounds each to arrive at total revenue and initial investment of Bz$325,000. Under these assumptions the estimated IERR is a favorable 24.1.

An alternative scenario was considered that reduced volume marketed to 25 percent of Cayo District volume as the most likely best case, live weight equal to 665 pounds per animal, the national average slaughter weight for 1989 and 1990, and average market price reduced from 95 cents to 90 cents per pound reflecting quality as judged by weight. The justifications for these changes are: (1) the probability of attracting cattle from the two northern districts and Belize District to a Belmopan facility when the end markets are in Belize City and Mexico appear to be very low and not in the national interest considering transport cost, (2) the expanding processing facilities in Cayo District and Belize District are likely to utilize the central market only as another buying alternative and BLPA is judged not to have sufficient bargaining strength to alter the existing pattern, and (3) the assumed weight of 800 pounds is considered unrealistic in view of national averages and the expectation that better quality animals will be bid away by the processors, leaving the central facility with lower weight/quality animals. These assumptions only affect market revenues from cattle marketing leaving all other revenues and all costs unchanged from the feasibility study. The results show an IERR of 8.3.

The third alternative is derived from a negotiating proposal of the GOB to require the full cost of the facility including land to be paid by BLPA before title is acquired and in 15 years rather than 28. In this computation all revenues remained as in the base case (50 percent of Cayo District cattle and 800 pound weights) and only investment costs changed from Bz$325,000 to Bz$506,000 and the discount period was changed from 28 to 15 years as per this proposal. The estimated result is an IERR of 7.5.

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[9]Ibid., p.21.

The fourth and fifth scenarios are based on the April 12, 1991 draft Memorandum of Understanding. Investment costs to BLPA total Bz$268,517 ($214,217 for market facilities plus $14,300 for supervision of construction plus $40,000 for land preparation and pasture establishment)[10]. This sum is to be repaid as deposits to the Fondo Ganadero in quarterly installments for 28 years of 25 percent of profits or a minimum fixed amount. This investment cost was used to estimate the IERR with all other assumptions as in the base case. The estimated IERR is 30.6 if total market revenue is based on sales of 50 percent of Cayo cattle and 11.1 if the assumption of 25 percent is used.

The April 12 MOU presents the most favorable investment alternative considered for market viability. The analysis only includes that portion of investment required for the market facility itself with office facilities, land and equipment granted by USAID and MAF as part of the BLPA strengthening program. If all assumptions of the feasibility study hold and cattle volume approaches 1,900 head per year, the project is economically justified. If cattle volume is 1,000 head less per year (or if other assumptions do not hold), there is no economic rationale to support the investment.

The usefulness of the internal rate of return analysis is the estimation of a discount rate such that the present worth of project benefits is equal to the present worth of project costs. For the private sector the estimated IERR can be compared to the prevailing interest rate for borrowing to judge project feasibility and for national development policy the estimated IERR represents the opportunity cost of capital if it were invested in the most remunerative alternative (using social values instead of financial values where appropriate).[11] The analysis is also useful to test the sensitivity of project feasibility to changes in assumed conditions.

The sensitivity of changes to market volume is of much concern to the evaluation. The sensitivity index for the last alternative estimated is 1.34 meaning that a ten percent decrease in cattle numbers marketed through the facility leads to a 34 percent decrease in the IERR. Variance of this magnitude indicates the investment is high risk as well as marginal in profitability.

The conclusions from analyzing the current proposal in the draft MOU are as follow:

- If all of the assumptions of the feasibility study hold and volume of cattle marketed approximates 1900 animals per year at 800 pounds, the IERR of

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[10]Moise Cal, Fax No 301-652-5934 to Fred Mangum, April, 23,1931.

[11]Hence, the only realistic IERR is that of scenario three where full project costs are used.

30.6 compares favorably with private market interest rates and with alternative public sector investments. Under these conditions the central market.facility should be immediately constructed (financial returns in the feasibility study are also positive); and

- If, as appears most probable at this time, annual volume of cattle marketed will only approximate 950 head, the IERR is only 11.1, below prevailing private market interest rates and presumably below most public sector uses for capital.

In this scenario the facility is a marginal investment and is high risk. While the central market facility at this time is difficult to support on economic grounds, there are valid social and developmental objectives that should be considered and could justify its construction. The project paper and other documents recognize the intangible benefits of a central facility in:

- Strengthening the bargaining position of smaller producers;
- Increasing confidence and incentive to invest for future industry expansion; and
- Providing a mechanism for institutional strengthening of BLPA as a way of increasing private sector participation.

All are project objectives and the central market will contribute toward these ends.

In view of the high risk and low probability of success, certainly in the current cessation of exports, the evaluation recommends an alternative to immediate construction. The decision has already been made to turn over to BLPA the equipment and vehicle for transporting animals. Pens are available at The Belmopan Showgrounds which can be temporarily used for assembly and selling of live animals. Training in the marketing process can be provided by the current Chief Of Party supplemented as needed by a short term specialist. Sales can begin as soon as the procurement of equipment is completed and the results will go far toward dispelling the doubt and uncertainty that presently exist. Project funds will be held for one year pending the establishment of a track record and the reopening of an export market. If livestock producers utilize the temporary facility and receive the expected benefits, then a decision to proceed with construction can be made with a high degree of confidence. If expected volume and benefits do not materialize within one year, project funds can be diverted to the Central Farm Laboratory or other use and BLPA, GOB, and USAID will avoid the loss of public confidence associated with an empty monument.

Several additions to the original marketing concept have evolved, some useful and some questionable. Under the current proposal reflows from the loan to BLPA would be directed to the Fondo Granadero Belize Partnership Program rather than to the GOB general fund and would be available for on-lending to Belize livestock producers. This appears to be a valuable complementary resource to the market activity permitting a larger volume of feeder and finished animals to pass through the facility and contributing to the overall project objective of developing the livestock sector.

A second set of additions to the original concept is a variety of services to be performed by the Association for its membership. Many similar organizations add these services over time to strengthen membership loyalty and to generate income for political activities or other non-revenue generating uses. Generally, these are self-supporting (hauling, retail of inputs) or enhance and extend public service activities (training).

However, the proposed addition of a market support function or "floor price" appears unrealistic. Marketing boards or price support activities worldwide, whether operated by governments or producer organizations, have a less than enviable record of success. The conditions for such success do not appear to be present in the Belize livestock industry. Large imports of meat products limit the ability of meat processors to pass on higher procurement costs to consumers on the demand side while a weak producer association limits ability to discipline producers to bargain cohesively on the supply side. The expectation is that attempts to withhold animals from sale to force up domestic prices will meet with little success since the Association is not likely to control a sufficient volume and better quality animals will be bid away by end users. Success in achieving higher market prices is much more likely if past efforts to obtain markets in Mexico can be reinstated as an alternative.

b. Meat Processing

Implementation of technical assistance in meat processing is particularly relevant to Belize livestock development because success in this activity can be the driving force in increasing live animal requirements and/or farm-level prices. Although data is not available on the rate of change, improvements made in this stage of the marketing chain have played a major role in improved markets for Belizean swine producers. Comparable advances could impact cattle producers if an acceptable corned beef product (imports totaled Bz$606 thousand in 1989) was produced and/or costs were lowered and quality improved for other beef products.

Implementation of the meat processing activity is a relatively low-cost, obstacle-free technical assistance component. By contrast, technical assistance to bring change in a traditional farm society is high cost, slow in achieving benefits and a constant struggle to overcome obstacles internal to the farm setting and external in

infrastructure and policy. Meat processors in Belize have demonstrated a willingness to commit their own investment resources for expansion and continually seek technical advice both project related and on their own initiative.

Given this receptive audience and the potential for price/quantity improvements at the farm level and more wholesome and safer products at the consumer level, this activity should be given a higher priority than that assigned it by project personnel. In the judgement of the evaluation team, awaiting the results of an assessment would yield little useful information that could not be obtained from interviews with meat processors to determine their training needs. In the longer term, alternative funding will be sought to do a thorough study of policy directives for swine production and processing. This would be particularly valuable after the closing of Belize Meats Ltd.

3. Conclusions and Recommendations

An important lesson learned at this midway point is that the project design must be specific when both private sector organizations and governments are involved. The project designers intent was to give a great deal of flexibility to those who were to implement the marketing component. This desire, while sound in theory, was operationally not manageable. A working relationship that was initially non-trusting, has improved with both GOB and BLPA working together in the PCC. Past differences, compounded by administrative delays in both GOB and USAID, have resulted in delays in implementing the market component. The following recommendations emanate from this lesson learned, and aim to improve the current situation:

- The decision to construct a central market facility should be postponed until the need and use by farmers will justify the investment. The cessation of exports, a previous failed attempt with an auction market, changes in structure of cattle production and marketing since the project was designed and the internal role of return analysis all call into question the viability of a central market facility at the present time;

- BLPA should be strongly encouraged to utilize the existing facilities at the Belmopan Showgrounds, vehicle and equipment to be immediately purchased with project funds and technical assistance from the Livestock Advisor supplemented as needed by a marketing specialist, to demonstrate for one year that the marketing concept is workable and will resolve the identified constraint. At the end of one year of successful operation, project funds would be released for construction of the pilot facility. If unsuccessful, project funds would be used for the central laboratory or other agreed need.

- BLPA's floor price concept should be dropped until an export outlet is available. The Association does not have the strength to serve as a bargaining organization and past efforts to market livestock products collectively on the domestic market have failed. The Association can perform a useful function for some of its membership in transport, assembly and sale of livestock without the potentially costly objective of withholding marketings. When an export market does become available, price enhancement can be achieved by diverting excess supplies to this alternative outlet. The Association can again play a useful role as it has done in the past by contracting for, assembling and delivering animals to strengthen prices.

- Actions to strengthen BLPA as a private sector participant (an original objective of the Project Paper) should be completed. The planned inputs were the provision of office equipment, supplies, fuel and vehicles. The opportunity to strengthen the Association was delayed by originally linking these resources to an agreement to construct a market facility. This assistance has now been delinked and funds in excess of the original amount are now available to the Association. BLPA should proceed with procurement for immediate implementation of this project component.

- Consultative meetings should be begun between the Project Management Committee and the leaders of the Belize meat processors to formulate an action plan based on their needs for training and other inputs as available. This planned project activity should be implemented.

C. Credit

1. Background/Situation

Available credit at acceptable interest cost and collateral conditions is identified in the Project Paper and in a variety of studies as a significant constraint to livestock expansion. Phase II sought to alleviate the capital constraint by providing US$300,000 from GOB resources to fund a production credit loan program with less stringent conditions than available on private markets. The project design anticipated that the credit program would be implemented by either DFC or NDFB and would establish a loan review committee that would include BLPA representation.

These issues and others became contentious issues as managers attempted to implement the credit component. DFC was never seriously considered as a lender and agreement with NDFB could not be reached because of a 12 percent interest charge, an inability to agree on how technical assistance and loan monitoring was to be

provided and a reluctance on the part of NDFB to form a credit review committee that would include BLPA. As a result the technical advisors recommended and all parties accepted the concept of the Fondo Ganadero modeled on a successful effort in Honduras. The Agreement between GOB and BLPA was signed on January 24, 1991 and the first credit for livestock production is expected momentarily.

2. Analysis

Discussions with NDFB capsuled the difficulty of project implementation when private interests are placed ahead of the common good. NDFB would not agree with the project objective of including BLPA in the loan review process, asking instead that the Association only refer applicants to the Fund. BLPA would not participate without receiving the two percent fee charged by NDFB for administration. GOB would not participate because it was asked to supply technical assistance (Extension training) as it did with the previous credit program for swine. However, MAF felt it did not have sufficient staff for an intensive effort. While not directly a part of this process, the AID Mission contributed to dissention and delay with less than diplomatic participation by a previous project manager. This individual alienated members of the Project Management Committee and a management style sharply different from other project managers created confusion and delay.

Because agreement to achieve a useful program as originally conceived could not be obtained, the Fondo Granadero concept has been accepted. This program has worked successfully in other settings and its application here holds promise.

However, USAID has expressed considerable concern with the Fondo Garadero concept and Agency funds are not being used for this activity. In particular, AID does not support the establishment of new credit institutions. Rather, greater benefits are expected from strengthening existing institutions. AID also objects to the proposed program because the project purpose is not clearly defined, possible higher cost to farmers relative to alternatives, and a failure to include all costs in the analysis.

3. Conclusions and Recommendations

- The Fondo Granadero concept should be implemented immediately in Belize. The evaluation supports this move, providing several suggestions that the management committee may wish to consider.

- A clear statement of objectives should be established for the Fondo. Is the primary objective to be developmental or commercial? The answer determines in large part the use of credit. If commercial, steers and feeder animals would be the major in-kind purchase and distribution. If developmental, female breeding animals and improved pastures would represent the majority of transactions.

Private sector lending institutions are available for short term-lending, albeit at higher interest rates. The major achievement of the Fondo if emphasis is placed on commercial production is thus likely to be displacement/supplement of commercial credit with little long term gain. Developmental emphasis will more likely contribute to growth in livestock numbers to achieve higher incomes, employment and an improved trade balance in keeping with the stated objectives of Phase II. It is therefore suggested that this be the emphasis of the Fondo.

- Suggest that, while recognizing the need for fiscal integrity, the GOB system of quarterly budget allocations currently planned to be used to replenish the Fondo conflicts with the timeliness of livestock, feed and pasture needs. An alternative procedure should be considered for transfer of capital to the Fondo.

- Additional MAF field staff are needed to provide technical and financial management to producers in in support of the credit program.

- Suggest computerization of BLPA membership, which is estimated at something over 5000 members (including family members). Over half of total national cattle numbers are accounted for by 56 farms. Swine numbers are more widely dispersed. To insure meeting project objectives of primarily assisting small farmers, BLPA membership should be computerized by amount of cess paid and specific allocations from the Fondo be set aside for small producers (however defined).

D. Policy Studies

1. Background/Situation

A project objective was to strengthen the data base and analytical capability for planning and policy making, particularly in the livestock sector and to provide resources for completing a minimum of five policy studies during the life of the project. A total of US$150,000 in USAID funds was provided for this purpose.

The collection, verifying and publishing of agricultural statistics has historically been a responsibility of the MOA. Collection of information has not always been regular, timely, comparable across years, and in a form where statistically valid conclusions could be drawn. As a consequence, policy decision making has suffered. The Project Paper includes an objective of improving the data base for planning and policy making.

2. Analysis

At approximately midway the project life, four policy studies have been completed, exceeding the planned rate. Examination of these documents leads to the conclusion that useful information has been generated for decision-making. In particular, the report on the feasibility of the central livestock market and the export market evaluation for cattle and beef have served as valuable inputs into discussion and policy making. The publication on costs of producing beef provides useful information on the supply response possibilities in the country. All in all, the record of midterm accomplishments in policy papers is satisfactory.

In two other areas performance has been less than desired and poses questions for both attainment of project objectives and sustaining present achievements. Continuing staffing problems in the Policy Unit and MAF's past unwillingness to assign a sufficiently high priority to agricultural statistics to move it high enough on an already over crowded agenda of tasks to be performed by field staff to result in acceptable data quality, make it doubtful that present attempts to improve will be very successful.The problem has been recognized by the Ministry and additional staffing has been approved and the use of a consultant is expected.

As a preferred alternative, the Central Statistics Office has recently been expanded in number of trained people, is well equipped and utilizes sampling and data collection methodologies that result is statistically valid results. Combining the statistical and data responsibilities of these two government units into one under the responsibility of CSO offers the rare opportunity to do a better job at less cost.

A second shortcoming is not unique to the Policy Unit. The inability to find and retain capable staff hampers both data base management and policy studies. Although the departure of trained staff can be rationalized if contributions are made to the Nation elsewhere, the short run problem for the Policy Unit is made more difficult. The rate of progress in the first half of the project is unlikely to be maintained in the second half because of staffing shortages.

V. LABORATORY SERVICES

A. Background

A planned project output was an improved functional capability for soil and plant analysis at the Central Farm Laboratories and an upgraded diagnostic lab for meat products to meet international trade requirements. The project provided US$90,000 for this use after an evaluation of equipment and training needs by the project team and after assisting the GOB determine its priorities for each lab.

At the midway point in the project an assessment of the Belize City lab has been completed and remedial measures taken to correct unsafe conditions in storage of previously purchased chemicals. USAID will not agree to the use of project procurement funds until needed safety precautions are in place and until the issue of the labs is rationalized. The evaluation for the Central Farm lab has not been completed although an effort was made by the project team and a consultant was identified.[12] Because the lab has been judged not to be adequate for the installation of new equipment (wiring, size and condition) and because it is without a trained chemist, planned procurement under the project has not as yet taken place.

B. Analysis

The Belize City agricultural facility is actually a complex of three labs with different missions all sharing the same facilities:

- The Veterinary Clinic has a primary mission of treating small animals. Fees are charged although in effect the small animal practice is subsidized by the GOB. There are similar clinics in Orange Walk and in Central Farm which treat a higher proportion of large animals;

- The Veterinary Diagnostic Laboratory in Belize City is primarily concerned with analysis of samples sent in from the field by vets (a majority of which are small animals). This lab also tests animals for disease (TB, brucellas, etc.) but without a regular pattern; and

- The Meat Residue Lab has the primary mission of tissue testing for residues to meet USDA requirements for export certification. Unfortunately, this Lab has never functioned despite prior USAID funding and samples were sent abroad for analysis when meats were being exported. A prior

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[12]Memo from Dr. Luis E. Tergas to Dr. Rafael Ledesma, August 31, 1990.

assessment indicates an additional US$90,000 is needed to make it operational. Even this additional expenditure will not resolve the over crowded working conditions and potential for environmental damage in a densely populated area.

The Soils Testing Laboratory at Central Farm has the primary objective of serving farmers by testing soil samples and making recommendations for nutrients. There has also been some use of the lab in the past for analysis of feeds and forages. Currently, some of the building and equipment is in such a poor state of maintenance that it is virtually unusable. Additional equipment purchased on a previous AID contract remains in cartons. Departure of staff has reduced human resources to a technician and limits the analysis that can be performed. MAF has taken the necessary steps to remodel the Soils Laboratory and has obtained a temporary VSO chemist. A MAF employee has been sent through Phase II for training as a chemist and is expected to become the lab director for the Meats Residue Lab upon completion of training. This person could serve the combined facility.

There is a definite need in the country for analytical laboratory facilities. The issue is how to provide these services in the most cost effective and sustainable manner. A proposal has been advanced by the private sector (citrus, banana, sugar) to support Government's efforts to provide these needed services. The proposal called for the establishment of a centralized soil and tissue laboratory to improve services to farmers. This concept would permit utilization of existing useable GOB equipment, items previously purchased and not yet placed in use and the new equipment available under Phase II.

A conclusion of the evaluation is that such a combination of functions in a multi-purpose, centralized facility is the only logical alternative for Belize. The justifications are as follow:

- Employing, training, and retaining specialized laboratory staff at government remuneration rates is a long term problem that can be expected to continue in at least the medium term. Combining facilities to the extent possible can spread the work load in peak periods, reduce under employment at other times and provide continuity when staff turnover occurs;

- Some buildings and equipment are specialized to particular types of analysis. Others may be shared for several purposes. A multi-purpose laboratory makes possible more and better quality facilities than can be justified for individual, smaller labs, and is expected to produce a higher quality product at less cost;

- A well equipped, well managed laboratory will gain the confidence of the

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- A well equipped, well managed laboratory will gain the confidence of the

private sector and attract work for fees that can be used to defray a portion of lab fixed costs;

- There are other needs for analytical testing to regulate quality of purchased farm inputs that can now not be contemplated but may become feasible with a well equipped, operating facility; and

- Both the Central Farm and Belize City laboratories need extensive repair, remodeling and enlargement, the addition of climate and humidity control, and improved safety procedures. An alternative to further investment is converting these buildings to other uses and constructing and equipping a new general purpose lab to meet the country's needs.

C. Conclusions and Recommendations

- The December, 1990 proposal by a joint committee representing private industry and MAF (chaired by Dr. G. B. Holder) for a centralized soils and tissue laboratory at Central Farm should be implemented.

- The GOB should seek donor support for designing, constructing and equipping a centralized laboratory (including Phase II project funds).

- The GOB should devise legislation for operating and maintaining the centralized lab so that it can perform analysis for private industry for fees that do not revert to the general fund but are earmarked for maintenance and operating expenses of the lab. The laboratory would continue to have a public service function serving the needs of smaller farmers, consumer food safety, and performing analysis for regulating quality standards.

VI. PROJECT MANAGEMENT AND ADMINISTRATION

A. Background

A project purpose was to assist the private sector in playing a significant role in directing livestock industry programs on a constructive, collaborative basis with the GOB. The BLPA represents livestock producers in Belize and was selected as the private sector cooperating entity. MAF recognizes the need to strengthen the private sector and agreed to joint management of key project components.

To support this objective, a Project Coordinating Committee was established to insure all points of view were considered in reaching decisions. The six-person Committee includes two representatives from MAF, one from BLPA, one from USAID, and two from the project team (one as a non-voting member).

B. Analysis

The PCC has been both useful and a source of frustration to those involved in project management. It usefulness comes in that the principals were forced to meet on a more or less regular basis to discuss project plans and progress. Given a history of sharp differences between BLPA and MAF, this interface was needed and has been at least partially successful in cooperative approaches to livestock development issues.

The members of the Committee, particularly BLPA and the project team, have been frustrated because of misconceptions concerning its role. The purpose of the Committee was to communicate, to coordinate and to advise. The BLPA had the expectation that more executive decision making authority would be delegated to the Committee.

In practice, the Committee has had little difficulty reaching agreement on needed actions to be taken. But when these decisions were conveyed to AID and GOB, action in the form of a decision to move ahead or to obtain funds has been very slow in coming. Moreover, in the process of reaching a decision, the final resolution may differ markedly from the Committee's recommendation or even the concept in the Project Paper. The Committee met often and on a regular basis in the early part of the project but now meets only irregularly and the private sector feels excluded from decision making. Delays in reaching decisions after the Committee has agreed on a course of action are in large part responsible for lack of progress in some project components.

A second management device used to administer project activities was the creation of a Project Administrator. The purpose of this Office was to handle the day to day

project activities including procurement, communications, report preparation and fiscal management. A MAF employee was seconded to the project to fill this post.

The Project Administrator has certainly facilitated progress. The Office has served as a central location for budgets and procurement that has made it easier for advisors and counterparts to obtain their needs without the time consuming process of GOB procurement. There has been a division of responsibilities with some duplication of effort with project reporting and financial records completed by the Administrator and contractor records maintained by the Chief Of Party.

Of most concern with regard to the position is a clear and coordinated understanding of duties and responsibilities. To the extent that the Administrator represents both project interests and the objectives of MAF, he may at times be placed in a difficult position. Discussion clearly revealed this situation has existed. A careful review of the Administrator's scope of work and discussion within the PCC would pinpoint responsibilities and facilitate project management.

A different sort of administration problem for the project has been delays in obtaining AID and MAF approval of expenditures and actions. In the case of AID, there has been a greater than usual turnover of project managers, each with a different management style. Adjusting to these individuals has been a source of frustration to the project team and their somewhat differing requirements has been a factor in delayed implementation of some components.

Project management and administration has also been impacted by the limited capacity of BLPA to service its producer members. Although BLPA has represented livestock producers for a number of years, it does not have adequate budget, staff, and services to fully meet member needs.

All livestock producers are members of the Association and contribute support through a cess levied on each animal sold at an authorized market. Commercial cattle producers are generally aware of the Association and large numbers attend the annual meetings with a majority supporting its programs. Most of the Association's efforts have been directed to beef producers and it has been particularly effective in obtaining export markets for live cattle, in conducting a cattle registration program, and in compiling census/slaughter data for beef cattle.

Efforts on behalf of swine, dairy, and poultry producers are less well focused. The Association has been taking steps to increase its efforts on behalf of this wider audience. Even with this deficiency, BLPA remains the only private sector organization representing the livestock sector and hence, the only feasible organization to reach livestock producers with project assistance. BLPA sees the livestock development project as an opportunity to expand its services through the credit and marketing components and to strengthen its full-time staff and office to serve its

members. Given success in these efforts, BLPA can be expected to be a stronger, more viable and permanent service and lobbying organization.

C. Recommendations

- An agreement should be established between GOB and USAID to respond in writing within an appropriate number of days to all positions put forward by the Project Coordinating Committee. The PCC is important both to short run project implementation and to long run cooperation between the GOB and the private livestock sector. Committee members now operate with a clearer understanding of purpose but with increased frustration that agreed positions are not acted on sooner.

- The following changes (which reflect the fact that the Project Administrator performs an essential management role that is made more difficult by different interpretations of his responsibility) should be implemented:

  -- Strengthen the responsibility of the position for project management to facilitate a fully functioning Office after technical advisors have departed;

  -- Devote a portion of an upcoming PCC to agreeing among all parties on a strengthened job description and a clear understanding of the Administrator's duties and responsibilities;

  -- More responsibility for project implementation, within the guidelines of the Project Paper, GOB requirements, and the technical assistance contract, should be transferred from USAID and GOB to the PCC and the Project Administrator, who are held accountable for actions and expenditures without excessive micro-management.

VII. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

The project goal is to increase agricultural productivity, income and quality of life among Belizean farmers, particularly those producers involved in livestock production. Achievement of this goal will, in turn contribute to larger employment in livestock production, processing and distribution, and an improved balance of trade position through food import substitution.

The project design included five components to achieve the project purpose of improving livestock production efficiency, expanding market outlets and increasing the volume of livestock products that are price and quality competitive with imported goods.

In the judgement of the Evaluation Team the design remains valid and no major modifications are recommended. The assumptions that underlie Phase II remain generally in place and are expected to hold for the second half of the Project. It should be noted, however, that some project targets are probably not realistic and will not be attained by the end of project. Specifically, the 30 percent increase in pork production and a 10 percent per year increase in quality beef exports are doubtful. Swine numbers have decreased because of relatively high corn prices but are now in a cyclical expansion. Beef cattle and products are no longer exported due to the closure of the only export-certified facility and to disease that prevents live animal sales abroad.

These changes also impact on the economic feasibility analysis used in the project design. Economic internal rates of return presented for various sub-activities can be expected to be lower than initially estimated. In particular, the base estimate for genetic improvement of beef cattle, pasture improvement, and swine improvement will decrease since they depend upon expected productivity gains resulting from the project. Changes external to the project will limit these gains. But since the estimated EIRRs were quite favorable, the decrease anticipated will not be of a magnitude sufficient to warrant changes in the project design.

Project progress at the midway point has been uneven across components and changes are recommended to address remaining constraints, to suggest alternatives to approaches that are not working well and to anticipate problems that can be foreseen for the remainder of Project life.

Direct beneficiaries of project outputs are expected to be approximately 5,000 members of the BLPA. This Association itself, as a representative of the private sector, will gain from a successful project through training, equipment and an

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improved image in the view of its membership. Indirect beneficiaries include the families of livestock producers, employees, and consumers of livestock products who will have available lower costs/higher quality meat products.

1. Project Accomplishments

The project team's assessment is that results in training,field trials/demonstrations and publication and dissemination of information equal or exceed planned targets at the halfway point of project life. Project records indicate that three individuals are receiving long-term degree training abroad, 26 have received short-term training abroad, and 716 have received training in Belize in 25 seminars and short courses. Field demonstrations/trials have been completed or are underway on 38 farms (including GOB stations). Farmers report they are generally satisfied with these efforts except in Corozol where farmer interest is reported as low. Publications have been prepared for dissemination to producers. These accomplishments compare to planned end of project outputs of 12 field demonstrations, 6-8 new printed publications, five nurseries on GOB stations and 20 farms, and 20 in-country training programs involving 400 people.

The screwworm eradication component is ahead of schedule by approximately six months and with a smaller expenditure than planned. At the current rate of progress Belize is expected to be declared screwworm free in January, 1992 and procedures appear to be in place to achieve long term objectives for monitoring and treatment after the project is ended.

Planned end-of-project output of five economic/analytical policy studies has already been met (including one underway). A review of their use and assessment of their contents leads to the conclusion that useful information was generated and contributed to national policy debate. Other objectives of this component included improvement on the agricultural data base and strengthening the capability of the Policy Unit have been less successful.

A major project input was technical assistance in the form of two long-term advisors for improved livestock management and for improved pasture/feed management. These efforts were supplemented by short term technical assistance in specialized subject matter areas. The evaluation team's judgement is that this aspect of the project has performed well given the time constraint imposed by project design. Interviews with GOB staff and livestock producers indicate both advisors are well received, competent in their specialty and have contributed in full to attaining project accomplishments. The contribution of the livestock advisor may have been even greater if the project design had not required his time to be spread too thinly over a variety of assignments and if the contracting firm had not been overly ambitious in what could reasonably be accomplished.

Both the GOB and USAID wish to insure the environmental integrity of the country. Phase II is making a contribution toward that end. A project objective is to utilize existing pastures more intensely and thus eliminate the need for addition forest clearing. The screwworm component is expected to benefit national wildlife populations in at least equal measure to commercial livestock.

2. Project Performance Behind Schedule and Areas of Concern

The general consensus of people interviewed by the Evaluation Team was that progress in the component to improve livestock production was about on schedule at this midway point. This was particularly true with GOB staff. Highlights pointed to include genetic improvement of the national cattle herd (implementation of artificial insemination capability at Central Farm and insemination of 244 beef cows and the import of beef and swine breeding stock) and the successful screwworm eradication program above.

However, it is clear to the Evaluation Team that results are mixed and much remains to be done if end-of project targets are to be met. Concerns include a decline in numbers of both beef cattle and swine in contrast to expected project outputs of a 30 percent increase in swine production and a 10 percent increase in beef exports. National milk production averaged a 8.8 percent per year increase from 1987-1990 with Macal output essentially constant in contrast to a project target of 10 percent per year. Given the results of the study on costs of producing beef, the quality of supporting infrastructure, and livestock producer's aversion to risk, it is the Evaluation Team's conclusion that project targets were set unrealistically high.

More serious concerns can be expressed on those project activities where no progress has been made and/or where there is little evidence to support the project being sustained upon completion. It is in these areas that project resources need to be reevaluated in terms of changes needed to improve project performance. Specifically, the areas of concern are: (1) marketing/processing, (2) laboratory services, (3) credit, (4) the Project Management Committee and (5) GOB support.

Project design anticipated the operation of a pilot central livestock market facility by the private sector at existing facilities at the MAF Showgrounds or new facilities to be constructed. All planning and design have been completed but a MOU has not as yet been signed. It appears that project managers have lost a valuable opportunity to demonstrate the pilot concept through failure to utilize existing facilities. This low-risk, low cost alternative to solving a complex marketing problem would have resolved the uncertainties that now inhibit investment by the private sector. These uncertainties lead to the conclusion that an economic justification for additional investment in a pilot facility does not at present exist. The investment may however, be justified on developmental grounds. It is also the conclusion of the evaluation that the Project Management Committee's failure to implement training and support of the meat

processing activity has further contributed to the ineffectiveness of the marketing component.

A credit component, funded from non-project resources, was included in the project design. The log frame contains no specific targets. For this reason and because an MOU has been signed and implementation is imminent, no specific conclusions and recommendations are made by the Evaluation Team. Some suggestions are advanced in Chapter IV.

Over time several laboratories have been developed in the country supported by donors including USAID. Additional resources are made available in Phase II to strengthen laboratory capabilities related to the livestock sector. Specifically, anticipated project outputs are: (1) an improved capability for soil and plant analysis at Central Farm and (2) an upgraded residue analysis lab for meat products to meet international trade requirements.

A continuing problem is that these two facilities and other specialized laboratories in the country tend to be under capitalized and under staffed. As a result, lab reports tend to be slow in reaching decision makers, of questionable value and in the case of the two facilities of most interest to the project, currently essentially non-operating. Given the expected budget situation, the pool of trained manpower, and turnover in Government staff, the recurring problems are unlikely to change.

Therefore, a conclusion of the evaluation is that a more cost-effective alternative to continuing support for several specialized labs is a combination of these functions into one facility that can share some equipment and staff (some specialized analysis would remain separate within the central laboratory). Funding for facilities would be sought from donors and operational funds would be a combination of GOB support and fees charged private sector users for analysis and earmarked for lab support.

While the above three project components have not been implemented at the midway point of the project, four other elements are of concern to the Evaluation Team because of their potential for performing below expectations. These items include the Project Management Committee, technical assistance, the participation of women, and sustaining project effort.

A major objective of USAID was to increase the participation of the private sector in a collaborative effort with the GOB to improve national livestock production. A mechanism for attaining this goal was the creation of a five member coordinating group (plus one non-voting member). The PMC was originally planned to be a policy making body to guide the project. The Committee functions well in reaching decisions and agreeing on action programs. However, it has never had the authority to implement programs and serves only as an advisory body. USAID procurement guidelines compounded by personnel turnover and GOB delays in decision making

compounded by the usual funding problems have resulted in the same delays and lack of follow-up it was created to prevent.

The project design placed a severe time constraint on the provision of technical assistance. A three-year project included only 1 1/2 years of TA spread thinly over a variety of topics. Both long-term advisors are well respected and have performed well in their specialties. Achievements in the pasture program especially reflects the concentration of effort in this area. The livestock advisor was required to carry out administrative duties in addition to livestock improvement activities and had major responsibilities in all other facets of the project. A conclusion is that part of the responsibility for lack of progress in areas covered above must be attributed to the excessive time demands placed on the technical assistance staff.

The evaluation could find only one instance where women have been targeted as project beneficiaries, meaningfully involved in the project or data collected to reflect their participation. The single exception was the community-wide invitations, particularly women because of the importance of cats and dogs, invited to screwworm information meetings. There does not appear to be any mechanism within the BLPA or the GOB to promote the involvement and participation of women in the livestock industry although membership in the Association is open to both sexes and the Governments's policy is one of non-discrimination. In defense of this lack of emphasis, it needs to be said that women are typically involved in livestock production in a significant way only in swine production and both the project and BLPA have focused primarily on beef production.

Sustaining project outputs is a major concern of all donor programs and is generally directly dependent upon the host government's willingness and ability to replace external assistance. The Evaluation Team is concerned that many of the gains derived from the project in livestock management and pasture management will not be maintained post-project. Staffing, even with recent training successes, is always difficult. The absence of technicians to assume a portion of routine and administrative duties of counterparts severely dilutes their present effectiveness, hampers technology transfer and robs the MAF of potential replacements if these valuable staff members depart or assume other duties. By contrast, adequate planning and provision of support for the screwworm eradication program seems to insure its continuity.

B. Major Recommendations

A major objective of the evaluation is to make recommendations to improve performance over the remainder of the project life. The recommendations that follow are listed by project component and flow directly from the Evaluation Team's analysis and conclusions reached regarding planned versus actual progress.

1. Livestock Improvement

- Employ technicians in order to more effectively utilize counterpart staff in their primary on-going work assignments. If necessary, contracts should be used for employment where budgets prohibit permanent staff.

- MAF should adopt the dual objectives of maintaining high quality breeding herds of beef, dairy, and swine as a basis for developing and disseminating improved breeding stock and also to price these animals so as to not compete unfairly with the development of private sector producers who wish to market breeding stock.

- Ensure that GOB provides available communication facilities and incentives for staff to respond to producer requests, as timing is critical to successs. Much of the needed equipment, training, and staff are in place for a successful AI program for beef and dairy animals.

- MAF should implement a monitoring system to insure that the recently developed breeding records and management plan be followed to maintain current breeding herds. A past problem on Government stations has been the lack of record keeping and/or the failure to use available records in breeding programs.

2. Pasture and Feed Improvement

- Have GOB give increased emphasis to the seed multiplication efforts and establishment of nurseries on selected farms.

3. Marketing and Meat Processing

- Implement the central market concept for one year in existing facilities to demonstrate success before investing in a marginal, high risk activity. If targets appear attainable at the end of one year using project provided equipment and technical assistance, then construction funds will be released. If the facility does not appear

viable based on actual experience, funds should be used for the central laboratory or other agreed use.

- o Develop a terms of reference for a technical advisor, prepared by USAID and funding provided through Phase II for a marketing consultant, if the decision to proceed is forthcoming.

- o Immediately release project funds intended to strengthen BLPA.

- o Begin consultation with the Belize meat processors, and rapidly implement training and other project support for this target audience.

4. Credit

- o Immediately implement the Fondo Granadero credit program for livestock producers as detailed in the signed Memorandum Of Understanding.

5. Strengthening the Policy Unit

- o Make the hiring of additional staff (including temporary volunteer staff) a MAF priority.

6. Laboratory Services

- o Create a centralized soils, tissue (plant and animal residues) and veterinary diagnostic laboratory at Central Farm by pooling resources available there and in Belize City supplemented by donor support.

7. Project Management and Administration

- o USAID and MAF should contribute to project implementation in the short run and strengthening of the livestock private sector in the long run by allowing the PCC the maximum extent of decision making possible within the context of government regulations. Where USG and GOB procedures prohibit shifting decision making, written responses to decisions reached in the Coordinating Committee should be made in an agreed number of working days.

- o The PCC should more clearly define and strengthen the role of the Project Administrator for present management efficiency and to insure adequate decision making for the project after long term advisors have departed.

C. Issues for the Future and Lessons Learned

The relative progress of the screwworm eradication component compared to other project components is revealing. The screwworm component was task specific, funds were allocated prior to project implementation and could be assessed in a timely manner with audits to insure fiscal responsibility and lines of monitoring and management were clear and simple.

Other project components, particularly the market facility and credit program were defined in the project design only in very general terms and without specific funding and implementation procedures. Even where specifics existed, a continual erosion away from project design intentions changed the emphasis and impact of these activities.

The results in the first case show attainments ahead of planned levels. In the second case, project accomplishments have either lagged or have yet to be implemented. The lessons to be learned are:

- The project design must be specific in assigning responsibilities and in determining sources of funds and procedures for accessing them; and

- Accomplishments even in more complex projects will be directly related to the degree that project managers are given responsibility for implementation and held accountable for their actions with a minimum of micro-management from USAID and the GOB.

A continuing problem for the GOB is adequate staffing for permanent positions at prevailing terms of public service. The problem is compounded when a number of donor programs with counterpart requirements are thrust atop usual requirements. The lesson to be learned from this project is that in small economies where budget strictures prevail, projects should give serious consideration to providing contract employees to supplement permanent staff. This would more nearly insure the meeting of project targets and counterpart training in the short run and negotiations before end of project for additional permanent positions could sustain project outputs.

A major objective of BLDP-II was to strengthen the participation of the private sector in livestock development. But funds to be used for this purpose were tied to the agreement to construct a marketing facility. Although this lesson has already been learned and has recently been corrected, there was unwarranted delay in proceeding with this activity. This delay was largely due to the inflexibility of a previous AID project manager and underscores the need in the future to balance agency rules with prevailing conditions and individual project requirements.

A second part of this lesson is that BLPA strengthening is going to be very long term. The temptation is to look at the citrus, sugar and banana associations as a model when in fact conditions are much different. These organizations are successful because they provide the only opportunity for processing/marketing of the commodity. In the absence of legislation to require selling livestock through BLPA, this condition does not hold in livestock marketing. A second important difference is the other commodity groups have well trained management staff while BLPA essentially operates with voluntary staff. Although there is no BLPA staff to train, training is needed for the board of directors so they can gain some appreciation of such topics as bargaining power, marketing principals, complementary linkages as opposed to competitive relationships in the marketing chain and credit operations.

ANNEX 1

Evaluation Scope of Work

SECTION C

DESCRIPTION/SPECIFICATION/WORK STATEMENT

1. Purpose of Evaluation

The purpose of this evaluation is to determine the progress made towards achieving the project's planned purpose, goal and defined objectives and the need for any changes in project design. In addition, the evaluation will indentify ways, if any, in which to expedite project implementation.

2. Project Background

a. Project Goal: To increase agricultural productivity, income and quality of life among Belizean farmers - particularly those producers and entrepreneurs involved in livestock production.

b. Project Purpose: To improve livestock production efficiency, expand market outlets and increase the volume of livestock products to reduce animal products imports to Belize and to improve the nation's balance of payment.

c. Project Design: The project has evolved through two phases: Phase 1 began with project authorization on August 22, 1983, nad was funded by a loan of US$1.1.18 million in local currency. Phase II, which started with Amendment No. 2 on December 31, 1988, and which will end with the Project Assistance Completion Date (PACD), December 31, 1992, provides an additional US$3.0 million in grant funds and US$1.0 million in GOB local cuuency contribution for the purpose of further enhancing and increasing the income and productivity of the livestock sector. The conponents of Phase I and II follow.

4. Phase I

a. Development of appropriate cultural practices and indigenous feed rations for swine;

b. Improvement of natural pastures for beef and dairy animals;

c. Development of milk marketing information;

d. Establishment of a (modern) pilot dairy processing facility;

e. Improvment of the meat cutting and processing capability of local butchers;

f. Installation of a meat testing capability responsive to

USDA import requirements; and

g. Assistance to the Ministry of agriculture in the development of rational agricultural plans.

5. Phase II

a. Improve livestock management by:

(1) expanding the genetic improvements program to replenish dairy, swine and cattle stock through selective importation and/ or artificial insemination;

(2) Establishing a srewworm control program in cooperation with the Mexico-United States Screwworm Eradication Commission; and

(3) developing central markets to improve the existing marketing/processing systems through the Ministry of Agriculture and the Belize Livestock Producers Association (BLPA).

b. Improve pasture/feed management, with special emphasis on improved feeding systems and rationing programs using locally produced feeds--particularly for swine production;

c. Strenghten the data base and analytical framework for planning and policy making in the livestock sector;

d. Strenghten the Ministry of Agriculture and Fisheries (MAF) laboratory capabilities and facilities to make the quality of diagnostic services to the livesock industry more competent, relevant and timely; and

e. Establish a local currency line of credit for small amd medium livestock producers who have difficulty obtaining credit through commercial banks.

6. STATEMENT OF WORK

This evaluation will asess the progress of the project since the March 1987 evaluation (attached). Key issues and questions for the evaluation include the following.

a. Assess the relevance of Phase II objectives. Are the goal, purpose and objectives realistic? Are they in consonance with GOB's policies and priorities? Is the Amendment Logical Framework (Logframe)? Were the project assumptions reasonable? What progress has been made in meeting the projects End of Project Status as detailed in the amended logframe?

b. Were women targeted as direct beneficiaries under the project? If so, how successful have the efforts been in reaching and involving women as beneficiaries? Is data being collected to reflect the participation of women participants/beneficiaries?

c. Compare the project components as stated in Amendment II to the project agreement for relevancy and performance. Should any components be terminated or modified? Should any new activities b incorporated if ther are adequate funds and time remaining in the project to complete them?

d. Reveiw the economic analysis conducted at the design stage of Phase II. Are the assumptions and conclusions still valid? For example, will investments in srewworm and artificial insemination programs pay off? How? Can the benefits be quantified? Recommend course of action for the GOB and USAID where appropriate.

e. Indentify the major constraints to successful implementation of the individual components and recommend how they might be overcome. Identify the major strengths of individual components that could be sustained beyond the PACD.

f. Examine the quantity and quality of project inputs such as technical assistance, counterparts, training, special studies and commodities. Have they been commensurate with the needs of the project? Have the project financed commodities, especially vehicles, been appropriately inventoried, indentified, used and maintained? Review remaining project inputs by components and recommend any changes in composition, timeliness, order of magnitude and allocation which would facilitate overall project implementation, (Do not exceed current GOB and USAID commitments). What provisions are being made by GOB to cover recurrent costs?

g. Asess the overall administration and management of the project. Has the GOB, BLPA, USAID and the Technical Assistance team provided the level of leadership, support and direction required by the project? Examine the role of the Project Adminstrator. Has the position fuctioned as was intended? Make recommendations as to how the project can maximize any benefits to be derived from this position. Examine whether management tools, such as flow charts, reports and feed-back system have been effectively used by project leaders, and make recommendations where necessary.

h. Have the GOB and the TA contractor complied with project reporting requirements in form, frequency, timeliness and substance?

i. Review the effectiveness of the Livestock Coordination Committee. Is it providing leadership and guigance to the project? Is the Committee's mandate and composition relevant to the project? How can it be made more effective?

j. Examine the extent to which livestock farmers are involved in the project. Does the BLPA adequately represent the livestock private sector? Are farmers aware of and participate in BLPA?

Does the project address the needs of livestock farmers? Could project resources be used more effectively to assist them?

K. Examine any environmental consequences to the project. Particularly note any significant positive contributions to the environment, as well as any negative impacts.

l. Review progress by GOB, USAID and the contractor on responding to certain issues arising from the March 1987 evaluation and incorporated in the BLPD II Indentify those issues which still need to be addressed.

m. If, based on this evaluation, it is determined that adjustment to the project design and implementation are necessary, make soecific recommendations and provide supporting justification.

SECTION D - PACKAGING AND MARKING: N/A

SECTION E - INSPECTION AND ACCEPTANCE: N/A

SECTION F - DELIVERIES OR PERFORMANCE

1. Evaluation Methods and Procedures

This evaluation will be carried out by four external evaluators on behalf of the GOB and USAID over a period of four calender weeks. The evaluation will require a total of 54 persons days.

The team will be based in Belmopan. All logistic and travel arrangement required to conduct interviews and site visits will be handled by the team.

Those to be interviewed include: (1) staff of MAF, (2) menbers of BLPA and their Board of Directors, (3) the Project Admistrator, (4)the resident technical assistance team, (5) project counterpart and field staff, (6) select beef and dairy cattle farmers, processors and swine producers, (7) appropriate individuals in the Ministry of Commerce/Trade, Ministry of Finance and Ministry of Economic Development and (8) USAID officials. A list of recommended contacts will be prepared prior to commencement of the evaluation. Contact may also be made with personel and agencies not on the prepared list.

Data will be collected from field observation, review of project files, quarterly and other reports, financial records prepared by the Project Administrator, Moises Cal, as well as any other sources deemed necessary to successfully conclude the assignment.

2. Level of Efforts and Expected Output

The level of effort for the 4- person team is estimated at 54 work days.

The performance for this evaluation will commence on or about April 2, 1991, and will terminate on or about May 27, 1991. Performance of this contract will be in Belize City and Belmopan.

3. Reporting Requirements

Six copies of a draft report will be prepared and presented to USAID and MAF on or before April 26, 1991, by the team leader. An oral presentation of the findings and recommendations will occur at the same time at the USAID office. USAID and MAF will provide the team leader with comments on the draft within fifteen days of the draft presentation. A final report will be presented by the team leader no later than thirty days after presentation of the draft report. Twelve copies of the final report, in English, will be submitted to the A.I.D Representative. A copy of the document will also be submitted on 3.5" or 5.25" diskettes, usind a word processing program compatible with IBM PC format.

--- The report will contain the following:

a. an executive summary to include the purpose of activity evaluated, purpose of evaluation; methodology used, lessons learned, findings snd conclusions; and recommendations; (no to exceed three pages, single spaced);

b. the body of the report to include a discussion of key issues and questions posed by the evaluation; the economic political, and social environment of the project; the composition of the evaluation team and its study methods; evidence/ findings regarding the evaluation issues and questions, conclusions drawn from the findings, recommendations based on the study findings and an action plan; and

c. the appendices to include the evaluation scope of work, individuals and agencies consulted, and any other information or data deemed necessary or relevant to the technical topics or study methodology.

4. Work Schedules

The team will adhere to the following work schedule unless otherwise agreed to by USAID:

Activity	Completed within
a. Present work plan to USAID for approval.	2 days
b. Give USAID and the GOB an oral presentation on the team's major findings	15 days
c. Provide USAID with six copies of the draft report	15 days

d. USAID to provide team with comments 25 days

e. Finalize and submit final report to USAID 40 days

SECTION H - SPECIAL CONTRACT REQUIREMENTS

1. COMPOSITION OF THE EVALUATION TEAM

The evaluation team will be comprised of four specialists recruited by the contractor. Two of the specialist position are reserved for Belizean nationals who will be interviewed and hired by the team leader. The team will include one Economist Management Specialist, who will also be the team leader; one Livestock Specialist; one Pasture/Land Use Specialist; and one Rural Sociologist. All four should have experience working with agricultural/livestock development projects, data collection and analysis, and preparation of reports. Additionally, the team leader should have experience in the implementation and monitoring of agricultural development projects as well as knowledge of USAID project implementation and monitoring policies and procedures.

a. <u>Economist/Management Specialist</u>

In the role of Economist/Management Specialist, the team leader will also be required to evaluate the project implementation strategy from the perspestive of economic returns, generation of income and cost effectiveness of project inputs. Special attention is to be given to the economic feasibility of constructing the central market, in site, location (Belmopan vs. San Ignacio), method of operation and support facilities, srewworm eradication, improved pasture and forage production and artificial insemination (AI) activities. Issues related to the cost of production and economies of scale should also be addressed. The specialist will be responsible for addressing all economic related inquiries and will assist other team members to qualitatively assess financial and other data requirements that impact upon project performance.

As team leader this person will be responsible for the preparation of the final plan of action within two days of arrival at post. This plan will be approved by MAF and USAID/ Belize within one day. Upon approval this work plan will guide the conduct of the evaluation.

Additionally, he/ she will be responsible for the coordination of work plans of the individual teams members and for preparation of the draft and final reports following the activity schedule below. Demonstrable writing skills are a prequisite. As team leader this person should have experience in planning or evaluating other USAID agricultural projects is

desirable. A post-graduate degree in agricultural economics with prior experience in Central America is required, prior experience in Belize is preffered.

This effort will require approximately twenty (20) person days, fifteen (15) in country and five (5) in the home office.

b. Livestock Specialist

This position is being reserved for a Belizean national. The livestock specialist will assess the present status of the livestock sector in Belize and of the livestock management components of the project. He/ she will carry out interviews, establish findings and make recommendations clearly and in a precise manner. A draft written report of the work undertaken on this component must be presented to the team leader for presentation at the debriefing session. A post-graduate degree in animal science and prior experience in livestock development, especially in Belize is essential.

This effort will require approximately fifteen (15) person days.

c. Pasture/Land Use Specialist

The pasture/land use specialist of the project will review the pasture development component as it relates to present land utilization and future use, taking into consideration the objectives of this component.

He/she will examine the land use requirements for pasture development, the use of machinery for land clearing/ pasture development, the use of commercial pesticides and fertilizers on pastures and the actual stocking rate on the various types of pastures. How are these activities related to the overall agriculture ecosystem in the country, for example soil type variations and beneficial flora and fauna species? Determine if these activities negatively impact on the enviroment and make appropriate recommendations for corrective actions where necessary. A post- graduate degree in pasture agronomy/ management with appropriate experience in pasture development in the humid tropics is required, prior experience in Belize is prefered.

This activity will require approximately twelve (12) person days.

d. Rural Sociologist

This position is reserved for a Belizean national with five or more years of relevant work experience in Belize. Experience in assessing rural related projects is absolutely critical in examining social concerns of this project. A university degree in sociology or related field is essential.

The rural sociologist will assess the livestock community relationships between different interest groups, such as producers/growers, technical workers, producers associations and government to determine the benefits of their participation in the project. Evaluate the participation of men and women in the project as well as the use of formal and non-formal communications/training systems. Illustrate where results have had positive or negative impact on project goals and purposes. Where appropriate, provide guidance on the generation of information that addresses gender differences in the delivery of services and benefits.

This activity will require approximately seven (7) person days.

2. Security Requirments

Neither the contractor nor contact employees will have access to classified or administratively controlled information.

3. Limitations

During the performance of the contract, the Contractor shall not make planning, budgeting, programming or policy decisions which determine the allocations of resources available to USAID, or establish USAID policy.

ANNEX 2

Project Design Summary Logical Framework

AID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

ANNEX I

Life of Project: From FY ___ to FY ___
Total U.S. Funding: ___
Date Prepared: ___

Project Title & Number: ___

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: Increase agricultural productivity, income and quality of life of Belizean farmers involved in livestock production.	Measures of Goal Achievement: 1. Agriculture sector growth approximates 5% per annum. 2. Increased employment in the livestock production, processing, and distribution systems.	1. Socio-economic indicators and reports provided by GOB. 2. Special studies and evaluations related to household income.	Assumptions for achieving goal targets: 1. Agriculture development remains a key sector priority for GOB. 2. Producers respond favorably to technology and policies that will improve productivity, expand markets and provide adequate economic rewards. 3. Political, economic, and social situation in Belize remains stable.
Project Purpose: Improve livestock production efficiency, expand market outlets and increase volume of livestock products to reduce animal product imports to Belize and improve nation's balance of payments.	Conditions that will indicate purpose has been achieved: End of project status. 1. Increase domestic pork production and processing capability by 30% by Life of Project. 2. Dairy production increases by 10% per annum and meets Macal Cooperative volume and quality requirements. 3. Beef production continues to meet domestic supply requirements and exports of quality beef expands 10% per annum. 4. Reliable credit and marketing systems assessed, and if found feasible, in place for producers and distributors which lowers production costs and improves production efficiency. 5. GOB Ministry of Agriculture institutional growth through human resources development and services support able to meet sector's needs. 6. Private Sector becomes a significant force in directing livestock industry programs on a constructive collaborative basis with GOB entities. 7. Belize declared screwworm free and Screwworm Monitoring Program in place.	1. GOB Agricultural Statistics. 2. Site Visits. 3. Annual Trade Reports. 4. Contractor and Credit Facility Reports. 5. Belize Livestock Producers Association Reports. 6. Workshops, Seminars and other Training Reports. 7. Screwworm Commission Reports.	Assumptions for achieving purpose: 1. Government policies reasonably consistent for livestock sector particularly in terms of export potential for meat products and live beef animals. 2. Ministry of Agriculture has extension resources and appropriate funding to support reasonable growth in livestock industry. 3. Programs in project actively supported by all in-country interest groups (e.g., Meat Processors Association, Macal Dairy Cooperative, Belize Livestock Producers Association). 4. Institutional resources of GOB entities accessible to private sect

Outputs	Magnitude of Outputs		Assumptions for achieving outputs
1. Central market established for livestock. 2. Artificial insemination program established in collaboration with both beef and dairy producers and importation of selected livestock started to increase herd size and productivity. 3. Quality on-farm milk production enterprises to support milk processing facilities. 4. Field trial program in pasture and forage improvements to support continued growth in swine, beef and dairy production. 5. Institutional laboratory support to forage component and livestock sector significantly upgraded. 6. Expanded policy analysis operations at Ministry emphasizing the livestock sector. 7. Screwworm Eradication Program institutionalized within GOB Ministry of Agriculture.	1. An operational Unit in Belmopan area to serve the livestock industry. 2. (a) A functional AI program, primarily directed to dairy producers, which is cost effective and adequately sized to need. (b) Importation program operational in coordination with producers. 3. Supply of quality milk increases. 4. A technically proficient improved pasture/feed management program which completes or conducts (a) 12 field demonstrations on pasture improvement. (b) 6 - 8 printed publication (new) for distribution to extension service. (c) Minimum of 20 in-country short courses, seminars, and workshops involving 400 people. (d) Complete five nurseries on GOB stations and 20 farms. (e) Fully incorporate cost benefits of on-farm forage improvements as part of the demonstration analysis. 5(a) An improved functional capability of the soil and plant analysis at Central Farm laboratories. (b) An operational seed multiplication unit for forage species. (c) An upgraded diagnostic lab for meat products to meet international trade requirements. 6. Minimum five economic/analytical studies related to livestock policy issues conducted and assessed. 7. An operational screwworm program in place adequately funded and supported by GOB and meeting criteria of joint U.S.-Mexico Commission.	1. Field Inspections. 2. Site Inspections. 3. Macal Reports. 4. Evaluation Reports and Studies on Policy Analysis complete with recommendations. 5. Contractor Reports. 6. Ministry of Agriculture Report. 7. Laboratory Data and Evaluation Reports. 8. Reports of U.S.-Mexico Commission for Eradication of Screwworm.	1. Facility found to be feasible and acceptable to farmers. 2. TA in project is timely and meets requirements. 3. GOB procedures and approval authority in place on a timely continuing basis. 4. Equipment procured as planned. 5. Belize Livestock Producers Associatic provides backstopping support for field trials and appropriate involvement for producers. 6. Adequate support by U.S.-Mexico Commission and GOB to screwworm eradication is maintained.

Inputs	Implementation Target (Type and Quantity) In U.S. $000				Assumptions for providing inputs
	A.I.D. Grant	GOB	Private Sector		
Technical Assistance	$1,160.415			1. Project financial records, vouchers, etc. in GOB, and USAID. 2. Contractor Reports. 3. USAID Audit Reports.	1. Project inputs provided in a timely manner. 2. GOB committed to recurrent costs. 3. Private Sector participation adequate and timely.
Long-Term	(462,860)				
Short-Term	(226,840)				
Administration (In-country Staff & Support (includes 3 vehicles)	(470,715)				
Training	565,000				
Long-Term	(176,000)				
Short-Term	(82,000)				
Long-Term					
In-Country Chemist	(180,000)				
In-Country	(127,000)				
Commodities (including 4 vehicles)	736,000				
Support Services	374,000				
Evaluations/Audits	65,000				
Credit		300,000			
Operating Costs and In-kind Contribution		600,000	100,000		
Inflation	50,000				
Contingency	49,585				
Total	$3,000,000	$900,000	$100,000		

ANNEX 3

List of Contacts

1. ALPUCHE, Jorge Ivan, MVZ
Chief of Field Operations
Belize Screwworm Eradication Program

2. AUGUST, John
Butcher

3. AUGUST, Peter
Butcher

4. AWE, Elias A.
Information Officer
Belize Screwworm Eradication Program

5. BEDRAN, Sandra
Manager
Atlantic Bank, Belize City

6. BELISLE, Denton
Mnaging Director
Development Finance Corporation, Belmopan

7. BOBADILLA, Catalina
Farmer
San Antonio, Rio Hondo, Orange Walk District

8. BRUCE, Jimmy C.
Program Coordinator
Mex-U.S. Screwworm Eradication Committee

9. CAL, Moises
Program Administrator
BLDP - Phase II, Belmopan

10. CARBALLO, Ofelio
Farmer
San Lazaro, Orange Walk District

11. CARR, John
Chairman
Belize Livestock Producers Association

12. CUELLAR, Manuel
Managing Director
National Development Foundation of Belize, Belize City

13. GARCIA, Pedro
District Agricultural Officer
Orange Walk District

14. GONZALEZ, Liborio
Chief Agricultural Officer
Ministry of Agriculture and Fisheries, Belmopan

15. HABET, Orlando
Livestock Officer
Central Farm

16. HOLDER, Dr. Marla
San Ignacio

17. HURLEY, Robert
Farmer
Cayo District

18. JUAN, Eduardo Jr.
Farmer
Cayo District

19. LEDESMA, Raphael A., Ph.D
Livestock Management Specialist/Chief of Party
Belize Livestock Development Project, Phase II

20. LIKE, George E.
Agricultural Development Officer
USAID/American Embassy

21. LIZARRAGA, Mark
Owner, South Side Mini Market
Belize City

22. LOHR, Manfred
Farmer
Cayo District

23. MCGANN, Joe
Project Manager
USAID/Belize

24. MCKESEY, Lincoln
Owner, McKesey Meats
Belize City

25. MOE, Bonifacio
Farmer
Orange Walk District

26. NEAL, Rodney
Permanent Secretary
Ministry of Agriculture and Fisheries, Belmopan

27. NOVELO, Jose
Farmer
Novech Farm, Yo Creek, Orange Walk District

28. OBANDO, Leonardo
Chairman, Board of Directors
Macal Dairy Cooperative

29. ORIO, Orlando
Executive Secretary/Field Officer
Belize Livestock Producers Association

30. PADRON, Manuel
Farmer
Orange Walk District

31. PARHAM, Windel
Director, Policy Planning Unit
Ministry of Agriculture and Fisheries, Belmopan

32. PATTEN, Allison
Agriculture Officer, Pastures
Central Farm

33. PECH, Melanio
Agriculture Officer
Central Farm

34. SHOL, Sebatian
Extension Officer
Ministry of Agriculture and Fisheries

35. SILVA, Dr. Balmore
Ministry of Agriculture and Fisheries

36. TERGAS, Luis E., PH.D
Pasture Management Advisor
Belize Livestock Development Project, Phase II

37. TORRES, Santiago
Farmer
Chan Pine Ridge, Orange Walk District

38. TROYER, Peter
Farmer
Cayo District

39. TZUL, Marco
Extension Officer
Ministry of Agriculture and Fisheries

40. VALENCIA, Elide
Resident Director
Central Farm

41. VERA, Ontonio
Farmer
Cayo District

42. WAIGHT, Joe
Butcher

43. WAIGHT, Joe
Permanent Secretary
Ministry of Economic Development, Belmopan

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ANNEX 4

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45. "Andropogon, a Productive Grass Recommended for Planting with 'Milpa' System, and in Association with Legumes in Belize," Tergas, Luis E., Ph.D., Valencia, Elide, and Patten, Alison G. Belize.

46. "Chrysopogon, a Productive Grass Recommended for Planting with 'Milpa' System," Tergas, Luis E., Ph.D., Valencia, Elide, and Patten, Alison G. Belize.

47. "Dwarf Elephantgrass, a High Quality Forage Grass for Belize," Tergas, Luis E., Ph.D., Valencia, Elide, and Patten, Alison G. Belize.

48. "Kleingrass, Blue Panic and Green Panic, Promising Forage Grasses for Belize," Tergas, Luis E., Ph.D., Valencia, Elide, and Patten, Alison G. Belize.

49. "Limpograss, a High Quality Grass Recommended for Planting in Lowlands," Tergas, Luis E., Ph.D., Valencia, Elide, and Patten, Alison G. Belize.

50. "Weed Management in Pastures in Belize," Native Pastures, Belize Livestock Development Project, Phase II (Draft form, first of three proposed manuals).