A.I.D. EVALUATION SUMMARY PART I

(BEFORE FILLING OUT THIS FORM, READ THE ATTACHED INSTRUCTIONS)

IDENTIFICATION DATA

A. REPORTING A.I.D. UNIT: AID/Burma (Mission or AID/W Office)

(ES#)

B. WAS EVALUATION SCHEDULED IN CURRENT FY ANNUAL EVALUATION PLAN? yes ☐ slipped ☐ ad hoc ☐

Eval. Plan Submission Date: FY 87 Q 3rd

C. EVALUATION TIMING: Interim ☐ final XX ex post ☐ other ☐

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 #	Project/Program Title (or title & date of evaluation report)	First PROAG or equivalent (FY)	Most recent PACD (mo/yr)	Planned LOP Cost ('000)	Amount Obligated to Date ('000)
482-0005	Maize and Oilseeds Production Project	1982	3/88	30,000	30,000

ACTIONS

E. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

Action(s) Required	Name of officer responsible for Action	Date Action to be Completed
Training:		
1. To the extent possible, arrange for BARD and BAPP short-term and long-term training to include research on tropical crops in developing countries or at International Agricultural Research Centers. Returned participant can then gain much practical experience that can be widely adapted to Burmese Agriculture.	Gary Alex, AADO	9/30/88
2. Develop a training plan for key seed farm personnel and BAPP managers to attend a study or observational tour of U.S. oilseed crop seed production programs over a full cropping season so that they are able to work with production of groundnut and sesame seed (self-pollinated crops), and to observe and learn from a private sector seed production program (sunflower).	Gary Alex, AADO BAPP TA Team	4/1/88
3. In order that returned participants can work in agriculture for longer periods of time, encourage a decision by the government to select appropriate		

(Attach extra sheet if necessary)

APPROVALS

F. DATE OF MISSION OR AID/W OFFICE REVIEW OF EVALUATION: mo___ day___ yr___

G. APPROVALS OF EVALUATION SUMMARY AND ACTION DECISIONS:

	Project/Program Officer	Representative of Borrower/Grantee	Evaluation Officer	Mission or AID/W Office Director
Signature				
Typed Name	Gary Alex	U Saing Uk	Terry Barker	Earl J. Young
Date:	12/31/87	12/31/87	12/31/87	12/31/87

1X

Action(s) Required	Name of Officer Responsible for Action	Date Action to be Completed
young candidates for long-term training. In order that they will put their training to practical use, encourage the government to select those who have demonstrated by their work a serious commitment to field work.	Gary Alex, AADO	2/28/88
Technical Assistance:		
4. In order to continue the innovative use of American farmers as consultants, attempt to incorporate in the BAP Project Work Plan use of U.S. farmers to provide appropriate assistance especially relating to seed farm management and crop production techniques.	Gary Alex, AADO BAPP TA Team	4/1/88
Project Inputs:		
5. Assure that the seed farms receive fertilizer, seeds, diesel fuel, building materials and other critical inputs to complete the development of the farms (land leveling, irrigation, and drainage on Sebin and Chaungmagyi).	Gary Alex, AADO	12/30/88
6. Assure follow-up on actionable recommendations from the fertilizer supply/demand study.	Doug Pickett, ADO	1/1/89
Sustainability:		
7. Incorporate in the BAPP Work Plan the development of bee-keeping operations in sunflower project areas to increase cross-pollination of sunflowers.	BAPP TA Team Gary Alex, AADO	4/1/88
Irrigation Pilot Projects		
8. Prepare inventories of MOP Project equipment and complete economic cost analyses demonstrating economic feasibility of irrigation pilot projects in the Irrawaddy Division before committing any new equipment to these activities.	Gary Alex, AADO BAPP TA Team UTinHtut, CMS	3/31/88
Rhizobium:		
9. Support ARI in moving rhizobium inoculum production facility to Maymyo.	Gary Alex, AADO	4/1/88

Action(s) Required	Name of Officer Responsible for Action	Date Action to be Completed
10. Assist ARI in its research programs to test the economic benefits of inoculum for groundnuts, on rhizobium adapted to Burma, and on the value of biological nitrogen fixation as a substitute for urea.	BAPP TA Team Gary Alex, AADO	11/1/88
Research:		
11. Assist the Agriculture Corporation to establish coordinated research plans for research activities and technical inputs by ARI, ARD and the seed farms.	Gary Alex, AADO BARD TA Team BAPP TA Team	10/1/88
12. Assist the Agriculture Corporation to develop a comprehensive fertilizer response research program and, following compilation of two years data, partition benefits of BAP project by input (fertilizer, seed, variety, and cultural practice).	Gary Alex, AADO BAPP TA Team	2/28/90
Beneficiary Impact:		
13. In coordination with the Agriculture Corporation, develop a socio-economic monitoring and evaluation system under the BAP Project at farm level to gather to test the effects of project technologies on farmers' yields, incomes, family work patterns and other factors relating to the nature and quality of farmer's lives before the BAP Project proceeds too far.	Gary Alex, AADO MOPP Eval. Team BAPP TA Team	9/30/88
14. Develop and submit to the Agriculture Corporation proposals for premium prices or other incentives which the government might use to encourage contract seed growers to produce adequate supplies of improved seeds.	Gary Alex, AADO BAPP TA Team	12/30/88

Action(s) Required	Name of Officer Responsible for Action	Date Action to be Completed
Impact on the Environment		
15. Through dissemination of technical brochures and scientific documents, seminars, short-term consultancies, research, etc., encourage the Agriculture Corporation to discontinue the use of Aldrin in Burma.	ADO/AADO/MUCIA	1/1/90

ABSTRACT

H. EVALUATION ABSTRACT (do not exceed the space provided)

The evaluation team concluded that the MOP Project was highly successful, and most of its recommendations were already being considered or would soon be implemented.

The team's enthusiasm for the results of the project were tempered by the concern about the economic situation in Burma. Burma is having increasing difficulty in obtaining the foreign exchange needed to import the investment goods increasingly being demanded by the economy. Burma's capital plant is in dire need of replacement. This includes mills, equipment, infrastructure, and almost all processing facilities. However, the exports of primary products going out of Burma are not adequate to cover the costs of imports for operations and maintenance, much less for replacement of plant. All of this is further exacerbated by declines in oil production and an increasing debt service burden which results from earlier policies. Such a situation suggests that it will be difficult to find the foreign exchange necessary to sustain gains made in agricultural production. Another concern stems from the difficulty in finding enough candidates to send abroad for professional training. Many of the current scientists were trained abroad several years ago. These are rapidly approaching mandatory retirement age. With only one agricultural university in Burma training at the graduate level, it will be difficult to meet the demand created by retirements, much less that required for further expansion of research, extension, management and production in agriculture.

The team concluded that there were no real failures under this project. There were delays and some outputs will not be fully operational before the project termination date, but the team concluded that this had not significantly interfered with the overall success of the project.

The specific causes of success of the project were:

1. Commitment of the Government of Burma to make the project succeed.
2. Technical assistance provided by the project.
3. Fertilizer made available through the project to project beneficiaries.
4. New seed varieties made available to project sites.
5. Introduction of improved cultural practices.
6. Economic opportunity for farmers to improve income.
7. Oilseeds are not a government controlled crop.

COSTS

I. EVALUATION COSTS

1. Evaluation Team

Name	Affiliation	Contract Number OR TDY Person Days	Contract Cost OR TDY Cost (US$)	Source of Funds
Mr. Warren Enger	RONCO	ANE-0005-C-00-7002-00	Approx $50,000	MOP Project
Dr. John Yohe	" "	" "		" "
Dr. Philip Boyle	" "	" "		" "

2. Mission/Office Professional Staff Person-Days (estimate) 36

3. Borrower/Grantee Professional Staff Person-Days (estimate) 60

5x

A.I.D. EVALUATION SUMMARY PART II

J. SUMMARY OF EVALUATION FINDINGS, CONCLUSIONS AND RECOMMENDATIONS (Try not to exceed the 3 pages provided)
Address the following items:

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

Mission or Office: A.I.D./Burma Date this summary prepared: 12/10/87

Title and Date of Full Evaluation Report: Final Evaluation Maize and Oilseeds Production Project (482-0005)--May 1987

The evaluation of the Maize and Oilseed Production Project (482-0005) was carried out in Burma between February 16 and March 14, 1987. This is the final evaluation of this project, following a mid-term evaluation by two years.

Findings: The evaluation team concluded that the project goal and purpose were met by reaching the quantified targets. Although it was noted that some of the outputs had not been fully achieved, most notably completion of the four seed farms, this did not affect reaching production targets. Shortfalls in seed from seed farms were made up by the use of contract growers. The delays in the development of the seed farms, caused by shortages of building materials and diesel fuel, therefore did not result in shortfalls of seed.

Shortfalls: Shortfalls in the project, such as a more complete understanding of impacts on participating farmers, shortage of Ph.D candidates and incomplete results of research are being addressed in related projects. Output #4 which called for a functional farm management information system was not achieved and will be implemented in a follow-on project.

Design and Implementation: The team feels that the goal and purpose were clear, targets were reasonable and obtainable, and the economic results were positive. The Burmese staff implementing the project were conscientious and undertook to assure that targets were reached. The technical assistance contractor, although apparently starting somewhat slowly, contributed significantly to the success of the project and to technology transfer to Burma. Their innovative use of American farmers as farm management and cropping systems consultants was extremely positive and well received by Burmese staff.

The USAID mission to Burma appears to have contributed greatly to the success of the project. The mission staff have an excellent rapport with Burmese officials and technicians and a thorough knowledge of the project. They have worked hard to overcome some difficult circumstances to insure that the project could be implemented smoothly.

Appropriateness of the Project Design: The Burmese preferred to have AID participate in a project that had high priority for the government but for which the technical approaches and implementation methodologies had already been worked out, at least in the grand lines, by the Burmese. The need was to obtain some rapid production increases, particularly in the oilseeds, given Burma's rapidly declining economic situation, while further technology was developed in-country and people were trained to carry on the work. The whole township system for agricultural extension is unique in that it incorporates not only the agricultural services of extension, research, input supply, marketing and credit, but it also involves the administrative branch of government from the national level down to the country, tract and village levels as

SUMMARY

well as the political systems down to the local level. In this way active participation by the technical services is assured. Because the systems for delivering technology to the farmers had been developed for rice, it was believed that the system could be easily adapted to handle the technology available for maize and the oilseeds.

Appropriateness of the Technology: The Burmese government felt that AID was an appropriate agency to assist in the expansion of maize and oilseeds in Burma due to the United States' long and successful experience in the production of these crops. Project designers from the U.S., however, recognized immediately that technology could not be simply transferred to Burma from the U.S. Several factors were important in this regard. The Burmese had little experience in the production and use of hybrid varieties of maize and sunflowers, two of the targeted crops, and little work had been done in Burma on testing varieties of soybeans, sesame, niger and groundnuts. In most cases the Burmese did not use highly mechanized production systems. Even animal traction was not at a high level of sophistication, particularly for cultivation other than rice. Fields in Burma were generally small and dispersed and contiguous fields of crops were not common for crops except rice. This makes management of insects and pest problems more difficult. Within this context, it was necessary to incorporate both training and research if a long-term program for the development of these crops were to be initiated.

"Rice extension" methodology under the project through the use of high technology sites (HTSs) at 40 locations in the eight intensive townships offered an ideal feedback mechanism for research. Adapting this methodology for maize and oilseeds was a technology that allowed much of the impressive gains in production from the project's inputs of seed and fertilizer.

The use of a proven, albiet unsophisticated, technology disseminated through a proven delivery system to obtain production gains while building a foundation for further technological advances, was the overall design.

Sustainability: By using the existing network of extension, research and seed multiplication systems in the country, the MOPP was able to get some quick and relatively cheap production gains from the project's inputs. The question is whether the country can sustain such production increases? The argument is somewhat speculative. Certainly the country can get further relatively cheap gains in oilseed production through the further development and use of hybrid sunflowers and the expansion of use of honeybees for pollination. Further production gains will depend on the ability of research programs to develop or adapt varieties and other technology. It will also depend heavily on the availability of fertilizer. Given Burma's current economic difficulty, making fertilizer available will not be easy. However, the project has definitely shown that fertilizer use will contribute greatly toward reaching national targets of oilseed and maize production. The technology has been proven.

Recommendations:

1. The follow-on project, Burma Agriculture Production (BAP) should search out ways by which critical input supplies such as diesel fuel can be made available to complete the development of the seed farms at Sebin and Chaungmagyi. Land leveling, irrigation and drainage are critical to making farms fully operational.

7x

2. Training should be continued under BAP and BARD. Training to the Ph.D. level in plant breeding and other services should focus on course work being accomplished in the U.S. and research toward development of the Ph.D. dissertation being accomplished in Burma. All M.S. degree training should be accomplished in the U.S.

3. Research plans should be developed for both ARI and the seed farms. Work plans should be developed and updated annually. Research should be initiated to partition the benefits of fertilizer, varieties and cultural practices under the Burmese environment.

4. BAP should continue to provide technical assistance in development of the seed farms at Thitcho and Kyaungsu.

5. For the four irrigation pilot projects in the Irrawaddy Division, economic/cost analysis studies should be prepared to demonstrate the plausibility of those activities. Up-to-date inventories of equipment and supplies should be made before new equipment is ordered. AID should concur in writing before new resources are committed to those four activities.

6. The rhizobium innoculum production facility should be moved to the peat mining site so as to economize on production of innoculum. ARI should continue to conduct research on the economic benefits of innoculum for groundnuts, research on rhizobium adopted to Burma and on the value of biological nitrogen fixation as a substitute for urea.

7. Short term training should be provided to keep seed farm personnel up-to-date in technologies. Short term training should also be provided to key seed farm personnel to spend 12-16 weeks (a cropping season) observing a state seed improvement association working. This last deals primarily with production of groundnut and sesame seed (self pollinated crops).

8. BAP project should search for ways to expand the bee keeping operations in sunflower project areas to assure cross pollination of sunflowers. It is estimated that farm level sunflower production could be increased 20-40% from this technical intervention alone.

9. The Agriculture Corporation should continue to identify and test acceptable substitutes to the use of Aldrin and look to completely eliminating this chemical from use in Burma during the BAP project.

10. The Agriculture Corporation should set up under BAPP a socio-economic monitoring and evaluation system to follow and evaluate farm-level changes in economic behavior leading to sustainable increases in oilseed production. The effects on BAPP farm families' quality of life also needs to be appraised. Work on survey instruments to measure socio-economic progress under BAPP has already begun. It should continue at least for the next five years.

BURMA

MAIZE AND OILSEEDS PRODUCTION PROJECT

482-0005

FINAL EVALUATION

RONCO Consulting Corporation
1629 K Street, N.W.
Suite 300
Washington, D.C. 20006

May 1987

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BURMA

MAIZE AND OILSEEDS PRODUCTION PROJECT

482-0005

FINAL EVALUATION

Contract No:

ANE-0005-C-00-7002-00

Prepared By:

Mr. Warren J. Enger - Agricultural Economist/Team Leader
Dr. John Yohe - Agronomist
Dr. Philip Boyle - Socio-Economist

May 1987

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BASIC PROJECT IDENTIFICATION DATA

Country:	The Socialist Union of the Republic of Burma
Project Title:	Maize and Oilseeds Production
Project Number:	482-0005 Grant
Project Dates:	Project Paper June 18, 1981 Project Approval Oct. 21, 1981 First Project Agreement October 21, 1981 Final Obligation: FY 85 Planned Project Assistance Completion Date (PACD) Mar 31, 1988

Project Funding:

a.	A.I.D. Bilateral Funding:	Grant	$30 million
b.	Other Major Donors:	None	
c.	Host Country Counterpart Funds:	(Kyat 79.2 Million)	$11.0 Million
			$ 10 Million
	Total		$ 51 Million

Mode of Implementation:	AID contractor, MUCIA
Project Design:	John Yohe = S & T (AID) Dick Newberg = Contractor Ed Glass et al = Contractor/Cornell

Responsible Mission Officials

a.	AID Representative	(1) David Merrill (2) Charles Ward (3) Earl Young
b.	Project Officer	(1) Charles Simkins (2) Douglas Pickett

Previous Evaluations:	Mid-term Evaluation Jan 1985 Douglas Pickett Asia Bureau AID Lloyd R. Frederick, S&T AID/W Wilfredo D. Rafols Dev. Associates Stanley Krause Dev. Associates

Cost of Previous Evaluation:

		Person Days	Dollar Costs
a.	Direct Hire (1) AID/W TDY (2) USAID Staff	58	
b.	Contract	58	30,821
c.	Other	0	0

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I. EXECUTIVE SUMMARY

A. Overview

This executive Summary contains the findings of the evaluation team on the Maize and Oilseeds Production Project (MOPP)-482-0005. The main issues raised during the evaluation are included.

The evaluation of the Maize and Oilseed Production Project (482-0005) was carried out in Burma between February 16 and March 14, 1987. A three-person team composed of the following members conducted it:

Mr. Warren Enger	Agricultural Economist/Team Leader
Dr. John Yohe	Agronomist
Dr. Philip Boyle	Socio-Economist

This is the final evaluation of MOPP and follows a mid-term evaluation by two years. Assistance, particularly with quantitative data, was provided by the Host Country project staff, and the staff of the AID Representative to Burma accompanied the evaluation team during in-country travel.

B. Project Description

1. General

The Maize and Oilseeds Production Project is designed to increase production of maize and the availability of oilseeds and oilseed cake in Burma. In addition to improving the nutrition of the burmese, particularly by contributing to vegetable oil intake, the long-term goal of the project is to increase rural incomes and employment.

Groundnuts, sunflowers and sesame are the major oilseed crops in Burma. Niger and sunflower are also grown for oil in small quantities. Soybeans, although grown, is used primarily for making soya sauce and soya butter. Maize is grown mainly for livestock feed. Crop yields in Burma for almost all of the major corps is lower than those of other Asian countries including Japan, China, Thailand, Pakistan, Sri Lanka and India. MOPP was intended to improve yields and therefore national production of a number of these crops through the improvement of technology and the use of inputs.

2. Project Goal

The Maize and Oilseeds Production Project has been operating in Burma for 5 years. The sector or program goal is to "increase production of oilseeds crops and maize in 28 townships of rural Burma, with positive effects on rural income and employment and on national food supply and nutrition".

Goal Level: Project Targets and Achievements

	Target (MT)	Achieved (MT)	Achieved (%)
Increase groundnut production	258,000	272,541	105
Increase sesamum production	25,000	36,399	145
Increase sunflower production	53,000	55,156	103
Increase soyabean production	12,000	dropped	
Increase maize production	228,000	228,638	100
	$ Million	$ Million	
Increase gross farm income	187.2	224.9	120
Exports of oilcake & maize	52.0	18.3	35
Increase value of oil production	$ 69	$ 191	278
Increase value of oilcake	-0-	$17.3	
Increase vegoil consumption p.c.	1 kg	1.22	122

3. Project Purpose

The project purpose is to bring about a rapid rate of adoption of high yielding inputs and tillage practices among farmers planting maize and oilseed crops in 28 project townships.

Purpose Level: Project Targets and Achievements

	Target (Acres)	Achieved (Acres)	% Achieved
Direct Impact from project			
Maize	373,000	485,174	111
Groundnut	388,000	416,031	125
Sesamum	312,000	385,961	123
Sunflower	115,000	166,225	144
Indirect Spread			
Groundnut	1,500,000	1,490,000	99.3
Soyabeans	20,000	dropped	

4. U.S. and GSRUB Assistance

AID is providing $30 million for the MOP Project. This includes: technical assistance ($2.4 M); participant training ($3.0 million); commodities ($20.0 million); and contingencies ($4.6 million). The GSRUB is providing $21 million including fertilizer ($10 million) and local costs of personnel, buildings, land, and operations ($11.0 million). The MOPP project is a separate project under the Agricultural Corporation of the Ministry of Agriculture and

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Forests, which has seven departments and three corporations. Technical assistance and management of training is done by a contract with the Midwestern University's Consortium for International Activities, Inc. (MUCIA).

C. Findings

The objective indicators established for measuring goal and purpose achievement were clearly quantified in the Project Paper and Project Agreement. The evaluation team concluded that the project goal and purpose were met by reaching the quantified targets. Although it was noted that some of the outputs had not been fully achieved, most notably completion of the 4 seed farms, this did not affect reaching production targets. Shortfalls in seed supply from seed farms were made up by the use of contract growers. The delays in the development of the seed farms were caused by shortages of building materials and diesel fuel. These seed farms will soon be fully developed and will be able to contribute to the follow-on Burma Agricultural Production Project (482-0007).

D. Shortfalls

Shortfalls in the project, specifically those concerning a more complete understanding of impacts on participating farmers, shortage of Ph.D. candidates and incomplete results of research, are being addressed in related projects. Output #4, which called for a functional farm management information system, was not achieved and will be implemented under BAPP.

E. Design and Implementation:

The team feels that the goal and purpose were clear, targets were reasonable and attainable, and the economic results were positive. The Burmese staff implementing the project were conscientious and undertook to assure that targets were reached. The technical assistance contractor, although apparently starting somewhat slowly, contributed significantly to the success of the project and to technology transfer to Burma. Its innovative use of American farmers as farm management and cropping systems consultants was very useful and well received by Burmese staff.

The USAID mission to Burma appears to have contributed greatly to the success of the project. The mission staff have an excellent rapport with Burmese officials and technicians and a thorough knowledge of the project. They have worked hard to overcome some difficult circumstances to insure that the project could be implemented smoothly.

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F. Issues

During the course of the evaluation, particularly in debriefings with USAID, several issues were raised. These can be categorized as (1) appropriateness of the Project Design (2) appropriateness of the technology, and (3) sustainability given the general milieu of Burma.

1. Appropriateness of the Project Design

The MOP Project was designed to increase the production of maize and oilseeds in Burma to meet national goals for exports, import substitution and per capita availability of these products. As this was the long-term sector goal, the medium term project "purpose" which was to help in the attainment of that goal was to expand the use of inputs and crop cultivation practices. These are noted above in the Goal and Purpose statements. However, as will be noted below, the project was designed with about 81% of AID's $30 million input going for commodities. Thus some people felt that the project was merely a "commodity drop." In fact, 60% of AID's funds were used for fertilizer. Given that only about 6% of AID funds were spent on training and 12.5% on technical assistance, the question is asked: how much technology transfer took place and why was an AID project necessary to elicit the production increases?

We believe the response to this criticism has to be in two parts. First is the particular setting under which AID was "returning" to Burma after 15 years absence, as was the case with all bilateral assistance to Burma. In this setting there was a caution on the part of the Burmese which precluded grand projects designed by foreign technicians. The Burmese preferred to have AID participate in a project that had high priority for the government but for which the technical approaches and implementation methodologies had already been worked out, at least in the grand lines, by the Burmese. Second was the need to obtain some rapid production increases, particularly in the oilseeds, given Burma's rapidly declining economic situation, while further technology was developed in-country and people were trained to carry on the work.

The Burmese had developed a system of increasing agricultural production through its "whole township program" that had proven so successful in increasing rice production. The major features of that program were an efficient agricultural extension system, an efficient method for maximizing the output derived from scarce agricultural inputs and a feedback mechanism for research and extension. The whole township system for agricultural extension is unique in that it incorporates not only the agricultural services of extension, research, input supply, marketing and credit, but it also involves the administrative branch of government from the national level down to

the county, tract and village levels as well as the political systems down to the local level. In this way active participation by the technical services is assured. Because the systems for delivering technology to the farmers had been developed for rice, it was believed that the system could be easily adapted to handle the technology available for maize and the oilseeds.

One interesting aspect, however, of the whole township approach that was used for increasing rice production is a system of quotas given to the producers that requires delivery of a large portion of their rice to the cooperatives or other government designated purchasers. Farmers receive inputs, particularly seeds and fertilizers, but to a certain extent also access to land, according to their participation in the project. That participation is largely measured by the farmer's ability to deliver his specified quota to the buying stations. Residuals beyond the market quotas and the amount allocated for home consumption can be sold on the open market. In the case of oilseeds, on the other hand, almost all of the crop is processed by small privately owned mills. Thus, there are only limited quotas that the farmer sells to cooperative mills.

2. Appropriateness of the Technology

The Burmese government felt that AID was an appropriate agency to assist in the expansion of maize and oilseeds in Burma due to the United States' long and successful experience in the production of these crops. Project designers from the United States, however, recognized immediately that technology could not be simply transferred to Burma from the United States. Several factors were important in this regard. The Burmese had little experience in the production and use of hybrid varieties of maize and sunflowers, two of the targeted crops, and little work had been done in Burma on testing varieties of soybeans, sesame, Niger and groundnuts. In most cases the Burmese did not use highly mechanized production systems. Even animal traction was not at a high level of sophistication, particularly for cultivation other than rice. Fields in Burma were generally small and dispersed and contiguous fields of crops were not common for all crops except rice. This makes management of insects and pests more difficult. Within this context, it was neccessary to incorporate both training and research if a long-term program for the development of these crops were to be initiated.

The project design called for the training of 25 people to the MSc level and 11 to the PhD. In addition, 70 short-term training programs were incorporated in various areas such as crop production and animal traction at International Centers (ICRASAT, IITA, IRRI, etc.) and in crop production, rhizobium production, computers, and management in the United States. The project design clearly realized

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the need to build a base of Burmese scientists to carry on the work of development in these crops after the termination of U.S. assistance. At the same time the level of technical assistance, limited due to cost and the stated position of the Burmese government to keep to the minimum foreign workers in the country, was determined for the most critical work of aiding in research and breeding and in the development of seed farms.

In addition to the foundation work laid in this project, the agricultural office in USAID/Rangoon worked with the Agricultural Corporation to develop two companion projects that would further the advances made in maize and oilseeds production. One project was intended to improve the efficiency of oil extraction in cooperative and private oilmills. The second was the Burma Agricultural Research and Development (BARD) project. The latter project was the outcome of the realization that the level of technology in these crops was far below that in neighboring countries of Asia. The BARD project aims directly at researching and developing technologies in these crops, including plant selection and breeding, plant protection, irrigation and drainage, crop management and mechanization.

While this foundation was being built, the need to make gains in production was recognized. Burma had little foreign exchange and was finding it increasingly difficult to allocate scarce resources to importing vegetable oil. It was evident, and has been clearly demonstrated through the project, that relatively easy production increases could be gotten with existing technology. Because the Burmese had already developed a good extension structure through its "whole township" approach for rice, the project designers felt that this system could be adapted for the dissemination of improved techniques of production in maize and oilseeds. At the same time the applied research under the project through the use of high technology sites (HTSs) at 40 locations in the eight intensive townships offered an ideal feedback mechanism for research. Adapting this "rice extension" methodology for maize and oilseeds was a technology that allowed much of the impressive gains in production from the project's inputs of seed and fertilizer.

The use of a proven, albeit unsophisticated, technology disseminated through a proven delivery system to obtain production gains, while building a foundation for further technological advances was the overall design. This seemed so imminently logical to the evaluators that we could not fault the choice. At the same time, the reinforcing of this project with companion projects and the follow-on BAP project should go far toward establishing in Burma the ability to sustain technological advances in the production of these crops. The design team chose the appropriate technology to reach the Project Purpose, and will be instrumental in reaching the long-term goal.

3. Sustainability

By using the existing network of extension, research and seed multiplication systems in the country, the MOPP was able to get some quick and relatively cheap production gains from the project's inputs. The question is can the project sustain such production increases? The argument is somewhat speculative. Certainly the country can get further relatively cheap gains in oilseed production through the further development and use of hybid sunflowers and the expansion of honeybees for pollination. Further production gains will depend on the ability of research to develop or adapt varieties and other technology. It will also depend heavily on the availability of fertilizer. Given Burma's current economic difficulty, making fertilizer available will not be easy. However, the project has definitely proven that fertilizer use will contribute greatly toward reaching national targets of oilseed and maize production. The technology has been proven.

Additionally, the project has contributed to the development of a cadre of trained researchers, managers and agricultural agents who will be able to carry on work in crop production. Further, the project has contributed to the national infrastructure for agriculture through the creation of the seed farms, and strengthening the national research facility at Yezin. This infrastructure and training will not assure sustainability of the project's gains, but will certainly offer three of the essential ingredients, trained personnel, research facilities, and seed multiplication and treatment facilities.

G. Conclusion

We conclude, therefore, that the MOP Project was highly successful, and most of our recommendations are already being considered and will soon be implemented.

Our enthusiasm for the results of the project must be tempered by the concern about the economic situation in Burma as noted above. Burma is having increasing difficulty in obtaining the foreign exchange needed to import the investment goods increasingly being demanded by the economy. Burma's capital plant is in dire need of replacement. This includes mills, equipment, infrastructure, and almost all processing facilities. However, the exports of primary products going out of Burma are not adequate to cover the costs of imports for operations and maintenance, much less for replacement of plant. All of this is further exacerbated by declines in oil production and an increasing debt service burden which results from earlier policies. Such a situation suggests that it will be difficult to find the foreign exchange necessary to sustain gains made in agricultural production.

Another concern stems from the difficulty in finding enough candidates to send abroad for professional training. many of the current scientists were trained abroad several years ago. These are rapidly approaching mandatory retirement age. With only one agricultural university in Burma training at the graduate level, it will be difficult to meet the demand created by retirements, much less that required for further expansion of research, extension, management and production in agriculture.

II. PROJECT SETTING

After achieving independence from Britain in 1948 Burma tended to emphasize large capital intensive infrastructure and social service programs at the expense of sustained economic growth. In the 1950s and 1960s many countries and international aid organizations, including the United States, contributed to Burma's development programs. During the 1960s and 1970s, however, there occurred a widespread diminution in foreign assistance as the country chose to look inward for solutions to its development problems. It was only in the late 1970s and early 1980s that this situation changed somewhat, allowing for the resumption of bilateral foreign assistance programming. The United States' development assistance program resumed in 1980, after a hiatus of 15 years.

The MOP Project was the first U.S. assistance project in agriculture for Burma after the AID program resumed in 1980. Two other agriculture sector projects, Edible Oils Processing and Distribution (EOPD—482-0006) and the Burma Agricultural Research and Development (BARD) Project (482-0012) are underway. The agreement for the Burma Agriculture Production (BAP) Project (482-0007) was signed in September, 1986. The EOPD Project will increase the efficiency and capacity of existing oil extraction mills. The BARD Project is designed to strengthen the Agriculture Research Institute's programs in oilseeds, and the BAP Project is a follow-on project to MOPP.

Obligations and expenditures under the AID Grant as of Jan 31, 1987 were as follows:

	$ Obligated	$ Committed	$ Expended	$ Pipeline
Technical Assistance	3,748,500	3,440,538	2,756,913	991,587
Participant Training	1,839,320	1,786,178	1,243,077	596,243
Fertilizer	17,946,221	17,394,090	16,945,976	1,000,245
Equipment	6,299,259	5,957,251	5,269,083	1,030,176
Evaluation	166,700	152,169	30,821	135,879
Totals	30,000,000	28,730,026	26,245,870	3,754,130

A mid-term evaluation issued on January 31, 1985, reported that although accomplishments to that time varied considerably across outputs and inputs, overall progress was excellent and noted the evaluation team's belief that the project was well on its way to a highly successful conclusion.

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III. THE PROJECT BENCHMARKS FOR EVALUATION

A. Project Description

We have chosen as the base of reference to measure project progress the Project Paper and Grant Agreement. There are two areas of difference between the two, which are described in Annex 1. Since the Grant Agreement is the binding document between the United States government and the Government of Burma, it will be used to assess project activity.

The sector or program goal for MOPP is to: "increase production of oilseed crops and maize in 28 townships of rural Burma, with positive effects on rural income and employment and on national food supply and nutrition".

The project purpose is to bring about a rapid rate of adoption of high yielding inputs and tillage practices among farmers planting maize and oilseed crops in 28 project townships.

The goal and purpose of the project were to be achieved through extension to farmers of ten technology components. These are: (1) use of improved higher yielding seed varieties; (2) proper land preparation; (3) plant density; (4) use of organic manure; (5) use of chemical fertilizer; (6) pest and disease control; (7) sowing techniques; (8) weed control; (9) timely harvesting; and (10) irrigation/water management practices.

The accomplishment of increased production of maize and oilseeds using the above ten components of the technology package were to be achieved through a comprehensive program, including technical assistance, training (long and short-term), provision of agricultural machinery and equipment, and fertilizer procurement.

The output parameters by which Project accomplishments can be measured are principally production targets for each crop. Non-crop output parameters were: increased production and possible export of oilcake; increased value and possibly reduced importation of edible oil, and the increased national availability of edible oil.

In addition to production targets, the Project Grant Agreement also cited the following institutional development outputs: (1) improved national research capability in maize and oilseeds; (2) introduction of improved maize and oilseed technology and production practices; (3) four fully equipped and staffed seed farms; (4) an operational farm management system for monitoring farm level production practices and providing feed-back on results to research and extension centers; (5) returned trainees in place within the research, extension, seed farm, and fertilizer distribution elements of the project and (6) a functional rhizobium production facility (inoculum for groundnut and soybeans).

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The project was intended to have both direct and indirect spread effects on cooperating farmers. It was anticipated that producers in 28 townships would be the direct beneficiaries. Additional groundnut and soybean producers would be indirect beneficiaries through the receipt of improved seed and inoculum. An additional 1.5 million acres (groundnut producers outside the project) would be a sizeable indirect benefit from the distribution of project produced inoculum only.

B. Evaluation Methodology

The evaluation of the MOPP project was conducted by a three man team from RONCO Consulting Corporation between February 16 and March 14, 1987. One member continued on after March 14 to help establish a farm level monitoring system. The preliminary report of this effort is attached as Annex 19. Further visits to Burma will be made to effect this monitoring system.

The team travelled with USAID/Rangoon staff, MOPP staff and MUCIA personnel to several maize and oilseed producing areas, all of the seed farms and the ARI at Yezin. A schedule of the in-country travel is attached in Annex 15. The team met with several local and regional staff. A list of those contacts is attached in Annex 16. On four occassions the team met with large groups of farmers, producers of maize, groundnuts, sunflower and sesame.

The team was fortunate to be accompanied by the Managing Director of MOPP, U Siang Uk, on all of the in-country travels. Through several days of travel and discussions, the director was able to provide valuable insights on the project as well as inform the team on the development of the project, adjustments made and experiences gained.

In addition to interviews with agricultural staff and farmers, the team evaluated data that had been compiled by the MOPP staff as well as other sources of national and regional data, including reports to the Pyithu Hluttaw and national census data.

Reports of the technical assistance team were reviewed as well as technical papers, project evaluations and project designs written by various consultants. Technical reports written by Burmese technicians were also reviewed, and oral communications received from various Agriculture Corporation officials, and one report by the Department of Health. The evaluation team held debriefings with the USAID staff of March 9. Debriefings were held with the Director General of the Agriculture Corporation and the MOP Project General manager on March 10. The latter debriefing was also attended by the USAID Representative and his Agricultural Development Officer. Generally the comments received in these debriefings were incorporated in the final draft report.

Because there was some concern over the reliability of the data, we attempted to review data very carefully and to cross-check data from independent sources where possible. The description of the methodology used by the Agriculture Corporation in collecting data and our comments on the soundness of the data can be found in Annex 13.

IV. EVALUATION FINDINGS

A. Achievement of Purpose and Goal-level Objectives

1. Goal Level

a. Increased production in and outside project areas

The project has surpassed each of the goal objectives set for groundnut, sesame, sunflower and maize. Soybeans were dropped from the project, since the infrastructure to extract soybean oil does not exist in Burma (solvent extraction). The evaluation team concurs with the appropriateness of the decision to drop soybeans. These achievements are documented in Tables 1 and 2 and in Annex 3. Based upon the data and information available to the team, there is no doubt that the project has contributed to increased production of the target crops.

Table 1. Increased Production (MT)

	Grant Agreement Goals	Intensive/Extensive Townships (Direct Benefits)	Indirect Benefits
Groundnuts			
Direct	87,000	125,000	
Indirect	171,000	-	245,999
Total	258,000		
Sesame	25,000	36,399	-
Sunflower	53,000	55,056	-
Maize	228,000	228,638	-

Source: Annexes 1 and 3

Table 2 Average Yields lbs/acre)

Crop	National 1970's decade	Average 1982/83 to 1985/86	MOPP area (1982-86)	High Technology Sites (1982-86)
Groundnut	716	921	1270	1786
Sesame	175	219	442	542
Sunflower	554	818	1166	1811
Maize	845	1495	2219	5109

Source: Annexes 1 and 3

b. Sustainability of Production Increases

(1) Broad project benefits that are likely to be sustained after donor funding ends.

The increases are likely to be sustained, since project farmers have come to recognize the technology packages to be superior to traditional methods of production. Contributing to the attainment of project goals were: improved crop varieties, fertilizer, improved cultural practices, better crop protection technology and increased contact and advice from the Agriculture Corporation extension service. In all meetings between the evaluation team and farmers, there were expressions of the need for more inputs, particularly fertilizer and seeds. There was an obvious good rapport and solid relationship between farmers and the extension service. The government appears committed to maintaining these increases by increasing allocations of fertilizer for groundnut, sesame, and sunflower production and expanding the programs to additional townships. The establishment of seed farms and seed processing facilities at Sebin and Chaungmagyi will continue to contribute to production of improved oilseed in Burma after donor funding has terminated.

(2) Institutional capacities being developed to continue project benefits.

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Management: Seed farm management, township production camps and the MOP Project management office in the Agriculture Corporation appear to have been strengthened through the assignment of dedicated, capable staff to manage these units. (See Annex 8). As trainees have returned from either long or short-term training, they have been assigned to key positions in these organizations. (See Annex 3, Table 15). The benefits from the training will not be fully recognized in the short term, but the impact will be seen as these people begin to contribute over the longer term. Stress must continue to be given to systematic record keeping on the seed farms. The cost efficiency of all farm operations on these farms should be determined. Records of crop operations must be maintained to provide base-line data from which to measure growth.

Technical: The technical strengthening of local institutions (seed farm, extension production camps, etc.) has been one of the stronger institutional outputs. This has primarily been accomplished through long-term and short-term training. In addition, in-country training (see Annex 3, Table 16) has improved the capability of the local units in the identification and solution of problems. This was apparent to the team from reports written by short-term consultants who have observed progress over a period of four years.

Financial: Plans and schedules have been prepared and implemented for maintenance and replacement of capital equipment at the seed farms. Short-term consultants have noted progress in this area. They have been impressed by the ability of technicians to implement the training they have received. Examples of this are improved maintenance and tracking of supplies in seed farm work shops. Staff mechanics, under the guidance of farm managers are caring for machinery and equipment in a more orderly and organized manner than before. Schedules have been developed and are being followed. Sample inventory sheets are included as Annex 10 .

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The major financial concern for sustaining production levels, or increasing them in the long-run, is the cost of fertilizer. This poses a particularly serious question, given Burma's current shortage of foreign exchange. In the recent report to the Pyithu Hluttaw (Parliament) (The Guardian, R 300 volume 3, no.15) it was noted that last year 48% of foreign exchange earnings were required to service debt. Urea is, fortunately, supplied from local manufacture, a recent expansion in capacity having helped Burma to meet its needs. The Burmese government has targetted 289,300 metric tons for production in 1986/87; however, optimal use on rice alone would require about 1,200,800 tons. Phosphate fertilizer comes entirely from imports, either government purchases or from foreign contributions through projects like MOPP. The government has committed resources over the past few years to both domestic production and imports, as can be seen in Table 3 below.

The ability of the SRUB to finance future commercial imports of fertilizer is uncertain. Maintaining current production levels after the project ends is therefore not guaranteed. The expansion of rhizobium use on groundnuts has taken some pressure off the demand for urea and must be seen as a very positive step.

A second financial concern, of lesser importance, is the SRUB's ability to finance other inputs, such as diesel fuel, spare parts, building materials and other expendables. The 1986/87 capital budget allocates 12.7% to agriculture, but the current budget allocates only 6.4%.

TABLE 3

Availability of Chemical Fertilizers (MT)

	1981/82	1982/83	1983/84	1984/85	1985/86
Domestic Purchase of Urea	132,419	100,559	116,532	150,396	304,300
Imports					
Urea	101,050	172,200	93,837	304,300	38,000
T.S.P.	106,140	87,500	61,500	130,100	140,000
Potash	24,780	23,500	17,000	21,500	50,000
Total	364,389	383,759	288,869	389,580	532,300

Source: Report to the Pyithu Hluttaw 1986/87

(3) Institutional capabilities established.

The framework for institutional strengthening is in place. During the BAP Project they will become increasingly institutionalized. In the opinion of this evaluation team necessary reforms will be in place and operational when donor financing comes to an end. This is subject, however, to the availability of input supplies, such as diesel fuel, short-term technical assistance, and other project inputs that will provide fine tuning and training for safeguarding of gains observed to date.

(4) Policy conditions required to facilitate continued long-term impact.

A major policy issue for the government of Burma is the allocation of scarce foreign exchange. Debt servicing required 48 % of foreign exchange earnings in 1985/86 and may be increasing. This endangers needed imports of equipment, spare parts, iron and steel, and fertilizer. As the amount of foreign exchange shrinks, policy decisions on priorities for its allocation could impact directly on oilseed production, particularly if fertilizer imports are reduced.

A second policy issue relates to the extent to which the market for farmer's oilseed will remain unrestricted. Currently only 9 % of the crop is marketed through cooperatives in the Five main oilseed producing divisions. Although the buying price by the cooperatives is slightly lower than the free market price, the farmer benefits by agreeing to sell part of his production through the cooperative, because that entitles him to allocations of scarce fertilizer. If the cooperative price deviates greatly from the free market price and a larger percentage of production is required to be sold through the cooperatives, production could be negatively affected.

A final policy concern of the evaluation team relates to long-term training. Currently, the government prefers to select candidates from among employees who have several years experience in the Agriculture Corporation. Their feeling is that these are people who are more stable and oriented toward studying in areas of direct concern to Burma.

The evaluation team feels that this is offset by the limited time a returned participant will have to work in agriculture before the mandatory retirement age of 60 years. It is also likely that the older participant's academic training may be somewhat out of date and their proficiency in technical areas needed for advanced training may be weak.

(5) Issues affecting sustainability and replicability of successful interventions.

The evaluation team feels that the production of sunflower oilseed could be increased by 20% to 30% if adequate beehives were available in the producing areas. Currently the farmers rely soley on wild bees and other insects for sunflower pollination.

A honey bee project currently exists in Burma but is targeted totally for the crop substitution program elsewhere. The crop substitution project did supply beehives on MOPP seed farms, and the results have been positive. However, no beehives are currently available for farmer fields. We feel that either the current honey bee project should be expanded to include sunflower areas, or a separate component of MOPP ought to be developed to introduce and maintain beehives.

We feel that the MOPP project should offer a premium in some form to contract seed growers. At present grain produced for seed receives the same price as grain produced for processing. Since assuring adequate supplies of improved seeds is crucial to the enhancement of production, the extra care and effort made by contract growers deserves additional incentive.

The current shortage of diesel fuel in Burma will undoubtedly persist and may increase. Good soil preparation, timely tillage, and harvesting of crops on the seed farms requires diesel fuel. Until now MOPP has received a large portion of the Agriculture Corporation's fuel allocation, but even that is really minimal. Methods are being sought to reduce the requirement for diesel fuel on seed farms; however, it is unlikely that the problem will be resolved soon.

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In another way, further expansion of farmer produced oilseeds is also partially linked to the availability of fuel: in initial land tillage and irrigation pumping. Although increases in production are not totally dependent on the availability of diesel fuel, it is unlikely that major increases in production can be obtained without adequate supplies.

(6) Critical decisions facing the Agriculture Corporation and AID relative to the oilseed program.

To sustain yield increases attributed to rhizobium use, the production of rhizobium will need to be increased. This requires moving the current rhizobium production facilities out of the Agricultural Research Institute at Yezin to a new location. A new facility will need to be developed for production, storage, and distribution of rhizobium.

An allocation of research activities, particularly for partitioning the effects of technical inputs, will have to be made between ARI, ARD and MOPP. A coordinated plan should be worked out under which each institution can make its special contributions.

A plan for measuring farm level impacts of the project is now being developed. This study should be undertaken before the follow-on project proceeds too far.

The follow-on project calls for a fertilizer supply/demand study in the first year of the project. This should be done as soon as possible and ways to ensure adequate supplies of fertilizer should be explored.

c. Impact on rural incomes

The MOPP project staff calculated the value of gross farm income increases due to the project as 1,529,260,000 kyats. At the current exchange rate of 6.8 kyat to one dollar the value in dollars is $ 224,891,170. If we used the last year figures for numbers of farms participating (96,660) the gross farm income would be increased by $ 2,351 or $ 470 per year. (Kyat 15,986 and kyat 3,197 respectively). The actual figures will be somewhat greater, since more farms participated in the last year than in earlier years. In addition, an indirect increase in groundnut production due to rhizobium use was estimated at 246,000 metric tons. This increase would have a farm gate value of kyat 1,479,936,000 or $ 217,637,640.

Rural employment generation is more difficult to measure. Increased acreage in the project area, over 5 years for all crops, was 450,500 acres If we calculate 50 person days of employment on average per acre of production, total employment increased by some 22,525,000 days.

Secondary employment generation certainly also occurred in oilseed processing and marketing, as well as through multiplier effects of increased rural income.

d. Effect of project on national food supply and nutrition

The project paper targets increasing available oil by 30% from 2.8 kgs/cap/yr to 3.8 kgs/cap/year. Clearly some error in data source or calculation was made in establishing this target. Actual available oil was 6.11 kgs in the base year (1981/82) according to our calculations (see Annex 2, Table 1), or 5.95 kgs according to MOPP (See Annex 3, table 9). Even the Project Paper (Annex E) estimated available supply at 4.42 kgs. According to our calculations available oil rose to 7.33 kgs in 1986/87. This is an increase of 1.22 kgs/cap/year, an increase of about 20%. Although the percentage increase achieved was lower than the target of 30%, the actual available oil increase was greater than targeted. Therefore, we conclude that the target was reached.

The benefits were, however, probably unevenly distributed, since vegetable oil consumption is vastly greater in the oilseed producing zones than elsewhere in the country. Therefore, oil consumption probably rose much greater in the project zone than the national averages indicate. Outside the project there appears to be a much greater reliance on other foodstuffs, particularly meat and fish, for oil.

An independent study on oil consumption in Burma supports the national average consumption of vegetable oils. This study, undertaken by Dr. Thyra Po of the Nutrition Department of the Ministry of Health, calculated per capita consumption at 5.7 kgs per year. However, the range was great; 1.1 kgs in Chin State and 41.25 kgs in Central Burma. The study, undertaken in 1982-83, covered 1046 households in 25 villages over 10 townships. (Areas covered included Chin State, Mandalay Division, Rangoon, Shan State, Arakan, Moulmein, Irrawaddy and Kachin). The average intake of 5.7 kgs compares with Agriculture Corporation figures of 6.08 for the same period. (See Annex 3, Table 9) The study did not include animal fats, fish, sesame for salads or direct

consumption of groundnuts or other oilseeds. The Department of Health, Ministry of Health, recommends a daily consumption of 8.76 kgs per year, 1.43 kgs above the 1986/87 Burmese supply level of 7.33 kgs.

2. Purpose Level

a. Contributions to Yields

(1) Project contribution to increased crop yields in project townships

The project purpose was to bring about a rapid rate of adoption of high yielding inputs and tillage practices among farmers planting maize and oilseed crops in 28 townships. Progress as measured against levels of achievement described in the Project Paper is documented in Tables 4 and 5.

Table 4 Purpose level objectives vs Achievements

Crop	PP Purpose objectives (acres)	Cumulative (1982-87) (acres)	Year Five PP objectives (1982-87)	Actual Year 5 (1982-87) (acres)
		a. Direct impact from project		
Maize	373,200	416,000	129,400	87,132
Groundnut	388,000	485,174	121,200	106,600
Sesame	312,200	385,961	94,000	82,900
Sunflower	115,400	166,225	44,000	46,000
		b. Indirect spread effect		
Groundnut	1,500,000			1,490,000

Source: Annex 1 and 3

Table 5 Distribution of Rhizobium

Crop	Year	Packages
Groundnut	1980-81	33262
	1981-82	280254
	1982-83	315831
	1983-84	395581
	1984-85	401300
	1985-86	407600

Source: Annex 1 and 3

(2) Sustainability of increases

The increased crop yields are sustainable. MOPP has been responsible for training farmers in the project townships to markedly increase production. The benefits of fertilizer, improved seed, improved cultural practices (land preparation, plant population density, farm manure application, pest and disease control, improved planting methods, weed control and timely harvesting) and improved irrigation/ water management practices have been responsible for these advances. Maximum progress will continue as long as fertilizer is allocated to the oilseeds sector. Urea production, fortunately, is increasing in Burma with the advent of a new urea plant about two years ago. However, Burma has no known source of phosphorus and will have to depend upon imports to satisfy this requirement. Yet urea increase alone is important. One farmer in the Henzada area on an intensive township site applied three bags of urea (75 lbs.) and 50 kg of triple super phosphate (110 lbs) per acre to sesamum and was able to produce 20-25 baskets per acre while the average for 5,000 acres of sesame in the township project site (for 25 lbs of urea and 50 kgs of TSP) was 9 baskets per acre. The average yield before the project was 4.5 baskets per acre. Research results from seed farm trials confirm that fertilizer and new varieties grown under proper cultural conditions will result in yield increases of 40-60%. Maximum yield fertilizer trials such as that done with the above mentioned farmer have not yet been deemed appropriate for the Agriculture Corporation to demonstrate, because of the limitation of fertilizer availability.

(3) Partitioning of technology inputs on yield increases

To discuss at present which components of the project and technology package are responsible for project success can only be done subjectively. There is not enough research available by which a partitioning analysis can effectively pin-point the value of fertilizer, improved varieties, or cultural practices and the contributions of each to yields. However, based upon experience and after evaluating information available the team believes that fertilizer contributes about 50% to increased yields, and that improved seed and improved cultural practices are probably together of equal importance in contributing to the remainder. The value of improved seed produced on the seed farms and the contribution of the seed processing facilities to improved yields are yet to be demonstrated; however, there is no doubt that there will be additional improvements in farmer production attributable to better quality and varieties of seed.

b. Profitability of the Technology Packages

The Agriculture Corporation has calculated the cost of producing winter and monsoon groundnuts and sesamum. The figures are given below, along with current average prices per basket (includes both sales to cooperatives and free market sales). Production cost includes hired and family labor, seed, and land tax. One bag of TSP is counted for groundnuts and one bag of TSP and one bag of urea for sesamum.

Table 6: Costs and Returns for Groundnuts and Sesamum
(Average in Kyat)

	Winter Groundnuts (yield 30 baskets)	Monsoon Groundnuts (yield 25 baskets)	Sesamum (yield 4 baskets)
Total Production cost/acre	853.00	721.67	206.50
Cost/basket	28.43	28.87	51.63
Returns (per basket)	68.36	68.36	187.88
Net/basket	39.93	39.49	127.26
Net/acre	1197.90	987.25	509.02

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By comparison, calculation for returns on high yielding varieties of rice, most of which is sold through cooperatives or other government designated buying agencies, would only net from .7 to 4 kyat per basket, depending on yield, or kyat 34.3 to kyat 240 per acre.

As noted above, research trials have not been performed that will permit the partitioning of the contributions of specific technology inputs to production increases. The team felt that approximately 50% of the increase in production was due to fertilizer. The remainder can be divided equally between seeds (25%) and improved cultural practices (25%). Obviously, this will vary greatly among oilseed crops and between zones. In the oilseed producing regions of Burma rainfall can vary among regions from 25 inches to 125 inches annually. Soils and drainage conditions are also quite variable.

It was clear to the team that farmers not only appreciated fertilizer but will purchase it on the free market when it is available. Use of fertilizer will greatly increase if supplies are made available. New seed varieties were also well received. Maize growers are regularly asking for new varieties. Sunflower growers are anxious to receive new open pollinated varieties from Australia, and many want the hybrids now being tested in Burma.

Metal plows used with oxen power have also been well accepted. However, their cost is too high for Burmese farmers. A locally made copy lacks the hardened metal on wear points.

c. Effect of the Project on the Balance of Trade

The project has contributed to the saving of foreign exchange or to the earning of foreign exchange in three ways. First, there have been earnings through the export of oilseed cake and maize. Second, there have been reductions in the importation of vegetable oil. Third, there have been increases in per capita consumption, which if maintained without increases in production, would require increases in imports.

The project targeted earnings from exports of oilseed cake and maize at $52 million. Actual exports were substantially less at $ 18,337,500. The main reason for this was increases in the use of these commodities for animal feed within Burma, coupled with lower prices on the international market.

The foreign exchange value of decreased oil imports was not targeted. Decreases in imports from the base year of 1981-82 totalled 11,137 metric tons of oil at a value of $9,415,106. (exchange rate (6.8 Kyat = $1)

The foreign exchange value of increased production was targeted at $69 million. This figure is difficult to understand. If we use the foreign exchange values of the oil equal to the average paid ($727.35 per ton) for imports during the period, the increased production would be valued at $34,445,113 from 47,357 tons of oil (based on recovery rates calculated for the Edible Oil Processing and Distribution Project).

For activity achievements we assumed that the Project Paper used some other value, such as local farmgate price or local retail price. Calculating the increased value at retail, the value of increased production would be $191,865,500 in increased oil production.

The total FX value is therefore:

Oilcake export$	18,337,500
FX value of increased domestic production	34,445,113
Total	$ 54,097,223

Although the world market value of new oil production was $34,445,113, imports were only reduced by $9,415,406. Consumption increased in Burma to account for the difference ($26,344,617).

One problem that is difficult to solve is to determine an appropriate shadow exchange rate for the Kyat. The current official rate of 6.8 Kyat equals one dollar clearly over values the Kyat. Parallel market rates can be as high as 35:1. The unofficial purchases of dollars at these rates, however, are also distorted by the small volume of dollars available on unofficial markets. A real value for the Kyat should lie somewhere between the two extremes. The effect of the overvalued Kyat on calculation of farm-level income will be to significantly over-value production in terms of foreign exchange. Thus, the increased gross form income noted under the executive summary of goal achievements is partly overstated by use of official exchange rates. Unfortunately, the Project Paper also used official exchange rates to calculate project targets. The real value of increased production will be the above FX value plus the value of nitrogen added by groundnut production plus values added for transport, processing and marketing.

B. Cause of Successes and Failures

There have been no real failures under this project that were evident to the evaluators. In two areas information was not available to determine if the project purpose was achieved or not. The first is the degree to which widespread improvement of tillage practices occurred. The second is if use of improved tillage practices will continue. As was noted above, data was not gathered on either the use of contribution of specific tillage practices to yield increases. If the contribution of a specific practice is not adequate to compensate for its effort or cost, it most likely will into be continued. Because we could not partition the contributions of each component of the technical package, we are only able to state that the overall package was successful and should spread. There have been delays and some outputs may not be fully operational before the project termination date, but this has not significantly interfered with the overall success of the project.

The specific causes of success of the project have been:

1. Commitment of the Government of Burma to make the project succeed.
2. Technical assistance provided by the project.
3. Fertilizer made available through the project to project beneficiaries.
4. New seed varieties made available to project sites.
5. Introduction of improved cultural practices.
6. Economic opportunity for farmers to improve income.
7. Oilseeds are not a government controlled crop.

C. Linkage of Inputs and Outputs Purposes and Goals of the project and to the problems addressed by the project

The goal and purpose objectives were very realistically linked to input and output capabilities of the project. The program expectations were realistic and within reasonable reach of the project.

The outputs of the project included:

1. Improved national research capability in maize and oilseeds.

2. Introduction of improved maize and oilseed technology and production practices (seed, water, fertilizer, extension services).

3. Fully equipped and staffed maize and oilseeds seed farms.

4. An operational farm management information system for monitoring farm-level production practices and providing feedback on results to research and extension centers.

5. Returned participant trainees in place within the research, extension, seed farm and fertilizer distribution elements of the project.

6. Inputs supplied to farmer participants (fertilizer, seed, management equipment - rhizobium inoculum).

7. A functional rhizobium production facility (inoculum for groundnuts and soybeans).

The inputs in the original project design totalled $48.0 million, of which AID was to supply $30.0 million. An additional $3.0 was added to the Burmese contribution. The inputs were broken down as follows:

AID

1. Technical assistance
   a. 156 person months of long-term TA
   b. 70 person months of short-term TA

2. Participant training
   a. 11 PhD degrees (44pys)
   b. 25 MSc degrees (50pys)
   c. 70 short-term programs (315 pms)

3. Commodities
   a. Fertilizer ($15.0 million)
   b. Machinery, equipment, parts and supplies ($5.0 million)

4. Contingency (20%)

SRUB

1. Commodities
   a. Fertilizer ($10.0 million)
   b. Fertilizer handling ($4.0 million)

2. Other costs
   Including minor commodities, farm facilities and operation, personnel, management, research and extension, fuel ($8.0 million plus $3.0 million).

Detailed data on the inputs and outputs are found in the annexes. As of the date of the evaluation, 22 persons had been sent to the United States for MSc training, two for PhD training, and 43 persons had been sent to various places including the United States and the international research centers for short-term training, and 15 had been sent on study tours. Further selections for training were being made, and continued funding of these will be handled under the BAP and BARD projects. With the exception of training of PhDs, targets are being met. Details of trainees, training institutions and field are given in Annex 11.

Annex 9 gives the 1986-87 and 1987-88 research program for maize and oilseeds that are planned by the Project and the Agricultural Corporation. This continues research that was noted in the mid-term evaluation. Research that began under the auspices of the MOP project is now partially shared under the AID funded BARD project.

Four farms for the production and handling of seed were established under the project. At the time of the evaluation the Agricultural Corporation had spent Kyat 49,933,040 ($734,309) on the four farms. Details of the completion of physical plant is given in Annex 3, Table 12. Although some work remained to be done, particularly in the completion of drainage and irrigation systems for the farms, progress was well advanced.

The supply of inputs reached targets in almost every case. Annex 3, Table 4 shows fertilizer distributions under the project and rhizobium production and distribution is given in Annex 5. Only seed production and distribution was slightly below target. Seed production on farms is given in Annex 3, Table 11. Although this amount was greatly below targets, it was made up for through the use of contract growers as seen in Annex 7. The difficulty in developing the seed farms due to slow arrival of equipment and machinery, lack of fuel, delays in building construction and failure to locate adequate underground water supplies for irrigation meant that production targets could not be met. In fact, the use of contract farmers to supply the shortfall in seed was felt by the evaluators to have been a positive outcome. This mode of seed production should be continued even when the seed farms are completely operational.

Overall the only major shortfalls in the input-output delivery and development were in long-term training for PhD level due primarily to the lack of candidates, and the slower than anticipated development of seed farms. Research has not been spectacular, but it has gone on and continues to improve. The support to the BARD project should help to give research the stimulus it needs to develop new technologies, seeds and cultivation practices. This will become extremely important when the easier gains in production that have been obtained from heavy use of fertilizer are no longer available. The long-term ability of research to improve technologies needed to further increase production may also be linked to the level of training reached, not only under this project but under the BARD and BAP projects as well.

Given the targets set under the project design, we would have to conclude that the linkages from inputs to outputs to purpose continued to hold at the end of the project. Clearly we could not find circumstances where the inputs were unwarranted for the project, nor where they were over or under supplied.

D. Beneficiary Impact

1. Overview

The ultimate aim of any socio-economic development project is to increase the well-being of people. According to the Project Paper social soundness analysis, some 200,000 farm families were to be direct beneficiaries of MOPP, while from 460,000 to 810,000 households were to benefit indirectly from the distribution of seed and, especially, inoculum outside the project area.

In the absence of a formal socio-economic monitoring and evaluation component within MOPP, a farm management information system was included among the list of project outputs in both the Project Paper and the Grant Agreement. This information system was to be used "for monitoring farm level production practices and providing feedback on results to research and extension centers". Each of the intensive townships was to have "a functional data collection and farm management information system . . . operated by trained staff".

While much data are collected by MOPP township managers, both in intensive and extensive project areas, they are not being used either to monitor on-farm production practices or to provide timely feedback to MOPP managers or USAID personnel regarding the effectiveness of the ten "means to higher yields" listed in the Grant Agreement.

Although the major rationale underlying the creation of the farm management information system was the need to monitor the production practices of participating farmers in order to evaluate the effectiveness of the extension program, much more could have been gleaned from this system regarding the impact on these farmers of successfully increasing the productivity and total production of their farms. While it seems obvious that increased farm revenue should lead to greater family well-being, we cannot at this time specify either the overall change in on-farm revenues or in the farm family's quality of life. With regard to the net impact on rural incomes and employment, both stated goals of the Project Paper, we really cannot conclude very much at present. Certainly production of oilseeds and maize has risen markedly in the project townships, but what the overall socio-economic impact may be on participating farm families is relegated largely to guesswork. The role, interests and the participation of women in project activities and accomplishments is also undocumented.

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2. Production Increases and Direct Beneficiaries

At present there are about 95,660 participating farm families in the 25 MOPP townships. Most are specialized in one crop; an estimated 990 are cultivating both maize and groundnuts in Tatkon township (Mandalay division). In addition to Tatkon, two other townships, Maubin (Irrawaddy division) and Kyauktage (Pegu) are involved with two-crop programs, although the participating farmers do not individually cultivate both crops, as about 20% of the Tatkon farmers do.

The total number of direct project beneficiary families is thus about half the figure of 200,000 stated in the Project Paper (but not stated in the Grant Agreement). Since it is unclear how the original figure was calculated during project design, little significance need be given to this shortfall. The same may be said for the total number of individuals benefitting, since the average farm family size in the five project divisions is 5.1, not 6 as estimated in the Project Paper. The total number of persons currently directly benefitting from the MOPP program is about 492,970, instead of the 1,200,000 calculated in the PP.

Since our interest in this section of the evaluation is to relate MOPP production increases to participating farm families, two sets of calculations have been made. In Table 7 we relate the total (life of project) value of increased production to the total number of households and persons involved, in order to derive household and per capita income. Since, in reality, the current figure for participants represents the end-point of a gradually growing number over the five years of MOPP, Table 8 relates Year 5 production increases to present participants. These figures multiplied by the number of years of participation would yield a better estimate of any given family's revenue increase (gross) during the project.

It can be seen in Table 7 that the total value of production increases under MOPP was about 1,529,260,000 kyat or $224,891,170 (1$=K6.8). This represents Kyat 15,986 ($2,351) per presently participating household and K 3,135 ($461) per household member. Groundnut production represented 49.2% of length of project gross revenue increases, followed by sesame (17.3%), maize (17.2%), and sunflower (16.3%). Thus $1,156 of the $2,351 of household gross revenue and $227 of $461 per capita profits are attributable to groundnuts alone.

In Table 8 we relate Year 5 production value increase from MOPP to the participating households in order to appreciate not only the current production pattern but to estimate better annual returns to households. Last year about 376,838,430 kyat or $55,417,415 of crops were produced by the 95,660 MOPP participants. This represents

K 3,939 ($580) per household and K 772 ($114) per capita. Groundnuts still predominate at 49 % of total production, but maize (19.6 %) and sunflower (18.1 %) appear to have replaced sesame production to some degree. In Year 5 groundnuts alone represented an increased household revenue of about $284, some $56 per family member.

3. Indirect Beneficiaries

Indirect beneficiaries of MOPP, estimated in the Project Paper at 460,000 to 810,000 households, were to increase their revenues from their use of rhizobium inoculum only. The number of these farm families, located outside the project areas, can only be grossly estimated, since no records have been kept on them.

Total increased production of groundnuts attributable to rhizobium distributed outside the project areas is estimated at about 246,000 metric tons on some 1,490,000 acres. This yields an increase per acre of about 165 kg.

Table 7

Total Project Value of Increased Production under MOPP (1982-87)*

Crop	Value of Crop (Kyat)	% of Total	Crop Value ($) ($)	Value Per HH (Kyat)	Value Per Kyat	$ Per HH	$ Per CAP
Groundnuts	752,020,000	49.2	110,591,170	7,861	1,541	1,156	227
Sesame	265,270,000	17.3	39,010,290	2,773	544	408	80
Sunflower	248,690,000	16.3	36,572,060	2,600	510	382	75
Maize	263,280,000	17.2	38,717,650	2,752	540	405	79
Total	1,529,260,000	100	224,891,170	15,986	3,135	2,351	461

* Value of crops in kyat and $ are rounded

** at 6.8 Kyat = $1.00
5.1 person/H.H.

TABLE 8

Year 5 Value of Increased Production under MOPP (1982-87)*

Crop	Value of Crop (Kyat)	% of Total	Crop Value ($)	Value Per HH (Kyat)	Value Per Kyat	$ Per HH	$ Per CAP
Groundnuts	184,552,830	49.0	27,140,122	1,929	378	284	56
Sesame	49,966,530	13.3	7,348,019	522	102	77	15
Sunflower	68,283,490	18.1	10,041,689	714	140	105	21
Maize	74,035,580	19.6	10,887,585	774	152	114	79
Total	376,838,430	100	55,417,415	3,939	772	580	114

* Value of crops in kyat and $ are rounded

Source: MOPP (see Annex 3, Table 2,5)

TABLE 9

Increased Value of Groundnuts from Rhizobium Production (Indirect Benefits)*

Total Tonnage Increase (1982-87)	246,000 MT*
Total Value Increase (1982-87)	K 1,479,936,000 ($217,637,640)
Year 5 Tonnage Increase (1986-87)	50,560 MT
Year 5 Value Increase (1986-87)	K 304,168,960 ($ 44,730,730)
Total Value per Indirect Beneficiary Household (Avg. of 149,000 HH)	K 9,932 ($ 1,461)
Total Value per Capita	K 1,947 ($ 286)
Year 5 Value per Household (153,200 HH)	K 1,985 ($ 292)
Year 5 Value per Capita	K 389 ($ 57)

* Tonnage and global value figures rounded.

Source: MOPP statistics

In Year 5 of MOPP an estimated 50,560 MT were produced on about 306,400 acres. At an average of two acres of groundnuts per farm family, we may estimate the number of indirect beneficiary households at an average of 149,000 during the length of project and at 153,200 in Year 5. This corresponds to a figure considerably less than the range of possible indirect beneficiaries proposed in the Project Paper social analysis.

Table 9 presents total project and Year 5 value increases of groundnut production attributable to MOPP-produced rhizobium. Total value increase over the length of project was 1,479,936,000 kyat, or $217,637,640. The total value of indirect project benefits is thus equal to 96.8% of direct project benefits, as given in Table 7. There is no actual proof, however, that the rhizobium was used in prescribed ways on farmers fields, since there was no extension service involvement under MOPP. Had one packet of inoculum been used per acre and all rhizobium put to service, then profits should have been of the magnitude calculated in Table 9.

The value of increased groundnut production due to rhizobium in Year 5 was K 304,168,960 or $44,730,730. This figure is equivalent to 80.7% of the direct project benefits in this year.

The value per household of these indirect, or spread, benefits over the length of project was about K 9,932 ($1,461), or some K 1,947 ($286) per farm family member. The Year 5 value per participating household was K 1,985, ($292), or some K 389 ($57) per capita.

A comparison of the value of direct and indirect project benefits indicates that while the total farm indirect benefits are nearly as great over the length of project as for direct benefits (96.8%), it is spread over 1 1/2 times as many farm families, thus reducing the per household benefit from about $2,351 to $1,461. The same is true for Year 5 benefits, the respective values being $580 and $292.

In terms of gross farm income, direct project benefits (kyat 1,529,260,000) are 132% of those listed in the Project Paper logframe. Number of person days of new employment were not indicated there but are estimated at some 22,525,000 (50 days per year for 450,500 acres). This represents at K 6.50 per day, a labor value of 146,412,500 kyat ($21,531,250) of additional direct project benefits. Little can be said regarding the composition of this labor force, household or hired, men or women, but statistics indicate an average of 28 days (56%) of family labor and 22 days (44%) of hired labor per acre.

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4. Female Beneficiaries

Little, unfortunately, can be said concerning MOPP impacts on women. As we have seen, benefits can be calculated or estimated for farm households, but no data have been gathered or estimated by MOPP management concerning the interests, roles, or participation of women per se in the increases of maize and oilseed production under this project. From the project design social analysis, which did not attempt to specify the role of women in the agriculture sector or in MOPP, through the mid-term evaluation, which contained no beneficiary impact analysis at all, no particular attention has been paid to women's questions, such as impact on their workload, on their role in decision-making in the household, in their disposal of increased income from benefits. On the other hand, there seems to be no reason to believe that women should have been adversely affected by MOPP, unless it be in increased yearly workload, itself reducing time spent in petty commerce and in carrying for children in the home.

A few general comments on the position of women in agriculture in rural Burma can, however, be made. According to a study by Seema Agarwal for USAID (The Participation and Training of Burmese Women in AID-funded Programmes in Burma, 12/86), "women comprise over 60% of farm workers, most of them in the capacity of hired labor". She goes on to say that "in oilseed farming of sesame, groundnut, sunflower and corn, women are responsible for 90% of the weeding, thinning, and harvesting". As in paddy production, women can be expected to bear most of the increased labor need where new crops or new acreage have been introduced under MOPP. Except for sunflower as a post-monsoon crop in lower Burma, most increase in labor need has resulted from expanded acreage of existing crops.

The total new person-days of employment generated (22,525,000) divided by presently participating households yields an average of 235 new labor days per household over 5 years, or about 47 per year. Of these, 56% (26 days) would have been added to family labor, the major part (perhaps 2/3, or 18 days) falling to females. Hired labor would have accounted for about 21 new days per household, of which about 60% (13 days) would have fallen to female workers.

In terms of oilseed and maize production it would appear grosso modo that the woman of the average household saw an increase per year in her labor time from new oilseed acreage of about 9% (18 days more than the pre-project 196 days). This does not appear to be onerous, particularly in respect to total on-farm labor time of women (all crops, all activities). Furthermore, productivity of this additional labor is greater than before MOPP. More study certainly needs to be made of possible negative consequences of increased acreage or new crops on women's health or time spent in caring effectively for children.

On the other hand, increasing farm revenues have probably tended, through a certain multiplier effect of increased disposable income to favor petty commerce for women. While this may mean increased subsidiary income for farm families, it may also lessen the mother's time caring for children in the home. This may result in a higher drop-out rate from school for female children, who must now increasingly fill in for their mothers. In the absence of solid data, this possibility can only be speculative.

National census data (1983) tell us more about the rural Burmese woman. While 50.4% of the rural population is female, only 14.7% of household heads are women. Of this group of female family heads: 8.6% are single (never married), 7.3% are married, 6.9% are divorced, and 77.2% are widowed. Average family size for female-headed families is not given, but it is 5.12 members overall for the 5 MOPP divisions (compared to a national rural size of 5.24).

Since there is no reason to believe that female-headed families are not represented among MOPP participating farm families proportionately to their share in the overall rural population, we can conclude that about 14.7% of the 95,660 MOPP direct beneficiary households and the 153,200 indirectly benefitting families are headed by women. This makes 14,062 and 22,520 households, respectively. In these farm families, even if there are grown sons still at home in many cases, the female household heads must play a significant role in decision-making. In this regard they merit being singled out for attention under future monitoring efforts incorporated in the Burma Agricultural Production Project (BAPP).

E. Future Socio-Economic Monitoring and Evaluation.

The "operational farm management information system", specified under outputs in the Project Paper and Grant Agreement, has not been implemented as such, although much data exist in the production camps (extension outreach centers) on all participating farmers. Records of input deliveries, acreage sown, and estimated yields per participant are kept and can be consulted. There is, however, no process of analysis of farm production practices, particularly with respect to the ten "means to higher yields" specified on page 1 of the Grant Agreement (1) use of improved seed, (2) proper land preparation, (3) plant density norms, (4) use of organic manure, (5) use of chemical fertilizers, (6) pest and disease control, (7) sowing techniques, (8) weed control, (9) timely harvesting (10) irrigation/water management practices.

In the absence of an operational farm-level information system, we cannot know or estimate the differential contributions of these 10 components. Of course, we know that fertilizer accounts for most of the production increases, yet much could be done to monitor the other nine components under BAPP.

The acquisition of data on production practices, even if done once or twice during the early years of the BAP Project would allow the Agriculture Corporation and USAID to evaluate and to modify as necessary the composition and emphasis of the 10 extension components. This would apply even to fertilizer application practices of the technology packages.

Socio-economic monitoring and evaluation of farm-level production practices and impacts under BAPP should thus subsume both the farm management information system called for in MOPP and the beneficiary impact data presently sought by both Agriculture Corporation and USAID managers alike. Such a comprehensive monitoring system is currently being developed by USAID in collaboration with MOPP managers in the AC. Much needs to be learned about household economic behavior in general: farm production practices, complementary revenue sources, division of labor, disposal of income, and roles and participation of women in economic life, especially relating to the group of female-headed farm families.

While economic behavior can be studied in the abstract in the form of quantitative indicators, interpretation of what these data mean for people requires social analysis. This is why the monitoring program must be socio-economic, its objective being the documentation of increased well-being of project beneficiaries and the development of the community.

F. Sustainability of Positive Effects of the Project

The positive effects of the project will continue as long as the Government continues to make fertilizer available to the oilseed sector and to the extent that oilseed marketing remains a combination of government and free market purchasers at the farm gate. More important than the value of the technical input is the demonstration by the project that the small farmer will adopt new technology, apply it, and demand more, as long as this is to his economic advantage.

G. Effectiveness of the Inputs

The commodity and technical assistance inputs have been absolutely necessary to achieve project success. Fertilizer imports are largely responsible for achieving the yield increases established in the goal statement of the project. The effectiveness of fertilizer inputs and new variety and cultural technology could not have been effectively implemented without the technical assistance. This is also true for seed farm development (farm land development, processing plant design and construction, and farm equipment maintenance and operation). The Burmese using pre-project technology could have used the fertilizer to good advantage, but they did not have the up-to-date technical training for the other programmatic aspects of the project. The project has been successful in placing 22 persons for the M.S. degree of the 25 positions planned for under the project. Eleven Ph.D. degree candidates were targeted in the

project, but as of March, 1987, only two had been placed. As of March 1987, 16 of the M.S. graduates were back in Burma. Six M.S. degree candidates and the two Ph.D. candidates were still in the U.S.. The impact of the training program upon the research capability and institutional strengthening of the Agriculture Corporation programs will be felt in the short-term in the follow-on BAP Project and in long-run research and extension accomplishments.

H. Impact on the Environment

The project is not affecting the environment negatively. No pesticides have been purchased under the project. The government has been testing pesticides to identify alternatives to aldrin. No negative residual effects of aldrin use have been identified yet, although a small amount of aldrin has been provided from non-project resources for seed treatment of groundnuts for termites, crickets, and white grubs. Agriculture Corporation has provided treatment instructions, including elementary safety precautions (all translated into Burmese). These instructions are affixed to farmers allotments of pesticides. The team feels that the Agriculture Corporation has conscientiously addressed the problem of phasing out the use of aldrin.

V. RECOMMENDATIONS

1. The follow-on project, Burma Agriculture Production (BAP), should seek ways by which critical input supplies such as diesel fuel can be made available to complete the development of the seed farms at Sebin and Chaungmagyi. Land leveling, irrigation, and drainage are critical.

2. Training should be continued under BAPP and BARD. Training to the PhD. level in plant breeding and other disciplines should stress course work in the U.S. and research toward development of the Ph.D dissertation in Burma. All M.S. degree training should be accomplished in the U.S.

3. Research plans should be developed for both ARI and the seed farms. Work plans should be developed and updated annually. Research should be initiated to partition the benefits of fertilizer, seed varieties, and cultural practices.

4. BAPP should continue to provide technical assistance in development of the seed farms at Thitcho and Kyaungsu.

5. For the four irrigation pilot projects in the Irrawaddy Division, economic/cost analysis studies should be prepared to demonstrate the feasibility of those activities. As part of those studies up to-date inventories of equipment and supplies should be made before new equipment is ordered. AID should concur in writing before committing new resources to those four activities.

6. The rhizobium inoculum production facility should be moved to the pest production site, in order to economize on production of inoculum. ARI should continue to conduct research on the economic benefits of inoculum for groundnuts, on rhizobium adapted to Burma, and on the value of biological nitrogen fixation as a substitute for urea.

7. Short-term training should be provided to key seed farm personnel and BAPP managers for 12-16 weeks during a cropping season in the U.S. to observe and learn from a private sector seed production program (sunflower). Short-term training should also be provided to key seed farm personnel who would spend 12-16 weeks (a cropping season) observing a U.S. state seed improvement association working. This last would relate primarily to production of groundnut and sesame seed (self-pollinated crops).

8. The BAP project should search for ways to expand the bee-keeping operations in sunflower project areas to assure cross-pollination of sunflower. It is estimated that farm level sunflower production could be increased 20-40% from this technical intervention alone.

9. The Agriculture Corporation should continue to identify and test for acceptable substitutes to the use of aldrin and should seek to completely eliminate this chemical from use in Burma during the BAP project.

10. The Agriculture Corporation should set up under BAPP a socio-economic monitoring and evaluation system to follow and evaluate farm-level changes in economic behavior leading to sustainable increases in oilseed production. The effects on BAPP farm families' quality of life also needs to be appraised. Work on survey instruments to measure socio-economic progress under BAPP has already begun. It should continue at least for the next five years.

ANNEXES

ANNEX 1

Project Targets and Achievements

BEST AVAILABLE DOCUMENT

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BEST AVAILABLE DOCUMENT

ANNEX 1

PROJECT TARGETS AND ACHIEVEMENTS AS OF MARCH 1, 1987

ACTIVITY	PROJECT PAPER LOG FRAME OBJECTIVES	GRANT AGREEMENT LOP TARGET	ACHIEVEMENT	PERCENT ACHIEVEMENT
GOAL LEVEL				
GROUNDNUT PRODUCTION				
ACRES PLANTED	388,000.0	388,000.0	485,174.0	125.04%
INCREASED PRODUCTION (MTs)	375,000.0	258,000.0	272,541.0	105.64%
DIRECT	125,000.0	87,000.0	125,001.0	143.68%
INDIRECT	250,000.0	171,000.0	245,999.0	143.86%
YIELD		1,325.0	1,270.0	95.85%
SESAME PRODUCTION				
ACRES PLANTED	312,200.0	312,000.0	385,961.0	123.71%
INCREASED PRODUCTION (MTs)	49,100.0	25,000.0	36,399.0	145.60%
YIELD		515.0	442.0	85.83%
SUNFLOWER				
ACRES PLANTED	115,400.0	115,000.0	166,225.0	144.54%
INCREASED PRODUCTION (MTs)	65,500.0	53,000.0	55,056.0	103.88%
YIELD		1,408.0	1,166.0	82.81%
MAIZE				
ACRES PLANTED	383,200.0	373,000.0	416,031.0	111.54%
INCREASED PRODUCTION (MTs)	375,000.0	228,000.0	228,638.0	100.28%
YIELD		2,475.0	2,219.0	89.66%
SOYABEAN PRODUCTION				
ACRES PLANTED	20,000.0		359,540.0	
PRODUCTION	12,600.0	12,000.0	111,251.0	927.09%
YIELD			680.7	
GROSS FARM INCOME (1000s KYATS)	1,760,000.0	1,273,000.0	1,529,260.0	120.13%
(1000s DOLLARS @ 6.8)	258,823.5	187,205.9	224,891.2	120.13%
OILCAKE & MAIZE EXPORTS (1000s KYAT	686,120.0	373,000.0	124,695.0	
(1000s DOLLARS @ 6.8)	100,900.0	52,000.0	18,337.5	35.26%
FOREIGN EXCHANGE VALUE OF INCREASED OIL PRODUCTION (1000s DOLLARS) (@6.8)	94,500.0	69,000.0	191,865.5	278.07%
FX VALUE OF REDUCED VEGOIL IMPORTS			9,414.0	
PER CAPITA CONSUMPTION OF VEGOIL (IN KGS)	3.8	3.8	7.3	192.89%

ANNEX 2

Tables

BEST AVAILABLE DOCUMENT

BEST AVAILABLE DOCUMENT

Table 1

AVAILABLE EDIBLE OILS FROM PRODUCTION AND IMPORTS
BURMA 1974/75 TO 1986/87

YEAR	POPULATION (THOUSANDS)	PRODUCTION (MT)	PRODUCTION PER CAPITA	IMPORTS (MT)	AVAILABLE FOR CONSUMPTION (KG P.C.)
1974/75	29,778	121,600	4.08	1,400	4.13
1975/76	30,389	125,010	4.11	1,400	4.16
1976/77	31,009	113,090	3.65	3,600	3.76
1977/78	31,642	137,160	4.33	8,700	4.61
1978/79	32,284	157,530	4.88	3,700	4.99
1979/80	32,939	105,680	3.21	6,800	3.41
1980/81	33,608	145,750	4.34	8,000	4.57
1981/82	34,287	201,058	5.86	8,500	6.11
1982/83	34,976	204,882	5.86	7,950	6.09
1983/84	35,680	215,414	6.04	4,294	6.16
1984/85	36,392	270,419	7.43	6,070	7.60
1985/86	37,115	263,420	7.10	4,549	7.22
1986/87	37,850	277,575	7.33		7.33

SOURCES: NATIONAL CENSUS;
REPORTS TO THE PYITHU HLUTTAW;
EDIBLE OILSEEDS PROCESSING PROJECT PAPER, USAID;
AGRICULTURAL CORPORATION DATA.

BEST AVAILABLE DOCUMENT

Table 2.a

EDIBLE OILSEED PRODUCTION AND PROCUREMENT
(1985-86)

NO.	TOWNSHIP	PRODUCTION (IN METRIC TONNES) GROUND-NUT	SESAME	SUN-FLOWER	TOTAL	PROCUREMENT GROUND-NUT	SESAME	SUN-FLOWER	TOTAL	PERCENT PROCURED	FERTILIZER DISTR MOPP TOWNSHIPS	TSP MT	UREA MT
MANDALAY DIVISION													
1	KYAUKSE	83.0	3111.0	360.0	3554.0	3.0	207.0	0.0	210.0	5.91%	SE	991.0	300.0
2	KYAUKPADAUNG	8304.0	6774.0	1362.0	16440.0	365.0	268.0	8.0	641.0	3.90%	GN	1500.0	
3	SINKGU	7624.0	738.0	0.0	8362.0	800.0	180.0	0.0	980.0	11.72%	GN	2191.0	225.0
4	SINKGAING	305.0	3117.0	1067.0	4489.0	8.0	218.0	0.0	226.0	5.03%		188.0	
5	NYAUNG U	14717.0	8424.0	14.0	23155.0	1256.0	272.0	0.0	1528.0	6.60%			
6	TADA U	1257.0	2628.0	1956.0	5841.0	65.0	220.0	2.0	287.0	4.91%			
7	TAUNGTHA	7331.0	6601.0	584.0	14516.0	566.0	526.0	0.0	1092.0	7.52%			
8	TUTKONE	3269.0	975.0	1070.0	5314.0	361.0	19.0	51.0	431.0	8.11%	MZ,GN	2619.0	825.0
9	NYDARHTOGYI	2125.0	6594.0	57.0	8776.0	144.0	451.0	0.0	595.0	6.78%			
10	PATHEINGYI	717.0	992.0	476.0	2185.0	187.0	72.0	0.0	259.0	11.85%			
11	PYAWBWE	933.0	3629.0	4267.0	8829.0	106.0	607.0	0.0	713.0	8.08%	SN	1419.0	439.0
12	PYINMANA	691.0	750.0	7.0	1448.0	17.0	40.0	0.0	57.0	3.94%	MZ	1830.0	1000.0
13	MAYMYO	268.0	119.0	15.0	402.0	66.0	0.0	0.0	66.0	16.42%			
14	MADAYA	8248.0	1066.0	361.0	9675.0	1160.0	49.0	0.0	1209.0	12.50%			
15	MOGOK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00%			
16	MYITTHAR	255.0	1798.0	91.0	2144.0	0.0	46.0	0.0	46.0	2.15%	SE	462.0	150.0
17	MYINGYAN	3573.0	4259.0	66.0	7898.0	198.0	172.0	3.0	373.0	4.72%			
18	MEIKTILA	2265.0	5907.0	529.0	8701.0	200.0	378.0	23.0	601.0	6.91%			
19	MAHLAING	2370.0	4481.0	1931.0	8782.0	256.0	514.0	0.0	770.0	8.77%			
20	YAMETHIN	2897.0	2012.0	4799.0	9708.0	141.0	43.0	11.0	195.0	2.01%	SN	1535.0	499.0
21	LEWE	2912.0	1051.0	137.0	4100.0	19.0	10.0	0.0	29.0	0.71%	MZ	1456.0	500.0
22	WUNDWIN	1703.0	3854.0	347.0	5904.0	12.0	111.0	0.0	123.0	2.08%			
23	THABAIKKYIN	3474.0	471.0	32.0	3977.0	442.0	76.0	0.0	518.0	13.02%			
24	THARZI	968.0	3094.0	235.0	4297.0	10.0	125.0	0.0	135.0	3.14%			
25	AMARAPURA	870.0	1669.0	87.0	2626.0	449.0	90.0	0.0	539.0	20.53%			
26	MANDALAY - 1	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.00%			
27	MANDALAY - 2	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.00%			
28	MANDALAY - 3	14.0	5.0	0.0	19.0	0.0	0.0	0.0	0.0	0.00%			
29	MANDALAY - 4	0.0	6.0	0.0	6.0	0.0	0.0	0.0	0.0	0.00%			
	TOTAL	77174.0	74126.0	19850.0	171150.0	6831.0	4694.0	98.0	11623.0	6.79%		14191.0	3938.0

SOURCE: MINISTRY OF COOPERATIVES AND MOPP

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BEST AVAILABLE DOCUMENT

Table 2.b

EDIBLE OILSEED PRODUCTION AND PROCUREMENT
(1985-86)

NO.	TOWNSHIP	PRODUCTION (IN METRIC TONNES) GROUND-NUT	SESAME	SUN-FLOWER	TOTAL	PROCUREMENT GROUND-NUT	SESAME	SUN-FLOWER	TOTAL	PERCENT PROCURED	FERTILIZER DISTR MOPP TOWNSHIPS	TSP MT	
PEGU DIVISION													
1	PE-GU	3878.0	737.0	29.0	4644.0	172.0	28.0	0.0	200.0	4.31%			
2	KAWA	5779.0	1101.0	439.0	7319.0	551.0	0.0	0.0	551.0	7.53%			
3	WAW	7650.0	599.0	74.0	8323.0	787.0	0.0	0.0	787.0	9.46%			
4	THANATPIN	3485.0	657.0	585.0	4727.0	462.0	115.0	7.0	584.0	12.35%			
5	DAIK U	8353.0	944.0	123.0	9420.0	635.0	3.0	0.0	638.0	6.77%	GN	1534.0	200.0
6	NYAUNGLEBIN	4223.0	1391.0	1240.0	6854.0	517.0	21.0	0.2	538.2	7.85%			
7	SHWE KYIN	4473.0	582.0	120.0	5175.0	530.0	40.0	0.0	570.0	11.01%			
8	KYAUKTAGIA	2089.0	972.0	2597.0	5658.0	189.0	144.0	9.0	342.0	6.04%	GN,SN	1035.0	225.0
9	TAUNGOO	1131.0	1133.0	87.0	2351.0	21.0	23.0	0.0	44.0	1.87%			
10	PHYU	4196.0	1057.0	1214.0	6467.0	157.0	5.0	5.0	167.0	2.58%			
11	OATTWIN	2042.0	883.0	826.0	3751.0	14.0	5.0	4.0	23.0	0.61%			
12	YEDASHE	936.0	2076.0	72.0	3084.0	29.0	9.0	0.0	38.0	1.23%			
13	HTANTABIN	2215.0	489.0	752.0	3456.0	134.0	24.0	5.0	163.0	4.72%			
14	KYAUKKYI	1715.0	808.0	44.0	2567.0	51.0	34.0	0.0	85.0	3.31%			
15	PROME	711.0	2304.0	319.0	3334.0	12.0	94.0	0.0	106.0	3.18%			
16	PADAUNG	2968.0	812.0	124.0	3904.0	296.0	71.0	2.0	369.0	9.45%			
17	SHWEDAUNG	4469.0	655.0	133.0	5257.0	115.0	3.0	2.0	120.0	2.28%			
18	PAUNGDE	584.0	1243.0	186.0	2013.0	9.0	93.0	96.0	198.0	9.84%			
19	THEIGON	834.0	1027.0	124.0	1985.0	1.0	0.3	11.0	12.3	0.62%			
20	PAUKKAUNG	527.0	2472.0	54.0	3053.0	23.0	221.0	0.0	244.0	7.99%			
21	THARAWADDY	2308.0	854.0	1258.0	4420.0	30.0	41.0	18.0	89.0	2.01%			
22	LETPADAN	3647.0	529.0	2210.0	6386.0	356.0	11.0	87.0	454.0	7.11%	MZ	125.0	45.0
23	OKPO	901.0	201.0	9362.0	10464.0	19.0	6.0	15.0	40.0	0.38%		117.0	25.0
24	ZEGON	133.0	680.0	203.0	1016.0	32.0	4.0	0.0	36.0	3.54%			
25	MINHLA	3437.0	1326.0	723.0	5486.0	128.0	0.2	7.0	135.2	2.46%			
26	GYOBINGAUK	706.0	540.0	330.0	1576.0	0.0	0.0	0.2	0.2	0.01%			
27	NATTALIN	1302.0	1534.0	60.0	2896.0	85.0	13.0	2.0	100.0	3.45%			
28	MENYE	5445.0	781.0	804.0	7030.0	156.0	0.0	1.0	157.0	2.23%			
29													
	TOTAL	80137.0	28387.0	24092.0	132616.0	5511.0	1008.5	271.4	6790.9	5.12%		2811.0	495.0

SOURCE: MINISTRY OF COOPERATIVES AND MOPP

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Table 2.c

EDIBLE OILSEED PRODUCTION AND PROCUREMENT
(1985-86)

		PRODUCTION (IN METRIC TONNES)				PROCUREMENT					FERTILIZER DISTR		
NO.	TOWNSHIP	GROUND-NUT	SESAME	SUN-FLOWER	TOTAL	GROUND-NUT	SESAME	SUN-FLOWER	TOTAL	PERCENT PROCURED	MOPP TOWNSHIPS	TSP MT	UREA MT
MAGWE DIVISION													
1	MAGWE	18584.0	12418.0	57.0	31059.0	2223.0	3194.0	0.0	5417.0	17.44%	GN	6084.0	375.0
2	YENANGYAUNG	2378.0	1710.0	303.0	4391.0	304.0	509.0	1.0	814.0	18.54%			
3	CHAUK	4598.0	3259.0	9.0	7866.0	1110.0	567.0	0.0	1677.0	21.32%			
4	TAUNGDWINGYI	1797.0	453.0	136.0	2386.0	778.0	279.0	10.0	1067.0	44.72%			
5	MYOTHIT	2876.0	3014.0	15.0	5905.0	353.0	844.0	0.0	1197.0	20.27%			
6	NATMAUK	6021.0	6305.0	919.0	13245.0	814.0	1449.0	61.0	2324.0	17.55%	GN	2370.0	50.0
7	MINBU	1267.0	3091.0	479.0	4837.0	144.0	802.0	14.0	960.0	19.85%			
8	PWINTBYU	283.0	957.0	1450.0	2690.0	40.0	208.0	37.0	285.0	10.59%			
9	SALIN	2449.0	669.0	586.0	3704.0	539.0	181.0	30.0	750.0	20.25%			
10	NGAPHE	24.0	792.0	5.0	821.0	3.0	258.0	0.0	261.0	31.79%			
11	SAYTPLETAYA	28.0	545.0	0.0	573.0	0.0	220.0	0.0	220.0	38.39%			
12	THAYET	811.0	1681.0	0.0	2492.0	522.0	561.0	0.0	1083.0	43.46%			
13	MYEHTAI	3769.0	2482.0	0.0	6251.0	2518.0	678.0	0.0	3196.0	51.13%			
14	SINBAUNGWAI	3860.0	3259.0	19.0	7138.0	1122.0	736.0	1.0	1859.0	26.04%			
15	MINHLA	312.0	2957.0	2.0	3271.0	137.0	1098.0	0.0	1235.0	37.76%			
16	KANMA	1489.0	269.0	0.0	1758.0	539.0	98.0	0.0	637.0	36.23%			
17	MINDEN	541.0	484.0	0.0	1025.0	170.0	153.0	0.0	323.0	31.51%			
18	PAKOKKU	2367.0	1450.0	9.0	3826.0	652.0	616.0	0.0	1268.0	33.14%			
19	YESAGYO	4301.0	509.0	125.0	4935.0	931.0	92.0	3.0	1026.0	20.79%			
20	MYAING	5540.0	4311.0	5.0	9856.0	430.0	1173.0	0.0	1603.0	16.26%			
21	PAUK	960.0	1736.0	4.0	2700.0	196.0	362.0	0.0	558.0	20.67%			
22	SAW	188.0	252.0	200.0	640.0	56.0	66.0	55.0	177.0	27.66%			
23	HTILIN	87.0	340.0	0.0	427.0	26.0	125.0	0.0	151.0	35.36%			
24	GANGAW	175.0	903.0	0.0	1078.0	30.0	340.0	0.0	370.0	34.32%			
25	SEIKPYU	478.0	231.0	23.0	732.0	169.0	72.0	0.0	241.0	32.92%			
	TOTAL	65183.0	54077.0	4346.0	123606.0	13806.0	14681.0	212.0	28699.0	23.22%		8454.0	425.0

SOURCE: MINISTRY OF COOPERATIVES AND MOPP

Table 2.d

EDIBLE OILSEED PRODUCTION AND PROCUREMENT (1985-86) SAGAING DIVISION

NO.	TOWNSHIP	PRODUCTION (IN METRIC TONNES) GROUND-NUT	SESAME	SUN-FLOWER	NIGER	TOTAL	PROCUREMENT GROUND-NUT	SESAME	SUN-FLOWER	NIGER	TOTAL	PERCENT PROCURED	FERTILIZER DISTR MOPP TOWNSHIPS	TSP MT	UREA MT
1	SAGAING	3233.0	5012.0	1315.0	66.0	9626.0	557.0	499.0	0.0	0.0	1056.0	10.97%			
2	MYINMU	2550.0	7502.0	1737.0	3.0	11792.0	244.0	578.0	85.0	0.0	907.0	7.69%			
3	MYAUNG	4088.0	1526.0	588.0	12.0	6214.0	1046.0	232.0	1.0	0.0	1279.0	20.58%	GN	1295.0	135.0
4	NGAZON	1135.0	5411.0	431.0	247.0	7224.0	103.0	336.0	2.0	0.0	441.0	6.10%			
5	MENYWA	1097.0	3168.0	741.0	4.0	5010.0	155.0	234.0	30.0	0.0	419.0	8.36%			
6	CHAUNG U	498.0	2343.0	741.0	56.0	3638.0	55.0	193.0	0.0	0.0	248.0	6.82%			
7	AYARDAW	1927.0	4815.0	488.0	145.0	7375.0	60.0	259.0	2.0	0.0	321.0	4.35%			
8	BUDALIN	2553.0	4927.0	9218.0	20.0	16718.0	124.0	240.0	514.0	0.0	878.0	5.25%	SN	268.0	115.0
9	KANI	4441.0	3839.0	123.0	83.0	8486.0	207.0	245.0	19.0	7.0	478.0	5.63%			
10	SARLINGYI	388.0	3790.0	472.0	11.0	4661.0	102.0	258.0	10.0	0.0	370.0	7.94%			
11	YINMARBIN	390.0	4871.0	121.0	416.0	5798.0	9.0	201.0	0.4	8.0	218.4	3.77%			
12	PALE	253.0	5487.0	394.0	242.0	6376.0	1.0	254.0	0.3	7.0	262.3	4.11%			
13	SHWEBO	1286.0	1302.0	247.0	25.0	2860.0	84.0	86.0	0.0	0.0	170.0	5.94%			
14	WETLET	682.0	3253.0	437.0	0.0	4372.0	84.0	688.0	14.0	0.0	786.0	17.98%			
15	KHIN U	2859.0	637.0	601.0	8.0	4105.0	96.0	19.0	0.0	0.0	115.0	2.80%			
16	YE U	788.0	279.0	482.0	8.0	1557.0	13.0	4.0	7.0	0.0	24.0	1.54%			
17	TAZAI	2741.0	140.0	1148.0	54.0	4083.0	271.0	9.0	50.0	3.0	333.0	8.16%	MZ	2677.0	1325.0
18	DEPAYIN	896.0	568.0	268.0	0.0	1732.0	43.0	3.0	0.0	0.0	46.0	2.66%			
19	KANBALU	5605.0	1641.0	324.0	732.0	8302.0	27.0	154.0	0.0	0.0	181.0	2.18%	MZ	1001.0	375.0
20	KYUNHLA	853.0	320.0	52.0	29.0	1254.0	43.0	16.0	1.0	0.0	60.0	4.78%			
21	LATHA	6650.0	22.0	19.0	169.0	6860.0	772.0	0.0	0.0	5.0	777.0	11.33%			
22	INDAW	1147.0	43.0	2688.0	0.0	3878.0	82.0	0.0	0.0	0.0	82.0	2.11%			
23	BANMAUK	313.0	37.0	10.0	14.0	374.0	24.0	0.0	0.0	0.0	24.0	6.42%			
24	PINLEBU	395.0	61.0	1.0	181.0	638.0	21.0	9.0	4.0	16.0	50.0	7.84%			
25	WUNTHE	384.0	94.0	1.0	5.0	484.0	30.0	0.0	0.0	0.0	30.0	6.20%			
26	KAWLIN	1160.0	225.0	31.0	316.0	1732.0	29.0	3.0	0.0	8.0	40.0	2.31%			
27	HTIGYAING	5039.0	53.0	2244.0	395.0	7731.0	358.0	2.0	0.0	8.0	368.0	4.76%			
28	MAWLAIK	836.0	2.0	15.0	37.0	890.0	170.0	0.0	0.0	0.0	170.0	19.10%			
29	PHAUNGPYIN	1397.0	9.0	16.0	9.0	1431.0	276.0	0.0	0.0	0.0	276.0	19.29%			
30	KALEWA	280.0	6.0	38.0	34.0	358.0	54.0	0.0	0.0	0.0	54.0	15.08%			
31	KALEMYO	1347.0	503.0	993.0	20.0	2863.0	36.0	5.0	0.0	0.0	41.0	1.43%			
32	MINKIN	3349.0	619.0	123.0	33.0	4124.0	414.0	5.0	0.0	0.0	419.0	10.16%			
33	TAMU	54.0	4.0	35.0	0.0	93.0	0.0	0.0	0.0	0.0	0.0	0.00%			
34	HOMMALIN	2993.0	3.0	669.0	0.0	3665.0	392.0	0.0	0.0	0.0	392.0	10.70%			
35	KHAMTI	10.0	5.0	7.0	0.0	22.0	0.0	0.0	0.0	0.0	0.0	0.00%			
36	NANYON	0.0	4.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.00%			
37	LAHAI	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.00%			
38	LESHAE	0.0	5.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.00%			
	TOTAL	63617.0	62529.0	26818.0	3374.0	156338.0	5982.0	4532.0	739.7	62.0	11315.7	7.24%		5241.0	1950.0

Table 2.e

EDIBLE OILSEED PRODUCTION AND PROCUREMENT
(1985-86)

NO.	TOWNSHIP	PRODUCTION (IN METRIC TONNES) GROUND-NUT	SESAME	SUN-FLOWER	NIGER	TOTAL	PROCUREMENT GROUND-NUT	SESAME	SUN-FLOWER	NIGER	TOTAL	PERCENT PROCURED	FERTILIZER DISTR MOPF TOWNSHIPS	TSP MT	UREA MT
IRRAWADY DIVISION															
1	BASSEIN-WEST	236.0	93.0	184.0	5.0	518.0	15.0	0.0	0.0	0.0	15.0	2.90%			
2	BASSEIN-EAST	867.0	36.0	460.0	4.0	1367.0	50.0	0.0	0.5	0.0	50.5	3.69%			
3	THARBAUNG	1568.0	378.0	2274.0	55.0	4275.0	69.0	0.0	62.0	0.0	131.0	3.06%			
4	NGAPUTAW	412.0	86.0	20.0	0.0	518.0	54.0	1.0	0.0	0.0	55.0	10.62%			
5	KYONPYAW	2029.0	960.0	1062.0	21.0	4072.0	31.0	69.0	2.0	0.0	102.0	2.50%			
6	YEKYI	4015.0	214.0	1940.0	116.0	6285.0	219.0	0.0	0.0	0.0	219.0	3.48%			
7	KYAUNGGONE	1742.0	170.0	2216.0	38.0	4166.0	94.0	3.0	71.0	0.0	168.0	4.03%	SE	150.0	80.0
8	HENZADA	2385.0	195.0	2685.0	10.0	5275.0	182.0	35.0	91.0	0.0	308.0	5.84%	SE	227.0	125.0
9	ZALUN	1900.0	47.0	6946.0	5.0	8898.0	30.0	0.0	391.0	0.0	421.0	4.73%	MZ	1700.0	700.0
10	LAYMYETHNMAR	1254.0	207.0	3641.0	0.0	5102.0	32.0	0.0	17.0	0.0	49.0	0.96%			
11	MYANAUNG	4391.0	944.0	2235.0	6.0	7576.0	123.0	5.0	11.0	0.0	139.0	1.83%			
12	KYAN GIN	1664.0	357.0	849.0	0.0	2870.0	317.0	4.0	46.0	0.0	367.0	12.79%			
13	INGABU	3806.0	731.0	4469.0	0.0	9006.0	478.0	93.0	87.0	0.0	658.0	7.31%			
14	MYAUNGMYA	311.0	993.0	478.0	11.0	1793.0	3.0	57.0	1.0	0.0	61.0	3.40%			
15	EINMAI	793.0	385.0	1462.0	4.0	2644.0	52.0	8.0	34.0	0.0	94.0	3.56%			
16	LABUTTA	11.0	67.0	113.0	0.1	191.1	0.0	1.0	0.0	0.0	1.0	0.52%			
17	WAKEMA	506.0	2254.0	6647.0	0.8	9407.8	13.0	44.0	155.0	0.0	212.0	2.25%	SE	928.0	375.0
18	MOULMEINGYUN	158.0	5130.0	740.0	0.0	6028.0	2.0	159.0	1.0	0.0	162.0	2.69%	SE	4700.0	1425.0
19	MAUBIN	332.0	64.0	3916.0	18.0	4330.0	15.0	3.0	135.0	0.0	153.0	3.53%	SE,MZ	688.0	400.0
20	PANTANAW	1459.0	204.0	4774.0	17.0	6454.0	46.0	3.0	172.0	0.0	221.0	3.42%			
21	YAUNGDOON	2190.0	162.0	3797.0	13.0	6162.0	263.0	4.0	64.0	0.0	331.0	5.37%	GN	1591.0	156.0
22	CANUBYU	1057.0	174.0	5452.0	56.0	6739.0	43.0	0.1	35.0	0.0	78.1	1.16%			
23	PYAPON	14.0	296.0	891.0	0.7	1201.7	0.0	0.2	16.0	0.0	16.2	1.35%			
24	BEGALE	0.0	2545.0	664.0	0.2	3209.2	0.0	22.0	0.1	0.0	22.1	0.69%			
25	KYAIKLAT	16.0	265.0	1257.0	0.4	1538.4	0.0	3.0	46.0	0.0	49.0	3.19%			
26	DEDAYE	2.0	6.0	139.0	0.0	147.0	0.0	0.2	4.0	0.0	4.2	2.86%			
	TOTAL	33118.0	16963.0	59311.0	381.2	109773.2	2131.0	514.5	1441.6	0.0	4087.1	3.72%		9984.0	3261.0

SOURCE: MINISTRY OF COOPERATIVES AND MOPP

Table 2.f

EDIBLE OILSEED PRODUCTION AND PROCUREMENT
(1985-86)

		PRODUCTION (IN METRIC TONNES)					PROCUREMENT						FERTILIZER DISTR		
NO.	DIVISION	GROUND-NUT	SESAME	SUN-FLOWER	NIGER	TOTAL	GROUND-NUT	SESAME	SUN-FLOWER	NIGER	TOTAL	PERCENT PROCURED	MOPP TOWNSHIPS	TSP MT	UREA MT
1	MANDALY	77174.0	74126.0	19850.0	0.0	171150.0	6831.0	4694.0	98.0	0.0	11623.0	6.79%	10	14191.0	3938.0
2	PEGU	80137.0	28387.0	24092.0	0.0	132616.0	5511.0	1008.5	271.4	0.0	6790.9	5.12%	4	2811.0	495.0
3	MAGWE	65183.0	54077.0	4346.0	0.0	123606.0	13806.0	14681.0	212.0	0.0	28699.0	23.22%	2	8454.0	425.0
4	SAGAING	63617.0	62529.0	26818.0	3374.0	156338.0	5982.0	4532.0	739.7	62.0	11315.7	7.24%	4	5241.0	1950.0
5	IRRAWADY	33118.0	16963.0	59311.0	381.2	109773.2	2131.0	514.5	1441.6	0.0	4087.1	3.72%	8	9984.0	3261.0
	TOTAL	319229.0	236082.0	134417.0	3755.2	693483.2	34261.0	25430.0	2762.7	62.0	62515.7	9.01%	28	40681.0	10069.0
	SEEDFARMS													660.0	315.0
	TAIKGYI													150.0	
	NATTALIN(THITCHO)													67.0	
	THONEGWA													200.0	
	KYAUKTAN													166.0	
	TOTAL													41924.0	10384.0

KEY: MZ = MAIZE, SN = SUNFLOWER, SE = SESAME, GN = GROUNDNUTS.

Table 3

NATIONAL ACREAGE, PRODUCTION, YIELDS, AND EXPORTS OF MAIZE
1974/75 - 1985/86

YEAR	ACREAGE SOWN	ACREAGE HARVESTED	PRODUCTION (MT)	YIELD (KG/ACRE)	YIELD (55lb BASKETS)	MT PURCHASED	MT EXPORTED
1974/75	215,000		65,000	302.33	12.12		
1975/76	203,000		61,000	300.49	12.04		
1976/77	199,000		58,000	291.46	11.68		
1977/78	207,513	195,500	75,000	361.42	14.49		
1978/79	247,341	205,716	77,000	311.31	12.48		
1979/80	357,021	247,341	126,000	352.92	14.15		
1980/81	347,327	357,021	167,000	480.81	19.27		
1981/82	380,684	347,347	206,000	541.13	21.69	21,372	22,987
1982/83	422,034	335,828	239,000	566.31	22.70	35,032	33,533
1983/84	513,358	446,766	309,000	601.92	24.13	31,852	17,567
1984/85	565,000	526,556	303,000	536.28	21.50	24,709	29,996
1985/86	596,000		378,000	634.23	25.42	55,880	21,906
1986/87							

SOURCE: REPORT TO THE PYITHU HLUTTAW
ON THE FINANCIAL, ECONOMIC AND SOCIAL CONDITIONS
OF THE SOCIALIST REPUBLIC OF THE UNION OF BURMA
FOR 1986/87
MINISTRY OF PLANNING AND FINANCE, 1986

NOTE: 1984/85 FIGURES ARE PROVISIONAL AND 1985/86 ARE ESTIMATES

Table 4

NATIONAL ACREAGE, PRODUCTION AND YIELDS OF GROUNDNUT
1974/75 - 1985/86

YEAR	ACREAGE SOWN	ACREAGE HARVESTED	PRODUCTION (MT)	YIELD (KG/ACRE)	YIELD (25lb BASKETS)	YIELD (KG/ACRE)	YIELD (25lb BASKETS)
				(OF SOWN ACRES)		(OF HARVESTED ACRES)	
1974/75	1,666,000	1,631,000	466,000	279.71	24.67	285.71	25.20
1975/76	1,669,000	1,607,000	410,000	245.66	21.66	255.13	22.50
1976/77	1,507,000	1,410,000	423,000	280.69	24.75	300.00	26.46
1977/78	1,481,000	1,392,000	464,000	313.30	27.63	333.33	29.39
1978/79	1,378,000	1,291,000	390,000	283.02	24.96	302.09	26.64
1979/80	1,200,000	1,126,000	342,000	285.00	25.13	303.73	26.78
1980/81	1,271,000	1,210,000	438,000	344.61	30.39	361.98	31.92
1981/82	1,478,000	1,372,000	573,000	387.69	34.19	417.64	36.83
1982/83	1,412,000	1,335,000	550,000	389.52	34.35	411.99	36.33
1983/84	1,385,000	1,294,000	531,569	383.80	33.85	410.80	36.23
1984/85	1,598,000	1,532,000	666,593	417.14	36.79	435.11	38.37
1985/86	1,597,000	1,495,000	651,247	407.79	35.96	435.62	38.41
1986/87							

SOURCE: REPORT TO THE PYITHU HLUTTAW
ON THE FINANCIAL, ECONOMIC AND SOCIAL CONDITIONS
OF THE SOCIALIST REPUBLIC OF THE UNION OF BURMA
FOR 1986/87
MINISTRY OF PLANNING AND FINANCE, 1986

Table 5

NATIONAL ACREAGE, PRODUCTION AND YIELDS OF SESAMUM
1974/75 - 1985/86

YEAR	ACREAGE SOWN	ACREAGE HARVESTED	PRODUCTION (MT)	YIELD (KG/ACRE)	YIELD (55lb BASKETS)	YIELD (KG/ACRE)	YIELD (55lb BASKETS)
				(OF SOWN ACRES)		(OF HARVESTED ACRES)	
1974/75	2,609,000	1,619,000	96,000	36.80	1.50	59.30	2.42
1975/76	2,464,000	1,641,000	134,000	54.38	2.22	81.66	3.33
1976/77	2,630,000	1,478,000	92,000	34.98	1.43	62.25	2.54
1977/78	2,696,000	1,496,000	111,000	41.17	1.68	74.20	3.03
1978/79	3,087,000	2,367,000	209,000	67.70	2.76	88.30	3.60
1979/80	2,563,000	1,559,000	110,000	42.92	1.75	70.56	2.88
1980/81	3,231,000	1,762,000	157,000	48.59	1.98	89.10	3.64
1981/82	3,385,000	1,909,000	180,000	53.18	2.17	94.29	3.85
1982/83	3,402,000	2,312,000	198,000	58.20	2.38	85.64	3.50
1983/84	3,308,000	1,902,000	206,760	62.50	2.55	108.71	4.44
1984/85	3,708,000	3,485,000	252,814	68.18	2.78	72.54	2.96
1985/86	3,668,000	2,627,000	269,141	73.38	3.00	102.45	4.18
1986/87							

SOURCE: REPORT TO THE PYITHU HLUTTAW
ON THE FINANCIAL, ECONOMIC AND SOCIAL CONDITIONS
OF THE SOCIALIST REPUBLIC OF THE UNION OF BURMA
FOR 1986/87.
MINISTRY OF PLANNING AND FINANCE, 1986

NOTE: 1984/85 FIGURES ARE PROVISIONAL AND 1985/86 ARE ESTIMATES
ACTUAL FIGURES FOR PRODUCTION ARE GIVEN FOR LATER YEARS,
EARLIER FIGURES ARE ROUNDED. YIELD FIGURES ARE CALCULATED.

Table 6

NATIONAL ACREAGE, PRODUCTION AND YIELDS OF SUNFLOWER
1974/75 - 1985/86

YEAR	ACREAGE SOWN	ACREAGE HARVESTED	PRODUCTION (MT)	YIELD (KG/ACRE) (OF SOWN ACRES)	YIELD (32lb BASKETS) (OF SOWN ACRES)	YIELD (KG/ACRE) (OF HARVESTED ACRES)	YIELD (32lb BASKETS) (OF HARVESTED ACRES)
1974/75	9,000	7,900	1,000	111.11	7.65	126.58	8.72
1975/76	10,000	8,600	1,000	100.00	6.89	116.28	8.01
1976/77	21,000	17,100	3,000	142.86	9.84	175.44	12.09
1977/78	85,000	80,700	13,000	152.94	10.54	161.09	11.10
1978/79	136,000	122,200	14,000	102.94	7.09	114.57	7.89
1979/80	81,000	54,700	13,000	160.49	11.06	237.66	16.37
1980/81	143,000	122,200	33,000	230.77	15.90	270.05	18.60
1981/82	258,000	229,200	71,000	275.19	18.96	309.77	21.34
1982/83	271,000	226,762	71,000	261.99	18.05	313.10	21.57
1983/84	347,000	315,537	114,000	328.53	22.63	361.29	24.89
1984/85	399,000	356,474	141,000	353.38	24.35	395.54	27.25
1985/86	488,000		186,000	381.15	26.26	N/A	N/A
1986/87							

SOURCE: REPORT TO THE PYITHU HLUTTAW
ON THE FINANCIAL, ECONOMIC AND SOCIAL CONDITIONS
OF THE SOCIALIST REPUBLIC OF THE UNION OF BURMA
FOR 1986/87, MINISTRY OF PLANNING AND FINANCE, 1986

ACREAGE HARVESTED FIGURES FOR 1982/83 AND A983/84 ARE FROM ANNUAL PLANS AND ACTUAL PRODUCTION OF MAIZE AND OILSEED CROPS IN BURMA (1977-78 TO 1982-83). 1984/85 DATA ARE ESTIMATED.

NOTE: 1984/85 FIGURES ARE PROVISIONAL AND 1985/86 ARE ESTIMATES

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ANNEX 3

MOPP Reports

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PROGRESS REPORT FOR THE YEAR

1982/83 TO 1986/87

Table 1. Crop area and production in project townships.

Crop & Year	Sown Acres	Production Basket	Production MT
Groundnut			
1982-83	71,940	3,243,760	36,794
1983-84	92,665	4,595,853	52,131
1984-85	105,514	5,331,130	60,471
1985-86	108,455	5,550,546	62,960
1986-87[a/]	106,600	5,305,870	60,185
Total	485,174	24,027,159	272,541
Project Goal	388.000	18,722,400	212,368
Sesame			
1982-83	61,130	492,279	12,061
1983-84	72,291	503,875	12,345
1984-85	87,405	637,790	15,626
1985-86	82,235	533,816	13,079
1986-87[a/]	82,900	520.300	12,748
Total	385,961	2,688,060	65,859
Project Goal	312,200	2,401,600	58,841
Sunflower			
1982-83	15,000	571,130	8,292
1983-84	23,375	718,220	10,428
1984-85	40,208	1,328,850	19,294
1985-86	41,642	1,331,007	19,325
1986-87[a/]	46,000	1,340,800	19,467
Total	166,225	5,290,007	76,806
Project Goal	115,400	5,083,500	73,808
Maize			
1982-83	55,870	1,992,156	49,714
1983-84	84,530	3,105,800	77,504
1984-85	93,030	3,141,120	78,385
1985-86	95,469	3,486,480	87,004
1986-87[a/]	87,132	3,860,054	96,326
Total	416,031	15,585,610	388,933
Project Goal	373,200	15,539,000	387,770

a/ 1986-87 data are preliminary.

Table 2. Increase in crop production.

Crop & Year	Production in MT	Increase Production MT
Groundnut		
1981-82 Base year	29508	
1982-83	36794	7286
1983-84	52131	22623
1984-85	60471	30963
1985-86	62960	33452
1986-87[a]	60185	30677
Total		125001
Project Goal		87000
Sesame		
1981-82 Base year	5892	
1982-83	12061	6169
1983-84	12345	6453
1984-85	15626	9734
1985-86	13079	7187
1986-87[a]	12748	6856
Total		36399
Project Goal		25000
Sunflower		
1981-82 Base year	4350	
1982-83	8292	3942
1983-84	10428	6078
1984-85	19294	14944
1985-86	19325	14975
1986-87[a]	19467	15117
Total		55056
Project Goal		53000
Maize		
1981-82 Base year	32059	
1982-83	49714	17655
1983-84	77504	45445
1984-85	78385	46326
1985-86	87004	54945
1986-87[a]	96326	64267
Total		228638
		228000

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Table 3 Selected crop yield data.

Crop	National Average 1970's decade	National Average 1982-83 to 1985-86	MOPP area 4 years	High Technology sites
	(Pounds/Acre)			
Groundnut	716	921	1270	1786
Sesame	175	219	442	542
Sunflower	554	818	1166	1811
Maize	845	1495	2219	5109

Table 4. Fertilizer distribution by crop, project townships.

Crop	Year	Sown Acres	Tons Fertilizer Urea	TSP	Potash
Groundnut	1982-83	71,940	695	1,77[illegible]	-
	1983-84	92,665	844	2,316	-
	1984-85	105,514	947	2,638	-
	1985-86	108,455	1292	2,712	-
	1986-87	106,600	1333	2,665	-
Total		485,174	5111	12,130	
Project Goal		388,000	7178	9,876	
Sesame	1982-83	61,130	1951	1,190[illegible]	-
	1983-84	72,291	2255	1,354	-
	1984-85	87,405	2662	1,571	-
	1985-86	82,235	2509	1,483	-
	1986-87	82,900	2537	1,500	-
Total		385,961	11,914	7,098	
Project Goal		312,200	9,830	5,857	
Sunflower	1982-83	15,000	562	376	-
	1983-84	23,375	549	555	-
	1984-85	40,208	1,369	865	-
	1985-86	41,642	1,407	886	-
	1986-87	46,000	1,526	951	-
Total		166,225	5,413	3,633	
Project Goal		115,400	4,083	2,61[illegible]	
Maize	1982-83	55,870	2,793	1,397	629
	1983-84	84,530	3,991	1,87[illegible]	[illegible]
	1984-85	93,030	4,486	2,174	[illegible]
	1985-86	95,469	4,499	2,114	[illegible]
	1986-87	87,132	4,096	2,366	[illegible]
Total		416,031	19,865	9,9[illegible]	[illegible]
Project Goal		373,200	18,424	8,924	[illegible]

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Crop	Year	Sown Acres	Tons Fertilizer Urea	TSP	Potash
All Crops					
	1982-83	203,940	6,001	4,762	629
	1983-84	272,861	7,639	6,104	824
	1984-85	326,157	9,464	7,248	1017
	1985-86	327,801	9,707	7,195	921
	1986-87	322,632	9,492	7,482	829
Total		1,453,391	42,303	32,791	4,220
Project Goal		1,188,800	39,515	27,271	4,175

Table 5. Value of increased gross farm income.

Crop	Increase (MT)	Value (Kyat in million)
Groundnut	125001	752.02
Sesame	36399	265.27
Sunflower	55056	248.69
Maize	228638	263.28
Total		1529.26
Project Goal		1273.00

Table 6. Value of increased oilcake, 1982-83 to 1986-87.

Crop	Increased Production (MT) Unprocess	Oilcake	Oilcake Value (K000)
Groundnut	125001	52013	95496
Sesame	36399	18200	22277
Total		70213	117,773

Table 7. Export of oilcake and maize.

(Value in thousand kyats)

Crop	Oilcake MT	Oilcake Value	Maize MT	Maize Value	Total Value
1981-82[a/]	8640	11848	22987	20549	
1982-83	10511	13320	33533	30644	43964
1983-84	3640	5003	17567	18875	23878
1984-85	4275	6052	29996	29010	35062
1985-86	6348	6492	21906	15299	21791
4 yrs Total	24774	30867	103002	93828	124695

a/ Base year

72X

Table 8. Import of vegetable oil.

Year	MT	Value (thousand kyats)
1981-82[a/]	8500	33922
1982-83	7950	28437
1983-84	4294	25473
1984-85	6070	38481
1985-86	4549	12255
4 yrs Total	22863	148,568

a/ Base year.

Table 9. Vegetable oil production and average rate of per capita consumption.

Year	Population (million)	Production (MT)	Average Consumption (kilo)
1981-82 Base year	34.29	201058	5.95
1982-83	34.98	204882	5.95
1983-84	35.68	215414	6.14
1984-85	36.39	270419	7.56
1985-86	37.12	263420	7.23
1986-87 (Estimate)	37.85	277574	7.46
Increase in percent			25.3%
Project Goal			30 %

Table 10. Soybean Production in Burma.

Year	Sown Acre	Harvested Acres	Yield/a Pounds	Production (MT)
1981-82	69,422	66,274	641	19,314
1982-83	70,350	64,603	670	19,666
1983-84	70,381	67,416	722	22,120
1984-85	72,983	69,610	743	23,522
1985-86	72,305	69,260	727	22,886
1986-87 Estimate	73,021	71,494	709	23,057

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Table 11. Seed Supply Requirement and Actual Distribution

	From 1982-83 to 1985-86			
Crop	1982-83	1983-84	1984-85	1985-86
Maize Acres	57,000	75,000	91,000	105,000
Seed requirement(bsk)	14,250	18,750	22,750	26,250
Distribution (bsk)				
From Seed Farms	4,750	13,625	16,397	13,965
Groundnut Acres	37,500	42,000	46,500	50,000
Seed Requirement(bsk)	225,000	252,000	279,000	300,000
Distribution (bsk)				
From Seed Farms	2,430	4,927	6,298	6,260
Sesame Acres	34,000	36,000	38,000	40,000
Seed Requirement(bsk)	4,250	4,500	4,750	5,000
Distribution (bsk)				
From Seed Farms	17	7	79	179
Sunflower Acres	15,000	20,000	25,000	30,000
Seed REquirement(bsk)	3,750	5,000	6,250	7,500
Distribution (bsk)				
From Seed Farms	960	1,020	1,369	4,315

74X

Table 12. Construction Buildings

Buildings	Chaungmagyi		Sebin		Thitcho		Kyaungsu	
	Planned	Completed	Planned	Completed	Planned	Completed	Planned	Completed
Farm Managers' Office	1	1	1	1	1	1	1	1
Training Hall	1	1	1	-	1	1	1	1
Farm Manager's Residence	1	1	1	1	1	1	1	1
2 Unit Quarters - 4 Buildings	6	6	6	6	14	7	7	6
4 Unit Quarters - 3 Buildings	6	-	3	-	9	-	4	-
Fertilizer Ware-House	1	1	1	1	1	1	1	1
Pesticide Storage	1	1	1	1	1		1	1
Generator Housing	1	1	1	1	1	1	1	1
Diesel Storage Tank	1	1	1	1	1	1	1	1
Groundnut & Maize Processing	1	1	1	1	1	-	1	-
Work Shop	1	1	1	1	1	1	1	1
Dinning Hall	1	-	1	-	1	-	1	-
Barrack	1	-	1	-	1	-	1	-
Farm Officers Residence - 2 Units	2	1	2	-	2	1	2	-
Tractor Shed	1	1	1	1	1	1	1	1
Seed Store House	1	1	1	1	1	1	1	1
Implement Storage	1	1	1	1	1	1	1	-
Cold Storage	1	-	1	-	1	-	1	-
Ware House (Ventilated Store)	1	1	1	1	1	-	1	-
Drying Floor	1	1	1	1	1	1	1	1
Lab and Office	1	1	1	1	1	-	1	-
Dryer	1	1	1	-	1	-	1	-
Machine Shop Store	1	1	1	1	1	1	1	1
Guest House	1	1	1	1	1	1	1	1
Cow Shed	1	-	1	-	1	-	1	-

Table 13. Technical Assistance (Long-term)

	Name of Consultant	Area	Duration
1.	Dr. Donald E. Herr	Agronomist (Team Leader)	1 yr
2.	Mr. George W. Otey	Seed Technologist	2 yrs 2 months
3.	Dr. E. T. Bullard	Agronomist (Team Leader)	2 yrs
4.	Mr. Ross E. Hagan	Water Management Specialist	2 yrs
5.	Dr. Arlo P. Thompson	Oilseed Production Specialist	2 yrs
6.	Dr. Frank G. Calhoun	Team Leader (Professor)	½ yr

Table 14. Technical Assistance (Short-term)

	Area Expertise	Duration (Man/Month)
1.	Seed Technology	2
2.	Irrigation Specialist	2
3.	Rhizobium Production	½
4.	Electric Pump Irrigation	1
5.	Agri. Mechanic & Engineering	12 ½
6.	Cropping System	2
7.	Corn Production	1
8.	Sunflower Production	1
9.	Seed Specialist	½
10.	Cropping System	7
11.	Farm Management	2

Table 15. Long-term Training

	Trainee	Degree	University	Assignment
1.	U Hoke San	M.S (Water Mgmt.)	Colorado State	Land Use Division (Hq.)
2.	U Saw Thet Swe	M.S (Peanut Breeding)	Univ. of Georgia	A.R.I Yezin
3.	U Tin Win	M.S (Peanut Production)	Univ. of Georgia	Central Farm (Magwe)
4.	U John Ba Maw	M.S (Maize Breeding)	Ohio State Univ.	A.R.I Yezin
5.	U Kyaw Soe	M.S (Soil Plant Relation)	Ohio State Univ.	Ground Water Irrigation (Monywa)
6.	U Soe Win Maung	M.S (Agri. Economy)	" " "	Planning Division (Hq.)
7.	U Than Htay	M.S (Agri. Extn.)	" " "	MOPP (Hq.)
8.	U Tin Htut Oo	M.S	" " "	Admin. (Hq.)

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Trainee	Degree	University	Assignment
10. Daw Htay Htay Win	M.S (Seed Technology)	Univ. of Georgia	A.R.I Yezin
11. U Mya Than	M.S (Seed Technology)	Oregon State Univ.	ARD (Hq.)
12. U San Nyunt	M.S (Seed Technology)	Oregon State Univ.	MOPP (Hq.)
13. U Kyaw Moe	M.S (Agronomy)	Texas A & M	A.R.I Yezin
14. U G. Thaung Khaw Mung	(Agri. Extn.)	Texas A & M	State Manager (Chin State)
15. U Tin Nwe	M.S (Sesame Breeding)	" "	A.R.I Yezin
16. U Thein Htoon	M.S (Seed Processing & Storage)	Miasissippi State University	Seed Farm (Chaungmagyi)
17. U Ba Hein	M.S (Extension)	Ohio State Univ.	Abroad
18. U Myo Nyunt	M.S (Sunflower Breeding)	" " "	"
19. U Tin Saung	M.S (Weed Control)	" " "	"
20. U Myo Chit	M.S (Entomology)	Texas A & M	"
21. U Aung Kyi	M.S (Agronomy)	Mississippi State University	"
22. Daw Mar Mar Myint	M.S (Soil Fertility)	" "	"
23. U Mya Maung	Ph.D (Entomology)	Ohio State Univ.	"
24. U Mar	Ph.D (Cropping System)	Mississippi State University	"

Table 16. Short-term Training

	Training Area	Numbers of Participants 82	83	84	85	86	Total
1.	Keys to Agriculture Development at the local level.	1	-	-	-	-	1
2.	Development & Operation of Agriculture Extension	2	-	-	-	-	2
3.	Agriculture Project Planning & Analysis	3	1	-	-	-	4
4.	Study Tour on Sunflower Production	2	-	4	-	-	6
5.	Study Tour on Soybean & Peanut	2	-	-	-	-	2
6.	Study Tour on Sesame Production	2	-	4	-	-	6
7.	Study Tour on Maize Production	2	-	4	-	-	6
8.	Rhizobium Technology	2	-	-	-	-	2
9.	Agr. Project Implementation	-	2	-	-	-	2
10.	Rhizobium Production	-	1	-	-	-	1
11.	Micro Computer	-	2	-	2	-	4
12.	Technical and Economic Aspects of Soybean	-	-	3	-	-	3
13.	Maize Breeding	-	-	1	-	-	1
14.	Study Tour on Groundnut Production	-	-	3	-	-	3
15.	World Cowpea Conference & Study Tour	-	-	2	-	-	2
16.	Nitrogen Fixing Aquatic Farm	-	-	2	-	-	2
17.	Irrigation/Water Management	-	-	-	4	-	4
18.	Peanut Production	-	-	-	2	-	2
19.	Peanut Breeding	-	-	-	2	-	2
20.	Seed Improvement & Farm Management	-	-	-	-	4	4
	Total	16	6	23	10	4	59

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ANNEX 4

List of Technical Assistance Short-Term

79

Technical Assistance
(Short-Term)

No.	Name	Expertise	Duration From	Duration To
1.	Dr. James de Louch	Seed Technology	13.3.83	31.4.83
2.	Dr. Skogerboe	Irrigation Specialist	13.6.82	4.8.82
3.	Dr. Robert J. Davis	Rhizobium Specialist	2.10.84	10.10.84
4.	Mr. Douglas Robinson	Electrician & Irrigation Specialist	8.2.83	28.2.83
5.	Mr. Norman Illsley	Agri. Mechanic	23.1.85	15.7.85
			1.11.85	31.12.85
6.	Mr. Lester Koccurek	Farm Machinery & Cropping System	23.1.85	15.3.85
7.	Dr. Chamnan Chutkaew	Corn Research & Production	13.8.84	1.9.84
8.	Dr. Arlo P. Thompson	Sunflower Specialist & Cropping System	17.1.84	12.2.84
9.	Dr. William Chappell	Weed Specialist	18.2.85	14.3.85
10.	Mr. Russell C. Toevs	Cropping System	4.11.85	2.1.86
11.	Mr. Gordon L. Brockmueller	" "	"	"
12.	Mr. Matthew H. Peart	" "	14.1.85	13.3.85
13.	Mr. Richard Isert	Agri. Engineer	2.3.85	17.3.85
14.	Mr. Richard Isert	Agri. Engineer	5.5.86	15.8.86
15.	Mr. Norman Illsley	" "	27.6.86	26.10.86
16.	Mr. A. Ben Manring	Engineer	15.10.86	31.10.86
17.	Mr. Matthew H. Peart	Cropping System	19.1..86	15.12.86
18.	Mr. Gordon L. Brockmueller	Farm Management	25.10.86	31.1.87

80 X

ANNEX 5

Rhizobium Production and Distribution in Burma

81

Rhizobium Production & Distribution in Burma

(in ½ lb packet)

Year	Production	Distribution
1982-83	763241	763241
1983-84	656728	656728
1984-85	606008	606008
1985-86	640240	640240
1986-87	690186	690186
Total	3356403	3356403

ANNEX 6

Distribution of Diesel Oil to Seed Farms

DISTRIBUTION OF DIESEL OIL

Year	Chaungmagyi	Sebin	Kyaungsu	Thitcho	Total
1982-83	250	200	9320	13380	23150
1983-84	2500	2330	6800	9670	21300
1984-85	9500	8560	11200	14990	44250
1985-86	9950	9930	16020	18040	53940
1986-87	3500	3340	11320	14830	32990
Total	25700	24360	54660	70910	175630

84X

ANNEX 7

Seeds Distribution from Contract-Farmers in Project Townships (baskets)

Seeds Distribution from Contract-Farmers in Project Townships

(in baskets)

Seeds	82-83	83-84	84-85	85-86
Maize	3800	4200	5240	5535
Groundnut	3568	34880	39712	49115
Sesame	1358	1805	1866	2098
Sunflower	1470	3100	4128	3100

ANNEX 8

MOPP Staff

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MOPP STAFF

ANNEX 8

No.	Position	No. of Personnel 82-83	83-84	84-85	85-86
	Head Office				
1.	Project Director	1	1	1	1
2.	Deputy P.D	2	2	2	2
3.	Project Co-ordinator	3	3	3	[illegible]
4.	Assist. P.D			6	6
5.	Subject Matter Specialist			5	5
6.	Dy. P.D		2	5	5
7.	Office Staff	30	38	48	48
	Total	36	46	70	70
	Division/State Level				
8.	Dy. State/Div. Manager	3	5	7	7
9.	Assist. General Manager S.M.S	3	5	7	7
10.	Office Staff	5	8	10	10
	Total	11	18	24	24
	Seed Farm				
11.	Farm Manager	4	4	4	4
12.	Dy. Farm Manager S.M.S	4	4	4	4
13.	Field & Office Staff	50	80	101	101
	Total	58	88	109	109
	Township Level				
14.	Township Manager	25	25	25	25
15.	Dy. Township Manager	25	25	25	25
16.	Field & Office Staff	177	280	365	365
	Total	227	330	415	415
	GRAND TOTAL	332	482	618	618

88X

ANNEX 9

1986-87 and 1987-88 Research Program for Maize, Peanut, Sesame and Sunflower

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1986-87 and 1987-88

Research Program for Maize, Peanut, Sesame and Sunflower

No.	Experiments	Location
A.	**Maize**	
1.	Breeding and Selection of New Corn Varieties	Yezin
2.	Varietal Yield Test	Yezin, Tatkon, Heho, Aung-pan, Kyauk-me, Mye-mon, Taung-dwin-gyi.
3.	Cultural Method & Fertilizer Dosage	Yezin, Tatkon, Heho, Let-pa-dan, Za-loke.
4.	Population Test for Each Soil Type	All areas.
B.	**Peanut**	
1.	Breeding & Selecting of New Varieties	Magwe
2.	Varietal Yield Test	All peanut growing areas.
3.	Storage Methods for Seeds	Lower Burma.
4.	Population Test for Each Soil Type	All areas.
5.	Yield Stability Test	All areas.
C.	**Sesame**	
1.	Breeding & Selecting of New Varieties	Yezin, Magwe, Mahlaing, Za-loke, Nyaung-U, Myingyan, Wakema, Myaung Mya.
2.	Varietal Yield Test	All sesame growing areas.
3.	Cultural Methods	Myaung Mya, Yezin.
4.	Population Test for Each Soil Type	All areas.
5.	Yield Stability Tests	All areas.

90X

No.	Experiments	Location
D.	Sunflower	
1.	Breeding & Selecting of New Varieties with High Oil-Content.	Yezin & MOPP farms.
2.	Cultural Methods including Planting Time, Fertilizer Dosage, Time of Irrigation, etc.	All sunflower growing areas.
3.	Storage Methods for Seeds	Lower Burma.
4.	Population Test for Each Soil Type	All areas.
5.	Yield Stability Test	" "
6.	The Use of Zero Tillage & Minimum Tillage.	" "

* The research program was approved by the Agricultural Research and Technology Development Committee presided by the Managing Director of Agriculture Corporation.

1. Agricultural Research and Technology Development Committee (Agriculture Corporation)

1.	Managing Director	Chair Person
2.	General Manager (Special Duty)	Member
3.	General Manager (ARI)	"
4.	General Manager (Extension)	"
5.	General Manager (Planning)	"
6.	General Manager (Applied Research)	Secretary

2. Maize Research & Technology Development Committee

1.	U Toe Aung, Farm Manager	Chair Person
2.	U Sein Thaung, Farm Manager	Member
3.	U Maw Kyi, Junior Officer	"
4.	U Kyi Maung, Dy. Asst. G.M	"
5.	U Tin Soe, Dy. Asst. G.M.	"
6.	U Chit Saing, Project Director (CIP)	"
7.	U Tin Myint, Dy. Divisional Manager	"
8.	Daw Wily Nyunt, Dy. State Manager	"
9.	U Than Aung, Farm Manager	"
10.	U Kyin Po, Junior Officer	"
11.	U Than Myint, Dy. Divisional Manager	"
12.	U Hla Toe, Dy. Divisional Manager	"

3. Peanut & Sesame Research and Technology Development Committee

1.	U Saw Win Kyi, Dy. General Manager	Chair Person
2.	U Mya Maung, Project Director (MOPP)	Member
3.	U Hla Shwe, Dy. G.M.	"
4.	U Hla Toe, Dy. Divisional Manager	"
5.	U Tin Myint, " " "	"
6.	U Ko Ko Lat, " " "	"
7.	U Hla Kyauk, Junior Officer	"
8.	Daw Khin Nyo, Dy. Farm Manager	"
9.	U Than Myint, Dy. Divisional Manager	"
10.	U Thaung, Farm Manager	"
11.	U Tin Myint, Dy. G.M.	"

4. Sunflower Research & Technology Development Committee

1.	U Siang Uk, Dy. Project Director	Chair Person
2.	U Myo Nyunt, Asst. G.M.	Member
3.	U Kyi Han, Farm Manager	"
4.	U Thein Pe, " "	"
5.	U Tin Myint," "	"
6.	U Ko Ko Latt, Dy. Divisional Manager	"
7.	U Than Myint, " " "	"

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ANNEX 10

Inventory and Maintenance Forms

NONEXPENDABLE PROPERTY RECONCILIATION
PROJECT INVENTORY

Page 1 of 14

DATE

INVENTORY NUMBER 482.0505

NAME KYAHUGSH FARM

	DESCRIPTION COMPONENT CARD NOMENCLATURE	QUANTITY						UNIT COST	VALUE ON CARD	VALUE COST	VALUE	
	12 ft power Tape	1		1	1					5.21		
	Hanging scale 720 lb	2		2	2							
	Hanging scale 200 lb	2		2	2			1.92		3.84		
	BALDWIN FILTER	12		12	12							
	Fuel Filter	2		2	2			4.56		9.12		
	Oil Filter	2		2	2			3.52		7.04		
	Antifreeze coolant	1		1	1							
	water separator	2		2	2			12.00		24.00		
	Air conditioner	2		2	2			900		1800.00		
	Fuel Tank cap & key	4		4	4			30.58		122.32		
	Centrifugal pump	6		6	6			635.57		3814.42		
	including:											
	- Hammer Cylinder	12		12	12			11.85		155.00		
	- O Ring	24		24	24			0.17		4.08		
	- Cock	12		12	12			1.06		12.72		
	- Head Gasket	12		12	12			2.35		28.20		
	valve spring	12		12	12			0.52		6.24		
	Piston Ring	12		12	12			4.32		51.84		
	- C Jack pin	12		12	12			2.46		29.52		
	- Packing	12		12	12			0.18		2.16		
	- Fuel pipe	12		12	12			1.21		14.52		
	Fuel pipe	12		12	12			1.21		14.52		

DISCREPANCY INVESTIGATION

CHATILLON 7208/2000 gm
HANSON M# 8220 200 lb
PF-10
IP-2299
SN-9586 } Spares for Gine Tank
SN-9803 }

GE mod # AF 910 SN# 2562553, 2565660 9A00 DTG
for Gine Tank 03/1524, 03/1567
DAE DRIVING mod # W2065

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MINISTRY OF AGRICULTURE & FORESTS
AGRICULTURE CORPORATION
MAIZE AND OILSEEDS PRODUCTION PROJECT
AID PROJECT 482-0005, USAID SUPPLIES
NO. 72/74 SHWEDAGON PAGODA ROAD, RANGOON

ORIGINAL
WAREHOUSE
CONSIGNEE
PLEASE SIGN & RETURN

IV NO.....

DATED....1-2-87.....

CONSIGNEE....Zebin Farm.....

AUTHORITY..PROJECT DIRECTOR...M.O.P.P.....

Sr. No.	PIO/C No.	Line Itm.No.	Description	Qty	Remarks
19	30045	2	Front wheel Cylinder sets 18003724	2 ea	(two)
20	"	"	Rear wheel Cylinder sets 18012303	2 ea	(two)
21	"	"	Front Hub Oil Seal 3965092	2 ea	(two)
22	"	"	Rear Hub Oil Seal 3998519	2 ea	(two)
23	"	"	Brake Pads 12300223	2 ea	(two)
24	"	"	Right Hand Caliper 15010481	2 ea	(two)
25	"	"	Left Hand Caliper 15010480	2 ea	(two)
26	"	"	Rotor (Disc) 14032431	2 ea	(two)
27	"	"	Rear Brake Shoe Repair set 12300219	4 ea	(four)
28	"	"	Universal Joint set 4806140	4 ea	(four)
29	"	"	Carburetor Repair set NPN	1 ea	(one)
30	"	"	Carburetor Air filter	3 ea	(Three)
31	"	"	Replacement fuel filter 102-50030	3 ea	(Three)
32	"	"	Complete Fuel Pump 6472370	4 ea	(four)
33	"	"	Front shock Absorber Rubber Bushing 4993590	4 ea	(four)
34	"	"	Rear Shock Absorber Rubber Bushing 4993572	4 ea	(four)

ISSUED.(.....) ITEM(S) ONLY

ISSUED BY- SIGNATURE.....

NAME.....

RECEIVED BY - SIGNATURE.....

NAME.....

LOGISTIC OFFICER

M.O.P.P. WAREHOUSE

95

PIO/C No. _____

Description _____

Location _____

Date	Issued	Balance	Received

ANNEX 11

MOPP Short- and Long-Term Participant Trainees by Person, Date, Institution, Degree and Cost

MAIZE AND OILSEEDS PRODUCTION PROJECT (482-0005) - SHORT TERM

Title of Course / Location	Dates	Participants	Ministry/Department	PIO/P Number and Fund Cite	Estimated Cost	
Agricultural Project Planning and Analysis (TC 140-2), Washington, D.C.	May 17, 1982-July 23, 1982	U Sann Myint U Thaung Tun Hlaing U Kyaw Myint	Agriculture Corporation " "	482-0005-1-20003	$36,043	(AGR)
Agricultural Project Implementation (TC 140-16), Washington, D.C.	July 26, 1982-Sept. 3, 1982	-ditto-	" "	482-0005-1-20004 72-1121021.3 HDAA-82-27482-AG13	$16,301	"
Development and Operation of Agricultural Extension Programs (TC 110-5), Univ. of Missouri	June 7, 1982-Aug. 6, 1982	U Khin Maung Aye U Maung Maung U Aung Soe Myint	Agriculture Corporation " "	482-0005-1-20005	$33,803	"
Keys to Agricultural Development at the Local Level (TC 140-32)	Aug. 9, 1982-Aug.20, 1982	-ditto-	" "	482-0005-1-20009 72-1121021.3 HDAA-82-27482-AG13	$ 5,595	"
8-MEMBER Summer Extension Study Tour						
(1) Sunflower Team	Aug. 9, 1982-Oct. 1, 1982	U Tun Shwe U Kyaw Kyaw Nyein	Agriculture Corporation " "	482-0005-1-20008	$76,600	"
(2) Soybean/Peanut Team	Aug.23, 1982-Oct. 1, 1982	U Siang Uk U Ba Thaung	" " " "			
(3) Sesame Team	Aug.23, 1982-Oct. 1, 1982	U Kyaw Khin U Hla Myo	" " " "			
(4) Maize Team	Aug.23, 1982-Oct. 1, 1982	U Chit Saing U Aye Myint Tun	" " " "	72-1121021.3 HDAA-82-27482-AG13		
Agricultural Project Planning and Analysis (TC 140-2), Washington, D.C.	April 18,1983-June 24,1983	U Mya Maung U Hla Oo U Aung Sann	Agriculture Corporation " "	482-0005-1-20021	$38,650	"

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MAIZE AND OILSEEDS PRODUCTION PROJECT (482-0005) SHORT TERM

Title of Course / Location	Dates	Participants	Ministry/Department	PIO/P Number and Fund Cite	Estimated Cost	
Agricultural Project Implementation (TC 140-16) Washington, D.C.	June 27, 1983-Aug. 5, 1983	U Mya Maung U Hla Oo U Aung Sann	Agriculture Corporation	482-0005-1-20023) ... 72-1121021.3) HDAA-82-27482-AG13	$17,200	(AGR
NIFTAL Training Course in Rhizobium Technology,,Hawaii and US Mainland	May 1, 1983-July 31, 1983	U Hla Than	Agricultural Research, Yezin	482-0005-1-20024) ... 72-1121021.3 HDAA-82-27482-AG13	$15,015	"
Micro-Computer Training, BUCEN, Washington, D.C. Carbondale, Illinois	Sept.6, 1983-Dec. 24, 1983	U Kyi Win U Maung Maung Yi	Agriculture Corporation " "	482-0005-1-20022) ... 72-1121021.3 HDAA-82-27482-AG13	$30,922	"
Technical and Economic Aspects of Soybean Production, TC 120-6, Chamgaign, Illinois	May 28, 1984-Aug. 31, 1984	U Tun Thein Daw Shirley Smellie Daw NyuntNyunt Wai	Agriculture Corporation " " " "	482-0005-1-30017) ... 72-1131021.3 HDAA-83-27482-AG13	$38,721	"
Maize, Groundnut & Sunflower Production (Study Tour), Ohio State University	June 27, 1984-Dec.15, 1984	U Than Tun	Agriculture Corporation	482-0005-1-30033) ... 72-1131021.3 HDAA-83-27482-AG13	$ 4,000	"
World Cowpea Research Conference & Study Tours, IITA, Ibadan, Nigeria, ICRISAT, Hyderabad, India; and Kasetsart Univ., Thailand	Nov.4, 1984-Dec. 15, 1984	U Siang Uk U Pe Maung Thein	Agriculture Corporation " "	482-0005-1-30041) ... 72-1131021.3 HDAA-83-27482-AG13	$	"
Micro-Computer Training, Western Illinois University	Jan. 18, 1985-July 12, 1985	U Hlaing Min U San Myint	Agriculture Corporation " "	482-0005-1-30040) ... 72-1131021.3 HDAA-83-27482-AG13	$36,832	"
Irrigation/Farm Management Observation Tour, Western USA and Thailand	April 21, 1985-July 31,1985	U Than Htay U Sein Win U Soe Myint U Soe Tin	Agriculture Corporation " "	482-0005-1-30067) ... 72-1131021.3 HDAA-83-27482-AG13 (For Thailand portion only - 2 weeks. The first 12 weeks in US arranged and funded by MUCIA).	$ 6,000	"

MAIZE AND OILSEEDS PRODUCTION PROJECT (482-0005) - SHORT TERM

Title of Course/Location	Dates	Participants	Ministry/Department	PIO/P Number and Fund Cite	Estimated Cost	
ICRISAT In-Service Training Course, Hyderabad, India	May 15, 1985-Nov. 15, 1985	U Kauk Yin U Thein Aung Daw Aye Thant Tin Daw Mu Mu Han	Agriculture Corporation " " " " " "	482-0005-1-30068) ... 72-1131021.3 HDAA-83-27482-AG13	$36,000	(AGF
Seed Improvement (TC 130-3) & Farm Management Course at Mississippi State Univ., Columbus, Mississippi and Study Tour at Bangkok, Thailand	May 25, 1986-Sept. 12, 1986	U Tin Myint U Thaung U Soe Win U Ne Win	Agriculture Corporation " " " " " "	482-0005-1-40026 ... 72-1141021 HDAA-84-27482-AG13	$64,021	(AGR

MAIZE AND OILSEEDS PRODUCTION PROJECT (482-0005) - LONG TERM - 1986

Ph.D. in Agronomy (Cropping Systems, Mississippi State Univ.	Aug. 28, 1986-Jan.31, 1989	U Mar	Agriculture Corporation	482-0005-1-40033 ... 72-1141021 HDAA-84-27482-AG13	$85,950	
M.Sc. in Agronomy (Crop Science) Mississippi State Univ.	Sept. 6, 1986-May. 31, 1988	U Aung Kyi	" "	482-0005-1 40034 ... 72-1141021 HDAA-84-27482-AG13	$62,200	
M.Sc. in Agronomy (Soil Science) Mississippi State Univ.	Sept. 6, 1986-May 31, 1988	Daw Mar Mar Myint	" "	482 0005-1-40035 ... 72-1141021	$65,200	4

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MAIZE AND OILSEEDS PRODUCTION PROJECT (482-0005) ARRANGED BY MIDWEST UNIVERSITIES CONSORTIUM FOR INTERNATIONAL ACTIVITIES (MUCIA) - CONTRACT NO. ASB-0005-C-00-2046-00

SHORT TERM OBSERVATION & STUDY TOUR

Course	Dates	Participants	Ministry/Department	PIO/P Number	University	
Sunflower Production	July 14, 1984-Oct. 19, 1984	U Sein Win	Agriculture Corpn.	482-0005-1-20060	Ohio State University	(AGF
"	"	U Htwe				"
"	"	U Win Myint				"
		U Kyaw Maung				"
Maize Production	"	U Tun Yi				(AGF
"	"	U Aye Thein				"
"	"	U Hla Kyi				"
"	"	U Soe Win (8)				"
Seseme Production	Aug. 16, 1984-Nov. 15, 1984	U Tun Than	"	482-0005-1-20062	Ohio State University	(AGF
"	"	U Mya				"
"	"	U Mya Tha				"
"	"	U Ko Lay				"
Peanut Production	"	U Hla Toe				(AGR
"	"	U Bo				"
"	"	U Myint Thein (7)				"

MAIZE AND OILSEEDS PRODUCTION PROJECT (482-0005) ARRANGED BY MIDWEST UNIVERSITIES CONSORTIUM FOR INTERNATIONAL ACTIVITIES, INC. (MUCIA)
CONTRACT NO. ASB-0005-C-00-2046-00

LONG TERM
AGRICULTURE CORPORATION

GROUP I 1983-1985					
Course for M.Sc. degree	Dates		Participants	PIO/P Number	University
1. Agricultural Extension	June 18, 1983 - Dec. 20, 1985	(2 yrs./6 mos.)	U Than Htay	482-0005-1-20025	Ohio State University
2. Soil Science	June 18, 1983 - Sept.30, 1985	(2 yrs./3 mos.)	U Kyaw Soe	482-0005-1-20026	Ohio State University
3. Plant Pathology	Aug. 18, 1983 - Jan. 06, 1986	(2 yrs./5 mos.)	U Hla Myint	482-0005-1-20027	Texas A&M
4. Agriculture Economics	Aug. 18, 1983 - Dec. 31, 1985	(2 yrs./4 mos.)	U Tin Htut Oo	482-0005-1-20028	Ohio State University
5. Agriculture Economics	Aug. 18, 1983 - Sept.09, 1985	(2 yrs./1 mo.)	U Soe Win Maung	482-0005-1-20029	Ohio State University
6. Water Management	Aug. 18, 1983 - Feb. 28, 1986	(2 yrs./6 mos.)	U Hoke San	482-0005-1-20030	Colorado State University
7. Maize Breeding	Aug. 25, 1983 - Sept.09, 1985	(2 yrs./1 mo.)	U John Ba Maung	482-0005-1-20031	Ohio State University
8. Groundnut Agronomy	Aug. 25, 1983 - Dec. 15, 1985	(2 yrs./4 mos.)	U Tin Win	482-0005-1-20032	Georgia State University
9. Peanut Breeding	Aug. 25, 1983 - Sept.09, 1985	(2 yrs./1 mo.)	U Saw Thet Swe	482-0005-1-20033	Georgia State University
GROUP II 1984-1986					
1. Agronomy	May 28, 1984 - Dec. 31, 1986	(2 yrs./7 mos.)	U Kyaw Moe	482-0005-1-20052	Texas A&M
2. Extension	May 28, 1984 - Jan. 3, 1985	(7 mos.)	~~U G. Thang Khan Mung~~	482-0005-1-20053	Texas A&M
3. Crop Breeding	May 28, 1984 - Dec. 31, 1986	(2 yrs./7 mos.)	U Tin Nwe	482-0005-1-20054	Texas A&M
4. Seed Technology	June 12, 1984- Dec. 31, 1986	(2 yrs./6 mos.)	Daw Htay Htay Win	482-0005-1-20056	Georgia State University
5. Seed Technology	June 12, 1984- Dec. 31, 1986	(2 yrs./6 mos.)	U San Nyunt	482-0005-1-20057	Oregon State University
6. Seed Technology	June 12, 1984- Dec. 31, 1986	(2 yrs./6 mos.)	U Mya Than	482-0005-1-20058	Oregon State University
7. Seed Technology	Aug. 22, 1984- Dec. 31, 1986	(2 yrs./6 mos.)	U Thein Htoon	482-0005-1-20061	Mississippi State Univ.
GROUP III 1985-1987					
1. Weed Science	Sept. 9, 1985- Sept. 9, 1987	(2 yrs./)	U Tin Saung	482-0005-1-20064	Ohio State University
2. Agriculture Extension	Sept. 9, 1985- Sept. 9, 1987	(2 yrs./)	U Ba Hein	482-0005-1-20065	Ohio State University
3. Plant Breeding	Sept. 9, 1985- Sept. 9, 1987	(2 yrs./)	U Myo Nyunt	482-0005-1-20066	Ohio State University
GROUP IV 1986-1988					
1. Entomology	May 5, 1986 - May 5, 1988	(2 yrs./)	U Myo Chit	482-0005-1-30090	Texas A&M
GROUP V 1986-1989					
1. Entomology (Ph.D.)	Sept. 16, 1986-Jan. 31, 1989	(3 yrs.4 mos.)	U Mya Maung	482-0005-1-40032	Ohio State University

ANNEX 12

Scope of Work

AID/Burma

Maize and Oilseeds Production Project

Final Evaluation

EVALUATION SCOPE OF WORK

I. ACTIVITY TO BE EVALUATED:

The Maize and Oilseeds Production (MOP) Project (482-0005) will be evaluated during the final quarter of U.S. Fiscal Year 1986. The MOP Project Grant Agreement was signed on October 26, 1981 and was originally scheduled to end on September 30, 1986. In November 1985, the project assistance completion date was extended by 18 months to March 31, 1988 to allow for the completion of long term training programs and delivery of fertilizer.

II. PURPOSE OF THE EVALUATION:

This summative/impact evaluation is designed to:

A. Assess MOP as the first phase of an oilseed production program.

1. assess the effectiveness of the Maize and Oilseeds Production Project (482-0005) in achieving the objectives established in the Project Paper, confirm the cause(s) of successes and failures, and assure that the inputs and outputs of the project are still plausibly linked to purposes/goals of the project and to the problem(s) addressed;

2. measure impact on target beneficiaries and determine what has happened as a result of the project; establish whether changes are positive or negative, anticipated or unanticipated;

3. determine whether the positive effects of the project are likely to continue after termination of funding, and in what ways and under what conditions these effects could be assured;

4. examine critically the effectiveness of inputs; and

5. frame the issues to be addressed by AID and the Government of Burma in assuring the sustainability and replicability of successful interventions.

B. Revise and Expand the Monitoring and Evaluation System to allow monitoring of progress toward output, purpose and goal level objectives of the oilseed production program.

In a recent audit of the MOP Project, the Regional Inspector General's Office for Audit (RIG/A/Manila) recommended "that AID/Burma revise the MOP Project information system to periodically assess whether the project is meeting its objectives." In response to this audit recommendation and in order to assure timely establishment of information gathering, reporting, and dissemination systems for the follow-on Burma Agriculture Production (BAP) Project (482-0007), AID/Burma has developed for the MOP and BAP Projects a comprehensive information monitoring and evaluation system which is to be introduced at the end of the MOP Project for full implementation under BAP.

AID/Burma believes it logical to task the team attempting to assess the success of the MOP Project with addressing data problems uncovered by the evaluation exercise. These joint objectives will serve to mitigate a tendency to design systems which generate more information than is necessary for program evaluation, while also assuring that information which is essential to the task of evaluation is included in the system. The evaluation team is tasked, therefore, with both evaluating the MOP Project and correcting/installing a cost effective monitoring and evaluation system for use under the follow-on BAP Project. The evaluation itself should crystallize issues and formulate questions which will help guide long term decisions by the Agriculture Corporation and AID relative to the oilseed program.

This evaluation has been included in the current ANE Bureau Evaluation Plan.

III. BACKGROUND:

After achieving independence from Britain in 1948, and following the trauma of World War II, Burma tended to emphasize large capital intensive infrastructure and social service programs at the expense of sustained economic growth. In the 1950s and 1960s, many countries and international aid organizations, including the United States, contributed to Burma's development programs. During the 1960s and 1970s, however, there occurred a widespread diminution in foreign assistance as the country chose to look inward for solutions to its development problems. It was only in the late 1970s and early 1980s that this situation changed somewhat, allowing for the resumption of bilateral foreign assistance programming. The United States' development assistance program resumed in 1980, after a hiatus of 15 years.

The MOP Project was the first U.S. assistance project in agriculture for Burma after the AID program resumed in 1980. Two other agriculture sector projects, Edible Oils Processing and Distribution (EOPD--482-0006) and the Burma Agricultural Research and Development (BARD) Project (482-0012) are underway. It is anticipated that an agreement for the Burma Agriculture Production (BAP) Project (482-0007) will be signed during the summer of 1986. The EOPD Project will increase the efficiency and capacity of existing oil extraction mills. The BARD Project is designed to strengthen the Agriculture Research Institute's programs in oilseeds, and the BAP Project is a follow-on project to MOP.

The purpose of the MOP Project was to bring about a rapid rate of adoption of high-yielding inputs and tillage practices among farmers planting maize and oilseeds crops in project townships. The program goals were to (a) increase production of oilseeds crops and maize in selected townships of rural Burma, with positive effects on rural income and employment and on national food supply and nutrition; and (b) to improve Burma's balance of trade through reduction of imports of oil and through an increase in exports of oil cake. The latter objective has been altered since the Government of Burma determined after the project was underway that it would be more cost efficient to use oil cake for livestock in Burma rather than export it.

Obligations and expenditures under the AID Grant as of May 30, 1986 were as follows:

	Obligated	Committed	Expended	Pipeline
Technical Assistance	3,400,000	3,282,338	2,083,820	1,316,180
Participant Training	1,600,000	1,600,000	1,158,109	441,891
Fertilizer	18,493,871	13,365,030	13,330,905	5,162,966
Equipment	6,306,129	5,626,293	4,032,192	2,273,937
Evaluation	200,000	38,925	30,821	169,179
Totals	30,000,000	23,912,922	20,635,847	9,364,153
Less Open Earmark Reservations of				663,087
Unreserved Funds Available				8,701,066

A mid-term evaluation issued on January 31, 1985 reported that though accomplishments to that time varied considerably across outputs and inputs, overall progress was excellent and noted the evaluation team's belief that the project was well on its way to a highly successful conclusion:

"With 20 months remaining, progress toward specific crop production targets exceeds 50 percent for maize and sunflowers, 73 percent of only about 33 percent of the edible oil target has been produced. Progress toward accomplishment of institutional development objectives, while somewhat uneven, is nonetheless tangible except in the case of Ph.D. training, which has not begun and now cannot contribute directly to the project because of time constraints, but should be fulfilled. Sixteen M.Sc. students are in the U.S. About 40 percent of the planned short-term overseas training is completed, and in-country training is vigorous. Research capability is increasing and applied research conducted on the seed farms. Technology is being applied more widely and systematically especially through the use of about 60 high technology 5-acre demonstration sites on farmers' fields in the 12 intensive townships. Four seed farms are producing about 7 percent of the project needs of seed though not yet fully operational. A farm management information system is slowly evolving; much data has been collected but analysis needs to be improved. More than half of the 600,000 packets per year produced by the Burma rhizobium inoculant production facility are used on groundnuts in the project. Fertilizer use has increased significantly.

On the input side, the Government of Burma has already contributed about 52 percent of its $21,000,000 share of the project even though construction has been delayed by limited supplies of cement, petroleum and electric power materials. USAID has contributed about 57 percent of its $30,000,000 share of the project in spite of considerable delays due to customs clearance processes and charges. Findings indicate that most components are more or less on schedule or lagging not far behind. Some special concerns were identified with respect to the MUCIA technical assistance contract and about assembly, use and maintenance of equipment.

Project Design and Policy Implications

The findings and conclusions of the evaluation indicate that the project is well designed and is being implemented by an appropriately placed and caring organization within the government structure. The Burmese Agriculture Corporation has invested heavily in making the effort successful. The purpose and objectives set for MOPP were reasonable, neither so ambitious as to be unattainable nor so easy as to be readily accomplished. In other words, the production and institutional development targets were appropriate to Burmese needs and conditions. Such success-supporting factors must be carefully considered in project design. When and where it counts, care is needed to insure that a project " belongs" to the host government or that grantee commitment exists to carry

the load successfully. The size and focus of the project are also in line with the Burmese government's capacity for marshalling necessary inputs. This is a crucial dimension of effective design and implementation.

The project has had its share of problems, also. Some of these are caused by constraints impinging from the outside such as unanticipated shortages in needed commodities like diesel fuel. Others have arisen because of factors closely related to the project: i.e., regulations followed or procedures used to get MOPP going. Two examples will suffice to illustrate the point.

The Grant Agreement contains language, perfectly legal and proper from the U.S. point of view, which has cost the Agriculture Corporation a very considerable amount in unbudgeted expense. The language in question has to do with duties and taxes for project related goods and services imported into Burma. (See Recommendations.) The problem is an onerous one, especially galling because it does not exist in projects supported by some other donors, and should be avoided in future AID project assistance.

The project was designated by AID as a Title XII effort and competition was limited to two university consortia short-listed by BIFAD. The evaluation team attributes certain problems encountered with the technical assistance component to (1) the lack of wider competition, and (2) the inappropriateness of the choice made, given the specialized requirements of working and living in Burma and of oilseeds research and technology. More detailed analysis of project technical assistance needs may have eliminated some of the problems met.

Recommendations

- Continue crop production and general project activities as planned, with the same dedication and competence as already expressed.

- Plan a program of applied research for the remaining project life, drafted initially by MUCIA advisors and their Burmese professional colleagues, After full consideration of previous data and ongoing research in Burma. Applied research can be mainly at seed farms. Components may include variety testing, fertilizer trials to determine optimum rates, integrated pest control methods, water management, and soil management. Determine efficient irrigation methods and water needs.

- Continue urgently the development of the seed farms. Improve land leveling and preparation. Continue actions to develop irrigation and drainage systems for major parts of seed farms.

- Conduct tests of oil content as an integral part of all variety testing of oilseeds.

- Establish systematic maintenance and continuous training programs for all MOPP equipment: agriculture, irrigation, seed processing, vehicles, etc.

- Continue development of facilities and programs to produce and distribute rhizobium inoculant for legumes, with attention to quality as well as quantity.

- Demand that MUCIA thoroughly orient, prepare and support contract personnel, and that a greater effort be made to provide appropriate expertise, Continue support of contract staff, as far as possible, by USAID and the Agriculture Corporation.

- Continue efforts by AID and Agriculture Corporation to provide for duty-free entry of project commodities and related goods, and to expedite customs clearances.

- Select and process personnel for appropriate short-term training as soon as possible, so their training can be useful during the remaining project life.

- Develop an operationally useful farm management information system based on the foundation of existing data. Use information for project monitoring and evaluation of the intensive-extensive township model. Strengthen internal project monitoring and evaluation through greater analysis of existing and additional data.

- The final project evaluation should be a joint Government of Burma-USAID activity and include a careful assessment of impact on maize and oilseeds producers, and include an assessment of the social and economic impacts on the non-farmers in the community.

Activity	LOP Target	Achieved Thru Crop Year 85/86	% Cum LOP Targets	Wet Season Targets CY 86/87	Dry Season Targets CY 86/87	Cum LOP	% Cum LOP Targets
GOAL LEVEL							
Groundnut Production							
Acres Planted	388,000	378,574	97.6%	50,400	70,250	-	-
Production (MT's)	258,000	258,786	100.3%	-	-	-	-
Direct (MT's)	87,000	94,356	108.5%	15,395	24,080	-	-
Spread (MT's)	171,000	164,430	96.2%	-	-	-	-
Yields/acre Participating Farmers (lbs)	1,325	1,270	95.8%	1,225	1,312	-	-
Maize Production							
Acres Planted	373,000	328,899	88.2%	88,969	19,600	437,468	117.3%
Production (MT's)	228,000	164,367	72.1%	79,806	9,690	253,863	111.3%
Yields/acre Participating Farmers	2,475	2,218	89.6%	2,750	2,310		
Sesamum Production							
Acres Planted	312,000	303,061	97.1%	20,000	73,500	396,561	127.1%
Production (MT's)	25,000	29,548	118.2%	3,688	9,971	43,207	172.8%
Yields/acre Participating Farmers	515	438	85.0%		486	459	
Sunflower Production							
Acres Planted	115,000	120,225	104.5%	-	44,000	164,225	142.8%
Production	53,000	39,932	75.3%	-	20,942	60,874	114.9%
Yields/acre Participating Farmers	1,408	1,166	82.8%	-	1,216		
Soybean Production							
Acres Planted	-	-	-	-	-	-	-
Production	13,000	-	-	-	-	-	-
Yields/acre Participating Farmers	-	-	-	-	-	-	-
Gross Farm Income (000 Kyats)	1,273,000	933,000	73.3%--	-	-		
(000 Dollars @ 7.2K = $1)	176,806	129,583	73.3%--	-	-		
Oil Cake/Soybean/Maize Exports (000 Dollars @ 7.2K = $1)	52,000	16,300	31.3%--	-	-		
Foreign Exchange Value of Increased Vegoil (000 Dollars @ 7.2K = $1)	94,000	76,000	80.9%	-	-	-	-
Per Capita Consumption of Vegoil (Vis's)	4.1	4.42	107.8%	-	-	-	-
PURPOSE LEVEL							
Acreages Planted Using Tech Packages							
Direct Impact							
Maize	383,200	265,940	69.4%	-	-	-	-
Groundnuts	388,000	283,240	73.0%	-	-	-	-
Sesamum	312,200	253,520	81.2%	-	-	-	-
Sunflower	115,400	78,470	68.0%	-	-	-	-
Total	1,198,800	881,170	73.5%	-	-	-	-
OUTPUT LEVEL							
Research							
Ongoing trials at Yezin							
Ongoing trials at 40 field technology sites	40	62	155.0%	-	-	-	-
Cultural Practices							
Township-specific, farm-tested tech packages developed							
Seed Farms							
Foundation seed farms operational							
2 X 70 acres for oilseeds	140	230	164.3%	-	-	-	-
2 X 110 acres for maize	220	125	56.8%	-	-	-	-
Certified seed farms operational							
2 X 800 for oilseeds	1,600	950	59.4%	-	-	-	-
2 X 3000 for maize	6,000	1,000	16.7%	-	-	-	-
MT's seed processing, drying, bagging and storage capacity	3,550		0.0%	-	-	-	-
Township farm engent info/data collection systems operating	8	8	100.0%	-	-	-	-
Percentage of Returned Participants working in MOPP	75.0%	50.0%	66.7%	-	-	-	-
Cumulative Inputs supplied to townships							
Fertilizer (MT's)	70,000	61,507	88.0%	12,177	8,247	82,011	117.2%
Seed (MT's)	9,000	2,741	30.5%	-	-	-	-
Agriculture Equipment (000$)	5,000	5,002	100.0%	-	-	-	-
Inoculum (000 lbs)	8,000	3,236	40.4%	-	-	-	-
Local Inoculum production							

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IV. STATEMENT OF WORK:

A. The Assessment

The evaluation team shall provide for each of the questions listed below:

--- Findings (evidence);
--- Conclusions (interpretation of the findings and best judgments based on this interpretation); and
--- Recommendations based on these judgments

The questions to be answered are, in priority order:

1. How effective has the MOP Project been in achieving the purpose and goal level objectives established in the Project Paper?

   Goal Level

   a. To what extent is the project contributing to increased production in and/or outside the project areas?
   b. Can/will the increases be sustained?
      (1) What broad project benefits are likely to be sustained after donor funding ends?
      (2) What local institutional capacities (management, technical, financial, provisions for maintenance and the replacement of capital equipment) are being developed to continue project benefits: Will they be in place once donor financing ends? What policy conditions are required to facilitate continued long-term impact? What issues must AID and the Government of Burma address to assure the sustainability and replicability of successful interventions? What critical decisions must be made by the Agriculture Corporation and AID relative to the oilseed program?
   c. To what extent is the project effecting positively rural incomes and employment?
   d. How is the project affecting national food supply and nutrition?

   Purpose Level

   a. Is the project contributing to increased crop yields in the project townships? Are the increases sustainable without the project? Which components of the project and technology package are responsible for the increases?

b. Has profitability increased to an extent necessary to maintain farmers' interest and participation? Are each of the elements of the technology package demonstrably profitable--either in terms of work, commodities or time savings, money earned, or employment generated, etc?

c. What is the effect of the project on the balance of trade?

2. What are the specific cause(s) of successes and failures?

3. Are the inputs and outputs of the project still plausibly linked to purposes/goals of the project and to the problems addressed by the project?

4. What has happened to project target beneficiaries as a result of the project? Were the changes positive or negative, anticipated or unanticipated?

   a. How were the interests and role of women taken into account at the design and appraisal stages? In what way did women participate in this process? How did their participation or non-participation affect project achievements?

   b. Were gender-specific data available or have they been developed since? How has such data been used in goal setting and resource allocation?

   c. What are the effects (impacts if available), positive or negative, of the project concerning women's access to production inputs and markets, division of workloads, income, education and training, role in household and community, and health conditions?

5. Are the positive effects of the project likely to continue after termination of funding, and in what ways and under what conditions can these effects be assured?

6. How effective are the inputs (i.e., training, commodities, technical assistance)?

7. Is the project having any significant impact upon the environment? If so, how are these impacts being addressed?

B. The Monitoring and Evaluation System

The evaluation team shall also review the MOP Project Monitoring and Evaluation Plan, amend it as necessary, and provide technical assistance in helping the Agriculture Corporation or its designated partner institution install (where absent) instruments for periodic

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data collection, analysis and dissemination essential to monitoring progress toward output, purpose and goal-level objectives of the MOP and BAP projects.

V. METHODS AND PROCEDURES:

Section A. The Assessment

In pursuing the evaluation, the team will use a cross-sectioned analysis approach. It will visit a representative number of project sites and activities, consult with project, township and other government officials, and with local farmers involved in the program. It will also talk with Government, AID and MUCIA officials, collectively and individually. It is anticipated that the evaluation will take approximately 25 days as follows:

--	Briefings in Rangoon with AID, Ag Corporation, MUCIA and Institute of Economics officials	2.5 days
--	Preparation/presentation of Detailed Evaluation Outline, discussions of field travel and approach to the Scope of Work	1.5 days
--	Field travel	12.0 days
--	Further discussions with AID/AC/IE officials	1.0 day
--	Preparation/presentation of draft evaluation report	4.0 days
--	Preparation/presentation of final evaluation report	4.0 days
	Total	25.0 days

Section B. The Monitoring and Evaluation System

The review and installation of the monitoring and evaluation system will derive from the experiences of the evaluation itself, but can begin during the evaluation exercise. This portion of the work will require approximately 36 days, including the period of the evaluation, and an initial post-draft evaluation period of 15 days for collaborative development of methodologies, detailed scopes of work, etc. This period will be followed by 4 periodic visits of 5 to 10 days each over a period of 2 years.

-- Briefings in Rangoon with AID, Ag Corporation, MUCIA and Institute of Economics officials	2.5 days
-- Preparation/presentation of Detailed Evaluation Outline, discussions of field travel and approach to the Scope of Work	1.5 days
-- Field travel, work on the evaluation, consultations with Institute of Economics counterparts, and preparation/presentation of a revised draft Monitoring and Evaluation Plan for the MOP and BAP Projects	17.0 days
-- Preparation/presentation of a final work plan for installation of data collection, analysis and dissemination programs designed to respond to the revised Monitoring and Evaluation Plan for the MOP and BAP Projects	15.0 days
Total Initial Period	36.0 days
-- Four subsequent visits of approximately 10 days each, or	40.0 days
Total Monitoring and Evaluation	76.0 days

VI. COMPOSITION OF EVALUATION TEAM:

The suggested composition of the U.S. component of the team is as follows:

Agricultural Economist and team leader with experience and ability to assess the macro level impacts of a production program on the national economy and to assess micro level economic impact of such projects on individual farmers.

Rural Sociologist/Anthropologist with experience and ability to assess the socio-economic effects of a food production program on individual farmers, their families and villages, and with experience in data collection/evaluation.

Agronomist/Seed Production and Processing Specialist. Candidate should have experience in tropical seed production and processing and should have experience in crop protection and be knowledgeable about pest management systems.

Women in Development Specialist

VII. REPORTING REQUIREMENTS:

Section A. The Assessment

The evaluation team will present to the AID Representative and to the Managing Director of the Agriculture Corporation:

- -- within one week of its arrival in Burma (4 copies each): an outline of the evaluation report;

- -- during the course of the evaluation, but at least once every 10 working days: an informal 30 minute briefing on the quality of findings, degree of cooperation, and the nature of the team's most critical thoughts about the program;

- -- at least three days prior to departure of the main body of the team (3 copies each): a draft report of not to exceed 20 single-spaced pages (excluding executive summary and annexes); and

- -- prior to departure from Burma of the evaluation team leader (4 copies each): a final written evaluation report containing the following sections:

  - -- Basic Project Identification Data Sheet (see outline attached)

  - -- Executive Summary. Three pages, single spaced (see outline attached)

  - -- Body of the Report. Not to exceed 20 single-spaced pages (excluding executive summary, background data and annexes)

  - -- Statement of Conclusions and Recommendations. Short and succinct conclusions, with topic identified by a short sub-heading related to the questions posed in the Statement of Work. Recommendations will correspond to the conclusions and will specify who, or what agency, should undertake actions recommended. This section will also note actions taken on previous evaluation recommendations.

  - -- Appendices. At a minimum, the following:

    - -- The Evaluation Scope of Work
    - -- The Project Logical Framework, together with a brief summary of the current status/attainment of original or modified inputs and outputs (if not already indicated in the body of the report)

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- -- A description of the methodology used in the evaluation;
- -- A bibliography of documents consulted;
- -- A list of officials consulted

and

-- prior to departure from Burma of the evaluation team leader (4 copies each): a draft "A.I.D. Evaluation Summary" of not to exceed 6 pages which responds to the ANE Bureau guidance (attached).

Section B. The Monitoring and Evaluation System

The evaluation (data design/installation) team will present to the AID Representative and to the Managing Director of the Agriculture Corporation:

-- during the course of the evaluation, but prior to submission of the first draft evaluation report (3 copies each): a revised draft Monitoring and Evaluation Plan for the MOP and BAP Projects;

-- in conjunction with submission of the final evaluation report (3 copies each): for each purpose and goal level objective, a final work plan describing the proposed approach(es) for assuring installation of data collection, analysis and dissemination programs necessary to answer on a periodic basis the questions established in the revised Monitoring and Evaluation Plan for the MOP and BAP Projects, to include:

- -- the final version of methodologies to be used
- -- the selection of sites or populations;
- -- the sampling or selection approach;
- -- the instruments to be used, if any; and
- -- the names of individuals who will be responsible for the collection, analysis and dissemination of the data;
- -- detailed scopes of work (responding to "AID Program Design and Evaluation Methodology Report No. 3 Selecting Data Collection Methods and Preparing Contractor Scopes of Work") for each of the data collection programs involved;
- -- the dissemination methods; and
- -- an outline of resulting preliminary and final reports

ANNEX 13

Production Statistics

National Production Statistics

Annex Tables 3, 4, 5, and 6 give data on acreage, production and yields of maize, groundnuts, sesamum and sunflowers for the period 1974-75 and 1985-86. The figures for area sown and area harvested are considered to be quite accurate by most observers. In Burma all land is registered by the Survey and Land Records Department (SLRD). The SLRD records cropping intentions before the season, which gives a first estimate of area sown to each crop. The Agriculture Corporation SLRD extension under Sup of People's council take a survey after planting to provide a provisional estimate of crop acreage. A second survey in mid-season confirms the crop acreage and provides the first yield assessment based on cropping history, season and crop appearance. Yield is assessed at maturity by sample plots in selected fields. At that time, harvested area of fields is also recorded.

For the monsoon crops, the data collection on yields and production begins in September and continues through November, or even later. All data must be collected, and reports submitted by the end of March in complete form. For winter crops, data collection on yields and production begins in January and continues through March. Final reports are submitted by the end of April.

Yield data for sunflower are done by wet measure i.e., direct harvest from field, and then adjusted. Groundnut and maize plots are weighed directly. Sesame yields are estimated by counting seed pods.

The system provides two separate estimates of sown area and an independent estimate of harvested area and yield. These data are recorded at the village level and aggregated at the township and division/state level. National statisitcs, such as those provided to the legislative body, will reflect corrected data from the Agriculture Corporation except for the last two years. The last two years will have provisional estimates and are usually adjusted in subsequent years.

As noted above, yield figures are provisionally estimated in mid-season and estimates made from sample plots which are harvested and weighed. The sample frame is a crop block, usually about 600 acres for rice. Three plots representing good, medium and poor fields are weighed, and a weighted averaged is calculated which could be 50% for good, 70% for medium and 10% for poor fields.

For oilseds, solid crop blocks are less common. In this case, 4-5 sample groups are taken from each village tract. Estimates are then aggregated at the township, state/division and national levels.

As only a small percentage of oilseed are purchased through the cooperatives of other government entities, it is more difficult to cross check yield and production estimates against market flows. There seems to be somewhat less confidence in the yield and production data than in the acreage data for oilseeds. Sample yield plots are chosen primarily by the People's Council in conjunction with Agriculture Corporation staff rather than by a statistical sampling method. Bias, therefore, could be built into the sampling frames. Additionally, it is not clear how the weights are assigned to each type of plot. However, it should also be noted that improving the accuracy of the numbers can often be costly. Any change in the system should, therefore, be considered only if the improved accuracy of the data is needed for planning and policy making.

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A review of the statistical soundness might be valuable. It is possible improvement could be made at little or not cost. However we feel that the data presented by the Agriculture Corporation are fairly accurate. Acreage figures are probably within 90% confidence and yield and production data within 80%. Biases should be consistently in the same direction, thus allowing farily consistent comparisons of magnitude, using some cross checks on data where possible.

ANNEX 14

MOPP Townships

The MOPP Townships

The MOPP project targets specific townships (28) in 5 divisions of Burma. Data collected on those townships is part of the overall data base prepared by the Agricultural Corporation for national statistics, Annex 2 Table 2.a-f give the estimates of production from the 5 most important oilseed producing division of Burma along with prochases of oilseed by the Cooperatives from these areas. The MOPP townships are identified on the right hand side as MZ (maize) SE (sesame) GN (groundnuts) SN (sunflower) along with the project quantities of fertilizer distributed to each.

The MOPP intensive and extensive townships are attached.

MAIZE AND OILSEED

PRODUCTION PROJECT TOWNSHIPS

(a) 12 Intensive Townships: They receive concentrated inputs. (See Table 1)

Table I

Sr. No.	Crop / Township	Division	Acreage (,000)
	Maize	-	105
1.	Taze	Sagaing	30
2.	Tatkon	Mandalay	15
3.	Pyinmana	Mandalay	25
4.	Lewe	Mandalay	15
5.	Zalun	Irrawaddy	15
6.	Maubin	Irrawaddy	5
	Peanut	-	50
7.	Singu	Mandalay	18
8.	Daik U	Pegu	17
9.	Nyaungdone	Irrawaddy	15
	Sesame	-	40
10.	Moulmein-gyun	Irrawaddy	40
	Sunflower	-	30
11.	Pyawbwe	Mandalay	13
12.	Yamethin	Mandalay	17
		Total	225

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(b) 16-Extensive Townships: They receive less inputs. (See Table II)

Table II

Sr. No.	Crop / Township	Division	Acreage (,000)
	Maize	-	24.4
1.	Kanbalu	Sagaing	20.0
2.	Letpadan	Pegu	4.4
	Peanut	-	71.2
3.	Myaung	Sagaing	14.8
4.	Magwe	Magwe	30.0
5.	Natmauk	Magwe	14.4
6.	Tatkon	Mandalay	6.0
7.	Kyauktaga	Pegu	6.0
	Sesame	-	54.0
8.	Kyaukse	Mandalay	12.5
9.	Myittha	Mandalay	7.5
10.	Kyaunggone	Irrawaddy	4.0
11.	Wakema	Irrawaddy	16.0
12.	Maubin	Irrawaddy	8,0
13.	Henzada	Irrawaddy	6.0
	Sunflower	-	14.0
14.	Budalin	Sagaing	5.0
15.	Okpo	Pegu	3.0
16.	Kyauktaga	Pegu	6.0
		Total	163.6

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ANNEX 15

Evaluation Itinerary

Evaluation Itinerary

February	18 (Wednesday)	Leave Rangoon Visit Daik-U Production Camp Visit Kyaung Su Seed Farm Visit Yezin Overnight at Yezin
	19 (Thursday)	Review rhizobium production In Yezin Visit corn production in Pyinmana Township Overnight at Sebin seed farm
	20 (Friday)	Review Sebin seed farm activities Review Chaung Magyi seed farm activities Overnight at USG Guest House, Mandalay
	21 (Saturday)	Mandalay to Singu Review groundnut production Overnight at USG Guest House, Mandalay
	22 (Sunday)	Leave Mandalay for Kyaukpadaung Review peanut production at Kyaukpadaung Review peanut production at Naatmauk Overnight at Magwe
	23 (Monday)	Leave Magwe for Prome - Nattalin View Thitcho seed farm Overnight at Thitcho seed farm
	24 (Tuesday)	Leave Nattalin for Rangoon

February 25-March 2; In Rangoon (Wednesday to Monday)

March	3 (Tuesday)	Travel to Letpadan by car Overnight at Letpadan
	4 (Wednesday)	Travel to Henzada by train Overnight at Henzada
	5 (Thursday)	Travel from Henzada to Letpadan by train From Letpadan to Rangoon by car

ANNEX 16

Contacts by Evalution Team

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Contacts by Evaluation Team

A. Persons met at Agriculture Corporation in Rangoon

	Name	Position
1).	U Khin Win	Managing Director
2).	U Tin Hlaing	General Manager (Extension)
3).	U Aung Khin	General Manager (ARD)
4).	Dr. Myint Thein	General Manager (Planning)
5).	U Siang Uk	Project Director, MOPP
6).	U Than Htay	Dy. General Manager, MOPP
7).	U Thaung Tin	" " " "
8).	U Ba Thaung	" " " "
9).	U Than Htay	Dy. Asst. General Manager, MOPP
10).	U San Nyunt	Research Assistant, MOPP
11).	Dr. Arlo P. Thompson	Sunflower Specialist, MOPP.

B. Persons met in Travel

1. Daik-U Township, Production Camp, Pegu Division(dt: Feb. 18, 1987).

	Name	Position
a.	U Aung Win	Township Manager
b.	U Ye' Lwin	Dy. Divisional Manager
c.	U Shwe Htoo	" Township Manager
		and 15 farmers.

2. Kyaungsu Seed Farm.

	Name	Position
a.	U Thaung	Farm Manager
b.	U Hla Myint	Dy. Farm Manager

3. Agriculture Research Institute, Yezin (Feb. 19, 1987).

	Name	Position
a.	U Myat Htwe	Dy. General Manager
b.	U Myo Nyunt	Dy. Asst. General Manager
c	U Nyunt	Township Manager, Pyinmana

4. Sebin Seed Farm

	Name	Position
a.	U Tin Myint	Farm Manager
b.	U Ne Win	Dy. Farm Manager
c.	U Soe Tint	Dy. Asst. Farm Manager
d.	U Thaung Shwe	Dy. Farm Manager

5. Chaungmagyi Seed Farm (dt: Feb. 20, 1987).

	Name	Position
a.	U Ko Lay	Farm Manager
b.	U Thein Pe	Dy. Farm Manager

6. Singu Township, Mandalay Division (Feb. 21, 1987).

	Name	Position
a.	U Aye Maung	Township Manager
b.	U Ohn Maung I	Dy. Township Manager
c.	U Ohn Maung II	" " "
		and 25 farmers.

7. Kyaukpadaung (dt: Feb. 22, 1987).

	Name	Position
a.	U Kan Nyunt	Township Manager

8. Natmauk

	Name	Position
a.	U Kyauk Yin	Township Manager

9. Magwe

	Name	Position
a.	U Tun Yi	Divisional Manager
b.	U Hla Toe	Dy. Divisional Manager
c.	U Khin Maung Chit	" " "
d.	U Tin Win	Farm Manager
e.	U Aung Myaing	Township Manager

10. Prome - Nattalin (dt: Feb. 23, 1987).

	Name	Position
a.	U Than Swe	Township Manager
b.	U Khin Maung Myint	Dy. Township Manager

11. Thitcho Seed Farm

	Name	Position
a.	U Soe Win	Farm Manager
b.	U Than Tun	Dy. Farm Manager
c.	U Thaung Myint	" " "

12. Return to Rangoon (dt: Feb. 24, 1987).

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12. Letpadan (dt: March 3, 1987).

	Name	Position
a.	U Ye' Lwin	Dy. Divisional Manager
b.	U Tin Maung Bo	Farm Manager
c.	U Hla Kyi	Township Manager, Latpadan
d.	U Win Myint	" , Min hla
e	U Tin Maung Lin	" , Okepho

13. Henzada (dt: March 4, 1987).

	Name	Position
a.	U Ko KO Latt	Dy. Divisional Manager
b.	U Than Htay	Dy. General Manager, MOPP
c.	U Thaung Tin	" " " "
d.	U Ohn Than	Township Manager, Henzada

14. Return to Rangoon (dt: March 5, 1987).

ANNEX 17

Weights and Measures

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WEIGHTS AND MEASURES

Basket of Paddy Rice	= 46 pounds
Basket of Maize	= 55 pounds
Basket of Groundnuts (with shells)	= 25 pounds
Basket of Sesamum	= 54 pounds
Basket of Sunflowers (with hull)	= 32 pounds
Basket of Groundnuts (without shells)	= 50.55 pounds
Basket of Soybeans	= 72 pounds
1 Viss	= 3.6 pounds
1 Viss	= 100 ticals
1 Metric Ton	= 2,204 pounds
1 Metric Ton	= 612.2 Viss
1 Basket	= 1.44 Cubic Feet
1 Tical	= 0.036 pounds
1 Barrel	= 110 Viss

ANNEX 18

Logical Framework

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

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

Project Title & Number: _____

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

ANNEX C

PAGE 1

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: (A-1)	Measures of Goal Achievement: (A-2)	(A-3)	Assumptions for achieving goal targets: (A-4)
1. To increase agricultural production, rural incomes and rural employment and begin to improve nutrition. 2. To improve Burma's balance of trade through an increase in exports of oil cake, and a reduction in imports of edible oil.	By year 5 the following increases will have been achieved: 1. Groundnut production up: 375,000 MT (Direct -125,000 MT; Spread 250,000 MT) 2. Sesamum production up: 49,100 MT 3. Sunflower production up: 65,500 MT 4. Soybean production up: 12,000 MT 5. Gross farm income up: K1,160 million ($161.1 million equivalent). 6. Exports of oil cake, soybean and maize up: $100.9 million 7. Foreign exchange value of increased vegetable oil availability of $94.5 million. 8. Per capita intake of vegetable oil up by 30 percent from approximately 2.8 Kgs. to 3.8 Kgs. 9. Maize production up: 575,000 MT	Items 1-4 - a) Crop reporting statistics of SRUB. b) Project reports of Agriculture Corporation. c) Routine reports Township and Village Tract Councils and Agriculture Corporation Managers Item 5 - a) Reports of prices, home consumption and marketing of project commodities of farmer participants at the township and village tract levels. b) Annual SRUB statistics on GDP contribution by state/division. Items 6 - 8 a) Bimonthly economic reports of the GSRUB on exports. b) Bimonthly SRUB reports on imports. c) Estimated domestic production of edible oils by the Ministry of Planning & Finance, Statistics Dept.	1. That weather will be normal on average throughout life of project. 2. That economic, political and social conditions will remain stable permitting the farmers to plant and harvest on schedule. 3. That no unexpected difficulties will be encountered in marketing of production. 4. That policies with respect to distribution of income remain essentially as at present. 5. That price relationships between vegetable oil and other food at retail are approximately as at present.

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PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

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

Project Title & Number: _____

PAGE 2

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose: (B-1)	Conditions that will indicate purpose has been achieved: End-of-Project status. (B-2)	(B-3)	Assumptions for achieving purpose: (B-4)
To bring about a rapid rate of adoption of high-yielding inputs and tillage practices for improved maize and oilseeds by farmers in selected townships.	The following acreages (by crop) will be planted using recommended higher yielding technology and inputs: Direct Impact from Project Maize 383,200 acres Groundnuts 388,000 acres Sesamum 312,200 acres Sunflower 115,400 acres Total 1,188,800 acres Indirect-Spread Effect Groundnuts 1,500,000 acres Soybean 20,000 acres	Detailed township, village and farm records maintained at township and village tract levels on acres with improved tillage pracrices and inputs used by individual farmers.	1. That acceptable technology can be introduced. 2. That acceptable economic incentives for adoption are provided. 3. That inputs and technical information can be delivered as planned in acceptable form and in the townships selected. 4. That weather conditions are near normal.

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PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

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

Project Title & Number: _____

PAGE 7

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Outputs: (C-1)	Magnitude of Outputs: (C-2)	(C-3)	Assumptions for achieving outputs: (C-4)
1. Improved national research capability in maize and oilseeds	1. Research: On-going trials conducted at central research facilities in Yezin and at 40 field-level high technology sites within 8 intensive townships on seed varieties, soils, fertilizer application rates, water control and other production variables affecting yields of maize and oilseeds.	1. Regular records of Agriculture Research Institute at Yezin and other sites.	1. That necessary staff is assigned and facilities can be established for conduct of trials, development of seed farms, etc.
2. Introduction of improved maize and oilseed technology and production practices (seed, water, fertilizer, extension services).	2. Cultural Practices: Newly developed technology farm-tested at high technology sites resulting in township and/or village specific production packages for each crop per towhship.	2. Regular records of the Extension Division staff managing high technonogy sites in the intensive townships.	2. That suitable technology can be tested and proven on a timely basis for use at demonstration sites.
3. Fully equipped and staffed maize and oilseeds seed farms.	3. Seed Farms: 2 foundation seed farms of 70 acres for oilseeds and 110 acres for maize plus 2 certified seed farms of 800 acres for oilseeds and approximately 3,000 acres for maize; all four operational and integrated with seed processing facilities for drying, bagging and storing 3,550 MT's per year of maize, groundnut, sesamum, flower and soybean seed.	3. Records of seed farm managers Agriculture Corporation project staff and U.S. seed technology advisors.	3. That needed equipment, funds and staff are provided on time.
4. An operation/farm management information system for monitoring farm-level production practices and providing feedback on results to research and extension centers.		4. AC regular reports.	4. That U.S. and local procurement proceeds as scheduled. That ocean shipping, internal transport and storage can be arranged as needed.
5. Returned participant trainees in place within the research, extension, seed farm and fertilizer distribution elements of the project.		5. AC personnel records.	
6. Inputs supplied to farmer participants (fertilizer, seed, management equipment - rhizobium inoculum)		6. AC Procurement Division receipt and distribution records for fertilizer and pesticides; and AC/Extension Division records on production and distribution of improved seeds, equipment and inoculum.	
7. A functional rhizobium production facility (inoculum for groundnuts and soybeans.			

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AID 1020-20 (3-78)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

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

Project Title & Number: _____

PAGE 2

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Outputs: (C-1)	Magnitude of Outputs: (C-2)	(C-3)	Assumptions for achieving outputs: (C-4)
	4. A functional data collection and farm management information system in place and operated by trained staff in 8 intensive townships. 5. 75%-100% of returned Burmese participant trainees occupy positions directly or indirectly involved with maize and oilseed production. 6. Cumulative inputs supplied as follows to project townships: - Fertilizer - 70,000 MT's - Seed - about 9,000 MT's - Pest management inputs (exact mix to evolve from project). - Agriculture equipment - Approx. $5 million. - Inoculum - 8 million pounds. 7. Local inoculum production of 3 million pounds per year by fifth year of project.		

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AID 1020-25 (5-70)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

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

Project Title & Number: _____

PAGE 4

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Inputs: (D-1) AID Funding 1. Technical assistance .... $2.4 million 2. Participant training ..... $3.0 " 3. Commodities ... $20.0 " 4. Contingency/ Inflation ..... $4.5 " 5. Evaluation..... .1 " Sub-total $30.0 million SRUB Funding 1. Fertilizer ... $10.0 million 2. " Distribution 4.0 million 3. Other local costs including personnel, facilities and supplies (K equivalent in US$) 4.0 million Sub-total $18.0 million TOTAL $48.0 million	Implementation Target (Type and Quantity) (D-2) AID - ($30.0 million) 1. Technical assistance a) 156 person months of long-term TA (13 PY's x 12 mos.) b) 70 person months of short-term technical assistance 2. Participant Training a) 11 PhD degrees at 4 yrs each--(44 PY's or 528 PM's). b) 25 MS degrees at 2 yrs each--(50 PY's or 600 PM's) c) 70 short-term training programs at average of 4.5 months (315 PM's) 3. Commodity Procurement a) Fertilizer ($15.0 million) TSP -30,000 MT (Approx. UREA 10,000 MT (Approx. b) Machinery, equipment, parts and supplies ($5.00 million) (1) Seed farms with farm production, processing & storage facilities ($2.70 million)	(D-3) AID - 1. - Contractor refords and quarterly reports; AID-financed documents (vouchers, etc.) 2. - Contractor records & quarterly reports; GSRUB project records; AID/Burma participant training records. 3. a. - AID/W procurement & shipping records; AC procurement, shipping, unloading records and monthly inventory reports. b. - Contractor procurement reports. AID/W financial records AC records and reports. 4. All of above depending on allocation and use of contingency reserve. SRUB 1 & 2. Agriculture Corporation Procurement Division records and monthly reports. 3. SRUB project records and quarterly reports.	Assumptions for providing inputs: (D-4) AID - 1. That the project is approved on schedule and that funds are provided as scheduled on an annual basis. 2. That contractor selection and procurement and staffing proceeds on schedule. 3. That participants are named, qualified and processed on schedule. 4. That commodity procurement proceeds as planned and accommodities are shipped, cleared and moved to project sites expeditiously. 5. That the contingency allowance for escalation in costs of TA, training and commodities proves adequate to meet needs. SRUB - 1. That SRUB budget resources are released on schedule. 2. That unusual difficulties are not encountered by the GSRUB, AID or the contractor in making needed procurement and imports. 3. That SRUB staff personnel and AID contractors can be assigned and remain in the project as planned.

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AID 1020-25 (5-70)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

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

Project Title & Number: _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Inputs: (D-1)	Implementation Target (Type and Quantity) (D-2)	(D-3)	Assumptions for providing inputs: (D-4)
	(2) 1 rhizobium production facility ($0.25 million) (3) Laboratory equipment publications and related research needs at ARI/Yezin ($0.10 million) (4) Equipment & materials for extension information demonstration on farm use ($1.10 million) (5) Spare parts plus procurement costs, shipping, handling, etc. ($0.85 million) 4. <u>Contingency</u> 15% contingency to cover inflation in costs of training, commodities and technical assistance and to finance some import needs which may have been missed in preparing detailed listings of requirements. <u>SRUB</u> - ($18.0 million) 1. Fertilizer ($10.0 million) UREA 26,000 MT (Approx.) MOP 4,000 MT (Approx.) 2. Fertilizer handling, transport and distribution from Rangoon port to township		4. That complementary facilities and equipment can be constructed, developed or purchased locally to meet project requirements.

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AID 1020-25 (5-70)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

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

Project Title & Number: _____

PAGE 4

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Inputs: (D-1)	Implementation Target (Type and Quantity) (D-2) level godowns (K28.0 million or $ 4.0 million) 3. Other costs including pesticide, management, staff, logistical support, research and extension facilities, seed farm facilities and operation plus establisment and operation of High Technology sites. Total: (Kyat 57.6 million or $ 8.0 million) (at K 7.2 = $1 U.S.)	(D-3)	Assumptions for providing inputs: (D-4)

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ANNEX 19

Socio-Economic Monitoring and Evaluation of the Burma Agricultural Production Project

Socio-economic Monitoring and Evaluation of the Burma Agricultural Production Project

1. The Problem

The Burma Agricultural Production Project is fortunate to extend a development effort whose successes appear to be undeniable. It represents a vote of confidence by USAID and the Burmese government for the work of the extension division of the Agriculture Corporation, Ministry of Agriculture and Forests.

In spite of impressive global figures indicating that production goals from maize and oilseeds under MOPP were in most cases surpassed during the last five years, there remains some concern both within the Agriculture Corporation and USAID that very little is known concerning the farm-level reality of these statistics. Two questions stand out: what are the differential effects of the various components of the technology package extended to project farmers; and what are the impacts on farmers' quality of life from production increases?

These questions are not simply academic but bear importantly on issues of sustainability of project successes and on community and rural development. It is in everyone's interest to determine to what degree permanent changes are occurring in farm-level production practices, and to what extent greater farm profits are resulting not only in enhanced community-wide economic activity but in verifiable improvements in farm family well-being.

The process of rural development, if it is to have any meaning, must result in permanent, sustainable improvements in the quality of life of rural people. Since BAPP (and MOPP before) intends to increase farmers' revenues and national food supply through the provision of artificially low-cost inputs, including the time and effort of extension agents who would normally be spread too thin to work intensively with all farmers, it should be shown that such encouragement and monetary incentives to project farmers will result in permanent increases in production and revenues. It should also be documented how and in which ways members of farm families are directly or indirectly benefitting from this new income. Finally, to what degree are economic and quality-of-life multiplier effects occurring in project villages and across village tracts?

There is another question which bears investigation. To what degree are farmers reinvesting a portion of their increased oilseed profits in on-farm improvements or in non-oilseed related economic activities. Quality-of-life issues are important, but if the whole rural economic base is to be developed, then increased profits under BAPP and MOPP should be in part applied to improving overall farm productive capacity.

The problem, succintly stated, is to design a cost-effective, simple, yet comprehensive socio-economic monitoring and evaluation system for BAPP, which will provide uncluttered, timely responses to the questions and issues indicated above. The system may rely on outside institutions and personnel to carry out some of its work, but it should eventually become a functional part of the capacities of the Agriculture Corporation.

2. Background

Although primary impetus to the realization of plans to include a monitoring and evaluation system under BAPP came from the USAID program results audit (8/86), the desire to follow project progress at the farm level already existed as part of the MOPP design. This was reflected in project objective #4 (Project Paper and Grant Agreement), which proposed to create: "An operational farm management information system for monitoring farm level production practices and providing feedback on results to research and extension centers. A functional data collection and farm management information system will be put in place and will be operated by trained staff in eight intensive townships."

This information system was never institutionalized under MOPP. In spite of fairly detailed data on inputs to farmers and estimates of individual farm yields, which are generated from the various project production camps (extension centers), the MOPP managers within the Agriculture Corporation (AC) have not systematically monitored the differential effects of the various components of the technology packages introduced to farmers. Nor have they been in a position to appreciate the impacts of production increases on individual farm households.

It seems clear that the farm management information system proposed under MOPP was intended to monitor effectiveness of the 10 components of the technology packages: " (1) use of improved higher yielding varieties of seed; (2) proper land preparation; (3) appropriate plant density; (4) use of organic manure; (5) use of chemical fertilizers; (6) pest and disease control; (7) sowing techniques; (8) weed control; (9) timely harvesting; and (10) irrigation/water management practices." All of this was to be mediated by the reinforced capacity (agents, machines, buildings, etc.) of the extension service of the Agriculture Corporation under the supervision of MOPP management. Eight townships were to receive an intensive package, 20 others were to receive reduced inputs.

The BAPP Project Paper and Grant Agreement are somewhat more vague about the components of the technology packages to be continued or introduced in the 42 townships comprising the project zone. They both do state that "depending on the crop, the input package will include fertilizer, improved seeds, some irrigation, pesticides, and technical advice (extension services) on the cultural practices and the best ways to employ the technology package."

As a consequence of the lack of an institutionalized farm-level information system for MOPP and USAID project managers, a fairly comprehensive monitoring and evaluation plan has been built into the BAPP design. The Project Paper is, as usual, most explicit and under the topic of "managers' priority questions" one finds goal and purpose-level concerns regarding: nature and degree of production increases and their sustainability within and beyond the project area; differential effectiveness, profitability, and sustainability of the components of the technology packages; and the degree to which individual consumption of edible oils is increasing. The questions of profitability of the production increases, that is the real incomes of farmers, and of employment creation both on-farm and in the wider community also are evoked in both the Project Paper and Grant Agreement.

Project evaluation is included as a special covenant to the BAPP Grant Agreement. Although a management information system is not specifically named here, the two parties have pledged inter alia to engage in the "evaluation, to the degree feasible, of the overall development impact of the Project." In the amplified description of the project (Annex 1 to the Grant Agreement) a "management information system" is outlined and is directly linked to "strengthening the planning and statistics unit" of the Agriculture Corporation. Elsewhere it is stated that "the evaluation plan will include several activities undertaken jointly by A.I.D. and the BAPP Management including: (1) acquisition of baseline data utilizing in-country research institution(s) and a short-term contractor within 6 months of project obligation; (2) mid-project evaluation in 11/88; and (3) a final Impact Evaluation in 1991."

3. Monitoring and Evaluation Methodology

The major investigative tool will be a rather comprehensive survey of the production practices and income uses of samples of farm families. These samples should be drawn from a rain-fed, monsoon cropping zone of upper Burma and from an area of post-mon oon, oilseed cropping in lower Burma. Follow-up interviews with farmers will be necessary to deepen our understanding of facts and trends revealed by the survey instrument.

In addition to the survey of farm families, investigators will conduct a survey of key village and community-level quality-of-life indicators. This should reveal concrete results of socio-economic multiplier effects from MOPP and BAPP revenue increases.

These three research techniques, principal farm family survey, follow-up interviews, and survey of community-wide quality-of-life indicators, should occur as a package in each of the study areas. Research should be conducted biennially, beginning as soon as possible this year, and last until the end of BAPP in 1991. The mid-term and final evaluations of BAPP will thus profit from the research performed this year, in 1989, and in 1991, as prescribed in the BAPP Grant Agreement.

3.1. Study Areas and Sampling

At least two general study areas should be selected, one characterizing the rain-fed, monsoon cultivation zone of upper Burma, the other representing the lowland, post-monsoon cropping zone of lower Burma. Within each of these areas two or, if possible, three townships will be selected for investigation. One of these townships will be currently participating in the MOPP program, one should be on line to begin participating this year under BAPP, the third is to be a comparable control population, which will not be involved in the oilseeds program, at least until after 1991.

If it is not possible to identify a true control population with which to compare MOPP and, in particular, the future BAPP participants, a second-best alternative will be to compare the present MOPP participants to the BAPP families scheduled to enter the oilseeds program this year. The BAPP township in each area will serve as a control to the MOPP township, allowing us to infer that socio-economic changes within the latter probably have been caused by its participation in the oilseeds program over the last three to five years.

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In the absence of a control group, future biennial monitoring of new BAPP participants, as well as present MOPP families, will have to assume that changes in socio-economic practices and quality-of-life indicators have resulted from participation in the oilseeds program. Much can be done in survey design to verify this assumption, while trends already identified in present MOPP families and villages should be followed closely in the new BAPP townships. By monitoring change in both new BAPP and old MOPP families through 1991, we should be able to draw worthwhile conclusions about trends and change magnitudes, even without control groups.

Samples of at least 50 farm families will be drawn from each of the townships selected for study. This will mean a minimum of 300 households to be surveyed, 150 in three townships of upper Burma, 150 in lower Burma. If a set of suitable control groups cannot be found, the overall sample will be reduced to 200. If a control population can be identified in one zone but not in the second, it should be included. Larger sample size can be envisaged if data collected do not become unwieldy.

The household samples are obviously quite small relative to total township population, so that care must be taken in their selection. Representative villages and village tracts should first be selected from the whole. Random selection may then proceed from such stratification. An effort should be made to include a proportionate number of female-headed households (15%) in the final sample from each township. Since samples are so small, pre-testing of questionnaires can be conducted on other samples drawn from the same townships.

3.2 Data Collection

The exact nature of the questionnaires and interview guides to be used in this monitoring and evaluation program will be left to the discretion of the implementing organization. It will be sufficient here to review the catagories of data to be collected, summarized, and analyzed in both the principal household survey and the community-level quality-of-life survey.

3.2.1. Principal (Household) Survey

The objectives of this survey are to: identify the socio-economic characteristics of the MOPP and BAPP farm families; evaluate the effectiveness on oilseeds production of the components of the extension program; and discover and elucidate the uses of increased farm revenue from oilseed production, including productive reinvestment and increased household consumption and savings. The following categories of data should be collected:

(1) Household demographic data;
(2) Possession of productive assets (land, animals, tools, irrigation works, etc.);
(3) On-farm production practices (all crops, all seasons);
(4) Inputs and yields (all crops, previous annual cycle);
(5) Cost of production and net farm income;
(6) Off-farm income sources;
(7) Use of family and hired labor (number, days, wages);
(8) Household expenditures (food, clothing, housing, social, religious, etc.);
(9) Use of the various components of the oilseeds extension package, specifically:
    (a) High-yielding improved seed
    (b) Proper land preparation
    (c) Appropriate plant density
    (d) Use of organic manure
    (e) Use of chemical fertilizers
    (f) Pest and disease control
    (g) Proper sowing techniques
    (h) Weed control
    (i) Timely harvesting
    (j) Irrigation and water management practices
    (k) Frequency of visits or information days from extension agents
(10) Marketing practices (prices, quotas, fees, etc.)
(11) Household quality-of-life possessions
    (a) Transportation animals
    (b) Bullock carts
    (c) Bicycles
    (d) House style, size, and construction (roofing, wood, etc.)
    (e) Utensils and tools
    (f) Pumps, piping
    (g) Lighting (lamps, generator, etc.)
    (h) Luxury clothing
    (i) Radios, radio/cassettes, televisions, etc.
    (j) Other luxury goods
    (k) Other forms of saving
(12) Household quality-of-life expenditures
    (a) Medical services and medicines (traditional and modern)
    (b) Veterinary services and medicines
    (c) School-related expenses
    (d) Social, ceremonial purposes (family-oriented)
    (e) Religious festivals and donations
    (f) Trips by family members
    (g) Luxury foods consumed
    (h) Amount of vegetable oil used
(13) On-farm productive reinvestment
    (a) Livestock
    (b) Irrigation improvements

(c) Bullock carts
(d) Land rental
(e) New or improved tools and implements
(f) Water rental
(g) Increased purchase of inputs for non-oilseed uses
(h) Increased use of wage labor
(j) Use of farm machinery (rental or purchase)

(14) Opinions, attitudes, problems of households regarding MOPP and BAPP program.

The preceding list of data categories, while comprehensive, is not meant to be exhaustive, but rather indicative of the type and detail of data to be elicited by the principal survey. The implementing organization can rearrange the categories as necessary and may wish to employ more than one questionnaire in more than one session with respondents.

3.2.2. Follow-up Interviews

Preliminary analysis of the results of the principal survey will reveal data problems and inconsistencies, or investigators may simply wish to deepen their understanding of particular trends and discoveries. This will be accomplished by in-depth interviewing of approximately 10% of the total sample, or 5 families from the 50 in each township. This mini-sample should be selected randomly and ought to contain one female household head.

Of particular interest in these more intensive interviews are the questions relating to household quality-of-life changes or lack of change, since investigators can go a long way toward understanding what changes have occurred, how they have developed over time, whether they are likely to continue, and the ways they are linked among themselves. Other information that can be elicited with more confidence in such an open-ended interview format, relates to quality of contact with the extension service and use of the MOPP/BAPP technology packages, marketing strategies, and specific uses of increased oilseed production income.

3.2.3. Community-level Quality-of-Life Indicators Survey

If a substantial proportion of farmers of a given village and village tract are significantly increasing their farm income through participation in the oilseeds program, there should result certain improvements in community life quality. A rapid, low-cost survey of key village and village tract (community) socio-economic indicators undertaken at the same time as the principal survey in the same locations should

reveal changes in petty commercial activities, number and types of shops, goods for sale in the periodic markets, house styles, size, and construction, and basic village infrastructure (roadways, canals, public buildings). Perhaps a key indicator will be the quality of construction and maintenance of the village monastic school and the size of public donations in specie or in kind, including village-wide festivals.

The number and quality of goods for sale at the village level should change with increased farmer incomes. More meat and fish products, as well as a wider range of non-local vegetables, should begin to appear, at least in one of the larger village tract markets. Luxury goods, cosmetics, and clothing should be found in greater quantity and quality as local purchasing power increases and consumer habits change.

Community-level changes should confirm consumption shifts revealed in the principal survey of households. Should the latter, for example, indicate a pattern of increased religious donation, the monastic school should soon bear witness. If greater personal travel in the local area is indicated, ownership of vehicles for hire should be on the rise.

The preceding community-level changes are meant to be indicative. The exact number and types of indicators will be refined on the ground by the implementing organization.

3.3. Data Analysis

Data collection techniques provide raw material, but conclusions depend on effective data analysis. The latter requires both statistical treatment of numbers and a good deal of informed judgement.

The research report that should follow each periodic investigation (1987, 1989, 1991) will be largely descriptive, but it should also attempt to trace causality through those factors found to be most related. Correlations and multiple regression analysis should point the way, but investigators will have to supplement statistical "number crunching" with follow-up interviews and their own knowledge of Burmese village life.

Ultimately, an effective survey starts with a model or models of the changes or differences to be sought. A sense of causal relationships is important in hypothesis and model formation. The latter, in turn, guide questionnaire design, so that likely scenarios of change and causal relationships between variables are carefully explored.

The reports issued by the implementing organization should show evidence that change models were formulated prior to questionnaire design, and that the data collected bring evidence to bear on the significance of the basic hypotheses. This is not to say that unforeseen discoveries and relationships will not be found; they certainly will be. However, data collection in the absence of a guiding rationale tends to produce an enormous amount of data which may appear to have little relationship to each other.

Analysis by computer of the survey data can be facilitated by a common statistical package for personal computers, such as Microstat, SPSS, or SAS. Such a computer would probably need 640K of RAM, and a minimum of a 10 MB hard disk in order to use these packages. The implementing organization should indicate possession of such a program and computer, or it should show how it plans to have adequate access to them (or the BAPP offie computer should be upgraded accordingly). In its proposed plan of action, it should indicate the types of statistical analysis and testing it plans to carry out, and the conceptual models it plans to investigate through statistical manipulation.

4. The Implementing Organization

The organization selected to carry out the monitoring and evaluation program described above should have the following characteristics: (1) ability to carry out the work in a timely and expedient manner; (2) capacity to employ highly-educated or experienced enumerators and interviewers; (3) proven conceptual and analytical ability; (4) capacity to remain with the program for at least 4 years; (5) proven ability to integrate socio-cultural and micro-economic analysis; (6) computer analysis capability, including possession of a microcomputer and knowledge of one or more statistical packages; and (7) ability and willingness to train one or more managers of the Agriculture Corporation in the process of research and questionnaire design, data collection, and final data analysis (including use of the personal computer and statistical package).

Prospective implementing organizations should be encouraged to submit their research proposals and budgets to the Agriculture Corporation as soon as possible. They should address themselves to the points listed above and to the scope of work described in preceding sections. Obviously, the budget is important, and care must be taken to assure that it is neither unrealistically low nor overly inflated.

5. Training of Agriculture Corporation Managers

Section F of the Grant Agreement amplified description (Annex 1) is devoted to "strengthening the planning and statistics unit" of the Agriculture Corporation. By this is meant that: "A capacity and methodology will be developed and institutionalized in the AC for systematically collecting and analyzing selected data needed for program/project conceptualization, design, management and evaluation; synthesizing and interpreting the results; and disseminating these to interested parties."

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Such an objective obviously requires serious training of selected Agriculture Corporation managers. Whether or not this research and analytical capacity can actually be institutionalized in the planning division of the AC, or whether this location is most appropriate for these functions, remains to be resolved by the managing director of the Agriculture Corporation. At the least, one member of this division ought to follow the progress of the monitoring and evaluation system and be trained alongside one or more members of MOPP management in the extension division.

Such training would not require enormous investment on the part of AC managers, since it would be extremely periodic, occurring over approximately 3-4 months the first year, with rather lessened involvement in the two repetitions scheduled for 1989 and 1991. It is very important that Agriculture Corporation managers actually contribute to discussions on research design, data collection methodology, and data analysis, including the use of microcomputer statistical applications. Many of the American-trained MOPP managers very likely have acquired experience in these areas, and can contribute, in any case, much knowledge of how the extension service interacts with MOPP and BAPP farmers.

6. Reporting and Feedback

It is very important that conclusions drawn from the various monitoring and evaluation exercises conducted by the implementing organization be communicated to AC and USAID managers in a timely and useful form. The results of the 1987 survey work, for example, should provide early guidance to BAPP (MOPP) managers, so that modification to their program can be made before the following agricultural cycle.

Feedback implies a short-term taking stock of activities through knowledge of previous results. Reporting by the implementing organization for each survey exercise should consist, therefore, of at least two steps: the written release of preliminary conclusions and recommendations, accompanied by one or more oral presentations; and a final, comprehensive report.

Care must be taken by the monitoring and evaluation organization to translate statistical and conceptual analysis into a format designed for managers. Conclusions and recommendations for action should be relevant to program objectives and must remain as clear-cut and practical as possible. The results of statistical tests for significance of relationships between variables, for example, should be presented in layman's terms.

7. Conclusion

The socio-economic monitoring and evaluation system proposed here has resulted from a felt need within the AC and USAID to relate aggregate numbers to real people. This does not imply that production data are somehow wrong or misguided; they are essential to judge overall attainment of objectives. What is implied is that we need to know more about how these impressive figures are being achieved through the actions of individual farmers and to what degree they can be sustained

after BAPP has terminated. We need to know what these production increases mean in terms of farmers' net income, so that their future willingness to participate in similar programs can be evaluated. This is, of course, important for the planning and design of future crop production projects.

Finally, we should want to know what all of this has to do with development. This concept implies permanent progress, an evolutionary step upward toward greater human welfare. This is, of course, the goal of the Burmese Government, as it is of USAID. This monitoring and evaluation program will enable us to demonstrate how this is being achieved by the Agriculture Corporation and BAPP/MOPP management. The lessons learned here will be useful to all parties concerned.