

A.I.D. EVALUATION SUMMARY - PART I

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

IDENTIFICATION DATA

A. Reporting A.I.D. Unit: Mission or AID/W Office <u>BELIZE</u> (ES# _____).	B. Was Evaluation Scheduled In Current FY Annual Evaluation Plan? Yes <input checked="" type="checkbox"/> Slipped <input type="checkbox"/> Ad Hoc <input type="checkbox"/> Evaluation Plan Submission Date: FY <u>93</u> Q. <u>1</u>	C. Evaluation Timing Interim <input type="checkbox"/> Final <input checked="" type="checkbox"/> Ex Post <input type="checkbox"/> Other <input type="checkbox"/>
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D. Activity or Activities Evaluated (List the following information for project(s) or program(s) evaluated; if not applicable, list title and date of the evaluation report.)

Project No.	Project /Program Title	First PROAG or Equivalent (FY)	Most Recent PACD (Mo/Yr)	Planned LOP Cost (000)	Amount Obligate to Date (000)
505-0006	Belize Livestock Development Project Phase II	'88	12/92		

ACTIONS

E. Action Decisions Approved By Mission or AID/W Office Director	Name of Officer Responsible for Action	Date Action to be Completed
Action(s) Required		
1. Government stations should raise the price of improved breeding stock to encourage the private sector to enter this market.	MAF	N/A: Project Completed
2. Surplus beef must be actively sold abroad.	MAF/BLPA	"
3. Steps should be taken to encourage poultry producers to become members of the Livestock Producers Association.	BLPA	
4. Improve the economics of swine production by encouraging producers to produce needed animal feed.	MAF/BLPA/Coop. Dept.	
5. Conduct feeding trials with the objective of identifying cheaper local feed stuffs.	MAF	
6. Nurseries should be established for production of legume seed for use by dairy farmer.	MAF	
7. Additional training of farmers is needed in pasture management.	MAF	
8. Increased administrative and technical assistance should be provided to Macal dairy.	Coop. Dept.	

(Attach extra sheet if necessary)

APPROVALS

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

G. Approvals of Evaluation Summary And Action Decisions:

	Project/Program Officer	Representative of Borrower/Grantee	Evaluation Officer	Mission or AID/W Office Director
Name (Typed)	Joseph McGann		Winston Bennett	Barbara P. Sandova
Signature	<i>Joseph McGann</i>		<i>Winston Bennett</i>	<i>Barbara P. Sandova</i>
Date	6/23/92		7/11/92	

S U M M A R Y (Continued)

Special Policy and Analytical Studies: A major constraint has been the lack of personnel in the MAF Policy Unit. Studies on milk and poultry industries, though identified, could not be undertaken though all other planned studies were accomplished. The return of two individuals from long-term training will address this staffing problem.

Honey Bee Rehabilitation Programme: In 1992, a program to rehabilitate honey industry was initiated with project funding. A facility was constructed to breed and sell milder queens. Equipment and materials have been sold to farmers to rehabilitate their hives and the money recovered used to establish a revolving fund.

Meat Processing: Several demonstrations and in-country short courses were provided to local processors.

Training: Long- and short-term training abroad and in-country training of farmers exceeded plans and were well received.

Belize Livestock Producers Association: BLPA is the only countrywide organization devoted to promoting and protecting the ability of cattle producers in Belize to produce and market. BLPA is managing the Fondo programme and the Livestock Central Market. Financial support provided to BLPA by BLDP II has greatly increased the capacity of BLPA to function. Further, involvement of BLPA in BLDP II project activities has broadened its vision of the industry and brought it closer to MAF.

Principal Recommendations

1. The MAF cannot provide all the seed and breeding stock required by the livestock industries. A few selected farmers should be involved in the production of breeding stock. The price charged by the MAF for breeding stock should not be less than that charged by breeding stock producers.
2. To reduce cost of production of pork, producers should use locally grown corn as feed.
3. Realising (a) producers need TA in a sequence of activities leading to production of pork, milk, beef or breeding stock, (b) producers are dispersed wide apart, and (c) shortage of TA staff time and transport facilities for them; the selected producers should be located in clusters, in highly accessible areas, close to where TA staff are stationed and that a project approach be used. This approach will also reduce the cost of marketing of primary produce.
4. In view of the need of a vibrant private sector organization for livestock and primary focus of the BLPA on beef production, poultry producers members should be brought into the organization.

Lessons Learned

The nongovernment Belize Livestock Producers Association was strengthened to improve its performance capability and has taken on new and expanded responsibilities, i.e. management of a credit fund and a Livestock Central Market. However, BLPA additional support will be required.

A.I.D. EVALUATION SUMMARY - PART II

SUMMARY

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

- Purpose of evaluation and methodology used
- Purpose of activity(ies) evaluated
- Findings and conclusions (relate to questions)
- Principal recommendations
- Lessons learned

Mission or Office: USAID/Belize	Date This Summary Prepared: 6/4/93	Title And Date Of Full Evaluation Report: Review of the Belize Livestock Development Project Phase II-3/10/
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Purpose of evaluation: The purpose of this evaluation was to review the accomplishments of BLDP II since its mid-term evaluation, review work plans for project related activities for 1993, and to provide appropriate recommendations to the GOB regarding the continuation of project activities after termination of USAID funding December 31, 1992.

Methodology: In carrying out this evaluation, the contractor reviewed all pertinent materials such as the BLDP II Project Paper, mid-term evaluation, workplans, reports, etc., and interviewed officials of USAID, BLDP II, BLPA, the MAF, and farmers participating in the project. Visits were also made to Government stations and farms.

Purpose of activity evaluated: To increase livestock production efficiency, expand market outlet and increase the volume of livestock products. The project was designed to address key constraints in production efficiency, expand market, and enhance the role of the private sector.

Findings and Conclusions: It was found that of the seven EOPS indicators of the Project, four were fully achieved, one was partially achieved, and two were not achieved. The four achieved were beef production, institutional growth, private sector, and the screwworm programme. Credit and marketing systems was partially achieved during the life of the project. While progress has been made, two EOPS, increased pork and milk production for local consumption was not achieved during the life of the project.

The findings of the followings activities under the Livestock Development Project are listed below.

Swine Production: The absence of farm records remains a serious problem to swine improvement as production parameters cannot be accurately evaluated, cost benefit analysis cannot be done and breeding programme cannot be designed. This problem has been addressed by BLDP II staff and should be furthered improved with the recent importation of new blood lines and by the implementation of the swine improvement plan designed under BLDP II. The swine improvement plan included breeding programmes, computerizing record keeping system, training in pig management and husbandry and several educational publications.

BLPA should increase its activities in swine production and marketing to better serve this portion of its producer-members. More emphasis also needs to be given to the technical and economic possibilities for using by-product feed materials.

Dairy Development: This EOPS was not achieved. There is only one Livestock Officer at Central Farm who is in charge of both beef and milk production. He is the main resource person for the dairy industry who makes operation and management plans for Central Farm and dairy farms. All milk animals at Central Farm are bred by Artificial Insemination.

Macal processing plant is of pivotal importance to expand milk production. Due to internal problems, Macal production did not increase. Present management of Macal has addressed this situation and the price paid to farmers has increased. There was a

S U M M A R Y (Continued)

steady increase in amount of milk purchased by Macal from January 1992 (28,992 lbs) to December 1992 (44,835 lbs). The staff of the Macal plant is generally qualified to run the plant but production errors effect the quality of produce and profitability.

Beef Production: Improved Brahman stock was imported and breeding plans were made and computerized, under the BLDP II. A large number of farmers and extensionist were trained in management and breeding of beef herds. Studies on pastures with reference to beef production were conducted. Credit was introduced. Market study was undertaken and a health inspection center was constructed at the Belize/Mexico border to facilitate export of live beef.

Pasture Improvement: Pasture improvement programme has progressed by introducing new grass species, nurseries, establishment and training of farmers in pasture management. Cost benefit of improved pastures has not been determined though cost of establishment, stocking rate, increased weight gain and increased milk production have been determined.

Nurseries have been established with financial assistance of the project to expand improved pastures. A laboratory to test purity of seed has been established at Central Farm and is operational.

Artificial Insemination (AI): The AI program was established in collaboration with beef and dairy producers. AI is being practiced at the Government stations for dairy and beef herds, and at farms in the Cayo district for dairy cows. The program is now operational on GOB beef herds and private dairy herds.

Screwworm Eradication Programme: In June 1992, Belize was declared free of screwworm and has maintained that status. Field Inspectors and Biotechnicians continue to monitor the situation throughout the country through farm visits and intensive "sweep" operation.

In 1992 following the success of the Screwworm activity, a Vampire Bat Education and Control Programme was initiated and administered through BLDP II. The activities funded were hiring of a consultant, and logistical support to training and purchase of equipment. This programme was integrated with the GOB component of the Screwworm Eradication Programme for field work. The vampire bat control programme is progressing satisfactorily.

Livestock Central Market (LCM): The LCM was constructed at Belmopan for a total cost, including design and equipment, of \$221,000. BLPA will operate the LCM.

Credit: The credit component of the project established a line of credit for small and medium livestock producers. This program is a partnership programme between the GOB and participating livestock producers.

Laboratory Services: The Meat Residue Laboratory never functioned because of shortage of finances to buy some equipment. The Veterinary Clinic and Diagnostic Lab at Central Farm received equipments such as a mobile clinic, and some embryonic transfer equipment. The mobile clinic greatly increased the efficiency of work of the field veterinarians.

The Soil and Tissue Analysis Lab at Central Farm has been renovated and is fuctional.

ABSTRACT

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

The Belize Livestock Development Project Phase II was a follow-on activity to Phase I. The goal of BLDP II was to increase productivity, income and quality of life of entrepreneurs engaged in livestock production. Achievement of such a goal will contribute to increasing employment in livestock production, processing and distribution system, and enhance the balance of trade situation through import substitution.

The project has five components: Livestock Management; Improved Pasture & Feed Management; Policy Studies; Laboratory Services; and Credit.

The BLDP II was completed in December 31, 1992. In March 1993, the contractor Dr. B.K. Rai, completed a final evaluation report. The major findings and conclusions of the evaluation report are:

1. domestic pork production and processing capability increased by 30 percent during the life of the project;
2. dairy production increased by 10 percent per annum;
3. the Livestock Producers Association and the GOB were responsible for the establishment of a livestock credit program;
4. project funded training strengthened the Ministry of Agriculture;
5. the private sector through the Livestock Association became a significant force in directing livestock industry programmes.;
6. an operational screwworm programme is in place and adequately funded and supported by GOB and meeting criteria of joint U.S./Mexico Commission. Belize became free of screwworm in mid-1992 and has remained so up to the present.

Lessons Learned

The non-government Belize Livestock Producers Association was strengthened to improve its performance capability and has taken on new and expanded responsibilities, i.e. management of a credit fund and a Livestock Central Market. However, BLPA additional support will be required.

COSTS

I. Evaluation Costs

1. Evaluation Team		Contract Number OR TDY Person Days	Contract Cost OR TDY Cost (U.S. \$)	Source of Funds
Name	Affiliation			
B.K. Rai, Ph.D.	---	15		
2. Mission/Office Professional Staff Person-Days (Estimate) _____		3. Borrower/Grantee Professional Staff Person-Days (Estimate) _____		

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REVIEW OF THE
BELIZE LIVESTOCK DEVELOPMENT PROJECT

PHASE II

Submitted to: United States Agency for International
Development, Belize
Ministry of Agriculture and Fisheries, and
Belize Livestock Producers Association

Submitted by: B.K. Rai, Ph.D.
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March 10, 1993

LIST OF ACRONYMS AND ABBREVIATIONS

AI	-	Artificial Insemination
BLDP I & II	-	Belize Livestock Development Project, Phase I and II
BLPA	-	Belize Livestock Producers Association
BOD	-	Board of Directors
CF	-	Central Farm, Ministry of Agriculture and Fisheries
D.A.O.	-	District Agricultural Officer
D.F.C.	-	Development Finance Corporation
E.O.	-	Extension Officer
EOPS	-	End of Project Status
ET	-	Embryo Transfer
GOB	-	Government of Belize
LCM	-	Livestock Central Market
NDFB	-	National Development Foundation of Belize
MAF	-	Ministry of Agriculture and Fisheries
PP	-	Project Paper BLDP II
T.A.	-	Technical Assistance
UHT	-	Ultra Heat Treated
USAID	-	United States Agency for International Development

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to many persons who shared their time, experience and knowledge and gave support to the review and preparation of this report. Individuals who have especially been helpful include Principal Veterinary Officer, Dr. Ivor Burns, Livestock Officer, Derrick Clare and Principal Agricultural Officer, Mr. Jose Smith from the Ministry of Agriculture and Fisheries; Agricultural Development Officer, George Like, Project Managers Fred Hunter Jr. and Joseph McGann from the USAID, and Executive Secretary, Orlando Orio from Belize Livestock Producers Association.

TABLE OF CONTENTS

	Page
Executive Summary	1
I. Introduction	5
II. End of Project Status Indicators.....	7
III. Swine Production.....	11
IV. Dairy Development.....	16
V. Beef Production.....	21
VI. Pasture Improvement.....	27
VII. Artificial Insemination.....	32
VIII. Screwworm Eradication Programme.....	35
IX. Livestock Central Market.....	36
X. Credit.....	38
XI. Laboratory Services.....	41
XII. Special Policy and Analytical Studies.....	43
XIII. Honey Bee Rehabilitation Programme.....	45
XIV. Meat Processing.....	46
XV. Training.....	47
XVI. Belize Livestock Producers Association.....	49
Annexes.....	51
Annex I - List of Contacts.....	51
Annex II - Statement of Work.....	53
Annex III - Project Log Frame.....	56

EXECUTIVE SUMMARY

A. Background

Belize Livestock Development Project-Phase II was approved in December, 1988 and had a project assistance completion date of December 31, 1992. The project was designed as a follow-on activity to an earlier work and had as its primary objective the improvement of livestock production efficiency, expansion of market outlets, and increased volume of livestock products. Another project goal was also to improve the ability of the private sector to contribute to livestock development. The project had five major activities:

- (i) Improved livestock management for greater enterprise profitability to be achieved through genetic improvement, screwworm eradication and marketing/processing;
- (ii) Pasture/feed management improvement;
- (iii) A policy and analytical studies component to strengthen the data base and framework of analysis for planning and policy making;
- (iv) A laboratory services component to strengthen capabilities and facilities to ensure quality services; and
- (v) A credit component for livestock producers.

The objectives of the review are to determine accomplishments of BLDP II since its mid-term evaluation and to provide appropriate recommendations regarding the continuation of project activities after termination of USAID funding December 31, 1992.

B. Project Accomplishments

Belize became free of screwworm in mid-1992 and has remained so up to the present.

Institutional strengthening of the MAF was assisted through human resources development and services support able to meet sector needs. Three staff members of the MAF obtained B.S. or M.S. degrees while 32 persons mostly staff of MAF received short-term training abroad in different aspects of livestock production. By means of seminars and demonstrations, 1,238 farmers were trained. Capability of the MAF to service the livestock industry increased with better equipped soils and vet laboratories, computers and transportation provided under the project.

Belize Livestock Producers Association, a private sector organization, with project assistance improved its performance capability and has taken on new responsibilities, i.e. management of credit and a new Livestock Central Market. Involvement of BLPA with BLDP II has brought it closer to MAF.

The project focussed mostly on beef production through genetic improvement of herd, pasture improvement, credit, foreign market assessment and assistance in the construction of a facility at the Belize Mexican border to export live cattle to Mexico. However, farmers income did not increase as beef or cattle could not be exported.

In absence of a holistic approach to pork and milk production production did not increase, though useful work on some components of production was accomplished e.g. importation of breeding stock of swine and developing breeding plans, breeding plans for dairy cattle, AI, and training of farmers in swine and milk production. Because of these project efforts, it is anticipated that milk and swine production will increase in the near future.

C. Recommendations

Increased production or increased income to farmers during the implementation or at the end of a project, attracts resources to continue activities post-project. However, the project initiated some activities basic to the improvement of the livestock industry

and thus, these activities will be continued. Recommendations for activities to be continued have been mostly developed in consultation with those involved in conducting the activities.

A total of 22 recommendations have been made for continuation of activities by MAF, Management of BLPA, and farmers. Major recommendations can be grouped as under:

- Since the MAF cannot provide all the seed and breeding stock required by the livestock industries, it is recommended to involve a few selected farmers in production of breeding stock. As a corollary to this, the price charged by the MAF for breeding stock should not be less than that charged by breeding stock producers.
- To reduce cost of production of pork and taking clue from broiler production in Spanish Lookout, it is recommended that pork producers use corn, a major component of feed, produced by themselves and processed at a village level facility now that rural electrification scheme is on.
- Realising (a) producers need TA in a sequence of activities leading to production of pork, milk, beef or breeding stock, (b) producers are dispersed wide apart, and (c) shortage of TA staff time and transport facilities for them; it is recommended that the selected producers should be located in clusters, in highly accessible areas, close to where TA staff are stationed and that a project approach be used. This approach will also reduce the cost of marketing of primary produce.
- For import substitution and to expand internal demand for primary produce; realizing that Belize is more rural than urban and many households lack refrigeration; it is recommended that a consultant(s) be hired to determine the economics of processing milk (and fruit juices) and meat into forms that would not need refrigeration during distribution i.e. 'UHT' milk and canned meats.
- In view of the need of a vibrant private sector

organization for livestock and primary focus of BLPA on beef production, it is recommended that BLPA make poultry producers members by levying a cess to provide services needed by the poultry industry and to strengthen itself financially, the concept being that a developed enterprise supports a fledgling one.

I. INTRODUCTION

A. Background

The Belize Livestock Development Project Phase II was a follow-on activity to Phase I. The goal of BLDP II was to increase productivity, income and quality of life of entrepreneurs engaged in livestock production. Achievement of such a goal will contribute to increasing employment in livestock production, processing and distribution system, and enhance the balance of trade situation through import substitution.

The purpose of the BLDP II was to increase livestock production efficiency, expand market outlet and increase the volume of livestock products. It was designed to address key constraints in production efficiency, expand market and enhance role of private sector. The project had five major activities:

- (i) Improved livestock management for greater enterprise profitability to be achieved through genetic improvement, screwworm eradication and marketing/processing.
- (ii) Pasture/feed management improvement comprising of cost/benefit demonstration, establishment of nurseries, testing on farm grain storage and in-country training.
- (iii) Special policy and analytical studies and trade. The object of this component being to strengthen data base and framework of analysis for planning and policy making.
- (iv) Laboratory services component was to strengthen capabilities and facilities to assure quality services, and
- (v) A credit component for livestock producers.

B. Purpose of Review

To review accomplishments of BLDP II since its mid-term evaluation, review work plans for project related activities for 1993, and to provide appropriate recommendations to the GOB regarding the continuation of project activities after termination of USAID funding December 31, 1992.

C. Procedure

The documents reviewed were: Final Evaluation BLDP (March, 1987), Project Paper BLDP II (June, 1988), Internal Review BLDP II (June, 1991), Mid-Term Evaluation BLDP II (August, 1991), implementation workplans 1991-92 and 1993, final report of long-term consultants, quarterly reports of BLDP II and some reports of short-term consultants. Interviews were held with officials of the MAF, and BLPA, and farmers participating in the project. Visits were made to Government stations and farms.

Based on information gathered and analysis thereof, a report has been prepared detailing finding and recommendations for the continuation of activities initiated under the project. Most of the recommendations have been developed in consultation with those to be involved in implementation. Evaluation of EOPS indicators has been conducted.

II. END OF PROJECT STATUS INDICATORS

Seven EOPS indicators have been identified in the PP. Evaluation of individual indicators follows:

1. Increased domestic pork production and processing capability by 30 percent by life of project.

The number of pigs slaughtered each year from 1988 to 1992 did not change while there was an unsatisfied demand of pork by processors indicating that the EOPS was not achieved.

The activities undertaken by the project were: importation of breeding stock, develop breeding plans, computerize swine records and train farmers in production. Testing on-farm grain storage, recommended in PP, considered important since corn constituted about 75 percent by weight of swine ration, was not done. Analysis of feeder pig production in private sector as recommended in PP should have been given priority to remove this bottleneck in increased pork production which still exists. If feeder pigs are available, a large number of farmers could fatten them using corn produced by them. Report of consultant on use of local products as feed became available only in January, 1993.

It appears that the project staff did not consider the EOPS otherwise they would have taken a holistic approach for increased production and identified and removed bottlenecks while still emphasizing certain component activities.

2. Dairy production increases by 10 percent per annum and meets Macal Cooperative volume and quality requirements

The amount of milk purchased by Macal dropped from 550,635 lbs in 1989 to 419,090 in 1990, 407,186 in 1991 and 415,912 in 1992 and remained at about one third of the processing capacity of a single

shift, indicating that the EOPS was not achieved.

The activities undertaken by the project in dairy sector were: development and revision of operational and management plans for Central Farm and farmers, animal breeding plan, milk records at Central Farm, AI and training of farmers. It appears that the project staff did not consider the EOPS and thus did not take a holistic view to increase milk production. Mid-term evaluation refers to shortage of milk cows which is correct for large increases in milk production but sufficient milk cows are available to produce the needs of Macal. The real problem is at Macal itself which was not identified and addressed. The project had financial capability and flexibility to address new problems as evidenced by inclusion of new activities in the project like management of africanized bee and construction of a cattle inspection station for export of live cattle.

3. Beef Production continues to meet domestic supply requirements and exports of quality beef expands 10% per annum.

Beef production continues to meet domestic supply requirements but export dropped because of closure of Belize Meats Ltd. which exported beef. Presently, there are surplus cattle which if not exported will lead to drop in price. Further, it is commonly mentioned that cattle are swimming across the border into Mexico.

In view of the above and lack of figures, it is felt that the EOPS has been achieved.

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.

Production of beef satisfied local demand and surplus had problems in export. Market assessment for Belizean cattle and beef

in CARICOM countries, Mexico and USA was conducted. BLDP II assisted in construction of a facility for export of live cattle to Mexico.

Livestock Central Market (LCM) building was constructed in end-December, 1992 and is expected to become operational in April, 1993. LCM will assist in marketing of all livestock.

BLDP II assisted in establishment of credit for fattening of steers by farmers (Fondo Ganadero). Credit for pork and milk production was not considered.

EOPS was partially achieved.

5. GOB Ministry of Agriculture institutional growth through human resources development and services support able to meet sectors needs.

Human resource development component of the BLDP II functioned very well. Three staff members of the MAF obtained B.S. or M.S. degrees while 32 persons mostly staff of the MAF received short-term training abroad, in different fields of livestock. In seminars and demonstrations, 1,238 participants were trained in extension methodology, pasture management, cattle management, dairy management, cattle breeding, AI, swine management, poultry production and bee-keeping.

Soil and Tissue Analysis Laboratory and Veterinary Clinic and Diagnostic Laboratory at Central Farm received equipment and training to provide a better service to the livestock industry. A consultant determined that to start the presently non-functional pesticide residue analysis laboratory, US \$200,000 were needed to buy equipment and reagents. Funds were not available and the laboratory did not start functioning.

The vehicles and computers, provided under the project greatly enhanced the capability of staff of MAF and BLPA to perform their duties, and service the farmers.

EOPS achieved.

6. Private sector becomes a significant force in directing livestock industry programmes on a constructive basis with GOB entities

BLPA is devoted to promoting and protecting the ability of cattle producers in Belize to produce and market. Under BLDP II it is able to perform its functions much better. Because of BLDP II its new activities are: management of credit programme for fattening steers and management of Livestock Central Market. Roles of MAF and private sector have become distinct while working together for betterment of the livestock industry. Limited financial resources of BLPA is a bottleneck in assuming a greater role. Presently, BLPA focuses most of its activities on beef production and marketing .

EOPS has been achieved.

7. An operational screwworm programme in place adequately funded and supported by GOB and meeting criteria of joint US-Mexico Commission.

On June 21, 1992 Belize was declared free of screwworm. Up to present, Belize continues to be free of this pest. Field Inspectors and Biotechnicians continue to monitor the situation throughout the country through farm visits and intensive "sweep" operations.

EOPS achieved.

Overall Conclusion

It is seen from above that out of seven EOPS indicators, four were fully achieved, one partially and two were not achieved. The two EOPS not achieved were increased pork and milk production for local consumption.

III. SWINE PRODUCTION

A. Results of Swine Improvement Programme under BLDP I

The swine component has stimulated producer interest in establishing swine enterprises and has achieved impressive momentum, even though current number of co-operators is limited. Potential for expansion appears promising. It would appear that insufficient thought and effort were given to the design of swine production systems that use feedstuffs produced by the farmers themselves and that are otherwise locally available at economical prices. The focus was changed to place higher priority on developing a stronger link between production, marketing and processing, and emphasizing work with farmers producing feeder pigs to sell to finishing operations.

The proposed follow-on activities focus on import substitution: increase production and market outlets. These interrelated project components would form the core of a follow-on project.

B. Activities Identified in Project Paper, BLDP II

- Importation of additional breeding animals predominantly boars to improve the swine herd. Small herds of each breed that are pure bred should be maintained to enhance a three-way-cross programme.
- Special emphasis will be placed on improved feeding systems and rationing programmes using locally produced feed. MAF work on locally produced feedstuff will be expanded.
- Analysis of the swine industry as to
 - importation issues related to imports of high protein concentrates versus relative needs of local

- products;
- cost/price differentials in production and marketing, and
- production of feeder pigs in the private sector.
- Testing on-farm grain storage. On-farm demonstrations of new methods, techniques and cost effective structures will be emphasized.

C. Summary of Results Presented at Internal Review

- To up-grade the genetic potential of the swine herd, 36 gilts and 18 boars were imported.
- Training in swine management production provided in two in-country training workshops to 50 farmers and 10 Extension Officers.
- Six publications

D. Results of Mid-Term Evaluation

The national pig population has decreased from 20,570 heads in 1987 to 17,816 in 1990 against 30 percent increase expected over the life of the project. Belize Livestock Producers Association (BLPA) slaughter figures have risen over the same period from 8,030 to 9,550. Favourable consumption combined with Mexican market caused a price increase. National Development Foundation of Belize (NDFB) contributed to increased interest by providing credit. There is currently demand for breeder and fattener pigs. 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 programme cannot be designed. This problem has been addressed by BLDP II staff.

The swine management plan included adequate breeding programmes, computerizing record keeping system, training in pig

management and husbandry and several educational publications. The supply of breeding stock to small farmers reduced from 173 in 1989 to 97 in 1990, at CF. This problem should be improved with the recent importation of new blood lines and by the implementation of the swine improvement plan designed under BLDP II.

BLPA should increase its activities in swine production and marketing to better serve this portion of its producer-members. More emphasis also needs to be given to the technical and economic possibilities for using by-product feed materials. One ingredient that should be given high priority is the feeding of cane juice to swine.

E. Plan of Work

- a. August, 1991 to December, 1992
 - To produce 1,056 heads of selected breeding stock for sale to farmers. (Achievement was about 1/2 of this)
 - Improvement to four piggeries at Central Farm, Burrel Boom, Stann Creek and Yo Creek. (Completed but facilities at Burrel Boom and Stann Creek need improvement)
 - Collection of data on methods and results of management of pigs. (Completed)
 - Short-term overseas training for two in artificial insemination. (Not accomplished)
 - Sugar-cane juice feeding trial. (Completed using growing breeding pigs)
 - Training in swine management practices to 50 farmers. (Completed)
 - Two publications. (Not achieved)
- b. 1993
 - Nil

F. Findings

Increase of domestic pork production by 30 percent, EOPS, did not materialize, as the number of pigs slaughtered were: 8,654, 8,270, 9,550, 8,180 and 8,168 in 1988, 1989, 1990, 1991 and 1992 respectively (BLPA Slaughter Reports). On-farm slaughter account for 15-20% of total slaughter returns, that are not recorded.

There is one Livestock Officer at Central Farm, in charge for pork production. The imported breeding stock is doing well at Central Farm and Yo Creek Stations. The Government stations could not meet the demand for breeder stock or fatteners and its role needs to be restricted to supply of seed stock to farmers multiplying breeder stock. Studies on feeding cane juice to growing pigs have been completed but data have not been analyzed yet. A consultancy report entitled "Alternative livestock feeding systems for Belize" became available at end of December, 1992.

To improve the economics of production, it is felt that all swine rearers should at least produce all the corn needed which is about 75 percent by weight of feed used. The success of Mennonites in producing broilers at Spanish Lookout is in part due to corn production by poultry farmers. Thus, depending on the amount of corn produced by a farmer, he should plan swine production. The production operation could be farrow to finish, feeder pig production or fattening only. At San Antonio Village three pig producers conduct farrow to finish operations with 15, 10 and 5 sows each, purchasing ready to use feed. With the expected drop in price of pork, the profitability will reduce unless farmers start to use corn produced by themselves. San Antonio village has electricity and an electric hammer mill could be used to grind corn. Protein concentrate could be mixed with ground corn to produce feed. A large number of farmers could be involved in fattening operations purchasing feeder pigs in the village. This approach to production of pork should be taken up as a challenge by Central Farm and BLPA. On-farm demonstrations of new methods, techniques and cost effective structure for storage of grains on farms identified in PP, having bearing on this approach to swine production, was not conducted.

The project has provided quality breeding stock in the country and farmers have been trained in swine husbandry.

G. Recommendations

(i) Realizing that the Government stations cannot supply the demand of all breeder pigs, it is recommended that the Government stations:

- produce a limited number of high quality breeding pigs;
- sell the breeder pigs to 10 selected farmers who will multiply the breeding stock for sale; and
- provide technical assistance and production supervision to these ten farms each having 10 to 15 sows breeding unit. (Action: MAF)

(ii) To improve the economics of production, it is recommended that the extension service of the Ministry of Agriculture and Fisheries (MAF) and BLPA encourage all swine producers to produce most of the corn needed for feed. Thus, depending upon the amount of corn produced by them, the producers could undertake farrow to finish, feeder pig production or fattening operations. A pilot pig production effort, at village level, incorporating corn production, grinding and mixing with purchased protein concentrate should be attempted. (Action: MAF/BLPA/Co-op Dept.)

(iii) Feed is the main cost component of production. Thus, feeding trials with the objective of identifying cheaper local feed stuffs should be continued. (Action: MAF)

IV. DAIRY DEVELOPMENT

A. Results of Dairy Industry Development Effort under BLDP I

Macal dairy plant was completed and is currently processing milk of acceptable quality. The short falls in accomplishments of stated objectives seem to be due to over-estimation of the interest and commitment of Macal producer members to seriously enter the dairy industry and the underestimation of technical and managerial requirements for the milk processing plant. Insufficient milk supply to the Macal plant places some question on the future economic viability of Macal Plant.

Fresh milk market may be limited due to high cost of production and marketing of pasteurized milk compared with imported manufactured products, and the lack of refrigeration in many households. Some of the suggestions for follow-on activities were:

- Increase production of dairy cattle. Consideration should be given encouraging milk production by beef cattle herds.
- Integrated feeding systems as feed supply is the primary production constraint in dairy production systems.
- Provision needs to be made for vital production inputs including improved breeding stock (AI) and production credit.

B. Activities Identified in Project Paper, BLDP II

- An AI program, based at Central Farm, in close collaboration with dairy producers will be developed and supported. Special emphasis will be directed to the membership of Macal Cooperative.
- Sound dairy husbandry practices will be promoted to

increase milk production. Again, special emphasis will be on those producer who supply the Macal Cooperative.

- If feasible, promote dual purpose animals to improve milk production.

C. Summary of Results Presented at Internal Review

- An operational and management plan for Central Farm and dairy farmers was revised.
- A breeding plan was prepared for the dairy animals at Central Farm and with dairy farmers.
- Records of dairy cows at Central Farm were updated and computerized.
- Milk production and calving percentage increased at Central Farm.
- Thirty eight farmers were trained in dairy management and sanitation practices.
- Three publications on AI were produced.

D. Results of Mid-Term Evaluation

- Dairy production continued slow increase. Western Dairies was the major producer. Macal produced about 150 gallons per day.
- Improvement in Macal dairy will translate into a faster rate of growth of milk production.
- Shortage of breeding stock and replacement milking cows hampers production. Milk production at Central Farm is increasing but herd is small and limits the number of animals made available to dairy farmers.

E. Plan of Work

- a. August 1991 to December, 1992.

- To produce and select 30 females and 15 males for sale to farmers. (Target achieved)
 - Quality milk for consumers: One technician was provided to Macal who left after working for one year.
 - One dairy technician to be recruited in October, 1991. (Not recruited)
 - 60 farmers and 15 Extension Officers to be trained in three sessions in dairy management practices. (One training session was held)
 - Visit 30 dairy farmers, once a week. (Farm visits were made)
- b. 1993
- Nil

F. Findings

There is one Livestock Officer at Central Farm who is in charge of both beef and milk production. He is the main resource person for the dairy industry who makes operation and management plans for Central Farm and dairy farms.

All milk animals at Central Farm are bred by AI. Since the two AI Technicians have been removed to other duties, it will be difficult for the Livestock Officer alone to provide AI services to the Macal membership. Two Mennonites were trained, of which one left the country and the other is providing AI service in the community.

Macal processing plant is of pivotal importance to expand milk production being an outlet for farmer's produce. The management of processing at Macal had problems and thus production never increased. Present management of Macal has solved problems for the time being and also price paid to farmers has been increased. There was a steady increase in amount of milk purchased by Macal from January, 1992 (28,992 lbs) to December, 1992 (44,835 lbs).

Quantity of milk purchased by Macal (lbs)

<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>
471,921	550,635	419,090	407,184	415,912

Macal has the capacity to process 1,500,000 lbs of milk p.a., in a single shift. To increase income, Macal is processing orange juice and distributing imported "UHT" milk. In the performance of the last activity, it is gaining useful experience in handling 'UHT' milk.

G. Recommendations

- (i) In view of conflicts in membership of Macal even at Board of Directors level it is recommended that a Co-operative Officer of the GOB should be nominated on the Board of Directors to counsel and guide the Directors. (Action: Cooperative Department)
- (ii) The staff of the plant is qualified to run the plant but every now and then there are slips, quality of produce drops, Macal loses financially and as a result reduces purchase of milk from producers. To overcome this problem, it is recommended that a knowledgeable person should visit the plant once a month and check operations of the plants. (Action: Macal/MAF).
- (iii) In view of continuous need of training of farmers in dairy husbandry, need of AI service and to encourage new farmers to produce milk, it is recommended that one Extension Officer be trained and appointed to perform these duties, special emphasis being directed to the membership of Macal. (Action: MAF/BLPA)
- (iv) To reduce the cost of servicing dairy farmers and to increase profitability of producers by reduced cost of freighting highly perishable produce to plant, it is recommended that selection of new producers should be limited to producers located in clusters and in highly accessible areas close to the plant. (Action: MAF and Macal)

- (v) It is recommended that Central Farm should target to produce increasing number of dairy heifers for sale to farmers, starting possibly with 50 in 1993. (Action: MAF)
- (vi) Realizing that market for pasteurized milk may be limited due to need of cold storage during distribution and lack of refrigeration in many households, it is recommended that option of 'UHT' should be considered when market for pasteurized milk was satisfied. (Action: Policy Unit, MAF)

V. BEEF PRODUCTION

A. Follow-on Action Suggested in Final Evaluation of BLDP I

- Increase the production of beef cattle and market outlets.
- Integrated feeding-systems activity would be primary focus.
- Credit.
- Belize cannot compete in U.S. deboned beef market because of CIF cost in the U.S. relative to other imported low quality beef and similar beef produced in the U.S.. Also transport costs and availability of EEC export subsidized beef and other external factors will limit competitiveness within CARICOM. On the other hand, progress has been made in slaughtering and meat processing and packaging to produce meat products that are cost and quality competitive in Belize with imported meat products.

B. Activities Identified in Project Paper, BLDP II

- Genetic improvement in beef herd through importation of beef cattle to be used in the MAF multiplication programme for distribution to producers.
- Comparative cost frame work would be assessed in order to determine Belize's comparative advantage within CARICOM. Technical and/or policy changes for developing viable negotiating positions with CARICOM partners need to be determined. This is particularly necessary for beef (various forms and cuts), canned meats and other livestock products.

C. Summary of Results Presented at Internal Review

- Review and evaluation of cattle herd at Central Farm and Yo Creek: Livestock Management Plan developed.
- Three hundred cattle inseminated artificially at Central Farm, Yo Creek as well as private farms.
- Four in-country workshops provided training in management and breeding practices for 144 farmers and 20 extensionists. Nine private ranchers were trained in AI.
- Five publications prepared.

D. Results of Mid-Term Evaluation

- BLPA estimates show a decline in annual slaughter number from 8,317 heads in 1987 to 7,139 heads in 1990. Part of decrease may be explained by the closure of Belize Meats Ltd. and present lack of beef exports.
- Poor husbandry, low genetic quality and poor pasture management continue to be major constraints.
- Cost of producing beef relative to prices received indicate the enterprise to be marginal when all resources are priced at market value.
- Live export of animals to Mexico contributed to increase in price to \$1.15 per lb in 1990. 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.
- Twenty Brahman heifers and five Brahman bulls were imported.
- Both the BLDP II and BLPA focussed on beef production.

E. Plan of Work

- a. August, 1991 to December, 1992

- Bull soundness evaluation planned for 150 heads. (About 1/3 accomplished)
 - Short-term training abroad in embryo transfer was planned for two officers of Central Farm. (Accomplished)
 - 120 embryo transfers were planned. (Not accomplished at all due to shortage of some equipment and drugs and other "infra-structure facilities)
 - It was planned to wean 119 males and females each at Central Farm and Yo Creek and then select them for breeding. (about 1/2 the target numbers were reached)
 - Two livestock field days to be held and 35 - 40 farmers to be trained. (Target accomplished)
 - One technician to be recruited. (Accomplished)
- b. 1993
- Maintenance of purebred herd and upgrade through import of bulls and use of AI.
 - Bull soundness evaluation will be carried out when requested.
 - Use of ET to increase Indu-Brazil stock in Orange Walk. (All equipment and drugs and infra-structure not available)

F. Findings

The data collected from the BLPA and presented below indicated that the number of cattle marketed by beef industry remained stagnant from 1988 to 1992. After the closure of Belize Meats Ltd. only a few cattle were exported to Mexico in 1990 and 1992.

	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>
Slaughter (Heads)	7,285	6,061	7,139	6,904	6,774
Exports (Heads)	<u>0</u>	<u>0</u>	<u>125*</u>	<u>0</u>	<u>50*</u>
	7,285	6,061	7,264	6,904	6,824

Data from BLPA. * Exported to Mexico

Export of cattle to Mexico in 1990 increased and set the price at \$1.15 per pound effective up to the present. As there is no export market at present there is an indication that the price is going to drop by 10 to 15 cents per pound.

Cost of production of beef determined by a consultant, under the BLDP II, varied from \$1.01 to \$1.57 per lb live weight under different levels of management. Similar result was obtained at Central Farm for one level of management. These costs indicate that many operators are willing to accept lower returns for owned resources due to their varied motivations for holding the assets and the means by which they acquired them. The assets may have been inherited or are perceived to be more secure form of wealth. The variable cost of production (consumed inputs in a single production period) on natural pasture was \$0.51 which must be recovered in the short-run and the fixed costs (depreciation, tax and interest on investments), a major part of which is non-cash, would rationally be recovered during the useful life of the asset or enterprise would be terminated. It is of interest to mention here that many farmers terminate beef enterprise each year. In light of this, it is clear that beef production is marginal when all resources are priced at market value.

Cost of establishment of improved pastures varies from \$117.86 to \$693.52 per acre depending upon degree of improvements made, the least costly being native pasture with 20 percent legume bank. In view of marginal profit in beef production, these costs are considered high. Improved pasture percentage was: 38 in 1978 and 31 in 1984 in the country of Belize and 38 in 1991 in Orange Walk district. These data indicate that percentage of improved pastures has not increased though a lot of effort has been made, over the years, by the MAF. However, carrying capacity of new improved pastures is higher than that of earlier improved ones because of better species of grasses being planted now. Further, some natural pastures are as good or better than improved ones.

Similar to pasture improvement, most producers do not pay much attention to genetic improvement of herd, though the importance is

realized. However, it can be argued that an improved herd on improved pastures would be more productive and economical. Some large producers do have better quality animals on improved pastures. In 1989, BLPA imported 44 breeding quality bulls for farmers from Guatemala. Now and then some farmers import improved stock, from adjoining countries.

Improved Brahman stock was imported and breeding plans were made and computerized, under the BLDP II. A large number of farmers and extensionist were trained in management and breeding of beef herd. Studies on pastures with reference to beef production were conducted . Credit was introduced. Market study was undertaken and a health inspection centre was constructed at border with Mexico to facilitate export of beef on hoof. These topics are discussed elsewhere in this report but have been brought together to indicate that the BLDP II focussed on beef production.

Based on a recommendation of mid-term evaluation; the Coordinating Committee of BLDP II monitored the execution of breeding plans through Project Administrator. There are indications that plans at Central Farm were changed. Post-project, the monitoring activities could start as soon as a senior officer of the MAF on studies abroad, returns.

G. Recommendations

- (i) Beef herd needs about 120 new bulls, annually, and the Government stations can produce only about 30 - 40. Most farmers cannot produce pure bred even after purchase of pure bred bulls as they do not own pure bred dams. In view of this, Government stations should supply seed stock to a few selected farms and provide supervision, so that in a few years these farms will produce breeding stock to meet the need of the industry. (Action: MAF/BLPA)
- (ii) Central Farm and Yo Creek stations charge low prices for pure bred animals in comparison to that charged in adjoining countries. This is a deterrent to local production of

improved stock by farmers for sale and it is also possible that some improved stock reaches slaughter house. The Government stations should raise sale price of improved stock to a level that it is economical for private individuals to go into production of breeding stock for sale. (Action: MAF)

(iii) In the interim, quality breeding stock not necessarily pure bred should be identified, certified and sold to other farmers. Information on availability with and need of farmers could be circulated in BLPA newsletters. Livestock Market Centre would also assist in distribution of breeding stock. (Action: BLPA)

(iv) Small amount of surplus beef must be sold abroad otherwise price drops in the country and producers suffer. Marketing abroad should be actively pursued at all times. (Action: MAF/BLPA)

(v) Grading of ready to slaughter beef animals and payment accordingly will motivate farmers to produce better quality animals. It is recommended that grades should be established and introduced to the beef industry. (Action: MAF/BLPA)

VI. PASTURE IMPROVEMENT

A. Results of Evaluation of BLDP I

Accomplishment of the pasture component in fostering a national pasture improvement programme are limited. Current emphasis on on-farm demonstrations of improved pastures using field tested and proven grasses and legume species may set the stage for expanded use of improved pastures by farmers.

External constraints to the advancement of pasture improvement programme were high costs and perceived unfavourable cost/benefit ratios for the establishment of improved pastures, few proven pasture improvement programmes, and the limited availability of field tested tropical forage legumes that are suited to specific production systems.

Pasture programme should be integrally linked with dairy and beef cattle feeding systems programme and should include economic analysis.

B. Project Paper BLDP II

- With the exception of phosphorus, all the nutritional requirements of cattle can be acquired in adequate amounts from palatable nutritious forages.
- Cost benefits of forage improvements at Central Farm and the other stations as well as on-farm sites will be demonstrated.
- High quality vegetative material and seed production nurseries of pasture/feed species will be established.
- Establish a functional seed multiplication unit at Central Farm.
- Better qualitative evaluation for recommended

pasture/forage/grain will be developed.

- Magnitude of output of BLDP II
 - 12 demonstrations on pasture improvement.
 - 6 -8 new publications.
 - 20 in-country short courses, seminars and workshops involving 400 people.
 - Complete 5 nurseries on GOB stations and 20 farms.
 - Cost benefits of on-farm forage improvements as part of demonstration analysis.
 - Operational seed multiplication laboratory.

C. Results of Mid-Term Evaluation

There are 45,000 heads of cattle on 120,000 acres of cleared land. This would indicate that adequate land is available for present use as well as in the near future. It is believed that about 10 percent of the farmers went out of cattle business within the last year.

- Some 37 farms were evaluated in five (5) districts representing 7,000 acres of which 13 selected farms of 120 acres, planted in four (4) districts with 12 species, will be studied and evaluated.
- Project imported seed to initiate the establishment of improved pastures in cost/benefit demonstration. 1,200 lbs seed of 15 species from 3 countries imported at a cost of US\$5,233.
- Pilot pasture seed production programme planned to be initiated in early 1991 with harvesting and processing to begin in 1992.
- Data to determine cost of establishment for different pasture systems was collected, separately for low and high input technology.
- Principles for the management and control of weeds in pastures were established. Two short courses, one

- demonstration and one seminar were carried out.
- Training of Extension Officers and farmers in pasture utilization and grazing management. However, the greatest level of success must be achieved in pasture establishment as its basic step.
 - New legumes and grass species adapted to acid infertile soils, are being evaluated.

The evaluation suggested the following:

- Emphasis should be on increasing carrying capacity as well as animal weight gain from existing and new improved pastures.
- Interest in improved pasture should expand as more information is developed on profits through cost/benefit analysis.

D. Plan of Work

- a. August, 1991 - December, 1992
 - Grazing trials on station and on farms for beef production. (Accomplished)
 - Improved pasture management for increased milk production. (Milk production increased by 16 percent when cows left for 3 hours a day in protein bank)
 - Establishment of nurseries - 50 acres. (Accomplished)
 - Training in grazing management, weed control, nursery establishment and management, and seed production. (Accomplished)
- b. 1993
 - Improved pasture management for increased milk production at Central Farm.
 - Establishment of nurseries.
 - Training farmers countrywide in grazing, weed control and dry season supplementation.

E. Findings

Pasture improvement programme has progressed well with reference to introduction of new species, nurseries, establishment and training of farmers in pasture management. Cost/ benefit of improved pastures has not been determined though cost of establishment, stocking rate, increased weight gain and increased milk production have been determined. May be it is too complex a task but review of BLDP I, Project Paper BLDP II, Mid-Term Evaluation BLDP II alludes to its need. Its determination further assumes significance as studies conducted under BLDP II indicate that beef production is marginal economically.

Nurseries have been established with financial assistance of the project to expand improved pastures. All nurseries are used for grazing till seed/planting material is needed. A laboratory to test purity of seed has been established at Central Farm and will become operational as soon as seeds are available.

Since beef production is economically marginal and cost/benefit of improved pastures has not been determined, it is felt that consideration be given to introduction of tree legumes in existing pastures especially those belonging to small farmers. The Government Official in both the Orange Walk and Cayo Districts felt that greater emphasis needs to be placed in establishment of pastures using vegetative planting material and thus such nurseries need to be established in all extension zones. However, cost of establishment of pastures with vegetative material is higher than establishment with seed. Feed supplementation in dry season was needed using minerals and molasses and/or protein bank. Seeds of grasses with 10-14 percent protein content, are available and can be imported to improve the carrying capacity of pastures. Guatemala and Mexico adopted such grasses several years ago. There are no protein banks in Orange Walk district, at present.

F. Recommendations

- (i) Nurseries of vegetatively planted grasses should be

established in all extension zones, with varieties suited to zones for use of cattle farmers. Grass seed can be obtained from existing nurseries. (Action DAO, and Pasture Agronomist)

(ii) Nurseries should be established for production of legume seed for use by dairy farmer. (Action: DAO and Pasture Agronomist)

(iii) Continuous training of farmers needed in pasture management especially to avoid over grazing and to provide supplemental feed in dry season. (Action: Pasture Agronomist)

VII. ARTIFICIAL INSEMINATION

A. Project Paper BLDP II

The project paper recognizes that AI is a proven technology for introducing new genetic material into the nation's dairy herd. At the present time, much of the milk produced by Macal and other dairy enterprises is produced by beef-type cows. Introduction of improved genetic characteristics in the present stock of animals will lead to increased production per cow.

Improvement in beef cattle herd presents an entirely different set of challenges. The nation's beef herd is largely Zebu breed and is dispersed over a wide geographic area. This restricts the use of AI given the intensive management required to maintain a cost effective programme. Importation of improved breeding herd is recommended as a rapid and efficient intervention for national beef herd improvement. A small pure bred breeding herd will be kept at Central Farm. Bulls will be sold at a fair market price to farmers.

B. Programme of BLDP II

A consultant for establishment of a breeding improvement plan stated in his report, "Government herds and selected private herds are recommended to multiplying seed stock from AI. Young bulls would be sold to farmers as principal means of distribution of superior genetics". In introduction to an AI publication of BLDP II in 1990, it is stated that AI is most widely practiced with dairy and beef cattle all over the world. As such the project initiated AI activity for the milk and beef herds inspite of what the project paper stated and the consultant recommended. The activities initiated were:

- Three persons were trained in AI in the U.S.A.
- In eight training sessions, 149 farmers and technicians were trained.
- Farmers were selected with dairy and beef herds to commence AI.
- Target set was 1,370 heads in 1990.

C. Constraints to achievements realized at time of internal review

- Late arrival of equipment. Most breeding cattle were put to natural mating by time of arrival of equipment.
- Farmer's reluctance and non-available time for heat detection.
- In Orange Walk, the cane season put farmers out of touch with their cattle.
- General lack of motivation due to poor progress within the livestock industry. Farmers are willing to invest if a reasonable return on investment can be achieved.

D. Plan of Work

- a. August, 1991 to December, 1992
 - Six technicians to be trained in AI. (Four were trained)
 - Fifteen E.O.'s to be trained in AI. (Six were trained)
 - AI service to be provided to 1,200 heads of cattle. (340 animals were inseminated)
 - Eight meetings of AI Advisory Committee planned. (Two meetings were held and then the committee dissolved)
- b. 1993
 - AI programme inactive. The causes of poor output were:
 - Cost of synchronization and AI.
 - Conflict with other farm activities.
 - Lack of facilities to restrain animals on farms.
 - Lack of continuity of staff.

- Communication attempt: beef vs dairy.

The work sheet concluded that AI should be restricted to dairy animals only.

E. Findings

The FP clearly recognized AI for dairy herd and indicated other approach to genetic improvement of beef herd because of logistics of implementation. A consultant at the start of the project recommended use of AI at the Government stations and selected private farms, to multiply seed stock and sale of young bulls to farmers for distribution of superior genetics. The project attempted AI on beef herd by training more than one hundred farmers and setting target of 1,370 heads, in 1990. The effort failed and the farmers had a bad experience.

AI is being practiced at the Government stations for dairy and beef herds and at farms in the Cayo district for dairy cows, on request.

VIII. SCREWWORM ERADICATION PROGRAMME

On August 2, 1988, at Kerrville, Texas, an agreement for Technical and Scientific Co-operation was signed by the Government of Belize with the Mexico-United States Commission for the Eradication of Screwworms. The objective of this agreement was to establish a program to eradicate the Screwworm (*Cochliomyia hominivorax*, Coquerel) from Belize, and to prevent reinfestation.

The program was officially launched on August 25th, 1989. The Program was implemented by the Belize Ministry of Agriculture and Fisheries and the Mexico-United States Commission for the Eradication of Screwworms. The GOB funded its part of the effort including contribution from BLDP II. The staff on the project is from GOB and the Commission. The technology for eradication is proven. No major operational problems was encountered. In June, 1992 Belize was declared free of screwworm. Up to the present, Belize continues to be free of screwworm. Field Inspectors and Biotechnicians continue to monitor the situation throughout the country through farm visits and intensive "sweep" operation. If Belize continues to be free, the efforts of the Commission in monitoring the surveillance will cease in December, 1993 while the efforts of the GOB will be reduced from April, 1994, onwards.

This is a successful component of the BLDP II. In 1987, BLPA estimated a loss of 1.5 million dollars due to this pest, annually. Farmers are enthusiastic about this effort which has reduced mortality among calves. Control of this pest will also help the well being of wildlife.

In 1992, a "Vampire Bat Education and Control Programme" was initiated with savings of BLDP I, administered through BLDP II. The activities funded were: hiring of a consultant, logistical support to training and purchase of equipment. This programme was integrated with GOB component of the Screwworm Eradication Programme for field work. The vampire bat control is progressing satisfactorily.

IX LIVESTOCK CENTRAL MARKET

A. Project Paper BLDP II

A pilot project under the management of the BLPA and in cooperation with the MAF will be initiated in the Belmopan area which will provide producers with a central location to sell animals. Based on experience of operation, assessment of prospects for expansion will be conducted.

B. Mid-Term Evaluation

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 BLPA. Failure of the 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. While the central market facility at this time is difficult to support on economic grounds, there are valid social and developmental objectives that could justify its construction.

Achievements to be highlighted are: (i) completion of a central market concept paper, (ii) a study tour to visit and observe livestock auction facilities in the U.S., (iii) formation of a co-ordinating committee composed of representatives of BLPA, MAF and USAID and the contractor, (iv) completion of a livestock market assessment study, (v) completion of a feasibility study, and (vi) completion of specifications, plans and blueprints and bids received.

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 GOB is providing a site for the facility.

C. Present Status

The construction of building was completed in December, 1992 but utilities are not provided yet and are expected by end-March,

1993. The expanded objectives of the Livestock Central Market are:

- i. To establish a facility which will provide a fair market price for both buyer and seller;
- ii. To establish confidence and trust in market prices;
- iii. To establish a known and fair market cost;
- iv. To establish a centralized location for procurement for butchers and processors;
- v. Implementation of a competitive bidding process;
- vi. Enable the exploration of potential complementary programs such as: implementation of livestock grades and standards; training activities; supply production related materials i.e. barbwire, minerals and medicines, provision of pasture propagating material, etc.

The operational plan of the Livestock Central Market is:

- i. Village representative determines the number and type of animals available in the area.
- ii. Representative contacts Livestock Central Market to make necessary arrangement: transportation and cattle delivery dates.
- iii. Livestock Central Market and/or producer arrange means of transportation.
- iv. Livestock are received and processed for sale.
- v. Livestock are sold on sale day.
- vi. Financial transactions are conducted at Livestock Central Market on sale day by buyer and seller.

The Livestock Central Market is expected to be operational in April, 1993 under the aegis of BLPA. BLDP II provided institutional support to BLPA in 1991 and 1992 to a total value of Bz\$72,000. It was hoped that with that support, BLPA will have saving to help in the start-up of the Livestock Central Market. Surplus is not generated. BLPA feels confident of operating the Livestock Central Market once utilities are provided in the facility. An attached slaughter plant can contribute to the success of the LCM.

X. CREDIT

A. Suggested Follow-On Activity to BLDP I

Practically all information provided and resource persons contacted considered the lack of production credit for limited - resource producers to be a primary constraint. Also the collateral requirements of commercial banks are too often beyond the available assets of these producers and the risk levels they will accept. Credit mechanisms being used in Latin America are the Fondo Ganadero and the Collateral Gratuity Fund.

B. Project Paper BLDP II

Credit component of the project will establish a local currency line of credit for small and medium livestock producers who have difficulty obtaining credit through commercial banks. It is acknowledged that loan recovery problems have been serious and that lenders have resisted lending to many farmers because of agricultural prices, incomes and repayment capacities generally are not secure. This project component will establish a line of production and marketing credit for livestock growers with the National Development Foundation of Belize (NDFB) and/or Development Finance Corporation (DFC).

C. Mid-Term Evaluation Report

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 as it was attempted to implement the credit component. DFC was never seriously considered

as a lender and agreement with NDFB could not be reached because 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 project management recommended and all parties accepted the concept of Fondo Ganadero modeled on a successful effort in Honduras. An agreement between GOB and BLPA was signed on January 24, 1991. However, USAID has expressed considerable concern with Fondo Ganadero concept and AID funds are not being used for this activity.

D. Fondo Ganadero as evolved in Belize

The Fondo Ganadero is a partnership programme between the GOB and participating livestock producers. BLPA receives a management fee for managing the project. It is limited in scope and consists of the Government supplying funds for:

- i. purchase of steers,
- ii. purchase of minerals and veterinary supplies at a rate of \$2/month per animal and
- iii. transportation of animals.

Government expects 6% interest per annum with a repayment period of 18 months maximum. The producer or beneficiary agrees to offer 25% as security either as cattle or as a fixed bank deposit assigned to BLPA after his project has been found to be technically and economically feasible and the beneficiary shall provide pasture, fencing, water, corral and management.

BLPA agrees to prepare a feasibility report on the beneficiary, submit it to the Programme Management Unit for approval. After approval, BLPA disburses cattle and supplies as needed and supervises project at monthly intervals until ready for market. When marketed, BLPA deducts loan, interest on loan and other expenses and pays the beneficiary the profit of the operation.

First credit was given on October 1, 1991 and in 1993 there are 20 beneficiaries. The amount of outstanding credit to farmers at end of January 1993 was \$347,365.70. One farmer who had started with 40 steers in October, 1991, lost two animals, yet made a net profit of \$6,300 over a period of about a year. In November, 1992 he took another 31 steers on credit. A few other farmers had not sold their animals yet and were concerned about marketing and expected lower price.

The 20 beneficiaries are distributed in three districts and are at considerable distance from one another even in one district specially in Cayo. Such a distribution of beneficiaries increases cost of supervision. BLPA should consider this aspect when accepting new beneficiaries.

E. Credit for Other Livestock Enterprises

BLDP I provided \$120,000 to NDFB to manage a Swine Revolving Fund. NDFB provides loans at the rate of 12 percent interest with little or no collateral requirement. This fund, including a \$90,000 reflow, has been issued to farmers, leaving little or no capital for NDFB to continue lending. A swine production manual under BLDP II (April, 1992) suggests that there is an urgent need to establish a fund where farmers can have easy access to investment and operating capital. The Small Farmers Development Bank and the establishment of a Swine Fund, managed by BLPA, could address this issue.

Credit is also needed for milk production, purchase of beef breeding stock and establishment of pastures.

XI. LABORATORY SERVICES

The objective of this component is to strengthen laboratory capabilities, and related facilities within the MAF that have the responsibility of assuring that quality services to the livestock sector are maintained and supported.

A. Meat Residue Laboratory

This laboratory has the primary mission to assess residues of pesticides in meat for export certification and was established in 1986. Unfortunately the lab never functioned because of shortage of finances to buy some equipment. Finally, the scientist relocated himself in private industry after three years. Further, additional expenditure on equipment will not resolve the over crowded working conditions.

Under the BLDP II, Mr. Mario Fernandez attended Northeast Louisiana University and returned after obtaining M.Sc. degree in analytical chemistry. Ms. Delilah Cabb, received 4 months of training in Miami Medical School and USDA Eastern Laboratory at Athens, Georgia, on meat residue analysis. A consultant, Mr. Roy Meyers, performed a comprehensive analysis of the lab. He determined that equipment and reagents needed, will cost US\$200,000.

Some buildings, equipment and trained personnel are specialized to particular types of analysis. A multipurpose laboratory makes possible more and better quality product at less cost. Mid-term evaluation recommended creation of a centralized soils, tissue (including pesticide residues in meat or plant products) and veterinary diagnostic laboratory at Central Farm by pooling resources available at Central Farm and in Belize City, supplemented by donor support.

B. Soil and Tissue Analysis Lab at Central Farm

This laboratory analyses soils and plant tissues to recommend

fertilizer applications. There has also been some use of the lab for analysis of feeds and forages. Additional equipment purchased on a previous AID project remained in cartons for a long time as the chemist left the service. MAF took steps and recruited a VSO chemist whose present contract expires mid-1993. The lab building is being renovated and all equipment purchased in 1990 is now in working condition. It is expected that the lab will become functional shortly.

C. Veterinary Clinic and Diagnostic Lab at Central Farm

A situation request was presented to BLDP II in November, 1990. The equipments received are: mobile clinic, and some ET equipment. A lot of small equipment and x-ray machine have not arrived yet, even after repeated reminders. The project administrator of BLDP II indicated that he contacted IRI, consulting firm of BLDP II and who in turn contacted the supplier. The supplier informs that equipment has been sent, though not received in Belize. This matter needs to be resolved early.

The mobile clinic increased the efficiency of work of the veterinarians, immensely. Foreign training obtained by two MAF officials in embryo transfer remains unused as all the equipment purchased has not arrived yet.

Presently, meat is not being exported but residue analysis is needed to check the contamination of food and water used in Belize. This responsibility falls on the Ministries of Health, Trade, Environment and Agriculture. These Ministries should consider co-financing for start-up and continued operation of the laboratory. Some cost of operation could be recovered by charging a fee for samples tested under a legislative framework.

D. Recommendations

- (i) A joint meeting of MAF, Ministry of Health, Ministry of Environment and Ministry of Trade should determine the possibility of co-financing for a pesticide residue lab.
(Action: MAF)
- (ii) Urgent action needs to be taken so that equipment purchased for vet lab but not received yet, is traced.
(Action: USAID)

XII. SPECIAL POLICY AND ANALYTICAL STUDIES

The objectives of this component are to strengthen the data base and framework of analysis for planning and policy making and to provide financial resources to conduct studies that will impact on the overall agricultural policy objectives and production targets. Under BLDP I, the basic framework for an effective policy planning unit was put into place. BLDP II is to direct more attention to addressing policy issues affecting the overall livestock industry.

Activities performed under the direction of the MAF, Policy Unit were:

- i. Record and accounts essential for livestock producers.
- ii. Market assessment for Belizean beef and pork in Belize and Belizean cattle and beef in selected CARICOM countries, Mexico and USA.
- iii. Feasibility of establishing a Central Market facility to serve the livestock industry in Belize.
- iv. An analysis of the Livestock Central Market survey.
- v. Beef cost of production.
- vi. Swine production technological package.
- vii. Meat processing.
- viii. Alternative livestock feeding systems for Belize.

The assistance provided to the policy analysis unit were:

- Procurement of computer, software and programs.
- The Economist Mr. Efrain Novelo attended a 6 week training course at USDA, Washington in Basic Agricultural Survey Statistics and Methods, in September, 1990.
- Procurement of one vehicle for the Policy Unit.

A major constraint has been the lack of personnel in the Policy Unit. Studies on milk and poultry industries, though

identified, could not be undertaken though all other planned studies were accomplished.

Mid-term evaluation of BLDP II referred to staffing problems in Policy Unit and acceptable quality of data collected by field officers and suggested combining of statistical and data responsibilities of the Policy Unit and Central Statistical Office. The basic problem of shortage of staff will continue which impinges quality of data collected.

MAF recognize the need of more staff in the Policy Unit and advertized a position of a statistician, but there were no applicants. Two staff members of the unit are on long-term training abroad. One is expected to return back in March, 1993 and the other in 1994.

XIII. HONEY BEE REHABILITATION PROGRAMME

With the establishment of Africanized honey bee in Belize, production of honey declined as producers left beekeeping because of the vicious nature of the new strain. In 1990, MAF started a programme to sell unmated European queens to honey producers. The queens were obtained from imported mated queens at Richmond Hill. The recovery of queens after mating at farmer's level was about 50%. The farmers were sold the unmated queens at \$2.00 each.

In 1992, a programme to rehabilitate honey industry was initiated with funding from savings of BLDP I administered through BLDP II. The activities funded were: acquisition of queen bees, building a queen rearing centre, purchase of equipment, materials and motorcycles, and training. A facility created comprises of a mating yard where 18 colonies of Africanized bee are maintained. Fifty nucleus hives, each with an unmated European queen produced at Richmond Hill, are introduced in the mating yard, every 20 days. About 65 percent mated queens are recovered. From March to September, 1992, 224 mated queens were produced and sold to the farmers at \$4.00 each. The hybrid hives are less vicious and can be managed with relative ease. In honey flow of March to June, 1993, the farmers will know the production potential of these hybrid bees.

Equipment and materials purchased under the project have been sold to farmers and the money recovered will be used as a revolving fund to provide credit to other beekeepers.

In the plan of work for 1993, 11 activities have been identified seven of which need additional funding. Some of the important activities are: trapping of Africanized bee swarms to reduce feral bee population, production and sale of European queens, assistance to farmers in honey production and establishment of pilot apiaries to promote beekeeping.

XIV. MEAT PROCESSING

A. Evaluation Report BLDP I

Technical assistance to meat slaughtering and processing enterprises has called attention to import substitution potential for meat products and has stimulated an expansion of the industry and of the variety of products produced.

A follow-on activity suggested is meat processing that would support the development of livestock industries by enhancing the demand for meat.

B. Project Paper BLDP II

- Short courses and/or seminars are proposed for meat processors and butchers to demonstrate new products as well as improved processing procedures and techniques for packaging, labelling, distribution and storing of processed products.
- An expanded domestic market is possible if Belize can manufacture an acceptable corned beef product.
- Economical canning using retort packaging and/or plastic and metal cans will be investigated.

C. Accomplishment of BLDP II

Through nine demonstrations, eleven seminars and numerous individual contacts, training was provided in May, 1992, by short-term consultants for meat and poultry processors in the subject areas of plant sanitation, carcass evaluation, cutting methods, retail cut identification, improved meat processing techniques, use of new ingredients in least cost formulations, new product development, quality improvement and control and packaging and labelling of meat products.

D. Recommendation

For import substitution and to expand internal demand for meat, manufacture of corned beef and economical canning of meats not needing refrigeration during distribution needs to be investigated. It is recommended that a consultant should be contracted to evaluate possibilities and enlighten processors in this field of processing. (Action: MAF/Funding Agency)

XV. TRAINING

A. Long-Term Overseas Training

- Mr. Derrick Clare attended California Polytechnic State University and completed a B.S. degree in Animal Science, concentration in animal nutrition.
- Mr. Mario Fernandez attended Northeast Louisiana University and completed an M.S. degree in Analytical Chemistry.
- Mr. Feliz Tzul attended University of Arkansas and pursued an Animal Science degree with concentration in Poultry Science.

B. Short-Term Overseas Training

Name	Country	2 Duration	Objective
Elide Valencia	Costa Rica	3 days	Tropical Pasture Seminar
Manuel Cowo	Costa Rica	7 days	Seed Multiplication Seminar
Dr. Victor Gongora	U.S.A.	21 days	Foreign Animal Health Diseases
Dalilah Cabb	U.S.A.	120 days	Meat Residue Analysis
Orlando Habet	U.S.A.	7 days	Artificial Insemination
Sebastian Shol	U.S.A.	7 days	Artificial Insemination
Narco Tzul	U.S.A.	7 days	Artificial Insemination
Timothy Lewis	U.S.A.	24 days	Meat Inspection
Gaspar Martinez	Trinidad	18 days	Management of Livestock
Elide Valencia	Puerto Rico	6 days	Caribbean Fd. Crops Soc. Meeting
Efrain Novelo	U.S.A.	40 days	Agric. Survey Statistics Methodology
Moises Cal	U.S.A.	7 days	Study Tour of Auction Market
Melanio Pech	U.S.A.	7 days	Study Tour of Auction Market
Michael DeShield	U.S.A.	6 days	Embryo Transfer
Orlando Habet	U.S.A.	6 days	Embryo Transfer
Martin Cal	Trinidad	7 days	Apiculture
Julian Avila	Trinidad	7 days	Apiculture
Roger Cal	U.S.A.	12 days	Management of Auction market
Dr. H. Novelo	U.S.A.	14 days	Clinical Pathology
Manuel Trujillo	Columbia	55 days	Pasture seed production

Marion Lewis	U.S.A.	12 days	Management of Auction market
Jose Nevaro	U.S.A.	12 days	Management of Auction market
Dr. Homero Novelo	U.S.A.	10 days	Management of Auction market
10 farmers & Extensionists	Honduras	4 days	Pasture Utilization
2 MAF, 1 BLPA Officers	Honduras	7 days	Study Tour "Fondo Ganadero"

C. Short-Term In-Country Training

Seminars on different topics were held in all the six districts of the country. The information on number of training sessions and number of participants for different topics, from September 1989 to December, 1992 is presented below:

<u>Topic of Seminar</u>	<u>No. of Seminars</u>	<u>No. of Participants</u>
Techniques in extension	2	39
Pasture Management	7	222
Cattle Management	6	200
Dairy Management	1	11
Cattle Breeding	3	113
Artificial Insemination	9	175
Swine Management	7	242
Poultry Production	3	37
Meat Processing	11	54
Vampire Bat Control	1	7
Bee Keeping:	<u>14</u>	<u>199</u>
	<u>64</u>	<u>1,299</u>

Long and short-term training abroad and in-country training of farmers were the most successful component of the BLDP II.

XVI. BELIZE LIVESTOCK PRODUCERS ASSOCIATION

A goal of the BLDP II is to improve the ability of the private sector to contribute to livestock development. BLPA is the only countrywide organization devoted to promoting and protecting the ability of cattle producers in Belize to produce and market. This is done through legislation, education, product promotion and marketing. Every producer is eligible to be a member of the association. The affairs of the association are managed by a management committee of eight. To ensure continuity, four members are elected every year to a term of two years.

The present staff of BLPA are: an Executive Secretary, an Administrative Assistant and a Field Officer for Fondo Ganadero. The sources of income are cess on livestock sold locally or exported, registration of brands, and Fondo management fee. The amount of funds raised by BLPA in 1991 and 1992 were Bz\$110,000 and \$136,000 respectively including financial support of \$36,000 provided by the BLDP II in each year of 1991 and 1992. The expected amount of fund to be raised in 1993 is \$118,650.

The functions of the BLPA are:

- Secure markets. BLPA has been very active in this field. It had identified the Mexican market for poultry meat when it was surplus in Belize a few years back and for live cattle and some were exported in 1990 and 1992. This market has temporarily closed because of screwworm outbreak and low price in Mexico as a result of dumping of meat by a third country. To keep this market open, Belize was required to build a cattle inspection station at Santa Elena border. BLDP II funding assisted in this venture. BLPA is now negotiating with the Mexican authorities to start export of cattle. Export of surplus beef from Belize is essential to maintain a good price in Belize.

BLPA is looking at ways and means of obtaining funds to build

a modern USDA approved slaughter facility in the Burrel Boom area.

- Educate membership. This objective is achieved through meetings, seminars and workshops. BLPA newsletter was started in 1986 and has become a regular bimonthly since mid - 1992. Production of brochures on improved technology started in 1992 and about 25 have been produced so far. The efficiency of BLPA to produce educational material has greatly increased with funding provided by BLDP II.

- Legislation. Branding of cattle is required by law. BLPA registers brands and updates them. Updating is in progress, presently.

Amendment to "Cattle Theft Law" is contemplated.

- Farmer profitability. BLPA is looking at duty exemptions for imported inputs. Fondo programme being managed by BLPA will increase participating farmers income and introduce new concepts of production. Livestock Central Market will assist farmers to obtain fair price for their animals. Both Fondo programme and Livestock Central Market are discussed separately.

Financial support provided to BLPA by BLDP II has greatly increased the capacity of BLPA to function. Further, involvement of BLPA in BLDP II project activities has broadened its vision of the industry and brought it closer to MAF.

Recommendations

- (i) Producers of poultry are not members of the BLPA. The poultry industry needs assistance in the timely detection of diseases, checking quality of feed and meat, and identifying new products and markets. Cess could be levied at processing plants or at hatcheries. About \$100,000 could be raised annually. The concept is that a successful enterprise should support a developing enterprise. (Action: GOB/BLPA)
- (ii) The Field Officer for the Fondo programme, a graduate of Belize College of Agriculture, needs short-term training in cattle production. (Action: MAF/BLPA)

ANNEXES

ANNEX I

List of Contacts

Awe, Elias	- Chief Field Operations, Screwworm Eradication Programme
Bradley, Michael	- Manager, Macal Plant
Burns, Ivor (Dr.)	- Principal Veterinary Officer, MAF
Cabb, Delilah	- Technician, Residue Laboratory
Cal, Martin	- Apiaries Inspector, Orange Walk
Cal, Moises	- UNDP
Cal, Roger	- Fondo Programme, BLPA
Cawich, E.	- Cattlefarmer, Orange Walk
Cawich, O.	- Cattlefarmer, Orange Walk
Chimilio, Bertie (Dr.)	- Veterinary Officer, MAF
Clare, Derrick	- Livestock Officer (Nutrition), MAF
Fernandez, Mario	- In-charge Residue Laboratory
Figueroa, Mike (Dr.)	- Veterinarian, Orange Walk
Franklin, E. (Dr.)	- Manager, Brodies Ltd.
Fuente, Antulio de la	- Cattle farmer
Galvez, Ramon	- Farmer, Director Macal
Gongora, Domingo	- Bee-keeper
Guerra, David	- Farmer, Director Macal
Habet, Orlando	- Livestock Officer (Cattle) C.F.
Hunter, Fred J.	- Project Manager, USAID
Juarez, Alberto	- Bee-keeper
Leiva, Margarito	- Apiaries Inspector, Orange Walk
Like, George E.	- Agricultural Development Officer, USAID
Link, John	- In charge Pesticide Control Board
Lohr, Manfred	- Farmer, Chairman BOD, Macal
Manzanero, Jose	- E. O. Corozal
McGann, J.	- Project Manager, USAID
Nemeth, Elizabeth	- Chemist (i/c Soils Lab) CF
Novelo, Homero (Dr.)	- Veterinarian, Orange Walk

Novelo, Jose Sr.	-	Chairman, BLPA
Orio, Orlando	-	Executive Secretary, BLPA
Parafeiti,	-	Livestock Officer, Yo Creek
Parham, Wendell	-	Director, Policy Planning Unit, MAF
Patten, Allison	-	Agricultural Officer (Pastures), CF
Pech, Melanio	-	Livestock Officer (Swine), CF
Smith, Jose	-	Principal Agricultural Officer, MAF
Tillet, W.	-	Director of Medical Lab Services
Trujillo, Manuel	-	E.O. i/c Pasture programme, Orange Walk
Zibb, Victor	-	Cattle and Swine producer, San Antonio Village

STATEMENT OF WORK

I. PURPOSE

The purpose of this contract is to: review project accomplishments under the Belize Livestock Development Project (BLDP II) since its midterm evaluation conducted by Devres, Inc. in May 1991; review work plans for project related activities after January 1, 1993; and to provide appropriate recommendations to the Government of Belize (GOB) regarding the continuation of project activities after termination of USAID funding December 31, 1992.

II. BACKGROUND

The goal of the BLDP II is to increase agricultural productivity, income and quality of life among Belizean farmers particularly those producers and entrepreneurs involved in livestock production. The purpose of the BLDP II is to improve livestock production efficiency, expand market outlets and increase the volume of livestock products that are price and quality competitive with imported livestock goods.

The BLDP II was approved in December 1988, and has a project assistance completion date (PACD) of December 31, 1992. All USAID funded goods and services purchased under this project will be furnished by this date. The USAID supported activities of the BLDP II will not be extended beyond December 31, 1992, nor will there be a USAID supported follow-on activity.

The BLDP II was designed to complement an earlier project and has as its primary objective the improvement of livestock production efficiency, expansion of market outlets, and increased volume of livestock products for the local market. The BLDP has five major activities which focus on: i) improved livestock management; ii) pasture/feed management; iii) policy studies; iv) laboratory services; and, v) credit (non-A.I.D. funded).

The BLDP II was last evaluated in May 1991 and this evaluation made a series of recommendations to achieve long-term project objectives and to ensure that project achievements are sustained. As a result of this evaluation, a two-day project implementation seminar was held in August 1991. This seminar involved MAF, BLPA and USAID and BLDP II personnel and was held to elaborate workplans and assign specific responsibilities and mechanisms for their execution. In August of 1992, a one-day follow-up seminar was held to review the execution of the 1991

workplans and to draw up workplans, again with the assignment of specific responsibilities and mechanisms for their execution, for the continuation of Livestock Project activities beyond the completion date of USAID assistance.

Considering no continuation project is planned, USAID believes a full final project evaluation is not required. It is felt, however, that a final review of project activities and post PACD project plans could be of benefit to the MAF and USAID.

III. ACTIVITIES

The contractor will obtain and become familiar with BLDP II evaluation completed in May 1991, and the recommendations made in it. The contractor will also review the project implementation workplans drawn up in August 1991 and those of August 1992. These documents will be made available by the USAID Agricultural Development Office (ADO).

The contractor will discuss these recommendations and workplans with ADO staff and, working with the ADO BLDP II Project Manager, will draw up a list of suitable questions for discussion with representatives of the Ministry of Agriculture and Fisheries (MAF) and the Belize Livestock Producers Association (BLPD) and other officials related to BLDP II. The representatives, in which the contractor will take the principal role in conducting interviews to determine:

- whether the workplans adequately address the evaluation findings and recommendations;
- progress made by the relevant entities in meeting the recommendations;
- progress made in developing suitable workplans for activities after December 31, 1992; and
- whether resources and mechanisms (funding, organization, policy, personnel, equipment) are adequate to carry out the workplans.

In addition to the review of documents and interviews with relevant officials, the contractor may also find it useful to visit field sites such as Central Farm, Yo Creek and individual participating farmers.

Based on the information obtained and his analysis the contractor will prepare a report detailing his findings and recommendations. The report will include a listing of the recommendations made in the May 1991 evaluation, the BLDP II 1991/1992 and 1992/1993 workplans, the contractor's findings with regard to the questions identified above, including specific deficiencies identified. In addition, the report will provide the contractor's recommendations, including:

- if workplans are inadequate, suggested alternatives and means of execution;
- if resources are inadequate, suggested strategies to overcome the constraints;
- any other recommendations to maintain BLDP II activities and benefits after December 31, 1992.

IV. METHODOLOGY

The contractor will obtain needed information to conduct this review from documents found at the USAID office in Belize City and at the BLDP II Project Office in Belmopan. Interviews will be conducted with USAID, MAF and BLPA staff. Travel to project sites outside of Belize City and Belmopan may be required in conducting this review.

V. WORK SCHEDULE

It is anticipated that the time required for this evaluation will require the full-time services of one person for 15 work days. Services should begin not later than February 10, 1993, and be completed than March 10, 1993.

VI. REPORTING

The contractor will be responsible for drafting and completing a report based on the findings of this review. Copies of this draft report, which will detail procedures, contracts, findings and recommendations, will be submitted by the end of the 12th working day to USAID, MAF and the BLPA. The contractor will present a briefing to USAID, MAF, and BLPA staff at this time and incorporate comments into their final written report. This final report will be presented not later than end of the 15th working day of the contract. Two copies of the final report will be submitted to USAID, two copies to the MAF and two copies to the BLPA. In addition of the report will be submitted to USAID on a 5-1/4 inch diskette on a Word Perfect Format.

VII. LOGISTICAL ARRANGEMENTS

The contractor will be responsible for all logistical and secretarial arrangements required for the execution of this contract. These services will not be provided by USAID, the MAF nor the BLPA.

VIII. METHOD OF PAYMENT

Payment will be made within thirty days on presentation and acceptance of final report and submission of an invoice to the Controller Office, USAID/Belize, P.O. Box 817, Belize City.

IX. PERIOD OF SERVICES

Services under this statement of work are expected to commence on February 10, 1993, through March 10, 1993.

Annex III

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

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

AID 1070-28 (1-72)

Project Title & Number: _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>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.</p>	<p>Measures of Goal Achievement:</p> <ol style="list-style-type: none"> 1. Agriculture sector growth approximates 5% per annum. 2. Increased employment in the livestock production, processing, and distribution systems. 	<ol style="list-style-type: none"> 1. Socio-economic indicators and reports provided by GOB. 2. Special studies and evaluations related to household income. 	<p>Assumptions for achieving goal targets:</p> <ol style="list-style-type: none"> 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.
<p>Project Purpose:</p> <p>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.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<p>Assumptions for achieving purpose:</p> <ol style="list-style-type: none"> 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 sector.

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.

Magnitude of Outputs:

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.

Assumptions for achieving outputs

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 Association 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.