PD-AAC-178
ISN-422-75

BURMA AGRICULTURE PRODUCTION PROJECT

AID/Burma
November, 1985

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) | Amendment Number: | DOCUMENT CODE: 3

COUNTRY/ENTITY: BURMA

3. PROJECT NUMBER: 482-0007

4. BUREAU/OFFICE: Asia and the Near East | 04

5. PROJECT TITLE (maximum 40 characters): Agriculture Corporation

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 91

7. ESTIMATED DATE OF OBLIGATION (Under "B." below, enter 1, 2, 3, or 4)
A. Initial FY 86 | B. Quarter 4 | C. Final FY 89

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY 86 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	6,000		6,000	29,355	645	30,000
(Grant)	(6,000)	( )	(6,000)	(29,355)	(645)	(30,000)
(Loan)	( )	( )	( )	(-)	(-)	(-)
Other U.S. 1.						
Other U.S. 2.						
Host Country		800		10,658	13,342	24,000
Other Donor(s)						
TOTALS	6,000	800	6,800	40,013	13,987	54,000

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) FN	123	070				30,000		30,000	
(2)									
(3)									
(4)									
TOTALS						30,000		30,000	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 076 | 072 | 011 | 012 | 020

11. SECONDARY PURPOSE CODE: 320

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	BF	PART/EQTY	NUTR				
B. Amount	25,000	2,500	2,500				

13. PROJECT PURPOSE (maximum 480 characters):

To introduce and bring about adoption in a 42-Township area farming systems which include among other things, new water, soil and pest management technologies.

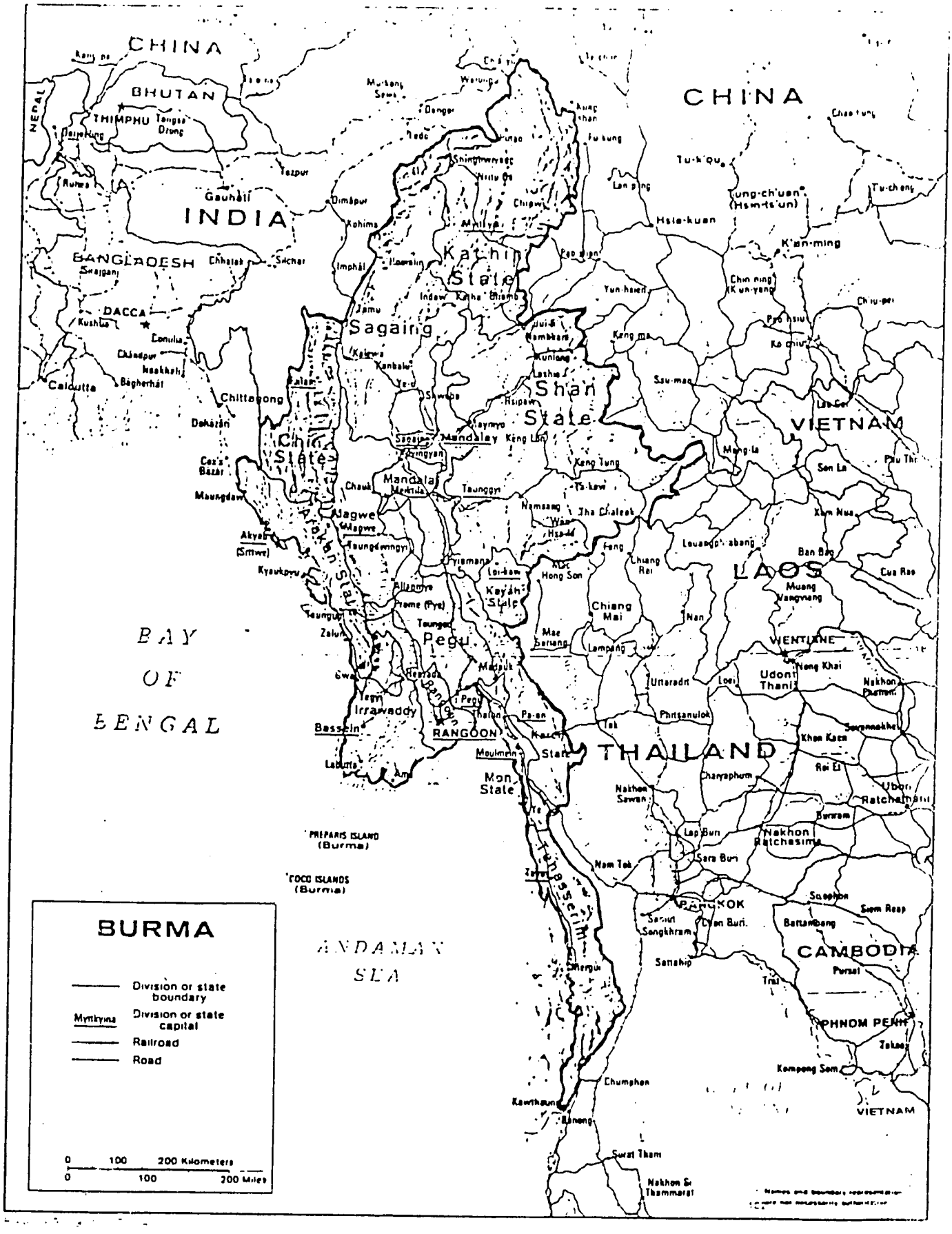
14. SCHEDULED EVALUATIONS
Interim: MM 10 YY 87 | MM 11 YY 88 | Final: MM 03 YY 91

15. SOURCE/ORIGIN OF GOODS AND SERVICES: [X] 000 [X] 941 [ ] Local [ ] Other (Specify)

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

17. APPROVED BY
Signature:
Title: AID Representative, Burma
Date Signed: MM 11 DD 21 YY 85

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


CHINA
BHUTAN
THIMPHU
INDIA
BANGLADESH
DACCA
Calcutta
Chittagong
Kachin State
Sagaing
Shan State
Chin State
Mandalay
Arakan State
Pegu
Irrawaddy
RANGOON
Mon State
Tenasserim
BAY OF BENGAL
ANDAMAN SEA
PREPARIS ISLAND (Burma)
COCO ISLANDS (Burma)
VIETNAM
LAOS
THAILAND
CAMBODIA
Chiang Mai
VIENTIANE
PHNOM PENH
BURMA
Division or state boundary
Division or state capital
Railroad
Road
0 100 200 Kilometers
0 100 200 Miles

	page
ABBREVIATIONS AND ACRONYMS	-vii-
I. PROJECT DATA SHEET	-i-
II. DRAFT PROJECT AUTHORIZATION	-ii-
III. PROJECT RATIONALE AND DESCRIPTION	-1-
A. Project Rationale	-1-
1. Country Setting	-1-
2. U.S. Interests and Objectives	-2-
3. AID Development Assistance Strategy	-2-
4. Relationship to Agency's Goals	-3-
5. Burma's Agricultural Development Strategy	-3-
6. Project Background and Lessons Learned	-4-
7. Donor Coordination	-6-
B. Project Description	-7-
1. Project Goal and Purpose	-7-
2. Project Outputs and End of Project Status	-8-
3. Project Inputs	-12-
4. Interaction of Project Components	-13-
5. Project Beneficiaries	-13-
6. Narrative	-15-
IV. COST ESTIMATES AND FINANCIAL PLAN	-17-
A. Cost Estimates	-17-
B. Recurrent Costs	-23-
C. Cost Rationale	-23-
V. IMPLEMENTATION PLAN	-25-
A. Implementation Schedule	-25-
1. Pre-obligation Actions	-25-
2. Calendar of Major Events	-26-
B. Project Management	-27-
1. Overview	-27-
2. AID/Burma Responsibilities	-27-
3. Regional and AID/W Assistance	-27-
4. Host Country Role	-28-
5. The Technical Assistance Team	-28-
C. Contracting and Procurement Plan	-28-
1. General	-28-
2. Technical Assistance	-28-
3. Procurement Services Agent	-29-
4. Commodities	-30-
5. Fertilizer	-30-
6. Training	-30-
7. Assessment of Methods of Financing	-30-
8. Audits	-31-
D. Training Plan	-31-
1. Long-term Training	-32-
2. Short-term Training	-32-
3. In-country Training	-32-

VI. PROJECT ANALYSIS -36-

A. Economic -36-
1. Overview -36-
2. Sensitivity Analysis -37-
3. Risks -37-
B. Financial -38-
C. Social Soundness -40-
1. Introduction -40-
2. Agriculture Sector -41-
3. Socio-Cultural Context: Village Structure -42-
4. Marriage Patterns -43-
5. Inheritance -44-
6. Social Status and Mobility -44-
7. Factors of Production: Land -47-
8. Factors of Production: Labor -47-
9. Factors of Production: Capital -49-
10. Household Economics -50-
11. Values, Beliefs and Ideology: Buddhism -51-
12. Equality and the Status of Women -53-
D. Administrative -55-
E. Technical -56-
1. Overview -56-
2. Soils, Crops and Fertilizer -57-
3. Justification -59-
4. Seed Farms -59-
5. Feasibility -61-
6. Crop Protection -62-
7. Current Problems -62-
8. Pest Problems -63-
9. Potential Pest Problems -66-
10. Pesticide Usage -66-
11. Pest Management Requirements -67-
F. Environmental -69-

VII. CONDITIONS PRECEDENT, COVENANTS, WAIVERS AND STATUS OF NEGOTIATIONS -80-

A. Conditions Precedent to Disbursement -80-
B. Covenants -80-
C. Waivers -80-
D. Negotiating Status -81-

VIII. MONITORING AND EVALUATION PLAN -82-

A. Users of the Information -82-
B. Project Goal, Purposes and Outputs -82-
C. Manager's Priority Questions -84-
D. Key Indicators and Administrative Data To Answer Manager's Questions -85-
E. Other Appropriate Methods to Answer Manager's Questions -89-
F. Host Country Support -89-
G. Feedback Procedures -89-
H. Budget -90-
I. Evaluation Schedule -90-

Annexes

A. PID Approval Message A-4
B. Logical Framework A-6
C. Statutory Checklist A-16
D. Grantee's Request for Assistance A-26
E. Project Analyses Tables A-27
1. Economic A-28
2. Financial A-42
3. Environmental A-52
F. Summary of Consultant Requirements For Crop Protection A-64
G. Requests for Waivers and Approvals A-66
H. Seed Equipment Listing A-76

Tables

1. Summary of Cost Estimates and Financial Plan 18-
2. Budget for Technical Assistance 19-
3. Budget for Commodities 20-
4. Budget for Training 21-
5. Projection of Project Expenditure by U.S. Fiscal Year -22-
6. Summary of Training Programs -33-
E1 Economic Benefits and Costs of Project A-28
E2 Total Incremental Economic Costs of Project Farms A-29
E3 Fertilizer Use and Economic Cost A-30
E4 Project Farm Labor - Incremental Economic Cost A-31
E5 Incremental Farm Production & Gross Economic Benefits A-32
E6 Project Economic Cost - AID A-33
E7 Project Township by State/Division and Crop A-34
E8 Anticipated Numbers of Townships and Crop Area Involved By State and Division A-36
E9 Fertilizer Applicatioin Rates and Total Requirements by Crop and Year A-37
E10 Projected Area, Yields and Production of Oilseed Crops without and With Project A-38
E11 Economic Import Parity Prices -- Fertilizer A-39
E12 Economic Import Parity Prices -- Oilseeds A-40
E13 Summary Table, Farm Financial Analysis - Direct Farm Costs and Benefits Due To The Project A-42
E14 Financial Analysis: Gross Farm Benefits Due To Residual Fertilizer A-43
E15 Estimates of Additional Farm Costs Associated With the Increased Production From Residual Fertilizer A-44
E16 Financial Analysis: Gross Farm Direct Benefits Due To Project A-45
E17 Financial Analysis: Direct Farm Costs Due To Project A-46
E18 Farm Budget For Grourdnuts With and Without Project A-47
E19 Farm Budget For Sesame With and Without Project A-48
E20 Farm Budget for Sunflower With and Without Project A-49
E21 Farm Budget for Niger With and Without Project A-50
E22 Estimates of Direct Employment Generation By Project A-51
E23 Pesticides Used, Being Tested, Or Considered For Use In Burma A-52
E24 Authorized Crop Uses of Approved Pesticides Based on USEPA Registered and/or FAO Maximum Residue A-53

E25 Annual Consumption of Pesticides on Project Crops in Burma 82-85 A-54
E26 Crop Pests in Burma A-55
E27 Potential Crop Pests in Burma A-56
E28 Summary of Training Programs For Crop Protection A-57
E29 Number of Burmese Now or Scheduled to go Abroad for Advanced Crop Protection Degrees, Number of Burmese in the Agriculture Corporation Trained Beyond the BAg. in Crop Protection Disciplines A-58
E30 Present Acreage on Major Crops By Township & Anticipated Crop Area A-59
F1 Summary of Consultant Requirements for Crop Protection A-65
H1 Equipment List for Crop Protection A-77
H2 General Accessories for Seed Facilities A-78
H3 List of Commodities to be Purchased for Seed Drying A-81
H4 List of Commodities to be Purchased for Seed Processing A-82
H5 List of Commodities to be Purchased for Seed Storage A-84
H6 List of Commodities to be Purchased for Seed Testing A-85
H7 List of Commodities to be Purchased (Crop Protection - Seed Farms) A-86
H8 List of Electrical and Miscellaneous Supplies to be Purchased A-87
H9 List of Commodities to be Purchased (Crop Protection - Townships) A-88

Maps and Charts

1. General Map of Burma -ii-
2. Selected Crop Areas of Burma -xiii-
3. Methods of Financing Chart -31-

ABBREVIATIONS AND ACRONYMS

AC	Agriculture Corporation
ACO	Area Contracting Officer
ADB	Asian Development Bank
A/ADO	Assistant Agriculture Development Officer
ADO	Agriculture Development Officer
AID/Burma	Agency for International Development/Burma
AIDREP	AID Representative to Burma
AID/W	Agency for International Development/Washington
ANE/PD	Office of Project Development, Bureau for Asia/Near East
APAC	Asia Projects Advisory Committee
ARD	Applied Research Division
ARI	Agricultural Research Institute
BAPP	Burma Agriculture Production Project
BARD	Burma Agriculture Research and Development Project
BSK	Basket, a Burmese unit of measure
BSPP	Burma Socialist Program Party
CADTC	Central Agriculture Development Training Center
CBD	Commerce Business Daily
CN	Congressional Notification
CY	Calendar Year
EA	Environmental Assessment
8(a)	Small firms designated as economically and/or socially disadvantaged by the Small Business Administration
FAO	Food and Agriculture Organization
FX	Foreign Exchange
FY	Fiscal Year
GDP	Gross Domestic Product
HYV	High Yield Varieties
IA	Institute of Agriculture, Yezin
IARC	International Agricultural Research Centers
IBRD	International Bank for Reconstruction and Development (World Bank)
ICRISAT	International Center for Research in Semi-Arid Tropics, India
IEE	Initial Environmental Examination
IFL	Institute of Foreign Languages, Rangoon
IITA	International Institute for Tropical Agriculture
ILO	International Labor Organization
IMF	International Monetary Fund
IQC	Idefinite Quantity Contract
IRR	Internal Rate of Return
K	Kyat, Burmese local currency
LC	Local Costs
LD_{50}	Lethal Dose to kill 50% of the Test Organisms
LOP	Life of Project

M/SER/AAM/OS	Office of Acquisition and Assistance Management, Overseas Division, AID/Washington
MOPP	Maize and Oilseeds Production Project
MRL	Minimum Residue Level
M	Million
MAF	Ministry of Agriculture and Forests
MOP	Muriate of Potash
MT	Metric Tons
OER	Official Exchange Rate
O/FIN	Office of Finance, Bangkok, Thailand
PACD	Project Assistance Completion Date
PID	Project Identification Document
PIO/C	Project Implementation Order/Commodities
PIO/P	Project Implementation Order/Participants
PIO/T	Project Implementation Order/Technical Services
PM	Person Months
PP	Project Paper
PROAG	Project Grant Agreement
PSA	Procurement Services Agent
RCMO	Regional Commodity Management Officer
RFP	Request for Proposal
RFTP	Request for Technical Proposal
RLA	Regional Legal Advisor
SER	Shadow Exhange Rate
SER/CM	Office of Contract Management, AID/Washington
SRUB	The Socialist Republic of the Union of Burma
S&T/AGR	Bureau of Science and Technology, Agriculture
TA	Technical Assistance
TOEFL	Teaching of English as a Foreign Language
TSP	Triple Super Phosphate (fertilizer)
ULV	Ultra Low Volume
UNDP	United Nations Development Program
USDH	United States Direct Hire
USEPA	United States Environmental Protection Agency
UPLB	University of the Philippines, Los Banos
WHO	World Health Organization
PPC	Bureau for Program and Policy Coordination, AID/W
S&T/IRM	Office of International Resource Management, Bureau of Science and Technology, AID/W
WTP	Whole Township Program
TSP	Triple Super Phosphate

CURRENCY EQUIVALENTS

K8.50 = US$1.00

WEIGHTS AND MEASURES

English/US Units		Metric Units
1 foot (ft)	=	30.48 centimeters (cm)
1 mile (mi)	=	1.609 kilometers (km)
1 acre (ac)	=	0.405 hectare (ha)
1 square mile (sq mi)	=	2.590 square kilometers (km^2)
1 long ton (lg ton)	=	1,016 kilograms (kg)

Burmese Units		English Units		Metric Units
1 viss (vi)	=	3.600 lb (.001607 lg ton)	=	1.633 kg
1 pyi (1.302 vi)	=	4.688 lb (.002092 lg ton)	=	2.127 kg
0.2133 pyi (.28 vi)	=	1 pound (lb)	=	0.4536 kg
0.4702 pyi (.612 vi)	=	2.205 lb	=	1 kg
477.9 pyi (662 vi)	=	1 long ton (2,240 lbs)	=	1,016 kg
470.2 pyi (612 vi) (m ton)	=	0.9842 lg ton (2,205 lbs)	=	1 metric ton

1 Basket Paddy (9.82 pyi)	=	46.0 lbs (.0205 lg ton)	=	20.9 kg
1 Basket Rice (16.0 pyi)	=	75.0 lbs (.0335 lg ton)	=	34.0 kg
1 Bag Rice (34.1 pyi)	=	160.0 lbs (.0714 lg ton)	=	75.6

Fiscal Years - October 1 - September 30 (up to September 1973)
October 1, 1973 - March 31, 1974
April 1 - March 31 (from April 1974)

Except otherwise specified, years in the report and statistical annex refer to fiscal years.

II. DRAFT PROJECT AUTHORIZATION

BURMA

Agriculture Production
Project (482-0007) and
Subproject (482-0007.01)

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorise the Agriculture Production Project ("the Project) for the Socialist Republic of the Union of Burma ("the Cooperating Country") involving planned obligations of not to exceed Twenty Nine Million Eight Hundred and Twenty Thousand United States Dollars ($29,820,000) in grant funds over a period from the date of authorization until September 30, 1991, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to assist in financing foreign exchange and certain local currency costs of the Project.

2. Further, pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Agriculture Production Subproject ("the Subproject") for the Socialist Republic of the Union of Burma ("the Cooperating Country") involving planned unilateral obligations of not to exceed One Hundred and Eighty Thousand United States Dollars ($180,000) in grant funds over a period from the date of authorization until September 30, 1986, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to assist in financing foreign exchange and certain local currency costs of contractor support items required under the Project.

3. The Project is designed to assist the Cooperating Country in increasing the production of oilseed and related crops in order to meet increased per capita nutritional requirements. This will be done through the introduction of improved seed, greater use of fertilizer, production of inoculum and the creation and implementation of appropriate technology packages to increase farm yields. The Grant shall include, but not be limited to, technical assistance and training to increase the capabilities of indigenous organizations to plan and implement the project as well as commodities in support of increasing crop yields and the production of improved seed and inoculum.

4. The Project Agreement, which may be negotiated and executed by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority shall be subject to the following essential terms and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

5. Source, Origin of Goods and Services.

Except for ocean shipping, goods financed under the Grant shall have their source and origin in the Cooperating Country or in the United States, except as noted below under the section titled "Waivers" or as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the Project shall be financed only on flag vessels of the United States, except as A.I.D. may otherwise agree in writing. Training financed under the Grant may be undertaken in the United States, the Cooperating Country or in third countries in accordance with the provisions of A.I.D. Handbook 10.

b. Conditions Precedent to Disbursement.

Except as A.I.D. may otherwise agree in writing, prior to any disbursement or the issuance of any documentation pursuant to which disbursement will be made, the Cooperating Country shall furnish, in form and substance satisfactory to A.I.D., a statement identifying the various agencies and offices of the Cooperating Country responsible for implementation of the Project and designating individuals in each such agency or office responsible for coordinating Project components.

c. Covenants.

(1) The Cooperating Country shall covenant that it shall process and clear expeditiously, and store and distribute properly, all goods and commodities financed under the Project.

(2) The Cooperating Country shall covenant that it shall ensure that the Ministry of Agriculture and Forests or other entities of the Cooperating Country to which the goods are destined will pay any and all taxes and duties on A.I.D.-financed commodities, and/or exempt such commodities from such costs.

(3) The Cooperating Country shall covenant that it shall ensure that each agency and office of the Cooperating Country responsible for carrying out the Project will cooperate to the maximum extent possible with the Ministry of Agriculture and Forests in carrying out the Project.

(4) The Cooperating Country shall convenant that during the project execution period it shall undertake a study of fertilizer pricing and supply and explore adjustments necessary to assure supplies adequate to meet long-term domestic requirements.

(5) The Cooperating Country shall convenant that during project execution, all funds generated from the sale of AID-financed fertilizer shall be placed into a special account, segregated from all other accounts, with generated proceeds being utilized for purposes of financing mutually agreeable activities in support of project objectives.

6. Approvals and Waivers.

Based upon the justification and findings set forth in Annex G of the Project Paper, I hereby:

a. Approve, if the Project Agreement is not executed prior to the fourth quarter of the 1986 fiscal year, a waiver of source and origin requirements from A.I.D. Geographic Code 000 (U.S. only) to Code 935 (Free World) and Code 941 (Selected Free World) for the procurement of small appliances, furniture and refurbishing items required under contractor support to be supplied from a number of vendors from Thailand and Singapore in the estimated amount of $75,000 (excluding freight) and certify that exclusion of procurement from Free World countries other than the Cooperating Country would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program;

b. Approve, notwithstanding the date of execution of the Project Grant Agreement, proprietary procurement pursuant to Federal Acquisition Regulation (FAR) Part 15.213(b)(ii) and authorize only if the Project Grant Agreement is not executed prior to the fourth quarter of the fiscal year, noncompetitive procurement procedures pursuant to FAR Part 6.302-2 to procure three vehicles and related spare parts, valued at $30,000 (excluding freight), manufactured by General Motors Corporation under contractor support items and determine that procurement conducted under procedures other than noncompetitive would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program; and

c. Approve a waiver of source and origin requirements from A.I.D. Geographic Code 000 (U.S. only) to Code 935 (Free World) for the procurement of sunfola seed to be supplied from Australia in the estimated amount of $10,000 (excluding freight) and certify that exclusion of procurement from Free World countries other than the Cooperating Country would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program.

Based upon the Environmental Assessment as contained in Section VI F of the project paper, I hereby approve the use of A.I.D. financing of pesticides required under the project.

Based upon justification contained in Annex G of this project paper, I hereby waive under this project AID policy requiring host country payment of participant international travel costs.

Signature _____

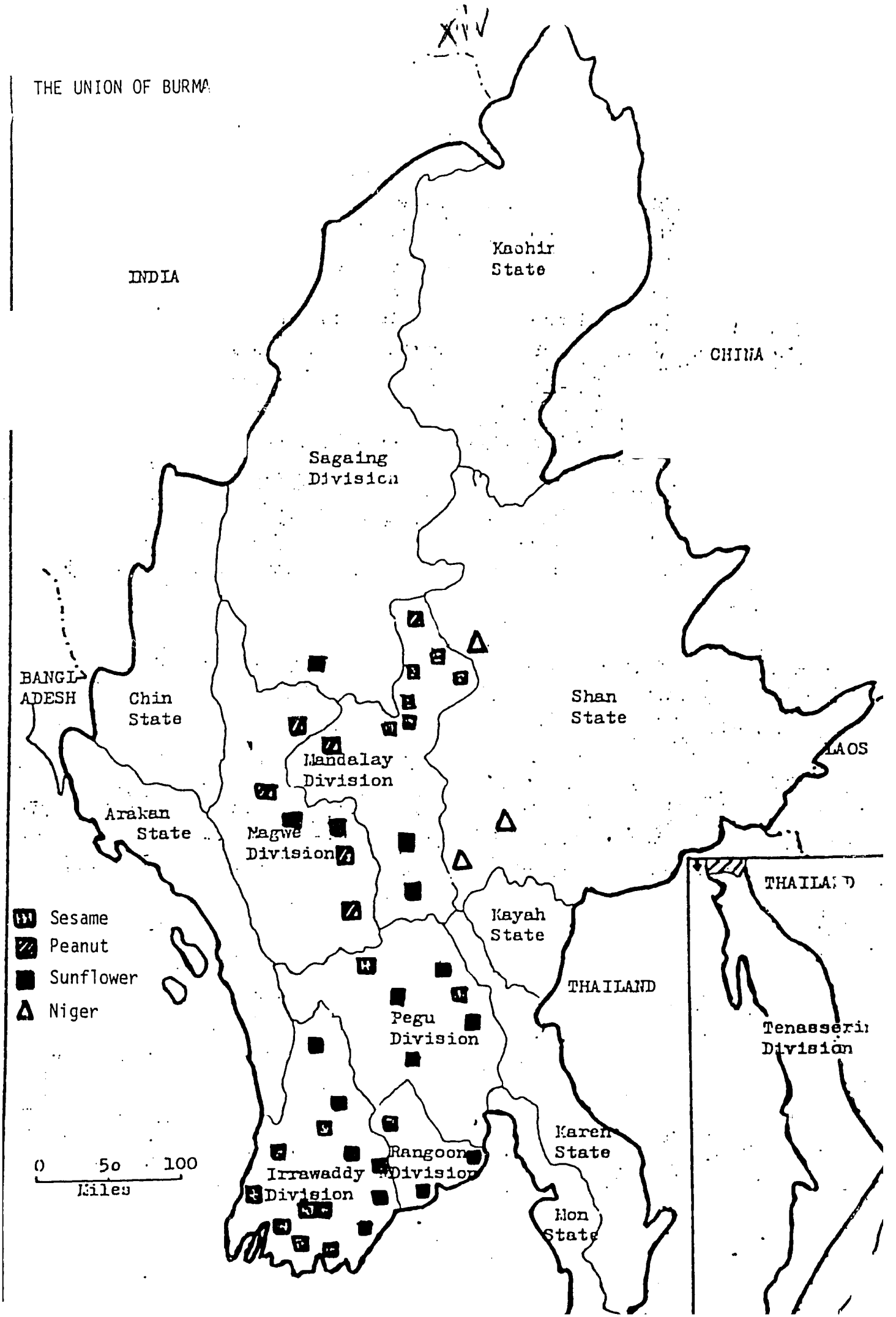
Charles W. Greenleaf, Jr.
Assistant Administrator
Bureau for Asia and the Near East

_____
Date

Clearances:

	Date	Initial
Peter Bloom, ANE/PD	_____	_____
Barry Sidman, ANE/DP	_____	_____
Kenneth Sherper, ANE/TR	_____	_____
David Merrill, ANE/PTB	_____	_____
Herbert Morris, GC/ASIA	_____	_____

AID/Burma:GMImhoff:gmi:10/09/85:


XIV
THE UNION OF BURMA
INDIA
Kachin State
CHINA
Sagaing Division
BANGLADESH
Chin State
Shan State
LAOS
Mandalay Division
Arakan State
Magwe Division
THAILAND
Kayah State
THAILAND
Pegu Division
Tenasserim Division
Karen State
Rangoon Division
Irrawaddy Division
Mon State
Sesame
Peanut
Sunflower
Niger
0 50 100
Miles

III. PROJECT RATIONALE AND DESCRIPTION

A. Project Rationale

1. Country Setting. Burma, about the size of Texas, has a current population estimated at 38 million which is growing at rate of 2% annually. The country's climate is tropical monsoonal with the northern portion of Central Burma constituting a "dry zone" with lower levels of rainfall and a shorter rainy season than areas immediately to the north and south; its economy is agriculturally based. Agriculture, including forestry, livestock and fisheries, accounted for about half of the country's GDP in 1983. It also utilized almost two-thirds of the labor force and produced over 80% of the export earnings. In addition, agricultural crops provide raw material for more than 60% of the country's industrial production. By Asian standards, land is relatively abundant and population density is low. The vast potential for irrigation has only begun to be tapped. The potential for increased agricultural production is great. Rice is by far the most important agricultural crop, accounting for about 50% of the gross cultivated area. In terms of area sown, sesame is the second most important crop. Other main crops include pulses, groundnuts, jute, cotton, and cereals other than paddy.

During the 1960s and early 1970s, value added in agriculture rose at about 1.6% per annum, which is below the population growth rate. In response to this unsatisfactory performance, the SRUB introduced a series of policy reforms beginning 1973/74, to improve incentives to farmers and provide for greater flexibility in the farming sector. The SRUB invited foreign assistance on an expanded scale to help develop the sector. Emphasis was placed on developing high yielding varieties (HYVs) suited to local conditions and promoting their use. Agricultural output increased sharply following the policy reforms as the government launched, in 1975/76, the successful paddy intensification drive, known as the Whole Township Program (WTP). This program combined improved availability of inputs and a greatly expanded and strengthened extension service with institutional support at the township level. Local factors have contributed to making the process unique and successful.

Rice is Burma's major agricultural export commodity as well as a significant source of government revenue through implicit taxation from SRUB-controlled pricing and exportation. Receipts from the export of this commodity have accounted for as much as 45% of export earnings in some years. The sharp drop in the world price of rice - now 50% of its 1980 level - made clear the vulnerability of an economy which depended so heavily on such a narrow export base. Because of this, the SRUB made a decision to diversify crop production. Since that decision, growth in rice output has been very slow as resources have increasingly been used to increase the output of other selected crops.

Following rice, edible oil is the most important single staple foodstuff in the national diet. Total fat intake is generally low and, partly as a result, caloric deficiencies have been found to be quite widespread. Except for milk products, edible oil is the only food item that is imported in significant amounts. The SRUB's aim of reaching self-sufficiency in edible oils by 1993/94, the end of the current Twenty Year Plan period, is not merely a question of eliminating net imports of edible oils, it also involves raising average per capita consumption to 8.76 kgs/year. At this level of consumption edible oils would account for about 10% of total average energy requirements. As a result of the increased oil consumption, average total fat intake would reach acceptable levels for the bulk of the population.

The major constraints to increased food crop production are the limited availabilities of fertilizer, improved seeds and pesticides, and, over the longer term, the capabilities to use these inputs more efficiently. While Burma has undeveloped petroleum reserves, the production from developed wells is only about 10 million barrels annually. This has resulted in diesel fuel and gasoline shortages which impose a constraint on increased agriculture production. This constraint limits the ability to irrigate land for pre-monsoon and winter crops and for supplemental irrigation of monsoon crops. Importing adequate quantities of the above commodities is not a viable option to Burma at this time given the country's extreme shortage of foreign exchange. And with debt servicing now a real burden (including IMF, estimated to reach 47% of export earnings in 1985/86), the country has to be very selective in any new loan obligations that it assumes.

2. U.S. Interests and Objectives. The AID program in Burma is grounded in United States interests in maintaining Burma as a relatively stable country in Southeast Asia, supporting its development possibilities which include the potential to contribute to overall world food supplies beyond its own self-sufficiency, maintaining its non-aligned status and increasing Burmese cooperation in mutual efforts to control the production and marketing of illegal narcotics.

3. AID Development Assistance Strategy. AID strategy in Burma is to select a few sound Burmese development efforts in key sectors that show significant potential for contributing to Burma's economic growth, and to concentrate AID support on these programs for a sufficient period of time to show measurable results. Efforts are principally directed toward technological and institutional improvements as essential instruments for obtaining increased productivity and continuing growth. The absorptive capacity for donor aid remains high and the basic structure of the society and government facilitate the distribution of benefits in the rural areas of Burma.

The AID program concentrates on two key sectors: agriculture and health. Within the health and agriculture sectors, AID currently supports two high priority programs of national scope - Primary Health Care and Maize and Oilseeds Production. In FY 1985, two additional projects; Agriculture Research and Development and Edible Oil Processing and Distribution were initiated.

4. Relationship to Agency Goals. The four cornerstones of AID's development assistance policy will be addressed in the project. Policy dialogue between AID/Burma and the Ministry of Agriculture will concentrate on the development of associated crops required, seed and inoculum standards to be established and the economics of fertilizer. The project will provide for institutional improvements in the Agriculture Corporation (AC) and the Ministry of Agriculture by emphasizing internal management systems which will potentially provide a model of project monitoring and evaluation for other Burmese programs. Technology transfer in the areas of improved production and distribution of seed and inoculum, water and soil management practices and cropping systems will be an integral component of this project. Finally, a role for the private sector, both in the person of farmers and farmers' cooperatives, and, as a consequence of the anticipated increases in production and processing of edible oil, private millers, is contemplated in the project.

5. Burma's Agricultural Development Strategy. Agricultural policy/strategy stems from, and is part of, the basic philosophy of the country--sometimes called the Burmese Way to Socialism--which is aimed at the provision of basic necessities and social services to all its citizens. One of the key government policies is to provide low cost food to everyone, and this, of course, reflects on prices received by farmers. The prices paid by the government to farmers for crops for which there are quotas are lower than free market prices. At the same time, however, a number of farm inputs are subsidized.

As noted, from 1975/76, when the WTP was launched, until the early 1980's, agricultural development strategy emphasized the expansion of paddy production. Since 1979/80, as part of its strategy to diversify agricultural production, the SRUB has extended the WTP to other crops. The selection of non-paddy crops for the diversification program is based on three criteria: importance in domestic food consumption; potential for exports or import substitution; and usefulness as raw materials for the agro-based industry. Since oilseeds rank high on the first criterion and fairly high on the latter two, increased oilseed production is assigned a very high priority by the Burmese Government.

Burma carries out its major agricultural policies through a mix of subsidies and taxes, both explicit and implicit, acreage and production quotas and direct marketing of produce. A number of inputs are heavily subsidized, especially

fertilizers, and particularly urea. Pesticides are also subsidized, as are improved seeds provided by the SRUB. Land and water fees are both low; and where irrigation is available this amounts to greatly subsidizing water. When available, some mechanized primary tillage operations are provided at a subsidized rate through the Agriculture Mechanization Department. The availability of these services is very limited, however, due to the scarcity of fuel. For the production of oilseeds, the great bulk of the farm traction will continue to be provided by draught animals. Low farm prices largely offset these subsidies. Evidence of this offset can be seen in the project economic analysis which indicates relatively stable cost/benefit ratios even in the face of 25-50% fluctuations in the prices of inputs.

Agriculture, the most dynamic sector in the economy, remains largely in private hands although as noted above the Government intervenes in a number of ways. The private sector also dominates road and inland water transportation and contributes about half of the value added in domestic trade and small scale manufacturing.

In summary, Burmese agricultural policy is centrally formulated and implemented, with organized participation from the national to the community level. Goals are set and interventions effected to attain goals. Interventions are in the form of a minimum level of subsidized inputs, assured markets, quotas and advisory services. The benefit to the rural community, which is well documented with respect to rice and applies to other crops as well, is a clear increase in farm family income and in rural labor income over the levels which existed prior to the township programs.

6. Project Background and Lessons Learned. BAPP is basically a follow-on to MOPP, the first AID-supported agricultural project in Burma upon resumption of U.S. assistance in the late 1970's. It was the Burmese who suggested that the U.S. provide assistance in the production of maize and oilseed crops. Since then, two related projects have recently been approved. One will assist in edible oil processing and distribution and the other will concentrate on basic research and farming techniques required for secondary crops, including oilseeds. The three projects are highly complementary.

In the fall of CY 1984, a U.S. review team made an assessment of AID's agricultural strategy in Burma. 1/ The team found the current strategy appropriate and recommended a follow-on to MOPP, with, however, more flexibility permitting work with crops growing in sequence or rotation with oilseed crops. Such a provision was also provided for in the research project.

1/ See Hooker, Morrow, Armstrong et at, "A Review of AID's Agricultural Sector Strategy in Burma", November 1984, pg.9

In early CY 1985, a formal mid-term evaluation of MOPP was conducted.2/ The evaluation was generally favorable and the team recommended a follow-on project. However, a decision was made to drop maize from any follow-on project. This decision was based on the belief that the limited resources available could be better used by concentrating on oilseed crops. AID/Burma developed a PID, titled High Protein Crop Development, which was approved by AID/W on May 30, 1985. The design of BAPP follows the PID closely.

The more important lessons learned from the MOPP project include the following:

-- The decisions to limit competition to Title XII institutions resulted in difficulties in obtaining qualified people who could adapt to working conditions in Burma. Contracting for related future projects should not be so constrained.

-- A major constraint in obtaining qualified candidates for participant training is the lack of English language capability. This constraint can be best addressed by AID/Burma offering English language training.

-- One obstacle to the timely implementation of the MOPP project has been a phrase in the Grant Agreement which states, in part, with respect to taxes and duties, that equipment, materials and commodities imported into Burma for project implementation or for use by expatriate personnel performing project services financed under the Agreement "shall either be exempted from payment or be paid by the Grantee". Such wording has cost the AC, the implementing agency, large sums of money in unbudgeted expenditures and has created delays and morale problems for contract staff. Grant Agreements need to be very clear, precise and tuned to particular host country circumstances. AID/Burma successfully negotiated duty-free agreements for later projects by referencing the Colombo Plan and having costs of contractor support items segregated from project grant funds. Such arrangements will be made under the BAPP.

The MOPP evaluation team also noted that:

-- AID-assisted projects need to address more fully the desires and needs of host countries. MOPP is successfully progressing on its intended course in spite of numerous difficulties, to a large degree because it was desired by the Burmese Government, meets the needs of Burma, and was jointly developed and implemented with able and dedicated Burmese agriculturists.

2/ See Pickett, Fredrick, De Rafols and Krause, "Maize and Oilseeds Production Project, Mid-Term Evaluation Report", February, 1985.

7. Other Donor Assistance. Over the past several years a number of multilateral and bilateral donor activities complimentary to this project have been implemented. This project will benefit from technical, capital, and information linkages already established between and among these projects.

a. In 1977 the World Bank loaned Burma $6.5 million for a seed development project. Also, in that same year, the UNDP made a grant to the AC for a crop development project. Though that project concentrated primarily on other crops, namely jute, cotton and rice, the broad experience will translate across product lines over the long term.

b. The UNDP Crop Protection project is a $1.0 million on-going project whose main objective is to develop teams of crop protection extension staff to work in selected areas throughout the country to monitor and evaluate major pest, disease, and weed problems in all crops. As noted in the project economic analysis below, the greatest probable risk to project success is the possibility of insect/disease infestation. Since A.I.D. is introducing at least one crop, sunflowers, which has a history of dramatic susceptibility to insects and diseases, the crop protection extension staff could play a potentially important role in this program.

c. The Canadian International Development Agency (CIDA), through the International Rice Research Institute (IRRI), has placed three technicians in Burma to work on the CIDA/Burma/IRRI farm machinery project. One aspect of that project deals with multiple cropping systems with paddy as the major crop. To the extent that improved cropping systems are developed, new recommended practices will directly benefit this project.

d. A major loan from the Asian Development Bank (ADB) is anticipated to enable the cooperative sector in Burma to increase the production and improve processing capacity of oilseeds in Burma. The problems of storage and distribution of oilseeds will also be addressed. As in the case of the A.I.D.-financed Edible Oils Processing and Distribution Project, the ADB project will allow Burma to process the increasing production resulting from this production project (BAPP) and the predecessor, Maize and Oilseeds Project, but will also serve to increase the edible oil yields from current oilseed production. However, a full ADB project appraisal is yet to be completed.

e. The Federal Republic of Germany has initiated a plant protection and rodent control project with the AC. This $3.0 million, 4-year project, which will be directed toward all crops, should have direct effect upon the BAPP Project.

B. Project Description

1. Project Goal and Purpose. The project goal is to increase production of food crops and crop intensity in 42 townships of rural Burma with positive effects on rural income and employment and on national food supply and nutrition. The increased output of oilseeds directly attributable to the project is estimated at 346,000 MT over the project life. Due to the residual phosphate, potash and nitrogen remaining in the soil after being applied to the project crops and the improved tilth and nitrogen left by legumes (groundnut), as an additional benefit, yields from crops will be higher than they would have been otherwise. Estimates developed in the economic analysis place the increased production in non-oilseed crops, rice paddy and pulses, at 42,335 MT and 1,460 MT respectively over the life of the project.

Estimates provided in the project financial analysis place the increase in employment at 20.5 million person days: 8.8 million person days for farm holder households and 11.7 million person days for hired laborers (SEE TABLE E22). The financial analysis also demonstrates that rural income will have increased by $203.5 million, comprised of $11.3 million wage income of laborers and $192.2 million net farm income of farm holder households.

The estimated production of oilseeds in the last year of the project will, after allowing for direct consumption, seed and waste, yield 3.8 times the amount of recent annual imports of this commodity. Thus, the project will make possible both an increase in edible oil consumption and a reduction (elimination) of edible oil imports.

In addition to the direct effect of the project, a spread effect is anticipated within the townships in the project area and in adjacent townships. Farmers are expected to plant a substantial area of oilseeds as a consequence of the spread effect. While "improved" seed will be available (from farmers) for planting, no commercial fertilizer or pesticides will be allocated from this project for this acreage and yields will be substantially lower than on the project farms. Even so, the spread effect is expected to be important, increasing production substantially. "Improved" seeds are not hybrids, but rather selected varieties. They perform better than ordinary varieties, therefore, even without applications of fertilizers and pesticides.

The purpose of the project is to introduce and bring about adoption in a 42-Township area farming systems which include among other things, new water, soil and pest management technologies. It is estimated that at full development, per acre yields will be 7.8, 2.7, 14.7, and 4.3 baskets/acre higher, respectively, for groundnut, sesame, sunflower and niger than without the project and that the respective areas under cultivation (sown) will have increased by 0, 42,000, 50,000, and 12,000 acres. This growth in area is expected to

occur as land that would have otherwise remained fallow is brought under the project. At full development, the total project areas for groundnut, sesame, sunflower and niger are estimated to be 203,000, 244,000, 205,000, and 20,000 acres respectively. The projected increases in production of groundnut (unshelled), sesame, sunflower, niger, paddy, and pulses are 68,460 MT, 99,422 MT, 171,206 MT, 7,189 MT, 42,335 MT, and 1,460 MT respectively over the project life.

2. Project Outputs and End of Project Status. Expected project outputs are projected according to the following rationale:

1) Appropriate amounts of chemical fertilizer applied to 2,528,000 acres of food crops; recommended fertilizer application rates refined, based on information derived from local fertilizer trials and a project-supported soil testing program instituted.

Rationale:

If the AC is able to extend to farmers through the Burmese system of high technology farms located in each of 42 project townships comprising the project area a technology package, and technical advice on its application, then it will have transmitted to farmers who farm 2,528,000 acres of crops a technology package which includes an appropriate fertilizer application component. There is an inherent assumption that the farmers will adopt the technology and that fertilizer will be available.

Also, the project includes support for adaptive research and demonstration plots which will include research trials in fertilizer use.

END OF PROJECT STATUS (EOPS):

Fertilizer Financing

By end of project, production increases of 68,460 MT, 99,422 MT, 7,189 MT, 171,206 MT, 1,460 MT in groundnut, sesamum, niger, sunflower and other pulses respectively.

2) Extension programs in water, soil and pest management strengthened.

Rationale:

The project includes support for the following components which will result in stronger programs in water, soil and pest management.

--185 person months of technical assistance;
--872 person months of overseas training;
--an estimated 122 person months of in-country training;
--on-farm programs will be instituted on seed farms in water management and crop protection;
--production and distribution of nitrogen-fixing inoculum;
--extension of a technology package, and technical advice on its application, to farmers in 42 project townships; and
--adaptive research and demonstration plots focussing on plant varieties; soil management; fertilizer use; irrigation/water management; crop protection; multiple cropping and inter-cropping on land which includes oilseeds in the crop sequence; and approaches to agro-forestry in Burma.

EOPS:

Water Management

Courses in water management incorporated into the AC's ongoing extension and farmer training programs. At least two staff members from each seed farm will have attended at least one training session in on-farm water management.

Pest Management

Courses in pest management, including the safe use of chemicals, incorporated in the AC's ongoing extension and farmer training programs. Scouting for early detection of pest infestation incorporated into extension as well as the crop production program at the seed farms.

Crop Protection

The important pests (insects, weeds, plant pathogens, nemotodes, and vertebrates) of each food crop will be identified, their biology studied, and their distribution mapped. Determinations will be made as to the importance of crop rotation on pest species. A scheme for monitoring pest will be developed. Base-line economic injury levels will be devised and utilized; pest control alternatives will be considered. Officials, as well as farmers, will be trained in pest identification, the use of monitoring techniques, and the selection of the proper management tactic. These individuals will also receive training in the proper use, handling and application of pesticides.

Field testing of pesticides will be completed and new products incorporated into an oilseed crop protection program. Area wide rat control program will be evaluated and incorporated into crop protection program if feasible.

Agroforestry

Workshops on the role of agroforestry and how it relates to farming systems developed and at least 50 farmers will have planted areas of trees on their own land.

Returned Trainees

The majority of returned trainees will be in positions to utilize and transfer their new-found knowledge to others within the AC and to participating farmers. It is expected that the training provided will provide better understanding and appreciation of policy issues which impact agriculture development.

3) Seed farms developed.

Rationale:

The project will provide for:
--installation of seed processing equipment and structures and institutionalization and operationalization of an effective operations and maintenance program;
--production of an estimated 225,000 baskets of quality improved seeds during project life;
--introduction of improved cultural practices, especially with regard to soil, water and pest management, effected and a meaningful accounting system developed and implemented through the introduction of workshops and short-term training; and
--institutionalization of an on-going program in adaptive research (in water, soil and pest management and varietal trials).

EOPS:

All construction completed and seed processing equipment installed and operational, producing quality improved seeds.

An effective O&M program, with budget, for farm equipment and for plant and equipment in place and operational.

A meaningful record keeping system installed and routinely maintained.

55,000 baskets of seed produced, processed and distributed to farmers (last year of project).

4) Capabilities strengthened in the Planning and Statistics Unit of the AC to collect, analyze and disseminate selected

socioeconomic and other data needed for program/project development, management and evaluation.

Rationale:

The project provides for strengthening of programs in "systematic collection and analysis of data/information needed for program management, including monitoring and evaluation." (see VII: Monitoring and Evaluation Plan)

EOPS:

A capacity and methodology developed and institutionized 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.

5) Capacity to produce and distribute inoculum at the rhizobium laboratory increased to 3 million 250-gram packets annually. Quality control improved and standardized.

Rationale:

The production and distribution of nitrogen-fixing inoculum will continue to be a component of the project.

EOPS:

Capacity attained to produce 3 million 250-gram packets of virile rhizobium annually.

6) More farm women participating in the AC farmer training and instructional sessions; more women trainees in participant training program.

Rationale

Women comprise 50% of agricultural graduates and a greater percentage of farm labor and AC staff.

EOPS:

Farm women attending AC farmer training and instructional courses, comprising at least 25% of the number; at least 25% of the participant trainees are women.

3. Project Inputs. Expected project inputs are as follows:

			Amount (US$000's)
a.	AID Funding		
1.	Technical Assistance [a/]		2,475
	96 PMs long-term	1,200	
	89 PMs short-term	1,275	
2.	Participant Training [b/]		2,254
	19 MS degrees; 2.5 yrs. ea.	1,188	
	5 Ph.D. degrees	416	
	52 short-term participants	632	
	430 in-country participants	18	
3.	Commodities [c/]		18,006
	Fertilizer: approx. 60,000 MT TSP [d/]	15,446	
	Equipment, Parts, Supplies [e/]	2,560	
4.	Contractor Support Costs [f/]		180
5.	Evaluation		400
6.	Contingency (approx. 10%)		2,307
7.	Inflation (5%/Yr.)		4,378
		Sub-total	30,000
b.	SRUB Funding		
1.	Technical Assistance		60
2.	Training (in-country)		195
3.	Commodities		20,663
	Fertilizer: approx. 65,000 MT Urea and 10,500 MT MOP	19,215	
	Other (including construction)	1,448	
4.	Operation and Maintenance [g/]		3,007
5.	Evaluation		75
		Sub-total	24,000
		GRAND TOTAL	54,000

[a/] See Table 2 for details
[b/] See Table 4 for details
[c/] See Table 3 for details
[d/] Including contingency and inflation, $20,208
[e/] Includes PSA contract cost
[f/] See Annex G for details
[g/] Includes some handling cost for fertilizer

4. Interaction of Project Components. The following components comprise the project:

-- Institutional Development, Technical Assistance and Training. A total of 185 person months of technical assistance will be provided to support project implementation and management, along with 872 person months of overseas training, both degree and non-degree, and an estimated 122 person months of in-country training. A program for the operation and maintenance of seed processing equipment and farm machinery at the seed farms will be strengthened. Programs will also be strengthened in on-farm water management, especially at the seed farms, but also for increasing the capabilities in extension; in crop protection; and in the systematic collection and analysis of data/information needed for program management, including monitoring, and evaluation.

-- Production and Processing of Improved Seed. Improved seed for oil crops (groundnut, sesame, and sunflower) and maize will be grown on four seed farms where seed will be processed and stored for distribution to farmers. Farmers will do much of the seed multiplication.

-- Production of Inoculum. The production and distribution of nitrogen-fixing inoculum will continue to be a component of the project.

-- Intensification of Farm Production. In the 42 townships comprising the project area, a technology package and technical advice on its application, will be provided to farmers. The package should bring about significant increases in the per acre yield of the crops in the project area. 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.

-- Demonstration Program/Technology Transfer. The project calls for 84 demonstration plots. This will include research trials and demonstration plots in plant varieties, soil management, fertilizer use, irrigation/water management, crop protection, multiple cropping and inter-cropping on land which includes oilseeds in the crop sequence, and approaches to agro-forestry in Burma.

5. Project Beneficiaries. The project will provide technology packages, including improved cultural practices, to an estimated 319,012 farm households during the last year of the project (See Table E7). In that year, these farmers will be cultivating an average of 2.11 acres of oilseed crops. With an average farm family size of 5.6 persons, the total direct beneficiaries will be approximately 1,786,000 persons. However, there will be another group of direct beneficiaries because the improved agricultural practices and

resulting increased production will generate a greater need for hired agricultural labor. While the number of households so benefitting is difficult to estimate, it could easily be enough so that total "direct" beneficiaries reached 2,000,000 persons. The share of the benefits accruing to the hired labor will be relatively much smaller than the benefits that the farm holder households will receive.

It appears that these benefits will, in fact, materialize. This is due to two factors: the capability of the SRUB to successfully implement the project given the structure of the AC; the high value placed on vegetable oils in the Burmese diet, the shortage of its present production, and the ready internal market for increases in production. There is every indication, therefore, that this organizational pattern will enable the project to accomplish its goal of increasing agricultural production, and thereby raising farm incomes, reducing un- and underemployment, and improving the nutritional standard of the general Burmese diet.

As has been indicated in earlier research in Burma, edible oils are intended to provide 10% of daily caloric requirements: they are a concentrated form of energy and are a source of acids and vitamins essential for good health. The present deficits in production and import of edible oil are most injurious to infants, children, and pregnant and lactating women.3/ Earlier studies have also indicated that the Burmese population both wants and would purchase more edible oil if it were available. Therefore, with increased production of oilseeds and increased farmer income, improvements in nutrition should be realized. Additional nutritional advances should also be gained by increases in the production and sale of such things as pulses and sorghum, which will be raised in conjunction with the oilseed crops, and be realized from the residual advantages of fertilizer applications.

In addition to the direct beneficiaries discussed above, another set of direct beneficiaries will be the employees of the AC who will receive training under the project. These include 19 persons who will receive M.Sc. degrees, five others who will receive Ph.D. degrees, and the individuals who will participate in the 35 short-term training programs which will average four months in duration. Once all of these educational and training programs are completed, the AC itself will benefit because of the greater degree of expertise which will be available to the Corporation -- a spread effect that will become most noticeable upon the completion of the project.

3/ See Miller, "The Sociocultural Feasibility of Burma's Edible Oil Production and Distribution Project: Technology Transfer To the Cooperative Sector with Nutritional and Social Impact", October, 1983

The increased production of oilseeds will reduce the need to import edible oil and will increase the amount of oilseed cake, saving/earning foreign exchange badly needed for the country's development effort.

In addition, there should be a large number of indirect beneficiaries since a greater availablity of edible oil should improve the general population's nutritional status. Moreover, the friends, relatives and neighbors of the participating BAPP farmers should benefit through a spread effect of the technology being introduced by the project. There is a problem here, of course, since there are limitations on how much fertilizer is available to the non-participating farmers. However, the improved seeds to be developed under the project, and the complimentary Agriculture Research and Development Project, should increasingly become available to the non-participating farmers as well as the knowledge of improved agricultural practices which will be given under BAPP through the AC extension corps.

Finally, it should be noted that an increase in the incomes of the participating farmers, whether landholders or hired, should put more money into circulation and this secondary benefit should accrue to other villagers such as, for example, carpenters, blacksmiths, shopowners, and monks.

6. Narrative. The project will assist Burma in increasing the production of farm crops, including oilseed, in order to meet the country's goal of increased per capita domestic production of edible oil to a level generally adequate to meet the fat requirements of the Burmese diet. The project will do this by supporting the production of improved seeds at seed farms, for distribution to farmers; the production of nitrogen-fixing inoculum to reduce the requirements for (imported) nitrogenous fertilizer; by providing a technology package to farmers to increase farm yields of oilseeds; and by providing technical assistance and training.

While basically a continuation of MOPP, the follow-on project places greater emphasis on institutional and human resource development; on technology transfer and diffusion; and on improved program management for more efficient utilization of Burmese and AID-provided resources. Thus, there are some important modifications and emphases in the project. These changes are based on the experience and lessons learned in implementing MOPP and in its monitoring and evaluation; on the AID/W PID review; the changed economic environment in Burma since MOPP was designed; and some are introduced to address "second generation problems" stemming from progress made under MOPP. These changes include the following:

- more attention to relationships with other crops. Oilseeds are grown in sequence, and sometimes inter-cropped with other crops. Experimental work will be conducted under the project to determine the combinations of crops, including varieties, which are best suited in the sequence under local conditions;

- more emphasis on developing the capacity and methodology for the systematic collection and analysis of data/information needed to assess the performance of the project, to identify areas needing special attention - in short, for the efficient, rational management of the project and its components, including the seed farms;

- more emphasis on training in on-farm water management. While Burma has a fair number of irrigation engineers with capabilities to construct, operate and maintain systems to deliver water to farms, expertise in on-farm water management is extremely limited;

- more emphasis on developing and institutionalizing a crop protection system certainly including the proper selection and use of pesticides;

- less emphasis on maize. While the project will continue to support the production of improved maize seed at the seed farms, the crop will not be included in the farm production component of the project. It is believed that this will result in a better use of the resources that AID will be contributing to the project; and

- the introduction of an activity in agroforestry. This will be a small exploratory activity to try to determine or discover practices and techniques in agroforestry which are financially attractive to farmers, as well as economically viable. The activity will require some applied research but of special importance is the involvement of farmers through plantings on their "own" land. The activity could serve a number of functions, all of which are empirically important: the protection of crops against hot winds, the production of forage for livestock, the conservation of soil and water and perhaps water harvesting, and the provision of firewood.

IV. COST ESTIMATES AND FINANCIAL PLAN

A. Cost Estimates

Total project costs are estimated at $54.0 million. The AID contribution is $30.0 million (all grant) or 56% of the total. The corresponding figures for Burma are $24.0 million and 44%. While most of AID's costs are FX costs, there will be local currency costs associated with technical assistance as well as local currency costs to be incurred for evaluations.

Before adding contingencies and inflation, the distribution of AID project costs over the project life are: technical assistance, 10.6%; participant training, 9.7%; commodities (less contractor support costs), 76.9%; and evaluations, 1.7%. Fertilizer costs constitute 86% of the total cost of commodities.

While the estimates are uncertain, a substantial proportion of the SRUB's contribution is in foreign exchange, mostly for the purchase of fertilizer. The foreign exchange component is estimated at 44% of the total. The SRUB will incur some local currency cost associated with training, mainly in-country, of which there is a substantial amount. Its contribution, however, is a small fraction of the total. The same is true for technical assistance. Its contribution for equipment and commodities, however, is over 50%. This includes, inter alia, seed farm development and construction, fertilizer, insecticides, office and farm equipment, and vehicles. Operation and maintenance costs include the cost of personnel for running the project, including seed farm personnel and operation and maintenance of the seed farms. It is expected that the SRUB will make a significant contribution, in relative terms, in setting up and implementing a data gathering system for evaluation.

The SRUB will be under tight internal and external budgetary constraints during the project life. However, because of the priority that the SRUB assigns to the project, we are confident that SRUB funding will be forthcoming as committed.

Table 1 provides the Summary of Cost Estimates and Financial Plan with Tables 2 through 4 reflecting the individual budgets by project component. Projections of expenditures for the project by fiscal year are shown in Table 5. AID's largest expenditures will be in project years 2 and 3 when both equipment and fertilizer will be arriving. However, annual expenditures during the last four years of the project will not be greatly different.

Table 1

SUMMARY OF COST ESTIMATES AND FINANCIAL PLAN
(U.S. $000's)

Source/Use	AID		Host Country		Total
	FX	LC	FX	LC	
Technical Assistance	1,980	495	--	60	2,535
Training	2,254	--	--	195	2,449
Equipment and Commodities	18,006	--	10,658	10,005	38,669
Operations and Maintenance*	--	--	--	3,007	3,007
Contractor Support	150	30	--	--	180
Evaluation	300	100		75	475
Contingency	2,307	--		--	2,307
Inflation	4,378	--		--	4,378
Total	29,375	625	10,658	13,342	54,000

*Includes construction, land development, and installation.

Table 2

BUDGET FOR TECHNICAL ASSISTANCE
(U.S. $000's)

TECHNICAL ASSISTANCE	PERSON MONTHS	PROJECT YEAR -1-	-2-	-3-	-4-	-5-	Total
1.LONG-TERM							
A. Seed Production-Processing	48	150	150	150	150	--	600
B. Production Agronomist	48	--	150	150	150	150	600
Total	96						1,200
2.SHORT-TERM							
A. Seed Marketing	2	--	15	--	15	--	30
B. Seed Quality Control	6	--	45	--	45	--	90
C. Mechanization/Maintenance	12	60	60	60	--	--	180
D. Records/Accounts	3	15	15	15	--	--	45
E. Rhizobium Inoculation	3	15	15	15	--	--	45
F. Well Drilling	6	45	45	--	--	--	90
G. Irrigation/Water Mgt.	12	--	60	60	60	--	180
H. Economic Entomologist	4	15	15	15	15	--	60
I. Weed Scientist	4	15	15	15	15	--	60
J. Vertebrate Specialist	3	15	15	15	--	--	45
K. Plant Pathologist	3	--	15	15	15	--	45
L. Stored Grain Pest	3	--	15	15	15	--	45
M. Soil Chemist	3	--	15	15	15	--	45
N. Sociologist/Anthropologist	6	--	45	--	45	--	90
O. Production Economist	2	15	15	--	--	--	30
P. Agro-Forestry	3	15	15	15	--	--	45
Q. Other	10	30	30	30	30	30	150
Total	89						1,275
Total Technical Assistance	185	390	750	585	570	180	2,475

Table 3

BUDGET FOR COMMODITIES
(less fertilizer and Contractor Support Costs)
(U.S. $000's)

COMMODITY	PROJECT YEAR -1-	-2-	-3-	-4-	-5-	Total
Seed drying Equipment	25.00	50.00	50.0	---	---	125.00
Seed Processing Equipment	---	228.70	---	---	---	228.70
Seed Facility Equipment	102.20	---	---	---	---	102.20
Seed Storage Equipment	50.00	50.00	50.00	50.00	---	200.00
Seed Testing Equipment	---	1.30	---	---	---	1.30
Seed Testing Expendable Supplies	---	10.00	10.00	10.00	10.00	40.00
Crop Protection Chemicals (Seed Farms)	8.00	8.00	8.00	8.00	8.00	40.00
Crop Protection Equipment (Seed Farms)	5.50	---	---	---	---	5.50
Crop Protection Equipment (Township)	310.00	436.80	---	---	---	746.80
Electrical Supplies (Chaungsu)	150.00	---	---	---	---	150.00
Electrical Supplies (Thitcho)	250.00	---	---	---	---	250.00
Rhizobium Inoculation Equipment	75.00	75.00	---	---	---	150.00
Cement & Bldg. Mat'ls.	25.00	25.00	25.00	25.00	25.00	125.00
Seed	2.00	2.00	2.00	2.00	2.00	10.00
Supplies & Materials, In-Country Trng.	25.00	25.00	25.00	25.00	25.00	125.00
Soil Testing Equipment and supplies	13.00	13.00	13.00	13.00	13.00	65.00
Unallocated (incl. Small Farm Implements)	25.00	35.00	45.00	45.00	45.00	195.00
TOTALS	1,065.70	959.80	228.00	178.00	128.00	2,559.50

Table 4

BUDGET FOR TRAINING
(U.S. $000's)

TRAINING (DURATION/PARTICIPANT)	No. Part.	PROJECT YEAR -1-	-2-	-3-	-4-	-5-	Total
1. STUDY TOUR							
Seed Program/Improvement(3mos.)	10	24	24	24	24	24	120
Pest Management (2mos.)	10	20	20	20	20	20	100
Organization/Management	4	--	20	20	--	--	40
Soils/Fertilizer	4	24	--	24	--	--	48
Irrigation	8	28	28	28	28	--	112
Seed Farm Mgt. & Processing	8	53	--	53	--	--	106
Pest Management Tour	8	--	53	--	53	--	106
Total	52	149	145	169	125	44	632
2. M.Sc. DEGREE							
Seed Processing/Handling	4	25	50	62.5	62.5	50	250.0
Entomology	1	--	25	25	12.5	--	62.5
Weed Science	1	25	25	12.5	--	--	62.5
Vertebrates	1	25	25	12.5	--	--	62.5
Plant Pathology	1	--	25	25	12.5	--	62.5
Nematology	1	--	25	25	12.5	--	62.5
Production Agronomist	4	25	50	62.5	62.5	50	250.0
Soil Science	2	25	50	37.5	12.5	--	125.0
Irrigation/Water Mgt.	2	25	50	37.5	12.5	--	125.0
Agricultural Economics	2	--	25	50	37.5	12.5	125.0
Total M.Sc.	19	150	350	350	225	112.5	1,187.5
3. Ph.D. DEGREE							
Seed Processing/Production	2	25	50	50	33.25	8.25	166.50
Entomology	1	25	25	25	8.25	--	83.25
Plant Pathology	1	25	25	25	8.25	--	83.25
Plant Breeding	1	25	25	25	8.25	--	83.25
Total Ph.D.	5	100	125	125	58.00	8.25	416.25
4. IN-COUNTRY TRAINING							
Seed Appreciation/Awareness (4 dys)	30	.12	.12	.12	.12	.12	.60
Skills Development							
Drying, Process & Storage (2 wks)	15	.21	.21	.21	.21	.21	1.05
Quality Control (2 wks)	15	.21	.21	.21	.21	.21	1.05
Seed Producers (1 day)	50	.05	.05	.05	.05	.05	.25
Seed Technology (3 wks)	20	.42	.42	.42	.42	.42	2.10
Field Days (1 day)	100	.10	.10	.10	.10	.10	.50
Pesticide Handling (1 wk)	50	.875	--	.875	--	--	1.75
Crop Protection (1 mo)	50	3.75	--	3.75	--	--	7.50
Water Management (1 wk)	50	.875	--	.875	--	--	1.75
Fertilizer Management (1 wk)	50	.875	--	.875	--	--	1.75
Total IN-COUNTRY	430	7.485	1.11	7.485	1.11	1.11	18.30

Table 5

Projection of Project Expenditure by U.S. Fiscal Year 1/
(U.S. $000's)

Source	FY 87		FY 88		FY 89		FY 90		FY 91		Total	
	AID	SRUB	AID	SURB	AID	SRUB	AID	SRUB	AID	SRUB	AID	SRUB
Technical Assistance	330	12	795	18	660	15	510	10	180	5	2475	60
Training	401	35	625	54	648	58	412	35	168	13	2254	195
Equipment & Commodities	956	1240	4632	5372	4108	4662	4159	4687	4161	4702	18006	20663
Operations & Maintenance	--	167	--	912	--	986	--	607	--	335	--	3007
Contractor Support *	180	--	--	--	--	--	--	--	--	--	180	--
Evaluation	10	5	20	8	150	20	20	12	200	30	400	75
Contingency	189	--	597	--	552	--	506	--	463	--	2307	--
Inflation	105	--	685	--	964	--	1209	--	1415	--	4378	--
TOTALS	2161	1459	7354	6364	7082	5741	6816	5351	6587	5085	30000	24000

1/ As initial obligation is projected in the fourth quarter of FY 1986, first project year to realize expenditures is estimated as FY 1987 (project year 1)

* As Contractor Support Costs will be unilaterally obligated, a portion of accrued expenditures will be realized in FY 1986

B. Recurrent Costs

Fertilizer is the single largest recurrent cost item included within the proposed project. Burma will have to continue to import fertilizers, since it produces no phosphates or potash and its domestic production of urea is not adequate to meet internal requirements. Fertilizer use is absolutely necessary to increase productivity and maintain a dynamic agricultural sector.

The import of consumer goods constitutes only about 10 percent of total commodity imports of Burma, with edible oils and milk products being the two largest items. As is shown in the financial analysis section (Section VI B), the project will, by the end of its five-year life, make possible (due to the increase in production of oilseed) both an increase in domestic oil consumption and the elimination of edible oil imports, the great bulk of which is palm oil. This savings in FX plus the increase in oilseed cake is substantially larger than the annual AID fertilizer contribution under this project. Thus, the project will make it possible for Burma to finance its phosphate requirements to continue its program in oilseeds production.

Regarding the recurrent costs of the seed farms, the project paper stresses the development of a meaningful accounting system for management which will make it possible to identify and allocate costs. The project paper also stresses the institution of an O & M program on the seed farms. These two components should go a long way toward adequately addressing current costs at the seed farms.

We note that it would be very helpful to the SRUB if it would begin reducing some of the subsidies on fertilizer, in order to reduce the internal budgetary pressure to which these subsidies contribute. In this regard, we have included, as a project convenant, a requirement that the SRUB shall undertake a study of fertilizer pricing and supply and explore adjustments necessary to assure supplies adequate to meet long-term domestic needs. A decrease in subsidies would make it possible for the Government to better meet internal recurrent costs as well as development expenditures generally. A phased program to reduce fertilizer subsidies would very likely require adjustments in the prices of farm outputs.

C. Cost Rationale

Total Costs. Total project costs are estimated at $54.0 million. The total number of direct beneficiaries (members of project farm households plus incremental laborers hired by the project farm households) is estimated at a minimum of 2,000,000 persons, for total project costs of $27.00 per direct beneficiary. For AID's contribution, it amounts to $15.00 per person, an average of $3.00/year/person over the five-year project life. In addition, there will be many indirect beneficiaries, due for example, to the spread

effect. And the project benefits will certainly not end at the end of the project life. It seems clear that the project cost per beneficiary is quite low. And as is shown in the economic and financial analyses, the economic returns are quite high and the financial benefits to farmers are extremely attractive.

Training. There is probably no expenditure more worthwhile than that for training. The Burmese have suggested that more in-country training be offered. This is provided for in the PP. We believe that the recommended areas in participant training are the priority areas. We note that there is more emphasis on management training as a component of the course work.

Technical Assistance. Technical assistance can be one of AID's best investments; it can also be one of the worst. The Burmese have had too many unproductive, negative experiences with technical assistance from donors generally. AID/Burma and AID/W will need to be very selective in approving candidates. We believe the technical assistance needs are adequately covered in the PP.

Pest Management. The project includes a crop pest management component which will provide training, technical assistance, and some commodities, including a small amount of chemicals for demonstration and evaluation purposes in townships and at the seed farms. We note that Burma will use chemicals whether there is a pest management component or even whether there is a project. What the project will try to do is to improve the safety with which chemicals are used and to encourage the Burmese Government to phase out the use of unapproved chemicals. This will increase the financial cost, including FX, to the Burmese Government but will reduce the social cost.

Commodities. Most of the commodity cost is for fertilizer. It is difficult to find an investment with as high and quick a return as is achieved by the use of fertilizer. This is precisely the reason, as they have learned from experience, that the Burmese attach such importance to this component, and especially so given the country's extremely tight FX position.

The other major sub-category of commodities is for the seed farms. The shortage of quality improved planting seed is a significant constraint to growth in agricultural productivity and farm income. Under MOPP a decision was made to address this constraint by helping to develop four seed farms. This project will complete the work begun under MOPP.

Evaluations. For the expenditures shown under evaluation, the Burmese are as desirous as is AID to develop a system in order to monitor the impact of the project.

V. IMPLEMENTATION PLAN

A. Implementation Schedule

1. Pre-Obligation Actions. The project is designed with a five-year implementation period. It is expected that authorization by AID/W will take place not later than the end of December, 1985, leaving at least six months for AID/Burma to negotiate and sign the project agreement by the fourth quarter of FY 1986. Thus, the project's PACD would be September 30, 1991.

There are several actions that the AID/Burma will undertake between the dates of project authorization and obligation that will give the project a head start and expedite implementation. These will be routine actions that will involve no expenditures or commitments by AID. Such actions include but are not limited to the following:

a. Identification of trainee candidates: AID/Burma will work with the AC to begin the process of identifying, screening and selecting qualified candidates for long-term and short-term training positions;

b. Preparation of PIO/Ps for long-term training: this is particularly important if university level trainees are intended to begin with the start of the 1987 spring semester. The AID/Burma Office of Program and Training will prepare unfunded PIO/Ps and send them to the Office of International Training, AID/W, as soon as possible to permit placement of these candidates before the semester begins;

c. Agreement with the AC on the terms of reference (TOR) for the short-term and long-term Technical Assistance advisors;

d. Preparation of a request for technical proposals (RFTPs) for Technical Assistance Services: AID/Burma will seek the assistance of the ACO in Bangkok, Thailand to develop a RFTP for the procurement of technical services;

e. Preparation of a PIO/C for the initial procurement of 15,000 MT of TSP to be delivered in October, 1987;

f. Preparation of specifications for vehicles and other contractor support items ie., small appliances, furniture, carpets, refurbishing items such as electrical fixtures, piping, etc., and;

g. Preparation and prepositioning of PO's and other unilateral obligating instruments by AID/Burma, AID/Thailand and GSO/Singapore for contractor support items financed from funds outside of the Grant Agreement.

2. Calender of Major Events. Following is a table of major implementation events and the approximate time they will take place, using the date of project agreement signature as a reference:

Action	Timing (months)
Project Authorization	- 6
Pre-obligation actions and negotiations with SRUB	- 6 to 0
Project Agreement Signed	0
Condition Precedent Satisfied	+ 1
Issue PO's to unilaterally obligate funds outside Agreement	+ 1
Issue PIO/T for TA Services	+ 1
Issue PIO/T for PSA Services	+ 1
Issue PIO/P for long-term training	+ 1
Complete RFTP and Advertise in CBD for TA contract	+ 2
Issue PIO/C to SER/COM for first Fertilizer Procurement	+ 2
Issue PIO/T for IQC for baseline data collection	+ 3
SER/CM Negotiate/Award PSA Contract w/8(a) firm	+ 4
Receive proposals for TA Services	+ 5
Contract for First Fertilizer Procurement Completed	+ 5
Issue PIO/C to 8(a) PSA firm for commodities	+ 6
Complete Evaluation of TA proposals	+ 6
Travel of first group of long-term trainees (Spring 1987)	+ 6
Negotiate/Award/Sign TA contract	+ 8
Observation tours begin	+ 8 to +56
Arrival of TA Team	+11
Second group of long-term trainees depart Fall Semester (87)	+11
Begin processing of short-term training	+12
First Procurement of Fertilizer Arrives	+13
Issue PIO/C to SER/COM for second Fertilizer Procurement	+14
Short-term training	+14 to +56
Short-term TA services begin	+14 to +54
Third group of long-term trainees departs (Spring, 1988)	+16
Contract for second Fertilizer Procurement completed	+17
Arrival of commodities	+17 to +20
Final group of long term trainees depart for (Fall 1988)	+23
Second Procurement of Fertilizer Arrives	+25
Mid-Project Evaluation Commences (second annual evaluation)	+26
Issue PIO/C to SER/COM for Third Procurement of Fertilizer	+26
All Party Review of Evaluation (possible adjustments made)	+28
Contract for third Fertilizer Procurement completed	+29
Third Procurement of Fertilizer Arrives	+36
Issue PIO/C to SER/COM for Final Procurement of Fertilizer	+37
Contract for final Fertilizer Procurement completed	+40
Final Procurement of Fertilizer Arrives	+47
Close out procedures initiated	+48
All long-term trainees complete training	+54
Technical Assistance contract completed	+54
Final Impact Project Evaluation Commences	+55
PACD	+60

B. PROJECT MANAGEMENT

1. Overview. The three major participants in project implementation and monitoring, AID/Burma, the AC, and the TA consultants, will coordinate closely at all stages of the project. Collaboration will be essential because each will have a related role to play as dictated by the agreements and contracts that govern their relationships. Therefore, a coordinating mechanism, such as regular meetings to assess progress, identify and relieve constraints, will be adopted.

Within this collaborative framework, the roles of the three major participants are discussed below.

2. AID/Burma Responsibilities. AID/Burma is a relatively small AID office with seven USDH staff. AID/Burma will assign the Agricultural Development Officer (ADO) as the project officer. He/she will assist the SRUB in project implementation, oversee project monitoring, work closely with counterparts in the AC and be the main contact point between the AID/Burma and the AC. The ADO will assist in developing a detailed project implementation plan and will monitor project progress based on that plan. He/she will be assisted by the AID/Burma Project Development Officer, the Assistant Agriculture Development Officer (A/ADO) as well as regional personnel.

The ADO will carry out all pre-obligation actions, will work to see that conditions precedent are met and will get procurement and training plans expedited. He/she will work closely with the AC in identifying and screening candidates for training. The ADO will liaize with the technical assistance team and will be responsible for internal project progress reports.

3. Regional and AID/W Assistance. Project implementation, particularly initial implementation actions, will depend greatly on assistance to be provided by the Regional Legal Advisor (RLA), the Area Contracting Officer (ACO), the Controller's Office (O/FIN) and the Regional Commodity Management Officer (RCMO). The RLA is located in Colombo and the ACO, O/FIN and RCMO are located in Bangkok. They will provide timely assistance in their areas of responsibility.

Additionally, AID/Burma may require the services of personnel in the areas of training, preparation and development of specifications, etc. These services will be provided directly either by AID/W or through IQC services.

To the extent possible, the project will use the services of a number of the centrally funded S&T projects, in particular the those dealing with seed and pest management as well as in agroforestry and perhaps water management.

4. Host Country Role. Primary coordinating and budgetary responsibility for the project will be with the Ministry of Planning and Finance and in particular with the Director-General of the Foreign Economic Relations Department. Overall responsibility for managing and implementing the project will rest with the AC of the Ministry of Agriculture and Forests.

The AC, like many other corporations of the SRUB is differentiated from departments because of certain parastatal-like, income-generating functions which distinguish them from the more straight-line departmental entities. The AC is a large and complex organization, national in scope, with ten separate divisions, offices in most rural townships, and some 20,000 staff members. It is involved in most aspects of the Burmese Government's agriculture development program, including such diverse functions as export of commodities and land use planning. It operates under the direction of a Managing Director appointed by the Minister of Agriculture and Forests and approved by the Council of State. Each of its divisions is headed by a General Manager or Deputy General Manager.

For BAPP, SRUB management will lie with the Managing Director of the AC who will be directly responsible for the implementation of the project and for coordination with other departments and corporations within the Ministry as well as with other SRUB ministries.

A project management team will be formed within the AC which will consist of a full-time Project manager and technical staff augmented by staff of the Planning and Statistics Division. Each AID-financed technical consultant will work with full-time technical counterparts in offices provided and maintained by the AC.

5. The Technical Assistance Team. The TA team will play a crucial role in implementing the project. They will share offices provided by the AC with counterparts and will work closely with them on a day-to-day basis. Potentially, they will be able to provide a great deal of support which should impact positively on the project. Therefore, they must be carefully selected to ensure that they are experts who also have familiarity with working conditions in developing countries.

C. Contracting and Procurement Plan

1. General. There will be several procurement actions to be undertaken in connection with this proposed project. There will be procurement of technical assistance, procurement services, fertilizer, required commodities and training.

2. Technical Assistance. All project technical assistance (long-term and short-term), will be procured under one direct AID contract to be signed with a firm or institution (or a joint venture of firms and/or institutions) of U.S. source and origin. This

approach would provide continuity to the project process and minimize AID/Burma staff time required for contract administration responsibilities. Such a contracting mode does not exclude an 8(a) firm from participating under the program. It may be possible to identify early in the contracting process an element, which could be contracted to a qualified 8(a) firm. This aspect should be encouraged as the contracting process progresses. The host country contracting mode was considered but thought to be not practical for this particular project. The SRUB, in preliminary discussions, has agreed to a direct contracting mode.

Procurement of the TA contract will follow standard AID competitive contracting procedures (i.e. publication of notice in the CBD, issuance of RFTP, evaluation of proposals, selection, negotiations and contract execution). All contracting actions will be undertaken by the Area Contracting Officer in Bangkok with the advice and assistance of AID/Burma. AID/W offices, ANE/PD and M/SER/AAM/OS in particular, will assist as may be requested by AID/Burma and the ACO.

The AC has agreed to provide the TA team with office space, office equipment, supplies, secretarial and administrative support, fuel, driver and in-country travel expenses. Housing for technical assistance will be financed under the project as an AID contribution. AID/Burma will be responsible for leasing housing for the two long-term contractors and renovating it to a minimally acceptable standard prior to the arrival of contract personnel. Further expenditures for maintenance and repair of housing will be borne by the contractor. The long delays in obtaining quality furniture and other contractor support items from the Burmese Timber Corporation has been an impediment to implementing existing projects in Burma. As an alternative, AID/Burma has agreed to finance from funds outside the Grant Agreement furniture and other contractor support items under the project to be procured by and titled to AID/Burma. AID/Burma is already importing appliances and other household furnishings for contractors under other AID-financed projects.

Vehicles for personal use by U.S. technicians will be financed from funds outside of the Project Grant Agreement and imported and registered by AID/Burma. Because the importation of privately-owned vehicles means long delays and extremely high customs duties and other import charges, which are assessible to the SRUB implementing agency, U.S. contracted technicians will not be allowed to ship their own vehicles. Therefore, the project will provide vehicles for both business and private use.

3. Procurement Services Agent. Given the expected types of equipment and commodities (excluding fertilizer) required under the project, the contract for procurement services under the project has been designated as an 8(a) opportunity. As such, it is recommended that

the procurement of the PSA contract follow informal competitive procedures where a reasonable number of capable and experienced 8(a)-designated firms compete for the contract. AID/Burma will prepare and issue the PIO/T for contracting by AID/W (SER/CM) with the Small Business Administration.

4. Commodities. Commodities, with the exception of fertilizer and contractor support items, will be procured by the PSA. Required equipment will be identified by BAPP and the TA team. AID/Burma will prepare the PIO/C's. After review and signing, the PIO/C's will be sent to the PSA for procurement action. The PSA will procure the goods, arrange for shipment/insurance and inform BAPP and AID/Burma of the status of all procurements on a monthly basis. The PSA will follow host country procedures in procuring the equipment.

5. Fertilizer. Fertilizer procurement will be undertaken with the assistance of SER/COM in Washington. PIO/C's will be prepared by AID/Burma and forwarded to SER/COM for action. As fertilizer cannot be procured during the months January through June, all fertilizer procurements contemplated under the project (four procurements of 15,000 MT each) shall be executed in the fourth quarter of each calendar year.

6. Training. It is envisioned that training under the project will be coordinated through the Office of International Training, AID/Washington. Some training may be arranged and administered through S&T Bureau's centrally funded projects as well as through the USDA OICD office as appropriate.

7. Assessment of Methods of Financing. It is anticipated that all contracts originating under this project will follow a direct AID contracting mode. The financing method envisioned for a contract for technical assistance will be a direct letter of commitment (direct L/COMM) issued by the Office of the Controller, Bangkok, Thailand. In the case of the contract for procurement services, the preferred method of financing the commodities will be a bank letter of commitment (bank L/COMM), due to the number of commodity items. The actual procurement services will be financed by a direct letter of commitment (direct L/COMM) issued by the Controller, Bangkok, Thailand. Fertilizer procurements will be financed by a direct letter of commitment (direct L/COMM) issued by AID/Washington. The financing method recommended for evaluation services under the project is direct payment utilizing either an IQC or PSC arrangement. Contractor support items, which will be funded from project funds outside of the Grant Agreement, will be financed by direct payments. To finance long-term and short-term participant training, it is recommended that standard S&T/IT procedures be used.

The following chart illustrates the methods of financing available under the project.

METHODS OF FINANCING CHART
($000's)

Method of Implementation	Method of Financing	APPROXIMATE AMOUNT
TA, direct contract	Direct L/COMM	2,475
Commodities, direct contracts	Bank L/COMM	2,987 1/
Procurement Services	Direct L/COMM	250
Fertilizer, direct contracts	Direct L/COMM	20,208 1/
Evaluation, PSC's or IQC's	Direct Payment	400
Training, direct contracts	Direct Transfer	2,254
Contractor Support Items, direct contract(s)	Direct Payment	180
TOTAL		28,754

1/ includes contingency and inflation factor over LOP

8. Audits. Responsibility for audits for all programs of the Burmese Government lies with the Central Accounts Office of the Council of the People's Inspectors. Representatives of this office are assigned to monitor financial and procurement activites of major Departments and Corporations of Burma. The SRUB is ready to cooperate in any audit activity under this project with the Inspector General's Office in Manilla (RIG/Manilla). There is no indication at this time that this project will require special audit coverage.

D. Training Plan

AID/Burma has included as much participant training in the project as it can reasonably expect given the number of qualified candidates available. One of the important constraints is the lack of candidates who are proficient in the English language. Thus, on the participant training qualifying examinations, a much larger proportion passes the technical component than passes the language component. To mitigate this constraint, efforts will be made to identify likely candidates,

prior to official selection, and encourage them to enroll in English courses so that, if they are selected to take the qualifying examination, they will have a better chance of passing.

Table 6 shows the number of participants, the areas and duration of training, costs, and schedules.

1. Long-term training. A total of 24 participants are proposed for long-term, degree training--5 to the Ph.D. level and 19 to the M.Sc. level.

2. Short-term training. A total of 52 participants are proposed for short-term training.

3. In-country training. In-country training is proposed for 430 Burmese in courses ranging from one day to one month. It is anticipated that other in-country training courses will be conducted as the need and opportunity arise. Some may be provided by TA personnel that are in-country, or by returning participants. Provision has been made to provide materials/supplies for such courses.

Table 6

SUMMARY OF TRAINING PROGRAMS

ACTIVITY PARTICIPANT TRAINING	DURATION MONTHS	PARTICIPANT NUMBERS	COST (US$ EACH)	PROJECT YEAR 1	2	3	4	5	TOTAL COST (US$)
1. Degree Training									
Seed Processing, Handling and Production (MS)	30	4	25,000/yr	1	1	1	1		250,000
(PhD)	40	2	25,000/yr	1	1				166,500
Entomology (MS)	30	1	25,000/yr	1					62,500
(PhD)	40	1	25,000/yr	1					83,250
Weed Science (MS)	30	1	25,000/yr	1					62,500
Vertebrates (MS)	30	1	25,000/yr	1					62,500
Plant Pathology (MS)	30	1	25,000/yr		1				62,500
(PhD)	40	1	25,000/yr	1					83,250
Nematology (MS)	30	1	25.000/yr		1				62,500
Soil Scientist (MS)	30	2	25,000/yr	1	1				125,000
Production Agronomist (MS)	30	4	25,000/yr	1	1	1	1		250,000
Irrigation and Water Management (MS)	30	2	25,000/yr	1	1				125,000
Plant Breeding (PhD)	40	1	25,000/yr	1	1				83,250
Agricultural Economic (MS)	30	2	25,00/yr	1	1				125,000
				Total					1,603,750

Table 6 (con'd)

ACTIVITY PARTICIPANT TRAINING	DURATION MONTHS	PARTICIPANT NUMBERS	COST (US$ EACH)	PROJECT YEAR 1	2	3	4	5	TOTAL COST (US$)
2. Study Tour									
Seed Programs and Improvement TC-130-3	3	10	12,000/yr	2	2	2	2	2	120,000
International Pest Management TC-130-8	2	10	10,000/yr	2	2	2	2	2	100,000
Organizational and Management Development TC-140-14	2	4	10,000/yr		2	2			40,000
Soil Testing and Fertilizer Management TC-120-5	2	4	12,000/yr	2		2			49,000
Irrigation Problems and Practices TC-120-1	2.5	8	14,000/yr	2	2	2	2		112,000
Seed Farm Management and Processing	1.0	8	6,625/yr	1		1			106,000
Pest Management Tour	1.0	8	6,625/yr		1		1		106,000
				Total					632,000

Table 6 (con'd)

ACTIVITY PARTICIPANT TRAINING	DURATION MONTHS	PARTICIPANT NUMBERS	COST (US$ EACH)	PROJECT YEAR 1	2	3	4	5	TOTAL COST (US$)
3. In-Country Training									
Seed Appreciation/ Awareness	4 days	30	20	1	1	1	1	1	600
Skills Development									
- Drying, Processing, Storage	2 wks	15	70	1	1	1	1	1	1,050
- Quality Control	2 wks	15	70	1	1	1	1	1	1,050
- Seed Producers	1 Day	50	5	2	2	2	2	2	250
Seed Technology- (MSU)	3 wks	20	105	1	1	1	1	1	2,100
Field Days	1 Day	100	5	2	2	2	2	2	500
Pesticide Handling	1 wk	50	35	1		1			1,750
Crop Protection	1 mo	50	150	1		1			7,500
Water Management	1 wk	50	35	1	1				1,750
Fertilizer Management	1 wk	50	35	1	1	1			1,750
				Total					18,300
			GRAND TOTAL						2,254,050

VI. PROJECT ANALYSIS

A. Economic Analysis

1. Overview. Estimates of economic farmgate parity prices, based on border prices, were used to value tradeable farm inputs and outputs--import parity prices for fertilizer, pesticides, and oilseeds and export for rice and pulses, initially at the "official" exchange rate (OER). Prices are denominated in local currency. Relative prices are assumed to be constant and constant 1985 prices are used.

There is little agreement on the value that should be used with respect to an overall shadow exchange rate (SER) or standard conversion factor. The range being used is wide--from 1.25 to 3.0 times the OER. While the former is being used in a substantial amount of analysis, a number of authorities consider this to be extremely low. It has been suggested that an average of the OER and the "free" market rate would provide a reasonable approximation. This gives a SER of about K19/$ (8.5 + 29)/2, or 2.2(OER). However, sensitivity analysis suggests that the economic returns to this project are rather insensitive to relatively large changes in the SER. Thus, the B/C ratio when using a SER of (OER)1.25 is 2.7 and 3.0 when using (OER)2.2. A discount rate of 12% is used. For this project anyway, it appears that the determination of the "true" SER is not important in the determination of the economic profitability of the project.

For some of the project inputs to be supplied by the SRUB (land development, construction, vehicles, other equipment), estimates of the indirectly traded portion were made and that portion valued in (adjusted) border prices. SRUB project personnel were valued at 1.3 times the financial cost. Hired farm labor was valued slightly below what appears to be the current market price and household labor slightly less than that.

All measurable direct benefits are attributed to incremental production of crops from yield and area increases. And the costs directly attributable to producing this extra output swamp the other costs. Of the direct production costs, fertilizer is by far the largest, followed by labor, with pesticides being a very distant third.

AID is not expected to provide any fertilizer under the project during the first year of the project life, and no benefits are attributed to the project during that year. Nor are any farm production costs assigned to it in the first year. However, the full costs of all training, TA, commodities, equipment, construction, and SRUB personnel were charged to the project. No credit was allowed, at the end of the project, for the remaining value of equipment, construction, and land development.

Benefit cost ratios were used as the measure of economic profitability. While the economic internal rate of return is very high, it has little meaning due to the nature of the net benefit

flows. Calculation of the B/C ratios is shown in Table E1. Tables E2 through E12, located within Annex E, provide the back-up data.

2. Sensitivity Analysis. As noted, the economic returns to the project appear rather insensitive to the level of the SER. The remaining sensitivity analyses were performed using SER I (i.e., (OER)1.25). Increasing project costs by 25% and by 50% reduces the B/C ratio to 2.1 and 1.8, respectively. Increasing project costs and decreasing project benefits each by 25% reduces the B/C ratio to 1.6. And reductions in project benefits of 25% and 50% reduces the B/C ratio to 2.0 and 1.3, respectively. The results of the sensitivity analysis are summarized below.

Sensitivity Analysis

		B/C Ratio
Base		2.7
Increase in SER from 1.25(OER) to 2.2(OER)		3.0
Increase in project costs of:	25%	2.1
	50%	1.8
Increase in project costs and benefits, each by	25%	1.6
Decrease in project benefits by:	25%	2.0
	50%	1.3

3. Risks. Past experience under MOPP strongly suggests that the area targeted for planting of oilseed crops will be achieved. Also, the projected yield increases under the project are based on the experience under MOPP, and both AID/Burma and AC officials are comfortable with the projections. Perhaps the greatest project risk is the possibility of insect/disease infestation. In part, because of this potential, the project is designed to develop a pest monitoring program for early detection of such infestation. While, given Burma's very scarce FX, in-country stocks of pesticides will always be low, we believe the risk is manageable.

There will not be enough quality, improved seed to go around, and the shortage of diesel will limit the pumping of irrigation water. Some of the planned winter season acreage of oilseed crops will follow other crops. In some cases, an initial irrigation will be needed for seed germination and early root development, in order to utilize the residual moisture. However, the seed and fuel shortages will impact only marginally on the project and will not jeopardize its success. The availability of quality seed will improve over time. Past experience also indicates that the SRUB will provide the targetted quantities of urea and experience under MOP indicates and that the technology package, along with the technical advice on its use, will be delivered to farmers and that farmers will respond. We see no serious risks that would jeopardize the success of the project.

It should be noted that in addition to the direct benefits, there will be indirect benefits which are not included in the economic analysis. There will be a spread effect, as is evidenced by, e.g., the sunflowers that farmers near seed farms have started producing. While non-project farmers will not have access to fertilizer and pesticides, the spread effect could nonetheless be really sizeable, producing significant benefits.

B. Financial Analysis

Direct project benefits will accrue to an estimated 319,012 farm households located in 42 different townships in 8 Divisions/States in Burma. The direct net benefits to project farms are sizeable, totalling an estimated K1,634 million over the project life (See Table E13). This amounts to an average of K5,120 ($602 at K8.5/$) for the 319,012 participating households. The project will also generate employment income for farm laborers estimated to total K105 million ($12.4 million) over the project life.

Discounted at 12%, the NPV of the total net benefit stream is K1,223 million. This includes no costs for additional household labor due to the project, and represents the return to farmers on their investment and labor. The benefit/cost ratio is a very high 7.4 to 1 (see Table E13).

Over the project life, it is estimated that the project will generate additional employment for project farm family labor of 8,847 thousand person days. While this appears to be a large number, it amounts to an average of 27.73 person days per participating farm over 4 years. The corresponding estimate for hired labor is 11,670 thousand person days, an average of 36.7 person days per farm or 9.2 person days per farm per year. The cost of the hired labor is estimated at K105 million; and the imputed cost of the farm household labor, K64 million.

The benefits arise mainly from increased per acre yields due to the utilization by project farmers of the technology package that the project will provide, and improved cultural practices due to the technical advice (extension) on how to use the package. There will also be some expansion in acreage, over what there would be without the project, for sesame, sunflower and niger, but not for groundnut. The estimates of yield increases due to project are based mainly on the experience under MOPP. In all cases, it was assumed that there would be some growth in yields without the project. The estimates for growth in area are based on the existing cropping patterns in the project townships. This growth is not expected to displace other crops, as there is substantial idle land during the winter season, especially in Irrawaddy Division where much of the expansion in area is expected to occur.

In addition to the increased yield and area of the crops to which the technology package is directly applied, there will be increased yields in the immediately following crops, due to the residual

phosphate, potash and nitrogen from applications to target crops. There will also be some nitrogen build-up from the (inoculated) legumes (groundnut) and likely better tilth. The gross benefits from these residuals, which we include as direct benefits, are estimated to account for about 12% of the gross direct project benefits over the project life. The incremental cost of these benefits is quite low, largely accounted for by the extra cost of harvesting the additional production.

Farm production costs are based on farm budgets with and without the project (see Tables E18 through E21). All input and output prices are stated in terms of constant 1985 farmgate financial prices. On the basis of our information, the increase in net income from the cultivation of sunflower under the proposed project is substantially greater than for the other three oilseeds. This may be explained in large part by the fact that sunflower is a relatively new crop in Burma and there is less farmer experience in adapting cultural practices for higher yields. The increase in net income from the cultivation of sesame follows sunflower. Groundnut is next with niger the lowest.

The market for oilseeds and associated crops is relatively free. On the basis of our estimates, the price that farmers receive for oilseeds is fairly close to the economic import farmgate parity price when using a SER of (OER) 1.25:

Outputs /Inputs Output	Prices Received/paid by farmers (K/bsk)	Economic Import Farmgate Parity Price		
		OER	SER I*	SER II**
--Groundnut	60	45	55	95
--Sesame	175	178	222	379
--Sunflower	65	53	66	110
--Niger	105	92	115	202
Fertilizer (k/mt)				
--Urea	360	2584	3128	5195
--TSP	1240	2355	2844	4699
--MOP	600	1743	2079	3352

*(OER) 1.25; **(OER) 2.2

As has been noted elsewhere, farm inputs, especially fertilizers, are heavily subsidized. If the farmer price of TSP fertilizer were doubled; the price of urea tripled; and the price of MOP priced at 2.5 times its current level, this would increase the farm production costs of the crops produced under this project by an estimated 57%.

However, with output prices unchanged, the B/C ratio would still be a very attractive 4.9 to 1. Such price increases would, according to some studies, practically eliminate the fertilizer subsidy.

Projected additional production of oilseeds due to project in 1990/91 is as follows:

	Conversion Factors			MTs Production	
	MT	Oil	Cake	Oil	Cake
Groundnut	18,076	.158	.258	2,856	4,664
Sesame	26,944	.285	.465	7,679	12,529
Sunflower	53,648	.224	.522	12,017	28,004
Niger	2,667	.285	.465	760	1,240
Total				23,312	

Using the conversion factors shown, the increase in edible oil production amounts to a total of 23,312 MT in 1990/91. This is 280% more oil than recent imports have averaged (6,105 MT over the last three years). In 1984/85, 6,070 MT were imported at an average CIF (Rangoon) cost of $792/MT, for a total cost of $4,810,000. At this price, the extra edible oil production due to project would be valued at $18,460,000. However, the increased production amounts to only 0.55 kg/capita for the estimated total population in 1990/91.

In addition to the edible oil, a substantial amount of oilseed cake will be produced. According to data provided, the FOB (Rangoon) price of groundnut cake exported in 1984/85 was $197/MT and $195/MT for sesame. At these prices, if exported the incremental production of groundnut cake projected for 1989/90 would earn $920,000 and sesame, $2,440,000, a total of $3,360,000 of foreign exchange. By eliminating imports of oil and exporting the incremental sesame and groundnut cake, the foreign exchange savings/earnings would clearly be adequate to cover the cost of the TSP that the US will be providing under the project, in order for the Burmese Government to continue its oilseeds production program. The sunflower cake would very likely all be consumed locally, since its protein content is lower and presents a shipping problem. Attaching a value of 1/2 of that of sesame/groundnut cake ($98/MT) the value of the incremental sunflower cake would be $2,740,000.

C. Social Soundness Analysis

1. Introduction. Although there are a number of socio-cultural issues which should be addressed during the implementation of the BAPP, there do not appear to be serious impediments to the successful implementation of the project. This section briefly describes the agriculture sector, the socio-cultural characteristics of the targetted population, the possible positive and negative consequences of BAPP implementation on this population, and the potential spread effect of the project. It concludes with a list of recommendations regarding project implementation.

2. The Agriculture Sector. Burma is basically an agrarian society with 97% of the total number of farms accounting for 85% of total farm acreage, and the average farm size is 7.5 acres. These smallholdings are worked by some 4.1 million farm families. Of these families, it is estimated that 75% are actual landholders and 25% work as hired farm laborers. With an average farm family size of 5.6 persons, these smallholdings account for approximately 23 million of Burma's estimated 38 million population.

Rice is the principal crop raised on the farms, but this is complimented by oilseed crops such as groundnuts, sunflower, sesemum and niger, and by sorghum, maize, wheat, sugar cane, legumes (pulses), vegetables and fruit trees. Livestock is raised as a source of draft power and dairy products, and farmers will also raise chickens, ducks, pigs, goats and sheep. Fish is also an important component in Burmese diets. It might be noted, however, that the Buddhist religion frowns on slaughtering animals, so these diets are frequently low in animal protein.

Although Burma is basically self-sufficient in food production, it must import some products such as coffee and wheat and, most importantly, vegetable oil. This latter product is the second most important food in the national diet, with present consumption at 5 kg/capita.

While offering few details here, it is important to note that, politically, the government is under the control of the Burma Socialist Programme Party (BSPP) which was founded by the military as a political instrument after it seized power in a coup in 1962. The BSPP's goal has been to establish a socialist democratic state and, to this end, it has assumed ownership of all natural resources, including land, and nationalized most of the non-agricultural means of production.

Private enterprises are allowed if they do not undermine the stated socialist economy. This is most notable in the agricultural sector where the peasant smallholders continue to produce over 95% of the total value of farm crops, the remainder being produced on cooperative and collective farms.

Of importance here, the BSPP political organization, which remains closely linked to the military, is hierarchical and highly structured. Thus, the country is divided into seven central Divisions which have the major concentrations of ethnic Burmans who share social, cultural, and linguistic traditions. There are also seven States which are defined by the major ethnolinguistic majorities for which they are named. For the most part, the States are located on the periphery of the core Divisions.

The seven Divisions and seven States are further divided into 314 townships which are again divided into village-tracts in the rural areas and wards in the urban areas. There are 289 rural townships (42

of which are targetted for BAPP) and 25 urban townships. Each level has an elected people's council and, in hierarchical fashion, all local governing bodies are ultimately accountable to the People's Assembly in Rangoon. Paralleling these political divisions are BSPP cadres who both work with and report upon the locally elected organizations (i.e. state/division, township and village-tract Party Units). Most Burmese also belong to various mass organizations such as the Lanzin Youth Central Organizing Committee, the Worker's Asiayone (Association) and Peasant's Asiayone. For the latter, there are state/division, township, village-tract, and village units of the Peasant's Asiayone.

In the agricultural sector, there is an Agriculture Corporation (AC) appointed, BSPP-approved, state/division manager who is in charge of agricultural production in the respective township based on crops and quotas established by the central government. Each township also has an AC township manager and most townships also have a number of AC-established "production camps" which serve several village tracts. These are staffed by AC extension workers and are distribution points for farm inputs, including improved seeds (developed at the Agriculture Research Institute at Yezin or at one of several AC operated seed farms), fertilizer, pesticides and information. The goal is to have every farmer within several miles of one of the production camps, and thus near to the available extension services.

As can be seen, this structured organization provides the government with a strong mechanism to implement its policies regarding various aspects of agricultural production (such as determining specific crops for specific geographical areas and setting production quotas for those crops), and there is every indication that this organizational pattern will enable the BAPP to accomplish its goal of increasing oilseed production, and thereby raising farm incomes, reducing un- and underemployment, and improving the nutritional standard of the general Burmese diet.

3. The Socio-Cultural Context: Village Structure. As noted above, each village tract is composed of a number of villages which are considered as a unit for administrative purposes, but each has a distinct social and geographical identity. Each village consists of a cluster of dwellings which are surrounded by the village's farm lands.

An average village may consist of 175-200 houses, a monastery and a monastic school (Pongyi Kyaung), a government primary school and, perhaps, a health clinic.

A majority of the houses are single dwelling units containing a nuclear family of mother, father, and unmarried sons and daughters. They are generally built with some combination of wood, bamboo, thatch and zinc and they tend to be single story and self-owned and built. The houses are built on wooden house posts, with wooden or bamboo floors, to protect the floors from the monsoon rains. The area

beneath the houses serves as a storage space and/or a cool sitting place during the dry season. The houses tend to be uncluttered since ostentatious displays are frowned upon and since the income levels prohibit large and/or unnecessary purchases.

Each has its own compound which is fully or partially enclosed. However, these compounds may contain one or two other houses which are likely to be occupied by married children, and their respective families. The village housing area is dotted with numerous varieties of trees which provide shade during the hot season. Easy access to any part of the village is made possible by a system of internal paths. A road may link the village to a major highway, but few, if any, villagers will possess motorized vehicles. The road will be used if agricultural or consumer goods are being brought into or out of the village, usually by ox-cart or tricycle, if government officials are visiting, and so forth.

Male and female villagers may leave their community during a given month to travel to nearby market centers, to attend religious ceremonies in neighboring areas, or perhaps to engage in seasonal wage labor in labor short areas. Children of school age may leave on a daily basis to attend their classes. Apparently, few people leave for social purposes since each village considers itself a separate social entity and, in general, social intercourse is restricted to relatives and neighbors in one's own village. Much of the social activity centers around religious events at the pongyi kyaung.

In addition to the farmers who live in a given village, the members of the local monastery/pagoda and the teachers and other government officials who may be present, the village may also have other occupational specialists. These might include carpenters, a blacksmith, a native doctor, and petty traders who operate the small food and dry goods stores. For the most part, there are few occupational specialists in the villages, however, since the populations are not great enough to support them. Additionally, most males and females of the same ages are capable of doing what their age and sex defines as their tasks -- again, indicating the general homogeneity of the villages. Larger villages may have a butcher, drawn from the small muslim population of Burma, since this is one task that Burman Buddhists are not supposed to undertake.

4. Marriage pattern. While polygamy is permitted under Burmese Buddhist custom, it is rare. Most marriages are monogamous and the preference is for both the man and the woman to be at least in their twenties. Spouses are normally found within the same or a neighboring village, and marriages are no longer arranged for economic reasons. Divorce is both legal and simple, but apparently it is relatively rare.

Traditionally, Burmans practiced a matrilocal post-marital residence pattern such that married daughters moved into close proximity to their parents, often with their houses located in the same compound as their parents. This system provided the women with a

shared labor pool for both agricultural tasks and for child-rearing. For some reason, the patterns seems to be shifting to a patrilocal residency such that married sons are moving into their parent's compounds. Interestingly, this change is also noticable in Thailand where it seems to be related to both land reform programs and to a great reduction in the availability of land for agricultural purposes -- characteristics also found in the Burma context. In any event, since marriage mates are most often drawn from the same village, women can maintain most of their social ties since they are still in proximity to each other.

Children are both expected and desired in Burmese families. In part, children are desired because of the contribution they can make to the farm and the household, and for the security they can provide parents in the latter's old age. But, it is also recognized that too many children can be a burden, so the average number of children is 3.8 household. Various forms of fertility control are practiced, including child spacing, contraceptives, and abortion.

5. Inheritance. Traditionally, in Burmese society, inheritance has been bilateral such that all offspring share in the material goods jointly accquired by the parents. Of particular interest is the fact that inheritance occurs in a descending rather than a lateral or ascending line. This inheritance principal is derived from Buddhism but it has the effect of ensuring that property (such as land and other scarce resources) will not be accumulated by individuals within a single generation. Thus, it helps to maintain an equality among the members of a given community.

In both traditional and modern Burmese society, upon the death of both parents, a son generally inherits the farmland. Obviously, the continual sub-dividing of the land would result in parcels too small to be economically viable. Even today, Burmese note that the ideal solution is to have three sons: one to inherit the land, one to become a monk (who can bring merit to the parents as well as to himself), and one to join the army and/or to obtain a government job via the route of formal education.

It might be noted that preserving property within a family is a traditional custom. Thus, before property can be alienated (i.e. sold to non-family members), there is a custom of pre-emption, both traditionally and in the present. Under this custom, a co-heir has the right of option to buy the share in undivided inherited property of another co-heir who wishes to sell. The right is that of being preferred to a stranger, the right of first refusal. This custom has had the effect of maintaining familial homogeneity in Burmese villages over generations.

6. Social Status and Mobility. Burman society has long been characterized as an economically egalitarian society, at least in terms of its rural population of small subsistance/cash crop farmers. In part this is because it is difficult to gain wealth through

agricultural labor expended on smallholdings, and smallholdings have been the norm for most of Burman history (including the present, following government-imposed land reform acts). In any event, what wealth was accumulated beyond that of neighbors frequently was and is expended on contributions to the monks and pagodas, which gains both merit and prestige for the giver.

Despite their early and long contact with India, Burmans never adopted a caste system. The rejection of caste seems to have been dependent on the Buddhist belief in rebirth since one could never be sure as to which economic or caste level one would be occupying in the next life. The basic equality of adults, including women, reinforces the caste-less nature of Burman society.

Classes have existed for long periods of time but, with the exceptions of the times they were colonized, the Burmans really could only distinguish the elite and the masses in an economic sense. The elite centered around the various monarchs, their administrators, advisors and soldiers. The masses, rural or urban, were basically indistinguishable.

This may be slowly changing, however. In part this is so since land reform did not provide land to all of the peasants and therefore there are land vs. landless distinctions. Among the landed, moreover, there are distinctions between what are termed "progressive farmers" and the rest. The former have, for whatever reasons, better and more land, and a greater access and receptivity to such agricultural inputs as fertilizer, improved seeds, pesticides, and extension. These farmers therefore grow more food and have higher farm incomes then their non-progressive, landholding counterparts. These differences show in slightly improved housing conditions (i.e. more wood in the structures which also frequently have zinc rather than thatch roofs) and probably improved family health, improved educational opportunities for their children, and greater contributions to various Buddhist causes.

Despite these differences, at the present time, the rural peasants still demonstrate a great homogeneity in their physical possessions and in their daily routines.Nevertheless, in time, these differences may bring about a more class-type of rural society. With more small and medium enterprises developing in Burma's urban areas, and with an expanding bureaucratic and professional class, there is, of course, a growing middle class at the present time in any event.

In a prestige or respect sense, however, there have always been certain individuals who are separated from the larger population. These have been the monks and nuns, the village headman and the village elders (now the village people's council) and, depending on time and place, military officers, teachers, medical personnel, university graduates, writers, artists, and bureaucrats.

The monks, village headmen and elders, of course, are rarely distinct from the rest of the rural population in an economic sense, but they have tremendous respect and, by extension, power: the monks because of their devotion to the Buddhist faith; the others because their age demanded reverance (in the past, it was not unusual to have rather young headmen, male or female, who in fact were basically spokespersons for the village elders, who made the actual decisions, and who maintained contact with the outside world as a representative of the village).

Education has always held respect for the Burmans. This is again related to Buddhism in terms of the learning of the Pali scriptures and the teachings of the monks. Thus, teachers, professionals (especially doctors), writers, and university graduates, as maximizers of the formal educational process, were and are held in high esteem. Intererestingly, bureaucrats seem to obtain esteem because of their educational levels and they can obtain considerable status if they control a successful project. Bureaucrats who, however, simply make or enforce rules may have low status.

As noted elsewhere, goverment officials and the military leaders in modern Burma are closely linked, and they share in some degree of esteem by Burmans as leaders of the country as it joins the world community and as defenders of Burmese independence. Nevertheless, in terms of Burma's political and military leaders, and in terms of its bureaucrats, it is useful to realize that, in Burmese society, there were and are:

> millions of cagey, individualistic farmers but very few classic peasants waiting for the signal to string up the landlord on a banyan tree. Wary farmers in their villages -- descendants of survivors of the rapacity of the Burmese kings -- care about the economic policies, not the rhetoric, emanating from Rangoon. Artificially low prices (because a farmer was required to sell to the government) were just taxes in disguise. Mass support was there fore scarce until the government had its "miracle" rice to distribute. Volunteer army units helping with the harvests are to a farmer just so many inspectors to reduce his illegal private sales. Village farm wisdom has never before seen the central government as anything but a dangerous force that takes more than it returns. Land reform and loans have been somewhat successful programs of the government, however, and certain agriculturalists appreciated the state services. As commercial fertilizer or pesticides become more necessary, then the new farmer will have to turn increasingly to the state. Even so, more demands on the state do not necessarily create revolutionary socialist peasants out of Burmese farmers.

Given these characteristics of social status in Burma, it can be seen that social mobility within the country is both possible and restricted.

It is possible because of programs of, more or less, free education; because of a political process which includes membership possibilities in mass groups, the BSPP, and in the military (from which goverment officials are drawn); because, at least for males, one can always become a monk; because age itself brings the status of elder; and because economic development itself will, inexorably, open opportunities in the economic sphere.

By contrast, social mobility is, at present, somewhat restricted in the rural areas due to the traditional closed nature of the villages and restraints on physical mobility; by differences, however slight, in landholdings by the landed and in the land vs. landless distinctions; by the belief that wealth gained should be given as gifts to the monks and monasteries; by the large labor requirements which are demanded in the mostly non-mechanized agricultural sector and the concomitant need to provide this labor on a familial basis, and, perhaps most of all, because formal education beyond the equivalent of U.S. fourth grade is more of an ideal rather than a reality for the vast majority of Burmese farmers.

7. The Factors of Production: Land. Under various nationalization acts over the past 35 years the Government of Burma has become the ostensible owner of all the nation's resources. Various land acts have required that, with certain exceptions (primarily small stands of tree crops and government operated farms), all arable land was to be allocated to cultivators working the land in relatively small plots. Thus, farmers have use rights (usufruct) to but not ownership of land. This generated initial fears among the rural population because of the inherent instability of land tenure with government ownership.

However, in Burma, the assignment of cultivation rights is the task of village land committees who also are responsible for approving individuals who seek to inherit land use rights from deceased relatives. For the most part, once the original land assignments were allocated by the committees (most frequently in non-contiguous plots) and agreed upon by the village populations (often after litigation), the land committees have typically allocated cultivation rights to deceased farmer's sons or other relatives.

8. The Factors of Production: Labor. Members of the nuclear and extended family provide a large proportion of the labor for the farms of central Burma. Additionally labor requirements may be met through cooperative actions not requiring financial payment or through hired labor. Of interest, in a 1960 study, it was revealed that about 30% of hired labor was provided by women, and this figure has apparently increased in the last quarter century.

Since there have been no studies undertaken on time or labor allocation by age and sex in Burma, an understanding of the division of labor in the agricultural sector is quite difficult, especially in terms of time allocation. Nevertheless, some things can be said. Women are basically responsible for the operation of households and for the general physical well-being of their families. Thus, women are mostly responsible for collecting water, buying and preparing food, cooking, cleaning, and so forth. Depending on their age, daughters will contribute to this effort. Women are apparently also designated as the family disciplinarians for daughters and for sons until the time they enter the monastery.

Men are responsible for going to the forests to collect wood which may be necessary for house repairs or for cooking, unless wood for the latter use is available nearby for then it is collected by the women. Also, men may collect water in barrels on ox-drawn carts if the distance warrents it. Men are also responsible for the maintenance and care of the cattle or water buffalo which are used in agricultural tasks. Women and children are responsible for the care of small animals, such as chickens, pigs and sheep or goats. Where appropriate, sons will assist their fathers and daughters their mothers.

The men are responsible for the maintenance of the farm tools and for clearing the land and preparing the land for planting. The tools include plows, harrows, bullock carts, hoes, rakes, post-hole diggers, and sickles. Most of the tools are self-made except for the metal parts which can be purchased at reasonable rates. Women and girls do the rice transplanting and weeding. Either male or female may be responsible for adding fertilizers and/or pesticides. It is unclear as to responsibility in the area of maintaining the physical structure of the rice paddy and of water management and control. These may be tasks shared by both males and females.

Women basically are responsible for rice harvesting, although males may assist in this endeavor. Women are responsible for threshing the rice, marketing what may be for sale, and storing what will be for family use. Men are responsible for taking the rice which is part of the government quota to its pick-up point, and men are responsible for physically settling debts which may have accrued by making loans to raise the crop (they also must sign for the loans initially). Women are responsible for household vegetable crops (kitchen gardens) through all stages of planting, harvesting, preparation, storage and so forth. From what can be ascertained at this point, the labor for secondary or double crops is divided into tasks in much the same manner as the rice crop.

For the transplanting of rice, large labor inputs are required. However, family labor is insufficient and hire labor may be financially prohibitive. Thus, neighborhood groups have evolved in Burma to accomplish the tasks of transplanting. These groups are

composed of relatives and friends who live in the same area. They are most commonly led by an older woman who contracts with farmers to work certain fields on certain days. These fields normally belong to farmers in the same neighborhood. The groups average 12 members each but range in size from 5 to 16 females.

There are two forms of payment to the individual members of the transplanting group, each member of which commits herslf to work with the group for about 60 days. One method of payment is a flat rate for a field planted. However, as noted, this can be expensive (from fiel interviews, the going daily rate is K10/person). More commonly, labor is performed on an exchange basis, called let-sa. Under this system of exchange labor, a woman gives a day of work in the fields of a farm family who has in the past, or will in the future, provide a day of work in the fields of her family. Under this arrangement, no money changes hands.

During the planting and growing season, hired labor and/or a younger male family member may live in field huts and not return to the village at night, especially if fields are far from the village. This not only saves time, but also allows the farmer to keep his cattle in the fields where someone will be able to look after them.

At harvest time, the need for hired labor is not so great. although some day laborers may be employed, the nuclear/extended family can basically harvest the rice crop.

The amount of labor required in Burma's non-mechanized agricultural sector is extensive. However, from the above listing, it should be apparent that the labor requirements on women and girls is considerably more extensive than that for men and boys -- a point which must be stressed when considering economic development programs. Of equal significance, it must be stressed that children are an integral part of the household labor force, a fact which contributes greatly to the high drop-out rates in the government school systems -- another factor which must be considered in agricultural development programs.

9. The Factors of Production: Capital. Credit is especially important to the operation of the average Burmese farm, especially since the population tends to live so close to the financial margin. A list of basic equipment needed for the operation of a farm would include: cattle or buffalo, bullock cart, plow, rotary harrow, 6 tooth harrow, hoe, rake, post-hole digger, sickle, rope, cattle trough, cow shed, field hut, seed rice, secondary crop seed, fertilizer, pesticides, sprayer, and, possibly, hire labor.

Moreover, it must be noted that loans made by Burmese farmers are for both "production" and "consumption": i.e. some funds are used to subsist during the production cycle and for religious contributions, while other funds are used to purchase the necessary items for production, e.g. seeds, fertilizer, etc.

Credit and labor costs are, of course, interrelated. In the 1960 study, the type of credit available to the farmer was the key point since the high productivity farmer had greater access to the lower interest credit sources, thus could borrow more and hire more labor. Thus, without capital, cultivators cannot hire transplanters; without transplanters productivity is low; and low productivity means low income.

In fact, only levels of productivity separate villagers (and these are relatively minor) who, for the most part, share an economic and social homogeniety, as has been indicated.

10. Household Economics. In Burmese households, it is recognized that the women control a majority of the cash resources which come to a family during the course of a year. It is the women who predominate in the rural markets as both buyers and sellers, and it is the women who manage income.

Villagers will go to neighboring markets on occasion, but their small daily purchases of food, cooking oil, tobacco, tin milk, tea, noodles, spices, matches, soap, candles, and so forth, are made in local, small village shops. Clothing, footwear, and hardware are the principal items bought at the larger markets. Rice is for the most part self-produced, although hired labor may well have to purchase this commodity if they are not paid in kind. The other food staple of the Burmese diet is a fish paste, Ngapi. which is made by each household from fish they catch or buy. for the most part, villagers puchase the goods which they do not themselves produce through the money earned from the sale of excess rice and through the sale of such cash crops as groundnuts and sunflower.

Payment for most commodities is in cash, although payment in rice may be made to hired agriculture laborers, in repayment for some loans, and is appropriate for contributions to religious charities (Pf. 202). In the 1960 study, it was found that, on average, approximately 40% of the rice crop was finally sold to generate cash.

Reliable and up-to-date figures on the disposition of net disposable income among farmers is simply not available. However, research conducted prior to the Revolution of 1962 can provide illustrative information on the manner in which net income is disposed, by item and percent. Thus, a 1959-60 study (Pf. 145) indicated that income was disposed as follows:

Item	Percentage of Income
Food	32
Tobacco and Betel	12
Clothing	7
Housing	9
Medicine	2
Religion	24
Social activities	9
Other	5
	100%

Also, even though education is technically free in Burma, there are costs associated with education: clothing, books, and, possibly, transportation (figures ranging from K30/month for primary school to K200/month for secondary school were reported to the research team). These also were not considered in the 1959-60 study since few children were attending school at any level in the study area.

Given the homogeneity of Burmese rural villagers, it is likely that the above listing was applicable to a majority of farm families since housing, meals, dress, and household effects show little variation among households. Moreover, there is little reason to believe that these categories and percentages do not continue for the average Burmese family today: if anything, the cost of food, goods and services has increased faster than the growth of net disposable income. In any event, with the political and economic withdrawal of Burma from the world society during the late 1960's and into the 1970's, the availability of goods declined. Goods are, of course, available in the "shadow economy" or "open market" but these are relatively expensive.

The figures do indicate that rural families live very close to the margin such that a disaster in the form of flood, cattle death or sickness of a working member of the family can plunge a family into debt from which it is difficult to recover.

From the above figures, it can also be seen that there is little, if any, funds available for savings. However, when savings are possible, the preferred method is by investing in jewelry and/or gold since these are always negotiable for cash or can be pawned or used as collateral for, say, an agricultural loan.

11. Values, Beliefs, and Ideology: Buddhism. A majority of the population of Burma are Theravada Buddhists (89%). Of the remainder, 5% are Christian, 4% are Muslim, and 2% are classified as animists (UNFPA 1985: 10). The percentage of Burmese who would be classified as Buddhists in Burma proper is probably closer to 95% of the population -- and their religion has a profound effect on both the daily lives of the people and on the potential for economic development. To understand this, it is necessary to iterate some of the Theravada Buddhist ideology and system of values.

A basic tenet of Theravda Buddhism is that rebirth in some form is assumed, and the form of the rebirth (as human or animal) is determined by the quality of one's previous existance. The sacred Pali scriptures indicate that the ultimate Theravada goal is final, total release from any more rebirths. This permanent state of freedom from the entire cycle is known as nirvana, a condition reached only by the Buddha and those who live at the highest levels of Buddhist accomplishments.

Another important Buddist tenet is that of the impermanence of all things, including wealth, prestige, power, and life itself. Thus, since power (read "inequality) is transitory, and since its pursuit can lead to demerits, it is not overtly sought, and this has led to an unusual degree of social and economic equality in rural Burmese society. Power, as for example with elders, comes by virtue of simply living a long time.

A key to achieving nirvana is to stress a nonattachment to the sensate world, which everyone must quit eventually. Thus, there is a lifelong quest is for nonattachment to kin, sensate pleasures, career, society and self. It is, of course, recognized that people will vary greatly in their ability to control secular desires since human weaknesses undermine sincere efforts. Nevertheless, people must try for nonattachment since this is the only route to break the endless cycle of rebirth and reach nirvana.

Given these basic beliefs, therefore, the most honored Burmese are the monks and nuns since they ostensibly control their desires as lay people try to do but cannot. In fact, virtually all Burmese males spend some time in a monastery striving for nonattachment, although the vast majority eventually leave the monastery because of the inability to maintain their self-control against the attachments to the things in the secular world.

While achieving nonattachment, and therefore nirvana, is extremely difficult, each Theravda Buddhist can nevertheless make gains because of the belief that the quality of this life determines the conditions of the next (and of the time between rebirths which is spent either in one of eight hells or thirty-two heavens). To improve the conditions of one's next life, it is necessary to gain "merit" and the principal manner for doing this is give generously to Buddhism, primarily through gifts of food, cash and robes to Buddhist monks for their own sustenance and for the maintenance of the monasteries and temples or pagodas. In addition, the good Buddhist should adhere to the standard five precepts which include: not lying, not stealing, not taking intoxicants, not committing adultery, and not killing any creature. To do these things is to gain "demerits" which must be paid in one or more of the eight hells before rebirth.

Of crucial importance here is to recognize that merit cannot be achieved through secular giving because "each person, poor or rich, sick or healthy, intelligent or otherwise, is the product of whatever merit or lack of it which was earned in previous lives" (AHS: 105). No one is to blame if life is difficult, since each person deserves what was earned before. From a development perspective, this belief can make it extremely difficult to work with poor populations who, after all, are receiving "just what they deserve" for their behavior in earlier lives.

Another aspect of this belief is that, particularly as people grow older, there becomes a pressing need to generate the resources which can convert to merit by donation to the Buddha's representatives on earth. Thus, economic development efforts designed to enhance income to improve the quality of life of the target population may, in fact, lead to great improvements in local pogodas.

This is so because it is the monks who provide the population with the mechanism to gain merit to improve their status upon rebirth. Thus:

> The major family nonsubsistence expenses are religious -- offerings at pagodas, money spent for pilgrimages, for the ordination ceremony for a son who will enter the monkhood as a novice for a short period, for the ear-boring ceremony for a girl, and for the daily and festival feeding of the monks and the presentation of gifts, such as robes, to them on appropriate occasions. All require funds and make take from 10 to 25 percent of disposable income depending on wealth and status. All of these activities provide both merit and social esteem.

12. Equality and the Status of Women. In addition to the religious ideology which permeates Burman society, there are other values and beliefs which have a strong bearing on activities undertaken in the economic development of the country. One of these deals with the issue of the economic, political and social status of Burmese women.

The equality of women is recognized not only in the home, but also in public life. Women in Burma enjoy constitutional rights of equality and, in fact, they have helped to write a number of Burmese constitutions. They have traditionally played their parts in public life as law-makers, judges, writers and teachers, as administrators, as philosophers, and even as village headmen.

As has been noted, women have traditionally and continue to control the family economy and the retail trade as well. Women are also well represented in large business enterprises, in the professions,and in the government. Women provide a majority of the agricultural labor, and when they are employed in agriculture or in industry, they receive the same wages for the same work. Moreover, such customs as the veil, purdah, child betrothal, foot binding, widow immolation -- these, and all the other disabilities suffered by the women of India, on the one side of Burma, and China on the other, have always been absent from Burma. Moreover, the percentage of literacy among women, relative to women in other South and Southeast Asian countries, has been high traditionally.

In the home the wife is, by law and custom, a sharer, and not merely a bearer of the burden of household chores and of children. Her rights to her own separate property, which she brought to the marital home or acquires later, are well defined; her share in the husband's and the joint earnings is a vested right. When the husband is away, or dies, the headship of the family passes to her, not to the eldest son.

In terms of property, both the civil legal code and the Buddhist codes or rules (the Dhammathats) support the fact that a husband and a wife are like "tenants in common" rather than individuals in "joint ownership" in property. Thus, living together in marriage does not make one the de facto nor de jure agent for the other. Instead, alienation of a wife's interest requires her consent. A husband cannot mortgage or sell the joint property -- acquired by either of them before or during the marriage -- except in circumstances in which it may properly be said that he has acted with the consent of his wife. Again, this is a custom which reinforces the economic equality of the female in Burmese society.

Burman women have been economically powerful by remaining close to their mothers, female relatives, and daughters through the matrilocal residency patterns -- a pattern which has allowed them to maintain strong economic and social support teams. As noted above, this matrilocal residence pattern is giving way to a patrilocal system, but women still, by and large, remain in their natal village and thus close to their female kin. Equal inheritance of wealth with brothers has given them financial power, which is often enhanced by their managing family finances or operating businesses. Through a traditional dowry system, women have also brought a degree of wealth into their marriages. While this wealth is often invested on behalf of the family, the value of the wealth, and the profit it may gain, are legally considered to remain as the property of the wife, a factor which many claim to enhance the stability of the Burmese marriages.

On the negative side, Buddhism assigns superiority to males since only males can achieve nirvana. Thus, women must show deference to males (as for example, in keeping their heads below their husband's, walking behind them, or eating after their husbands). Nevertheless, women seem to consider these as token concessions for, as one Burman women explained: "let him go first. That is where the snakes are".

Also, traditionally, the husband/father has been considered to be the "head of household", although when he is absent or gone, it is the mother who assumes this role.

In any event, the issue of equality is important here because it is manifested in a most unusual level of freedom and equality for Burmese women. Thus, despite the public deference granted to males within the society, "in the all-important matters of money, of divorce, inheritance, of freedom of movement, the right of giving advice, of transacting business or of putting one's own name alongside a husband's on a shop front, women admit no inferiority. Thus they serve without shackles, and are equal without impairing the pride of masculinity".

D. Administrative Analysis

The management and implementation of the project will rest in the Ministry of Agriculture and Forestry. The Ministry of Agriculture consists of seven Departments and three Corporations. The Agriculture Corporation, under its Managing Director, is responsible for all aspects of crop production (research extension as well as procurement of commodities).

The Managing Director of the Agriculture Corporation will assume responsibility for the overall operational and implementation aspects of the project. He will designate a Project Director to manage the program. The Project Director will have a Deputy Project Manager as well as several Deputy General Managers who will perform as administrators in various aspects of the project.

In order to accomplish the objectives of the project, several divisions of the Agriculture Corporation will be involved. It will be necessary that the Project Director coordinate with the General Managers of four divisions of the Agriculture Corporation. These divisions include Extension Division, Planning and Statistics Division, Procurement Division, and the newly formed Agriculture Research Institute and Agriculture Research Development Division. The latter division is an amalgamation of two divisions which formerly functioned under two General Managers but now are administered by a Managing Director (Special Duty).

During the past three years, the Maize and Oilseed Project has developed an organizational structure which has done an excellent job in accomplishing project objectives. As indicated in the MOPP evaluation 4/, the AC has performed impressively well in overall management. It has developed a crucial link to the field activities through the Township Managers of the Extension Division. The Township Managers have provided the essential supervision, guidance and motivation for the farm level production phase. Additionally, competent seed farm managers have been appointed to carry out the management aspects of seed development activities. The Project Manager has developed, as well, strong links with the Agriculture Research Institute at Yezin.

There seems to be little question that the Agriculture Corporation has developed an administrative and organizational structure which will assure continuity in project management in future agriculture production projects.

E. Technical

1. Overview. The project as designed is judged to be technically feasible. The crops selected for particular townships are appropriate, the project will introduce no crop into a township which is not already produced there. Experience under MOPP has provided a number of good benchmarks on which to based assessments, including the capability of the AC to to deliver technology packages and technical advice to farmers. While transportation has been a continuing concern for a number of years, the capacity of the sector seems to expand enough to meet requirements, if barely. An analysis of the real capacity of crushing mills indicates that there will be adequate capacity to mill the increased oilseed production. The production of

4/ (Maize and Oilseed Production Project, Mid-Term Evaluation, pg. 33)

planting seed at the four seed farms is judged to be technically feasible, as is the procurement and installation of equipment to process the seed. And the same is true with respect to the suggested pest management program.

2. Soils, Crops and Fertilizers. The choice of target crops for the various townships is very appropriate. The cropping pattern in the townships supports this conclusion. The rainfall distribution pattern is the primary determinant of crop suitability and crop sequence.

The second physical determinant for crop selection is the interaction of soil and topography. The significance of the topography rests largely in water control, freedom from flooding for the crops of interest and the availability of stored moisture to carry the crop to maturity when the monsoon ends.

The soil texture and fertility also dictate the crops which can be grown successfully. Light friable soils are required for groundnuts, a restriction imposed by the buried fruit. The other three target crops, sunflower, sesame and niger have no such restriction, although all four crops require well drained soils.

Alluvial soils predominate over the entire region covered by the project. Generally these soils are considered fertile but they are also responsive to fertilizer. Although only a few soil analyses are available, most indicate alkaline and mildly acid soils. The tests are low to moderate in total nitrogen and all of the fertility experiments reported showed a consistent response to this nutrient. The phosphorus levels are relatively low but the general chemistry of the soils indicates that strong fixation should not be a problem. Except for the sandy phases, potash levels appear to be adequate. Since groundnuts will be planted on the light, sandy soils, potash fertilizer should be applied in those areas, at least where a potassium response has been noted earlier.

Groundnuts are also very likely to respond to sulfur. Again it is the sandy soils which are most likely to be deficient in this essential element but reports of sulfur deficiency on other soils are common. Pre-plant application of gypsum is the most satisfactory method of treatment but sidedressing with gypsum or spraying soluble sulfates is also giving good results. Gypsum is mined locally and there is a proposal to begin a new grinding operation, which should be encouraged.

In the background material available to the design team, other secondary and micronutrients were not reported to be seriously deficient On soils with pH 7.5 and above, zinc and manganese deficiencies might be expected but no general program of supplying micronutrients should be planned now. The calcium and magnesium levels are probably adequate for the proposed life of the project and beyond. The sandy soils again are the ones to watch most closely.

The recommended fertilizer application rates are consistent with both the soil analyses and the agronomic response data provided by the AC. The rates are modest but sufficient to produce substantial yield increases - the estimates used to compute project benefits are reasonable. All of the rates of application should be tested in the course of the project. However, soil testing facilities in Burma are not well developed or widely used. Some assistance to the existing laboratories could prove very effective. Initially this should be in conjunction with experimental sites but eventually should be provided to farmers as well.

Inoculation of legumes is as critical as the apolication of nitrogen fertilizer to the non-legumes. Great care must be observed in handling the inoculant so that its bacteria are not killed in transport and storage prior to application.

The fertilizer requirements for the project were derived from the crops, season, target area and recommendated application rates. It should be noted that the project calls for import in only four years. Under the project, AID will provide approximately 15,000 MT of TSP annually beginning in FY 88. The Government will provide approximately 17,000 MT of urea and 2400 MT of MOP. Gypsum will also be supplied by the Burmese.

Results obtained in MOPP support both the proposed recommendations and provide evidence that the package of practices is substainable after external support is withdrawn.

The analysis of Burma's domestic production, imports and consumption of fertilizer conducted by the AID Agricultural Sector Strategy Review Team less than a year ago is still current and this topic will only be mentioned here. Urea is the only chemical fertilizer that Burma produces. . Output has averaged about 130,000 MT annually over the last four years. The Government uses its own foreign exchange to pay for some imports. It also receives fertilizer under concessional aid, mostly grants. Imports of phosphate will continue to be required to obtain full value from the urea produced. Domestic production is not adequate to meet domestic needs, however, and urea is also imported. The country also imports phosphates and potash fertilizer.

It seems quite clear that the fertilizer component of this project can be carried through without serious difficulties. The AC has long experience in handling fertilizer and should have no trouble with movement from port or factory.

There is a ready market for oilseeds and farmers are unlikely to have a marketing problem. Oil mills are well distributed throughout the project area and there is no need for long distance transport which will reduce the return to farmers. An analysis of the real crushing capacity of mills indicates that the capacity will be

adequate to handle the additional oilseed production. The AC has staff in place in all of the townships and the staff are experienced in both supply and advisory functions. Once the fertilizer is taken by the farmer, it is likely to go on the target crop. There are checks on cooperators under the Burmese system but, more importantly, the use of fertilizer on these crops is highly profitable.

There are some potential problems. Weather can be expected to create problems in a program that covers such a range of rainfall zones in a tropical climate. Also, it is unlikely that high quality seed of the best varieties will be available for all cooperators. Moreover, knowledge of the soils in specific sites is meagre and even with support, soil testing services are not likely to be adequate. And plant pathogens, insects, vertebrates and weeds will all compete for the improved diet that well-fertilized plants afford.

The biggest potential problem facing Burma's fertilizer program is the heavy subsidy applied to fertilizer. Very quickly this can become the dominant item in the national budget, not excluding defence. As noted, the returns to farmers under this project would still be very attractive even if the farmer price of fertilizer were doubled. This could not be done in one fell swoop, however.

3. Justification. This project is not only directed to meeting basic needs in Burma, it is also developing a sustainable pattern which can become part of the national strategy after the project is completed. A balanced fertilizer program is essential for sustained agricultural production. The native soil fertility will not satisfy crop requirements even at present cropping intensities. Neither can farm incomes be increased substantially without increasing cropping intensity and yield of crops per acre. The utility of fertilizer is already recognized by both SRUB and by farmers. The full value of the nitrogen fertilizer cannot be realized without supplements of phosphorus and eventually potash also.

The target crops for this project are most desirable. There is a need for additional edible oil in local diets, with projections two to three times current levels.

Results under the MOPP clearly demonstrate that AID/Burma and the AC have the capacity to carry out the project.

The benefits of the project will not be limited just to gains in crop production, but also to rural employment, farm income and dietary improvements. The data which the project will generate will be critical for planning future programs.

4. Seed Farms. MOPP envisioned and provided for development of four well equipped seed farms which could provide an adequate seed supply to increase production of oilseed crops and maize in 28 townships of rural Burma. Low quality seed and short seed supplies have been identified as significant constraints to improvement of maize and oilseed production.

The four seed farms are to be operated by the Agriculture Corporation (AC) with cooperation of the Research and Development Departments which could provide seed stocks and assistance in selecting varieties for multiplication and maintaining varietal purity. While varying degrees of success were achieved under MOPP at all four seed farms, more emphasis was placed upon developing seed production capabilities at two selected farms, Sebin and Chaung Magyi. Since these two farms have been designated by the AC as future Foundation Seed Farms, then logically they received primary consideration.

It is quite obvious, however, that with the continued emphasis placed on increasing the supply of edible oil so as to improve the national food supply and nutrition and to also improve rural income and employment, the four seed farms will not have the capacity to meet the anticipated demand for planting seed. Therefore, it is necessary to expand seed production capabilities by providing assistance to the other seed farms previously identified for this purpose. This objective is to be accomplished under BAPP, which will expand and strengthen the seed production capabilities completed under MOPP.

To accomplish this objective, it will be necessary to develop seed production, harvesting, processing, drying and storage capabilities at Kyaung Su and Thitcho. Since these two farms have been identified by AC as future certified seed production farms, development of production capabilities at these farms is in accord with both the AC seed development program and with the project objectives of increasing quantities of improved seed of oilseed crops to meet the needs of 42 townships. The project will, of course, continue to provide assistance to Sebin and Chaungmagyi as these farms develop and expand their production output.

At the present time and within the existing framework of seed production and supply in Burma, the immediate goals of the four seed farms will be to concentrate on production of improved seeds without regard to the technical concept of either foundation or certified seed classes. However, as the seed program expands and expertise is developed, then the future goals of the AC to designate separate roles to the seed farms for either foundation or certified seed production is well within capabilities and certainly follows the generally acceptable continuity of seed program development.

The selection of these four seed farms has previously been justified, site descriptions are generally accurate, and production figures have been reviewed. However, for the purpose of this project, it is again necessary to focus on the quantities of seed that can be

produced on the seed farms and to examine the current and projected seed demand. Based upon this information, the capacities and capabilities of the seed facilities can be projected, necessary management to be provided by the AC can be outlined, and appropriate training and technical assistance can be projected for project duration.

5. Feasibility. As a result of the design characteristics and emphasis of MOPP, many of the technical questions relating to choice of technology, technical capability of the implementing organization and general feasibility of a seed improvement program in Burma have been answered in the affirmative. Additional training, technical assistance and equipment will be provided under this project to further develop the capabilities of the AC, through the development of the selected seed farms, to expand and strengthen seed production facilities in Burma. A concern that must be realized early on by the AC is the absolute need of establishing an effective management and accounting system for the anticipated expansion in the seed program. This emphasis on system management capability is warranted in view of the impending increase in emphasis on four seed farms.

The project's intent is to develop within the AC a system of production and management capability to insure the efficient supply of high quality improved seeds for oilseed crops in response to demand.

The approach to developing production capability is through expanding and strengthening seed production capabilities of the four selected seed farms. The procurement of necessary production and processing equipment and facilities is technically sound as such approaches have consistently proven satisfactory in numerous programs in developing countries.

The approach to develop effective management is through training both locally and in the U.S. Degree training in the U.S. will include emphasis in appropriate management and marketing courses as a part of the training in technical areas of seed processing, production, drying and storage. Local assistance will be provided by short-term consultants who will stress appropriate management techniques, accounting procedures and organizational structure for AC project officers.

6. Crop Protection. Increases in acreage and production of oilseed crops through MOPP has not, up to this point, significantly increased the incidence of serious pest outbreaks. However, continued use of high yielding varieties, increased levels of fertility, continuous cropping, and expansion of land devoted to oilseed crops is likely to result in serious outbreaks of pests (insects, plant pathogens, weeds, nematodes, birds and rodents). Throughout the world this situation is well documented. Within Southeast Asia high production rice is probably the best example. Several insect species, such as stem borer and leafhoppers, as well as rats, have severely limited production over wide areas. There is evidence also of this phenomon taking place in the oilseed crop groundnut. In Thailand certain insect species have increased as technological advances in production of groundnut have been utilized.

As was noted in MOPP, in projects that have increased production as their goal, it is paramount that crop protection problems be addressed and that an appropriate scheme(s) be devised to manage pests efficiently so as to avoid catastrophic pest outbreaks. With this in mind, the followings must be addressed as part of the overall BAPP:

1) determinations should continue to be made as to the status of present and potential pests of the primary crops,

2) a thorough assessment should be conducted of present control practices, including pesticide selection and use patterns, pesticide distribution, environmental implications, and the impact of agronomic practices on pest populations, and

3) an assessment should be made of pest management needs.

A crop protection component in BAPP, similiar to the one that is suggested in this paper, is technically feasible.

7. Current Problems. There is very little evidence that pesticide resistance has developed in Burma. The possible exception is the diamond-back moth in cruciferous crops. It is likely that if pesticides become a major production input in oilseed crops that resistance, especially in regard to insecticides and rodenticides, could become a problem.

Residues of pesticides on oilseed crops have not been reported as being a problem in Burma. If pesticide use increases significantly or if new pesticides are introduced into the system, residues in the seeds or other plant material could pose a threat to both humans and animals. The use of insecticides and fungicides on planting seed and/or stored seeds will require safeguards, such a dyes to mark treated seeds or secured storage areas, to prevent consumption by humans and animals.

The use of pesticides should only be permitted where the applicator has an understanding of their use, proper handling and application and precautions associated with the product being used (see Environmental Analysis for further discussion).

8. Pest Problems. A listing of the most serious pests of groundnut, sesame, and sunflower has been provided by the AC and appears as Table E26. This list has been supplemented through discussions with local township officials, AC crop protection specialists, AID personnel, FAO plant protection staff and documents prepared for various projects in Burma. No doubt, however, the list is far from complete.

a. Groundnuts. In spite of numerous pest problems, less than 16% of groundnuts are treated with any pesticides. In some areas, termites, crickets and white grubs causeserious losses to sown seeds. Some protection is provided by treating seeds with aldrin at the rate of 5 pounds of 5% dust per basket of seed (25 pounds/basket) per acre (0.25 pounds active ingredient per acre). No effective aldrin substitutes are known in Burma and it appears that little testing of potential substitutes for aldrin has been conducted. A fungicide, chlorothalonil, is also used sometimes with aldrin to reduce seed rots. More effective management of soil insects and seed and seedling pathogens could allow for a one-third reduction in seeding rate. This figure is probably a conservative estimate and could go as high as 50%. Since this represents a significant reduction in input costs, the impact of soil pest organisms on groundnut germination and survival should be carefully evaluated. This should be done under ideal seeding conditions, as well as those that delay emergence.

Above ground portions of the the plant are subjected to a number of pests. One of the most important plant pathogens is a leaf spot, Cercospera spp, which can be severe during the monsoon season. In the areas of high rainfall, groundnut production can be reduced 40% by this disease. Extensive outbreaks of leaf worm in the Pegu area have occurred in the past. Leaf binders have caused significant damage in the Division of Mandalay. Leaf miners are often abundant in several areas of Burma, but their impact on yield has not been determined. One insect pest, the common hairy caterpillar, is a serious pest of groundnut, as well as sesame and sunflower. Cropping two or more of these crops in a rotation could result in increased population levels of this species. Spider mites are especially a problem in the

dry season and in the low rainfall areas during the monsoon. Significant mite damage has been noted in the Magwe area. Rodents are serious pests of groundnut during both the monsoon and post-monsoon seasons. Rat damage to groundnut runs as high as 90% crop loss. Bandicota bengalensis is the primary rat species of concern and is found throughout Burma. Other rat species encountered are Rattus exulans and R. rattus. Currently there are no satisfactory management strategies in place. An effective rat control program is without a doubt one of the most important crop protection needs in Burma.

Weeds in the Mandalay and Magwe Divisions cause serious problems in some fields. Bermuda grass, Cynodon dactylon, and other weeds are abundant enough to result in 30% to 50% crop reduction. Bermuda grass is not controllable with normal cultivation and may require rotation with crops, such as sorghum, or the use of herbicides, such as alachlor and/or metoachlor. The returns from effective weed control should be significant. Weed control in an experimental test at Magwe has increased groundnut production by 17 baskets (25 pounds/basket) per acre.

b. Sesame. The phyllody disease caused by a microplasma which is vectored by a jassid insect can be very serious and significantly reduce sesame yields. In the Yezin area 15% to 20% of the plants are affected. Infected plants suffer 30% to 40% loss of seed. Another pest, the sesamum sphingid, is a defoliator and causes some concern, although it is not a major pest. The sesamum leafroller is most severe in lower Burma on sesame following paddy. Sesame is relatively new in lower Burma and effective natural control agents may not yet be established. The former use of endrin, as well as other insecticides, for control of this pest is thought to have prevented the establishment and/or build-up of beneficial organisms. Information on sesame pests and pest-induced looses, like for many of the other crops, appears to be severely lacking.

c. Sunflower. The major problem is leaf stem blight, Alternaria helianthi, which can be devastating during the hot, humid, monsoon season. None of the available fungicides provide effective control. Therefore, it would be more appropriate for sunflowers to be grown after the monsoon. It has been reported that differences in susceptability among present varieties occurs so breeding for resistance is a possible solution to the problem.

As with groundnut, rodents are also serious pests of sunflower. No satisfactory control programs have been established. Parakeets, parrots, and sparrows pose a serious threat to sunflower planted next or near to wooded or other roosting areas. Use of devices to frighten the birds are only partially successful. Chemical repellents have not been tested. As with all the crops in the BAPP weeds are a serious problem in sunflowers. Hand weeding is an effective means of control if labor is available. Alternative control methods, such as herbicides, show some promise and should be explored.

d. Post-Harvest. The oilseed crops included in this project are subject to a host of stored product pests including insects, plant pathogens, and vertebrates. These pests are especially a problem in Burma due to the warm climate and high humidity, as well as for the fact that storage facilities provide limited means of excluding pests and vertually no means of environmental control. The pest of greatest importance for post-harvest is rats. It has been reported that up to 30% of a crop such as groundnut may be lost to this pest during storage.

Because of the type of containers used and the lack of proper sanitation, insect pests also take their share of stored grain. Insects such as the Indian meal moth, khapra beetle, and red flour beetle are of greatest concern. Also, plant pathogens can cause serious problems. They are especially a problem where grain is not properly dried before storage or where the environment is such that humidity and temperature are difficult to control within storage. Where grain is subjected to these conditions, both pathogens and insects create problems which result in significant losses. The pathogen Aspergillus flavus which produces the toxin aflatoxin, is of major concern. Recently it was noted that 3 out of 10 samples of oilseed cake contained aflatoxin. Proper handling and storage of seed after harvest, especially where the crop was under moisture stress during the growing seasons, is extremely important to reduce the incidence of this pathogen. Seeds or pods containing this dormant pathogen may be attacked by the pathogen if the pods or seeds become wet, if not properly dried, or if placed in a moist environment.

9. Potential Pest Problems. In any agro-ecosystem increasing agricultural inputs and/or intensification of cultivated crops leads to conditions that favor outbreaks and damage by pests. Pest complexes are constantly changing and slight changes in cropping systems can drastically change pest species. This has been well documented throughout the world. Earlier in this section it was noted that this was the case for the rice-based cropping system in Thailand. It was not until high production management tactics were developed and practiced that minor insect pests and plant pathogens became major problems. The same scenario is predictable for Burma unless a wide array of pest management practices are evaluated and implemented.

As was noted in the BARD project and slightly modified here, new pests orginate as exotic species imported unintentionally from other countries and as native species that adapt to an existing or introduced crop. The first source poses the most serious threat to Burma's oilseed crops. Major pests of oilseed crops in other parts of the world could seriously affect production in Burma. There is no way to insure that quarantine procedures will effectively keep exotic pests from entering Burma. It has already been reported that a new exotic weed species has been discovered. Probably more will come.The other source of new pests on oilseed crops are native pests that now exist on related or unrelated plant species. These may adapt to the oilseed crops, especially the recently introduced crop, sunflower. The recent discovery of a previously unknown dipterous insect attacking young sunflower stems at one of the MOPP farms is an example of a new pest.

10. Pesticide Usage. With the exception of cotton, pesticides are used on a limited basis in Burma. No pesticides are produced domestically, although some repackaging occurs. Since all pesticides are imported this represents a drain on foreign exchange. Thus, the Government promotes limited use and when purchases are made, buys the least expensive materials. Purchases include some of the older pesticides that are no longer approved for use in the U.S. or have been replaced by more effective or selective compounds that are in many cases more expensive. Data on annual consumption of pesticides on oilseed crops from 1982-1985 are given in the EA section, Table E25. Analysis of the data shows that approximately 163,000 pounds of active ingredients were used on 5,504,792 acres of oilseed crops in 1984-85. Only a relatively small percentage of the acreage of these crops are treated during any one season. This is a minuscule amount in terms of possible environmental impact, but for the individuals using the pesticides the hazards can be great.

According to Burmese crop protection scientists the only chlorinated hydrocarbon insecticide now used on oilseed crops that cannot be replaced by other materials is aldrin for protection of groundnut from termites, crickets, and white grubs. Fungicides are very rarely used on oilseed crops. However, seed that is shipped into

Burma for planting may be treated with a fungicide. Herbicides have only been used experimentally. Tests on the use of several products have shown that alachlor and metolachlor as preplant incorporated applications are effective against weeds in groundnuts. Nematicides are not now used even experimentally. In addition there is no data o nematodes or their portential impact. Rodenticides are available b have only been used on a limited basis. Where they have been used, zinc phosphide and coumachlor have provided only limited control. There is no doubt that significant returns could be garnered from th use of a one-dose rodenticide like brodifacoum. However, due to its toxicity to humans and animals, this product may have limited applicability unless used by trained individuals, such as extension personnel.

The present mix of pesticides used in Burma is relatively good. However, some very undesirable products from the stand point of hazards to the user, the consumer of the treated products, the environment, or combinations of these should be noted. Assisting Burma in phasing out the uses of aldrin, through the establishment of an alternative soil insecticide, and phenyl mercury acetate, through the use of less toxic fungicides, can be important contributions of this project.

There is very little evidence that pesticide resistance has developed in Burma. The possible exception is the diamond-back moth in cruciferous crops. It is likely that if pesticides become a major production input in oilseed crops that resistance, especially in regard to insecticides and rodenticides, could become a problem.

Residues of pesticides on oilseed crops have not been reported as being a problem in Burma. If pesticide use increases significantly o if new pesticides are introduced into the system, residues in the seeds or other plant material could pose a threat to both humans and animals. The use of insecticides and fungicides on planting seed and/or stored seeds will require safeguards, such a dyes to mark treated seeds or secured storage areas, to prevent consumption by humans and animals.

The use of pesticides should only be permitted where the applicator has an understanding of their use, proper handling and application and precautions associated with the product being used (see Environmental Analysis for further discussion).

11. Pest Management Requirements. Over the long term there is no way to know for sure what effect this project will have on the known oilseed crop pests or those that will adapt to the crops or be introduced over time. However, experience tells us that the pest complex will constantly be changing and that serious problems are likely to develop. As a result, it is imperative that a pest management component be included as an important part of the BAPP. To insure that pest management techniques are developed, investigated, and utilzed in this project, research and extension input are also

needed. The following are important steps in the development of sound pest managment program for oilseed crops in Burma. They should be implemented on all BAPP farms, including the seed farms, during the life of the project.

a) Where possible, determine the important pests (ie. those that may limit yield) of oilseed crops in the various townships. This could be done by extension agents or other local individuals with the help of crop protection specialists in the AC, BAPP, and FAO. This can be used to develop management strategies and to map the distribution of important pests in Burma.

b) Determine at what time(s) during the development of each crop that each pest occurs; including multiple generations, alternate crops, etc. Develop a time table for each pest (could be based on dates and/or crop development stage).

c) Develop drawings and/or photographs of pests and their various life stages and damage to aid in the identification process on the local level. Distribute the materials at training sessions or when individual producers come in for consultation concerning pest problems.

d) Determine the alternate host(s) of each pest, if any. Can the alternate host(s) be eliminated or the cropping cycle changed in such a way to eliminate or reduce the problem.

e) Devise a scheme for the monitoring of each pest. AC, BAPP, and/or FAO personnel could train extension personnel or other local officials in techniques for determining pest and/or damage levels. They in turn could teach farmers.

f) Utilize economic thresholds where available and feasible. Where not available, establish crude base-line thresholds until more reliable ones are available. Base-line thresholds are normally very conservative, but this should be sufficient, initially.

g) Devise appropriate control tactics for the management of threatening pests. use pesticides only where needed. To reduce the risk to humans, animals and other beneficial organisms, where possible, use pesticides with low mammalian toxicity and those that are selective for the pest to be controlled. Also use proper timing and minimum effective rates. For weeds use hand weeding where possible. However, if severe infestations occur or labor is a problem herbicides may be needed.

- use disease and/or insect resistant or tolerant varieties where possible.

- when pests are noted, survey natural enemies to determine if natural control is possible.

- modify cultural practices where feasible for control of pests. Adjustments in planting date, selective crop rotation, use of a trap crop(s), etc., may be useful to decrease pest levels. Planting the same crop in the same field two or more times in a row should be avoided.

- consider the introduction or augmentation of beneficial organisms for pests which do not have effective biological controls.

- develop an effective rodent control program utilizing traps, tracking powder, baits, etc. Techniques utilized should not pose a serious threat to humans or animals (other than the rats).

- develop an effective stored products pest control scheme. Should evaluate present storage methods, pest species present, control tactics presently utilized and alternative controls. If chemical seed treatments are required, use of dyes to identify treated seeds and use of control materials that pose a limited threat to humans and animals should be utilized. Also, if rodenticides are utilized, their placement should be such that they do not pose a serious threat to humans or other animals.

h) Develop a practical delivery system; training programs (see Table E28), monitoring and decision-making materials, etc.

i) Continue to send Burmese scientists to the U.S. for training in crop protection (see Table E29). When these scientists return, integrate them into crop protection activities on oilseed crops.

j) Develop a testing program to evaluate alternative pesticides to those presently being used, as well as to evaluate new compounds against pest not presently controlled by existing products or against new pests. A rodent control evaluation program should be conducted at the village tract level to determine impact and feasibility. The rodenticide brodifacoum should used.

F. Environmental Assessment

After examining all the potential environmental problems associated with the BAPP the only environmental concern relates to the hazards associated with the use of pesticides as a part of the crop protection effort. Therefore, the EA examines the problems of pest control in the project. The EA, along with the Crop Protection section of the PP, reviews the current status of pest problems, potential future problems, and pesticide use on oilseed crops in

Burma. The conclusion is that current pest losses are generally lower than expected in tropical countries, yet there are frequent pest outbreaks that require pesticide treatment to prevent economic losses. It is expected that pest problems will increase in the future.

Farmers in the project areas use several insecticides including carbaryl, phosphamidon, malathion, diazinon, phenthoate, and aldrin. One of these, aldrin, is a chlorinated hydrocarbon which has been suspended by the USEPA and is no longer used in the U.S. for agricultural purposes. Phenthoate is not registered by USEPA in the U.S. The others are registered by USEPA as either general use or restricted use compounds. Other pesticides used in Burma on oilseed crops include the fungicides cuperous oxide and phenyl mercury acetate and the rodenticides coumachlor and zinc phosphide. Cuperous oxide and the rodenticides used in oilseeds are registered by the USEPA without restriction. The use of phenyl mercury acetate has been canceled by USEPA in the U.S.. Although not presently used in oilseeds in Burma, the rodenticide brodifacoum and the herbicides alachlor and metoachlor are being tested in research programs. Other pesticides under consideration for use in oilseed crops include fenetrothion, chlorphrifos, fenvalerate, and mancozeb. The products currently used, being tested, or considered for use are listed along with their USEPA registration status, LD_{50}'s, and WHO toxicity classifications in Table E23. Also the authorized uses of approved pesticides based on USEPA registration and/or FAO maximum residue limits are given in Table E24.

Of the pesticides used on oilseed crops in Burma that have been canceled in the U.S. by USEPA, aldrin makes up approximately 12% of the pesticides applied. There is no evidence that such use has caused toxicological problems to applicators or harmful environmental consequences although there has not been careful monitoring for such problems. In view of the known long-term environmental impact of the use of aldrin and the known or suspected human and/or environmental hazards, the EA concludes that long term use of this product in the project should be discouraged. The EA recommends that the uses of aldrin be phased out and that relatively inexpensive and efficaceous substitutes having environmentally acceptable properties be identified and substituted for this chlorinated hydrocarbon. The other USEPA cancelled pesticide, phenyl mercury acetate, is used very little in Burma. If use of this product were to increase the human and environmental impact could be great. Since effective substitutes for this fungicide are available, use should be cancelled as rapidly as possible.

The principal issue to be resolved is whether the adverse environmental impacts and health hazards associated with the use of the chlorinated hydrocarbon aldrin during the phase-out period are mitigated by the short and long-term benefits which will accrue from such use to the farmers and the project's success in increasing food supplies and export income for Burma.

The EA also addresses the need for appropriate training in pest management for users of pesticides and that the BAPP provide TA (see Crop Protection section) in developing and providing this training. In addition the EA encourages the use of a sound pest management scheme on oilseed crops in Burma.

Purpose:

A. To examine the environmental, human health, and economic aspects of the following five alternatives:

1. Use no pesticides in the project areas on oilseed crops.

2. Use on oilseed crops in the project areas only pesticides registered by USEPA for the same or similar uses without restrictions.

3. Use in the project areas on oilseed crops only pesticides registered by USEPA for same or similar uses with or without restrictions.

4. Use in the project area on oilseed crops only pesticides registered by USEPA for the same or similar uses without restrictions, as well as allow for the continued use of the USEPA cancelled pesticide aldrin for soil and seed treatment.

5. Use II. A. 2. except continue the use of aldrin on oilseed crops in the project area ONLY until the local farmers can be familiarized with new products and their physical characteristics, application procedures, and efficacy.

B. To insure that proper training in the use and application of pesticides is an integral part of the project and that attention is paid to informing all concerned as to the potential hazards to humans, animals, and the environment from the use of pesticides.

C. To insure that sound pest management principles are employed in the management scheme devised for the project.

The USEPA Registration Status of Pesticides Currently in Use in Burma (See Table EA 1):

Aldrin uses in the U.S. are now restricted to termite control. The acute oral LD_{50} of the technical material is 67 mg/kg and the dermal for rabbits is 98 mg/kg. Aldrin is used predominantly in Burma as a 2.5% and 5% dust for seed or soil treatment. By extrapolation the oral and dermal toxicities of the dust are 2613 (2.5%) and 1273 (5%) mg/kg and 3822 (2.5%) and 1862 (5%) mg/kg respectively. Aldrin as used in Burma presents relatively low user hazard and should not result in significant crop residues if groundnuts grown in treated areas are blended with those from non-treated areas. Significant quantities of aldrin or its soil degradation product, dieldrin, should not accumulate in the physical or biological environment under the conditions and levels of use.

The use of phenyl mercury acetate in the U.S. has been cancelled by USEPA. The human and environmental hazards associated with the use of this compound warrants its immediate cancellation in Burma.

Carbaryl, chlorpyrifos, diazinon, fenitrothrin, fenvalerate, malathion, cuperous oxide, mancozeb, coumachlor, and metoachlor, are registered without restriction by the USEPA for the same or similar uses, in most instances, as proposed in Burma.

Phosphamiden, brodifacoun, zinc phosphide, and alachlor are classified as restricted use pesticides by USEPA for the same or similar uses, in most instances, as those proposed in Burma.

Phenthoate is not registered for use in the U.S.

Alternatives, Including the Proposed Action:

A. Background.

1. No pesticides are produced in Burma. They are purchased, imported and controlled internally by the Government. Orders for pesticides are put out on bids and where possible the least expensive products are purchased. Buying the least expensive products conserves needed foreign exchange. The products purchased in the past included certain chlorinated hydrocarbon insecticides which are now considered to be too hazardous to be used. Although aldrin is still used, the Government considers the environmental hazards to be insignificant because of the relatively small quantities used. However, officials are deeply concerned about the health and safety of those Burmese applying pesticides and have initiated training programs, at the local level, in the safe use of these products. They are also seeking effective and safer alternatives to those that pose human and/or environmental hazards. They are also looking for alternative control strategies.

2. Pesticides are used on a very small percentage of oilseed crops. Less than 16% of grourdnut, 2% of sesame, and 4% of sunflower were treated with pesticides during the previous three cropping season (see Table EA 3).

3. Carbaryl, diazinon, and aldrin were the major pesticides used on oilseed crops during the previous three cropping season representing approximately 85% of the active ingredients applied. However, the total active ingredients for all sown acres over the previous three cropping season averaged only 0.043 pounds per acre per year for the oilseed crops.

4. AC officials state that there are presently no effective alternative chemical insecticides available in Burma for aldrin as a seed and soil treatment against termites, crickets and white grubs. Even though alternative insecticides are available outside Burma for most soil insect pests, Burmese farmers are not familiar with their physical characteristics, methods of applications or their general relative efficacy. Therefore, a sudden imposition of these alternatives could cause confusion and ill will.

B. Alternatives.

1. Use no pesticides in the project area on oilseed crops. Even though pests on these crops are not considered to cause high average yield losses at this time, there are local infestations that cause unacceptable yield reductions. Elimination of all pesticides would alienate farmers and jeopardize the success of the project.

2. Use on oilseed crops in the project areas only pesticides registered by USEPA for the same or similar uses without restrictions. Most of the pesticides used in Burma fit into this category. These are known to be effective against most but no all pests of these crops; notable exceptions are soil pests such as termites, crickets and white grubs. This alternative would eliminate the potential environmental and/or human hazards created by using restricted pesticides or the USEPA cancelled pesticide aldrin. However, the general lack of knowledge regarding specific alternatives to aldrin as a soil insecticide, would create a lack of confidence in the project among most farmers and unacceptable losses for some.

3. Use in the project areas on oilseed crops only pesticides registered by USEPA for same or similar uses with or without restrictions. In addition to those pesticides listed in III. C., this alternative would also permit the use of pesticides listed in III.D. These products are restricted in the U.S. by USEPA. These products have only been used in Burma in very small quantities on oilseed crops because most are relatively new or more expensive than many of those now or previously used. None, however, provide for an effective alternative to aldrin against soil insect pests. Thus essentially an increased risk would occur with no increase in benefit over alternative IV. B. 2.

4. Use in the project area on oilseed crops only pesticides registered by USEPA for same or similar uses without restrictions, as well as allow for the continued use of the USEPA cancelled pesticide aldrin for soil or seed treatments. Burmese scientists in the AC do not know of any potentially effective substitutes for aldrin for soil insect

control. However, several candidate soil insecticides, like chlorpyrifos, are likely to be effective. Also, discussions with some individuals within the AC and FAO indicate that aldrin as applied may not be as effective as some think. Therefore, tests should begin as soon as possible to establish and alternative to aldrin before the end of the project. The continued use of aldrin for an indefinite period of time could lead to environmental and health problems. Thus, this alternative is suspect and not viable.

5. Use IV. B. 2 except continue the use of aldrin on oilseed crops in the project area ONLY until the local farmers can be familiarized with new products and their physical characteristics, application procedures, and efficacy. This alternative would allow farmers to use a pesticide that they know by experience to provide some control and allow time for efficacy evaluations to be conducted on alternative products. The limited amount of aldrin used in seed and soil treatments on oilseed crops in the short run should not create serious environmental or human hazards. Before the project is completed a suitable substitute for aldrin should be available. To insure that this happens, tests should begin as soon as possible to identify alternative materials.

It is noteworthy that only a small portion of the total acreage of oilseed production is involved and therefore such a phaseout of aldrin should have minimal impact - approximately 10% (145,420 acres) of groundnut, less than 0.1% (3,915 acres) of sesame and 0.5% (1,831 acres) of sunflower are treated with aldrin. Hopefully, improved pest managment practices, including the continued phaseout of the chlorinated hydrocarbon pesticides, in this project will serve as an example and as a catalyst to similar positive actions by the Burmese and will be extended to other agricultural areas within the country.

Selection of the Most Feasible Pesticide Use Alternative:

Based on the present pest situation on oilseed crops in Burma and pesticide use pattern, it appears that the most feasible alternative is IV.B.5. This will have the least disruptive effect on the selection and use of pesticides and will allow for the gradual decrease in the use of aldrin before completely phasing it out prior to project completion.

Extent to Which the Proposed Pesticide Users are Part of Pest Management Programs:

Most of the pesticides are basically well adapted to pest management programs. This is especially true if pest control decisions are made based on the use of pesticides only as needed and with optimum timing of application. As a result, minimum use of pesticides are expected in the project. This situation could change as the result of a major pest outbreak(s) during the project.

Proposed Method or Methods of Application Including Availability of Appropriate Application and Safety Equipment:

Burmese farms in the project area average about 5 acres. Most pesticides are applied with knapsack sprayers and hand-held ULV applicators. Seed treatment is done manually. Thus, there normally will not be excessive drift away from the target area. User exposure will result from such application methods because safety equipment is generally not available.

Acute or Long-term Toxicological Hazards and Measures Available to Minimize Such Hazards (See Table E23):

The acute hazards of all pesticides proposed for use in the project are low to medium. LD_{50} values range from greater than 8,000 + mg/kg (mancozeb) to 67 mg/kg (aldrin). None of the pesticides, with the exception of aldrin, are expected to be especially persistent. Furthermore, with the exception of aldrin, there are no known long-term toxicological hazards known to be associated with their use. The long-term toxicological hazards associated with aldrin are well known and Federal Register reference describing these hazards in detail can be found in the USEPA publication "Suspended and Cancelled Pesticides," USEPA, OPA 159/9, Second ed., October 1979. Safety equipment is usually not available to small farmers; thus, there will be some hazard to applicators. Plans for pesticide safe handling and application training are included in the PP.

Caution on the Distribution, Handling, Storage, and Use of Pesticides:

Where pesticides are to be used great care in the distribution, handling, storage and use of these products must occur. Pesticides should be kept in their orginal containers or if repackaged, the new containers must be properly labelled indicating name of product (common name, trade name, chemical formula), warning as to the toxicity level of the product, what use(s) the product is labelled for, rate(s) of product to be used, mixing instructions if required, application method(s), re-entry information, antidotes or other medical treatment information, as well as, safety precautions. The safety precautions should include proper applicator handling information to minimize exposure; including type of clothing, masks, boots, gloves, etc. if required, as well as precautions concerning potential contamination through drift, run off water, and/or movement into ground water and subsequent exposure to non target organisms such as humans and animals. Great care should be exercised to insure that contamination of food, water, clothing, and articles used in the preparation, serving, or consumption of food does not occur.

Pesticide containers, whether bulk or those used to distribute pesticides to farmers, should be non-corrosive and sealed to insure minimum risk of pesticide escape. It is especially important that they be non-corrosive if stored for any length of time. It is highly

desirable that pesticides be distributed in containers sized to insure rapid use with little to none left for storage. It is also highly desirable that containers be destroyed after use. It is probably unrealistic to assume that this will be done in areas where a container, no matter what it originally held, serves a useful purpose, whether desirable or not. However, people utilizing these containers for other uses should be cautioned that thorough cleaning is necessary and that carrying or storing of water, food, or food stuffs, as well as, using pesticides containers for cooking is highly undesirable and could result in severe sickness or death. BAPP personnel should inform extension personnel and local officials of the dangers of the reuse of these containers. In turn the extension service and other local officials should notify the people at the local level of the potential dangers.

Compatability of the Proposed Pesticides with Target and Non-Target Organisms and Areas:

The pesticide aldrin is toxic to fish and to wildlife, and its persistence can cause carry-over effects from one year to the next. However, the relative small acreages involved will minimize the actual impact. This coupled with the proposed phaseout, should insure the well being of that portion of the environment not yet negatively affected. A majority of the other pesticides now available in Burma are relatively non-persistent and are acceptable for agricultural purposes if used according to label directions. Minimum impact on non-target organisms and areas would be expected to occur. However, contamination through drift, run off water, and/or ground water could occur with any of these pesticides and great care should be exercised to insure that this does not happen.

The Conditions Under Which the Pesticides are to be Used:

The pesticides will be applied in open fields of oilseed crops which are annually subject to periods of heavy rainfall and extended periods of drought and continuous high temperatures. These tropical conditions and rotations with other crops should result in relatively more rapid degradation of residues than in temperateregions. The application of these materials with knapsack sprayers and/or hand-held ULV sprayers will minimize drift to non-target flora and fauna and to bodies of water.

The Requesting Country's Ability to Regulate or Control the Distribution, Storage, Use and Disposal of Pesticides:

The Government has complete control of the importation, distribution, and recommendations for use of pesticides. None are manufactured in Burma. Distribution is from a central storage to divisions or states to township storage facilities and then either directly or through village cooperatives to the farmers. There are no established residue tolerances nor are there presently capabilities to monitor pesticide residues.

The Provision For Training Pesticide Users and Applicators:

The Government has initiated a program through its Extension Division to provide training to users of pesticides in proper and safe handling methods. Additionally, the BAPP provides for training programs in the proper use and handling of pesticides for project personnel, seed-farm workers, farmers, and others involved in the use of pesticides, as well as training in pest management techniques.

The Provisions Made for Monitoring the Use and Effectiveness of the Pesticides:

The project is looking to the ARI at Yezin to conduct research on pesticides and develop appropriate pesticide use efficacy data for pest problems encountered in the project. Additionally, ARD sites will provide an opportunity to conduct practical field trials of pesticides as well as other production technologies. In addition the AC keeps records on the use of pesticides on the various crops.

Environmental Consequences:

A. Alternative #1--Use no pesticides in the project areas on oilseed crops. The environmental impact of this option is limited to the unchecked damage and yield losses caused by pests of oilseed crops, the resulting economic losses, and reduced food and oil production. Such losses are considered to be unacceptable and would alienate a considerable portion of the affected farmers.

B. Alternative #2--Use on oilseed crops in the project areas only pesticides registered by USEPA for the same or similar uses without restrictions. The environmental consequences of this option are similar but not as severe as for the first in terms of pest induced reduced yields and economic losses to farmers. On the other hand, attempts to use available unrestricted pesticides that have not been tested adequately or are minimally effective against some pests would alienate farmers and compromise the success of the project. Thus, this is not a desirable action.

C. Alternative #3--Use in the project areas on oilseed crops only pesticides registered by USEPA for the same or similar uses with or without restrictions. This alternative adds phosphamidon, brodifacoum, zinc phosphide, and alachlor to the lists of materials available under XV.B. Alternative #2. All have been little used on oilseed crops in the past in Burma. Phosphamidon, brodifacoun, and zinc phosphide are rated as "extremely to highly hazardous" by WHO. Thus farmers would be exchanging safe insecticides with known efficacy value for some more hazardous materials that have not been tested for a number of pests. This option would have the same consequences of XV.A. Alternative #1 and B. Alternative #2 plus adding an extra human risk factor.

D. Alternative #4--Use in the project area on oilseed crops only pesticides registered by USEPA for the same or similar uses without restrictions, except aldrin for soil or seed treatment. This alternative allows for indefinite continued use of aldrin. Although the use of this product up to this point does not appear to have caused any long term environmental problems, continued use and possible expansion of use as farmers become more familiar with the potential economic losses resulting from soil pests makes the long term use of aldrin highly undesirable. The risk is too great.

E. Alternative # 5 - - Use XV.B. Alternative #2 except continue the use of aldrin on oilseed crops in the project area ONLY until the local farmers can be familiarized with new products and their physical characteristics, applications procedures, and efficacy. This alternative will allow farmers to continue the use of aldrin until a suitable substitute(s) is available. This will have the least disruptive effect on the selection and use of pesticides and will allow for the gradual decrease in the use of aldrin before completely phasing it out prior to project completion. It will also allow for the continued use of products listed under XV.B. Alternative #2.

Actions Recommended if Alternative #5 is Utilized:

Subject to the approval of the proposed Alternative #5, it is recommended that:

1. Project personnel, in cooperation with the Government, should begin testing products to substitute for aldrin for the control of termites, crickets, and white grubs on oilseed crops. All reasonable alternatives should be evaluated and at a minimum chlorpyrifos should be tested. Testing should be completed before the end of the third year of the project. Testing protocols should provide for collection of residue data in the harvested agricultural commodity, if tolerances and/or MRLs have not already been established for that use. ST/AGR can provide assistance with test protocol design.

2. Any promising candidate pesticides should be further tested in practical trials on ARD farms and elsewhere. For those use patterns which do not have established food tolerances (USEPA or FAO/WHO), samples should be collected for residue analysis.

3. Treatment instructions, including elementary safety precautions, should be translated into Burmese and these instructions affixed, as labels, to each farmer's allotment of pesticide.

4. Other candidate pesticides should also be evaluated as they become known to project personnel. Pesticide management is a dynamic field and the search for new, more cost effective and safer materials is a continuous process. Emphasis should be given to pesticides which have been toxicologically cleared by the USEPA and/or FAO/WHO.

5. Since groundnuts grown in the presence of aldrin will translocate new residues to the soil metabolite dieldrin, special attention should be taken to mix these groundnuts with those harvested from non-treated areas.

6. The Government should re-examine the real (total) cost of pesticides considered for importation giving full consideration to such factors as environmental costs, health hazards, effects on beneficial organisms, and usefulness in pest managment as part of total farming systems. The Government has an advisory board made up of experts on pesticides to assist in the decisions regarding their importation and use in Burma.

7. As part of the PP farmer training in the proper use of pesticides should be provided.

VII. CONDITIONS PRECEDENT, COVENANTS, WAIVERS AND STATUS OF NEGOTIATIONS

A. Conditions Precedent to Disbursements

Except as A.I.D. may otherwise agree in writing, prior to any disbursement or the issuance of any documentation pursuant to which disbursement will be made, the Cooperating Country shall furnish, in form and substance satisfactory to A.I.D., a statement identifying the various agencies and offices of the Cooperating Country responsible for implementation of the Project and designating individuals in each such agency or office responsible for coordinating Project components.

B. Covenants.

1. The Cooperating Country shall covenant that it shall process and clear expeditiously, and store and distribute properly, all goods and commodities financed under the Project.

2. The Cooperating Country shall covenant that it shall ensure that the Ministry of Agriculture and Forests or other entities of the Cooperating Country to which the goods are destined will pay any and all taxes and duties on A.I.D.-financed commodities, and/or exempt such commodities from such costs.

3. The Cooperating Country shall covenant that it shall ensure that each agency and office of the Cooperating Country responsible for carrying out the Project will cooperate to the maximum extent possible with the Ministry of Agriculture and Forests in carrying out the Project.

4. The Cooperating Country shall convenant that during the project execution period it shall undertake a study of fertilizer pricing and supply and explore adjustments necessary to assure supplies adequate to meet long-term domestic requirements.

5. The Cooperating Country shall convenant that during project execution, all funds generated from the sale of AID-financed fertilizer shall be placed into a special account and segregated from all other accounts and funding for purposes of financing activities mutually agreeable in support of project objectives.

C. Waivers

As previously mentioned, contractor support items such as furniture, small appliances, refurbishing materials and vehicles will be procured from project funds outside of the grant agreement. It is anticipated that the project grant agreement will not be signed before the fourth quarter of FY 1986. Although AID/Buram could obligate those project funds prior to the PROAG being signed, it would not be prudent to do so. Therefore, given that in all probability there will

be less than 60 days to unilaterally obligate project funds, it is recommended that waivers of source/origin and competetive procurement procedures be included in the project authorization. In addition, it is recommended that proprietary procurement be authorized for the procurement of vehicles required by the technical assistance team. Finally, sunfloa seed required under the project can only be procured form Australia, hence, a waiver of source/origin for this procurement is also included in the authorization. Waiver requests are appear in Annex G of this paper.

D. Negotiating Status

The above conditions and covenants have been discussed with and agreed upon by the Ministry of Agriculture and Forests. During Project Agreement negotiations, the AID/Burma Representative will incorporate into the Agreement, appropriate language to cover their terms and conditions.

VII. MONITORING AND EVALUATION PLAN

The evaluation plan for the Burma Agriculture Production Project will include several purely evaluative activities undertaken jointly by AID and the BAPP Management in order to gather essential data. The plan will also depend for much of its data on information which is routinely available from extant monitoring systems.

A. Users of the Information

The major users of information collected under the BAPP will be: (1) the various teaching, research and operations elements of the Agriculture Corporation; (2) the cooperative organizations which market, process and distribute oilseed and processed oils; (3) farmers who participate in the project production program; (4) farmers outside the project area who may wish to adapt the technologies being transmitted through the project; (5) other donors and their counterpart organizations involved in the oilseed sub-sector; (6) project management; and (7) AID/Burma.

B. Project Goals, Purposes and Outputs

The goal of the project is to increase agricultural production, rural incomes, rural employment, and to continue to improve nutrition by assisting individual Burmese farmers and other private sector agriculture sector entities in achieving increased production from which they will derive increased net income and other benefits (incentives) encouraging further individual efforts to increase production.

The project purpose is to introduce and bring about adoption in a 42-Township area farming systems which include among other things, new water, soil and pest management technologies. A corallary purpose is to positively influence levels of income and employment, national food supply, and nutrition.

The outputs include:

Studies and Research:

- -- Planning studies and economic analyses developing and examining alternative programs designed to reduce the foreign exchange costs to the Government of Burma of fertilizer subsidies.

- -- Planning studies, economic analyses, and pilot program tests examining alternative marketing, processing and distribution programs for oilseed crops.

- -- Adaptive research and demonstration plot programs are implemented focussing on plant varieties, soil

management, fertilizer use, irrigation/water management, crop protection, multiple cropping and inter-cropping on land which includes oilseeds in the crop sequence, and approaches to agro-forestry in Burma.

-- Capabilities of the Planning and Statistics Unit of the AC for collecting, analyzing and disseminating selected socio-economic and other data needed for program/project development, management and evaluation strengthened. Examples of this effort will include training obtained from participation in supervising or implementing:

  -- Informal, rapid-approach, sample surveys designed to obtain reliable estimates of production.

  -- A sample survey of farm families in the project area measuring changes in: (1) net income by crop, (2) relative increases in yields and net income due to the technology package, (3) on-farm job creation by acre of crops (and, by extrapolation, farm and township), and, (4) off-farm job creation by township based on increased processing requirements and purchasing power.

  -- Rapid, simple, sample consumption surveys measure changes in consumption levels of edible oils.

  -- Informal, rapid-approach, sample surveys to verify farmer yields in the project area and indicate the extent to which increases in net income from increased yields and production are accruing to farmers (either from the formal market system or other systems) and to capture data about employment generated, time saved, etc., under the project.

Extension/Technology Transfer

-- 185 person months of technical assistance provided in support of project objectives

-- A technology package (including fertilizer application rates, cultivation practices, water, soil and pest management practices derived from the adaptive research noted below) and technical advice on its application extended to farmers in 42 project townships.

-- On-farm water management and crop protection programs will be instituted on four seed farms.

-- Capacity to produce and distribute inoculum at the rhizobium laboratory increased to 3 million 250-gram packets annually. Quality control improved and standardized.

Training

-- 872 person months of overseas training and an estimated 122 person months of in-country training conducted in areas of project emphasis.

C. Managers' Priority Questions

Following are the priority questions to be addressed by the Monitoring and Evaluation system at the goal, purpose and output levels:

Goal Level:

1. To what extent is the project contributing to increased production in and/or outside the project areas? Can/will the increases be sustained?

2. How much are rural incomes being increased as a result of this project? Are increased net incomes and/or other benefits derived from increased production sufficient to encourage further individual efforts by individual farmers and other private sector entities to increase production?

3. Is individual consumption of edible oils increasing as a result of this project?

Purpose Level:

1. 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?

2. 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, commodity or time savings, money earned, employment generated, etc?

Output Level:

Studies and Research:

1. To what extent are studies financed/administered under the project providing answers to the purpose and goal level questions above?

2. To what extent are studies financed/administered under the project providing meaningful analysis of alternative programs for assuring the future availability of resources for purchase or production of fertilizer adequate to meet rising demands? Is anyone acting on the basis of information provided in the analyses?

3. Are studies being implemented which will help determine the most efficient and timely marketing, processing and distribution systems being employed in the oilseed sub-sector?

4. Is the capability of the Planning and Statistics Unit of the AC being strengthened to improve collection, analysis and dissemination of socio-economic and other data needed for program/project development, management and evaluation?

5. To what extent are the programs for adaptive research and demonstration answering relevant questions about appropriate plant varieties, soil management, fertilizer use, irrigation/water management, crop protection, multiple cropping, agro-forestry and inter-cropping?

Extension/Technology Transfer

1. How much technical assistance is being provided in support of the various components of the project and how useful is it?

2. How many farmers farming how much land in which townships are being taught to use the technology package? Do they have access to the necessary inputs to implement the package? Are they using all the elements of the package? If not, which elements are they using and why are they not using the other elements?

3. What progress has been made in installing on-farm water management and crop protection programs on the seed farms?

4. How many 250-gram packets of inoculum are being produced and distributed annually? Have quality control procedures been improved and standardized? How?

Training

How many person months of training have been provided under the project overseas? In-country?

D. Key Indicators and Administrative Data to Answer Managers' Questions

Following are the key indicators, administrative data, studies, and/or information resources from which project managers will derive verifiable indication of progress (or lack of progress) under the BAPP:

Goal Level:

1. To what extent is the project contributing to increased production in and/or outside the project areas? Can/will the increases be sustained?

The information necessary for determining the magnitude of increase in production is available from administrative records maintained in the project townships and is regularly reported to the central offices of the AC. This information is thought to be reliable with respect to areas planted, but unreliable with respect to specific production levels. Nevertheless, it provides a relative indication of changes in production levels over time. Informal, rapid-approach, sample surveys may be used to verify these reports and provide basis for more reliable estimates of production.

2. How much are rural incomes being increased as a result of this project? Are increases in net income and/or other benefits derived from increased production sufficient to encourage further efforts by individual farmers and other private sector entities to increase production?

The AC will contract with the Institute of Economics or a similar local institution to design and implement a sample survey of farm families in the project area to establish baseline data from which to measure changes in: (1) net income by crop, (2) relative increases in yields and net income due to the technology package, (3) on-farm job creation by acre of crops (and, by extrapolation, farm and township), and (4) off-farm job creation by township based on increased processing requirements and purchasing power. Other factors may be incorporated or substituted at survey design stage.

3. Is individual consumption of edible oils increasing as a result of this project?

The AC will contract with the Ministry of Health or other appropriate local institution(s) to design and implement rapid, simple, sample consumption surveys or macro-economic data analyses (as appropriate) to establish baseline/continuing data from which to measure changes in consumption levels of edible oils.

Purpose Level:

1. 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?

The information necessary for determining the magnitude of increase in yields is, like production data, available from administrative records maintained in the project townships and is

regularly reported to the central offices of the AC. This information has heretofore proven generally unreliable since certain percentages of farmers' production must be sold to the government--and yields are consequently understated. Project management will implement informal, rapid-approach, sample surveys to verify/improve upon these reports and provide basis for more reliable estimates of yields.

Research from the Agriculture Research Institute, adaptive research carried out under this project, and data from surveys described above will provide the basis for determining which components of the project and technology package are responsible for increased yields.

2. 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?

Again, research from the Agriculture Research Institute, adaptive research carried out under this project, and data from survey(s) described above will provide the basis for determining which components of the project and technology package are responsible for increased yields. The sample survey(s) in particular will provide the basis for determining which components of the project and technology package are actually being adopted by farmers and therefore contributing to increased yields in the project area. An extension/expansion of this study will indicate the extent to which increases in net income from increased yields and production are accruing to farmers (either from the formal market system or otner systems). These surveys will also capture data about employment generated, time saved, etc.

Output Level:

Studies and Research:

1. To what extent are studies financed/administered under the project providing answers to the purpose and goal level questions?

The indicators are self evident.

2. To what extent are studies financed/administered under the project providing meaningful analysis of alternative programs for assuring the future availability of resources for purchase or production of fertilizer adequate to meet rising demands? Is anyone acting on the basis of information provided in the analyses?

The indicators are self evident.

3. Are studies being implemented which will help determine the most efficient and timely marketing, processing and distribution systems being employed in the oilseed sub-sector?

The indicators are self evident.

4. Is the capability of the Planning and Statistics Unit of the AC for collecting, analyzing and disseminating selected socio-economic and other data needed for program/project development, management and evaluation being strengthened?

Technical assistance contractors will be asked to indicate in periodic reports (a) the nature of problems initially encountered in establishing socio-economic progress indicators and (b) the steps taken to improve on the capability of the Planning and Statistics Unit to collect, analyze and disseminate these data.

5. To what extent are the programs for adaptive research and demonstration answering relevant questions about appropriate plant varieties, soil management, fertilizer use, irrigation/water management, crop protection, multiple cropping, agro-forestry and inter-cropping?

Technical assistance contractors will be asked to indicate in an initial survey report the relative degree to which these questions have been addressed before project implementation. Periodic or special contractor reports called for in contractor work plans and issued over the period of project implementation will provide comment on the relevance of the adaptive research and demonstration programs to information needs of farmers and other interested parties.

Extension/Technology Transfer

1. How much technical assistance is being provided in support of the various components of the project and how useful is it?

The source of this information will be the project managers and host country technical counterparts. The information regarding usefulness will generally be communicated informally, but project managers will consider use of a quick and easy "check-off" technical assistance report card which is linked to formal scopes of work.

2. How many farmers farming how much land in which townships are being taught to use the technology package? Do they have access to the necessary inputs to implement the package? Are they using all the elements of the package? If not, which elements are they using and why are they not using the other elements?

Questions to answer these questions will be built into the formal survey system described above.

3. To what extent have on-farm water management and crop protection programs been instituted on the seed farms?

These questions will be answered by site visits to the seed farms and by contractor and AC reports.

4. How many 250-gram packets of inoculum are being produced and distributed annually? Have quality control procedures been improved and standardized? How?

These questions will be answered by site visits to the inoculum production center and contractor and AC reports.

Training

How many person months of training have been provided under the project overseas? In-country?

Information about overseas training will be available in monthly training reports issued by the AID training officer. The AC will have overseas training information available from its own personnel records. Information on in-country training will be available from regular reports of AC extension agents and trainers. These reports are regularly gathered and compiled in presentation form by AC project personnel.

E. Other Appropriate Methods to Answer Managers' Questions

Project managers will solicit from host country institution(s) identified to work with socio-economic and nutrition surveys other alternative methods for obtaining information necessary to effective management of the project . Project designers believe that the monitoring and evaluation system presented here is already fairly elaborate. The AID Office hesitates to include in this paper promise of additional data gathering systems and/or objectives.

F. Host Country Support

There will be no formal monitoring and evaluation unit established under the project. It will be the responsibility of AID and AC project managers and, as subsequently determined and specified, the Planning and Statistics Unit of the AC, to assure that the monitoring systems established in this plan are carried out on a continuous basis and according to the periodicity necessary to achieve the objectives of this monitoring and evaluation plan.

G. Feedback Procedures

Annual reports will be generated by the Contractor and disseminated to all potential institutional users identified in Section 1. The farmers and other interested private sector parties identified in Section 1 will receive feedback on project research findings and the experiences of other farmers/participants from workshops and extension activies.

H. Budget

A.I.D.	Government of Burma
$400,000	(costs of local institutional contracts and foreign information management experts and evaluation consultants)
	$ 75,000 (Staff costs)
Totals $400,000	$ 75,000

I. Evaluation Schedule

The evaluation plan for the Burma Agriculture Production Project (BAPP) will include several activities undertaken jointly by AID and the BAPP Management including; (1) acquisition of baseline data utilizing in-country research institution(s) and an IQC contractor within 6 months of project obligation; (2) mid-project evaluation in 11/88; and (3) a final Impact Evaluation in 1991. Annual project reviews having (1) agendas which incorporate points of evaluation listed above and (2) presentations of reports including data gathered from administrative and contract research information will allow AID/Burma and the BAPP project management team to assess project progress, and, on a regularly scheduled basis, make necessary adjustments in project implementation strategy.

The responsibility for project evaluation will rest with BAPP project management assisted by the Ministry of Agriculture and Forests. It is anticipated that AID/Burma will sponsor training for several analysts from the BAPP project management team to improve evaluation techniques and analysis as required.

The concept of evaluation is not new to the Ministry of Agriculture and Forests or to officials tentatively identified within the BAPP project management team. SRUB officials have actively participated in the mid-project evaluation of the Maize and Oilseed Production Project as well as the Agriculture Sector Review earlier this calendar year.

Project funds will be used to pay for the costs of (1) U.S. consultants required to assist in acquisition of baseline data, (2) local institutional contracts, and (3) foreign information management experts and evaluation consultants for joint evaluations scheduled for the mid-term evaluation in November 1988 as well as the final Impact Evaluation scheduled for 1991. It is estimated that up to $400,000 in grant funds plus Burmese Government-funded local costs will be adequate to cover these costs. AID/Washington technical assistance and guidance will most likely be needed from such offices as PPC/Evaluation and ANE Bureau/DP/Evaluation to help in defining the scope of the evaluations and to help identify and recruit qualified evaluation team members.

ANNEXES

Annex A. PID Approval Message
Annex B. Logical Framework
Annex C. Statutory Checklist
Annex D. Grantee's Request for Assistance
Annex E. Project Analysis
    1. Economic Tables
    2. Financial Tables
    3. Environmental Tables
    4. Technical Tables
Annex F. Draft Scopes-of-Work for Technical Assistance Team
Annex G. Requests for Waivers
Annex H. Seed Equipment Listing

ANNEX A

Annex A

PID APPROVAL MESSAGE

The Asia Project Advisory Committee (APAC) approved the subject PID on May 30, 1985. The reporting cable, STATE 170593 '85, is attached.

VZCZCMJP97ETA183
PP RUMJRV
DE RUEHC #2593 1560150
ZNR UUUUU ZZH
P 050151Z JUN 85
FM SECSTATE WASHDC
TO AMEMBASSY RANGOON PRIORITY 5976
BT
UNCLAS STATE 170593

AID AMB EEX DCM CHRON

AIDAC

E.O. 12356: N/A
TAGS:
SUBJECT: HIGH PROTEIN CROP DEVELOPMENT PROJECT (482-0007) - APAC REVIEW OF PID

1. THE ASIA PROJECT ADVISORY COMMITTEE (APAC) REVIEWED THE PROJECT IDENTIFICATION DOCUMENT (PID) FOR THE HIGH PROTEIN CROP DEVELOPMENT PROJECT WITH AID REP WARD MAY 30. THE APAC APPROVED THE PID AND DEVELOPMENT OF A PROJECT PAPER (PP) FOR THE PROJECT WITH THE FOLLOWING GUIDANCE.

2. THE APAC DISCUSSED ONE ISSUE, THE POLICY CONTEXT FOR THE PROJECT. MR. WARD STATED THAT THE PROJECT WAS FOCUSED ON CROPS THAT ARE LESS SUBJECT TO CONTROLS THAN OTHER CROPS. APAC MEMBERS NOTED AID/BURMA ACHIEVEMENTS IN PROVIDING ASSISTANCE TO PRIVATE OIL MILLERS AS WELL AS COOPERATIVES UNDER THE NEW EDIBLE OIL PROCESSING PROJECT.

THE APAC ALSO ASKED THAT THE PP INCLUDE ANALYSIS OF POSSIBLE PROJECT-SPECIFIC POLICY CONSTRAINTS, AND, IF THERE ARE ANY, HOW TO ADDRESS THEM.

3. THE APAC ALSO BRIEFLY DISCUSSED THESE CONCERNS WHICH SHOULD BE COVERED IN THE PP:

- A. THE RELATIONSHIP OF THIS PROJECT TO OTHER AID PROJECTS IN THE BURMA PROGRAM SHOULD BE DESCRIBED IN THE PP.

- B. THE RATIONALE FOR THE TOTAL DOLLAR VALUE OF THE PROJECT SHOULD BE SPELLED OUT IN THE PP. THIS COULD BE BASED ON THE NUMBER OF TOWNSHIPS TO BE ASSISTED, ACREAGE AND/OR FERTILIZER REQUIREMENTS.

- C. THERE WAS CONCERN OVER RECURRENT COSTS, ESPECIALLY OF IMPORTED FERTILIZERS, AFTER THE PROJECT. THE PP SHOULD ANALYZE PROSPECTS FOR CONTINUED ACCESS TO REQUIRED INPUTS AFTER OUR ASSISTANCE ENDS.

- D. ANALYSIS OF THE IMPACT OF THE PROJECT ON WOMEN SHOULD BE INCLUDED IN THE PP. THE APAC NOTED EARLIER AID/BURMA EFFORTS TO FUND STUDIES OF WID EFFECTS OF

AGRICULTURAL PROJECTS AND SUGGESTS MEANS BE FOUND TO DO THIS ANALYSIS.

- E. IT WAS ALSO SUGGESTED THE PP INCLUDE A "LESSONS LEARNED" SECTION AND AN EVALUATION PLAN LIKE THAT OF THE EDIBLE OIL PRODUCTION PROJECT. DAM

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ANNEX B

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Annex B

Project Title & Number: Agriculture Production Project No. 482-0007

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: To increase agricultural production, rural incomes, rural employment and to continue to improve nutrition.	Measures of Goal Achievements: By year 5 the following increases will have been achieved: 1. Groundnut production up: 68,460 MT's 2. Sesamum production up: 99,422 MT's 3. Niger production up: 7,189 MT's 4. Sunflower production up: 171,206 MT's 5. Other Pulses production up: 1,460 MT's 6. Foreign exchange value of increased vegetable oil and cake availability of $20 million. 7. Average per capita annual consumption of edible oil increased from 6 kg to 6.5 kg. 8. Increased Net Farm Income of 1,632 million ($192 million).	Item 1-5 a) Crop production statistics of SRUB. b) Project reports of Agriculture Corporation. c) Routine reports Township and Village Tract Councils and Agriculture Corporation Managers. Item 6 & 7 Estimated domestic production of edible oils by the Ministry of Planning and Finance, Statistics Division. Item 8 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 GDI contribution by state/division.	Assumptions for achieving goal targets: 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.

	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	Assumptions for achieving purpose
Project Purpose: introduce and ng about adoption a 42 township area ming systems which lude among other things water, soil and t management hnologies.	Conditions that will indicate purpose has been achieved: End-of-Project Status: The following acreages (by crop) will be planted using recommended technologies and inputs: 2. Direct Impact From Project Niger 20,000 acres Groundnuts 203,000 acres Sesamum 244,000 acres Sunflower 205,000 acres Other oilseeds 11,500 acres Total 683,500 acres 2. Increase in oilseed production will eliminate the need to import edible oils and also acreage the export of oilseed cake, freeing/ generating enough foreign exchange for Burma to purchase its own TSP for continuing the oilseeds production program. 3. Courses in water management incorporated into the AC's ongoing extension and farmer training programs. At least two staff members from each seed farm will have attended at least one training session in on-farm water management. 4. Courses in pest management, including the safe use of chemicals, incorporated in the AC's ongoing extension and farmer training programs. Scouting for early detection of pest infestation incorporated into extension as well as the crop production program at the seed farms.	Detailed township, village and farm records maintained at township and village tract levels on acres with improved tillage practices and inputs used by individual farmers.	1. That acceptable technology 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 farmers accept and adopt technologies introduced. 5. That weather conditions are near normal.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose:	Conditions that will indicate purpose has been achieved: End-of-Project status. 5. The important pest (insects, weeds, plant pathogens, nemotodes, and vertebrates) of each food crop will be identified, their biology studies, and their distribution mapped. Determinations will be made as to the importance of crop rotation on pest species. A scheme for monitoring pest will be developed. Base-line economic injury levels will be devised and utilized; pest control alternatives will be considered. Officials, as well as farmers, will be trained in pest identification, the use of monitoring techniques, and the selection of the proper management tactic. These individuals will also receive training in the proper use, handling and application of pesticides. Field testing of pesticides will be completed and new products incorporated into an oilseed crop protection program. Area wide rat control program will be evaluated and incorporated into crop protection program if feasible. 6. Workshops on the role of agroforestry and how it relates to farming systems developed and at least 50 farmers have planted areas of trees on their own land.		Assumptions for achieving purpose:

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose:	Conditions that will indicate purpose has been achieved: End-of-Project status. 7. The majority of returned trainees will be in positions to utilize and transfer their new-found knowledge to others within the AC and to participating farmers. It is expected that the training provided will provide better understanding and appreciation of policy issues which impact agriculture development. 8. All construction completed and seed processing equipment installed and operational, producing quality improved seeds. An effective O&M program, with budget, for farm equipment and for plant and equipment in place and operational. A meaningful record keeping system installed and routinely maintained. 55,000 baskets of seed produced, processed and distributed to farmers (last year of project). 9. A capacity and methodology developed and institutionized 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 dissiminating these to interested parties.		Assumptions for achieving purpose:

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose:	Conditions that will indicate purpose has been achieved: End-of-Project status. 10. Capacity attained to produce 3 million 250-gram packets of virile rhizobium annually. 11. Farm women attending AC farmer training and instructional courses, comprising at least 25% of the number; at least 25% of the participant trainees are women.		Assumptions for achieving purpose:

(6)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Outputs: 1. Appropriate amounts of chemical fertilizer applied to 2,528,000 acres of food crops; recommended fertilizer application rates refined, based on information derived from local fertilizer trials and a project-supported soil testing program. 2. Extension programs in water, soil pest management strengthened. 3. Seed farms developed. 4. Capabilities strengthened in the Planning and Statistics Unit of the AC to collect, analyze and disseminate selected socioeconomic and other data needed for program/project development, management and evaluation. 5. Capacity to produce and distribute inoculum at the rhizobium laboratory increased to 3 million 250-gram packets annually. Quality	Magnitude of Outputs: 1. Field demonstration trials with at least 5 locations in each township. 2. 2 Inoculum and 4 seed quality assurance laboratories will be developed and expanded. 3. Efficient irrigation, adequate drainage, diversion ditches and raised seed beds will be demonstrated. These practices to be extended to farmers' fields in 8 townships. 4. 75% - 100% of returned participants occupy positions directly or indirectly involved with crop production. 5. -185 person months of technical assistance; -872 person months of overseas training; -an estimated 122 person months of in-country training; -on-farm programs will be instituted on seed farms in water management and crop protection -production and distribution of nitrogen-fixing inoculum; -extension of a technology package, and technical advice on its application, to farmers in 42 project townships; and	1. Regular records of Agriculture Research Institute at Yezin and other sites. 2. Regular records of the Extension Division staff managing high technology sites in the intensive townships. 3. Records of seed farm managers Agriculture Corporation project staff and U.S. seed technology advisors. 4. AC regular reports. 5. AC personnel records. 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.	Assumptions for achieving Outputs: 1. That necessary staff is assigned and facilities can be established for conducting trials, development of seed farms, etc. 2. That suitable technology can be tested and proven on a timely basis for use at demonstration sites. 3. That needed equipment, funds and staff are provided on time. 4. That U.S. and local procurement proceeds as scheduled. That ocean shipping, internal transport and storage can be arranged as needed.

...t Outputs:	...mary Outputs:	...DICATORS	...OF VERIFICATION

Assumptions for achieving ... output:

ontrol improved and tandardized.

. More farm women articipating in the C farmer training nd instructional essions; more women rainees in participant raining program.

-adaptive research and demonstration plots focussing on plant varieties; soil management; fertilizer use; irrigation/ water management; crop protection; multiple cropping and intercropping on land which includes oilseeds in the crop sequence; and approaches to agro-forestry in Burma.

109

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Inputs: AID Funding 1. Technical Assistance $ 2.475M 2. Participant Training $ 2.254M 3. Commodities $18.006M 4. Contractor Support Costs .18 M 5. Contingency inflation $ 6.685M 5. Evaluation $ .4 M Sub-Total $30.0 M SRUB Funding . Technical Assistance $ .060M . Training $ .195M . Commodities $20.663M . Operations &Maintenance 3.007M . Evaluation $ .075M Sub-total $24.00 M TOTAL $54.00M	Implementation Target(Type & Quantity) AID- ($30.0 million) 1. Technical Assistance a) 96 person months of long-term TA (8 PY's x 12 mos). b) 89 person months of short-term technical assistance 2. Participant Training a) 19 MS degrees at 2½ yrs each--(40 PY's or 480 PM's) b) 5 PhD degrees at 4 yrs each c) 52 short-term training programs at average of 4 months (140 PM's) d) 430 in-country participants 3. Commodity Procurement a) Fertilizer $15.446 million TSP-60,000 MT (approx.) b) Equipment, parts and supplies $2.56 million c) Contractor Support Costs $.18 million	AID 1. Contractor records 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 invnetory 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 report. 3&4 SRUB project records, and quarterly reports.	Assumptions for providing Inputs: 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 accomodities 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.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Inputs:	Implementation Target(Type & Quantity) 4. Evaluation (one mid-term and one final evaluation.) $0.4 million 5. Contingency and inflation $6.685 million SRUB - ($24.00 million) 1. Technical Assistance $ .060 M 2. Training $ .195 M 3. Fertilizer $ 19.215 M Urea - 40,000 MT MP - 20,000 MT 4.Operations and Maintenance $ 3.007 M 5. Evaluation .075 M		Assumptions for providing Inputs: 4. That complementary facilities and equipment can be constructed, developed or purchased locally to meet project requirements.

ANNEX C

Annex C

Checklist of Statutory Criteria

PROJECT CHECKLIST

A. GENERAL CRITERIA FOR PROJECT

1. FY 1982 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653 (b) (a) Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget country or international organization allocation reported to Congress (or not more than $ 1 million over that amount)?	(a) Congressional Notification to be made before authorization. (b) Assistance is within Operational Year Budget.
2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be: (a) Engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	(a) Yes. (b) Yes.
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?	No further legislative action required.
4. FAA Sec. 611(b); FY 1982 Appropriation Act Sec. 501. If for water or water-related land resource construction has project met the standards and criteria as set forth in the principles and Standards for planning Water and Related Land Resources, dated October 25, 1973? (See AID Handbook 3 for new guidelines.)	N/A

PROJECT CHECKLIST

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all this assistance for it will exceed $1 million, has Mission Director certified and regional Assistance Administrator taken into consideration the country's capability to receive, maintain and utilize the project?	N/A
6. FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.	No.
7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; and (c) encourage development and use of cooperatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	The project introduces and encourages farmers to plant high protein crops and improve existing yields through improved technology and the use of fertilizers. These productivity gains will further competition and initiative in the private sector.
8. FAA Sec. 601 (b). Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs including use of private trade and investment abroad and encourage private U.S. participation in foreign assistance programs(including use of private trade channels and the services of U.S private enterprise)	The project will facilitate Burmese Government investment in rural development and may indirectly encourage U.S. private trade investment. It is planned that project procurment will be the U.S. when applicable. TA from U.S. firms will be funded under the grant.

PROJECT CHECKLIST

9. FAA Sec. 612(b), 636(h); FY 1982 Appropriation Act Sec. 507. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.	The SRUB is contributing 45 percent of the cost of this project. No procurement is planned in countries for which the U.S. owns excess currency.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	There is no U.S. owned Burmese currency available for this project.
11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes.
12. FY 1982 Appropriation Act Sec.521. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?	N/A
13. FAA 118(c) and (d). Does the project comply with the environmental procedures set forth in AID Regulation 16? Does the project or program take into consideration the problem of the destruction of tropical forests?	Yes, see Section VI F of of this PP.
14. FAA 121 (d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)?	N/A

PROJECT CHECKLIST

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria a. FAA Sec. 102(b), 11, 113 281(a). Extent to which activities will (a) effectively involve the poor in development at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?	Project will significantly improve the ability of the Burmese to implement programs designed to improve the productivity of small farms in rural areas. Project will indirectly strengthen cooperatives and improve the status of women (see VI C of this PP).
b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used?	Yes.
c. FAA Sec. 107. Is emphasis on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?	Yes. The project will emphasize productivity improvements through the introduction of improved seed, fertilizer, water management and other appropriate technology.

PROJECT CHECKLIST

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the letter cost-sharing requirement being waived for a "relatively least developed" country)?	Yes.
e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"? (M.O. 1232.1 defined a capital project as "the construction, expansion, equipping or alteration of a physical facility or facilities financed by AID dollar assistance of not less than $100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character.)	N/A
f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?	Yes, See Section VI A of the PP.
g. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.	The project directly supports the Burmese program to increase edible oil quantity and quality nationwide. The program was conceived by the Burmese to meet a critical national food requirement and is focused on rural needs.

PROJECT CHECKLIST

C. STANDARD ITEM CHECKLIST (PROCUREMENT)

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed?	Yes.
2. FAA Sec. 604(a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him?	Yes.
3. FAA Sec. 604(d). If the cooperating country discriminates against marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company?	The cooperating country does not discriminate.
4. FAA Sec. 604(e); ISDCA of 1980 Sec. 705(a). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U.S.)	N/A
5. FAA Sec. 604(g). Will construction or engineering services be procured from firms of countries otherwise eligible under Code 941, but which have attained a competitive capability in international markets in one of these areas?	N/A
6. FAA Sec 603. Is the shipping excluded from compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centrum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S. flag commercial vessels to the extent that such vessels are available at fair and reasonable rates?	No.

PROJECT CHECKLIST

7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? If the facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?	Yes.
8. International Air Transport. Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will U.S. carriers be used to the extent such service is available?	Yes.
9. FY 1982 Appropriation Act Sec. 504. If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States?	It will.
B. Construction	
1. FAA Sec. 601(d). If capital (e.g., construction) project, will U.S. engineering and professional services be used?	N/A
2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?	N/A
3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million (except for productive enterprises in Egypt that were described in the CP)?	N/A

PROJECT CHECKLIST

C. Other Restrictions

1. FAA Sec. 122(b). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?	N/A
2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administed by an international organization, does Comptroller General have audit rights?	N/A
3. FAA Sec. 620(h). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries?	Yes. Where pertinent, a negative determination regarding commingling shall be obtained prior to any AID-financed commodity being procured.
4. Will arrangements preclude use of financing:	
a. FAA Sec. 104(f) FY 1982 Appropriation Act Sec. 525: (1) To pay for performance of abortions as a method of family planning or to motivate or coerce persons to practice abortions;	Yes.
(2) to pay for performance of involuntary sterilization as method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization;	Yes.
(3) to pay for any biomedical research which relates, in whole or part, to methods or the performance of abortions or involuntary sterilizations as a means of family planning;	Yes.
(4) to lobby for abortion?	Yes.
b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property?	Yes.
c. FAA Sec. 660. To provide training or advice or provide any financial support for police,	Yes.

PROJECT CHECKLIST

prisons, or other law enforcement forces, except for narcotics programs?	
d. FAA Sec. 662. For CIA activities?	Yes.
e. FAA Sec. 636(i). For purchase, sale, long-term lease, exchange or guaranty of sale of motor vehicles manufactured outside U.S., unless a waiver is obtained?	Yes.
f. FY 1982 Appropriation Act, Sec. 503. To pay pensions, annuities, retirement pay, or adjusted service compensation for military personnel?	Yes.
g. FY 1982 Appropriation Act, Sec. 505. To pay U.N. assessments, arrearages or dues?	Yes.
h. FY 1982 Appropriation Act, Sec. 506. To carry out provisions of FAA section 209(d) (Transfer of FAA funds to multilateral oranizations for lending.)	Yes.
i. FY 1982 Appropriation Act, Sec. 510. To finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields?	Yes.
j. FY 1982 Appropriation Act, Sec. 511. Will assistance be provided for the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights?	No.
k. FY 1982 Appropriation Act, Sec. 515. To be used for publicity or propaganda purposes within U.S. not authorized by Congress?	No.

ANNEX D

Annex D

GRANTEE'S REQUEST FOR ASSISTANCE

The Ministry of Agriculture and Forests has been in close contact with AID/Burma during the development of this project. They are supportive of the project and it is expected that the Burmese Governement will submit an official REQUEST FOR ASSISTANCE when AID funding authorization is confirmed.

ANNEX E

Annex E -- Economic Tables

Table E1

ECONOMIC BENEFITS AND COSTS OF PROJECT
(million kyats)

CASE I

	COSTS				BENEFITS	
Project Year	Project Farms*	SRUB**	Total AID**	Total Costs	Total Benefits	Net Benefits
1		5.2	22.3	27.5		-27.5
2	135.8	5.2	31.4	172.4	439.7	267.3
3	148.5	5.2	24.1	177.8	504.1	326.3
4	168.4	5.2	18.1	191.7	549.6	357.9
5	183.2	5.2	12.4	200.8	601.5	400.7
			NPV***	587.2	1567.9	980.7
			B/C ratio		2.70	

CASE II

	COSTS				BENEFITS	
Project Year	Project Farms*	SRUB**	Total AID**	Total Costs	Benefits	Net Benefits
1	----	5.6	39.2	44.8	-------	-44.8
2	204.3	5.6	55.2	265.1	745.1	480.0
3	220.7	5.6	42.3	268.6	853.7	585.1
4	244.7	5.6	31.9	282.2	930.4	648.2
5	262.1	5.6	21.7	289.4	1017.7	728.3
			NPV***	880.4	2654.8	1774.4
			B/C ratio		3.0	

* Includes Economic cost of fertilizer at farmgate
** Does not include fertilizer
***Discounted at 12%

A SER of OER X 1.25 is used in Case I and an OER X 2.2 for Case II.

Table E2

TOTAL INCREMENTAL ECONOMIC COSTS OF PROJECT FARMS
(million kyats)

	1987/88	1988/89	1989/90	1990/91	Total
SER I (1.25 OER)					
Fertilizer	91.27	96.33	101.32	104.54	393.45
Pesticides	11.30	11.90	12.40	12.70	48.30
Oxen Power	-----	2.55	7.65	12.65	22.85
Manure	-----	0.24	0.99	1.47	2.70
Seed	-----	0.19	0.73	1.08	2.00
Other	-----	0.12	0.41	0.61	1.14
Labor	33.27	37.21	44.94	50.12	165.55
Total	135.84	148.54	168.44	183.17	635.99
SER II (2.2 OER)					
Fertilizer	150.98	159.36	167.64	172.97	650.95
Pesticides	20.00	20.90	21.80	22.40	85.10
Oxen power	-----	2.55	7.65	12.65	22.85
Manure	-----	0.24	0.99	1.47	2.70
Seed	-----	0.32	1.23	1.83	3.38
Other	-----	0.12	0.41	0.61	1.14
Labor	33.27	37.21	44.94	50.12	165.54
Total	204.25	220.70	244.66	262.05	931.66

Table E3

FERTILIZER USE AND ECONOMIC COST*

USE (MT)	1987/88	1988/89	1989/90	1990/91	Total
Urea					
Groundnut	0	0	0	0	0
Sesame	7575	8212	8850	9150	33787
Sunflower	6563	6938	7313	7688	28502
Niger	350	400	450	500	1700
Total	14488	15550	16613	17338	63989
TSP					
Groundnut	8700	8875	9025	9075	35675
Sesame	2525	2737	2950	3050	11262
Sunflower	2763	2900	3038	3163	11864
Niger	350	400	450	500	1700
Total	14338	14912	15463	15788	60501
MOP					
Groundnut	1912	1950	1987	2000	7849
Sesame	0	0	0	0	0
Sunflower	575	588	600	600	2363
Niger	0	0	0	0	0
Total	2487	2538	2587	2600	10212

ECONOMIC COST (million kyats)

SER I (1.25 OER)

	K/MT	1986/87	1987/88	1988/89	1989/90	Total
Urea	3230	46.8	50.2	53.7	56.0	206.7
TSP	2944	42.2	43.9	45.5	46.5	178.1
MOP	2179	5.4	5.5	5.6	5.7	22.3
Total		94.4	99.7	104.8	108.1	407.1

SER II (2.2 OER)

Urea	5685	82.4	88.4	94.4	98.6	363.8
TSP	5181	74.3	77.3	80.1	81.8	313.5
MOP	3835	9.5	9.7	9.9	10.0	39.2
Total		166.2	175.4	184.5	190.3	716.4

*At OER (K 8.5/$) import farm parity (1985) prices are estimated as:

	K/MT	$/MT
Urea	2584	304
TSP	2355	277
MOP	1743	205

Table E4

PROJECT FARM LABOR - INCREMENTAL ECONOMIC COST

		1987/88	1988/89	1989/90	1990/91	Total
DIRECT FARM EMPLOYMENT GENERATED (1000 pd)						
Farm Family						
Groundnut		780	796	808	812	3196
Sesame		404	438	778	938	2558
Sunflower		0	220	440	660	1320
Niger		28	68	108	148	352
R. Fert. Cps		341	352	362	366	1421
Total		1553	1874	2496	2924	8847
ECONOMIC COST (million kyats)						
Farm Family	K/day					
Groundnut	7.5	5.9	6.0	6.1	6.1	24.0
Sesame	7.5	3.0	3.3	5.8	7.0	19.2
Sunflower	7.5	0.0	1.7	3.3	5.0	9.9
Niger	7.5	0.2	0.5	0.8	1.1	2.6
R. Fert. Cps	7.5	11.6	14.1	18.7	21.9	66.4
Hired Labor						
Groundnut		1560	1592	1616	1624	6392
Sesame		202	219	423	519	1363
Sunflower		525	625	725	825	2700
Niger		13	37	61	85	196
R. Fert. Cps		244	251	260	264	1019
Total		2544	2724	3085	3317	11670
ECONOMIC COST (million kyats)						
Hired Labor	K/day					
Groundnut	8.5	13.3	13.5	13.7	13.8	54.3
Sesame	8.5	1.7	1.9	3.6	4.4	11.6
Sunflower	8.5	4.5	5.3	6.2	7.0	23.0
Niger	8.5	0.1	0.3	0.5	0.7	1.7
R. Fert. Cps	8.5	2.1	2.1	2.2	2.2	8.7
Total	8.5	21.6	23.2	26.2	28.2	99.2

Table E5

INCREMENTAL FARM PRODUCTION & GROSS ECONOMIC BENEFITS
Gross Benefits in Million Kyats
Production in 1000 Baskets

	K/bsk	1987/88	1988/89	1988/90	1990/91	Total
Production						
Groundnut		1417	1484	1542	1594	6037
Sesame		902	995	1062	1100	4059
Sunflower		2203	2764	3132	3696	11795
Niger		39	59	80	105	283
Paddy		466	496	523	544	2029
Pulses		10	11	12	13	46
Economic Value:	SER I (1.25 x OER)					
Groundnut	55	77.9	81.6	84.8	87.7	332.0
Sesame	222	200.2	220.9	235.8	244.2	901.1
Sunflower	66	145.4	182.4	206.7	243.9	778.5
Niger	115	4.5	8.8	9.2	12.1	32.5
Paddy	23.5	11.0	11.7	12.3	12.8	47.7
Pulses	67	0.7	0.7	0.8	0.9	3.1
Total		439.7	504.1	549.6	601.5	2094.9
Economic Value:	SER II (2.2 x OER)					
Groundnut	95	134.6	141.0	146.5	151.4	573.5
Sesame	379	341.9	377.1	402.5	416.9	1538.4
Sunflower	110	242.3	304.0	344.5	406.6	1297.5
Niger	202	7.9	11.9	16.2	21.2	57.2
Paddy	36.7	17.1	18.2	19.2	20.0	74.5
Pulses	129	1.3	1.4	1.5	1.7	5.9
Total		745.1	853.7	930.4	1017.7	3546.9

Table E6

PROJECT ECONOMIC COST-AID

	FY 87	FY 88	FY 89	FY 90	FY 91
Project Economic Cost - AID ($000'S)					
Participant Trng	399	620	644	408	165
TA	330	795	660	510	180
Commodities*	1126	905	253	253	203
Evaluation	50	25	150	25	150
Contingency (10%)	191	607	556	510	466
Total	2096	2952	2263	1706	1164
Kyats Millions OER (K 8.5/$)					
Participant Trng	3.39	5.27	5.47	3.47	1.40
TA	2.81	6.76	5.61	4.34	1.53
Commodities*	9.57	7.69	2.15	2.15	1.73
Evaluation	0.43	0.21	1.28	0.21	1.28
Contingency (10%)	1.62	5.16	4.73	4.34	3.96
Total	17.81	25.09	19.24	14.50	9.89
Kyats Millions SER I (OER x 1.25)					
Participant Trng	4.24	6.59	6.84	4.34	1.75
TA	3.51	8.45	7.01	5.42	1.91
Commodities*	11.96	9.62	2.69	2.69	2.16
Evaluation	0.53	0.27	1.59	0.27	1.59
Contingency (10%)	2.02	6.45	5.91	5.42	4.95
Total	22.26	31.37	24.05	18.13	12.36
Kyats Millions SER II (OER x 2.2)					
Participant Trng	7.46	11.59	12.04	7.63	3.09
TA	6.17	14.87	12.34	9.54	3.37
Commodities*	21.06	16.92	4.73	4.73	3.80
Evaluation	0.94	0.47	2.81	0.47	2.81
Contingency (10%)	3.56	11.35	10.40	9.54	8.71
Total	39.19	55.21	42.32	31.91	21.76

*Excludes fertilizer

Table E7

PROJECT TOWNSHIP BY STATE/DIVISION AND CROP

GROUNDNUT

SR.No.	STATE/DIVISION	TOWNSHIP	Sown Area* (Acres)	Farmers	Average (Acres)
1.	Mandalay	Tatkon	14,000	6,858	2.04
		Singu	17,000	7,391	2.30
		Kyaukpadaung	34,000	15,455	2.20
2.	Magwe	Magwe	50,000	17,344	2.88
		Natmauk	32,000	11,521	2.78
3.	Sagaing	Myaung	13,000	5,546	2.34
4.	Pegu	Daik-U	21,000	6,226	3.37
		Kyauktaga	7,000	2,489	2.8
5.	Irrawaddy	Yandoon	15,000	7,465	2.00
	TOTALS	9	203,000	80,295	2.53

SESAME

	STATE/DIVISION	TOWNSHIP	Sown Area* (Acres)	Farmers	Average (Acres)
1.	Mandalay	Myittha	6,000	1,352	4.43
		Kyaukse	26,000	5,843	4.45
		Singaing	19,000	4,584	4.14
2.	Irrawaddy	Moulmeingyun	40,000	17,807	2.24
		Wakema	30,000	16,855	1.78
		Einme	15,000	11,016	1.36
		Henzada	12,000	4,357	2.75
		Myaungmya	9,000	4,357	2.23
		Bogale	21,000	10,657	1.97
		Kyaunggone	5,000	2,326	2.15
3.	Pegu	Nyaunglebin	14,000	1,1154	1.25
		Prome	9,000	2,236	2.78
		Paukkhaung	5,000	2,784	1.80
		Thegon	5,000	4,630	1.07
5.	Rangoon	Taikgyi	28,000	8,423	3.32
	TOTALS	15	244,000	109,381	2.23

Table E7 (con'd)

SUNFLOWER

SR.No.	STATE/DIVISION	TOWNSHIP	Sown Area* (Acres)	Farmers	Average (Acres)
1.	Mandalay	Pyawbwe	16,000	6,926	2.31
		Yamethin	14,000	6,167	2.27
2.	Sagaing	Budalin	10,000	4,176	2.39
3.	Magwe	Pwintbyu	8,000	3,488	2.29
4.	Irrawaddy	Zalun	16,000	5,038	3.17
		Maubin	19,000	10,565	1.79
		Wakema	19,000	14,286	1.33
		Danubyu	15,000	4,885	3.07
		Kyaiklat	12,000	8,064	1.50
		Pantanaw	12,000	8,496	1.40
		Ingapu	10,000	5,237	1.90
		Yandoon	10,000	4,851	2,06
5.	Pegu	Letpadan	8,000	3,721	2.15
		Okpo	6,000	2,727	2.00
6.	Mon	Chaungzone	8,000	7,334	1.09
7.	Rangoon	Kyauktan	14,000	19,526	0.72
		Thongwa	8,000	3,488	2.29
	TOTALS	17	205,000	118,975	1.72

NIGER

SR.No.	STATE/DIVISION	TOWNSHIP	Sown Area* (Acres)	Farmers	Average Acres
1.	Shan State	Kalaw	6,000	3,208	1.87
		Pangtara	6,500	3,186	2.04
		Nawnghkio	7,500	3,967	1.89
	TOTAL	3	20,000	10,361	1.93
	GRAND TOTAL	44**	672,000	319,012	2.11

* targetted for 1990/91

** a net of 42 townships since two appear twice

Table E8

ANTICIPATED NUMBERS OF TOWNSHIPS AND CROP AREA INVOLVED BY STATE AND DIVISION - (1990/91)

(Crop area in thousand acres)

Sr. No.	State/Division	Groundnut		Sesame		Sunflower		Niger		Total	
		Twp	Area	Twp	Area	Twp	Area	Twp	Area	Twp	Area
1.	Sagaing	1	13	-	-	1	10	-	-	2	23
2.	Mandalay	3	65	3	51	2	30	-	-	8	146
3.	Magwe	2	82	-	-	1	8	-	3	3	90
4.	Pegu	2	28	4	33	2	14	-	-	8	75
5.	Rangoon	-	-	1	28	2	22	-	-	3	50
6.	Irrawaddy	1	15	7	132	8	113	-	-	16	260
7.	Mon	-	-	-	-	1	8	-	-	1	8
8.	Shan	-	-	-	-	-	-	3	20	3	20
	TOTAL	9	203	15	244	17	205	3	20	44	672

Table E9

FERTILIZER APPLICATION RATES AND TOTAL REQUIREMENTS BY CROP AND YEAR

A. Proposed Rate of Chemical Fertilizers per acre

Crop	Rate per acre					
	Urea		TSP		MOP	
	Kg.	lb.	Kg.	lb.	Kg.	lb.
Groundnut (N-Burma)	*	-	50	110	12.5	27.5
Groundnut (S-Burma)	*	-	25	55	-	-
Sesame	37.5	82.5	12.5	27.5	-	-
Sunflower (N-Burma)	37.5	82.5	25	55	12.5	27.5
Sunflower (S-Burma)	37.5	82.5	12.5	27.5	-	-
Niger	25	55	25	55	-	-

*Rhizobium to be used in Groundnut.

B. Chemical Fertilizer Requirement (MT)

Fertilizer/Yr.	Groundnut	Sesame	Sunflower	Niger	Total
TSP	35675	11262	11864	1700	60501
1987/88	8700	2525	2763	350	14338
1988/89	8875	2737	2900	400	14912
1989/90	9025	2950	3038	450	15463
1990/91	9075	3050	3163	500	15788
Urea	-	33787	28502	1700	63989
1987/88	-	7575	6563	350	14488
1988/89	-	8212	6938	400	15550
1989/90	-	8850	7313	450	16613
1990/91	-	9150	7688	500	17338
MOP	7849	-	2363	-	10212
1987/88	1912	-	575	-	2487
1988/89	1950	-	588	-	2538
1989/90	1987	-	600	-	2587
1990/91	2000	-	600	-	2600

Table E10

PROJECTED AREA, YIELDS AND PRODUCTION OF OILSEED CROPS WITHOUT AND WITH PROJECT

Crop/ Year	Area Sown (1000 Ac) W/O	W	Incremental	Yield (Bsk/Ac)* W/O	W	Production (1000 Bsk) W/O	W	Incremental
Groundnut								
1987/88	195	195	-	37.7	44.9	7343	8760	1417
1988/89	199	199	-	38.6	46.1	7690	9174	1484
1989/90	202	202	-	39.5	47.2	7986	9528	1542
1990/91	203	203	-	40.3	48.1	8178	9772	1594
Total	799	799	-			31197	37234	6037
Sesame								
1987/88	202	202	-	3.8	6.9	771	1397	626
1988/89	219	219	-	4.0	7.3	877	1590	713
1989/90	219	236	17	4.7	7.7	1036	1810	774
1990/91	219	244	25	5.4	8.1	1177	1987	810
Total	859	901	42			3861	6784	2923
Sunflower								
1987/88	175	175	-	19.7	32.3	3441	5644	2203
1988/89	175	185	10	20.4	34.2	3570	6334	2764
1989/90	175	195	20	21.4	35.2	3738	6870	3132
1990/91	175	205	30	22.4	37.1	3914	7610	3696
Total	700	760	50			14663	26458	11795
Niger								
1987/88	14	14	-	2.3	5.1	32	71	39
1988/89	14	16	2	2.6	5.9	36	95	59
1989/90	14	18	4	3.0	6.8	42	122	80
1990/91	14	20	6	3.4	7.7	48	153	105
Total	56	68	12			158	441	283

*Yield based on area sown.

Residual

Paddy - 1000 Bsk	Sesame	Pulses
466	276	10
496	282	11
523	288	12
544	290	13
2029	1136	46
	2923	
	4059	

Table E11

ECONOMIC IMPORT PARITY PRICES -- FERTILIZER (constant 1985 prices)

	UREA	TSP	MOP
FOB ($/MT) a/	185	126	87
Freight, INS ($/MT) b/	55	88	55
CIF, Rangoon ($/MT)	240	214	142
CIF, Rangoon (K/MT) c/	2040	1819	1207
Internal handling, transport, losses (K/MT)			
- OER d/	544	536	536
- SER I e/	578	570	570
- SER II f/	707	697	697
Farmgate Price (K/MT)			
- OER d/	2584	2355	1743
- SER e/	3128	2844	2079
- SER f/	5195	4699	3352

Notes to Table

a/ In constant 1985 prices. Are averages of World Bank July, 1985 projections for 1986-89. Urea: bagged, N.W. Europe; TSP: bulk, US Gulf; MOP: bulk, Vancouver.

b/ Including transhipping. For TSP, assumes that 50% will be shipped on US bottoms and 50% on foreign bottoms.

c/ K8.5/$

d/ "official" exchange rate: K 8.5=U.S.$1

e/ Assumed shadow exchange rate: 1.25 X OER

f/ Assumed shadow exchange rate: 2.2 X OER

Table E12

ECONOMIC IMPORT PARITY PRICES -- Oilseeds

Groundnut	OER a/	SER b/	SER c/
Shelled, CIF Rangoon ($/MT)	720	720	720
Shelled, CIF Rangoon (K/MT)	6,120	7,650	13,464
Port Charges, handling, transport Port to Factory (K/MT)	512	512	512
Ex-factory price (K/MT)	6,632	8,162	13,976
Handling, trans, losses (K/MT) d/	133	163	280
Import parity farmgate price shelled (K/MT)	6,499	7,999	13,696
Import parity farmgate price, unshelled e/			
- K/MT	3,964	4,879	8,355
- K/BSK f/	45	55	95

Notes to Table
a/ "official" exchange rate: K 8.5=U.S.$1
b/ Assumed shadow exchange rate: 1.25 X OER
c/ Assumed shadow exchange rate: 2.2 X OER
d/ 2% of ex-factory price
e/ 61% of shelled
f/ 88.184 baskets/MT

Table E12 (con'd)

Econonomic Import Parity Prices -- Oilseeds

Sesame	OER a/	SER b/	SER c/
FOB Sudan ($/MT)	700	700	700
Freight, Ins ($/MT)	95	95	95
CIF, Rangoon ($MT)	795	795	795
CIF, Rangoon (K/MT)	6758	8447	14867
Port to farm handling, transport, processing	620	620	620
Import parity farmgate price			
- K/MT	7378	9067	15487
- K/BSK d/	181	222	379
Sunflower			
FOB, US, ($/MT)	300	300	300
Freight, Ins ($/MT)	75	75	75
CIF, Rangoon ($/MT)	375	375	375
CIF, Rangoon (K/MT)	3188	3984	7013
Port to farm handling transport (K/MT)	560	560	560
Import parity farmgate price			
- K/MT	3748	4544	7573
- K/BSK e/	54	66	110

Notes to Table
a/ "official" exchange rate: K 8.5=U.S.$1
b/ Assumed shadow exchange rate: 1.25 X OER
c/ Assumed shadow exchange rate: 2.2 X OER
d/ 40.826 baskets/MT
e/ 68.894 baskets/MT

Annex E -- Financial Tables

Table E13

SUMMARY TABLE, FARM FINANCIAL ANALYSIS - DIRECT FARM COSTS AND BENEFITS DUE TO PROJECT
(Million Kyats)

	Direct			Residual Fertilizer		TOTAL		
Year	Total Costs	Total Benefits	Net Benefits	Total Costs	Total Benefits	Total Costs	Total Benefits	Net Benefits
1986/87	-	-	-	-	-	-	-	-
1987/88	49.7	341.9	292.2	2.24	53.2	51.9	395.1	343.2
1988/89	55.7	399.7	344.0	2.33	54.6	58.0	454.3	396.3
1989/90	66.7	440.0	373.3	2.41	55.9	69.1	495.9	426.8
1990/91	75.5	488.7	413.2	2.47	56.5	78.0	545.2	467.2
Total	247.6	1670.3	1422.7	9.45	220.2	257.0	1890.5	1633.5
NPV[a/]						191.3	1414.4	1223.1
B/C[a/]						7.4		

a/ discounted at 12%

Table E14

FINANCIAL ANALYSIS: GROSS FARM BENEFITS DUE TO RESIDUAL FERTILIZER

Crop/Year	1987/88	1988/89	1989/90	1990/91	Total
Paddy					
Total					
- Q (1000 bsk)	466	496	523	544	2,029
- V (K1000)	4,660	4,960	5,230	5,440	20,290
Following:					
-Sunflower (1000 bsk) a/	(135)	(145)	(155)	(165)	(600)
-Sesame (1000 bsk) b/	(159)	(173)	(186)	(193)	(711)
-Groundnut (1000 bsk) c/	(144)	(146)	(146)	(146)	(582)
-Niger (1000 bsk) d/	(28)	(32)	(36)	(40)	(136)
Sesame					
Total					
-Q (1000 bsk)	276	282	288	290	1,136
-V (K1000)	48,300	49,350	50,400	50,750	198,800
Following					
-Sunflower e/	(30)	(30)	(30)	(30)	(120)
-Groundnut f/	(246)	(252)	(258)	(260)	(1,016)
Pulses g/					
-Q (1000 bsk)	10	11	12	13	46
-V (K1000)	260	286	312	338	1,196
Totals (K1000)	53,220	54,596	55,942	56,528	220,286

Notes to Table

a/ Delta; 1 bsk/Ac; paddy valued at K10/bsk
b/ Winter sesame
c/ Winter groundnut
d/ Two baskets/Ac
e/ Northern Burma; 3/4 bsk/Ac
f/ Monsoon; central Burma; 2 bsk/Ac
g/ Following monsoon sesame

Table E15

ESTIMATES OF ADDITIONAL FARM COSTS ASSOCIATED WITH THE INCREASED PRODUCTION FROM RESIDUAL FERTILIZER *
(K000's)

Crop Labor	1987/88	1988/89	1989/90	1990/91
Paddy				
Family	690	734	774	804
Hired	895	952	1004	1044
Pulses				
Family	70	77	84	91
Hired	23	25	27	29
Sesame				
Family	2208	2256	2304	2320
Hired	1325	1354	1382	1392
Total	5211	5398	5575	5681
Family	2968	3067	3162	3216
Hired	2243	2331	2413	2465

*The extra costs associated with the incremental production are practically all in harvesting. The following are estimates of the average days of labor required for harvesting a basket of the crops.

	Paddy	Sesame	Pulses
Family	0.12 (K1.48)	1.0 (K 8.0)	0.88 (K7.0)
Hired	0.16 (K1.92)	0.6 (K 4.8)	0.25 (K2.25)
Total	0.28 (K3.40)	1.6 (K12.8)	1.13 (K9.25)

Table E16

FINANCIAL ANALYSIS: GROSS FARM DIRECT BENEFITS DUE TO PROJECT

Crop/Year	1987/88	1988/89	1989/90	1990/91	Total
Groundnut					
-Q[a/] (1000 bsk)	1,417	1,484	1,542	1,594	6,037
-V[b/] (K1000)	85,020	89,040	92,520	95,640	362,220
Sesame					
-Q (1000 bsk)	626	713	774	810	2,923
-V (K1000)	109,550	124,775	135,450	141,750	511,525
Sunflower					
-Q (1000 bsk)	2,203	2,764	3,132	3,696	11,795
-V (K1000)	143,195	179,660	203,580	240,240	766,675
Niger					
-Q (1000 bsk)	39	59	80	105	283
-V (K1000)	4,095	6,195	8,400	11,025	29,715
TOTALS (K1000)	341,860	399,670	439,950	488,655	1,670,135

Notes to Table

a/ Q is abbreviation for physical quantity

b/ V is abbreviation for farmgate price or value. Unit farmgate prices, in K/Bsk are: 60, 175, 65 and 105 respectively for groundnut, sesame, sunflower and niger.

Table E17

FINANCIAL ANALYSIS: DIRECT FARM COSTS DUE TO PROJECT
(KOOO's)

Crop/Year	1987/88	1988/89	1989/90	1990/91
Groundnut				
-Exc FFL[a/]	27,926	28,493	28,948	29,099
-inc FFL[b/]	33,386	34,065	34,604	34,783
Sesame				
-Exc FFL[a/]	8,686	9,418	15,335	19,369
-inc FFL[b/]	11,514	12,484	20,781	25,935
Sunflower				
-Exc FFL[a/]	12,434	16,427	20,420	24,390
-inc FFL[b/]	12,434	17,959	23,500	29,010
Niger				
-Exc FFL[a/]	658	1,324	1,990	2,656
-inc FFL[b/]	826	1,732	2,638	3,544
TOTALS				
-Exc FFL[a/]	49,704	55,662	66,693	75,514
-inc FFL[b/]	58,160	66,248	81,523	93,272

a/ excluding farm family labor
b/ including farm family labor

Table E18

FARM BUDGET FOR GROUNDNUTS
WITH AND WITHOUT PROJECT (Kyat/Acre)

A. Groundnuts

	Without Project		With Project	
	Qty	Value(Kyats)	Qty	Value(Kyats)
Total Income	39 bsk	2340 bsk	46.6 bsk	2796
Costs				
Seed	9 bsk	540	9 bsk	540
Fertilizer				
Urea	-	-	-	-
TSP	-	-	44.76 kgs	55.55
MOP	-	-	9.83 kgs	5.9
Farm Manure	5 carts	30	5 carts	30
Insecticide	-	-		10
Other	-	10	-	10
Family Labor	28 days	196	32 days	224
Hired Labor	22 days	198	30 days	270
Team Days Owned	11 days	220	11 days	220
Team Days Hired	2 days	40	2 days	40
Total Costs		1,234		1,405
NET FARM INCOME		1,106		1,391

B. Monsoon Groundnuts

Total Income	34 bsk	2,040	41 bsk	2,460
Costs				
Seed	6 bsk	360	6 bsk	360
Fertilizer				
Urea	-	-	-	-
TSP	-	-	110 lbs	62
MOP			28 lbs	8
Farm Manure	5 carts	30	5 carts	30
Insecticide	-	-	-	24
Other	-	10	-	10
Family Labor	28 days	168	33 days	198
Hired Labor	23 "	173	29 "	218
Team Days Owned	14 "	195	13 "	195
Team Days Hired	3 "	45	3 "	45
Total Costs		981		1,150
NET FARM INCOME		1,059		1,310

Prices:

Groundnuts	- 60K/baskets		Family Labor	= 7.00 K/day
Urea	- 9K/25 Kg bag		Hired Labor	= 9.00 K/day
TSP	- 62K/50 Kg bag		Team Days	= 20.00 K/day
MOP	- 30K/50 Kg bag			

Table E19

FARM BUDGET FOR SESAME
WITH AND WITHOUT PROJECT (Kyat/Acre)

A. Sesame

	Without Project		With Project	
	Qty	Value(Kyats)	Qty	Value(Kyats)
Total Income	4.49 bsk	786	7.53 bsk	1318
Costs				
Seed (lbs)	7 lbs	22	5 lbs	16
Fertilizer				
Urea	-	-	37.5 kgs	13.5
TSP	-	-	12.5 kgs	15.5
Farm Yard Manure	5 carts	30	5 carts	30
Insecticide	-	-		5
Other	-	10	-	10
Family Labor	18 days	126	20 days	140
Hired Labor	11 days	99	12 days	108
Team Days Owned	8 days	160	8 days	160
Team Days Hired	2 days	40	2 days	40
Total Costs		497		538
NET FARM INCOME		299		780

B. Winter Sesame

Total Income	4.3 bsk	753	8.5 bsk	1,488
Costs				
Seed (lbs)	7 lbs	22	5 lbs	16
Fertilizer				
Urea	-	-	83 lbs	14
TSP	-	-	28 lbs	16
Farm Yard Manure	5 carts	30	5 carts	30
Insecticide	-	-		24
Other	-	10	-	10
Family Labor	18 days	108	20 days	120
Hired Labor	11 days	83	12 days	90
Team Days Owned	8 days	120	8 days	120
Team Days Hired	2 days	30	2 days	30
Total Costs		403		470
NET FARM INCOME		350		1,018

Prices:

Sesame	- 175K/basket	Family Labor	- 7.00 K/day
Urea	- 9K/25 Kg bag	Hired Labor	- 9.00 K/day
TSP	- 62K/50 Kg bag	Team Days	- 20.00 K/day

Table E20

FARM BUDGET FOR SUNFLOWER
WITH AND WITHOUT PROJECT (Per Acre)

	Without Project		With Project	
	Qty	Value(Kyats)	Qty	Value(Kyats)
Total Income	20.95 bsks	1362	34.81 bsk	2263
Costs				
Seed	8 lbs	16	8 lbs	16
Fertilizer				
Urea	-	-	37.50 kgs	13.5
MOP			3.11 kgs	1.87
TSP	-	-	15.61 kgs	19.36
Manure	3 carts	18	3 carts	18
Insecticides	-	-	-	9
Others	-	10	-	10
Family Labor	22 days	154	22 days	154
Hired Labor	7 days	63	10 days	90
Team Days Owned	10 days	150	12 days	180
Team Days Hired	3 days	45	3 days	45
Total Costs		456		557
NET FARM INCOME		906		1706

Prices:

1 basket Sunflower (32 lbs) = 65 Kyats
Urea - 9K/25 kg bag
TSP - 62K/50 kg bag
MOP - 30K/50 kg bag

Family Labor - 7 K/day
Hired Labor - 9 K/day
Team Days - 15.00 K/day

Table E21

FARM BUDGETS FOR NIGER
WITH AND WITHOUT PROJECT (Per Acre)

	Without Project		With Project	
	Qty	Value(Kyats)	Qty	Value(Kyats)
Total Income	2.82 bsks	286	6.49 bsks	681
Costs				
Seed	7 lbs	13	7 lbs	13
Fertilizer				
Urea	-	-	25 kgs	9
TSP	-	-	25 kgs	31
Manure	5 carts	30	5 carts	30
Others	-	10	-	10
Family Labor	18 days	108	20 days	120
Hired Labor	11 days	83	12 days	90
Team Days	8 days	120	8 days	120
	2 days	30	2 days	30
Total Costs		394		453
NET FARM INCOME		98		228

Prices:

1 basket Niger	-	105 K/basket	Family Labor	- 6.00 K/day
Urea	-	9 K/25 kg bag	Hired Labor	- 7.50 K/day
TSP	-	62 K/50 kg bag	Team Days	- 15.00 K/day

Table E22

ESTIMATES OF DIRECT EMPLOYMENT GENERATION
BY PROJECT ON PROJECT FARMS
(Person days)

Labor Source/ Year	Ground-Nut	Sesame	Sun-Flower	Niger	Residual Fertilizer Crops	Total
Farm Family						
1987/88	780	404	-	28	341	1,553
88/89	796	438	220	68	352	1,874
89/90	808	778	440	108	362	2,496
90/91	812	938	660	148	366	2,924
Totals	3,196	2,558	1,320	352	1,421	8,847
Hired						
1987/88	1,560	202	525	13	244	2,544
88/89	1,592	219	625	37	251	2,724
89/90	1,616	423	725	61	260	3,085
90/91	1,624	519	825	85	264	3,317
Totals	6,392	1,363	2,700	196	1,019	11,670

Table E23

PESTICIDES USED, BEING TESTED, OR CONSIDERED FOR USE IN BURMA.

Pesticide	EPA Registration Status[1]	LD_{50} mg/kg Oral/Dermal	WHO Toxicity Classification[2]	Currently Available to Farmers in Burma[3]
Insecticides				
Aldrin	C	67/98	IB	+
Carbaryl	G	500/4000	II	+
Chlorpyrifos	G	135/2000	II	-
Diazinon	G	300/3600	II	+
Fenitrothion	NR	570/1300	II	-
Fenvalerate	R	451/5000+	II	-
Malathion	G	1375/4100	III	+
Phenthoate	NR	400/4800	II	+
Phosphamidon	R	15/125	IA	+
Acephate	G	866/2000	III	
Propargite	G	2200/3000	II	
Fungicides				
Cuperous oxide	G	1000/8000+	III	+
Mancozeb	G	8000+/10,000	IV	-
Phenyl mercury acetate	C	60/	IA	+
Captafol	G	6200/15,400	IV	
Carboxin	G	3828/8000	IV	
Chlorone B	G	11000/5000	IV	
Metalaxyl	G	699/3100	III	
Sulfur	G	-		
Zebenide	G	5200/10,000	IV	
Rodenticides				
Brodifacoum	R	0.27	IA	*
Coumachlor	G	900	II	+
Zinc Phosphide	R	45/	IA	+
Herbicides				
Alachlor	G	1800/13300	III	*
Metoachlor	G	2780/10,000+	III	*

1 G= general use; R = restricted use by certified applicators; C= agricultural uses cancelled.

2 1A= extremely hazardous; IB = highly hazardous; II = moderately hazardous; III = slightly hazardous; IV = unlikely to present acute hazard in normal use.

3 + = presently used in Burma, use data available; -= being considered for use in Burma or used but no use data available; *= presently being tested in Burma.

Table E24

AUTHORIZED CROP USES OF APPROVED PESTICIDES BASED ON USEPA REGISTRATION AND/OR FAO MAXIMUM RESIDUE

Pesticide	Groundnut	Sesame	Sunflower
Insecticides			
Aldrin	C	C	C
Carbaryl	X	-	X
Chlorpyrifos	X	-	X
Diazinon	X	-	X
Fenitrothion	-	-	-
Fenvalerate	X	-	X
Malathion	X	-	X
Phenthoate	-	-	-
Phosphamidon	-	-	-
Acephate	X	-	-
Propargite	X	-	-
Fungicides			
Cuperous oxide	-	-	-
Mancozeb	X	-	-
Phenyl mercury acetate	C	C	C
Captafol	X		
Carboxin	X		
Ceresane			
Chlorone B			
Labilite			
Metalaxyl	X		X
Sulfur			
zebenide	X		
Rodenticides*			
Brodifacoum	-	-	-
Coumachlor	-	-	-
Zinc phosphide	-	-	-
Herbicides			
Alachlor	X	-	X
Metoachlor	X	-	-

* For baiting in and around fields and in storage areas

Table E25

ANNUAL CONSUMPTION OF PESTICIDES ON PROJECT CROPS IN BURMA, 1982-1985.

Pesticides	Formulation[1]	Groundnut[2] 82/83	Groundnut[2] 83/84	Groundnut[2] 84/85	Sesame[2] 82/83	Sesame[2] 83/84	Sesame[2] 84/85	Sunflower[2] 82/83	Sunflower[2] 83/84	Sunflower[2] 84
Insecticides										
Malathion	90%EC	3356	4345	-	2175	1138	-	-	100	
Diazinon	40%EC	9691	9240	359	7969	4407	-	2057	1082	
Phosphamidon	50%EC	12	99	185	10	-	-	1	18	
Phenthoate	50%EC	3265	1925	492	370	296	222	63	50	
Aldrin	5%D	476161	389790	4698	36032	18000	500	1870	125	
Aldrin	2.5%D	157676	436883	716090	-	-	-	1546	8260	15
Carbaryl	85%WP	82560	123040	163520	28200	25000	-	-	-	2
Fungicides										
Cuperous oxide	10%D	1784	2349	2914	21	-	-	-	-	
Phenyl mercury acetate	50%D	-	-	-	-	-	-	-	-	2
Rodenticides										
Zinc phosphide	80%D	5366	3763	2160	-	-	-	46	-	
Coumachlor	30%D	368	-	-	-	-	-	-	-	

[1] EC = emulsifiable concentrate (gallons); D = dust (pounds); WP = wettable powder (pounds).
[2] Acres sown = 1,549,831 groundnut; 3,546,019 sesame; 408,942 sunflower.

Data provided by Agriculture Corporation

Table E26

CROP PESTS IN BURMA*

Crop Status	Common Name	Scientific Name	Current
Groundnut	Termites	Odontotermes pervidens	serious locally
	Common hairy caterpillar	Spilsoma obliqua	major
	Cock chafer grubs	Anomala antiqua	serious locally
		Adoretus birmanus	
		Holotrichia pruninosella	
	Leaf worm	Spodoptera litura	major
	Groundnut leaf binders	Aproaerma modicella	major
		Stomopteryx subsecivella	major under dry conditions
	Spider Mite	Tetranycus spp.	major under hot/ dry conditions
	Leaf spot	Cercospera spp.	severe in monsoon
	Crown rot	Aspergillus niger	moderate
	Mold	Aspergillus flavus	moderate
	Rats	Bandicota bengalensis,	major in field and storage
		Rattus exulans, R rattus	moderate
	Weeds	many species	major
Sesame	Common hairy caterpillar	Spilosoma obliqua	major
	Sesamum sphingid	Acherontia styx	minor
	Sesamum leaf roller	Antigastra catalaunalis	major
	Sesamum jassid	Orosius sp.	vectors phyllody
	Peach aphid	Myzus persicae	minor
	Two-spotted sesamum bug	Eysacoris guttiger	occasional
	Sesamum phyllody	microplasma	serious outbreaks
	Rats	see groundnut	major, vectored by Orosius sp.
	Weeds	many species	major
Sunflower	Gram pod borer	Heliothis sp.	minor
	Leaf worm	Spodoptera litura	minor
	Common hairy caterpillar	Spilosoma obliqua	minor
	Jassid	Empoasca sp.	transmits diseases
	Schlerotium blight	Schierotium rolfsii	minor, could be serious without rotation
	Leaf stem blight	Alternaria helianthi	major in monsoon
	Rats	see groundnut	serious
	Birds (parakeets)		serious locally
	Weeds	many species	major

* Based on discussions with AC, FAO, and AID Officials

Table E27

POTENTIAL CROP PESTS IN BURMA*

Crop	Common Name	Scientific Name
Groundnut	Tobacco thrips	Frankliniella fusca
	Bud/bollworms	Heliothis spp.
	Fall armyworm	Spodoptera frugiperda
	Potato leafhopper	Empoasca fabae
	Cutworm	Agrotis spp.
	Bacterial wilt	Pseudomonas solanacearum
	Sclerotinia blight	Sclerotinia minor
	Root-knot nematode	Meloidogyne napla
	Lesion nematode	Pratylenchus brachyurus
	Ring nematode	Macroposthonia ornata
	Weeds	many species
Sesame	Spider mite	Tetranycus urticae & other spp.
	Grasshoppers	complex
	Aphids	complex
	Cutworms	Agrotis spp.
	Tigermoth	Diacresia obliqua
	Leaf spots	Cercospora sesami, Alternaria sp., Pseudomonas sesami
	Bacterial wilt	Pseudomonas solanacearum
	Stem rot	Macrophomina phaseoli
	Weeds	many species
Sunflower	Sunflower beetle	Zygogramma exclamationis
	Sunflower moth	Homoeosoma electellum
	Banded sunflower moth	Cochylis hospes
	European sunflower moth	Homoeosoma nebulella
	Cutworms	complex
	Bollworms	Heliothis spp.
	Indian meal moth	Plodia interpunctella
	Rust	Puccinia helianthi
	White blister rust	Albugo tragopogi
	Leaf wilt	Verticillium albo-atrum
	Downy mildew	Plasmopara halstedii
	Stem rot	Sclerotinia sclerotiorum
	Birds	parrots, sparrows
	Weeds	Many species

* Based on discussions with AC, FAO, and AID officials and on available literature

Table E28

SUMMARY OF TRAINING PROGRAMS FOR CROP PROTECTION
(U.S.$)

Activity	Duration	Participants Numbers	Costs (ea.)	Project Year 1	2	3	4	5	Total Costs
Participant Training									
1. Study Tour-International Pest Management TC 130-8	8 weeks	5	10,000	1	1	1	1	1	50,000
2. Degree Training-									
Vertebrates (MS)	30 month	1	25,000	1					62,500
Weed Science (MS)	30 month	1	25,000	1					62,500
Nematology (MS)	30 month	1	25,000		1				62,500
Entomology (PhD)	40 month	1	25,000	1					83,250
(MS)	30 month	1	25,000		1				62,500
Plant Pathology (PhD)	40 month	1	25,000	1					83,250
(MS)	30 month	1	25,000		1				62,500
In-Country Training									
1. Safe Handling and Proper Application of Pesticides	1 week	50		1		1			
2. Crop Protection Workshop	1 month	50			1		1		

Table E30

PRESENT ACREAGE OF MAJOR CROPS BY TOWNSHIP & ANTICIPATED CROP AREA

Sr. No.	Township	Anticipated Groundnut Area At Full Development ('000 AC)	Monsoon Crops Acreage ('000)							Winter Crops Acreage ('000)					
			Paddy	Peanut	Sesame	Cotton	Jute	Sugar-cane	Sor-Ghum	Maize	Peanut	Sesame	Sun-Flower	Pulses	Total
1.	Tatkon	14 M*	42	15	13	-	-	8	-	16	4	5	3	4	110
2.	Magwe	50 M	1	50	111	1	-	-	-	-	6	19	-	12	200
3.	Natmauk	32 M	10	33	107	13	-	-	5	1	2	5	5	13	194
4.	Kyaukpadaung	34 M	14	31	107	7	-	-	26	-	2	3	-	18	208
5.	Myaung	13 W	6	5	25	2	-	-	7	8	17	5	1	33	109
6.	Daik U	21 W	103	-	-	-	1	-	-	2	21	10	-	2	139
7.	Singu	17 W	19	2	5	-	-	-	1	3	17	5	1	8	61
8.	Yandoon	15 W	70	-	-	-	7	-	-	3	15	6	11	30	142
9.	Kyauktaga	7 W	130	-	3	-	2	-	-	1	7	7	-	4	154
		203	411	150	407	34	10	8	39	34	94	65	22	135	1409

M* = Monsoon; W = Winter Season

Table E29

NUMBER OF BURMESE NOW OR SCHEDULED TO GO ABROAD FOR ADVANCED CROP PROTECTION DEGREES.

Discipline	Now Abroad		Scheduled to go abroad	
	MS	PhD	MS	PhD
Entomology	2*	-	1*	1**
Plant Pathology	1*	-	1*	1*
Weed Science	1*	-	1*, 1**	-
Nematology	-	-	1**	-
Vertebrate Science	-	-	2**	-
Totals	4	0	7	2

* through MOPP and AC/Crop Protection
** through BAPP

NUMBER OF BURMESE IN THE AGRICULTURE CORPORATION TRAINED BEYOND THE B. AG. IN CROP PROTECTION DISCIPLINES

Discipline	ARI		ARD		Extension		Total	
	MS	PhD	MS	PhD	MS	PhD	MS	PhD
Entomology	1	0	2	0	1	0	4	0
Plant Pathology	1	0	1	0	1	0	3	0
Weed Science	0	0	0	0	0	0	0	0
Nematology	0	0	0	1	1	0	1	1
Vertebrate Science	0	0	0	0	0	0	0	0
Total	2	0	3	1	3	0	8	1

All data provided by Agriculture Corporation

PRESENT ACREAGE OF MAJOR CROPS BY TOWNSHIP & ANTICIPATED CROP AREA

Sr. No.	Township	Anticipated Sesame Area At Full Development ('000 AC)	Monsoon Crops Acreage ('000)							Winter Crops Acreage ('000)					
			Paddy	Peanut	Sesame	Cotton	Jute	Sugar-cane	Sor-Ghum	Maize	Peanut	Sesame	Sun-Flower	Pulses	Total
1.	Myittha	6	51	1	13	31	-	-	2	-	1	2	1	12	114
2.	Kyaukse	26	49	2	32	15	-	-	-	-	-	1	3	14	116
3.	Singaing	19	35	2	25	8	-	-	-	-	-	4	3	3	80
4.	Moulmeingyun	40	163	-	-	-	12	-	-	1	-	40	2	3	221
5.	Wakema	30	155	-	-	-	45	-	-	1	4	31	20	10	266
6.	Einme	15	134	-	-	-	8	-	-	1	4	16	2	8	173
7.	Henzada	12	132	-	-	-	3	-	-	4	11	10	9	27	196
8.	Myaungmya	29	199	-	-	-	3	-	-	11	2	35	5	2	257
9.	Bogale	21	204	-	-	-	-	-	-	-	-	21	2	2	229
10.	Kyaunggon	5	105	-	-	-	-	-	5	-	6	4	8	-	128
11.	Taikkyi	28	111	1	4	-	2	1	-	2	6	28	1	7	163
12.	Nyaunglebin	14	10	-	-	-	2	-	-	1	14	15	3	5	50
13.	Prome	9	56	2	12	12	-	-	-	2	1	10	1	4	100
16.	Tegone	5	83	1	5	3	-	-	-	2	2	6	-	4	106
17.	Paukkhaung	5	36	1	19	12	-	-	-	1	1	5	-	3	78
	Total	244	1523	10	110	81	75	1	7	26	52	228	60	104	2277

PRESENT ACREAGE OF MAJOR CROPS BY TOWNSHIP & ANTICIPATED CROP AREA

Sr. No.	Township	Anticipated Sunflower Area At Full Development ('000 AC)	Monsoon Crops Acreage ('000)						Winter Crops Acreage ('000)						
			Paddy	Peanut	Sesame	Cotton	Jute	Sugar-cane	Sor-Ghum	Maize	Peanut	Sesame	Sun-Flower	Pulses	Total
1.	Budalin	10	23	18	54	3	-	-	18	1	3	28	11	29	188
2.	Pyawbwe	16	32	10	63	23	-	-	1	3	1	3	17	25	178
3.	Yamethin	14	53	15	39	13	-	-	3	4	2	2	17	10	158
4.	Letpadan	8	92	1	1	-	2	-	-	3	12	4	5	9	129
5.	Okpo	6	76	-	-	-	-	-	-	1	3	2	22	14	118
6.	Chaungzone	8	63	-	-	-	-	-	-	-	1	-	7	5	76
7.	Zalun	16	81	-	-	-	12	-	-	15	11	4	15	33	171
8.	Maubin	19	135	-	-	-	16	-	-	7	4	7	18	18	205
9.	Wakema	19	155	-	-	-	45	-	-	1	4	31	20	9	265
10.	Danubyu	15	102	-	-	-	10	-	-	1	4	4	15	45	181
11.	Yandoon	10	70	-	-	-	7	-	-	3	15	6	11	30	142
12.	Kyaiklat	12	133	-	-	-	5	-	-	-	-	9	11	6	164
13.	Pantanaw	12	60	-	-	-	19	-	-	3	9	6	10	10	117
13.	Ingapu	10	123	2	-	-	1	-	-	3	16	10	10	5	170
14.	Kyauktan	14	153	-	-	-	-	-	-	-	-	1	14	-	168
15.	Thonegwa	8	143	-	-	-	-	-	-	-	6	-	8	2	159
16.	Pwintpyu	8	56	-	17	2	-	-	-	6	3	-	8	25	117
	Total	205	1550	46	174	41	117	-	22	51	94	117	219	275	2706
		***	****	**	***	***	****	**	***	***	**	***	***	***	*****

PRESENT ACREAGE OF MAJOR CROPS BY TOWNSHIP & ANTICIPATED CROP AREA

Sr. No.	Township	Anticipated Niger Area At Full Development ('000 AC)	Monsoon Crops Acreage ('000)							Winter Crops Acreage ('000)					
			Paddy	Peanut	Sesame	Cotton	Jute	Sugar-cane	Sor-Ghum	Maize	Peanut	Sesame	Sun-Flower	Pulses	Total
1.	Kalaw	6.0	21	3	-	-	-	-	-	2	-	-	1	2	29
2.	Pindaya	6.5	18	3	-	-	-	-	-	11	-	-	2	2	36
3.	Naung Hkio	7.5	24	8	-	-	-	1		4	-	-	-	1	38
	Total	20.0	63	14				1	-	17			3	5	103
		====	==	==				===		==			===	===	===

ANNEX F

Annex F -- Requirements for Technical Assistance

TA is needed in the crop protection component of the BAPP (see Table F1). The BAPP TA team should include a broadly-trained PM Specialist for at least two years to coordinate all crop protection activities. Short-term TA is needed to assist the long-term TA and AC in local programs including training (see Table F2) and development and to refine PM techniques.

A. Long Term. The PM Specialist will coordinate all crop protection activities in the target townships and seed farms. He will devise a PM scheme to be utilized in the management of pest in the project areas in cooperation with the appropriate local officials. In addition he will supervise the short-term consultants' activities and provide assistance in the design and conducting of the training of AC officials and farmers. The qualifications of the PM Specialist include:

- Ph D in PM or one of the crop protection disciplines
- Experience in developing PM programs for farmers
- Prior experience in PM in a foreign country
- Experience in the design and conducting of PM training courses

B. Short Term: Short-term assistance in entomology, vertebrate control, plant pathology, weed science, and stored product pests would be useful. An economic entomologist is needed to aid in the development of economic injury levels and control alternatives and to develop test plots at the seed farms and in farmer's fields. A vertebrate specialist is needed to assess and design a vertebrate control program. An area wide rodent control program utilizing several control tactics should be evaluated at one or two village tracts. This should include both the village and farms within the tract. A plant pathologist could aid in the development of techniques for the screening of resistant varieties and in the use of soil and foliar fungicides for disease control. The plant pathologists should also look at cropping systems and their effect on disease incidence. To coordinate a program designed to identify the weed species of oilseed crops a weed scientist is needed. A weed scientist could also provide assistance in weed control techniques, especially if herbicides are to be employed. Help is needed in the proper identification of weeds, field testing of herbicides, and development of control alternatives. A stored products pest specialist is needed to assess present methods of storage and pest control and to recommend methods to prevent or reduce storage losses.

Annex F -- Tables

Table F1

SUMMARY OF CONSULTANT REQUIREMENTS FOR CROP PROTECTION

Activity	Duration (Month)	Cost (US$)	Project Year 1	2	3	4	5	Total Cost (US$)
Long Term Consultants								
1. Pest Management Specialist	24	150,000/yr	1	1				300,000
Short Term Consultants								
1. Economic Entomologist-Economic Thresholds and Control	4	15,000/mo	1	1	1	1		60,000
2. Weed Scientist-Identification and Control	3	15,000/mo		1	1	1		45,000
3. Vertebrate Specialist-Damage Control	3	15,000/mo	1	1	1			45,000
4. Plant Pathologist-Plant Resistance and Fungicides	3	15,000/mo		1	1	1		45,000
5. Stored Grain Pest Management Specialist-Damage Control	3	15,000/mo		1	1	1		45,000

ANNEX G

Annex G

Waiver of Proprietary Procurement and Competition

Drafted: PDO:GMImhoff

Initialed: _____

Waiver Control No. _____

Action Memorandum for the Assistant Administrator for Asia and the Near East

Through: Charles D. Ward, AID Representative to Burma

From: Gary M. Imhoff, Project Development Officer

Problem: Request for Waivers approving of Proprietary Procurement and Noncompetitive procedures for the procurement of three General Motors (GM)-manufactured vehicles and spare parts from the United States (code 000).

(a) Cooperating Country:	Burma
(b) Authorizing Document:	Grant 482-0007.01
(c) Project:	Agriculture Production
(d) Nature of Funding:	Development Loan [ ], Other [x]
(e) Description of Goods:	2 ea. vehicles and spare parts
(f) Approximate Value:	$30,000 (excluding freight)
(g) Probable Source:	United States

(h) Waivers of Proprietary Procurement and Competition for Contracts valued over $25,000:

Discussion: The Burmese Government has agreed that AID/Burma should procure directly under the Agriculture Production Project, using authorized grant funds outside of the grant agreement, contractor support items including two vehicles (sedans). Early purchase and delivery of these vehicles is required so that funding, which is available only until September 30, 1986, can be obligated in a timely manner and required transportation can be made available for the contractors during the first trimester of 1987.

a. Proprietary Procurement Waiver

The vehicles in question are GM-manufactured sedans. GM vehicles are required because the Embassy and AID/Burma have standardized on GM-manufactured vehicles and the benefits of compatability with spare parts inventories and familiarity by operating and maintenance personnel outweigh the benefits derived from soliciting offers for a number of different models and makes of vehicles. This rationale is consistent with justification contained in Federal Acquisition Regulation (FAR) Part 15.213(b)(ii) which permits proprietary procurement when "...equipment or parts have been adopted as standard supply".

b. Waiver Permitting non-Competitive Procedures

Because this is a direct procurement, regulations and procedures as outlined in the FAR and A.I.D. Acquisition Regulation apply. Federal Acquisition Regulation (FAR), part 6, requires that all procurements be effected by full and open competition unless within one of the exceptions of section 6.001 (not applicable here) or of subpart 6.3.

One of the circumstances permitting other than full and open competition is contained in FAR Part 6.302-2 (noncompetitive procurement), which states, in part, "when the Agency's need for the supplies or services is of such an unusual and compelling urgency that the Government would be seriously injured unless the Agency is permitted to limit the number of sources from which it solicits bids or proposals, full and open competition need not be provided for".

Although funds for procurement of these vehicles will be segregated from the bilateral grant agreement, it would not be prudent or wise for AID/Burma to procure the goods until assured of the Burmese Government's approval of the terms of the project agreement. Therefore, AID/Burma does not intend to pursue the procurement of these vehicles until the Project Agreement has been signed. Assuming that the Project Grant Agreement is signed in the fourth quarter of the current fiscal year, it would be impossible to follow formal competitive procedures for the procurement of the required vehicles and award a contract during the period that funds remain available for this purpose. If the Project Grant Agreement is signed prior to the fourth quarter of the current fiscal year, this procurement action will be initiated earlier and lessened the "unusual and compelling urgency" to waive competitive procedures. Funds for this grant project are available for obligation only until September 30, 1986. Failure to obligate the funds in a timely manner will delay the implementation of the project.

If this request is approved, and the Project Grant Agreement is signed in the fourth quarter of the current fiscal year, it is proposed that AID/Washington informally solicit bids from among a reasonable number of U.S.-suppliers of GM-manufactured vehicles and provide a synopsis of the quotes to AID/Burma. Upon our review and approval, a contract will be executed with the responsive and responsible supplier providing the lowest total cost quote. AID/Washington is aware of sources of the required vehicles and is familiar with the available model and specifications. It is believed that with special effort, AID/Burma can complete such procurement by the end of September, 1986.

Advertising requirements are not mandatory for contracts made overseas (see FAR Part 5.201(b)).

Primary Justification: These vehicles are essential to this AID-financed project and non-AID foreign exchange is not available for this purpose. The Mission, as well as the Embassy, has standardized on GM-manufactured vehicles and, if the Project Grant Agreement is signed in the fourth quarter of the current fiscal year, there will exist an unusual and compelling urgency to procure these vehicles as funds are available only until September 30, 1986 for this purpose.

Authority: According to FAR Part 6.304, approval of the justification for other than full and open competition shall be approved in writing for a proposed contract not exceeding $100,000 at a level above the contracting officer. As this request has been cleared by the Director, Office of Project Development, your approval of this request is sufficient for approval.

Recommendation: For the above reasons, I conclude that procurement conducted under procedures outlined above is necessary for the attainment of U.S. foreign policy objectives or objectives of the foreign assistance program if the Project Grant Agreement is executed in the fourht quarter of the current fiscal year and I recommend that you certify by authorizing the project.

Procurement Source/Origin Waiver

Drafted: PDO:GMImhoff

Initialed: _____

Waiver Control No. _____

Action Memorandum for the Assistant Administrator for Asia and the Near East

THROUGH: Charles D. Ward, AID Representative to Burma

FROM: Gary M. Imhoff, Project Development Officer

Problem: Request for Procurement source/origin waiver from geographic code 000 (U.S. only), to geographic code 941 (Thailand) and 935 (Singapore)

(a) Cooperating Country:	Burma
(b) Authorizing Document:	Grant 482-0007.01
(c) Project:	Agriculture Production
(d) Nature of Funding:	Development Loan [ ], other [x]
(e) Description of Goods:	Furniture, appliances and refurbishing items for contractor residences
(f) Approximate Value:	$74,000 maximum (excluding freight)
(g) Probable Source:	Thailand and Singapore
(h) Source Waivers granted for Commodity Procurement:	

Discussion: The Burmese Government has agreed that AID/Burma should procure directly under the Agriculture Production Project, using authorized grant funds outside of the grant agreement, contractor support items including furniture, small appliances and refurbishing items for contractor residences. Assuming that the Project Grant Agreement is not signed prior to the fourth quarter of the fiscal year, early purchase and delivery of these items, which are not available on a timely basis from the authorized geographic code (000 and cooperating country), is required so that residences can be rehabilitated and completed in time for contractors' arrivals during the first trimester of 1987. The necessary items are required for two contractor residences. The proposed procurement of these items from Thailand and Singapore requires source/origin waivers.

Given that the Project Grant Agreement is executed in the fourth quarter of the fiscal year, it would be impossible to: (1) research market sources, (2) develop specifications for U.S. purchase, (3) communicate choices, and (4) execute contracts for the procurement of these contractor support items in the United States during the period that funds would remain available for this purpose. AID/Burma, AID/Thailand and GSO/Singapore are aware of sources of these items, are familiar with the available models and specifications, and can, with special effort, complete such procurement in Thailand and Singapore by the end of September, 1986.

If these procurement actions can be initiated earlier in the fiscal year, and the Project Grant Agreement executed prior to the fourth quarter of the fiscal year, it would lessened the "unusual and compelling urgency" of the procurement. Even though funds for procurement of these items will be segregated from the bilateral grant agreement, it will not be prudent or wise for AID/Burma to procure the goods until assured of the Burmese Government's approval of the terms of the project agreement. Based on past experience, the grant agreement will not be signed until the fourth quarter of the fiscal year and therefore, funds for this grant project will be available for obligation only until September 30, 1986.

AID Handbook 1B, Procurement Policies, Section 5.B.4. allows waiver of source and origin requirements in cases involving, among other criteria, "persuasive political considerations" or "circumstances as are determined to be critical to the success of project objectives."

The "persuasive political considerations" in this case derive from the delicate nature of the re-nascent U.S. assistance program in Burma and the role of that assistance in achieving foreign policy objectives. Though the AID program in Burma has direct and specific operational, and indirect policy, objectives, one of its principal objectives within a political context is the demonstration of: (1) U.S. good will; (2) effective and timely U.S. assistance which works efficiently to support Burma's development objectives; and, most importantly, (3) the viability and versitility of free, open and democratic political and economic systems and the technologies which result from this environment. Within this context it is as important that AID-financed projects are implemented quickly and without interruption as that they are implemented and achieve operational objectives. A failure to procure rapidly the items described above would have a direct and detrimental effect upon the achievement of project objectives and, as a direct result, U.S. foreign policy objectives in Burma. The effect of delays on this project and on our overall assistance objectives, even when combined with other waivers under this project, far outweigh even the very important issues of source and origin which you must consider.

Primary Justification: These items are essential to this AID-financed project, and if the Project Agreement is not signed before the fourth quarter of the fiscal year, will not be available on a timely basis from the authorized source, and non-AID foreign exchange is not available for this purpose. The delays which would result from procurement in the United States, of the contractor support items listed above would have a direct and detrimental effect upon the achievement of project objectives and U.S. foreign policy objectives in Burma by not having residences ready in a timely manner for contractor acceptance.

Authority: You have concurrent authority, pursuant to Section 2, subpart F(1) and (2) of the Redelegation of authority as included in State cable 162401, dated May 29, 1985, to waive US source/origin and nationality requirements.

Recommendation: If the project grant agreement is not executed prior to the fourth quarter of the fiscal year, for the above reasons, I conclude that procurement from the sources requested above is necessary to the attainment of U.S. foreign policy objectives or objectives of the foreign assistance program and I recommend that you certify by authorizing this project.

Attachment:
Estimated Contractor Support Costs

CONTRACTOR SUPPORT COSTS

Cost Estimate for Household Furnishings and Furniture

A. HOUSEHOLD FURNISHINGS	Cost ($)	
Air Conditioners (5 @ $600)	3,000	
Electric refrigerator (side by side)	1,000	
Electric freezer 15.7 cu ft.	1,000	
Electric Stove	900	
Automatic washer	700	
Drapery/upholstery material	1,000	
Electric dryer	500	
Dehumidifier	260	
Water filters	150	
Water heaters 50 gal	250	
Table lamps ($40-$50 each)	200	
Floor lamps	100	
Swivel chairs	200	
Step down transformers 240/120	300	
Desk lamps (2 @ $25 each)	50	
Floor polisher	150	
Vacuum cleaner	175	
Bed, Box spring double	200	
Bed, mattress double	300	
Bed frame, metal	150	
Bed, Box spring single (2)	300	
Bed, mattress single (2)	300	
Bed frame, single (2)	200	
Rugs (with backing) (2)	300	
6" sponge rubber (60)	60	
Bathroom Facilities (Medicine Cabinet/Stool)	255	
Garden tools (hoses, sprinkler)	150	
Lawn Mower	100	
Copper Wiring	500	
Fire extinguisher and alarm	250	
Other furnishings	2,000	
TOTAL FURNISHINGS/House		15,000
B. HOUSEHOLD FURNITURE for one 7-room house		22,000
C. VEHICLE, including 20% spare parts		15,000
D. FREIGHT (approx. 25%)		14,250
E. REHABILITATION COSTS/HOUSE		16,000
Sub-Total		82,250
TOTAL Contractor Support Costs (2 x sub-total)		164,500
Contingency		15,500
GRAND TOTAL		180,000

Procurement Source/Origin Waiver

Drafted: PDO:GMImhoff

Initialed: _____

Waiver Control No. _____

Action Memorandum for the Assistant Administrator for Asia and the Near East

THROUGH: Charles D. Ward, AID Representative to Burma

FROM: Gary M. Imhoff, Project Development Officer

Action Requested: You are requested to approve a procurement source/origin waiver from Geographic code 000 (U.S. only), to Geographic Code 935 (Selected Free World).

(a) Cooperating Country: Burma
(b) Authorizing Document: Grant 482-0007
(c) Project: Agriculture Production
(d) Nature of Funding: Development Loan [ ], other [x]
(e) Description of Goods: Sunfola seed
(f) Approximate Value: $10,000 (excluding freight)
(g) Probable Source: Australia
(h) Source/Origin Waivers granted for Commodity Procurement:

Discussion: Open-pollinated seed, identical to that included in this request, was purchased in 1983 and again in 1985 under the Maize and Oilseed Production Project. At those times sunflower seed suppliers in the United States indicated that only hybrid seed and not open-pollinated seed, is sold in the United States. Procurement was waived and an award made to Pacific Seed Company of Australia. It is our understanding that this situation remains unchanged and U.S. seed suppliers cannot satisfy our request for sunfola sunflower seed required under the subject project.

Justification: The seed is essential to the subject project, is not available from the authorized source/origin, and non-AID foreign exchange is not available for the purr se.

Recommendation: For the above reasons, I conclude that procurement from the sources requested above is necessary to the attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program, and I recommend that you certify by authorizing the project.

Action Memorandum for the Assistant Administrator for Asia and the Near East

Through: Charles D. Ward, AID Representative to Burma

From: Gary M. Imhoff, Project Development Officer

Problem: Your approval is sought to waive AID policy requiring host country payment of participant international travel costs.

Discussion: Handbook 10, Chapter 2, Section B, Paragraph 10 indicates that it is AID policy that: " . . . the host government normally pays for medical examination or certification, international travel, and salary continuation to maintain the Participant's family." Handbook 10, Chapter 15, Paragraph 15, Section B.1. reiterates this policy and indicates that "the cost of international travel, including incidental costs en route as well as the cost of travel between the Participant's home country, is paid by the host government or other sponsor unless . . . In the case of of Mission-funded programs, Mission Directors have justified and authorized full or partial waivers and have so notified DS/IT."

Justification: This waiver is justified by: (1) the host country's significant contribution to the local currency costs of the project and to the training component in particular, (2) the magnitude and increasing size of the disequilibrium in Burma's foreign exchange account, and (3) AID's logical desire not to exacerbate this foreign exchange problem on the one hand while attempting to alleviate it on the other.

Recommendation: For the above reasons, I conclude that your approval to waive AID policy requiring the host country payment of participant international training costs as requested above is necessary to the attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program, and I recommend that you approve this request by authorizing the project.

ANNEX H

Annex H -- Seed Equipment Listing

Table H1

Equipment List For Crop Protection

	Quantity	Est. U.S. Unit Cost	Total Costs (US$)
Solo Hand Pump Backpack Sprayer	1,000	200	200,000
Nozzles For Above	5,000	5	50,000
Replacement Hoses	2,000	10	20,000
Replacement Rubber Gaskets	2,000	3	6,000
Replacement Sprayer Guns	1,000	40	40,000
Replacement Screwtop Lids	250	15	3,750
Replacement Tanks	100	50	5,000
		Total	324,750
Sweep Nets - 15" Diameter (4 per seed farm)	16	25	400
Sweep Net Replacement Bags (8 per seed farm)	32	12	384
Shake Cloths (4 per seed farm)	16	10	160
Blocklights (2 per seed farm)	8	500	4,000
		Total	329,694

Table H2

GENERAL ACCESSORIES FOR SEED FACILITIES

QUANTITY	LOCATION	DESCRIPTION	UNIT COST ($000)	TOTAL PRICE CIF ($000)
4	1-C, 1-S 1-K, 1-T	Fork-lift Industrial Truck, 3500 lb. load capacity, Clarklift 500, Clark Eqpt. Co.	17.3	69.2
2	1-K, 1-T	Vacuum Cleaner Pick-up Power Head, Tornado Jumbo Vac.	1.7	3.4
2	1-K, 1-T	Blower, Hand Held, Tornado Blower Model 98800	0.5	1.0
2	1-K, 1-T	Belt Conveyor, aluminum portable for bags, Burrows aluminum bag conveyor "R" Series	3.0	6.0
4	2-K, 2-T	Platform bag truck - 4-wheel, Burrows type 4-wheel	0.7	2.8
6	3-K, 3-T	Bag truck, 2-wheel, Minneapolis bag truck, Burrows No. 1026	0.2	1.2
2	1-K, 1-T	Electronic moisture tester for seed, electronic solid state unit operable on both 230 V, 50 Hz, 1 phase current or battery power, steinlite Model 500 PT2B	1.5	3.0
4	2-K, 2-T	Bag holder, seedburo universal bag holder no. 114	0.1	0.4
2	1-K, 1-T	Bag cleaner, 5 h.p. motor, 230 V, 50 Hz, 3 phase, (Note: Include Electric Motor), Burrows bag cleaner	1.5	3.0
2	1-K, 1-T	Ladder, aluminium extension type, 36 feet, total height in two sections, minimum 30 feet working height to meet type II ANSI A 14.2 standards with spring loaded safety locks	0.35	0.7

NOTE: 1/ The location indicates seed farms for which items are specified, i.e., 2-C means two (2) items for Chaungmagyi; 2-S means two (2) items for Sebin; 2-K means two (2) items for Kyaungsu; 2-T means two (2) items for Thitcho

Table H2 (con'd)

QUANTITY	LOCATION	DESCRIPTION	UNIT COST ($000)	TOTAL PRICE CIF ($000)
2	1-K, 1-T	Seed divider, heavy duty Boerner Type, Boerner seed divider (Seedburo No.34)	0.8	1.6
2	1-K, 1-T	Weight-per-bushel tester, hand type, seedburo No.26 hand bushel wgt. tester	0.2	0.4
2	1-K, 1-T	Grain testing hopper, anchor type, seedburo No.42 grain tesing hopper	0.1	0.2
4	2-K, 2-T	Seed trier, 30 inch long with 9 openings without partitions, 1/2 inch diameter, seedburo No.236 bag trier	0.1	0.4
4	2-K, 2-T	Seed trier, 18 inch long with 5 openings without partitions, seedburo No.180	0.05	0.20
4	2-K, 2-T	Seed trier, special purpose, nickel plated steel, tapered 9 inch long, leatherette shield, seedburo No.36 bag trier	0.03	0.120
6	3-K, 3-T	Sample pan, seed, triangular, 10in x10in x2 1/4in, seedburo No.64 sample pan	0.010	0.06
16	3-K, 8-T	Sample pan "official", aluminum, 1 1/2 quart capacity, 8 1/2in x 12in x 1 1/2in with pour spout, seedburo No.33 sample plan	0.015	0.240
2	1-K, 1-T	Grain scale (Dial-o-gram type), 2610 g capacity with weights. Ohaus dial-o-gram 1600	0	0.3

Table H2 (con'd)

2	1-K, 1-T	Hand testing screens (9-inch square), round hole perforated metal (64 ths inch): 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 26 28, 30, 32, 34 and fractions of an inch 1/12, 1/13, 1/14 1/15, 1/16, 1/18, 1/20 (30 screens)			
		Oblong holes perforated metal (Width in 64 ths inch, Length 3/4 inch - only width given): 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24 and in fractions 1/18 x 1/2, 1/16 x 1/2, 1/20 x 1/2 (21 screens)	10	1.0	2.0
		To include three hand testing screen racks of wood with 24 screen capacity each - Burrows hand testing screens with rack			
4	2-K, 2-T	Seed Magnifier, 4 inch diameter lens, 3 power with 7 inch focal length, burrows No.1-1790 magnifier	10	0.040	0.160
2	1-K, 1-T	Oven, heated air, 3 adjustable shelves, adjustable air-vent, 0-300C thermometer for 230 V, 50 Hz, Seedburo model No.95076-16	10	1.0	2.0
4	1-K, 1-S 1-K, 1-T	Aluminum spray tank for tornado blower model 98800	10	0.090	0.360
3	1-S, 1-K 1-T,	Mechanics tool set, 146 pieces packed in six drawer chest, Craftsman 200		0.8	2.4
30 Boxes	15-K 15-T	Filter masks, 3M type for non-toxic dusts, 100 per box, Burrows No. 8-0730		0.035	1.050
					102.19

Table H3

LIST OF COMMODITIES TO BE PURCHASED FOR SEED DRYING

QUANTITY	LOCATION 1/	DESCRIPTION	UNIT COST ($000)	TOTAL PRICE CIF ($000)
8	2-C, 2-K, 2-S, 2-T	Conveyor, flighted drag belt portable type for ear corn, peanuts in shell, grain. 20 ft. length, Burrows series 2500 portable aluminum conveyor	2.0	16.0
4	1-C, 1-K, 1-S, 1-T	Bagging scale, Howe Richardson Model G 17	2.2	8.8
4	1-C, 1-K, 1-S, 1-T	Conveyor, flighted drag belt, portable type. 24 ft. length, Burrows Series 2500 portable aluminum conveyor	1.8	7.2
4	1-C, 1-K, 1-S, 1-T	Trough belt conveyor for ear corn, 52 ft. long, 14 in. wide, Equipment Specialists, Inc. Trough belt conveyor	4.2	16.8
1	1-T	Elevator, Belt - Bucket Type, 42 ft. discharge ht for shelled corn, Universal Industries Model D-1000 ED	7.8	7.8
				56.6

Table H4

LIST OF COMMODITIES TO BE PURCHASED FOR SEED PROCESSING

QUANTITY	LOCATION	DESCRIPTION	UNIT COST ($000)	TOTAL PRICE CIF ($000)
2	1-K, 1-T	Farmer stock peanut cleaner, Model 488 heavy duty peanut cleaner, Hobbs Adams Engineering	10.5	21.0
2	1-K, 1-T	Elevator, Belt Bucket Type, 31 ft. Discharge ht., Model D-1000 ED, Universal Industries	4.8	9.6
4	2-K, 2-T	Elevator, Belt Bucket Type, 24 ft. Discharge ht., Model D-1000 ED, Universal Industries	4.4	17.6
2	1-K, 1-T	Bagging scale, Semi-automatic, Weight range 25-240 lb, Howe Richardson, Model G 17	2.3	4.6
2	1-K, 1-T	Bag closer (Sewing Head Type), Union Special 2100	1.2	2.4
2	1-K, 1-T	Conveyor, flighted drag-belt portable type, 20. ft. length, Burrows Series 2500 Portable Aluminum Belt Conveyor	2.5	5.0
2	1-K, 1-T	Gravity table seed separator, rectangular deck 42 in.X 90 in., Type A deck, Oliver Hi-cap Model 160	13.8	27.6
1	1-T	Air & Screen Cleaner, Four screens, size 54 in X 60 in, Crippen Model H 5460	38.0	38.0

Table H4 (con'd)

QUANTITY	LOCATION	DESCRIPTION	UNIT COST ($000)	TOTAL PRICE CIF ($000)
2	1-K, 1-T	Conveyor, flighted drag belt portable without 2-wheel dolly Adjustable carriage Burrows Series 2500	2.5	5.0
1	1-K	Air and screen cleaner, screen frame 42 in. wide, 60 in. long, Crippen NW-342.	33.0	33.0
1	1-K	Elevator, Belt Bucket type, 25 ft. discharge height, Universal Industries, Model C2-175 Easy dump	2.9	2.9
2	2-K	Elevator, Belt Bucket type, 27 ft. discharge height, Universal Industries, Model C2-175 Easy dump	3.1	6.2
1	1-K	Elevator, Belt Bucket type, 22 ft. discharge height, Universal Industries, Model C2-175 Easy dump	3.0	3.0
2	1-K, 1-T	Seed treater, metered slurry type, Gustafson S-100ss stainless steel	4.0	8.0
2	1-K, 1-T	Seed bagging-weighing-sewing system, Howe Richardson, Uni-Pak bagging system	12.0	24.0
4	1-C, 1-S 1-K, 1-T	Width and thickness separator, CEA Carter Day Model No. 1-VT	5.2	20.8
				228.7

Table H5

LIST OF COMMODITIES TO BE PURCHASED FOR SEED STORAGE

QUANTITY	LOCATION 1/	DESCRIPTION	UNIT COST ($000)	TOTAL PRICE CIF ($000)
6	3-K, 3-T	Dehumidifier, heavy duty industrial refrigertion cycle type, Remmington Model D-20 Industrial Dehumidifier (230V,50hz)	2.0	12.0
8	2-C, 2-S 2-K, 2-T	Hygrothermograph, Recording Type, Temperature range 10 to 110 F, Relative humidity from 0-100%, with 200 recording charts (weekly), Bendix Hygrothermograph	0.7	5.6
6	2-C, 2-S 1-K, 1-T	Hygrometer/Thermometer, 5 inch dial, humidity 0-100%, Temperature - 10 to 190 F, Abbeon (Burrows No. 1-1440)	0.090	0.560
6	3-K, 3-T	Cooler doors, 5 ft. wide X 7 ft. high, 20 guage galvanized steel pans with cavity filled with 4 inch foamed-in-place polyurethane, Jamison ply foam cooler door	1.2	6.2
20 Rolls	5-S, 5-C 5-K, 5-T	Weather stripping, sponge rubber with adhesive back, 1 inch wide X 7/16 inch thick, in 50 ft. Rolls	0.025	0.5
				24.86

Table H6

LIST OF COMMODITIES TO BE PURCHASED FOR SEED TESTING

QUANTITY	LOCATION 1/	DESCRIPTION	UNIT COST ($000)	TOTAL PRICE CIF ($000)
4	1-C, 1-S 1-K, 1-T	Purity work board and Diaphanoscope	0.150	0.6
20	5-C, 5-S 5-K, 5-T	Seedburo Forceps, No. MM, 5 1/4 inch long, medium sharp, Nickle plated	0.005	0.1
20	5-C, 5-S 5-K, 5-T	Seedburo wire center floor brush No. 10524, 24 inch brush	0.025	0.5
20	5-C, 5-S, 5-k, 5-T	Seedburo counter and Bench brush No. 6308, 8 inch brush, 14 inch overall length.	0.006	0.120
	C, S, K, T,	Expendable Supplies-Germination Towels, Blotters, TZ, Plastic Bags, Indelible Pencils, Plastic Ware	40.0	40.0
				41.32

Table H7

LIST OF COMMODITIES TO BE PURCHASED (CROP PROTECTION - SEED FARMS)

QUANTITY	LOCATION	DESCRIPTION	UNIT COST ($000)	TOTAL PRICE CIF ($000)
10.6% allocation	C	Fungicide and Insecticide seed treatments	0.848	4.24
10.2% allocation	S	Fungicide and Insecticide seed treatments	0.816	4.08
17.9% allocation	K	Fungicide and Insecticide seed treatments	1.432	7.16
61.3% allocation	T	Fungicide and Insecticide seed treatments	4.904	24.52
16	C,S,K,T	Insect sweep nets - 15" diameter heavy duty muslin bag	.028	.448
32	C,S,K,T	Heavy duty muslin replacement bags for 15" diameter sweep net	.012	.384
8	C,S,K,T	Insect blacklight traps	.500	4.000
96	C,S,K,T	Fluorescent blacklight replacements	.005	.480
8	C,S,K,T	Replacement trap pans for blacklight trap	.025	.200
				45.512

Table H8

LIST OF ELECTRICAL AND MISCELLANEOUS SUPPLIES TO BE PURCHASED

1 Set	C	Electrical supplies for Chaungsu	150.0	150.0
1 Set	T	Electrical supplies for Thitcho	250.0	250.0
				400.0

LIST OF MISCELLANEOUS SUPPLIES

Support to Rhizobium Inoculation Program	150.00
Support for Cement	125.00

Table H9

LIST OF COMMODITIES TO BE PURCHASED (CROP PROTECTION - TOWNSHIPS)

2,000	Hand pump backpack sprayer	.250	500.000
5,000	Nozzles for backpack sprayers	.005	25.000
2,000	Replacement hoses for backpack sprayers	.010	20.000
2,000	Replacement rubber gaskets for backpack sprayers	.003	6,000
1,000	Replacement sprayer guns for backpack sprayersr tanks	.040	40.000
50	Replacement screw top lids for backpack sprayer tanks	.015	750
100	Replacement tanks for backpack sprayers	.050	5.000
	Pesticides for evaluation and demonstration plots		150.000
			746.750
		GRAND TOTAL	1,805.932

C. Technical Assistance in Burma. TA in the areas of research and extension in crop protection will be provided through AC/ARI, ARD, and Extension and BARD (see Table CP 6 for Burmese scientists trained beyond B.Ag.). To insure that the BAPP obtains assistance from these groups all should work closely together in the development of programs and priorities. Most of the supporting research will be conducted at Yezin or outlying stations. It is very important that some research be conducted at outlying stations since soil type, rainfall amounts, plants grown, pests encountered, etc. may vary. Additional professional personnel will be needed at ARD, especially in entomology and weed science where trained personnel are in short supply. The FAO-sponsored Crop Protection Project can provide helpful backstopping of research and extension PM activities.

Annex 2

Initial Environmental Examination

Project Location:	Burma
Project Title:	Strengthening Health Care Delivery Systems
Funding:	$15.0 million
Life of Project	FY 1986-1991
IEE Prepared By:	AID/Burma
Date:	November 1985
Environmental Action Recommended:	Environmental Assessment to be conducted during project paper development

Concurrence: _____ Date 11/29/85
Charles D. Ward, AID

Environmental Officer Bureau for Asia Decision:

Approval of Environmental Action Recommended: Date _____

Disapproval of Environmental Action Recommended: Date _____

_____
Environmental Officer, Bureau for Asia