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UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D.C. 20523

PROJECT PAPER

BURMA

EDIBLE OIL PROCESSING  
AND DISTRIBUTION

(482-0006)

NOVEMBER 1984

PDA 0249

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE

A = Add  
C = Change  
D = Delete

Amendment Number

DOCUMENT CODE

3

2. COUNTRY/ENTITY

BURMA

4. BUREAU/OFFICE

ASIA

04

3. PROJECT NUMBER

482-0006

5. PROJECT TITLE (maximum 40 characters)

EDIBLE OIL PROCESSING AND DISTRIBUTION

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)

MM DD YY  
09 30 90

7. ESTIMATED DATE OF OBLIGATION  
(Under 'B.' below, enter 1, 2, 3, or 4)

A. Initial FY 85

B. Quarter 4

C. Final FY 88

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

A. FUNDING SOURCE	FIRST FY 85			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	5860		5860	9000	500	9500
(Grant)	( 5860 )	( )	( 5860 )	( 9000 )	( 500 )	( 9500 )
(Loan)	( )	( )	( )	( )	( )	( )
Other:						
U.S. 1.						
U.S. 2.						
Host Country		500	500	-	4744	4744
Other Donor(s)						
<b>TOTALS</b>	5860	500	6360	9000	5244	14244

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) FN	164	030				9500		9500	
(2)									
(3)									
(4)									
<b>TOTALS</b>						9500		9500	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

11. SECONDARY PURPOSE CODE

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

A. Code	TECH	LAB	NUTR	TNG	COOP
B. Amount	5000	2000	500	1000	1000

13. PROJECT PURPOSE (maximum 480 characters)

To upgrade and expand oil mills in Burma and to increase the capability of indigenous organizations to plan, implement, and evaluate programs to improve edible oil processing and distribution.

14. SCHEDULED EVALUATIONS

Interim MM YY MM YY Final MM YY  
07 87 07 89 10 90

15. SOURCE/ORIGIN OF GOODS AND SERVICES

000  941  Local  Other (Specify)

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

17. APPROVED BY

Signature

Title

Chief, ASIA/PD

Date Signed

MM DD YY  
01 28 85

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION

MM DD YY

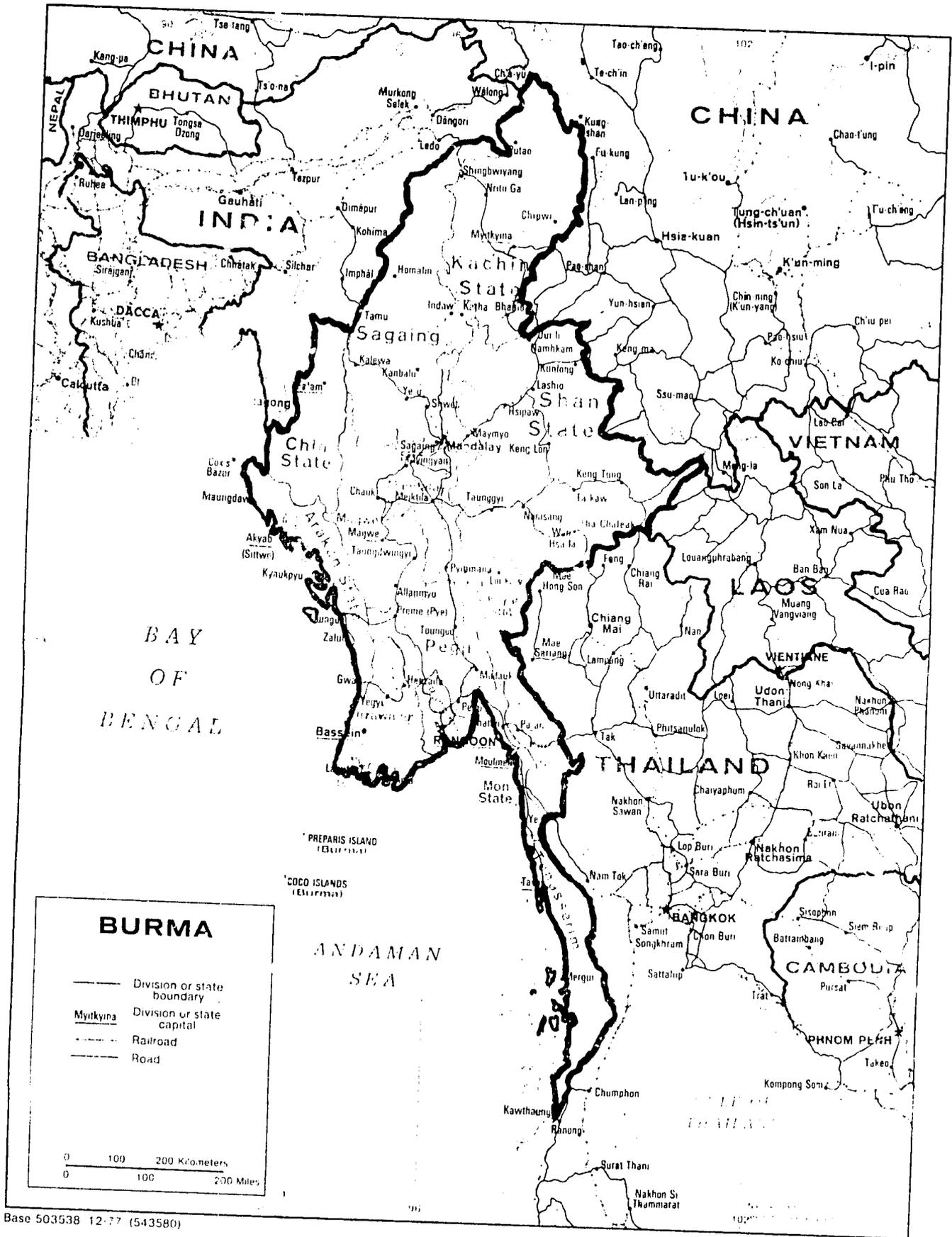


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ABBREVIATIONS

ACO	Area Contracting Officer
ADB	Asian Development Bank
AID	Agency for International Development
AIDREP	AID Representative
AID/W	Agency for International Development/Washington
ASIA/PD	Asia Bureau Office of Project Development
BSPP	Burma Socialist Program Party
CBD	Commerce Business Daily
CID	Cottage Industries Department
CY	Calendar Year
FAO	Food and Agriculture Organization
FSN	Foreign Service National
FX	Foreign Exchange
FY	Fiscal Year
KFW	Kreditanstalt for Wiederaufben
IBRD	International Bank for Reconstruction and Development
ILO	International Labor Organization
IQC	Indefinite Quantity Contract
IRR	Internal Rate of Return
LC	Local Costs
MOA&F	Ministry of Agriculture and Forests

MOC	Ministry of Cooperatives
MT	Metric Ton
PACD	Project Activity Completion Date
PD	Planning Division (Ministry of Cooperatives)
PID	Project Identification Document
PIO/C	Project Implementation Order/Commodities
PIO/P	Project Implementation Order/Participants
PIO/T	Project Implementation Order/Technical Services
PP	Project Paper
PPC	Bureau for Program and Policy Coordination
RCMO	Regional Commodity Management Officer
RFTP	Request for Technical Proposal
RLA	Regional Legal Advisor
SER/CM	Office of Contract Management
S&T/IRM	Office of Internal Resource Management, Bureau of Science and Technology
TA	Technical Assistance
UNDP	United Nations Development Program
USDH	United States Direct Hire

IX

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON D C 20523

PROJECT AUTHORIZATION

**BURMA**

**Edible Oil Processing  
and Distribution  
Project No. 482-0006**

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended. I hereby authorize the Edible Oil Processing Distribution Project ("the Project") for the Socialist Republic of the Union of Burma ("the Cooperating Country") involving planned obligations of not to exceed Nine Million Five Hundred Thousand United States Dollars (\$9,500,000) in grant funds over a five (5) year period from the date of authorization, 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. The Project is designed to assist the Cooperating Country in upgrading and expanding edible oil processing and distribution and to support activities increasing maize and oilseed production. This will be accomplished by: increasing the capabilities of the Ministry of Cooperatives (MOC) to plan, implement, monitor and evaluate projects; upgrading the efficiency of edible oil processing in both the private and cooperative sectors; instituting greater management production measures in the Industrial Producers Cooperatives; improving the quality of edible oil produced; and improving edible oil distribution. The Grant shall include, but not be limited to, technical assistance and training to increase the capability of indigenous organizations to plan, implement and evaluate programs improving the production quality of and the distribution of edible oil and the provision of raw materials, equipment and commodities required to produce components for the rehabilitation of oilseed mills.
3. 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.

4. a. 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 A.I.D. may otherwise agree in writing. Services financed under the Grant shall have their nationality in the United States or in the Cooperating Country except as A.I.D. may otherwise agree in writing. Except 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. Training financed under the Grant may be undertaken in the United States or in third countries in accordance with the provisions of A.I.D. Handbook 10.

b. Conditions Precedent to Disbursement.

1. Except as A.I.D. may otherwise agree in writing, prior to any disbursement for the upgrading of oilseed mills and related technical assistance 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.

2. Except as A.I.D. may otherwise agree in writing, prior to any disbursement for the procurement of laboratory equipment, and the bench-type solvent extraction plant, or the issuance of any documentation pursuant to which disbursement will be made, the Cooperating Country shall furnish to A.I.D., in form and substance satisfactory to A.I.D.: evidence that the new laboratory facility of the Cottage Industries Department of the Ministry of Cooperatives is functional (with operating utilities and program safety equipment on line); a listing of staff that will be trained to use new equipment; and a listing of laboratory equipment and materials to be used.

c. Covenants.

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

2. The Cooperating Country shall covenant that it shall ensure that the Ministry of Cooperatives 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 Cooperatives in carrying out the Project.

4. The Cooperating Country shall covenant that it shall make every effort to ensure that loans made available to cooperatives, private sector organizations and other entities in furtherance of the objectives of the Project shall be made available at an interest rate not to exceed six [6] percent per annum over a period of twelve [12] years, except as A.I.D. may otherwise agree in writing.

5. The Cooperating Country shall covenant that it shall make every effort to ensure that private as well as cooperative mills benefit significantly from rehabilitation activities financed under the Project and that upon request by A.I.D. it shall furnish to A.I.D. annual work plans and other planning and implementation documents identifying, in advance of rehabilitation, mills to be upgraded.

6. The Cooperating Country shall covenant that it shall make every effort to ensure that where private mills are to be utilized on a contract basis for the processing of oilseeds for township cooperatives or cooperative syndicates, private mills rehabilitated under the Project shall be given preference over other private mills for such contracts. The Cooperating Country shall covenant that it shall make every effort, by adjusting

township procurement levels to provide sufficient oilseeds on a custom basis to such rehabilitated private mills or other means, to ensure that such rehabilitated private mills operate at a capacity equal to that of cooperative mills rehabilitated under the Project.

Signature Charles W. Greenleaf  
Charles W. Greenleaf  
Assistant Administrator  
Bureau for Asia

2/12/85  
Date

Clearances:

	Date	Initial
Herbert E. Morris, GC/ASIA	<u>Herb</u>	<u>2-11-85</u>
Peter Bloom, ASIA/PD	<u>PB</u>	<u>2-11/85</u>
John Westley, Asia/DP	<u>JW</u>	<u>2-8-85</u>
David Merrill, ASIA/EA	<u>DM</u>	<u>2-11-85</u>
Barry Sidman, Asia/TR	<u>BS</u>	<u>2/11/85</u>

GC/ASIA:JScales:hp/2/6/85

### III. PROJECT RATIONALE AND DESCRIPTION

#### A. Project Rationale

1. Country Setting. Burma, with an area of 261,288 square miles, is the largest country on the Southeast Asian mainland. Facing the Bay of Bengal and the Andaman Sea on the west and south, it shares land borders with Thailand, Laos, China, India and Bangladesh.

Burma is rimmed on the north, east and west by mountain ranges with elevations up to 15,000 ft. above sea level along the Chinese border and 8,000 ft. along the Indian border. The Irrawaddy River is the country's economic lifeline and major transportation system, connecting Rangoon with Mandalay in the central area. The northern region is characterized by relatively cold, arid conditions in winter. The Irrawaddy delta and Tenasserim panhandle have tropical climates with monsoon rains alternating with a dry season. The northern portion of Central Burma constitutes a "dry zone" with lower levels of rainfall and a shorter rainy season than areas immediately to the north and south.

Administratively, Burma comprises seven states (Shan, Kachin, Chin, Arakan, Mon, Kayah, and Karen) and seven divisions (Rangoon, Mandalay, Pegu, Sagaing, Magwe, Irrawaddy, and Tenasserim). The seven divisions constitute "Burma proper" populated primarily by members of the Burman ethnic group. Each of the seven states has a particular minority ethnic group which predominates.

In 1983, the population of Burma was estimated at 35.3 million with an annual growth rate of 2.0 percent since 1973. Although there is a low overall population density of 52 people per square km, only 27 percent of the land is considered suitable for cultivation which effectively increases the population pressure on arable land to 193/square km.

Burma is an agrarian society, and the agriculture sector is the mainstay of Burma's economic activity. Together with the livestock, fishery and forestry sectors, it accounts for 38 percent of the Gross Domestic Product and about 66 percent of total employment. Additionally, about two-thirds of the processing and manufacturing sector is agro-based, and agriculture products dominate exports.

Because the agriculture sector is largely subsistence-based, major resource inputs are labor and draft animals. This may account, in part, for the high proportion of fallow land. Only 48 percent of arable land in Burma is cropped, and only 41 percent of this is harvested in an average year. Rice is the most important crop in Burma and accounts for 47 percent of the approximately 25 million acres sown to crops. On the basis of area sown, sesamum, a major oilseed concerning this project, is second only to rice but is considered a "catch crop" as evidenced by the fact that sesamum acreage harvested during the past seven year period amounted to only about 60 percent of the total area planted.

Burma is the world's ninth poorest nation in terms of per capita income (\$189/yr). Life expectancy was only 57 years in 1982, with a relatively high infant mortality rate ranging from 90 to 100/1000 live births.

Although Burma produces most of its own food, it must import substantial amounts of palm and refined soybean oil, which drains scarce foreign exchange reserves. Following rice, edible oils are perhaps the most important single staple foodstuff in the Burmese national diet. Total fat intake is generally low and, partly as a result, caloric deficiencies have been found to be quite widespread. Thus the Burmese Government's aim of achieving self-sufficiency in edible oils by 1993/1994 (the end of the Twenty Year Plan period) is not merely a question of eliminating net imports of oils. It also involves raising average per capita consumption to 8.76 kg/year from the present 5kg/year in order to provide 10 percent of the total average energy requirement. Studies have indicated that women and children in urban areas have particularly poor nutritional intake levels.<sup>1</sup>

The Burmese Government has pursued policies and set targets which recognize the importance of the edible oil deficit and requested donors for ideas and assistance. AID was the first of the donors to propose a comprehensive approach to increasing edible oilseed production and improving the efficiency of edible oil extraction and distribution through technology transfer and institutional development.

2. U.S. Interests and Objectives. The United States is interested in the stability and progress of Burma as an independent nation in Southeast Asia. U.S. development interests in Burma stem from recognition of Burma's long-term potential for economic growth, for satisfying the aspirations of its people, and for potential contributions to world food supplies. U.S. economic interests are also increasing in Burma as larger quantities of U.S. products are purchased each year.

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.

<sup>1</sup> Miller, Charlotte I. "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 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. The objective of AID's health sector support is the reduction over time of morbidity and mortality, especially among infants and children.

Because of Burma's high potential for agricultural production increases, AID is engaging in a long-range strategy to raise Burma's production of selected food crops. AID's provision of U.S. technology, research, and training assistance for oilseeds production and processing, will make Burma less dependent on edible oil imports and move it closer to meeting its domestic requirements. It will also increase rural incomes and support AID's nutritional objectives in the health sector.

AID also supports the development of Burma's human resources through training programs in the United States and third countries.

The four cornerstones of AID's development assistance policy are being addressed in the project. Policy dialogue between AID/Burma and the Ministry of Cooperatives has already been instrumental in the Ministry focusing on the need to narrow the gap between cooperative and private oilseed prices. The project is proposing institutional improvements within the Ministry as well as additional resources to enable the technical divisions to provide better information to the oil mills and workshops. These increased capabilities will persist after the project is finished. Technology transfer is an integral component of the project. The provision of master mechanic and processing engineer consultant services will assist the Ministry and Cooperative Societies in upgrading the operations of existing oil mills, increasing operational efficiency, and opening new avenues to technologies such as solvent extraction. And finally, private sector participation is included in the project. Six of the 15 targeted mills, and a similar percentage of the estimated 45 additional mills, to be rehabilitated are private.

This project is directly supportive of AID's strategy in agriculture and human resources and addresses the concerns of AID in the development process.

4. Project Background. The United States and the Socialist Republic of the Union of Burma embarked on a renewed effort to increase economic cooperation with resumption of bilateral economic assistance programs in August, 1980. Since then, the AID program in Burma has grown at a deliberate, calculated pace, concentrating on a few areas promising maximum positive impact. The first priorities identified in the agricultural sector were maize and oilseeds production and edible oil processing. For administrative reasons, agricultural production activities were separated from oil processing in the first project, Maize and Oilseeds Production (482-0005), approved in June, 1981. In order to assist the Burmese in processing increased oilseeds and reducing

dependence on imported edible oils, a study team was sent to Burma in January, 1983, to identify a follow-up project.

The report of the team, "Oilseed Processing and Edible Oil Distribution in Burma", was warmly received by the Burmese Government and other donors. It summarized crucial issues and constraints in implementing a long-range strategy for oilseed processing. Based on this report, a Project Identification Document (PID) was drafted and approved in June, 1983.

In response to issues raised in the PID review, a second study team in the fall of 1983 refined the technical, economic and financial analyses of the earlier feasibility study, analyzed the role of cooperatives in Burma, assessed the social soundness of an edible oil production and distribution project, reviewed institutional capability, and prepared a draft project paper. The project envisioned at that time provided for a \$10 million grant by AID for training and technical assistance to the Ministry of Cooperatives (MOC) and to organizations in the Magwe Division, which is the major oilseed producing area. The project also envisioned financing for the construction of a 25 MT/day solvent extraction plant, refinery, and bottling operation in Magwe and for commodities and technical assistance to improve existing mechanical oil expellers.

Subsequent to the work of the second study team in the fall of 1983, the Asian Development Bank (ADB) confirmed their interest in a series of major soft loans to upgrade edible oil production and processing in Burma. An independent consulting team, with United Nations Development Program (UNDP) financing, produced an assessment of the oilseed subsector in June, 1984.

The ADB/UNDP assessment report provided the following major recommendations: (a) substantial additional oilseed production would result from a program combining farmer credit with training and seed multiplication and the substitution of groundnuts for sesamum on certain lands; (b) major processing improvements could be made by a series of related programs to increase and improve the operation of mechanical expellers; (c) significant technical assistance was needed by organizations involved in edible oil processing and distribution; (d) a modern solvent extraction plant should only be introduced to Burma when sufficient production levels in certain oilseeds are achieved; (e) a substantially larger solvent extraction plant than had earlier been envisioned for Magwe might be more attractive at such a time; and (f) it was likely to recommend to ADB an initial loan focused on constructing new expeller plants, improving existing expeller operations, and initiating an improved seed production program.

Following further discussions, AID/Burma concluded that it would be prudent to defer consideration of AID financing for construction of a solvent extraction plant and for actual upgrading of existing expellers

until the ADB/UNDP team's report could be considered and further discussions could be held with ADB. In place of the earlier AID-financed technical assistance/training/expeller improvement/solvent extraction plant project idea, a revised project concept was developed. The proposed project called for coordinated AID/ADB financing of a national program to upgrade edible oil processing and distribution: a Phase I AID-funded project directed at the immediate technical assistance, training, and equipment requirements of organizations involved in the national upgrading program, and follow-on AID and ADB programs to carry out the design, construction, and modernization efforts.

This revised project concept of an immediate AID program to support obvious training, technical assistance, and basic equipment requirements, coupled with a second phase program relating U.S. expertise to capital funding by other donors, was presented to the Ministry of Cooperatives for consideration.

It appeared that the Ministry of Cooperatives supported the concept of an overall AID/ADB effort combining AID and ADB resources. AID grant financing would fund engineering services, technical assistance and training. ADB loan financing would cover the capital project inputs. The proposed project was not formally endorsed by the Burmese government primarily because the AID-financed project would have financed much more technical assistance than commodities. The Burmese Government normally requires a substantial commodity/equipment component.

Now, it appears that the planned ADB intervention in the oilseed subsector will not be forthcoming as scheduled. Therefore, in order to be responsive to the immediate needs of the Burmese government, this project was developed. It will provide technical assistance and training to upgrade the capability of the MOC and participating cooperatives, and also include the required equipment to upgrade the efficiency of existing oilseed mills and Industrial Producers' Cooperatives.

## 5. Issues Addressed in Project Design

a. Introduction. A number of issues of varying importance were addressed in the PID approval cable from AID/W in July, 1983. However, most became irrelevant after the project was materially modified in August, 1984. A new guidance cable was received from AID/W in September, 1984. Two matters of special concern to AID do, however, justify separate discussion in establishing the context of this project: (i) the role of cooperatives and the private sector, and (ii) pricing.

b. Cooperatives and Private Sector. A major concern was expressed that increasing the "cooperative" sector's capability to procure and process oilseeds would be at the expense of the "private" (i.e. individually-owned, enterprise-for-profit) edible oil millers who have dominated the processing sector to the present time. This project proposes to achieve the optimum economic benefits possible. And since

mills in both sectors share equally in rehabilitation potentials, consideration of one sector over another would not achieve this optimum situation.

In fact, the distinctions between cooperative and private milling operations are greatly blurred due to several factors.

First, village cooperative societies and Industrial Producers' Cooperatives (an important intermediate beneficiary and key oil mill service/technological outreach arm proposed under this project) are in fact made up of private individuals and households engaged in independent economic enterprise, such as farming, industrial machining, and forging. Their reasons for joining cooperatives are influenced by national ideological principles, community peer relationships, and the like; but economic self-interest is the main element driving their participation. Therefore, it is not uncommon to find the same craftsmen belonging to a cooperative and at the same time running his/her own enterprise. For example, Industrial Producers' Cooperatives share some common facilities such as expensive, modern lathes and milling machines, and capital loans to procure them. But the same members of these cooperatives maintain separate workshops, labor forces, and financial accounts. This is the private sector. Private sector activities outside of the cooperative system clearly do not have the important advantages of membership, such as ready access to institutional credit and imported machinery, but they are free to charge what the traffic will bear while coop members generally are expected to adhere to a "cost plus 10 percent" formula in pricing.

Second, township and divisional (province/state) level cooperative societies will, for the foreseeable future, process a substantial portion (an average of 72 percent over the 1978-82 period) of the oilseeds they procure under contract arrangements with private millers. These private millers stay in business because of the oilseed buying program of the cooperatives, which bear all the working capital and price fluctuation risks attendant in raw material purchases.

Finally, while the Burmese Government to date has rejected direct AID assistance to the private sector, the Ministry of Cooperatives endorses the project objectives of screw-press mill upgrading, technology transfer, and quality control advice and improvements to the private sector so long as these program activities pass through the relevant cooperatives. Industrial Producers' Cooperatives, key action agents in the technical services (essentially mill upgrading) component of the project, sell their products and services to both cooperatives and private mills with the only difference being a reported 5 percent rebate to fellow cooperative/members (a practice common even in the U.S.). Private mill operating problems can and will be analyzed and corrected by Industrial Producers' Cooperatives and the Cottage Industries Department as these private mills are "sold" upgrading packages. Township/divisional

cooperatives can also seek project supported services for private mills working on a contract processing basis for them.

c. Pricing Policy. Burmese cooperatives operate with a high degree of autonomy. While one-third of cooperative executives are appointed by the government, local councils and the local party officials usually have the prevailing voice in appointments and often reflect local attitudes and concerns. Cooperatives are, to a surprising extent, financially independent, raising capital from members and from loans and paying income taxes on retained earnings ("profits"). No government budget support is provided for any cooperative organization.

The extent of direct central government control over cooperatives is, therefore, circumscribed. Understanding this concept is important since AID/Burmese government dialogue on pricing policy, even in the face of broad agreement on principles, does not automatically translate into rational price adjustments at the local level in wholesale purchase of oilseeds or retail sale of edible oil. AID/Burma and the Ministry of Cooperatives have, in fact, had an open and constructive dialogue on the problems of low return to the farmer, disparities in private and cooperative edible oil retail prices, and unresponsiveness of cooperatives to cyclical price and market conditions.

Although important circles of the Burmese government understand the need for greater sensitivity to market mechanisms, it is recognized that price adjustment cannot be effectively mandated from above.

There is minimal price competition between the cooperative sector and the private sector as far as prices paid to oilseed producers are concerned. One would expect that the private sector would establish prices paid to producers that are only slightly higher than the cooperative prices paid to oilseeds producers. However, this has not been the case. Private sector prices are always higher than cooperative prices, averaging 40-70% higher than cooperative (Table 1). However, the farmer is encouraged to sell through the cooperative channel by a range of incentives. For example, the cooperative societies may be issued special supplies of consumer goods and building materials to be allocated for sale at low prices to farmers selling oilseeds to the cooperatives. Farmers may also receive seed, fertilizer or other production credits which are repayable in kind.

Table 1

Average Annual Prices Paid to Producers  
(Kyats per basket)

Year	Cooperative Sector		Private Sector	
	Groundnuts	Sesamum	Groundnuts	Sesamum
1978-79	26.9	80.8	34.9	111.2
1979-80	25.1	90.0	40.4	128.7
1980-81	30.6	114.6	46.6	146.9
1981-82	26.1	98.8	44.3	142.3
1982-83	33.1	117.7	52.4	164.3
1983-84	44.0	137.0	61.0	182.0

Source: Ministry of Cooperatives

In effect, the prices offered to producers by the cooperative sector form a price floor, or a support price, to farmers. The cooperative sector is performing what is normally considered a function of the state at no cost to the state. Therefore, one could consider many cooperatives as marketing cooperatives attempting to ensure a floor price to the producer.

It appears, however, that market mechanisms, even in the limited way they affect Burma, have narrowed price differentials between cooperatives and the private sector in recent years. The largest price differentials occurred in 1981/82, as can be seen in the previous table, when prices paid by the private sector were 70% and 44% higher than cooperative prices, for groundnuts and sesame, respectively. This differential was reduced to 39% and 31% for the 1983/84 seasons according to the 15 mills surveyed.

Analysis indicates that more effective and competitive cooperative purchasing forays in the oilseeds market have had and will have the effect of raising producer prices as the private sector reacts to protect its market share. Apparently, intense price competition by private millers will also have the effect of encouraging the upgrading or discarding of inefficient oil milling capacity in the cooperative sector. Meanwhile, producer prices are trending upwards and retail oil prices have been highly erratic.

This increased awareness to market mechanisms on the part of the cooperative system -- from the central to the local level -- can be aided by this project. It has been recommended that alterations in pricing policies be preceded by: a) a statistically-sound price data collection process, and b) expert analysis of price and non-price variables to determine the existing relationships of different price levels over time in the marketing system. This sophisticated pricing analysis process will require technical assistance and training within the Ministry of Cooperatives. These elements are included in this project.

## B. Project Description

1. Project Purpose. The project is designed to complement a donor wide program to upgrade and expand edible oil processing in Burma and support the activities planned under the Maize and Oilseeds Production Project (482-0005) over a five year period by focusing on: (a) increasing the capabilities of the Ministry of Cooperatives (MOC) to plan, implement, monitor and evaluate projects, (b) instituting greater management/production measures in the Industrial Producers' Cooperatives, (c) upgrading the efficiency of edible oil processing in both the private and cooperative sectors, (d) improving the quality of edible oil produced, and (e) improving edible oil distribution. The project purpose will be accomplished by: (a) providing technical assistance and training to increase the capability of indigenous organizations to plan, implement and evaluate programs to improve production, quality and distribution of edible oil; (b) providing raw materials, equipment and commodities required to reproduce components for the rehabilitation of oilseed mills.

The project will be implemented over a five year period, but grant funds from AID are expected to be obligated within the FY 85 to FY 87 period.

2. Participating Entities. The indigenous entities identified to participate in the project are as follows:

a. The Ministry of Cooperatives (MOC): The MOC will have overall responsibility for the implementation of the project. The MOC will work through its Cooperative Department to improve overall sector planning, and its Cottage Industries Department will be responsible for project implementation and oversight and will supervise the technical assistance effort. Both Departments will receive technical assistance, training, and commodities to upgrade and improve their skills.

b. Screw-Press (Expeller) Oilseed Mills: The recently completed ADB/UNDP oilseed sector feasibility study estimated that there are 2000 screw-press oilseed mills in Burma. Of this total, approximately 20 percent (400 mills) operate more or less efficiently, but their productivity could be significantly increased with moderate investment. Of the remaining mills, 60% are inefficient and would require major investments to bring their efficiency and productivity to a break-even point. The remaining 20% are hopelessly outdated and should be shut down.

The project will focus on upgrading approximately 10%-15% of the top 400 mills, ie., 40-60 mills. Ninety-five percent of these 2,000 mills are in private hands and share equally with the cooperatives in their efficiency and upgrading potential. It is essential therefore that this project rehabilitate mills in both sectors in order to capture that portion of the population of mills most capable of being rehabilitated with moderate investment. As a consequence, this will enable the country

to achieve the greatest possible gain to Burma's oilseed processing industry under this project. Criteria other than existing and potential efficiencies in the selection of which mills to rehabilitate will depend on factors such as accessibility, responsiveness of owners, private mill/cooperative mill mix, and proximity to one of the Industrial Producers' Cooperatives.

This project paper is based on an in-depth analysis of 15 of these mills (9 cooperative and 6 privately owned) which were studied by the UNDP/ADB team and by AID technical experts and are considered a representative sample of the target group of mills. All analysis is based on data collected on these mills.

c. Industrial Producers' Cooperatives (Workshops). Most mechanical skills in Burma are housed in regional Industrial Producers' Cooperatives. These Cooperatives own and operate workshops equipped with relatively modern machinery and well-trained mechanics. There are 5 such workshops in Burma. They vary in organization, focus, assets and skill levels. However, in all instances their membership consists of skilled persons who pool their talents and expertise to provide a one-stop service to prospective customers. Some of the members own specialty shops outside the cooperative framework and continue to provide their services as private entrepreneurs. A typical workshop has a little over 100 members. One was formed back in 1952 and the others are only several years old.

Most workshops derive the major source of their income from the rebuilding of vehicles. Some of these vehicles are acquired as surplus from the Burmese government and others are purchased after being written off by their owners after being involved in accidents. However, all workshops derive some part of their income from the manufacture of screw-press mill components.

Four of these workshops will carry out the rehabilitation, manufacture or repair of screw-press mill components under the project. These four are located in the same areas as the 15 oilseed mill sample selected for analysis. The only workshop that will not participate in the project will be the Industrial Producers' Cooperative in Rangoon.

### 3. Project Outputs and End of Project Status

a. Upgraded Planning Division (PD) of the MOC. Under the Cooperative Department of the Ministry of Cooperatives, the Planning Division is responsible for research, data collection and analysis, economic planning, coordination of donor inputs, and major project preparation. The Planning Division is now staffed with 33 people (85% hold B.Sc. degrees), but this number will be increased to 128 over the next two or three years. An internal appraisal of the Planning Division concluded that it has skill deficiencies in certain areas of its responsibility.

The Planning Division's skills in data collection, storage, retention and analysis will be greatly enhanced under the project; so will its project preparation, appraisal, monitoring, and evaluation. By the end of the project, the Planning Division should be more fully staffed with skillful professionals supported by appropriate equipment and tools to carry out their responsibilities.

b. Upgraded Cottage Industries Department (CID) of the MOC. The Cottage Industries Department currently has 298 positions. A pending reorganization would bring its staff levels up to 512. The divisions of the Cottage Industries Department that will receive assistance under the project are the Innovation, the Technical Services, and the Training and Education Divisions.

The Innovation Division is responsible for quality control of the cooperatives' edible oil and for the development of new and the adaptation of existing technologies (such as the development of weaning foods) for cooperative products. It is staffed by chemists, physicists, botanists and engineers. It also maintains a quality control laboratory.

The Technical Service Division is responsible for such things as physical plant design, assistance with technical problems, upgrading of existing plants, and the construction of new plants. These two divisions channel their services to local level plants and entities through the Training and Education Division, which has branches all over the country.

The Training and Education Division maintains a technical library for CID, and provides training in edible oil technology to cooperatives through seminars, symposia, in-country programs, and practical problem solving at site facilities.

The capabilities of the Cottage Industries Department will be greatly enhanced under the project, which will enable it and its divisions to carry out future programs in upgrading existing screw-press mills, operating new ones, and preparing to begin work on solvent extraction plants. This upgrading will be done by additional equipment for the Innovation Division laboratory (including a lab-size solvent extraction plant), information dissemination equipment, technical assistance, and training.

At the end of the project, the Cottage Industries Department should have better trained personnel and managers with a working knowledge of modern oil processing operations. The Cottage Industries Department's information dissemination activities will have been enhanced and its outreach expanded to provide information and technical assistance to cooperatives and related private sector facilities. Additionally, the Cottage Industries Department will be able to carry out an expanded program of quality control work and will be able to continually update skills through the facilities of an expanded library.

c. Upgraded Capacity and Capability of Industrial Producers' Cooperatives (Workshops). Workshops participating in the

project will be provided equipment, tools, raw materials, and technical assistance to improve their operations, particularly in the manufacture of screw-press parts. At the end of the project, these Workshops should be better equipped, more productive, safer to work in, and more responsive to expanding their work beyond vehicle repair and more toward oil processing technologies.

d. More Efficient, More Productive Screw-Press Mills. The 40-60 screw-press mills participating in the project, both cooperative and private, will undergo major rehabilitation. These mills will also adopt annual maintenance procedures and better managerial techniques, safety measures, and improved storage of seed oil and cake. At the end of the project, these mills should be more efficient, extracting more oil from a unit of seed cheaper and faster. They should also be able to handle more than double the tonnage of seed they now handle with less pressings and resulting in better quality products. The seed-cake resulting will have less oil content thus increasing its storage life and improving its marketability.

#### 4. Project Inputs

a. AID Inputs. AID inputs will consist of grant funds which will be expended for training, technical assistance and commodities, as follows:

(1) Training Training will be provided primarily to the personnel of the MOC in three ways: long-term training, short-term training and observation tours. Training under the project is summarized in the following table:

Table 2

#### Proposed Training for Ministry of Cooperatives

Type	Entity	No. of Persons	Person/month	Skill areas
Short term	PD	10	40	Data collection, analysis, computer programming, marketing project design, macro and sector planning
Short term	CID	10	30	Solvent operations, instrumentation, metallurgy, nutrition, quality control
Long term	PD	1	24	Financial analysis and macro-economic planning
Long term	CID	10	168	Chemistry, metallurgy, quality control, nutrition, packaging, solvent extraction
Observation Tours	MOC Coop Private	45	45	Oil extraction, oil expelling, refining, bottling, distribution

(2) Technical Assistance. Technical Assistance (TA) will be provided through the MOC to its subordinate entities and to workshops and screw-press mills, both cooperative and private. The TA will consist of two distinct parts: long-term and short-term. Long-term technical assistance advisors will be stationed in Burma and will work with the involved entities on a daily basis. The efforts and expertise of these resident advisors will be augmented by short-term experts who will visit Burma for short durations.

Long-term TA will consist of 10 person-years to be provided through the Cottage Industries Department during the life of the project. The TA team will consist of three persons, a chief of party and two other experts. The chief of party will be an expert in oil extraction and refining and will oversee the overall TA effort for the four years (48 months) of the project implementation. The team leader will work with other members of the team and with project entities in defining and arranging for short-term TA and training requirements. The other two experts will be qualified master mechanics who will work with the Workshops and screw-press mills in manufacturing mill parts and in rehabilitating, maintaining, and operating these mills. A total of 72 person-months of services will be required from the master mechanics, or a total of 120 person-months of long-term TA.

The short-term technical assistance will be provided to the Planning Division, to the Cottage Industries Department and to the Workshops and Mills. The Planning Division will receive 12 person-months of this TA in the areas of planning, economic analysis, statistics, and financial analysis. The Cottage Industries Department will also receive 12 person-months of short-term TA in the areas of metallurgy, nutrition, quality control, material handling and similar skills. The Workshops and mills will receive 12 person-months in areas such as mechanical repairs, equipment operation and safety procedures.

In total, there will be 36 person-months of short-term TA, probably involving visits by more than 12 experts, some visiting Burma more than once.

(3) Commodities. Project funds will be used to finance a variety of equipment, machinery, materials and vehicles. An illustrative list of such commodities follows:

- (a) Library Materials and Computer Software: Assorted materials to upgrade the reference libraries at the Cottage Industries Department and the Planning Division, and some computer software to enhance the capability of the Planning Division's computer facility.
- (b) Standard Reference Laboratory. Used to analyze seed cake and oil samples. Examples include vacuum equipment, gas chromatograph and accessories, spectrophotometer and accessories, blanchers, dryers, ovens, and centrifuge machines.

- (c) "Bench" Solvent Extraction Plant. With a capacity of about 25 kg/hr for demonstration purposes, this will complement the existing pilot-scale expeller.
- (d) Shop Equipment, Tools and Spares. Equipment included under this category is electric welding equipment, carbonizing and heat treatment, pipe benders and sheet metal rollers, vices, clamps, various handtools, gauges, micrometers, etc.
- (e) Raw Materials. Materials used in the manufacture of oil mill parts and components. These may include different grade steels in the form of sheets, ingots or rods, plus some plastics and associated materials.
- (f) Off-the-Shelf Components. These are components that would be hard to manufacture by the Workshops. Examples include ball bearings, motors, generators and similar components.
- (g) Packaging/Distribution. This includes equipment introduced to support better cleaning methods (steam) of barrels now being used for transporting oil as well as improving the loading, unloading and repair of barrels. It is anticipated that 500 gallon tanks, either steel or wood-stave, lined with plastic materials will be introduced.
- (h) Vehicles. It is estimated that six vehicles will be needed for the project: three to provide long-term technical assistance advisors with transportation and the remaining three for the use of short-term advisors and general support.
  - (i) Household Appliances and Supplies. These will include items such as air-conditioning units, refrigerators, stoves and furnishing for housing the long-term technical advisors.
  - (j) Mobile Equipment. There has been discussion regarding the procurement of a mobile lab, a mobile workshop, and caravan-type mobile housing units. Some, if not all, of these and similar equipment will be procured under the project.
- b. Host Country Inputs. The project inputs to be provided through funding by the Burmese government are detailed in Table E.4 of Annex E. They are summarized below.
  - (1) Port handling costs and inland freight for all imported items under the project.

- (2) Land and buildings for production and processing activities, office space, a limited number of vehicles, and in-country travel.
- (3) Salaries for trainees and replacements, supervisors and support staff, language training and other local costs, financial and in-kind including loan administration costs associated with the project.
- (4) Utilities, support staff, office space, vehicles and drivers, office equipment and suppliers, and in-country travel for the technical assistance team.
- (5) Local expenditures for laboratory and library supplies and facilities, including administrative and operating costs of the facilities.
- (6) Operation and maintenance costs by four Workshops and 60 oil mills for fabrication, rehabilitation, and annual rebuilding and maintenance of expeller parts.

It must be noted that this host country contribution understates the magnitude of the Government's involvement in the project because of the relatively low monetary value of expenditures for staff and the low salaries in the cooperative and private sector.

5. Interaction of Project Entities. Perhaps a brief description of how the actors in the project will relate and interact with each other would be useful. AID grant funds will be used to procure the services and commodities listed. The Burmese Government, in turn, will grant the value of the services portion of AID inputs (technical assistance and training) to the mills and Workshops. The Government will also grant the value of all commodities, training and technical assistance to the MOC or its subdivisions. The rest of the commodities will be made available to the four Workshops and mills on a loan basis, and will include C.I.F. Rangoon prices of all commodities plus import duties and taxes. The terms of the foreign exchange portion of the loan will be an interest rate of 6% for 12 years, with a five year grace period. The remaining portion of the loans which includes import duties and taxes, will be at the rate of 9% for 12 years without a grace period. Other loans for local capital expenditures and operating costs will vary in terms of repayment and will be at an 8%-9% interest rate. The loans to the Workshops and mills will be administered by the MOC project management team through the Myanma Economic Bank. Debt service payments by the Workshops and mills will be made to that bank.

The Workshops will utilize their newly acquired and original equipment and materials to manufacture screw-mill parts and components and will assist the mills in major rehabilitation efforts. The Workshops

will provide their services to all mills, cooperative and private. The availability of workshop services to all mills will be a condition of their participation in the project. Charges made to both types of mills will be the same, except for a rebate of about 5% which will be returned to cooperative mills.

The AID financed portion of the project grant funds will not be available to the mills for rehabilitation. Those mills that wish to borrow for that purpose will do so from the Myanma Economic Bank at prevailing rates. This will be true of both cooperative and private mills, although cooperative mills will have the advantage of the cooperative structure. However, based on the design team's conversations with the six private mills included in the 15 mill sample, loan funds are apparently available to these mills from the Bank as well as from private sources. Mills undergoing rehabilitation or ordering components and parts will either use their own funds or borrowed funds to pay the Workshops for parts, materials and services.

The technical assistance team will work with the Workshops and the mills to smooth out the process and expedite project progress.

### C. Project Beneficiaries

This project is supportive of a national program to increase the quantity and quality of edible oil in Burma. This program will benefit those Burmese families in the project area except the declining minority who consume only edible oil produced from traditional hsi-zone animal-driven mills. Included among the beneficiaries are consumers, oilseed farmers, and oilseed millers.

Consumers will benefit from a more efficient oilseeds extraction and distribution process through an increase in the quality of oil and stabilized overall lower prices. As efficiency increases, and sanitation and better distribution practices are introduced, mills will be able to produce an unadulterated product with a consistent and assured quality. A survey conducted in October 1983 found that consumers are concerned about the low quality of edible oil which results from marketing oil which is contaminated by poor handling and exposure to air. Many of these quality considerations can be remedied by inexpensive mill rehabilitation. Instead of pressing oil cake four to five times, for example, with the resulting oil becoming poorer in quality each time and then mixing with the better oil, more efficient processing will enable the crusher to obtain the same amount or more oil in one or two presses. The oil thus produced will be of better quality. This increased efficiency will lead to greater capacity available for crushing oilseed and lower marginal costs for oilseeds processing. These efficiencies would be passed on to the consumer in the form of better oil for a lower price. As mentioned earlier, a major problem for the population of urban areas has been the poor nutritional status of infants, children and women. The additional oil generated from reducing residual oil in oil

cake will improve the nutritional status of many Burmese. It would be an exaggeration to assert that the additional output would directly benefit the most malnourished, but the net increase in oil availability in urban areas would certainly increase supplies in general and produce positive nutritional benefits.

Producers will also benefit from improvements to the edible oil sector by increased competition among mill operators. In an environment of greater production capacity, lower processing costs and less product differentiation (improved quality versus traditional quality), millers will offer higher prices to farmers for oilseeds. The more efficient mills in both the private and cooperative sectors will be more competitive than less efficient mills. Higher prices to farmers will be an incentive to increase oilseed production. Such price incentives are an important factor in the production program which has been initiated under the Maize and Oilseeds Production Project financed by AID.

Local organizations will be major beneficiaries of the program to increase edible oil production in several ways. The most immediate benefits will be better management, improved planning, better and more training and new skills to do innovative work. This will be the initial point of concentration on which further improvements by the Burmese Government, AID and other donors to the sector will build. As a result, the scarce foreign exchange currently being expended for edible oil imports can be diverted to other investments and/or goods.

Industrial Producers' Cooperatives (Workshops) will benefit directly from the oil mill service/technical outreach arm proposed under this project through training in technical and managerial areas. These Workshops will carry out the mill upgrading/rehabilitation program envisioned in this project. This will enable existing oil mills in both the cooperative and private sectors to benefit from more efficient operations and managerial skills. The ability to produce a better quality product more efficiently will enhance their economic viability.

#### D. Donor Coordination

This project is designed to assist Burma to become self-sufficient in edible oils through increased efficiencies in oilseed extraction, refining and distribution and by increasing the capability of the indigenous Burmese organizations to effectively plan and deliver technical services in the edible oil sector.

It is envisioned that total oilseed processing subsector investment requirements in Burma could exceed \$100 million over the next 6 years. The major donors to this effort will be the Asian Development Bank, which is planning a \$30 million loan, AID (through the proposed grant of \$9.5 million to fund this project), and the West German Kreditanstalt for Wiederaufben (KfW) which has programmed \$2 million (equivalent) for a loan in the edible oil processing subsector.

Other projects are less directly related to oil processing and distribution. These projects are:

Maize and Oilseeds Production Project (MOPP) - AID. The project goal is to increase production of oilseed crops and maize in 40 townships of Burma. MOPP will have positive effects on rural income and employment and on national food supply and nutrition. This US\$ 51.7 million project started in 1982 is to bring about a rapid rate of adoption of high-yielding inputs and tillage practices among an estimated 200,000 farm families. By year five of the project, oilseed production is targeted to have increased by approximately 500,000 M.T.

Promotion of Small Scale Industries Project - Federal Republic of Germany. Involves the upgrading of technical skills of the Industrial Producers' Cooperative Societies and strengthening the capabilities of the Cottage Industries Department. The major emphasis of the project involves ceramic, metal casting works and sheet metal works.

Myanma Economic Bank Industries Loan - ADB. Under the project, the Magwe Division Cooperative Syndicate has borrowed \$0.5 million for equipment to be used in a 30 metric ton per day oilseeds expeller plant. Total project investment costs are approximately US\$2 million. The equipment has been ordered and is now being shipped to Burma. The oil will be marketed in an unrefined state to all regions of Burma, although edible oil deficit areas will receive special consideration.

Cooperatives Management Services (CMS) - UNDP. The immediate objective of this International Labor Organization project is to improve the efficiencies of operations and the quality of services to the cooperative societies. Under this project the Cooperatives Management Services will be established to increase the management and analytical capability of the cooperatives. At the end of this four-year project a fully operational Cooperatives Management Services will be in place with a technically competent staff comprising the director and 23 consultants. Seventy executive committee members and staff primarily in the cooperatives but also in the Ministry of Cooperatives will be trained under this project.

Strengthening of Cooperative Schools and Training Institutes - UNDP. This project, also executed by the ILO will provide facilities and trainers in cooperative education. Subject matter will include training techniques, financial analysis, marketing, production and project management. This project is linked to the Cooperatives Management Services and will base its education and training programs on materials and methods developed by Cooperatives Management Services.

The current and planned donor activities are summarized in Table 3:

TABLE 3

Current/Proposed Donor Activities in Edible Oil

Production/Processing

Activity	Donor Status	Donor Funding Level
Maize and Oilseeds Production	AID-ongoing	\$30.0 million
Promotion of Small Scale Industries	FRG-ongoing	0.75 million
Myanma Bank Loan (sub-loan)	ADB-ongoing	0.5 million
Oilseed Processing	ADB-feasibility	30.0 million
Oilseed Processing	KFW-feasibility	2.0 million
Cooperatives' Mgt. Services	UNDP-ongoing	1.8 million
Strengthening of Schools and Training Inst.	UNDP-funds committed	1.0 million

AID/Burma has taken the lead in proposing to the Ministry of Cooperatives that the coordination of donor activities will minimize duplication and overlap and could result in a better use of donor funds to assist in the edible oil subsector. KFW recognizes the importance of this coordination and is eager to review existing feasibility work undertaken by AID and that proposed by the ADB before proceeding with planned funding. AID/Burma in particular is interested in working with the ADB to parallel the use of our current and future funding with the ADB's capital assistance. To enhance the likelihood of cooperation with ADB, AID/Burma has already entered into a serious dialogue with the ADB related to assistance in the edible oil subsector.

IV. COST ESTIMATE AND FINANCIAL PLAN

A. Cost Estimate

The total project cost is estimated at \$14.244 million. The AID contribution is \$9.5 million (all grant) with the Burmese contribution at

\$4.74 million. This is the equivalent to 67 percent and 33 percent of the total project cost from AID and Burma, respectively. The AID contribution will cover all foreign exchange costs of technical assistance, as well as including \$500,000 of local currency costs required for local support staff and local costs for consultants, training, commodities and evaluation. The Burmese Government, cooperatives, and private firms will contribute labor for rehabilitation efforts and maintenance, investment in expanded facilities, space for laboratory, personnel and administrative expenses and other local costs.

TABLE 4  
Summary of Cost Estimates and Financial Plan  
(US\$ 000)

Source	AID		HOST COUNTRY		TOTAL
	FX	LC	FX	LC	
Technical Assistance	2,046	500	--	161	2,707
Training	861	--	--	133	994
Equipment and Commodities <sup>1</sup>	4,316	--	--	230	4,546
Operations and Maintenance	--	--	--	4,199	4,199
Evaluation	250	--	--	21	271
Inflation	478	--	--	--	478
Contingency	1,049	--	--	--	1,049
<b>Total</b>	<b>9,000</b>	<b>500</b>	<b>--</b>	<b>4,744</b>	<b>14,244</b>

<sup>1</sup> Includes installation, maintenance and service charges

The summary cost estimate of the AID dollar commitments and the Burmese kyat commitments are detailed in Table 4. Of the individual components of the project, technical assistance will be \$2.71 million (19%) of the total project costs and training will be \$1.0 million (7%) of the total cost. Total equipment and commodity costs will be \$4.5 million (32%) of the total project costs. A total of \$1.5 million has been budgeted for inflation and contingencies.

The Burmese Government will contribute 6 percent of the total technical assistance expenditures including utilities, support staff, office space, vehicles and drivers, equipment and supplies, in-country travel, etc. and 13 percent of the training costs in the form of salaries, replacement personnel, training support, training materials and

other local costs. Contributions by Cooperative and private workshops and mills is estimated to be the dollar equivalent of \$4.2 million. This is largely comprised of labor for fabrication of mill parts by the Workshops and their installation into the estimated 60 mills to be rehabilitated. A breakdown of most government contributions is detailed in Table E.4.

The timing of Burmese Government expenditures will occur over the duration of the project and it is not anticipated that project funding requirements will strain the MOC or local organizations' budgets. The MOC has been given the mandate to carry out other donor-assisted projects in recent years and has the financial and management competence, budget and staff to implement the proposed project.

Projections of expenditures for the project by fiscal year are shown in Table 5. AID's major expenditures will be in project years 2 and 3 when equipment will arrive for the Workshops, and the rehabilitation work for the 15 mills is undertaken. The other 45 mills expected to be upgraded under the project will take place over the remainder of the project period. Financing of technical assistance is expected to be via PIO/T's and an AID direct contract through AID Direct Letter of Commitment to firms and/or institutions. Disbursements for long-term training will be on a PIO/P basis. Short-term training will be funded by invitational travel orders or PIO/P's, as appropriate. Disbursements for equipment are expected to be through Bank Letters of Commitment.

#### B. Recurrent Costs

The project is part of a major program by the Burmese Government toward increasing the quantity and quality of domestically produced edible oil available to the Burmese public.

The institutional development program incorporates only existing institutional structures which are already funded through the Burmese Government budgetary process. Costs in support of technical assistance (vehicle support and field travel expenses) will give rise to a set of recurrent costs only during the life-of-project. Maintenance and continued upgrading of the laboratory and technical library may require certain foreign exchange (estimated at \$20,000/year) while estimated recurrent costs in support of the rehabilitation of the oilseed mills will be more than offset by anticipated increases in sales revenues and efficiencies as a result of increased production levels. Mills are presently rebuilding worn screw parts and cage bars up to four times per year. Hardened steel will have to continue to be used after the project ends to routinely rebuild mill parts if the mills are to retain their increased efficiencies generated under the project. However, the economics involved in rebuilding mill parts annually rather than quarterly will make it profitable for the mills to continue their more efficient operations. Recurrent costs directly related to the Government will be minimal.

Table 5  
 Projection of Project Expenditures by U.S. Fiscal Year<sup>1</sup>  
 (US\$ 000)

Source	FY 86		FY 87		FY 88		FY 89		FY 90		TOTAL	
	AID	BURMA	AID	BURMA	AID	BURMA	AID	BURMA	AID	BURMA	AID	BURMA
Technical Assistance	10	10	660	40	730	40	730	40	416	31	2546	161
Training	5	-	200	40	300	40	200	20	156	33	861	133
Equipment & Commodities	30	-	1400	80	1000	70	1000	70	886	10	4316	230
Operations & Maintenance	-	10	-	1000	-	1150	-	1100	-	940	-	4200
Evaluations	-	-	-	-	100	10	-	-	150	10	250	20
Inflation	3	-	135	-	130	-	115	-	95	-	478	-
Contingency	7	-	290	-	275	-	250	-	227	-	1049	-
<b>TOTAL</b>	<b>55</b>	<b>20</b>	<b>2685</b>	<b>1160</b>	<b>2535</b>	<b>1310</b>	<b>2295</b>	<b>1230</b>	<b>1930</b>	<b>1024</b>	<b>9500</b>	<b>4744</b>

<sup>1</sup>  
 As initial obligation is projected in the fourth quarter of FY 1985, first project year to realize expenditures is estimated as FY 1986 (project year 1).

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V. IMPLEMENTATION AND MONITORING 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 February, 1985, leaving six months for AID/Burma to negotiate and sign the project agreement by the end of FY 1985. Thus the project's PACD would be September 30, 1990.

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

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

b. Preparation of PIO/Ps for long-term training: This is particularly important if university level trainees are intended to begin at the start of the 1986 spring semester. The AID Office will prepare PIO/P work sheets and send them to the Office of International Training as soon as possible to permit placement of these candidates before the semester begins;

c. Agreement with the MOC on the terms of reference (TOR) for the short-term and long-term technical assistance advisors;

d. Preparation of a request for proposals (RFPs) for technical services: The AID Office will seek the assistance of the regional contracting officer in Bangkok to develop an RFP for the procurement of technical services;

e. Publication of an RFP synopsis in the Commerce Business Daily (CBD): when the RFP is near completion, the AID office will request AID/W to publish a synopsis in the CBD advising interested firms and institutions of the availability of the RFP and the closing dates;

f. Preparation of specifications for vehicles and other commodities: The AID Office will request assistance from the Regional Commodity Management Officer (RCMO) and an IQC firm, if needed, to assist in the preparation of specifications and bidding documents for the procurement of vehicles and related equipment. In addition, other project items, ie. raw materials for fabrication, shop equipment, model components, portable caravans/laboratory facilities etc. developed after the TA team arrives, will have bid documents reviewed by the RCMO;

g. Preparation of a request to S&T/IRM to review statistical and economic forecast software packages designated to be used with the current MOC computer, Hewlett Packard Model 9000 series/9030 A with a 1.2 MB memory.

2. Calendar 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 starting point:

Table 6.  
Major Implementation Events

<u>Action</u>	<u>Timing (months)</u>
Project Authorization	-6
Pre-obligation actions and negotiations with Burmese Govt.	-6 to 0
Project Agreement Signature	0
Completion of RFP and advertising in CBD for TA contract	0
Issue PIO/P for long-term training	+1
Issue PIO/C for first commodities needed for TA team	+1
Receipt proposals for TA	+4
Complete Evaluation of TA proposals	+5
Travel of first group of long-term trainees (Spring 1986)	+6
Receive quotations/bids for first commodities/award contracts	+6
Negotiate/Award/Sign TA contract	+7
Observation tours begin	+8 to +56
Arrival of first group of commodities	+10
Arrival of TA team at post	+10
TA team prepares specifications for second group of commodities	+12
Begin processing of short-term training	+12
Second group of long-term trainees departs for Fall Semester, '86	+11
Short-term training	+14 to +56
Issue IFB for second group of commodities	+14
Short-term TA services begin	+14 to +54
Third group of long-term trainees departs (Spring, 1987)	+16
Arrival of first shipment of second group of commodities	+19
Workshops receive their first shipment of materials	+21
First Rehabilitation of mills begins	+24

Final group of long-term trainees departs (Fall 1987)	+23
Other shipments of second group of commodities arrive and distributed	+25 to +36
Rehabilitation of mills continues	+26 to +60
Technical Assistance contract completed	+54
All long-term trainees complete training	+60
PACD	+60

A bar-chart showing the progression of these activities is shown in Figure 1.

3. Financial Arrangements. It is envisioned that a \$9.5 million grant agreement will be signed between the grantee, as represented by the Burmese Ministry of Planning and Finance, and the grantor, the United States Government, in September, 1985. Contracts for goods and services to be provided under the project will commit funds and disbursing authorizations, ie. direct letter of commitments and/or bank letter of commitments will earmark grant funds. The participating oilseed mills (both Cooperatives and private sector) and workshops will be able to finance imported materials and equipment under the project by local currency loans obtained through the Myanma Economic Bank. The Myanma Economic Bank will provide loan terms and rates which will allow the participating oilseed mills and workshops to realize a fair return on their investment. It is envisioned that loans shall be made available at an interest rate not to exceed six (6) percent per annum over a period of twelve (12) years, provided however, that A.I.D. may in writing approve terms other than those proposed (see Covenant 3, pg. 74). Loan terms and rates are to be substantially identical for both the participating workshops, cooperative and private sector mills. The major difference in loan terms and rates between the cooperative and private sector oilseed mills will be that the Ministry of Cooperatives can not guarantee repayment for private sector oilseed mills (the MOC will for Cooperative mills) and Myanma Bank officials will make the initial assessment for repayment potential. In the case of default by either a cooperative society or private oilseed mill operator, an extension of time (a form of loan restructure) will be the first desired action. If, after the extension period, default of the loan cannot be avoided, equipment in the value of the loan amount outstanding shall be confiscated and provided to other oilseed mills in order to recover the loan amount outstanding (equipment condition permitting).

It is also envisioned that the Ministry of Cooperatives will petition the Burmese Cabinet for income relief in the form of tax holidays for the participating Cooperative Societies and private sector oilseed mills on income generated from the sale of equipment, services, and edible oil produced as a result of project inputs.

Figure 1  
Implementation of Activities Chart

Project Year

1

2

3

4

5

Technical Assistance

Prepare and Review TOR's \*

Prepare RFP and CBD notice \*

Publish CBD notice

Review and Evaluate Proposals

Negotiate and Sign TA Contract

TA team arrives/commences work

Short-term TA

Training

Identify LT training candidates

Prepare PIO/P's

1st group of long-term trainees

Observational tours

2nd group of long-term trainees

Short-term trainees (in country)

Short-term trainees (out of country)

3rd group of long-term trainees

Final group of long-term trainees

Commodities

Prepare specs PIO/C 1st group

Bid 1st group and award contract

1st group shipped/arrives at port

Prepare specs/IFB's for 2nd group

Advertise, Renew and Evaluate

Proposals for series of bids

2nd group shipped/arrives at port

\* Indicates pre-implementation activities

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As repayments in the form of local currency are made, loan proceeds will revert to the Bank through the MOC. Although there is no objection on the part of the Burmese Government to utilize these regenerated funds to assist additional oilseed mills (both Cooperatives and private sector), the Burmese Government cannot state categorically, at this time, that a separate fund shall be established with the regenerated loan funds. An evaluation of the proposed project, including loan repayment schedules and an assessment of the further needs of the oilseeds subsector must be taken into account first.

#### B. Project Management and Monitoring

1. Overview. The three major actors in project implementation and monitoring, AID/Burma, the MOC, and the TA consultant, will coordinate closely at all stages of the project. Close collaboration will be essential, because each will have a related role to play as dictated by signed agreements and contracts that govern their relationships. Therefore, a coordinating mechanism, such as regular meetings to assess progress and identify and relieve constraints, will be adopted. In addition, the informal warm relationships that now exist between AID/Burma staff and officials of the MOC, will be nurtured and cultivated in order to enhance project progress.

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

2. AID/Burma Responsibilities. The AID Office will assign a USDH officer as project manager (PM) to assist the Burmese Government in project implementation and to oversee project monitoring. The project manager will be responsible for all project matters on the AID side. This person will work closely with counterparts in the MOC and will be the main contact point between the AID Office and the MOC. The PM will assist in developing a detailed project implementation plan and will monitor project progress based on that plan. He/she will be responsible for obtaining other expertise from other AID Office staff and regional personnel when such expertise is needed. The PM will anticipate implementation problems and provide suitable solutions and will keep the AIDREP informed at all times of project status and of problems that may require the AIDREP's attention and intervention.

The project manager will carry out all pre-obligation actions, will work to see that conditions precedent are met and will get the procurement and training plans expedited. He/she will work closely with the MOC in identifying and screening candidates for training. The PM will act as the main contact 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 the AID Office by the Regional Legal Advisor (RLA), the Area Contracting Officer (ACO) and the Regional Commodity Management Officer (RCMO). The RLA is located in Colombo and the ACO and RCMO are located in Bangkok. They will provide timely assistance in their areas of responsibility.

Additionally, the AID Office may require the services of personnel in the areas of training, preparation of RFPs, etc. These services will be provided the AID Office either by USDH staff in AID/W or through IQC's.

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 rests with the Ministry of Cooperatives which consists of two major departments:

a. the Cooperative Department which is responsible for the expansion and development of cooperatives in Burma and for statutory functions; and

b. the Cottage Industries Department which is a technical department established to promote small and medium scale industrial cooperatives.

The present organizational structure of the Ministry of Cooperatives is shown in Figure 2.

For this project a project office will be set up under the Cottage Industries Department auspices which will serve as the focal point for day-to-day project implementation, monitoring of progress and evaluation. The Planning Division of the Cooperative Department will also be represented in the project office.

A project management team formed within the Ministry will consist of a full-time project manager and technical staff. Each AID-financed technical consultant will work with a full-time technical counterpart in offices provided and maintained by the Ministry of Cooperatives.

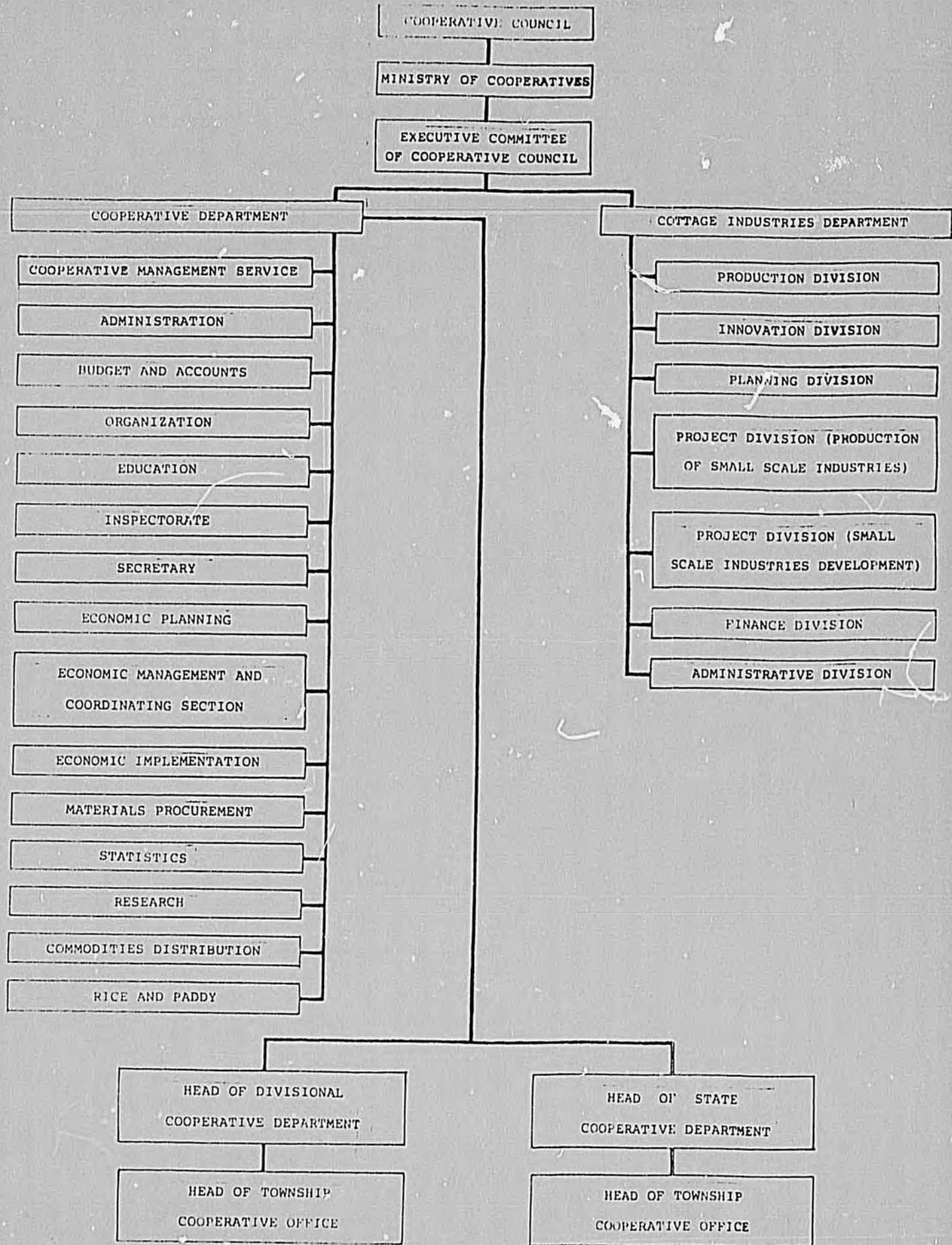
5. The Technical Assistance Team. The TA team will play a crucial role in implementing the project, once they are in country. They will share offices at the MOC with counterparts and will work closely with them on a day-to-day basis. Potentially, they will be able to provide a great deal of support which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

### C. Procurement Plan

1. General. There will be several procurement actions to be undertaken in connection with this proposed project including procurement of technical assistance and related commodities, including raw materials required for the rehabilitation of the oilseed mills.

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

ORGANIZATION CHART OF THE MINISTRY OF COOPERATIVES



firms and/or institutions) of U.S. source and origin. This approach will provide continuity to the project process and minimize AID/BURMA staff time required for contract administration responsibilities. Such a contracting mode does not exclude the services of an 8 (a) or small business firm from participating under the program as a prime contractor. Alternatively, it may be possible to identify early in the contracting process an element, such as the short-term training needs, which could be sub-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 impractical for this particular project. The Burmese Government, in preliminary discussions, has agreed to a direct AID contracting mode.

Procurement of the TA contract will follow standard AID contracting procedures (i.e. publication of notice in the CBD, issuance of RFP, evaluation of proposals, selection, and contract signature). All contracting actions will be undertaken by the Area Contracting Officer in Bangkok with the advice and assistance of AID/Burma. AID/W offices, ASIA/PD and SER/CM in particular, will assist as may be requested by the AID Office and the ACO. It is anticipated that disbursement for technical assistance services will be done through a direct letter(s) of commitment through the Office of the USAID Controller, Bangkok.

The idea of having the International Labor Organization (ILO) provide the services of the two master mechanics was considered in project design but was rejected. Coordination/cooperation with ILO is desirable as a matter of AID policy and ILO has a relatively successful wood-working project in Burma at present. However, in-depth analysis indicated that a joint effort will delay the project by probably a year, and the resulting arrangements may prove hard to implement. Also, the Burmese Government indicated serious reservations about the idea.

The MOC has agreed to provide the TA team with office, office equipment, supplies, secretarial and administrative support, furnishings, fuel, drivers 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 three 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 from local woodworkers and the procurement constraints to buying furniture from the Timber Corporation has been an impediment to existing projects in Burma. As an alternative, AID/Burma has agreed to finance furniture under the project to be procured by and titled to AID/Burma. The AID office is already importing appliances and other household furnishings for contractors. This will remain in practice and these furnishings will also be titled to AID/Burma.

Vehicles for personal use by U.S. technicians will be purchased under the project 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 (up to 300%), U.S. contract technicians will not be allowed to ship their own vehicles. Therefore, the project will provide vehicles for both business and private use.

3. Commodities and Vehicles. Commodities will be divided into two groups for procurement purposes. The first group will consist of those commodities that the technical assistance team will need for their work immediately upon arrival in Burma. This first group will include such items as computer software, appliances (refrigerators, air-conditioners, etc.) for the residences of the TA team, and vehicles for the TA team. The first group will be procured and consigned to the AID Office through PIO/Cs immediately after obligation. The AID Office and MOC will identify these items and the Regional Commodity Management Officer will assist in the preparation of the specifications and the PIO/C. These items will be procured on a competitive basis in accordance with regular AID commodity procurement procedures.

All other commodities will be procured after the TA team has arrived in Burma and begun its work. Laboratory/library materials, shop equipment and tools, raw materials, portable caravans/laboratory facilities, etc. are examples of this second group of commodities. The TA team will be responsible for verifying the exact need for this group, and will prepare all specifications and bidding documents for their procurement. The specifications and bidding documents shall be reviewed by AID/Burma and by the RCMO and RLA prior to their issuance. Procurement will be done in accordance with AID rules and guidelines.

Because of the relatively large volume of commodities involved, it may be prudent to retain a Procurement Services Agent (PSA) to assist with procurement. The PSA could assist in procuring all commodities or have a limited involvement where its services would focus on certain items only. Most likely, the services of the PSA would be used in the procurement of the second group of commodities only. Thus his/her services would be needed after the TA team's arrival and commencement of work on the specifications. Disbursements for commodities will be done through bank letter(s) of commitment and letter(s) of credit drawn on U.S. banks in favor of suppliers.

Another possibility is to combine both the TA and procurement service requirements under a single contract if a qualified firm can be identified. This would tend to increase the responsiveness of the contracting firm to timely commodity and equipment arrival.

4. 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, or a contract for a combination of technical assistance and procurement services will be a direct letter of commitment (direct L/COM) issued from the Office of the Controller, Bangkok. In case a separate contract is finalized for procurement services only, the preferred method of financing will be a bank letter of commitment (bank L/COM) due to the number of items and sources of supply of the commodities. The financing method recommended for evaluation services under the project is direct payment utilizing an IQC or PSC arrangement.

The following chart illustrates the methods of financing available for a given contract option under the project.

METHODS OF FINANCING CHART

<u>Method of Implementation</u>	<u>Method of Financing</u>	<u>Approximate Amount</u> (US \$ 000's)
<u>Option 1</u>		
TA and Commodities direct contract	Direct L/COM	7,200
PCS's or IQC's (Evaluation)	Direct Payment	250
<u>Option 2</u>		
TA, direct contract	Direct L/COM	2,900
Commodities, direct contract	Bank L/COM	4,300
PCS's or IQC's (Evaluation)	Direct Payment	250
TOTAL (under either option)		7,450

5. Audits. Responsibility for audits for all programs of the Burmese Government lies with the Central Accounts Office of the Council of the Peoples's Inspectors. Representatives of this office are assigned to monitor financial and procurement activities 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

1. Long-term Training. The AID Office will work with the MOC immediately after authorization to identify as many of the eleven long-term training candidates as possible at the earliest possible time. Every effort will be made to admit those candidates identified and judged to have the required English language proficiency to appropriate U.S. institutions as early as possible. It is anticipated that this initial number will be selected for study beginning the spring semester of 1986. A second group of long-term trainees will be admitted beginning the fall of 1986. The remaining trainees will be admitted subsequently as they are identified and have achieved English language proficiency. Those candidates who do not have the required English language capacity will be provided some short-term training at the expense of the MOC. All long-term candidates should be in training not later than

the fall semester of 1987. The AID Office will prepare PIO/P's to cover all long-term training and the Office of International Training will assist in processing and backstopping these candidates. At present, it is not anticipated that the TA team will be involved in placing the long-term trainees.

2. Short-term Out of Country Training. Approximately 20 candidates from the MOC will be selected for short-term training and 45 for observation tours. Short-term training will involve periods anywhere from 1-4 months per person, and will include academic courses, seminars conducted by other than universities, on-the-job training, familiarization tours, etc. The exact training vehicle will be selected to meet the particular requirements of the candidate and the training objective.

The same procedures for the identification and screening of candidates for long-term training described earlier will apply to short-term training. However, in all cases, short-term training will be conducted in accordance with a training plan based on the recommendations of the TA team. The TA team will be responsible for all short-term training and their home office will assist in the identification of suitable courses and other training possibilities to meet the goal of the training. Short-term training could be conducted in the U.S. or in third countries. It is anticipated that the majority of this training will take place in the U.S.

3. In-Country Training. The TA team will also be responsible for conducting a program of training in Burma to upgrade existing skills and prepare a cadre of trained officers to complement out of country training efforts. The TA team will draw heavily on short-term experts to provide in-country training. It is expected that all levels of the MOC and cooperative organizations at Division level and below will benefit from this effort.

## VI. PROJECT ANALYSES

### A. Summary Technical Analysis

1. Overview. Burma has approximately 2000 screw-press (expeller) mills, and a large number of traditional, animal-driven mortar and pestle (Hsi-Zone) operations. It is estimated that about 70% of all edible oil production in Burma is accomplished through screw-press mills. These are a mixture of many makes from many countries. The most recent are over 30 years old. They are outdated, worn-out, inefficient, and improperly maintained. Seed needs to be pressed repeatedly, 4-5 times, to remove about 85% of its oil content. The resulting oil is of lower quality and the remaining seedcake has a high oil content (over 8% by weight) which results in spoilage and rancidity. These old mills also use outmoded, unsanitary methods of oil collection, filtration, storage and distribution which leads to oil and cake contamination.

2. The Target Group of Mills. Studies by AID-financed teams identified some relatively inexpensive minor rehabilitation work and some process modifications that would increase the capacity and efficiency of some of these mills. The UNDP/ADB in their sector study completed in June 1984 confirmed AID's initial assessment and indicated that perhaps 20% of all existing mills, or about 400 of them, can be rehabilitated with relatively marginal inputs. The UNDP/ADB study identified 16 mills that were particularly suitable due to their location and management capability.

A thorough analysis was made of these mills. One mill had burned down since the UNDP/ADB team visit, but data was collected on all other fifteen (15) mills. Interviews were conducted with their owners. Of the fifteen, nine (9) mills are cooperative-owned and six (6) are privately-owned. It was decided to use this data as a representative sample of the 400 mills that potentially lend themselves to easy rehabilitation. The technical analysis, and this Project Paper as a whole, are based on this sample, although it is expected that about 10-15% or 40-60 of the privately owned and cooperative mills, of the target group of mills will be rehabilitated under this project.

3. Current Problems of Screw-Press Mills. The AID-financed team in its 1983 report identified four deficiencies that contributed greatly to poor mill performance. These are: (a) rapid deterioration of wear parts due to facing with soft steels; (b) inadequate cooking of seed prior to pressing; (c) poor sanitation such as oil running in open channels; and (d) poor cleaning and handling of barrels used for oil distribution. The UNDP/ADB report also identified these same deficiencies and added four more: (a) poor seed selection, (b) improper seed cleaning, (c) lack of seed rolling prior to crushing, and (d) an inadequate, unreliable supply of power.

Some of the above deficiencies are not easily remedied. For example, providing an adequate, reliable power supply, such as generators to augment and provide backup for existing power, is not possible due to the scarcity of diesel fuel. Another area is seed selection. Most mills do not have the facilities to grade seed even if they could reject relatively inferior seed. Rollers which fracture the seed prior to crushing would improve the conditioning and efficiency of the pressing operation. Their incorporation in all mills would be most desirable. But they are a relatively expensive item, costing perhaps \$100,000 per mill. Since groundnuts, because of their nature, do not require rollers, mills would have to make the large investment in rollers for handling sesamum which constitutes only about half of their annual load. The technical analysis concluded that this was not financially feasible to mill owners. Therefore, rollers will not be included as a part of rehabilitation.

4. Proposed Mill Rehabilitation. The most important deficiency identified is the quick wearing out of wear parts in screw-press mills. Contact surfaces require rebuilding to proper dimensions and tolerances once every three months. The constraint appears to be the unavailability of harder steels for surfacing and the lack of familiarity with technologies of steel hardening. Rebuilding of shafts, screws, spacers, and cage bars of screw-presses with hard steel will be undertaken under the project. This becomes an annual maintenance act. Parts surfaced with harder steels are expected to last one year.

Another equally important deficiency is improper cooking of seed prior to pressing. Proper cooking causes oil cells in the seed to rupture, thus facilitating pressing and increasing oil yield. The project will undertake rehabilitation and upgrading of all cooking facilities. New steam boilers, piping, gauges, and instrumentation will be added to all mills. Cookers will be upgraded by increasing the number of rings and steam jackets.

Seed cleaning facilities will be improved and upgraded. A two-level screening process will be instituted where it is not already in use. The upper, large-mesh screen retains large dirt particles and impurities but passes the seed. The lower, smaller-mesh screen retains the seed and passes smaller impurities. Two decorticators (hullers) will be added to mills processing sunflowers. Sunflowers are presently being processed hulls and all, and significant amounts of oil are lost in the absorption process to the sunflower hulls. In addition, sunflowers processed with hulls produce a cake which is not palatable to livestock and therefore of little economic value.

Improved sanitation and safety measures will be introduced in all mills.

Finally, facilities for steam cleaning and repair of barrels will be introduced at each mill as part of rehabilitation.

5. Role of the Industrial Producers' Cooperatives (Workshops). Screw-press mills have traditionally depended on small mechanical shops in their home areas to machine wear parts and to assist in other mechanical work required at these mills. However, these shops have generally lacked the resources and sophistication to do some of the work, although they have traditionally shown laudable imagination, resourcefulness, and ingenuity.

The formation of the Industrial Producers' Cooperatives (Workshops) has improved the mechanical capability tremendously. As shown in the technical analysis, these Workshops have proven capabilities in terms of skills, machinery, and resources. All Workshops do a booming business in salvaging, repairing, and selling vehicles. All Workshops are also doing screw-press mill work where they do repairs, casting of new parts, and rebuilding worn-out surfaces. Some of the Workshops have even built screw-presses from scratch by duplicating the components of old ones.

The Workshops will undertake all rehabilitation of mills. Their role will be to manufacture or rebuild parts as required to assist mill owners in the installation of relatively sophisticated equipment and parts. Workshops will be provided with raw materials such as hard steels and with additional machinery, tools and safety equipment as well as technical assistance and training to carry out this work. As both the technical and institutional analyses show, these Workshops are well equipped to do the work. It is expected that screw-press mill repair work will remain a minor portion of their workload.

6. Conclusion. All technical aspects of the project are routine activities being undertaken by all actors at present. The project will simply improve upon these activities, making them safer and more efficient. All commodities and equipment are readily available and will require no special manufacture or handling.

Project estimates were carefully developed, based on a thorough analysis, and are considered firm.

In sum, the project is technically feasible.

## B. Financial Analysis

1. Purpose. This financial analysis will focus on the profitability to individual workshops and oil mills of the resources granted under this project. It must be emphasized that the financial rate of return does not represent the efficiency with which oilseeds are processed in Burma or the net gain to the economy from the project. Private and cooperative mills will be liable for the CIF value of the commodities as well as import duties, customs charges, sales tax, port tax, and other non-productive capital expenditures. The analysis will also include an assessment of the financial viability of the workshops and oil mills. To accomplish this, balance sheets and income/expense statements from the workshops and cooperative societies implementing the mill rehabilitation will be assessed, as well as their past financial results and projected future operations appraised.

2. Approach. For the purpose of this project appraisal it is important to establish that processing mills and workshops are financially capable of carrying out the type of rehabilitation improvements described in the Project Paper. To accomplish this, the analysis will assess the financial condition and capabilities of selected cooperative mills and workshops. Because of the relative brevity of this appraisal, it was considered appropriate to select four township cooperatives which were typical and representative of the nine cooperative township oilmills which are being considered for rehabilitation. Financial statements from all workshops have been included in the analysis.

Financial statements from private mills were not available to us because private mill operators are reluctant to share information regarding their financial operations with anyone. Instead, a series of questions was asked to determine the adequacy of their financial resources and their willingness to carry out implementation activities.

More detailed assessments will be made during implementation phase to determine which mills will actually be included in the Project, although it is likely that the 15 mills visited will all be upgraded as a result of the project. It has been determined that 400 of the 2000 mills in Burma can be significantly improved with moderate cost inputs and although the project cannot upgrade all of them, services from cooperating workshops will spread to at least 10-15% of them.

The project analysis will include two cash flows. The first will deal with cooperative mills, in the aggregate, and the latter, the Workshops. The analysis will also include benefit-cost, net present worth, and financial internal rate of return as indicators of the project's financial feasibility.

3. Financial Status of Cooperative Mills. The township cooperatives that own and operate cooperative mills are involved in many enterprises of varying profitability. These activities include: brokerage (buying and selling of oilseeds), transportation services (trucking), operating consumer shops, and oilseed milling. They are also involved in other enterprises including weaving, livestock production, butchering, and saw milling. Despite large cooperative membership, including most farmers in the respective townships, the cooperatives often find themselves with an inadequate capital base to carry out capital investment-type activities. For this reason, the rehabilitation effort appears to suit individual township cooperatives very well.

Financial records were obtained for the oil mill operations as well as for the township societies. Analyses of the oil mill operations show an illiquid position, low asset turnovers, low returns on asset, and marginal profitability. This is not altogether unexpected since these mills are pressing and repressing oilseeds up to 4-5 times. Efficiency and profitability diminish quickly with each successive repressing. The relative difficulty of obtaining diesel fuel, and certain spare parts, as well as forced shutdowns because of electricity shedding will also act as incentives for mills to participate in a rehabilitation program. Looking at a typical cooperative township society as a whole, however, one sees a more liquid operation. They are, by and large, solvent and have relatively attractive rates of return.

Four Societies to be involved with the project were selected for analysis and the results are summarized in Annex D, Table D.1 and D.2. These Societies were chosen on the basis that they represented an average society. They possess neither disproportionately large nor small amounts of working capital. The 1982/83 and 1983/84 financial statements for two representational township cooperative societies are included in Table D.3 through D.6 of Annex D. The current assets over liabilities ratio, a measure of the cooperative's liquidity, shows a ranging from 1.5 upwards which puts the societies in a favorable position. They appear to be able to pay current debts from current assets. Another indicator of liquidity is the amount of working capital the cooperatives possess which ranges from 4 million to 10 million Kyat. With an average rehabilitation cost of 800,000 Kyat per mill, they appear to have an adequate capital base with which to finance such work.

Rates of return for the township societies are also attractive. This return aggregates lucrative activities of brokerage (buying and selling of oilseeds) as well as less profitable activities such as livestock production and oil milling. However, the rates range between 10% to 28%. This measure is somewhat misleading in that the equity includes a large "funds" account. These are actually capital reserves set aside to be used for social purposes such as extension, education, pension and public health activities. When this account is excluded from rate of return calculation, returns are far more attractive ranging from 65% to 114%.

Given the favorable indicators listed above, and because the cooperatives have been able to meet their obligations in the past and show an appropriate profit, it is apparent that these entities are financially sound and viable and will continue to be so.

4. Financial Status of Workshops. The financial conditions of the four Industrial Producers' Cooperatives (Workshops) are more variable than those of the Township Cooperative Societies. One Workshop, Pegu, had a substantial loss last year which was due to its recent formation with no business being generated. Start-up costs, therefore, represented a net loss for the year. The volume of business forecast this year, however, is double that of the oldest and financially most stable Workshop in Yenangyaung. In general, however, the Workshops are not as liquid nor as solvent, have lower rates of return and a lower capital turnover than the more diversified township cooperatives. This is not to say, however, that they are not well-managed operations. These Workshops have substantial commitments invested in high value machinery, land, buildings and ancillary facilities. Organizationally the Workshops are a combination of small, individual, privately-owned businesses that have come together to gain access to credit, imported machinery and parts, and other cooperative-related services. Two Workshops that have been formed for a long time in Meiktila and Yenangyaung are in better financial condition than the two newer ones, at Mandalay and Pegu.

It is estimated that a \$1,495,000 additional investment in machinery will be required by these four Workshops under the project. Their purchasing of raw materials to fabricate expeller parts using a cost plus 20% profitability formula for pricing will not be at the expense of more lucrative enterprises (such as vehicle rebuilding and repair) and will not be detrimental to their financial viability. It is envisaged that all materials purchased by the four Workshops for oil mill rehabilitation will be financed through the Myanma Economic Bank.

Financial ratios for the four Workshops are summarized in Tables D.7 and D.8 supporting financial statements for each Workshop are included in Tables D.9 through E.12 of the annex.

Each Workshop is in a relatively good liquid position. Having the working capital available for modest purchases of raw materials when needed will eliminate the need to borrow short-term money. Rates of return are not as good at some Workshops as one would expect. A diversified approach at Workshops such as Mandalay in the manufacture of everything from oil mills and rice mills to potato peelers may not lend itself readily to a quick turnover. Workshops such as Yenangyaung that have had a more coordinated approach for some time can point to their success as an indicator of its value. Rates of return for Yenangyaung were 13.2% and 13.3% for 1982/83 and 1983/84, respectively.

5. Analysis for Oil Mills. The cash flow analysis indicates that rehabilitation is a financially viable activity. Other indicators such as (a) the benefit-cost ratio, (b) the net present worth and (c) the financial internal rate of return also point to the financial feasibility of the project.

The following data base and assumptions are incorporated in the cash flow for the cooperative mills. Net benefits without the project were obtained from the March 31, 1984 income/expenditure statements of the oil mills. However in an estimated thruput of 20,500 tons of raw materials during the budget year ending March 1984, an average cost of \$20.50/ton of oilseeds processed was derived. The Societies have attributed certain relevant costs to the Society as a whole and have excluded these in the milling operation. Consequently, an unrealistically low cost/ton of oilseeds processed was derived. The benefits with project include the same benefits without project as well as additional oil (25 Kyat sesame, 25 Kyat groundnut) and increased value of meal (2 Kyat/viss) as a result of the rehabilitation. Because of the reduced number of pressings, capacity will increase by 220% to a total of 45,100 tons of oilseeds processed annually. It was assumed that the mills would operate the same number of days that they do now. For conservativeness in computation, it was assumed also that the additional oilseeds will be processed on a contract basis with benefits accruing to the mill at a rate of \$24/ton for sesame and \$16.5/ton for groundnuts. This is the average price charged by the cooperative and private mills surveyed. The mix between the two oilseeds will remain the same as currently exists, that is 65% groundnuts and 35% sesame. The additional oil and value of the meal (cake) from the additional oilseeds processed is valued similarly to the above method. These calculations are shown in Table D.13.

Costs of processing "with project" include usual and incremental costs. Incremental costs will include additional labor required to handle additional oilseeds, additional power requirements as a result of less down-time, additional transportation charges, maintenance and depreciation. Depreciation includes that portion allocated for equipment now at the Workshops as well as that allocated for the purchase of equipment under the project.

The net cash flow for the mills without the project is as follows:

Table 7.

Projected Net Cash Flow for Cooperative Mills (without Project)

Year	(\$ '000)		
	Gross Benefits	Costs	Benefits
1	408	420	-12
2	415	420	- 5
3	425	420	- 5
4	430	420	10
5	435	420	15
6	435	420	15
7	435	420	15
8	435	420	15
9	435	420	15
10	435	420	15

A projected net cash flow in Table 8 for cooperative mills within the project indicates a positive flow in every year except year one. Payback of new equipment costs can be made after three years although it has been extended to five years to allow the mills to improve their financial situation after many years of marginal operations. The net financial benefit calculation shown in Table D.13 indicates that 45% of incremental financial benefits will be provided from additional oil extracted from oilseeds. Additional oil produced is estimated to be 585 tons/year from the 15 mills. Fifteen percent of the incremental financial benefits will accrue in the form of improved cake. Representatives from the Mandalay Dairy Project invited the team to discuss the possibility of marketing the cake through the cooperative sector to their project. Because of its higher protein level, longer shelf life before turning rancid, and better digestibility, the Dairy Project personnel offered to pay a premium for the cake. A price differential of 0.2 Kyat/viss (10% increase) is estimated to be a fair premium. The additional benefits will accrue to the mill operators due to the impact of better processing margins applied to the 120% additional oilseeds processed.

Table 9 shows the streams of benefits and costs and takes into account the time value of money. The financial benefit/cost ratio is 1.22 and the financial internal rate of return is 50%. The rate of return figure is also consistent with other projections of rehabilitation rates of returns ranging from 35% to 65%.

6. Analysis for Workshops. This analysis will be similar to that of the oil mill. A projected cash flow table is computed and the benefit/cost ratio, net present worth, and the financial internal rate of return are shown. The analysis will demonstrate that the cash flow to Workshops is positive under the project with a benefit cost of 1.28. The calculated financial internal rate of return is 23.5%

The financial analysis for the Workshops, however, shows a more marginal operation than that for the mills. A projected cash flow without the project is shown in Table 10. Assumption used in the cost and benefit calculations are shown in Tables D.3, D.4 and D.5 of Annex D. A major factor affecting the financial feasibility of the project is the cost of new equipment. Equipment valued at \$1,495,000 C.I.F. will be purchased for the Workshops, however, import taxes, custom duties, service charges, port charges and other nonproductive costs will add approximately \$530,000 to the Workshops' obligations. Credit arrangements indicate that the latter will be borrowed from Myanma Economic Bank at a rate of 8%. Financing for the C.I.F. portion of the machinery will also be from Myanma Economic Bank over a 12 year period at 6% interest. Repayment of the principal will be deferred for four years although interest pay rates must be made when accrued.

Table 8

Net Cash Flow For Cooperative Mills - with project (\$'000)

Year	Total Net Benefits	Usual Costs	Incremental Costs					Total Costs	Net before taxes	Taxes	Net after taxes	Depreciation	Loan Repayment	Net Cash Flow
			Labor	Maintenance	Depreciation	Misc	Interest							
1	408	420	-	-	-	-	53	473	(65)	-	(65)	-	-	(65)
2	2256	420	33	198	151	40	124	969	1287	733	554	151	400	305
3	2263	420	33	198	151	20	96	918	1354	807	538	151	400	289
4	2273	420	33	198	151	20	68	890	1383	831	553	151	400	304
5	2278	420	33	198	151	20	40	862	1416	850	566	151	400	317
6	2283	420	33	198	151	20	12	834	1449	869	580	151	400	317
7	2283	420	33	198	151	20	-	822	1461	877	584	151	171	560
8	2283	420	33	198	151	20	-	822	1461	877	584	151	-	735
9	2283	420	33	198	151	20	-	822	1461	877	584	151	-	735
10	2283	420	33	198	151	20	-	822	1461	877	584	151	-	735
11	2283	420	33	198	151	20	-	822	1461	877	584	151	-	735
								822	1461	877	584	151	-	735

1 Loans for financing of project foreign exchange component is 6%  
 Loan for financing local costs, including customs duties, sales tax and other charges- 9%  
 Loan for operations cost - 9%

2 60% rate

Table 9.

Benefit/Cost Calculation - Oil/Mills (\$'000)

Year	Discount Factor	Incremental Costs <sup>1</sup> (@ 10%)	Present Value Incremental Costs	Incremental Benefits	Present Value Incremental Benefits
1	.909	1,508	1,373	0	0
2	.826	1,004	829	1,841	1,521
3	.751	1,058	795	1,838	1,380
4	.683	1,082	739	1,843	1,259
5	.621	1,101	684	1,843	1,145
6	.564	1,119	631	1,844	1,040
7	.513	1,128	579	1,848	948
8	.467	1,128	527	1,848	863
9	.424	1,128	478	1,848	784
10	.386	1,128	435	1,848	713
11	.350	1,128	<u>395</u>	1,848	<u>647</u>
			7,465		10,300

Benefit/Cost Ratio  $10,300/7,465 = 1.38$

Net Present Worth =  $10,300 - 7,465 = \$2,835,000$

Internal Rate of Return 50%

<sup>1</sup> Includes labor, maintenance, miscellaneous and taxes (Table 8)

<sup>2</sup> For this analysis, investment accrues in years cash outlay is made.

Table 10.

Projected Net Cash Flow for Workshops - without Project (\$000)

<u>Year</u>	<u>Gross Benefits</u>	<u>Gross Costs</u>	<u>Net Benefit</u>
1	699	574	125
2	710	565	145
3	710	550	160
4	710	550	160
5	710	550	160
6	710	550	160
7	710	550	160
8	710	550	160
9	710	550	160
10	710	550	160
11	710	550	160

Another factor affecting Workshop financial viability is that machinery imported under the project must be used for more than fabricating machinery parts for screw-press mills if it is to be a profitable proposition. It is estimated that, given the amount of raw materials under the project, only 30% - 50% of a new machine's time will actually be spent fabricating oil mill parts for the 15 priority mills. The Workshops will be encouraged to utilize resources fully by expanding its current activities and branching into new activities. It is anticipated that a large portion of this "excess capacity" will be productively utilized in rehabilitation efforts of the other 45 mills to be upgraded. This factor resulting in incremental income from other activities has been incorporated into the cash flow analysis. The Workshops have indicated their willingness to do so and were instrumental in the equipment selection the project.

Repayment of the loan for the foreign exchange component, as well as local costs such as taxes, duties, customs charges and port charges, will be over a nine year period and is reflected in the cash flow in Table 11. The local cost component of the imports, as well as the operating loans, will be the first to be repaid in full. After this, taking advantage of a four-year grace period, the lower interest loan (6%) for the C.I.F. value of the equipment will begin to be repaid.

A benefit/cost ratio for the Workshop was also computed in Table 12. For every unit (Kyat) spent by the Workshops, they will receive 1.28 Kyats in return. The net present value of the project is \$921,000 for the Workshops.

Table 11.

## Net Cash Flow for Cooperative Workshops - with Project (\$ '000)

Year	Usual Revenue	Incremental Revenue		Usual Costs	Incremental Costs							Net Income	Taxes	Net After Taxes	Depre- ciation	Loan Repayment	Net Cash Flow	
		From Other Activities	From Mills		Total Revenue	Initial Replacement Fabrication	Rebuild worn	Cage Bar Fabri- cation	Misc. Fabri- cation	Depre- ciation	Interest							Total Cost
1	699	70	-	769	574	-	-	75	-	-75	-	754	15	9	6	81	90	5
2	710	100	1,200	2,010	565	485	-	85	515	1,190	820	495	328	85	240	3	-	-
3	710	493	200	1,403	550	-	78	52	42	98	139	881	522	313	209	98	300	7
4	710	475	200	1,385	550	-	78	52	42	98	119	939	446	268	178	98	270	6
5	710	466	200	1,376	550	-	78	52	42	98	105	925	451	270	180	98	270	8
6	710	458	200	1,368	550	-	78	52	42	98	91	911	457	274	183	98	250	31
7	710	449	200	1,359	550	-	78	52	42	98	77	897	462	277	184	162	250	33
8	710	441	200	1,351	550	-	78	52	42	98	63	883	468	281	187	162	250	35
9	710	433	200	1,343	550	-	78	52	42	98	49	869	474	284	190	162	250	38
10	710	424	200	1,334	550	-	78	52	42	98	-	820	514	308	266	162	-	304
11	710	416	200	1,326	550	-	78	52	42	98	-	820	506	304	202	162	-	300

<sup>1</sup>Initial repayments will be on loans for working capital, operating, taxes, duties, etc., which carry no grace period. Repayment in Kyat equivalent of the foreign exchange portion of the loan will start in year 5 of the project.

Table 12.

Benefit/Cost Calculation - Workshop (\$ '000)

Year	Discount Factor	Incremental Costs	Present Value of Cost	Incremental Benefit	Present Value of Benefits
1	.909	1,495	1,359	70	64
2	.826	1,200	991	1,300	1,074
3	.751	401	301	693	520
4	.683	172	117	675	461
5	.621	172	107	666	414
6	.564	172	97	658	371
7	.513	172	88	649	333
8	.467	172	80	641	299
9	.424	172	73	633	268
10	.386	172	66	624	240
11	.350	172	60	616	216
		Total	\$ 3,339		\$ 4,260

Benefit/Cost Ratio -  $4260/3339 = 1.28$   
 Net Present Worth -  $4260-3339 = \$921,000$   
 Internal Rate of Return = 23.5%

<sup>1</sup> Includes initial replacement fabrication, annual and miscellaneous fabrication and taxes (Table 11). Investment accrues in year each outlay is made during years 1,2 and 3.

### C. Economic Analysis

1. Introduction. Benefits that will accrue to the economy of Burma as a result of this project are many. First, there are direct benefits which are clearly attributable to the project: those that are readily quantifiable and others that, though they are tangible, do not lend themselves to quantification. Next, there are the indirect benefits which will accrue to the national economy of Burma but cannot be easily attributed to the project without assumptions and qualifications that could raise questions as to their magnitude, if not validity. Examples of indirect benefits are: savings in foreign exchange expenditures for importation of edible oil that would be needed without the project; employment generation; and stimulation of agricultural production to meet the demand created by increased processing capacity. Finally, there are benefits resulting from the multiplier or spread effect, when more and better machinery stimulates other commercial activity. Although the two latter elements are important, this analysis will focus on direct benefits, which are the primary indicators of the economic feasibility of the project.

2. Methodology. The economic analysis will focus on the incremental benefits (and costs) that will result from the project. In other words, the additional benefits that will accrue "with" the project, above and beyond those that would be realized "without" the project, will be computed where possible.

Project benefits will derive primarily from the outputs of the rehabilitated mills in the form of more and better oil and better seedcake. These benefits from mill production will be measured against their associated costs. The Workshops are intermediate agents in the process. Although their outputs will have economic value, this will be rather minor and will not be quantified.

In quantifying the incremental costs and benefits, all of the 15 mills in our sample will be considered jointly, rather than separately, and the results aggregated.

The U.S. dollar will be the unit of value. All costs and benefits expressed in Kyat will be converted to U.S. dollars. A traditional analysis will then be conducted in which economic costs are derived from financial costs and benefits. Benefit and cost streams will then be developed and discounted, and an economic internal rate of return (EIRR) computed.

In order to test the validity of the assumptions underlying the analysis, computations will be subjected to a sensitivity analysis.

3. Economic Factors and Shadow Pricing. The following assumptions and rates will be used in the analysis:

a. The Burmese Kyat official rate of exchange against the U.S. dollar is currently 8.5:1. However, black market rates are

considerably higher, probably in the 25-30 : 1 range. It would be difficult to gauge where the Kyat would settle if it were allowed to float freely. However, a review of rates used by international lending institutions over the past two years indicate that they have used a shadow price for the Kyat closer to the official rate. For example, the UNDP/ADB oilseed sector study completed in June 1984 used a 10.85:1 rate. A rate of 11:1 will be used in this analysis.

b. The social discount rate is relatively low in Burma due to the structure of the economy. The opportunity cost of capital is low, and savings accounts draw interest rates of 5-10%, even when savings are committed for 20 years. The UNDP/ADB study used a 10% social discount rate for their computations; the same rate will be used here.

c. Skilled and semi-skilled labor is in short supply in Burma, and existing wages are considered to be slightly undervalued by the UNDP/ADB team. Consequently, the opportunity cost of this class of labor was adjusted upward by a factor of 63%. Unskilled labor, on the other hand, is in abundant supply, particularly during the six month period following a harvest and preceding the next planting. The UNDP/ADB team estimated a weighted average for the opportunity cost of unskilled labor throughout the year at 6 Kyat per day, slightly less than the 6.5 Kyat per day Government minimum wage rate. Skilled and semi-skilled labor financial wages will be adjusted upward by 63%. Unskilled labor will be considered competitively priced at the 6.0 Kyat per day rate.

d. Benefit and cost streams will be discounted over a 20 year period.

4. Adequacy of the Supply of Raw Materials. The project will result in a substantial increase in the processing capacity of the mills undergoing rehabilitation. The question is raised whether there will be enough oilseed produced in the areas where these mills operate to meet the increased capacity. If not, the mills will process the same volume of seed quickly and then remain idle, or attract new oilseed that would otherwise go to less efficient mills. In that case, these less efficient mills will remain idle instead.

It is estimated that the 15 mills as a group process about 89 tons of sesamum and groundnut seed per day. These mills are now operating an average of 230 days per year. Their current demand for seed is then 20,500 tons annually.

The technical analysis concluded that these mills would increase their current capacity to 220% or 196 tons per day. The technical analysis further estimates that, after rehabilitation, the days of operation could increase to 300 per year. Thus, projected demand after rehabilitation is estimated at 58,800 tons annually.

Analysis from data provided by the Ministry of Cooperatives indicates that production in the areas of the 15 mills for sesamum and groundnuts

will be 234,000 tons in 1984-85. The report further estimates that production of the two seeds will increase to 280,000 tons annually by the end of the project and to 330,000 tons in ten years through natural attrition and currently active agricultural production initiatives. However, the report estimates that planned agricultural production projects will probably increase production of the two seeds in the areas of the 15 mills to around 600,000 tons annually in 10 years. Thus, the demand and potential supply figures could be summarized in the following table:

Table 13

Supply and Demand for Oilseeds in Project Area

	<u>1984/85</u>	<u>1989/90</u>	<u>1994/95</u>
Demand by Rehabilitated Mills (tons)	20,500	58,800	58,800
Minimum Supply (tons)	234,000	280,000	330,000
Maximum Supply (tons)	-	-	600,000

As can be seen from the table, the seed demand of the rehabilitated mills represents a fraction of projected production. Although it is recognized that modern expeller mills will come on-stream in the meantime and will increase the demand, it can still be stated with confidence that the availability of seed will not be a problem. There will be a shift of oilseed processing from highly inefficient, high residue oil content-type mills, to upgraded cooperative and private mills.

It is estimated that 150,000 tons of the minimum supply of oilseeds in 1984/85, or 50%, falls within the 13 townships in which the first 15 mills will be rehabilitated. These are oilseeds which are subject to direct procurement by the cooperative sector. It is likely that the cooperatives will use a combination of methods to procure the 58,800 tons of oilseeds projected to be demanded by the rehabilitated mills. The competitive pricing mechanism will be one method. Increasing the share that farmers are obliged to sell to Cooperatives in return for reduced prices on certain items is another. Running the mills at a minimum of 75% capacity is essential for the mills' financial viability. Ensuring this minimum amount of raw material to mills will guarantee that oilseeds are processed as efficiently as possible, thereby gaining approximately 600 additional tons of oil annually by reducing the residual oil content from 8% to 6%. To ensure the efficiencies and net gain of oil to Burma, it is essential that the rehabilitated private mills share equally in

additional processing opportunities. The Ministry of Cooperatives has indicated that rehabilitated private mills which process oilseeds for township cooperatives or cooperative syndicates will receive priority consideration over other private mills when surplus cooperative oilseeds are processed on a contract basis. The Ministry is also fully aware of its responsibility to adjust procurement levels within townships so that private mills having undergone rehabilitation will receive adequate oilseeds for processing on a certain basis. This applies particularly to those mills that operate on a solely contract basis for the cooperatives. Many rehabilitated private mills, however, will continue to rely solely on the pricing mechanism for obtaining their supply of raw materials.

5. Project Economic Costs. The 15 mill sample is the unit of analysis. Costs considered will be limited to their rehabilitation, maintenance and "incremental" operating costs. Rehabilitation will be a one-time action in which major repairs, upgrading and improvements are made. Rehabilitation costs consist of cost of material and manufacture or purchase of needed components, as well as the transportation costs of these components and their installation. Annex C, Detailed Technical Analysis, contains an illustrative list of the rehabilitation components and costs to a typical mill.

Since materials, machinery, tools and off-the-shelf items to be used in rehabilitation will be procured from the U.S. on a competitive basis, their costs reflect real value, i.e. financial costs are equal to economic costs. Freight and insurance are also competitively procured. However, the SRUB imposes a 15% import duty on all of these types of materials, an additional commodity and service tax of 35%, landing charges of 6.5%, import license of 6.5%, and port dues of another 6.5%. The cost of these materials to the mills will be adjusted by deducting all of these charges. The installation of material and equipment during rehabilitation will be done in part by the employees of the individual mills involved. These employees have some of the skills required and they will be idle in any case since each mill will be shut down during rehabilitation. However, the installation of relatively sophisticated items will be done by qualified specialists. The following table shows financial and economic costs of rehabilitation.

Table 14

Shadow Pricing for Imports, Labor and Other Local Costs  
Associated with Initial Rehabilitation

	<u>Financial Cost(\$)</u>	<u>Economic Cost(\$)</u>
Imports	1,195,000	768,000
Skilled labor	135,000	220,000
Unskilled labor	24,000	24,000
Local Costs Other Than Labor	154,000	154,000
Total	\$ <u>1,508,000</u>	<u>\$1,166,000</u>

The next cost stream involves maintenance. The most important item here is the projected annual replacement of worn-out screws and cages in the individual presses. The annual financial and economic costs are shown below.

Table 15

Shadow Pricing for Imports, Labor and Other Local Costs  
Associated with Annual Maintenance

	<u>Financial Cost(\$)</u>	<u>Economic Cost(\$)</u>
Imports	78,000	54,300
Skilled Labor	63,200	103,000
Unskilled Labor	20,000	20,000
Local Costs Other Than Labor	36,400	36,400
	<u>\$197,600</u>	<u>\$213,700</u>

The final cost stream is incremental operational costs which consist of additional operational costs that mills will incur due to the increased capacity. They will not include the cost of additional raw materials since we are dealing with increments only. Thus neither the cost of raw materials bought, nor receipts from the sale of oil and cake, will be included in the analysis. We are only interested in incremental benefits and in incremental operational costs. These will include the costs of additional labor and fuel. The technical analysis indicates that there will be no additional power costs after rehabilitation. However, approximately 10 unskilled laborers will be required for each mill after rehabilitation to offload the additional seed and load the cake. This amounts to 60 Kyat per mill per day, or a total of 270,000 Kyat for 300 days of operation per year.

6. Project Benefits. Project benefits that will accrue to the national economy of Burma derive from the outputs of the mills. These come in the form of increased oil outputs from the same unit of seed,

increased capacity of the mills to process more seed in the same unit of time, and the increased value of the seedcake due to lower residual oil content. There are other benefits in addition to the above, but these will be the only ones quantified.

The first benefit consists of additional oil that can be pressed from the same unit of seed as a result of the increased efficiency of screw-presses after rehabilitation. At present, the 15 mill sample houses 52 screw-presses and processes approximately 20,500 tons per year, operating 230 days. The seed undergoes four to five pressings and results in a seedcake with an average residual oil content of about 8.0%, based on laboratory analysis of cake samples taken from the 15 mills. The cake itself represents approximately 50% of the weight of the original seed load. It is estimated that the oil content in the cake can be reduced to 6.0% in two pressings after rehabilitation. Thus, the additional amount of oil, i.e. the total amount of residual oil recovered, is realized to be  $2\% (50\%) 20,500 = 205$  tons of oil per year. At 20,815 Kyat per ton (based on an average price for all types of oil of 34 Kyat per viss and 612.2 viss per ton), the value of residual oil thus salvaged would be 4,267,000 Kyat.

The second type of benefit consists of additional oil realized because of the increased capacity of all mills after rehabilitation, and their ability to operate for a longer number of days per year because of less downtime. On the average, it is estimated that mills will be able to process 220% of their current load after rehabilitation due to higher efficiency resulting from fewer pressings. It is further estimated that mills will increase their work year from 230 to 300 days due to less breakdowns. Thus all mills put together will be able to process 220% 20,500  $(300/230) = 58,800$  tons instead of the current 20,500 tons per year, or a difference of 38,300 tons. It would not be unreasonable to assume that this increased capacity will be met from increased seed production. However, in order to arrive at a more conservative estimate, it will be assumed that this additional tonnage will be diverted to the rehabilitated mills from less efficient ones. However, the additional residual oil salvaged from the cake, estimated at 2%, will be realized from this additional tonnage. The total weight of residual oil realized from increased capacity will be  $2\%(50\%)(38,300 \text{ tons}) = 383$  tons valued at 7,972,000 Kyat.

The third benefit consists of the increase in the value of better quality cake due to reduced oil content. Again, project benefits will be limited to the increase in the value of the cake due to the project. Current figures show that cake prices, with 8.0% average oil content, are about 920 Kyat per ton. Cake with a 6.0% oil content is estimated to be marketable at about a quarter of a Kyat per viss higher, or 153 Kyat per ton. The total cake involved includes the increased tonnage due to efficiency and due to increased capacity, or  $50\%(58,800)(98\%) = 28,800$  tons of cake per year. The increase in the value of cake for this tonnage would be  $(28,800 \times 153) = 4,406,000$  Kyat.

Another direct project benefit that could be quantified is the increase in the value of better quality oil produced after rehabilitation. Oil produced through two pressings has better color, less bitterness, and fewer impurities than oil now being produced through four or five pressings, and it probably can command one or two Kyat more per viss. However, this likely benefit will not be quantified in order to arrive at a more conservative estimate of project returns.

Another tangible benefit that will be translated into cost savings is better oil distribution. Better barrel management, such as better handling and steam cleaning, will result in better quality oil to the end user. However, though tangible, this would be a hard benefit to quantify.

The operations of Workshops will be improved greatly through additional equipment, machinery, on-the-job training, and technical assistance. The Workshops should be more efficient, more versatile, more productive, and safer to work in. The same could be said of the mills themselves. However, these benefits are not easily quantifiable but are tangible and important.

Finally, benefits will accrue to the national economy through the training and technical assistance that will be provided personnel of the MOC.

7. Benefit-Cost Analysis. The benefits and costs quantified in the previous sections are summarized in the following table. All values are shown in U.S. dollars. Values computed in Kyat have been converted to U.S. dollars at the shadow rate of 11:1. Discounting is for 20 years at 10% social discount rate.

The cost of project technical assistance, training, evaluation, and services of a Procurement Services Agent (PSA) amount to about 37% of all project costs. In order to incorporate these economic costs into the analysis, all cost figures were multiplied by a factor of 1.37.

Table 16

BENEFIT-COST ANALYSIS

<u>Year</u>	<u>Costs (\$000)</u>				<u>Benefits (\$000)</u>				<u>Net Ben</u>	<u>Disc. Factor</u>	<u>Disc.Net Ben.</u>
	<u>Rehab.</u>	<u>Maint.</u>	<u>Oper.</u>	<u>Total</u>	<u>Eff.Cap.</u>	<u>Cake</u>	<u>Total</u>				
0	1,597	-	-	1,597	-	-	-	-	(1,597)	1,000	(1,597)
1	0	293	35	328	388	725	401	1,514	1,186	.909	1,078
2	0	"	"	"	"	"	"	"	"	.826	980
3	0	"	"	"	"	"	"	"	"	.751	891
4	0	"	"	"	"	"	"	"	"	.683	810
5.	0	"	"	"	"	"	"	"	"	.621	737
6.	0	"	"	"	"	"	"	"	"	.565	670
7.	0	"	"	"	"	"	"	"	"	.513	608
8.	0	"	"	"	"	"	"	"	"	.468	555
9.	0	"	"	"	"	"	"	"	"	.424	503
10.	0	"	"	"	"	"	"	"	"	.386	458
11-20	0	"	"	"	"	"	"	"	"	2.369	2,809

Economic Internal Rate of Return About 56%.

8. Sensitivity Analysis. In order to test the sensitivity of these results to changing project conditions, the benefit cost analysis was redone with changed assumptions. The following three assumptions were made in conducting sensitivity computations:

a. It was assumed that the shadow price of the Kyat would be close to the black market price by doubling the exchange rate to 22 Kyat per U.S. dollar;

b. It was assumed that there would be a shortage of seed available for crushing so that mills would operate 230 days a year only (as they do now) instead of the 300 days per year assumed at increased capacity; and

c. It was assumed that project costs would increase by 20% while at the same time benefits would decrease by 20%.

The sensitivity analysis is shown in the following table.  
Table 17

SENSITIVITY ANALYSIS

Year	Assumption A					Assumption B				Assumption C			
	Disc. Fact	Bens	Costs	Net Bens	Disc Net	Bens	Costs	Net Bens	Disc Net	Bens	Costs	Net Bens	Disc Net
0	1,000	0	1,325	(1,325)	(1,325)	0	1,597	(1,597)	(1,597)	0	1,916	(1,916)	(1,916)
1	.909	757	201	556	505	1,161	328	833	757	1,211	394	817	742
2	.909	"	"	"	459	"	"	"	688	"	"	"	675
3	.751	"	"	"	418	"	"	"	626	"	"	"	614
4	.683	"	"	"	380	"	"	"	569	"	"	"	558
5	.621	"	"	"	345	"	"	"	517	"	"	"	507
6	.565	"	"	"	314	"	"	"	471	"	"	"	462
7	.513	"	"	"	285	"	"	"	427	"	"	"	419
8	.467	"	"	"	260	"	"	"	389	"	"	"	382
9	.424	"	"	"	236	"	"	"	353	"	"	"	346
10	.386	"	"	"	215	"	"	"	322	"	"	"	315
11-20	2,369	"	"	"	1,317	"	"	"	1,973	"	"	"	1,935

EIRR = 30%

EIRR = 33%

EIRR = 25%

9. Conclusion. The foregoing analysis indicates that the project is economically feasible. It demonstrates that screw-press mill rehabilitation and processing improvements can yield very high returns for small investments. Under the most conservative assumptions, the economic internal rate of return is in excess of 56%. The economy will be able to recoup rehabilitation investments during the first two years of operation following rehabilitation. These findings are not surprising since a great deal of investments, or sunk costs, have been made in these mills already. This is typical of rehabilitation-type projects.

The results of the analysis are consistent with the conclusions reached by the UNDP/ADB report. Analysis conducted for rehabilitated mills indicated an EIRR of 47%, as compared with an EIRR of 25% for new screw-press mills and 28% for solvent extraction plants. They are also consistent with the results of the original feasibility study for this project conducted in 1983 where the EIRR for rehabilitated mills was 50%,

while other EIRRs were 15%, and 14% for new screw-press mills and solvent extraction plants respectively.

Analysis indicates that the EIRR is sensitive to changing conditions. However, the EIRR is so high that, although it is materially influenced by changing project conditions, the returns are still substantial under the most conservative assumptions. In other words, the economy will be able to recoup rehabilitation costs within a three year period even under the worst-case scenarios.

#### D. Social Soundness Analysis

This proposed project, which merges elements of the original project design with the technical assistance envisaged as a Phase I project will impact directly on the social soundness of the overall program of upgrading edible oil extraction and processing. A detailed analysis was completed by Dr. Charlotte Miller in 1983 entitled The Sociocultural Feasibility of Burma's Edible Oil Production and Distribution Project: Technology Transfer to the Cooperative Sector with Nutritional and Social Impact. The report addressed three issues: (a) the compatibility of the project with its sociocultural environment, (b) the likelihood of a spread effect, and (c) the distribution of benefits among different groups. The report examined the effect of improvements in the edible oils sector (upgrading existing expellers, introducing solvent extraction, refining and bottling facilities, and improving the management, planning and technical capabilities within the cooperative sector).

Miller found that the activities embodied in the initial project proposal were "compatible with the socio-cultural environment introducing no culturally abhorrent elements and anticipating through design components potential problems with management, procurement, taste preference, size of purchase, marketing and industrial safety. The analysis of spread effects shows positive social impact on technology transfer, planning, management and support for other development efforts. The assessment of distribution of benefits among groups shows a broad positive impact on the cooperative sector, and private sector in the Magwe Division with benefits also accruing to the Government of Burma, the Ministry of Cooperatives and U.S. private manufacturers of equipment".

1. Quality Considerations. The Miller report dealt with the role of oil in the Burmese diet, the issue of potential acceptability of refined oil, pricing, and preference in oil purchases. Not surprisingly, the demand for edible oil was found to be fairly inelastic at current levels of oil availability and is evidence of its importance to the Burmese consumer. Data suggests a real concern about the poor quality of oil--that 93 percent of the qualities consumers complained about can be directly attributable to the lack of refining to remove undesirable free fatty acids and other properties which contribute to a rapid rate of spoilage. And although refining and bottling will increase the retail price of oil, consumers value the qualities added by refining.

2. Nutritional Considerations. A major socio-economic problem identified in oilseed producing deficit areas has been the poor nutritional status of infants, children and women (both pregnant and lactating). The pre-feasibility study undertaken in January and February of 1983 found that average edible oil consumption during the previous three year period was only two-thirds that recommended by the Ministry of Health to meet 10 percent of the daily caloric requirements. Edible oils are a concentrated form of energy and are a source of acids and vitamins essential for good health. It is difficult to consume enough carbohydrate foods to provide these needed calories and vitamins. Increased oil consumption resulting from this sectoral program will therefore have significant positive nutritional effects.

3. Gender Considerations. Much has been said about the relative equality of the sexes and high status of women in Burma. The belief in male authority in the family and in the society in general is traditional, but women are said to have considerable freedom of action to seek employment, to marry, to get divorced, to influence family finances and to carry on commercial activities. This generalization was borne out by the limited observations of Burmese domestic life and gender interactions during the period that the analysis was conducted and has been documented in previous studies by Steinberg and others. For instance, it was observed that wives were free to practice a religion different from their husbands. Also, many observers commented that there is a high proportion (although unmeasured) of fully employed adult women in Rangoon. In the MOC for example, there were several women assigned to work as counterparts with the design team including an office chief and two professionals from the Cooperative Technical Services Department.

Women will be considered on an equal basis with men in the selection process for training under this project. Observations and information collected indicate that follow-on activities will not have any negative impact.

4. Spread Effect. This project and follow-on activities have high potential for multiplying its effect and delivering benefits well beyond the direct beneficiaries of project assistance. The initial impact of this spread effect will occur to other parts of MOC and local organizations not directly benefiting from the project. Library facilities and computer equipment can be useful to other areas, especially in the cottage industry sector. The spread effect of management training for cooperatives at all levels, for expeller mill personnel and for the MOC will be a better flow of information and assistance up and down the organizational structure. This will improve and maximize the resources financed by this and subsequent projects and set a positive example for organizations in other sectors, as well. The past experience of the Burmese in metal casting, spare parts repair and copying and rebuilding of equipment, show the tremendous existing capacity in Burma to take something, copy it and keep it working. Working with private individuals through the Industrial Producers' Cooperative Societies in areas such as hardfacing will spread into other areas of the edible oil sector (manufacturers of other parts, individuals outside the Industrial Producers' Cooperative Societies will copy and employ these new techniques) and to other sectors (transportation, agriculture, production, etc.) as well.

These spread effects support the determination that the project is socially sound.

## E. Institutional Analysis

1. General. The institutional analysis will attempt to demonstrate that the entities participating in the project do have the capacity to carry out the roles assigned to them. These entities include the Ministry of Cooperatives, the Industrial Producers' Cooperatives Workshops, and the screw-press mills.

The MOC will manage the project and will be responsible for the selection and approval of training candidates, installing and operating commodities procured for its divisions, and providing direction for the technical assistance effort. The MOC and its subordinate departments and divisions are staffed with competent personnel experienced in the management and implementation of projects financed with funds from international donors. It is evident that the MOC has the institutional capability--and its staff the skills and know-how to carry out its responsibilities under the project.

The screw-press mills receiving rehabilitation will have a relatively passive role in project implementation as the recipients of rehabilitation services. However, a brief analysis of these mills is included below.

The most important actor in the project will be the Industrial Producers' Cooperative Workshops which will have the key role in project implementation. The relative success or failure of the project will depend on the intensity of their participation. A thorough analysis of the Workshops is included below.

It should be noted that the question of financial resources for the cooperative societies that own the mills, and of the Workshops, themselves, have been addressed in the financial analysis. The institutional analysis will focus on other resources, organizational structure, present workload and operations, and the impact of the project on all of these.

2. Cooperatives in Burma. In late 1983 AID/Burma arranged for a study of the cooperative system in Burma. The ensuing report<sup>1</sup> is now complete and is available for review in the Asia/PD office in AID/Washington or at the AID/Burma office in Rangoon. The following sections are extracted primarily from the report to provide an institutional framework for the proposed project.

"Little was known until recently by the donor community and AID of the true nature of the cooperative movement in Burma. However, we do know that Burmese cooperatives substantially meet the requirements for AID assistance since:

<sup>1</sup> "Cooperatives in Burma" by A. David Redding, October 1983.

- they serve an economic purpose;
- both member benefits and contributions are equitable;
- membership is voluntary;
- cooperatives are financially independent of the government; and
- cooperatives are run by executive committees comprised mostly of their own members.

"Cooperatives are not new to Burma. First established under colonial legislation in 1905, they concentrated on supplying credit to farmers. Their progress was slow, especially during the first decade and many failed during the worldwide depression before World War II. However, some continued to function into the postwar period and were gradually transformed into village cooperatives after 1970.

"The Revolutionary Council, formed in 1962, proclaimed the Burmese Way to Socialism as its governing policy. The new regime also recognized at that time the potential contribution of cooperatives toward achievement of Burma's economic and social goals and in 1970 it announced a comprehensive plan for their development, to be implemented by the Ministry of Cooperatives. In 1972 the Government officially announced that cooperatives were to be the 'Second Pillar of the Burmese Economy,' the other two being the State and the Private Sectors.

"In one or another aspect, cooperatives seem to have taken root in the Burmese economy and society. Of the estimated 7 million families, almost all heads of households are members of one or another cooperative (family members receive privileges through them). Over 4.6 million rural families are members of the multipurpose village cooperatives, though mostly for consumer-goods-distribution rather than production purposes; and over 1.5 million urban families are members of urban consumer cooperatives.

#### Relationship to Power Structure

"The governing organizations are the Burma Socialist Programme Party (BSPP), the sole political party in Burma, and the Peoples Councils (the nominal government). Both operate in parallel at the national, State/Division, township, and sub-township (village or ward) levels.

"The government provides training, supervision, and technical support via the Ministry of Cooperatives and its Cottage Industries and Cooperatives Departments. More specifically, the Ministry has encouraged the formation of new cooperatives, the extension of cooperative activities, and improvements in the quality and efficiency of cooperative production and operations generally--through organizational, educational, and administrative efforts of the Cooperatives Department, through technical assistance by the Cottage Industries Department, and through cooperative arrangements (e.g., on fertilizer inputs) with the Ministry of Agriculture.

"The Ministry also facilitates loans to cooperatives from the Myanma (Burma) Economic Bank and the Myanma Agricultural Bank. Such loans, according to Ministry officials, amounted to K 15 million (just under \$2 million) in 1982/83 and are expected to increase substantially in 1983/84. While most of them have been made to cooperatives at division and township levels in the past, Ministry policy is to assist primary cooperatives to obtain an increasing proportion of such loans in the future.

"The Ministry of Cooperatives recognizes that it is participating more directly in cooperatives than is the case in some developed countries, but it believes this guidance and support is necessary in view of the 'general inexperience' of the Burmese with such activities and that this involves only the 'postponement' of their 'complete freedom' until after they have received more 'education and training'. The guidance, it might be noted, is far from the direct control over cooperatives exercised by governments in some other developing countries; and the support is not as great in some respects as that provided to cooperatives by the U.S. in earlier years in the form of tax benefits and price supports. (Cooperatives in Burma pay income taxes, and there are no subsidies or price supports.)

"Units of the Burma Socialist Program Party (BSPP) are involved in key decisions such as those related to pricing and sales of village cooperative produced oilseeds to township cooperative societies. However, cooperatives are in tune with the Party, since all cooperative executive-committee members, whether elected or appointed, are members of the BSPP. Moreover, it appears that the BSPP supports the concept that cooperative activities should maintain their essentially voluntary character.

#### Cooperative Types and Functions

"Cooperatives in Burma are of two types: primary societies and cooperative groups. The most important primary societies are the multipurpose cooperatives in villages and the consumer cooperatives in urban areas. Others include credit societies and producer cooperatives in various sectors of the economy.

"Producer Cooperatives play a relatively small role in Burma whether measured by their share in total production or by comparing their membership and volume of business with that of other cooperatives which are mainly engaged in distributing activities. However, the government is encouraging them (as well as the production arm of the multipurpose village tract cooperatives) to increase their production, by providing loans as well as some access to imported materials and equipment. The Cooperatives Department of the Ministry of Cooperatives is also providing technical assistance to remedy a lack of entrepreneurial and management knowledge and skills. And the Cottage Industries Department of the Ministry is providing technical assistance for production activities, partly through foreign assistance.

### Cooperative Groups

"Primary groups have been formed in some 150 instances by two or more primary cooperative societies to perform economic or other functions when shared interests of primary cooperatives suggest that advisability.

"Township societies have been formed in about 300 townships in Burma. Each society's membership consists of all the primary cooperatives in that township--a total of about 20,000 for all of Burma--with primary cooperatives usually being represented at the township level by the chairman or another member of their executive committee. Primary cooperatives furnish the share capital for the societies as well as investment funds for special projects. According to cooperative regulations, the investment funds are voluntary, the share capital is not.

"In addition to organizational, coordinating, and educational activities on behalf of their primary members, these societies market the agricultural and industrial production of their member cooperatives, purchase and distribute goods and services to their member societies, and engage in some industrial production on a larger scale than would be possible for the primary societies. They are governed in much the same way as the primary societies, by an executive committee two-thirds of whom are elected by the general while one-third is appointed after a consensus of local representatives of the Ministry of Cooperatives, the Party, the local Peoples Council, and other public organizations including the elected executive-committee representatives.

"Division syndicates number 16, one each in the 7 Divisions and 7 States of Burma, plus an additional one in both Shan State and Rangoon Division. Their membership consists of all the township societies within the Division or State; and they are governed, as is the case with other cooperatives, by an executive committee, two-thirds of whom are elected by the township society representatives.

"The principal functions of the syndicates are: to coordinate the activities of member societies, to provide transportation and trade services; to engage in purchases from or sales to State and other enterprises on behalf of their constituent societies; and to undertake economic activities which would be beyond the technical, financial, or managerial capabilities of their constituent societies or which would require large-scale government or other assistance.

"Central Cooperative Society. Founded in 1975, the Society's membership consists of the 298 township societies. Its Council has an additional 149 members who are government-appointed (the same elected/appointed ratio as in the executive committees of other cooperatives), and its executive committee is composed of the chairmen of each of the 15 active township syndicates plus 8 government-appointed members including the Deputy Ministry of Cooperatives, who serves as ex-officio chairman of the committee. The government-appointed members of the executive committee work full time; the township syndicate representatives meet with them once a month.

"Local autonomy. Local cooperative societies, including those at both primary and intermediate levels, have a substantial degree of autonomy in practice from national institutions such as the Ministry of Cooperatives, despite State appointment of one-third of the members of executive committees at all cooperative levels. This is in part because the appointees to local executive committees are usually selected mainly by the local representatives of the Peoples Councils and the Party. Such local bodies and their appointees often see things differently from national bodies, and their views usually prevail.

### Implications for Projects

#### AID Policies and Burmese Cooperative Principles

"Cooperatives in Burma meet most conditions for AID assistance which are listed in the draft Policy Determination, 'Overseas Cooperative Development,' dated August 24, 1983. Moreover, Burmese cooperatives also qualify for assistance under the provision that AID support may be provided if it is aimed at changes in appropriate directions.

"The four policy 'conditions' and the relationship of Burmese cooperative principles to them are summarized below.

"Economic purpose. Cooperatives in Burma were formed primarily to serve an economic purpose--which is fully consistent with AID policy directives. They are financially independent of the government; they receive no government subsidies; and they are developing cooperative self-reliance.

"Voluntary membership and use. All the evidence indicates that Burmese joining of cooperatives has been voluntary, to secure economic benefits. Where they see no net benefits, Burmese do not join or do not participate in a particular cooperative activity. Thus, even Ministry of Cooperatives employees do not all belong to their cooperative credit society. Equally important in principle, but much more important from a national economic point of view, only a very small percentage of village-cooperative members participate in cooperative farming, preferring instead to continue to farm individually, although virtually all of them participate in cooperative purchases of consumer goods and production inputs.

"Member control. All members have 'the opportunity to participate' in cooperative affairs, even though (as the Policy Determination indicates is often the case) relatively few members may in fact manage the affairs of their cooperative. The Government of Burma exercises 'normal' government functions such as enacting enabling legislation, chartering and registering, auditing, training and facilitating of financing. In addition, however, although there is still a large measure of local autonomy, the Burmese Government exercises a management role through its appointment of one-third the members of cooperative executive committees.

"The Ministry of Cooperatives stresses that these measures are transitory, that they are necessary because of the general lack of experience and management skills among members, and that education and training will lead to the 'complete freedom' of cooperatives from such government involvement.

"The government may thus reduce its role gradually in any event. An AID presence, however, would enable it to have not only a more fruitful policy dialogue generally with the Government of Burma but would also provide opportunities for AID to encourage and facilitate -- without any undue pressures on this sensitive issue -- gradual changes in the direction of the 'complete freedom' promised by the government and toward the 'member control' stipulated in AID's draft Policy Determination.

Equity in contributions and benefits is a policy which seems fully met by Burmese cooperatives in both principle and practice.

### 3. The Screw-Press Mills

a. Background. Screw-press mills were introduced in Burma in the 1930s, and they gradually replaced the traditional ox-driven mortar and pestle operations that had been in existence for probably hundreds of years. Screw-press mills gained quick acceptance because they process tons of seed per day compared with kilograms of seed that were processed by the mortar and pestle method. Another reason for their quick acceptance was their relative efficiency; they increased oil yields by 10% above what was achievable with the traditional method.

Most oil mills were privately owned until the 1970-1972 period. At that time, the Burmese Government adopted and implemented a comprehensive plan for cooperatives, and some of the screw-press mills began to pass from private hands to cooperative societies. Most such transfers resulted from privately-owned mills going bankrupt and their assets being turned over to cooperative mills. Even now, the number of cooperative mills is only about 80, and the remaining estimated 1,900 mills are in the private sector with about 80% of all installed processing capacity. In general, cooperatives process about 10% of all seed processed. However, cooperative mills are only able to process 30% of their procurement. The cooperatives must enter into agreements with private mills to process the remaining 70%. Hence 97% of actual processing is done by private expeller mills and traditional hsi-zone methods.

b. Cooperative Mills. Cooperative mills are owned by the township cooperatives in their areas. These parent cooperatives are involved in profit-making enterprises such as buying and selling of seed, trucking, operating consumer shops as well as operating screw-press mills. A typical township cooperative is governed by an executive committee, two thirds of its members are elected from among the membership of the cooperative and one third appointed after consultation with the MOC and local people's councils. The executive committee determines the number and kinds of employees needed to run cooperative

enterprises, hires and fires, sets salaries and benefits, and provides general policy guidelines. The managers they hire perform only middle-level management functions, carrying out the policies set by the executive committee and providing day-to-day supervision of the particular enterprise.

The cooperative mills are generally run in this fashion. The township societies do have the institutional depth, experience, and management expertise to carry out their role in the project.

c. Private Mills. Private mills are operated as individual enterprises with a profit motive. Consequently, those private mills with a relatively better plant and higher operational efficiency generally attract more business than their less efficient sister mills. Typically, a private mill is owned by an individual or family group. These owners are secretive and cautious about sharing any but the most mundane types of information. This is primarily due to uncertainty regarding their status in Burma's new social structure. But it is also due to competition with cooperative mills that enjoy certain advantages such as access to credit, imported commodities, and access to the MOC and its influence.

Private mills are relatively efficient and prosperous. They are operated with fewer people than cooperative mills, and their plants appear to be cleaner and the equipment in a better state of repair. They indicated, in candid conversations, that funds could be made available from private sources, as well as from the Myanma Economic Bank, to undertake rehabilitation. There is no doubt that these mill owners know what their mills require in terms of rehabilitation and will have the capability and desire to participate in the project.

#### 4. The Industrial Producers' Cooperative Workshops

a. Background and Objectives. Although one industrial cooperative was formed in 1952, the history of these cooperative Workshops dates back to 1970 when cooperatives in general became a "pillar" of the Burmese economy. They have organized skilled journeymen and laborers into a disciplined, highly productive work force by pooling the different skills members of the cooperative have to offer. There have been incentives offered by SRUB for the formation of Cooperative Workshops. Examples include access to the latest machinery and equipment that are imported by the MOC, as well as easy access to credit resources. There are only five Workshops in Burma at present located at Mandalay, Meiktila, Yenangyaung, Pegu and Rangoon. Rangoon will be the only Workshop that will not participate in the project.

Aside from providing employment for their members and availing themselves of the incentives provided cooperatives, in general Workshops, list among their objectives improving technology, upgrading member skills, training new journeymen and extending collective borrowing to their members.

b. Typical Organization. The membership of workshop cooperatives is from about 100 to 140 members. All cooperative members work at the Workshop and are considered equal for voting purposes, regardless of skill level. The membership elects a 15-person committee which is representative of the membership as a whole. It consists of a chairman, a vice chairman, two secretaries and 10 members. The executive committee then appoints a general manager to oversee operation of the Workshop. The manager is assisted by heads of technical divisions and branches and also by an administrative staff.

The Workshop normally consists of several industrial operations. Typically, there is a machine shop, a foundry operation, a welding shop, a blacksmith shop, a general repair operation (electrical, fuel systems, brakes, carburetion etc.), and a carpentry shop in each Workshop. These specialty shops carry out actual production, while an administrative organization handles purchasing, marketing, personnel management, and accounting. The administrative staff comprises about 15% of the Workshop's work force.

The Workshops offer a competitive salary structure and attractive benefits such as housing, subsistence, education, and medical services. Thus their work force is stable and most members, particularly the general manager, his assistants and division and branch chiefs, have spent many years with their respective Workshops.

All cooperative Workshops have extensive on-the-job training programs. On the average, it takes a worker seven years to progress from apprentice to journeyman level.

c. Resources and Current Operations. The Workshops' physical plant consists of several buildings located on a tract of land anywhere from 5 to 30 acres. These buildings are equipped with industrial machinery such as lathes, shaping and drilling machines, compressors, saws, grinding machines, welding machines and a variety of other equipment and tools. These machines are manned by a resourceful and well-trained mechanic and apprentices.

The primary source of the Workshops' capital appears to be loans obtained from the Myanma Economic Bank. Loans are made available for the purchase of new machinery and for other investments. These loans vary in terms, but are generally paid back by the Workshops ahead of their due time.

Presently, all Workshops devote the major portion of their operation to the rehabilitation and rebuilding of trucks. Trucks are purchased at auctions as surplus material or acquired after being involved in major collisions. These trucks are then rebuilt and rehabilitated using parts manufactured by the Workshop itself, except for a few that cannot be reproduced and which are bought from local vendors. The average Workshop rehabilitates approximately 25 vehicles per year. Rebuilt trucks are first offered to members of the Workshop and to local cooperative societies. If not bought by a member or by a cooperative, trucks are sold at auction to private dealers.

However, Workshops rehabilitate a variety of other equipment and manufacture such items as potato slicers, water pumps, compressors, and lathe chucks. Without exception, all Workshops are now involved in the manufacture of screw-press mill components. However, with the exception of the Mandalay Workshop, this aspect appears to be a minor part of their operations.

Cooperative members work an eight (8) hour day, unless the workload demands otherwise. Overtime work is not uncommon. All Workshops realize a 20% profit on products they sell.

d. Role in the Project. Workshops will manufacture all components of screw-presses in their area. They will also participate in the rehabilitation of mills, particularly in the areas where mill operators lack the skills such as boiler installation, steam piping, industrial welding, etc. It is expected that focus on screw-presses and other mill facilities will increase the workload of the average Workshop by about 5-10%. There is no question that all Workshops will be able to carry this additional workload without difficulty. All possess the resources, capacity and know-how. All will be provided materials and equipment on a loan basis to carry out the task, and will be provided technical assistance and training to do it well.

However, all Workshops are slightly apprehensive about participating in the project. They fear that equipment and materials procured under the project will be earmarked for screw-press oil mill rehabilitation so that they would pay for these commodities but would not be able to use them in their general operations. Also, some of the Workshops are under the mistaken impression that the project will divert their efforts from a profitable vehicle rehabilitation business to the less-certain world of oil mill rehabilitation. These erroneous impressions persist despite repeated rebuttals by the project team and by MOC personnel.

5. Conclusion. There is little doubt that the Workshops possess the required expertise to carry out their role in the project. Without doubt, they are able to manufacture duplicate parts and components of the highest precision and to install and service these parts and components in screw-press oil mills. They will have good incentives to participate despite current apprehensions. They will be offered the equipment that they feel they need so that it will fit in with their general operations. They will be given new and modern materials and supplies and will be offered technical assistance and training in the latest technologies. And they will be encouraged to diversify their operations and expand their profit-making capabilities.

Therefore, it can be concluded that all Workshops will participate in the project without reservations and that they will carry out the role assigned to them efficiently, expeditiously, and effectively.

## F. Environmental Analysis

The proposed project envisions the rehabilitation of existing screw-press oil mills in Burma over a period of five years. It is anticipated that, after rehabilitation, these mills will have increased their efficiency and expanded their capacity. In other words, these mills will be doing the same thing they are doing now, only doing it better and faster. This is simply an effort to restore these mills to their peak efficiency - the same efficiency which they had when first built.

It is not believed that the project, as envisioned, will have a significant, foreseeable effect on the environment of Burma or the international environment as a whole.

In fact, one of the activities of the project will be to improve the environmental conditions of these mills. Specifically, sanitation conditions at all mills, such as the flow of pressed oil in open channels, will be addressed through project inputs. Additionally, there is a provision for steam cleaning and repair of all barrels used for transporting oil, thus reducing the chances of leakage and contamination. The project will endeavor to adopt environmental guidelines as set forth by the International Bank for Reconstruction and Development (IBRD) for the control of effluents (see Annex I), incorporate environmental design and monitoring procedures in training, particularly observational tours, and include an element in the evaluation plan dealing specifically with environmental protection. Furthermore, safety equipment and tools will be provided to mill operators as well as Workshop personnel who will undertake mill rehabilitation. These and other environmental protection measures will be a continuing concern of the technical assistance team throughout the project's life. In sum, the environmental conditions of the mills and Workshops should be greatly improved through the project.

Based on this analysis, an initial environmental examination (IEE) indicating a negative determination is recommended.

## VII. Conditions and Covenants

### A. Conditions Precedent to Disbursements

1. Except as A.I.D. may otherwise agree in writing, prior to any disbursement for the upgrading of oilseed mills and related technical assistance 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.

2. Except as A.I.D. may otherwise agree in writing, prior to any disbursement for the procurement of laboratory equipment, and the bench-type solvent extraction plant, or the issuance of any documentation pursuant to which disbursement will be made, the Cooperating Country shall furnish to A.I.D., in form and substance satisfactory to A.I.D.: evidence that the new laboratory facility of the Cottage Industries Department of the Ministry of Cooperatives is functional (with operating utilities and program safety equipment on line); a listing of staff that will be trained to use new equipment; and a listing of laboratory equipment and materials to be used.

### B. Covenants.

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

2. The Cooperating Country shall covenant that it shall ensure that the Ministry of Cooperatives 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 Cooperatives in carrying out the Project.

4. The Cooperating Country shall covenant that it shall make every effort to ensure that loans made available to cooperatives, private sector organizations and other entities in furtherance of the objectives of the Project shall be made available at an interest rate not to exceed six [6] percent per annum over a period of twelve [12] years, except as A.I.D. may agree otherwise in writing.

5. The Cooperating Country shall covenant that it shall make every effort to ensure that private as well as cooperative mills benefit significantly from rehabilitation activities financed under the Project and that upon request by A.I.D. it shall furnish to A.I.D. annual work plans and other planning and implementation documents identifying, in advance of rehabilitation, mills to be upgraded.

6. The Cooperating Country shall covenant that it shall make every effort to ensure that where private mills are to be utilized on a contract basis for the processing of oilseeds for township cooperatives or cooperative syndicates, private mills rehabilitated under the Project shall be given preference over other private mills for such contracts. The Cooperating Country shall covenant that it shall make every effort, by adjusting township procurement levels to provide sufficient oilseeds on a custom basis to such rehabilitated private mills or other means, to ensure that such rehabilitated private mills operate at a capacity equal to that of cooperative mills rehabilitated under the Project.

C. Negotiating Status

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

### VIII. EVALUATION ARRANGEMENTS

The evaluation plan for the Edible Oil Processing and Distribution Project will include several activities undertaken jointly by AID and the Ministry of Cooperatives including: (1) annual project evaluations starting in 7/86; (2) possible major project evaluations in 7/87 and/or 7/89; and (3) a final Impact Evaluation in 1989-90. Annual project evaluation exercises are intended to allow the AID/Burma and Ministry of Cooperatives 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 within the Ministry of Cooperatives will rest with the Planning Division of the Cooperatives Department assisted by the Cooperatives Management Service of the Ministry. When fully staffed, the Division's Project Planning Section will have direct responsibility for evaluation. Under the terms of this project, AID/Burma will sponsor training for several analysts from the Project Planning Section.

The concept of evaluation is not new within the Ministry of Cooperatives. At present, the Planning and Statistics Division, in conjunction with the designated Project Manager and the Project Implementation Committee, carries out three types of evaluations: (1) ex-ante evaluation; (2) on-going evaluation; and (3) ex-post evaluation. These three types of evaluation, particularly the skills and experience gained from the on-going UNDP-assisted project in management systems development, are consistent with AID's requirements for and style of project evaluation.

Project funds will be used to pay for the costs of U.S. consultants required to assist in the joint major evaluations of 7/87 and 7/89, as well as the final Impact Evaluation in 1989-90. It is estimated that up to \$250,000 in grant funds plus Burmese Government-funded local costs will be required. AID/Washington technical assistance and guidance will most likely be needed from such offices as PPC/Evaluation and Asia Bureau/Development Planning to help in defining the scope of the evaluation and possibly to recruit qualified evaluation team leaders.

Annex A

PID APPROVAL MESSAGE

The Asia Project Advisory Committee (APAC) approved the subject PID on June 21, 1983. The reporting cable, State 192670 '84, is classified and is available in AID/W offices. A second cable, State 291991 '84, which is based on a review of the revised project concept paper is attached.

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Department of State

OUTGOING  
TELEGRAM

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TAGS:

SUBJECT: EDIBLE OILS PROCESSING AND DISTRIBUTION PROJECT  
(482-0005), PROJECT COMMITTEE (PC) REVIEW

REF: CONCEPT PAPER, DATED 08/14/84

1. AN ASIA BUREAU PROJECT COMMITTEE (PC) MEETING WAS HELD ON SEPT. 21, 1984 TO REVIEW THE SUBJECT PROJECT. THE MEETING WAS NECESSITATED BY THE EVOLUTION OF THE PROJECT SINCE THE PID WAS APPROVED LAST YEAR. FOCUS WAS ON THE PROJECT OUTLINE/CONCEPT PAPER NEGOTIATED WITH THE MINISTRY OF COOPERATIVES (MOC) ON AUGUST 14, 1984. REPRESENTATIVES OF ASIA/PD, ASIA/TR, GC/ASIA, THE DESK, PPC/PDPR, AND S AND T/ARD ATTENDED THE MEETING. THE PC APPROVED THE PROJECT AS NOW ENVISIONED AND PROVIDED THE FOLLOWING GUIDANCE FOR PROJECT PAPER PREPARATION

2. PROJECT FINANCING AND CREDIT ARRANGEMENTS: THE PP SHOULD CLEARLY DEFINE THE FINANCIAL ARRANGEMENT BETWEEN THE GRUB AND OTHER ENTITIES PARTICIPATING IN THE PROJECT. THE CONCEPT PAPER STATES THAT COMMODITIES WILL BE PROCURED WITH AID GRANT FUNDS AND DELIVERED DIRECTLY TO THE INDUSTRIAL PRODUCER COOPERATIVES (IPCS) AND TO THE COTTAGE INDUSTRIES DIVISION OF THE MOC (CID)

WOULD THESE FUNDS BE LENT OR GRANTED BY THE MOC TO THE IPCS AND CID? PRESUMABLY THE IPCS WILL CHARGE MILLS THEY ASSIST IN REHABILITATION FOR SERVICES RENDERED AT PRICES REFLECTING THE BASIC FINANCIAL COST-PLUS PROFIT. WILL FUNDS THUS GENERATED BE USED TO PAY BACK THE MOC? HOW AND WHEN WILL THE IPCS AND THE CID PAY BACK? AT WHAT INTEREST RATE? WILL REPAYMENTS GO INTO A REVOLVING FUND TO ASSIST MORE IPCS? SHOULD THESE FUNDS BE USED TO CONTINUE AND EXPAND REHABILITATION SERVICES OF IPCS TO COOPERATIVE AND PRIVATE MILLS? THE PP SHOULD EXPLORE A SYSTEM OF RECYCLING REVENUES GENERATED BY THE IPCS WITH THE IDEA OF SUSTAINING, ENHANCING AND REPLICATING THE REHABILITATION EFFORT. HOW WILL THE INDIVIDUAL MILLS PAY THE IPCS? ADDITIONAL QUESTIONS ARE: WILL THERE BE CREDIT AVAILABLE TO THE MILLS? WILL COOPERATIVE MILLS BE ABLE TO OBTAIN CREDIT MORE READILY THAN PRIVATE MILLS? WHAT IF MILLS DEFAULT? WHAT PAY BACK GUARANTEES SHOULD THERE BE FOR BOTH TYPES OF MILLS? WILL A

TWO-STEP LENDING PROCEDURE BE USED? THE PP SHOULD ANSWER THESE AND SIMILAR QUESTIONS IN DETAIL SO THAT THE FLOW OF FUNDS DURING PROJECT IMPLEMENTATION IS CLEAR.

3. COMMODITIES: PC RECOGNIZED THE NEED TO PERMIT THE PROCUREMENT OF MORE COMMODITIES THAN IS NORMAL IN AN AID PROJECT, GIVEN THE DESIRES OF THE MOC. PROCUREMENT FROM U.S. SOURCE AND ORIGIN SUPPLIERS SHOULD BE MAXIMIZED IN ORDER TO AVOID REQUESTS FOR WAIVERS FOR LARGE AMOUNTS. IT SHOULD BE NOTED THAT THERE ARE U.S. MANUFACTURERS WHO PRODUCE WHOLE EXPELLER UNITS, AND IT IS OUR UNDERSTANDING THAT THESE U.S. MANUFACTURED UNITS ARE COMPETITIVE ON THE INTERNATIONAL MARKET. THEREFORE, CONSIDERATION SHOULD BE GIVEN TO REPLACING WHOLE EXPELLER UNITS THAT ARE BEYOND ECONOMICAL REPAIR. REGARDING COMPONENT PARTS TO BE COPIED, IS THERE A QUESTION REGARDING ROYALTIES AND COPYRIGHT PROTECTION? THE PP SHOULD ADDRESS COMMODITY-RELATED ISSUES IN DETAIL.

4. INDUSTRIAL PRODUCER COOPERATIVES: GIVEN THE KEY ROLE IPCS WILL PLAY IN THE PROJECT, THE PP SHOULD INCLUDE THOROUGH ANALYSES OF THEIR STRUCTURE, CAPABILITIES, AND RESOURCES. THIS INSTITUTIONAL AND ADMINISTRATIVE ANALYSIS SHOULD DEMONSTRATE THAT THE FOUR IPCS ARE CAPABLE OF UNDERTAKING THE IMPORTANT ROLE BEING ASSIGNED THEM, AND THAT THE PROPOSED TECHNICAL ASSISTANCE AND TRAINING COMPONENTS ARE SUFFICIENT FOR THIS PURPOSE.

5. DIFFERENCE IN PRICE CHARGES BY THE IPCS BETWEEN THE REHABILITATION OF COOPERATIVE AND PRIVATE MILLS WAS NOTED BY THE PC. PP SHOULD DEMONSTRATE THAT THIS DIFFERENCE, NOTED IN THE CONCEPT PAPER AS A REBATE TO THE COOPERATIVE MILLS, WILL NOT BE A CASH FLOW CONSTRAINT TO THE REHABILITATION OF PRIVATE MILLS.

6. SCHEDULE OF THE DESIGN TEAM, INCLUDING REVISED SCOPES OF WORK OF THE TWO CONTRACTOR PERSONNEL, WAS SENT IN A SEPTEL. ANY PRELIMINARY WORK THAT MISSION MAY BE ABLE TO DO IN ADDRESSING THESE AND OTHER ISSUES WILL GREATLY HELP IN MEETING THE PP DESIGN TARGET OF NOVEMBER 15, AND WILL BE GREATLY APPRECIATED. DAH

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PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORKLife of Project: \_\_\_\_\_  
From FY 85 \_\_\_\_\_ to FY 89 \_\_\_\_\_  
Total U.S. Funding \$9.5 Million  
Date Prepared: November 1984Project Title & Number: Edible Oil Processing and Distribution (482-0006)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>To attain self-sufficiency in edible oil production.</p>	<p>Measures of Goal Achievement:</p> <p>Domestic edible oil production equals 20 pounds per capita (estimated to require production of 415,600 MT/Yr. by 1994).</p>	<p>-- Census and Statistics data -- Agriculture Corporation Records -- Ministry of Cooperatives Records -- Special Reports</p>	<p>Assumptions for achieving goal targets:</p> <p>-- SRUB priorities on edible oil production and consumption remain unchanged. -- Continued political/social stability and economic growth. -- Pricing relationships between oilseeds and other crops remain favorable.</p>
<p>Project Purpose:</p> <p>To upgrade and expand oil mills and increase the capability of indigenous organizations to plan, implement and evaluate programs to improve edible oil processing and distribution.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <ol style="list-style-type: none"> <li>1. Oilseed mills processing 220% greater quantities of oilseeds than present (initial 15 mills processing 45,100 MT oilseeds by year 5).</li> <li>2. Functioning technical and analytical libraries servicing MOC and cooperatives.</li> <li>3. CID laboratory implementing quality control testing for 50% of cooperatives.</li> <li>4. Continuing in-country training program for oil extraction operators.</li> <li>5. MOC has developed and is implementing a national program to improve edible oil production and distribution.</li> <li>6. Trained staff performing functions appropriate to their training.</li> </ol>	<p>-- Oilseed mill's financial statements and records -- MOC Records -- Project Records/Evaluation -- Site Visits -- Special Survey</p>	<p>Assumptions for achieving purpose:</p> <p>-- Production of oilseeds does not decrease. -- Mandate for cooperatives involvement in oilseed processing remains adequately strong to allow cooperatives to purchase adequate oilseeds. -- That acceptable economic incentives are provided to combine in capturing adequate raw materials. -- That inputs and technical services can be delivered as planned in an acceptable form. -- MOC able to recruit and retain quality personnel.</p>

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PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project: 7/84 to 7/89  
From FY 85 to FY 89  
Total U.S. Funding: \$9.5 Million  
Date Prepared: November 1984

Project Title & Number: Edible Oil Processing and Distribution (482-0005)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Outputs:</p> <ol style="list-style-type: none"> <li>1. Rehabilitated screw-press oil mills processing at a minimum of 75% capacity with a recommended program of annual maintenance in place.</li> <li>2. Upgraded capacity and capability of workshops.</li> <li>3. Returned participant trainees in place within MOC and other local organizations.</li> <li>4. Fully equipped and staffed reference laboratory.</li> <li>5. Fully equipped and staffed reference library in Cottage Industries Department.</li> </ol>	<p>Implementation Target (Type and Quantity)</p> <p><u>Oil Mills:</u></p> <p>15 mills completely rehabilitated with an additional 30-45 mills to be upgraded to varying degrees.</p> <p><u>Library:</u></p> <p>500 new books 20 periodical subscriptions 15 technical journals/publications</p> <p><u>Mill/Workshop Equipment/Materials:</u></p> <p>Machine equipment (\$1,495,000) Raw materials (\$1,623,000) 6 vehicles</p> <p><u>Training Staff:</u></p> <p>6 MS degrees 7 other long-term trainees 30 short-term trainees 45 observation tour participants</p> <p><u>Operating Laboratory:</u></p> <p>\$615,000 new equipment</p>	<p>-- MOC Records</p> <p>-- Project Records</p> <p>-- Project Audits</p> <p>-- Site Visits</p>	<p>Assumptions for achieving outputs:</p> <p>-- Responsible SRUB and other employees will be identified and released for in-country and overseas training.</p> <p>-- Timing and quality of inputs to meet project requirements.</p>

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## TECHNICAL ANALYSIS

### A. Screw-Press (Expeller) Mills

1. Oilseed Processing by Screw-Press. Oilseeds, as received, should be inspected for weight per unit volume, moisture content, foreign matter and spoilage such as mildew, insect infestation, etc.

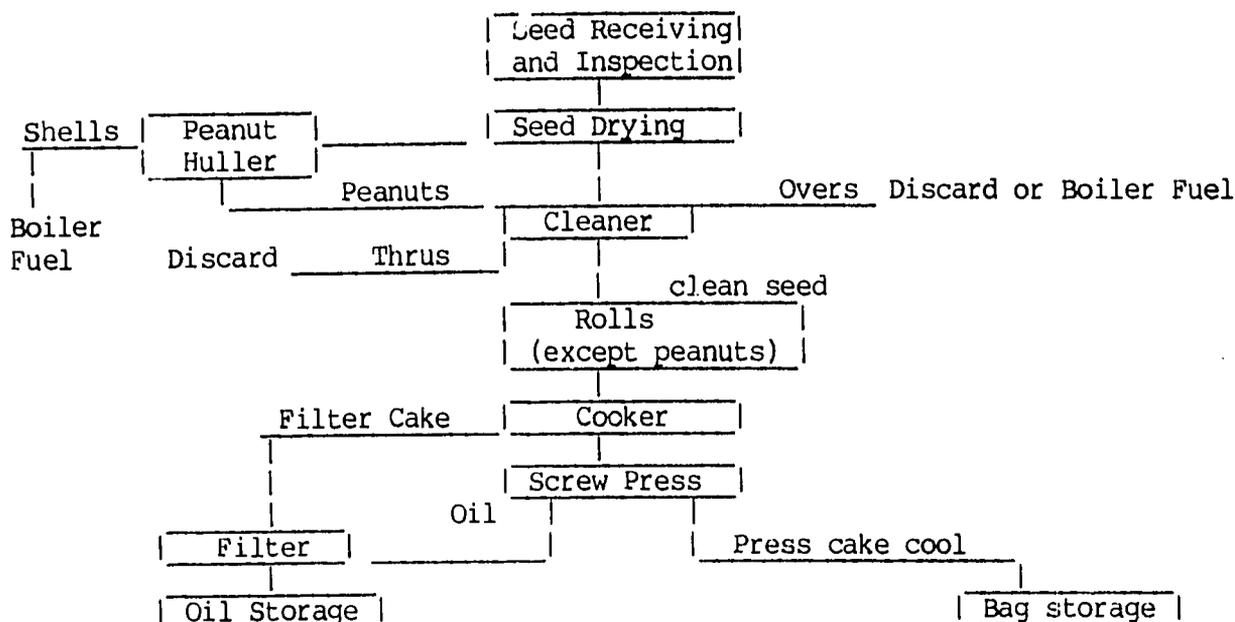
The seed should then be dried to a uniform moisture of 8% to 10% as rapidly as possible before storage in godowns, not in the processing building. The bags of seed in storage should be in rows not more than 4 bags wide with walkways between rows and on pallets, preferably, to allow aeration and minimize heating.

Seeds for processing are cleaned over 2 deck screens with perforations sized to pass the seed through the top deck and hold out the larger size foreign matter. The bottom screen perforations are sized to hold the seed and let the smaller foreign matter pass through. Peanuts received in the shells must be shelled prior to cleaning. As other seeds such as sunflower are produced, they should be decorticated. Aspiration is desired over the screens to lift the lighter foreign matter. Following cleaning, the seeds (other than peanuts) are broken by passing through crushing rolls or grinders to reduce the particle size and start the rupturing of the oil cells.

The crushed seeds are next conveyed to the cooker above the press to be conditioned for pressing. The cookers are stacked in units 2 or 3 kettles high, with enough retention time to heat the material to 250°F or more while reducing the moisture content to 4% or less. Level control gates in each kettle are necessary to maintain a constant retention time to accomplish the above results. At the same time, steam is regulated to the jacketed bottoms and the kettle rings are aspirated above the material level to draw off moisture. The conditioned material is then discharged directly from the cooker to the press. The press feed rate and cake discharge choke should be adjusted to utilize the maximum horsepower possible in the press for best results.

As the oil is expelled from the press, it should gravity flow into a covered trough, or be screw conveyed by an enclosed conveyor, to a small holding tank. It is pumped while still hot to a filter press to remove solids that were expelled with it. It is preferable to blow the press with compressed air prior to cleaning to get as much oil from the cake as possible. The filter cloths must be washed frequently to prevent rancidity and maintain good quality of oil. Filtered oil should be stored in clean enclosed tanks.

The pressed cake must be cooled before bagging to prevent spontaneous combustion. In cases where the cake is second-pressed, it should be broken up prior to conveying to the cooker. Usually less heat is required depending, of course, on the moisture content.



2. Brief Description of Solvent Extraction Process. Solvent extraction is significantly more efficient than expelling oil from seed. Oil from seeds with an oil content of 35% or less is extracted directly. However, higher-content seeds must be pre-pressed before extraction. Approximately 75% of the oil is expelled from the seed through low pressure pressing. The seed (of low-oil content) or the pre-pressed seedcake is then subjected to percolation of solvent through it that extracts practically all of the remaining 25%. About 1% of oil remains in the extracted meal after the solvent action. The oil is then separated from the solvent by heating the mixture. The solvent has a much lower boiling point (about 60°F) and thus evaporates leaving the oil behind. The solvent is condensed and recirculated for further use. Similarly, the solvent remaining in the extracted meal is recovered by heating the meal with both live and jacketed steam. Both the extracted oil and meal are practically free from any traces of solvent.

3. Maintenance Program for Screw-Presses. Normal preventative maintenance practices should be used at all times such as, but not limited to:

- a. Routinely scheduled lubrication program;
- b. Maintaining proper belt tensions;
- c. Keeping all steam pressure regulating valves, traps, relief valves and pressure gauges in good working condition;
- d. Having instruments such as thermometers, ammeters, etc., accurately calibrated.

In addition, a screw-press has wear parts that require periodic replacement. These are shaft worms and collars, cage bars and spacers, and choke. If not too badly worn, these parts can be rebuilt. All rebuilding, to be effective, must be to the specifications of the original parts, i.e., materials used and final dimensions. Shaft worms should have the finished grind of the outside diameter  $+ 0$  to  $-0.015''$  of the specified diameter when rebuilt or made locally. Similarly cage bars should be precision ground to within  $+ 0.001''$  or  $- 0.001''$ . The main shaft must be straight and true, and the cage inside diameter to dimension and free from nicks and gouges.

When rebuilding a shaft, all worms and collars must fit flush together with no openings between them. In a relined cage, the bars must be installed straight and true with proper spacers between them so that a smooth surface is formed. A slightly tilted cage bar will continually shave off cake in a manner like a plane used on wood. Suggested spare wear parts are as follows:

- 1 - main shaft for up to 4 to 5 identical presses
- 1 - set of worms and collars per press unless presses are set up on a staggered schedule to be down for repairs
- 1 - cage for up to 4 or 5 presses
- 1 - set of cage bars, spacers and breaker bars per press unless presses set up on a schedule like above
- 1 - choke wear part per press

4. Existing Conditions of a Typical Sampled Mill. A typical or average Project screw-press mill has 3 to 4 screw-presses with 2 high cookers with jacketed bottoms, a double deck screen cleaner, a crude huller if peanuts are purchased unshelled, a plate and frame oil filter with pumps, and a small boiler. All the above processing equipment is old and generally in disrepair. Other than the boiler, the equipment is housed in a barn-like building with dirt floor. The boiler is outside with no housing. About 75% of the mills are powered by electricity and the others by diesel engines, except one using a steam engine. In many mills, seed storage in the same building is not a desirable situation.

The efficiency of the processing operations is very low. This is due to insufficient preparation of seed to the presses. Seeds are not broken prior to cooking, and the heating in the cookers is inadequate and has no controls. This results in the necessity of a total 4 to 6 pressings by recycling cake and still leaves 8-10% oil in the cake. In addition, frequent power failures and scarcity of diesel fuel contribute to production time losses. Maintenance of normal wear parts is minimal to almost nil. In many mills, no spare shaft or cage parts are stocked resulting in up to 1 month downtime while they are rebuilt. Rebuilt parts are made from inferior metals and have a working life of only 2 to 3 months.

With proper preparation, that is, breaking the seed prior to cooking, controlling the cooking process with level controls, steam pressure regulators, steam traps and thermometers so that the material enters the press at approximately 250 F and 4% moisture, the number of pressings could be reduced to no more than two with resulting lower oil content in the cake. Having the proper steel stock and welding rods for shaft and cage parts would give an operating life of about 1 year instead of the current 3 months.

The targeting of 15 mills is really a pilot effort with more than 2000 mills in existence of which some 400 are considered worth rehabilitating. A summary of the existing conditions of the 15 mills in the sample is shown in the following table.

Table C.1

DATA FOR OIL MILLS SAMPLED

Location/ Type	Seed Processed	Ton/day	Number Presses	Type Cookers	HP	Number Pressings	Boiler	Remarks
1 Prone Coop. (Rare)	Peanut	15.0	6 HEB	2 High	2 - 25	4	Used Loco 25 PSIG	Ave. 3 Power Failures/ Day - 2-3 hrs.
	Sesame	15.0		Jacketed	4 - 20	5		
	Sunflower	15.0		Bottoms		4		
2 Aunglan Coop.	Sesame	6.75	3 HEB	1 High	2 - 20	4	None	Use generator 6-10 pm daily
	Peanut	4.50		No Jacket	2 line 50	4		
3 Thaugdwin- gyi Coop.	Sesame	1.6	1 HEB	2 High Jacketed bottoms	Steam engine	6	Loco 120 PSIG	No electricity - run Daylight only Power 3 years away
4 Pagan Coop.	Sesame	4.0	2 KRUPP	2 High	25 each	3	FARRAR 100 PSIG	
	Peanut	4.8		Jacketed Rings-Bottoms		3		
5 Yesagyo Coop. (Rare)	Peanut	5.0	1 ZAYODA	2 High	FUSKIN	3	Vertical 75 PSIG	Generator on line for lights. No power to mill
	Sesame	8.0	2 KRUPP	Temp. Conveyor	Engine line	4		
	Sunflower	5.0				-		
6 Pakokku Coop.	Sesame	5.8	3 Local Built	2 High	30 each	3	Loco 50 PSIG	Have to shut down 1 press to run 20HP huller cleaner line power
	Peanut	3.0		Jacketed Bottoms		4		
7 Taungtha Coop.	Sesame	6.0	1-KP GER	2 High	50	4	Loco 25 PSIG	Down 1 month to rebuild shaft and cage run 2 months-repeat
	Peanut	5.0	1-EP BURMA	Jacketed Rings-Bottoms	30	4		
8 Mandalay Coop.	Sesame	15.0	2-CHINA	3 High Jacketed	23 each	3	Vertical 50 PSIG	Low voltage 6-10 pm
	Peanut	15.0	2-KRUPP	2 High bottoms	45 line	3		
			1-INDIA	Jacketed				

DATA FOR OIL MILLS SAMPLED

Location/ Type	Seed Processed	Ton/day	Number Presses	Type Cookers	HP	Number Pressings	Boiler	Remarks
9 Meiktila Coop.	Sesame Peanut	5.4	2-KP	2 High J.B.	50	3	Loco	Run 12pm-4pm. Lack Power evening hours
		2.5	2-MAX			3		
10 Natmauk Yan Aung Min Private	Sesame Peanut	4.0	2-HEB	2 High Jacketed Bottoms	Ruskin Engine Line	4	Vertical	Generator on line Shaft for lights
		4.0				4		
11 Natmauk Pa Day Tha Private	Sesame Peanut	Down Since April	2-HEB 1-MAX	2 High Jacketed Bottoms	Ruskin Engine Line	4	Loco Pressure N.A.	Down/no fuel available. Generator for lights. No one knew any details
		4						
12 Mandalay Dana Bala Private	Sesame Peanut	2.0	3-MAX 1-INDIA	2 High Jacketed Bottoms	25 each 20	3-4	Vertical	Run 8 hours/day. Short seed supply
		2.5				3-4		
13 Mandalay Aung Myamma Private	Peanut	3.0	3-INDIA 3 sec 2-INDIA 4 " " " " " " 1-HEB 4 " " " " " "	2 High Jacketed Bottoms	3-50 Line shafts	3-4	Loco	Run 20 hours/day No Power 6-10am
						50 PSIG		
14 Mandalay Thu Kha Yanada Private	Sesame Peanut	2-3	2-INDIA 1-MAX 1-BURMA	2 High Jacketed Bottoms	20 H.P each	3	Vertical	Run 8-12 hours/day Seed supply
		2-3				4		
15 Pegu Private	(Rare) Sesame Peanut	6-8	4 HEB	3 High Jacketed Bottoms	25 each V-Belt Drive	3-4	Vertical 125 PSIG	Equipment in very good condition

5. Present Constraints. There is nothing we can do to supply sufficient electric power or insure that it is never interrupted. Similarly we cannot insure ample diesel fuel for engines that supply some mills with power.

We can improve the processing operations while the mill is running by supplying rolls to break the seed, steel stock for repair parts to be made in Burma, instruments and controls for cookers, and steam boilers from the United States. The Burmese can then be instructed in proper operational procedures and controls to increase the productivity and efficiency of the mills considerably. Similarly, workshops can be instructed on how to make the spare parts to the required tolerances with the proper U.S. stock metals.

6. Proposed Activities. It is recommended that complete roller mill machines, if feasible, and boilers be bought from the United States and imported for use in the mills. Steam pressure reducing valves, steam traps, steam pressure gauges and dial thermometers should also be purchased from the United States until the expertise is gained in Burma for their manufacture.

Items such as additional rings for cookers, level controls for cooker rings, good spare press shaft and cage wear parts, can all be made in the workshops with proper steel stock purchased and imported from the United States.

Cleaning screens, conveyors, elevators, oil pumps, and oil tanks are now being made in Burma and can be repaired locally.

The oil mills will need some technical assistance in the design and installation of the additional ring on the cookers and for the level controls in each ring. This would necessarily have to be done well ahead of changeover to allow for workshop fabrication. Since each mill is different a single standard unit cannot be made. One week in each mill would probably be needed by the engineer.

When all the required machines, parts, and materials are at the mill, and it is ready to shut down for rehabilitation, technical assistance from the Workshop will be needed during construction. The process engineer will provide technical assistance for start up and a period of operation. Periodic checks of the operation should be made during the first year. The main thrust after start up will be instruction to operators on proper processing procedures and controls.

7. Work Plan. The work plan for the mills would logically have to follow the completion of the parts from the Workshop. Mills in the area of each Workshop should be targetted one at a time. This will expedite the first mills and stagger the mill start-ups for the technical assistance force. The order of the mills' rehabilitation would probably be set by the Ministry of Cooperatives.

Assuming a two month period in the Workshop to produce the necessary parts for each mill, and with four mills each being serviced by two of them, it would take 8 months to supply all of them after the Workshop starts the work. The oil mill technical assistance should continue periodically for a year after the mill start-up.

Several things could cause delays in the project such as:

- a. Late delivery of machines and material from the United States,
- b. Delays in getting such materials through Burma Customs,
- c. Inability of some Workshops to be in full production in time; and
- d. Not planning the mill rehabilitation construction schedule properly.

8. Production Increases Resulting from Rehabilitation. The rehabilitation includes increased cooking and use of better screw-press shaft and cage parts. This, along with the technical training to be given all mill supervisors and operators would easily give a 10% increase in hourly throughput for each press. After rehabilitation and training, no more than two pressings should be necessary. Presently the average mill has four pressings. Thus the capacity can be doubled. The total increase would be:

Per 100 Viss seed now processed  $\times 1.1 \times 2 = 220$  Viss processed after rehabilitation.

$220 - 100 = 120\%$  average increase.

The addition of crushing rolls at each oil mill could give another 10% increase in the production rate. This would increase the capacities of mills by 140% instead of the above calculated 120%. At a cost of over \$100,000 per roll and the addition of a 50HP motor 1/, the rolls would not be economically feasible at this time.

9. Oil Yield Increase Resulting from Rehabilitation. Analysis of residual oil in the pressed cake is rare in Burma. During the past year, the analysis of 16 finished pressed cake samples, about half sesamum and half peanut, were analyzed and the results made available. These averaged 8% residual oil. After rehabilitation and training, the pressed cakes should average about 5% residual oil with no more than 2 pressings.

To be conservative, 6% residual oil content will be used. Large heavy duty presses, powered by 150HP to 200HP motors produce cakes with 5% or less residual oil in one pressing. It must be remembered that double pressing will be necessary with the rehabilitated existing screw-presses.

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1/ Since the mills are generally restricted to a maximum level of power usage, the additional energy requirement for the 50HP motor to power the rolls would effectively force the mill to idle an expeller which uses the same horsepower motor. There would therefore be a net loss in total capacity.

The gain in oil recovered per 100 viss produced would be as shown in the following calculations in Table C.2

Table C.2

Comparison of Recovered Oil With and Without Project

	<u>Present</u>	<u>Rehabilitated</u>
Sesamum Seed % Oil	50	50
Viss Sesamum Seed	100	100
Viss Oil in Seed	50	50
Viss Non Oil in Seed	50	50
Press Cake % Oil	8	6
Cake Wgt. (Wgt. Non Oil)		
(100 - % Oil)	54.35	53.20
Oil Recovered (100 - cake wgt.)	45.65	46.80
Gain 1.15 Viss Oil/100 Viss Sesamum Seed Processed		
Peanuts % Oil	40	40
Viss Peanuts	100	100
Viss Oil in Peanuts	40	40
Viss Non Oil in Peanuts	60	60
Press Cake % Oil	8	6
Cake Wgt. (Wgt. Non Oil)		
(100 - % oil )	65.22	63.83
Oil Recovered (100 - cake wgt.)	34.78	36.17
Gain 1.39 Viss Oil/100 Viss Peanuts Processed		

B. Industrial Producers' Cooperatives (Workshops)

1. Introduction. Based on a visit to four Cooperative Workshops in Mandalay, Meiktila, Yenangyaung, and Pegu and discussions with Cooperative Workshop officials, the following observations and conclusions have been reached:

To facilitate the manufacture of all spare part requirements in support of the 15 oil mill extraction plants, the Cooperative Workshops' equipment will need to be upgraded. In some cases, present machines will need to be replaced and new types of machine shop equipment will need to be added. The Mandalay facility, as an example, will require new facilities and additional electric power to accommodate new machinery requirements. New materials will need to be introduced having the proper mechanical properties to ensure the maximum possible life of the spare parts to be manufactured.

2. Typical Workshops. There are three categories of Cooperative Workshops referenced in this technical analysis:

a. Category A: Workshop having machine shop equipment in above average working condition with the proper type and amount of equipment to support the additional proposed workload. Operators are trained in and are using precision measurement tools. End products indicate care is taken to manufacture products having given dimensions and tolerances. Extensive knowledge exists in die castings using local materials. Limited knowledge in procedures to heat treat materials to extend their life is available. Presently all effort is devoted to truck rehabilitations. Workshop should be capable of supporting additional workload to fabricate and/or manufacture oil mill spare parts. Facilities are more than adequate.

b. Category B: Workshop having machine shop equipment in average condition which will require replacement of present equipment within the next 5 to 10 years. They will require additional equipment to support oil mill spare part manufacture. Operators are not trained in the use of precision measurement tools (presently using calipers to arrive at satisfactory size and/or tolerances). End product is operational, but because tolerances are relatively unknown, the life of the product is questionable. They have knowledge of die cast procedures using local and Chinese material, but limited knowledge in heat treatment procedures. Present efforts are devoted to truck rehabilitation. New facilities are being constructed.

c. Category C: Machine shop equipment is very old and will require replacement. Facilities are mostly open type structures with a roof only to protect the equipment from the elements. Operators have no knowledge of the use of precision measurement tools. Limited use of die cast procedures were observed. Machine shop equipment is limited to lathes and shapers. The Workshops will require addition of milling machines, surface grinder boring machines, threading machines, additional lathes of various sizes, compressors, welding machines and electrical transformers of adequate size to support the machine shop power requirements, plus the normal complement of hand tools.

The operational efficiency of Workshops in Category A is probably the optimum that can be expected that is adequate to support the requirements. Workshops in Category B are in the process of building new facilities and should, in most respects, meet all requirements with additional machinery and personnel training.

Workshops in Category C will require new facilities and machinery. Presently the electric power is not adequate to support new machinery. Extensive personnel training will be required.

3. Constraints Analysis. Periodic power outages will have to be accepted; therefore, workshops may not be operational at all times.

Presently, the Workshops devote most of their time and efforts to rehabilitation of trucks. The manufacture of oil mill parts will require time that would normally be devoted to truck rehabilitation, and priorities will need to be established. Cooperation of the Workshops to accept additional workloads to support fabrication and repair of oil press spare parts is essential.

#### 4. Proposed Activities

a. Shelf Items. The following parts will need to be purchased. Bearings, gauges, pressure reducing valves, thermometers, steam trap seals, boilers, etc. Bearings and seals that have metric measurement will not be available from many American vendors.

Parts to be Locally Manufactured. The following parts will be locally manufactured. Main screw feed worms, collars, shaft, cage lining bars, spacers and replacement castings as required. Cookers are to be modified locally. With new material available for making new screw and cage parts, the plan is to fabricate a complete set of required replacement parts for each press.

Old parts from each press will then be returned to the Workshop for rebuilding. Oil mills will then have the required spare parts to rebuild the mill with a minimum of downtime.

High carbon steel with maximum abrasion quality and good machinability is to be used for fabrication of oil screw parts. It is expected that the finished product will be heat treated to obtain the maximum quality wear surfaces. Cage parts will be fabricated from finished flat steel bars made of high carbon steel with maximum abrasive qualities. The final process of screw part, manufacturing and/or rebuilding is expected to be grinding the wearing surface of the flight to specific tolerance to insure maximum possible press production. The final product should have minus 0 to plus 0.015 inches.

Spacers are expected to be fabricated using blue tempered and polished spring steel stock of the correct dimension requiring no machinery. Cut to correct length from a roll of 1" x 0.10 or .020 or .025 stock depending upon the required tolerance between the cage bars.

c. Technical Assistance. Workshop personnel will need to acquire or upgrade skills in the following areas:

Machine shop operation, metal fabrication and heat treatment; use of precision measurement tools and their application; knowledge of steel products, their application, mechanical properties, machinability and weldability; and knowledge of product safety requirements and the ability to establish an acceptable safety program.

5. Work Plan. Procurement of materials to fabricate spare parts to support the 15 oil extraction mills should be the number one priority. Some Workshops presently have the capability to fabricate spare parts.

Procurement of additional machine shop equipment and support tools will be the second phase.

Construction of new machine shop facilities where required should be considered before new equipment is ordered. There should be some guarantee that adequate electric power will be available. In some cases transformers will be required having adequate KVA rating to support machine shop power requirements.

6. Training. Training will be required in the following categories:

- a. Precision measurement tools
- b. Heat treatment process
- c. Preventive Maintenance (Machine Shop Equipment)
- d. Safety Habits
- e. Operations of new equipment
- f. Installation of new equipment
- g. Quality control
- h. Calibration of precision measurement tools

### C. Scopes of Work

1. Scope of Work - Master Mechanic. The candidate should have a minimum of 15 years experience in machine shop, foundry, welding and mechanical repairs with a minimum of 5 years experience at a senior supervisory level. Past experience working in a foreign country is desirable. Normal duties will include but are not limited to the following:

- a. Develop detailed design and specification for equipment, supplies and vehicles for procurement purposes.
- b. Visit cooperative Workshops to verify requirements.
- c. Establish training program on heat treatment process, precision measurement tools, equipment operation and application required for manufacture of oil mill spare parts.
- d. Visit mill sites to identify maintenance problems and establish preventive maintenance schedules.
- e. Assist and instruct on the installation of boiler, steam distribution system and instruments. Establish procedures for operation of boiler plant.

- f. Establish schedule for manufacture of oil press screw and cage parts to minimize mill downtime.
- g. Establish procedures to clean and sanitize oil drums using in-line steam cleaner installed at boiler site.
- h. Establish stock levels for materials to insure adequate supplies are available through life of project to support mill requirements.
- i. Determine proper heat treatment process, and insure proper equipment and supplies are available or on order.
- j. Establish a safety program for machine shop and foundry operation.
- k. Develop proper procedures for application of hard surface material to maximize life of wear surface.

2. Scope of Work - Process Engineer. The candidate should have a B.S. degree in Industrial or Chemical Engineering and be experienced in all phases of oil milling in both screw-press mills and solvent extraction plants. Previous foreign work is desirable. Normal duties will include, but are not limited to the following:

- a. Act as Chief of Party for the Technical Assistance Team. In that capacity, provide overall direction of team activities and ensure proper coordination with USAID and the Burmese Government. Act as an advisor to the Cottage Industries Department of the Ministry of Cooperatives.
- b. Develop and supervise the program for rehabilitation of the oil mills.
- c. Supervise and monitor the detailed design and specifications for additions to cookers and new screw press shaft and cage parts that are to be made in Workshops.
- d. Supervise and monitor the installation of new equipment, additions to existing equipment and other mill renovations necessary for rehabilitation.
- e. Develop and monitor mill operating procedures including safety and sanitation.
- f. Periodically monitor mill to see that procedures are being followed.

D. List of Tables for Technical Analysis Annex.

Table C.3

COST TO REPLACE ALL WEAR PARTS PER PRESS <sup>1</sup>

Material	Foreign Cost				Total		No. Per Press	Landed Cost (\$)
	Freight (FOB)(\$)	Freight Insurance(\$)	Import Tax(\$) <sup>2</sup>	Other Taxes Costs (\$) <sup>4</sup>	Total Mater-ial Costs(\$)			
Shaft feed worm	195.00	59.00	30.00	126.75	410.75	1	410.75	
Reg Worm	165.00	50.00	25.00	107.25	347.25	6	2083.00	
Collar	149.00	45.00	23.00	96.65	313.85	6	1883.10	
Cage bars	1.00	.30	.15	.65	210.00	160	336.00	
Breaker bars	7.50	1.13	2.25	4.87	15.75	2	31.50	
Spacers	.25	.08	.05	.16	54.00	480	259.20	
Discharge choke	190.00	57.00	28.50	123.50	399.00	1	399.00	
Shaft	1664.00	500.00	250.00	1081.60	3495.00	1	3495.60	
Total Cost for Materials to Workshops.								\$ 8492.40 =====

	Labor Costs	Per Press Cost(Kyat)	Total
Shaft feed worm	45 hrs x 12 = 540 Kyat	1	540
Reg worm	40 hrs x 12 = 480 "	6	2880
Collar	20 hrs x 12 = 240 "	6	1440
Cage bars <sup>6</sup>	14 hrs x 12 = 168 "	160	168
Breaker bars	20 hrs x 12 = 240 "	2	480
Spacers <sup>7</sup>	12 hrs x 12 = 144 "	480	144
Discharge choke	40 hrs x 12 = 480 "	1	480
Shaft	80 hrs x 12 = 960 "	1	960
Total Kyat			7092

<sup>1</sup>Dollar Equivalent unless otherwise indicated

<sup>2</sup>Ocean Freight Insurance-30%

<sup>3</sup>Port Duty Steel Products-15%

<sup>4</sup>Other Taxes & Costs-65%

<sup>5</sup>Machine Shop Labor Cost-12 Kyat per hr.

<sup>6</sup>All Cage Bar can be made at one time machine cost.

<sup>7</sup>All Spacers can be made at one time machine cost.

Table C.4

COST TO REBUILD WEAR PARTS PER PRESS  
(Foreign Exchange Portion)

(A) Material

	Welding Rod	No. Per Press	Total Cost
Shaft feed worm	60.00	1	60.00
Reg worm	52.80	6	316.80
Collar	33.00	6	198.00
		TOTAL	\$570.80

(B) Local Cost Machinist

Shaft feed worm	24 hr x 12 = 288 Kyat	1	288
Reg worm	18 hr x 12 = 216 "	6	1,296
Collar	8 hr x 12 = 96		576
	TOTAL KYAT		2,160

(C) Local Cost Welder & Heat Treatment<sup>1</sup>

Shaft feed worm	40 x 12 = 480	1	480
Reg worm	30 x 12 = 360	6	2,160
Collar	12 x 12 = 144	6	864
	TOTAL KYAT		3,504

TOTAL LOCAL COST 5,664 Kyat

<sup>1</sup>  
Local Labor @ 12 Kyat per hour

Table C.5

COST TO WORKSHOPS FOR MATERIALS USED IN REHABILITATION

A. Material Cost (A)

Size	Qty	Weight	Total wgt.	Cost/lb	Total Cost (FOB)(\$)
1. 4" OD x 2" ID Steel	240" @	28 lbs/ft	6720 lb.	3.00	20,160
2. 2"2" OD x	" 80" @	24 "	1920 lb.	3.00	5,760
3. 6" OD	" 60" @	96 "	5760 lb.	3.00	17,280
4. 1/2" x 1"	" 7280' @	1 "	7280 lb.	3.00	21,840
5. 3/4" x 1"	" 480" @	1.5 "	480 lb.	3.00	1,440
6. 3/4" x 1/2"	" 800' @	2 "	1600 lb.	3.00	4,800
7. 1/8" x 4' x 8' "	26 plates	262 "	6838 lb.	1.00	6,838
8. Gauge Steam Pressure	6 ea @	21.00			126.00
9. Thermometers	6 ea. @	35.00			210.00
10. Steam traps	6 ea. @	50.00			300.00
11. Pressure Regulators	6 ea. @	100.00			600.00
Valves					
12. 2" x 10' galvanized Pipe	225 length,	30 lb/length	44.26/length		12,175
13. 1" x 10 "	" 75 "	, 20 "	20.00 "		1,500
14. Welding Rod 1/8" 500 lbs @	5.00 per lb.				2,500
15. Bearings (thrust)	6 ea		400.00 ea		2,400
16. Bearings (Tail Shaft & Gear box)	6 ea		200.00		1,200
17. Seals	6 ea		50.00		300
18. Welder Hoods	6 ea		15.00		90
19. Welder Aprons	6 ea		20.00		120
20. Welder Gloves	12 ea		5.00		60
21. Chipping Hammers	6 ea		8.00		48
22. Welder Goggles	12 ea		6.00		72
23. Safety Shoes	24 pairs		40.00		960
24. Safety Glasses	24 pairs		10.00		240
25. Welders Curtains	6 ea		60.00		360
26. Fire Extinguishers	12 ea		600.00		7,200
27. Boilers	13 ea				240,000
28. Portable in-line steam cleaner	15 ea		700.00		10,500
Sub total Material Cost					\$312,099
B. Freight and Insurance (30%)					\$ 93,629
C. Import tax (15% Material Cost)					\$ 46,814
D. Other Taxes and Costs (65% Material Costs)					<u>\$202,864</u>
Total Landed Cost					\$655,406

Table C.6

COST TO OIL MILLS FOR REHABILITATION AND ANNUAL MAINTENANCE

Oil Mill	Number Presses	Rehabilitation Cost(\$)	Yearly Maintenance Cost(\$)	Extra Labor Cost(\$)
1. Promé Cooperative	6	160,150	22,800	3,810
2. Aung Lan Cooperative	3	99,850	11,400	1,905
3. Taungdwingyi Cooperative	1	24,400	3,800	635
4. Pagan Cooperative	2	68,800	7,600	1,270
5. Yesagyo Cooperative	3	107,450	11,400	1,905
6. Pakokku Cooperative	3	92,450	11,400	1,905
7. Taungtha Cooperative	2	74,600	7,600	1,270
8. Mandalay Cooperative	5	140,750	19,000	3,175
9. Meiktila Cooperative	4	125,150	15,200	2,540
10. Yan Aung Min - Private	2	66,300	7,600	1,270
11. Pa Day Tha - Private	3	92,450	11,400	1,905
12. Dana Bala - Private	4	114,350	15,200	2,540
13. Aung Myanma - Private	6	153,450	22,800	3,810
14. Thu Ka Yadana - Private	4	129,350	15,200	2,540
15. Pegu -Private	4	58,600	15,200	2,540
Total	52	<u>1,508,100</u>	<u>197,600</u>	<u>33,020</u>

Sample Rehabilitation Cost

Imports: F.O.B. Price x 1.3 Freight x 1.615 Customs Duty, Port Dues License Fees, Commodity and Service Tax	
Add 3rd ring to cooker	\$ 1,000 Import + \$ 1500 Local
Add level controls - 3 rings	\$ 600 Local
Add steam controls and Instruments	\$ 2,300 Import
	\$ 5,400 Total/cooker
Build new 3 high cooker	\$ 4,000 Import + \$ 6,000 Local
Level controls, steam controls, Instruments	2,900 same as above
	\$12,900 Total/cooker
Rewire mill electrical (estimated average)	\$ 5,000 Local/mill
Cover conveyors, pits, etc., guard belts and pulleys, raise feed floor (estimated average)	\$ 2,000 Local/mill
New Main Shaft complete, cage bars, spacers	\$ 10,000/press Import Steel
Boiler 3000 pound per hour	\$ 53,750 Import + \$ 5,000 Install Local
2000 " " "	\$ 32,250 " + \$ 5,000 " "
1000 " " "	\$ 21,500 " + \$ 5,000 " "
Steam piping into cookers (estimated average)	\$2,000 local/mill Import Pipe

Yearly Maintenance Cost

Rebuild worms, collars	\$ 2,000/press (\$1,000/press import)
New cage bars	\$ 1,000/press Import
Other Miscellaneous maintenance	\$ 800/press Local

Additional Power Cost

Nil - No extra motors, slightly more load to some.

Additional Labor Cost

No additional office workers, Supervisors, Operators, cleanup labor, etc. will be needed. More seed handlers and cake handlers will be needed. An average of 5 additional seed handlers during the receiving season, about one half of the pressing time, and 5 additional cake handlers all the time could be required. This would be 3 men per screw-press in each mill.

Table C. 7

MACHINE SHOP EQUIPMENT PROPOSED FOR WORKSHOPS(\$)

	Material Cost	Freight & Insurance <sup>1</sup>	Import Tax <sup>2</sup>	Other Taxes <sup>3</sup>	Cost per ea	Qty	Total Cost
Drill Press	18,000	5,400	2,700	11,700	37,800	4	151,200
Lathe 8"	31,000	9,300	4,650	20,150	65,100	4	260,400
Lathe 12"	40,000	12,000	6,000	26,000	84,000	4	336,000
Lathe 14"	45,000	13,500	6,750	29,250	94,500	4	378,000
Shaper	9,000	2,700	1,350	5,850	18,900	4	75,600
Milling Machine	80,000	24,000	12,000	52,000	168,000	2	336,000
Surface Grinder	65,000	19,500	9,750	42,250	118,500	2	237,000
Air compres- sor	4,000	1,200	600	2,600	8,400	4	33,600
Welding Machine	5,000	1,500	750	3,250	10,500	4	42,000
Equipment to be determined	252,038	75,611	37,805	163,824	529,278	1	529,278
					Total		\$ 2,024,328 <sup>4</sup>

<sup>1</sup>Freight & Insurance 30%

<sup>2</sup>Import Tax 15%

<sup>3</sup>Other Tax & Cost 65%

<sup>4</sup>Of this amount, total CIF cost is \$1,495,000 and \$529,328 is for import and other taxes and local costs.

Table C. 8

MACHINE SHOP EQUIPMENT EXISTING AT WORKSHOPS.

Equipment List for Mandalay Cooperative Workshop

1. Lathe Machine
2. Press Drilling Machine
3. Grinders
4. Shaping Machine
5. Milling Machine
6. Compressor

Equipment List for Pegu Cooperative Workshop

1. Surface Grinding Machine
2. Automatic Lathe Machine 14"
3. High Speed Precision Lathe Machine 15"
4. Drilling Machine
5. Nozzle Reconditioner
6. Nozzle Testmotor
7. Cylinder Boring Machine
8. Valve Refacer
9. Valve Sear Grinder
10. High Pressures Car Washer
11. Oil Lubricator
12. High Pressure Grease Pump
13. Volt Ignition Tester
14. Volt Ampere Tester
15. Timing Light
16. Compression Gauge
17. Spot Welder
18. Chain Block
19. Hydraulic Garage Jack
20. Valve Lifter and Compressor
21. Machine on Order
  1. Crankshaft Grinding Machine
  2. Hydraulic Crankshaft Sleighting Press
  3. Hydraulic Press
  4. Cylinder Boring Machine

Equipment List for Meiktila Cooperative Workshop

1. Crankshaft Grinding machine A M C. K-1500 (Denmark)
2. Boring machine (Japan)
3. Lathe machine (England)
4. Electric Diesel Fuel Pump Test Bench (N.E. -6)
5. Geared Head Lathe machine (China) Model (L-3/900 W-2. No.320 mm Chuck)
6. Geared Head Lathe (China)
7. Hack Saw Machine (China) model G.T. -2
8. Crankshaft Regrinding Machine (China) model No. 8260
9. Shaping machine (China) model B-635-1
10. Lathe machine (China) 10 ft.
11. Hino Shell Press Machine
12. Press Machine with motor

13. Hydraulic Press with standard Assy
14. Spot Welder
15. Hydraulic Crankshaft straighting & Checking Press No. 860
16. Air Compressor 2 sets
17. Universal Tools & Cutter Grinder
18. Centerless Twin Roll, Thread, Rolling Machine & spare discs
19. Cylinder Boring Machine C/W Std. Assy: model NWA-No.0
20. Cylinder Boring Machine C/W Std. Assy: model NWA. No.-2
21. Valve Seat Cutter set model R.2500, S-2
22. Valve Refacer C/W 125 mm Grinding Wheel
23. High Pressure Car Washer Auto Servicing
24. Polishing & Burnishing Machine
25. Diesel Fuel Pump Test Stand C/W Assy: Kit for testing D.P.A. Pump Adaptor and 2 years spare kit
26. Surface Grinding Machine & Spares
27. Universal Plate Working Machine
28. Brake Service Machine F.M.C.
29. 300 amp. 230 x 400 V Welding Transformer

Equipment List for Yenangyaung Cooperative Workshop

Machines Installed

(a) Before 1983.

1. Lathe Machines
2. Shaping Machine
3. Drilling Machines
4. Grinding Machine
5. Air Compressor
6. Hack Saw
7. Crankshaft Grinder
8. Welder Transformer
9. Chain Block
10. Electrical Drill Gun
11. Line Boring Machine
12. Connecting Rod Grinding Machine

(b) After 1983.

1. Crankshaft Journal Build-up Machine
2. Cylinder Boring Machine
3. Honing Machine
4. Line Boring Machine
5. Universal Milling Machine
6. Radial Drilling, Boring & Trapping Machine
7. Universal Tool & Cutter Grinder
8. Valve Seat Cutter
9. Valve Seat Cutter
10. Shaping Machine
11. Diesel Fuel Pump Test Stand
12. Nozzle Testmaster
13. Nozzle Reconditioner

14. Surface Grinding Machine
15. Universal Plate Working Machine
16. High Pressure Car Washer
17. High Pressure Grease Pump
18. Air Compressor
19. Spot Welder

Table C.9

VEHICULAR EQUIPMENT COST<sup>1</sup> (\$)

Material Total	Freight & Insurance	Import Tax	Other Taxes and Cost	Total Landed Cost	No. of Units	Total
10,000	3,000	1,500	6,500	21,000	6 ea.	\$126,000

<sup>1</sup> It is suggested that AMC Jeep CJ-8, which have been accepted by the Burmese Government for importation as project vehicles, be used. Although Burmese regulations restrict the size engine to 2.0 liters, the CJ-8, having a 2.5 liters engine is acceptable.

Table C. 10

		<u>LABORATORY COST</u>
No.	Item	Cost (\$)
2	Analytical Balance	2,000
1	Moisture tester	5,000
1	Disc mill-hand operated	500
1	Laborator hammer mill with motor	1,000
1	Drying oven	1,000
1	Soxlet extractor apparatus	4,500
1	Kjeldahl apparatus	3,500
1	Electric muffle furnace with platinum capsules	3,000
1	Centrifuge	1,000
1	Chromatograph	4,500
1	Smoke & flash point apparatus	1,500
2	Water baths with variable heat control	2,500
1	Specific gravity apparatus	2,800
1	Spectrophotometer apparatus	5,000
1	Gas grammatograph apparatus	25,000
1	Vacuum pump	800
1	Refrigerator with freezer	600
	Other small apparatus	8,000
	Chemicals	17,500
	Microscope	2,000
	FOB	\$ 90,700
	Ins/Freight	\$ 27,210
	CIF TOTAL	\$ 114,910

Table C.11

EQUIPMENT, VEHICLES AND MATERIALS SPECIFICATIONS

Item No.	Qty.	New Machine Shop Equipment, Vehicular Equipment Steel Products and Other Supplies
1	4	Drill Press 25" Geared Head Power Feed Capacity to 1 1/2" 440 Volt 50 Cycles
2	4	Lathe 8" Automatic Power Feed 6 table complete with 4 jaw chuck, tailstock, steady rest, tool post, tool holder, (facing-roughing and turning), Morse taper headstock, external and internal grinding attachment, complete set of lathe doge including grinder doges. Standard set of threading, turning and boring tools. Lathe milling attachment, three boring tool set. Carbide insert tool holder with carbide insert 440 Volt, 50 Cycle.
3	4	Lathe 12" Automatic Power Feed table complete with 4 jaw chuck, tailstock, steady rest, tool post, tool holder, (facing-roughing and turning), Morse taper headstock, external and internal grinding attachment, complete set of lathe doge including grinder doges. Standard set of threading, turning and boring tools. Lathe milling attachment, three boring tool set. Carbide insert tool holder with carbide insert 440 Volt 50 Cycle.
4	4	Lathe 14" Automatic Power Feed table complete with 4 jaw chuck, tailstock, steady rest, tool post, tool holder, (facing-roughing and turning), more taper Headstock, External and Internal grinding attachment, complete set of lathe dog including grinder doges. Standard set of threading, turning and boring tools. Lathe milling attachment, three boring tool set. Carbide insert tool holder with carbide insert 440 Volt 50 Cycle.
5	4	Shaper 12" travel with tool holder 440 volt 50 cycle
6	2	Milling machine automatic power feed vertical and horizontal milling attachments with index milling head, universal dividing head. Milling cutter, arbors, collars, carbide end mills 440 Volt 50 cycle.
7	2	Surface grinde. similar to SCHOU Model Model 400. Segment type stone inserts. Stones to accommodate grinding high tensil steel.
8	4	Air compressor 15 cu.ft. two stage 2 HP electric driven approximately 80 gallon tank 440 volt 50 cycle.

- 9     4     Welding machine electric ARC 300 amp. Continuous welding range AC or DC current complete with 50' welding lead, ground and electrode holder 440 volt 50 cycle.
- 10           Welders' accessories
- 6ea   Hoods           x\$ 15.00 = \$ 60.00
- 6ea   Aprons           x\$ 20.00 =\$ 120.00
- 6ea   Gloves            x \$ 5.00 = \$ 30.00
- 6ea   Chipping Hammer x\$ 8.00 =\$ 48.00
- 12ea   Goggles           x \$ 6.00 = \$ 72.00
- 11           Safety equipment
- 48     Safety shoes x\$ 40.00   =\$ 1,920.00
- 12     Safety glasses x\$ 10.00 = \$ 120.00
- 6     Welder screen curtains x\$ 60.00 =\$ 360.00
- 12     Fire extinguisher (wheeled) 48lb. capacity x \$ 600.00 = \$ 7,200
- 12           Steel products
- 12ea   4"OD x 2"ID 10 x 20' hot rolled round steel stock 4615-4620 or comparable steel that can be hardened to produce high case hardness and resistance to wear and abrasion to have good machinability life, heat treatment.
- 8ea   2 1/2"OD x 10' hot rolled round steel stock 4615-4620 or comparable steel that can be hardened to produce high case hardness and resistance to wear and abarasion to have good machinability life, heat treatment.
- 6ea   6"OD x 10' hot rolled round steel stock 4615-4620 or comparable steel that can be hardened to produce high case hardness and resistance to wear and abarasion to have good machinability life, heat treatment.
- 375ea 1/2" x 1" x 20' hot rolled abrasion resisting flat base grade # 235 or equal having good heat treatment quality.
- 16ea 3/4" x 1" x 26' hot rolled abrasion resisting flat base grade # 235 or equal having good heat treatment quality.
- 40ea 3/4" x 1 1/2" x 20' hot rolled abrasion resisting flat base grade # 235 or equal having good heat treatment quality.

Steel Products	Qty
4"OD x 2"ID = 28 lb per ft. x 240'	= 6,720 lbs
2 1/2" OD = 24 lbs per ft.x 80'	= 1,920 lbs
6"OD = 96 lbs per ft.x 60'	= 5,760 lbs
1/2" x 1' = 1 lb per ft. x 7,280	= 7,280 lbs
3/4" x 1" = 1.51 lb per ft.x 320'	= 480 lbs
3/4" x 1 1/2"= 2 lb per ft. x 800'	= 1,600 lbs
1/8" x 4'x 8"= 263 lbs per plate x 26 plates=	<u>6,838 lbs</u>

3059 lbs x 4.00 per lb = 30,598 lbs x 4.00 per lb

= \$122,392.00

13 225 2" galvanized steel pipe x 10' x \$ 44.26 = \$ 9,958.50  
75 1" galvanized steel pipe x 10' x \$ 20.00 = \$ 1,500.00

14 6 Gauge (Steam Pressure) 160 lbs maximum in 10 lbs.  
graduations 3 1/2" dial 1/4" bottom screw = \$ 21.00ea  
6 Thermometer, dual scale, liquid filled  
Bi Metal 4" stem, 3" diameter temperature range  
50° to 300° = \$ 35.00  
6 Steam traps 1/2" NPT 1,000 cap lbs/hr at  
125 PSI = \$ 50.00  
6 Pressure regulating valve 1" inlet pressure  
steam outlet pressure 5-125 PSI = \$ 100.00

15 6 Bearing (thrust) = \$ 2,400.00  
6 Bearing tail shaft & Gear Box = \$ 6,000.00  
6 Seal's = \$ 100.00

16 Welding Rod  
1/8" Electrode for welding high alloy  
steel found in machine and drive components  
to be used in a hard facing application  
500 lbs at 5.00 per lb = \$ 2,500.00

17 6 ea AMC CJ8 Jeep Wagon 6 ea @ 10,000.00 = \$ 60,000.00  
13.5% spare parts = \$ 8,100.00

CJ8 Jeep Wagon with all Standard Equipment including left hand drive  
four cylinder 23 litre gasoline engine four speed transmission,  
locking gas cap, heavy duty suspension, H78x15 polyester 4 ply tires  
with tubes, one spare wheel with tire and tube, mist litre metallic  
cobot.

Optional features:

76 litre gas tank  
Heavy duty suspension  
Heavy duty cooling system  
Heavy duty battery  
Holozen fog lamps  
Longitudinal rear seats  
2 Vehicles 4 wheel drive  
4 Vehicles 2 wheel drive  
Spare part kit  
6 Spare part kits with wheel tire & tube

- 18 5 ea Boiler 3,000 lb, Per, Hr, at 100 PSIG
- 7 ea Boiler 2,000 lb, Per, Hr, at 100 PSIG
- 1 ea Boiler 1,000 lb, Per, Hr, at 100 PSIG
  
- 19 15 ea Portable in-line steam cleaners. 80 to 120 steam pressure PSI, discharge capacity 140 to 190 GPM steam consumption, 9 to 11 BHP complete with 25' 1/2" steam hose, pressure gun, handle fan and round nozzle. Note = This type of cleaner was selected because it can utilize steam from the boiler rather than a steam cleaner requiring electric power and fuel.

Table C.12

ILLUSTRATIVE CALCUALTION FOR IMPORTED COMMODITIES

1	F.O.B. Cost	\$ 100.00
+2	Insurance (5%)	5.00
+3	Freight Charges (25%)	<u>25.00</u>
4	C.I.F. Cost	130.00
+5	Landing Charges (0.5% on C.I.F)	<u>6.50</u>
6	Assessable Value	136.50
+7	Custom Duty (Percent according to	20.50

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Annex D

FINANCIAL ANALYSIS TABLES

Table D. 1

Financial Ratios - Representative Township Societies (1982-83)

	<u>Meiktila</u>	<u>Taungtha</u>	<u>Pakokku</u>	<u>Taungdwingyi</u>
Financial Ratio	2.1	2.3	1.7	1.70
Current Ratio	8.9	21.1	9.6	2.31
Acid Test Ratio	1.88	11.1	4.7	1.8
Return of Assets (%)	6.3	6.1	10.9	5.8
Return on Net Worth (%)	11.9	10.7	27.8	14.1
Assets claimed by:				
Current Liabilities (%)	6.1	3.7	6.7	38.3
L.T. Liabilities (%)	38.7	39.8	53.8	20.1
Net Worth (%)	72.1	56.4	39.4	41.0
Net Income/Total Liabilities(%)	113.0	130.0	65.0	70.0
Working Capital ('000 kyat)	9,707	8,306	8,602	5,754

Note: All mills have cleaner screens and hullers to meet their needs. These were manufactured locally. Most of them are in need of repair and should be handled by the mills.

Table D.2

Financial Ratios for Township Societies (1983/84)

	<u>Meiktila</u>	<u>Taungtha</u>	<u>Pakokku</u>	<u>Taungdwingyi</u>
Financial Ratio	1.9	1.9	1.6	1.8
Current Ratio	5.3	2.4	1.5	1.6
Acid Test Ratio	1.9	1.1	0.9	3.8
Return on Assets (%)	9.1	3.5	6.0	4.4
Return on Net Worth (%)	19.9	7.4	16.3	9.8
Assets claimed by:				
Current Liabilities (%)	13.6	27.8	46.8	10.1
L.T. Liabilities (%)	40.4	24.7	16.1	45.0
Net Worth (%)	46.0	47.4	37.1	44.9
Net Income/Total Liabilities(%)	85.0	90.0	59.0	81.0
Working Capital ('000 Kyats)	9,216	3,055	4,819	3,952

Table D. 3

Representative Income Statement of Four Township Cooperatives  
1982/83 ('000 Kyat)

	<u>Meiktila</u>	<u>Taungtha</u>	<u>Pakokku</u>	<u>Taungdwingyi</u>
<u>Revenue</u>				
Gross Profit	3,429	1,793	2,606	1,718
Services Income	-	1,192	2,169	335
Other Income	2,851	92	282	72
Rebate	-	7	-	-
Refund	-	-	-	-
Dividend on share	-	5	-	-
Total Income	<u>6,280</u>	<u>3,088</u>	<u>5,057</u>	<u>2,125</u>
<u>Expenses</u>				
Administration & Salaries	2,106	867	845	376
Rentals	-	20	98	34
Maintenance	222	203	271	57
Insurance	101	30	43	54
Taxes and Duty	890	344	127	1
Distribution & Charges	-	-	12	56
Audit Fees	5	5	5	5
Depreciation	293	173	548	141
General Expenses	1,685	645	797	745
Trade Loss	14	118	89	-
Total Expenses	<u>5,316</u>	<u>2,405</u>	<u>2,835</u>	<u>1,469</u>
<u>Net Income</u>	964	683	2,222	656

Table D. 4

Representative Income Statement of Four Township Cooperatives  
1983/84 ('000 Kyat)

Revenue	Meiktila	Taungtha	Pakokku	Taungwingyi
Gross Profit	3,771	1,324	2,305	1,468
Services Income	108	630	1,706	294
Other Income	1,059	971	137	286
Rebate	23	367	-	-
Refund	-	-	-	-
Dividend on share	5	5	-	-
Total Income	4,967	2,623	4,148	2,048
<u>Expenses</u>				
Administration & Salaries	1,337	1,924	901	407
Rentals	79	16	267	74
Maintenance	242	79	242	43
Insurance	170	65	66	60
Taxes and Duty	62	33	-	2
Distribution & Charges	-	-	11	160
Audit Fees	5	5	5	5
Depreciation	232	173	538	102
General Expenses	1,377	39	746	697
Trade Loss	8	4	-	-
Total Expenses	3,512	2,337	2,776	1,550
<u>Net Income</u>	1,455	286	1,371	498

Table D. 5

## Representational Balance Sheets of Four Township Societies

1982/83 ('000 Kyat)

	Meiktila (82/83)	Taungtha (82/83)	Pakokku (82/83)	Taungdwingyi (82/83)		Meiktila (82/83)	Taungtha (82/83)	Pakokku (82/83)	Taungdwingyi (82/83)
<u>Current Assets</u>					<u>Liabilities</u>				
Cash	183	72	502	89	Accounts Payable	1,230	414	1,354	4,398
Accounts Receivable	1,515	2,063	-	7,156	Long-term Bank Loans	5,805	2,948	3,053	2,280
Advance	613	2,501	5,826	601	Long-term Other Loans	98	1,547	7,843	-
Inventories	8,626	4,084	6,672	2,306					
Total Current Assets	10,937	8,720	13,000	10,152	Total Liabilities	7,133	4,090	12,250	6,678
<u>Fixed Assets</u>					<u>Net Worth</u>				
Investments	190	189	182	21	Shares	1,734	395	823	276
Tangible/Intangible	4,127	2,356	7,052	1,149	Retained earnings	985	4,437	2,222	656
					Funds	5,401	1,525	4,939	3,712
Total Fixed Assets	4,317	2,545	7,234	1,170	Total Net Worth	8,120	6,357	7,984	4,644
Total Assets	15,253	11,265	20,234	11,322	Total Liabilities/ Net Worth	15,253	11,266	20,234	11,322

Table D. 6  
Representational Balance Sheets of Four Township Societies  
1983/84 ('000 Kyat)

	<u>Meiktila</u>	<u>Taungtha</u>	<u>Pakokku</u>	<u>Taungdwingyi</u>		<u>Meiktila</u>	<u>Taungtha</u>	<u>Pakokku</u>	<u>Taungdwingyi</u>
	(83/84)	(83/84)	(83/84)	(83/84)		(83/84)	(83/84)	(83/84)	(83/84)
<u>Assets</u>					<u>Liabilities and Net Worth</u>				
<u>Current Assets</u>					<u>Liabilities</u>				
Cash	661	664	368	46	Accounts Payable	2,165	2,254	10,653	1,137
Accounts Receivable	2,020	989	936	3,366	Long-term Bank Loans	6,287	2,005	3,657	4,581
Advance	1,406	659	7,737	945	Long-term Other Loans	161	-	-	497
Inventories	7,294	2,997	6,431	5,810					
Total Current Assets	11,381	5,309	15,472	10,167	Total Liabilities	8,613	4,259	14,310	6,215
<u>Fixed Assets</u>					<u>Net Worth</u>				
Investments	2,205	204	188	23	Shared	161	388	977	289
Tangible/Intangible	4,357	2,593	7,082	1,085	Retained earnings	1,455	286	1,372	50
					Funds	5,714	3,172	6,083	4,721
Total Fixed Assets	4,562	2,797	7,270	1,108	Total Net Worth	7,330	3,846	8,432	5,060
Total Assets	15,943	8,106	22,742	11,275	Total Liabilities/ Net Worth	15,943	8,105	22,742	11,275

Table D.7

Financial Ratios for Cooperative Workshops (1982-83)

	<u>Yenangyaung</u>	<u>Meiktila</u>
Financial Ratio	1.5	2.7
Current Ratio	30.0	1.5
Acid Test Ratio	3.9	0.8
Return on Assets (%)	4.2	9.2
Return on Net Worth (%)	13.2	14.7
Assets claimed by:		
Current Liabilities (%)	1.8	37.3
L.T. Liabilities (%)	66.5	-
Net Worth (%)	31.7	62.7
Net Worth/Total Liabilities(%)	46.0	170
Working Capital ('000 kyat)	3,557	1,328

Table D.8

Financial Ratios for Cooperative Workshops (1983/84)

	<u>Yenangyaung</u>	<u>Mandalay</u>	<u>Pegu</u>	<u>Meiktila</u>
Financial Ratio	1.3	2.3	2.7	1.7
Current Ratio	6.8	-	0.7	22.1
Acid Test Ratio	0.13	0.1	0.2	4.5
Return on Assets (%)	2.7	4.8	loss	0.3
Return on Net Worth(%)	13.3	-	loss	11.4
Assets claimed by:				
Current Liabilities (%)	7.7	NA	36.6	2.8
L.T. Liabilities (%)	71.9	44.3	-	30.0
Net Worth (%)	20.4	55.7	63.4	42.2
Net Worth/ Total Liabilities(%)	25.6	125.5	173.4	73.2
Working Capital ('000 Kyat)	5,281	449	(31,460)	8,922

Table D.9

Representative Income Statement of Four Township Cooperatives  
1982/83 ('000 Kyat)

<u>Revenue</u>	<u>Yenangyaung</u> <u>(1982/83)</u>	<u>Taungtha</u> <u>(1982/83)</u>
Gross Profit	696	1,515
Services Income	258	668
Other Income	317	-
Rebate	-	-
Refund	-	-
Dividend on shares	-	-
Total Income	<u>1,271</u>	<u>2,183</u>
<u>Expenses</u>		
Administration/Salaries	221	444
Rentals	-	-
Maintenance	22	68
Insurance	266	1
Taxes & Duty	13	348
Distribution Charges	-	-
Audit Fees	3	3
Depreciation	45	310
General Expenses	400	300
Trade Loss	-	-
Total Expenses	<u>970</u>	<u>1,474</u>
Net Income	301	709

Table D.10

Representative Income Statement of Four Workshops  
(1983/84) ('000 Kyat)

<u>Revenue</u>	<u>Yenangyaung</u>	<u>Meiktila</u>	<u>Pegu</u>	<u>Mandalay</u>
Gross Profit	687	1,715	-	31
Services Income	1,216		-	-
Other Income	13	106	-	3
Rebate	-	-	-	-
Refund	-	-	-	-
Dividend on shares	-	-	-	-
Total Income	1,916	1,821	-	34
<u>Expenses</u>				
Administration & Salaries	339	182	4,041	8
Rentals	-	-	309	-
Maintenance	61	65	261	1
Insurance	-	-	4,764	-
Taxes and Duty	-	292	-	-
Distribution Charges	-	-	-	-
Audit Fees	-	3	-	3
Depreciation	-	46	925	-
General Expenses	1,199	497	332	23
Trade Loss	-	-	-	-
Total Expenses	1,599	1,084	10,632	34
Net Income (loss)	317	737	(10,632)	-

Table D. 11  
Representational Balance Sheets of Two Workshops  
1982/83 ('000 Kyat)

	<u>Yenangyaung</u> (82/83)	<u>Meiktila</u> (82/83)		<u>Yenangyaung</u> (82/83)	<u>Meiktila</u> (82/83)
<u>Assets</u>			<u>Liabilities and Net Worth</u>		
<u>Current Assets</u>			<u>Liabilities</u>		
Cash	31	326	Accounts Payable	129	2,880
Accounts Receivable	476	1,972	Long-term Bank Loans	4,299	-
Advance	-	-	Long-term Other Loans	471	-
Inventories	3,179	1,910			
	-----	-----		-----	-----
Total Current Assets	3,686	4,208	Total Liabilities	4,899	2,880
<u>Fixed Assets:</u>			<u>Net Worth</u>		
Investments	15	685	Shares	60	469
Tangible/Intangible	3,473	2,824	Retained earnings	301	709
	-----	-----	Funds	1,914	3,659
Total Fixed Assets	2,488	3,509		-----	-----
	-----	-----	Total Net Worth	2,275	4,837
Total Assets	7,174	7,717		-----	-----
			Total Liabilities/ Net Worth	7,714	7,717

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Table D. 12  
Representational Balance Sheets of Four Workshops

1983/84 ('000 Kyat)

	<u>Yenangyaung</u>	<u>Mandalay</u>	<u>Pegu</u>	<u>Meiktila</u>		<u>Yenangyaung</u>	<u>Mandalay</u>	<u>Pegu</u>	<u>Meiktila</u>
	(83/84)	(83/84)	(83/84)	(83/84)		(83/84)	(83/84)	(83/84)	(83/84)
<u>Assets</u>					<u>Liabilities and Net Worth</u>				
<u>Current Assets</u>					<u>Liabilities</u>				
Cash	23	326	1,297	844	Accounts Payable	904	-	119,729	422
Accounts Receivable	23	120	21,111	1,045	Long-term Bank Loans	8,423	-	-	3,870
Advance	71	3	2,056	-	Long-term Other Loans	-	200	-	725
Inventories	6,068	-	63,805	7,455					
Total Current Assets	6,185	449	88,269	9,344	Total Liabilities	9,327	200	119,729	8,217
<u>Fixed Assets</u>					<u>Net Worth</u>				
Investments	15	1	-	4	Shares	172	20	193,343	544
Tangible/Intangible	5,516	-	239,042	5,919	Retained earnings	1,281	201	-	737
					Funds	936	23	14,239	5,169
Total Fixed Assets	5,531	1	239,042	5,922	Total Net Worth	2,389	251	207,582	6,450
Total Assets	11,716	451	327,311	15,267	Total Liabilities/ Net Worth	11,716	451	327,311	15,267

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Table D.13

Benefits Calculation

- A. Benefits from increased processing efficiencies for existing volume oilseeds (20,500 tons):
1. Existing benefit = \$408,000
  2. Additional Groundnut oil = 13,325 tons groundnuts processed @ incremental 1.39 viss oil/100 viss processed x 25 Kyat/viss = (2,836,142 Kyat) (\$333,664)
  3. Additional Sesame Oil = 7,175 tons sesame process incremental rate of 1.13 viss processed x 23 Kyat = 1,142,179 Kyat (\$134,374)
  4. Add. Final value of higher quality produced  
Groundnut 13,325 tons x 57% x .2 Kyat/viss = \$109,460  
Sesame 7,175 tons x 47% x .2 Kyat/viss = \$ 48,600
- B. Benefits from additional oilseeds processed (24,600)
1. Service charge benefits:  
Groundnut 15,990 tons x \$ 16.5 = 263,835  
Sesame 8610 tons x \$24.0 = 206,640
  2. Value of additional groundnut oil: 15,990 tons groundnuts incremental rate of 1.39 viss oil/100 viss process x 25 Kyat/viss = 3,403,372 Kyat (\$400,400)
  3. Value of additional sesame oil = 8610 tons sesame incremental rate of 1.13 viss oil/100 viss processed C 23 Kyat/viss = 1,370,615 Kyat (\$161,250)
  4. Incremental value of additional rate  
Groundnut 15,990 x 57% x .2 Kyat/viss = \$131,353  
Sesame 8,610 x 47% x .2 Kyat/viss = \$ 58,320

BUDGET DETAIL/COST ASSUMPTIONS

Table E.1

Cost Estimate for Technical Assistance

I. Resident Advisors

<u>Year One (illustrative)</u>	<u>Cost</u>
Posting:	
Travel of family (4 persons)	\$ 6,000
Unaccompanied baggage	1,000
Household effects	11,500
Temporary lodging	500
Housing allowance	15,000
School allowance	5,000
Recuperation leave	5,000
Salary	54,000
Fringe benefits (30% of salary)	16,000
Post differential (25% of salary)	13,500
Overhead (100% of salary)	54,000
Total year one	\$ 181,500
<u>Year Two (illustrative)</u>	
Home leave (travel/per diem)	\$ 8,000
Housing allowance	15,000
School allowance	5,000
Salary	57,000
Fringe benefits (30% of salary)	17,100
Post differential (25% of salary)	14,250
Overhead (100% of salary)	57,000
Total year two	\$ 176,350
<u>Year Three (illustrative)</u>	
Departure from post:	
Travel of family	\$ 6,000
Unaccompanied baggage	1,000
Household effects	12,800
Temporary lodging	2,500
Housing allowance	15,000
School allowance	5,000
Salary	61,000
Fringe benefits (30% of salary)	18,300
Post differential (25% of salary)	15,250
Overhead (100% of salary)	61,000
Total year three	\$ 197,850
Total budget for three year assignment	\$ 552,700
Total long-term T.A. Budget (10 person years)	\$ 1,826,000

II. <u>Short-term Specialists</u>	<u>Cost</u>
International travel (Pro rated)	\$ 1,000
Per diem (in-country) 30 days x \$65	1,950
Salary (26 days x \$240)	6,240
Overhead and multiplier	10,310
Supplies and miscellaneous expenses	<u>500</u>
Total short-term T.A. budget/month	\$ 20,000
Total short-term T.A. for 36 months	\$ 720,000
TOTAL TECHNICAL ASSISTANCE	\$ 2,546,000

Table E.2

Cost Estimate for Training

I. Long-term Overseas Training

MS degree (2 years) and one year specialized training calculated as follows:

Category	Cost	Cost
<u>Tuition</u>	<u>2 years degree</u>	<u>1 year training</u>
Minimum/yr.     \$ 2,200	\$ 4,400	\$ 2,200
Maximum/yr.     \$ 5,500	11,000	5,500
Orientation in D.C.	2,250	2,250
<u>Stipend (24 months)</u>		
Minimum/mo.     \$ 200	12,600	7,200
Maximum/mo.     \$ 600	25,200	14,400
<u>International travel</u>	3,000	3,000
Book and supplies \$ 600/year	1,200	600
<u>Insurance</u> \$ 750/year	1,500	750
<u>Term Break Program</u> \$3,500 per break	7,000	3,500
Total Minimum	31,950	19,500
Total Maximum		
Total Estimated Cost <u>1/</u>	<u>\$ 41,550</u>	\$ <u>28,100</u>
5 M.S. degrees; 6-1 year training	\$ 207,750	\$ 168,600
Total Long-Term overseas training	\$376,350	

1/ Total estimated cost is the average of maximum and minimum for 2 year degree. It is estimated at above average for one year training because of its specialized nature.

II. Short-term Overseas Training

Calculated for 20 participants to the U.S. for an average 3 to 5 months each as follows:

70 months (average cost \$3,500/month)	\$ 245,000
Total airfare (\$3,000 x 20 participants)	<u>60,000</u>
Total short-term overseas training	\$ 305,000

III. Observation Tours

Calculated at an average of \$2,800 per individual per three week tour to third country in Asia as follows:

Air fare (Asian region)	\$ 1,000
Per diem (\$100 x 28 days)	2,800
Miscellaneous	<u>200</u>
Total cost/person	\$ 4,000
Total cost/tour (15 people)	\$ 60,000
Total observation tours training (3 tours)	\$ 180,000
TOTAL PARTICIPANT TRAINING	\$ 861,350

Table E.3

Cost Estimate for AID Financed Commodities

3A	Commodities for workshops and mills	Cost (\$)
	Equipment for workshops (Table C.7)	\$1,495,000
	Vehicles (Table C.9)	78,000
	Material for 15 mills (Table C.5)	405,700
	Material for additional estimated mills	\$1,217,100
	Commodities for Ministry of Cooperatives	
	Decorticator for mills (2)	\$ 50,000
	Standard reference laboratory equipment	115,000
	Model solvent extraction plant/refinery	500,000
	Library reference material	100,000
	Audio visual equipment	\$15,000
	Microfiche/Micro film	20,000
	Photo copier and supplies	5,000
	Books (500 @ \$400 each)	20,000
	Periodical subscriptions	3,000
	Information storage and Retrieval system	10,000
	Word Processing Unit	10,000
	Miscellaneous Library Equipment	17,000
	Household furnishings and furniture	\$ 105,000
	Procurement Service Agent	\$ 250,000
	TOTAL EQUIPMENT AND COMMODITIES	<hr/> \$4,315,000

1 CIF Rangoon basis

Table E.4

Estimated Cost of Host Country Contribution

I.	<u>Support for TA (10 person years)</u>	
	- Utilities (\$2,000/yr)	\$ 20,000
	- Furnishings (\$2,000/house)	8,000
	- Vehicle maintenance	18,000
	- Fuel	5,000
	- Office space	20,000
	- Support staff	40,000
	- Supplies	20,000
	- In-country travel	20,000
	- Administrative staff	<u>10,000</u>
	Sub-total	\$ 161,000
II. A.	<u>Overseas Training (297 Person months)</u>	
	- Salaries while overseas (K 700/month)	\$ 24,500
	- Allowance (K 2,000/Participant)	16,500
	- Training and salaries for replacements while in overseas training	30,000
	- In-country travel	10,000
	- Language instruction (11 students)	8,500
	Salaries while in language (4 mos/student)	
	Instruction costs (K 2,000/student)	
	Language laboratory space	
	- Training materials	5,000
	- Administrative support	10,000
	- Other training expenses	<u>5,000</u>
	Sub-total overseas training	\$ 109,500
	<u>B. On-the-job training</u>	
	- Salaries while on training	
	Oil mills (100 person months)	8,000
	Workshops (60 person months)	5,000
	- In-country travel	5,000
	- Other training expenses	<u>5,000</u>
	Sub-total on-the-job training	\$ 23,000
	Sub-total training	\$132,500

III. Commodities

- Laboratory supplies and facilities (local costs)	\$ 100,000
- Library materials	20,000
- Office equipment and supplies	60,000
- Vehicles (3)	30,000
- Miscellaneous	
	<hr/>
Sub-total	\$ 230,000

IV. Operations and Maintenance for Ministry

- Laboratory space	\$ 50,000
- Salaries of administrative personnel involved in project not included above	50,000
- Office space	50,000
- Maintenance of MOC facilities	50,000
- Other operating costs	20,000
	<hr/>
Sub-total	\$ 220,000

V. Operations and maintenance for 60 mills and 4 workshops

Labor for rehabilitation work in mills (21,880/mill)	\$ 1,312,000
Labor for annual maintenance (\$6,240/mill/yr.)	1,310,000
Additional Annual Labor for seed handling (\$2,201/mill)	528,000
Investment by mills for additional storage (\$2,000/mill)	120,000
Labor expended by workshops to fabricate parts (\$2,892/mill)	175,000
Labor expended by workshops to fabricate cooker modifications (\$200/mill)	12,000
Labor expended by workshops for annual rebuilding oil screw and cages (\$2,310/mill)	400,000
Prorated charges for use of existing machinery in Workshops to fabricate oil mill parts	108,000
Investment by Workshops for expansion of facilities (\$2,000/Workshop)	8,000
Sub-total Operations and Maintenance	\$ 3,979,000

VI. Evaluation \$ 21,000

TOTAL BUDGET FOR HOST COUNTRY CONTRIBUTION \$ 4,722,500

Table E.5

Cost Estimate for Household Furnishings and Furniture

A.	<u>HOUSEHOLD FURNISHINGS</u>	<u>Cost (\$)</u>
	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
	FURNISHINGS/House	<u>15,000</u>
II.	HOUSEHOLD FURNITURE for three 7-room house (origin, composition and specifications to be determined)	\$60,000
	TOTAL HOUSEHOLD FURNITURE FURNITURE AND FURNISHINGS (3 Houses)	\$105,000

ANNEX F

GRANTEES REQUEST FOR ASSISTANCE

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

Annex G

Initial Environmental Examination

Project Location: Burma  
Project Title: Edible Oil Production and Distribution  
Funding: \$9.5 million  
Life of Project: FY 85-89  
IEE Prepared By: AID/Rangoon  
Date: November, 1984

Environmental

Action Recommended: Negative Determination

Concurrence:

Date 2/22/85

Environmental Officer, Bureau for Asia Decision:

*Michael C. Stilling*

Approval of Environmental Action Recommended: Date 2/22/85

Disapproval of Environmental Action Recommended: Date \_\_\_\_\_

THE WORLD BANK

JUNE 1983

OFFICE OF ENVIRONMENTAL AFFAIRS

GENERAL GUIDELINES

DISPOSAL OF INDUSTRIAL EFFLUENTS

1. These guidelines are intended for general application to disposal of effluents and pollutants for most industrial sources. Although general in nature, they should be applied to the total environment whether the effluents are in the gaseous, liquid or solid state. These guidelines may be applied where particular data is not otherwise available, or as a supplement for those specific industries where guidelines have been developed by the Bank.
2. Pollution may be defined as the addition, from either natural or man-made sources, of any foreign substances to the air, water or land in such quantities as to render such medium unsuitable for specific or established uses. An industry may frequently produce wastes that affect more than one of these media. Thus, the Appraisal or Supervision Mission must consider the total range of disposal operations in order to properly evaluate effluent treatment and control measures. Toxic properties are of prime concern in evaluating effects of industrial pollution. Table 1 presents a summary of waste toxicity from a number of industries.
3. Pollution may also result from noise and heat, which are measurable in terms of intensity and effect but have no physical, chemical or biological composition.
4. This guide is concerned primarily with the effects of pollution on the environment. However, consideration should also be given to the effects of specific contaminants on personnel at the industrial work place.

SOURCES AND CHARACTER OF WASTES

5. Effluents are frequently complex, heterogeneous mixtures of several substances or materials. Gaseous effluents may include particulates (solids) or aerosols (liquids); liquid effluents may include dissolved solids or gases, as well as suspended solids; and solid wastes often contain one or several liquids.

Gaseous Effluents

6. Airborne pollutants originating at stationary sources whether or not diluted with air, are generally exhausted through a stack. From the stack they will disperse into the atmosphere and eventually return to ground level. Ground level concentrations may be estimated on the basis of the stack height and diameter at stack mouth, gas velocity or flow, and temperature. For new installations some of this information will need to be derived from performance at existing installations.

TABLE 1 - Some Hazardous Wastes Produced by Industry(a)

Industry	Toxic Waste Produced				
	Solvents	Metals	Gases	Org.	Inorg.
Mining		X	X		X
Textiles		X		X	
Paper Prod. Etc.			X		X
Alkalai & Chlorine					X
Cyclic Intermediates	X	X	X	X	X
Organic Chemicals	X	X	X	X	X
Inorg. Chemicals		X	X	X	X
Plastics	X		X	X	
Drugs			X	X	X
Soaps & Cleaners				X	
Paints, etc.	X			X	X
Agri. Chemicals	X			X	X
Explosives				X	X
Petr. & Coal Products	X	X	X	X	X
Leather Tanning		X		X	X
Asbestos Products			X		X
Blast Furn. & Steel		X	X	X	X
Non-Ferrous Metals			X		X

(a) From "A Study of Hazardous Waste Materials, Hazardous Effects and Disposal Methods", Vol. 1, Report PB 221-465. Booz-Allen Applied Research, Inc. Available from National Technical Information Service, Inc., Springfield, Va. (1973).

7. Gaseous effluents most frequently result from combustion processes. They may also be either by-products of chemical reactions or suspended particulates resulting from mechanical operations such as grinding. Principal impurities of combustion gases generally include sulfur dioxide (SO<sub>2</sub>) particulates (flying ash or carbon), nitrogen oxides (NO<sub>x</sub>), carbon dioxide (CO), and mercury compounds from combustion of certain coals.

8. Chemical products released to the atmosphere are too numerous to mention, and depend upon the particular industry considered. As examples, hydrofluoric acid and fluoride compounds evolve from production of both aluminum and phosphoric acid; arsine a particularly lethal arsenic compound, (AsH<sub>3</sub>) can result from the burning of pyrites or blends in a reducing atmosphere.

9. Quarrying and mining operations can discharge dust or particulate matter into the atmosphere, as can plants producing steel, cement, and fertilizers. While dusts may create environmental problems, it is important to note that they may also create serious occupational hazards if the work place has been poorly designed or is not properly operated. The human health problem is of primary importance in these situations.

#### Liquid Effluents

10. Apart from normal human wastes discharges, other liquid effluents from industrial plants consist principally of cooling water and waste by-products dissolved or suspended in water originating from the process or other sources. In many cases the gaseous effluents are stripped of particulate matter by wet scrubbers which, in turn, discharge to plant sewers.

11. Cooling water, as the nomenclature implies, is used to cool process materials. It is generally uncontaminated in flowing through the plant, except for an increase in temperature and for containing chromates used to protect surfaces from corrosion. When cooling water is combined with other waste streams, the total effluent will contain these other contaminants.

12. Liquid effluents will generally be at temperatures higher than those in receiving waters. Therefore, care must be exercised to keep the temperature differences as small as possible to avoid harmful effects on aquatic plant and animal species living in the receiving waters.

13. As a general guideline for Bank projects, effluent temperatures should not be more than 3° C higher than that of the receiving waters. Where the receiving water temperatures are at 28° C or less, the effluent temperature may be a maximum of 5° C above that of the receiving waters. In cases where maintaining these differentials causes excessive increases in project costs or undue harm to fisheries or other aquatic life, the maximum allowable temperature may be determined from the following equation:

$$T_{max} = OT + \frac{URLT-OT}{3}$$

Where:  $T_{max}$  = Maximum allowable stream temperature after mixing

OT = Optimum temperature for species affected

URLT = Ultimate recipient lethal temperature for species affected.

14. An important but frequently overlooked source of liquid pollution is the accidental or deliberate discharge of hazardous materials. Toxic materials have been known to reach adjacent waterways during plant start-up periods because of accidents or inadequate preparation. Village wells and surface supplies have been contaminated from careless disposal of ion-exchange unit backwash discharges. Where toxic materials are used or produced in the industrial operations, measures for prevention of accidental spills should be established and fully described by appraisal and supervision missions.

#### Solid Wastes

15. Land may become polluted or rendered otherwise unsuitable for specific uses through addition of waste materials. Among the more common substances are (1) paper, cartons, plastics, and other packing materials; (2) rubble from demolition and other discarded building materials; (3) stripped soil, exposed erodible soil and tailings from mining operations; (4) slag heaps from smelting operations; (5) pulp, pits, culls, vines and other organic residuals from canning operations; and (6) organic sludges from pulp and paper mills, textile plants and other industrial operations.

16. Land disposal may include spray irrigation, land farming, sanitary landfill, deep well disposal and "secure" burial.

17. Proper location and operation of disposal sites are principal factors in handling solid wastes. A general unsightliness, noxious odor caused by decomposing organic residues, and breeding of disease carriers, can result from improperly operated areas.

18. Dust may also create a problem at dump sites that are completely dry. These sites should be kept to a minimum or eliminated, depending upon their composition and the environment surrounding the disposal site.

#### MANAGEMENT OF WASTES

19. Measurement of effluents, both as to quantity and quality is basic to a waste management program. Acceptable and recognized techniques are readily available for this purpose. The management program will involve sampling and analysis of effluents, flow measurements, application of established standards, and control of discharges through treatment or other means. Standardized laboratory techniques should be utilized to assure data acceptability.

### Sampling and Analytical Procedures

20. Monitoring of air contaminants may be accomplished through emission source testing or atmospheric monitoring. Industrial processes may involve frequent cyclic changes. Therefore source monitoring must be carefully timed so that measurements are made when the process is operating in typical fashion. Fluctuations of peak loadings must be determined. All waste source variables should be defined so that samples will represent typical process conditions.
21. Atmospheric monitoring requires establishment of an air monitoring network. Location of the sampling stations should be based on the use to be made of the data, such as (1) source-oriented monitoring for enforcement purposes; (2) zones of highest projected pollution concentrations; (3) background data needs prior to industrial development; (4) high population density areas; and (5) background data needs where industrial development is not imminent.
22. Analytical methods for air contaminants are described in the literature. Methods are generally classified as chemical or physical, and cover dustfall, suspended particulate matter, gaseous substances and organic pollutants.
23. Wastewater sampling points should be such that flow conditions in the discharge stream will have achieved a homogeneous mixture. The effluent discharge velocity at the sampling point should be high enough to assure collection of a well-mixed representative sample.
24. Flow measurements are an integral part of any wastewater monitoring program. Selection of a method will depend upon the facilities available, the degree of precision required, and the conditions under which the wastes are discharged (batch operations, operating periods, etc.). The weight of contaminants discharged to a receiving stream can be calculated from both the flow rate and the measured concentration of contaminants derived from the analytical data.
25. Techniques for the qualitative analysis of wastewaters fall into four categories; chemical, physical, biological and biochemical. Specific analyses will depend upon the nature of the industrial operation and other factors determined on a case-by-case basis.
26. All significant waste streams, including single or combined flows, which are present or planned, should be described in terms of flow rate (volumetric) and their chemical, physical, and biological characteristics. If partial or full treatment of the waste stream is being or will be provided, a full description should be furnished by the missions.

27. Solid wastes from industry often pose special problems such as non-degradability (plastics) and toxicity (chemical residues). In establishing disposal methods, solid wastes should be classified and rated as to their effects such as (1) human toxicity; (2) groundwater contamination; (3) biodegradability; and (4) mobility. Chemical, physical, and biological methods, as described above, are normally used to analyze air and water effluents from solid waste disposal areas.

28. Quantities of solid wastes are measured in terms of both volume and weight. Leachates are measured by collecting all drainage from the disposal area, and passing it through a device for flow measurement and sample collection.

#### Units of Measurement

29. In order to permit comparison of data between projects it is essential that, insofar as possible, the same units be used in reporting environmental data. With the rapid movement towards universal use of metric units throughout the scientific and technical communities, Bank missions should confine themselves to that system.

30. More commonly-used metric units are as follows:

Gaseous Effluents: Micrograms per Normal cubic meter  $\mu\text{g}/\text{m}^3$  (normal)\*  
Milligrams per Normal cubic meter  $\text{mg}/\text{m}^3$  (normal)  
Grams per Normal cubic meter  $\text{g}/\text{m}^3$  (normal)

#### Liquid Effluents:

Milligrams per liter  $\text{mg}/\text{L}$   
Micrograms per liter  $\mu\text{g}/\text{L}$

#### Solid Effluents:

Milligrams per kilogram of solid waste (dry basis)  $\text{mg}/\text{kg}$

#### Flows:

Liters per second  $\text{L}/\text{s}$   
Cubic meters per hour  $\text{m}^3/\text{h}$

#### Pressure:

Kilograms per square centimeter  $\text{kg}/\text{cm}^2$   
Newtons per square centimeter  $\text{N}/\text{cm}^2$

#### Temperature:

Degrees Centigrade  $^{\circ}\text{C}$

\* Normal Conditions:  $0^{\circ}\text{C}$ , 101.3 kPa (760 mm Hg)  
kPa - Kilo Pascals

### Application of Standards

31. "Standards" are defined as levels at which specific materials may be safely discharged to the environment. "Standards", "regulation", and "norm" are terms frequently applied very loosely in appraising a plant's performance. A strict definition may differ between countries, or even between regions in the same country. Therefore, appraisal and supervision missions should clearly define standards used in rating effluent disposal performance. Data for both standards used and a plant's performance should be expressed in units of contaminant per unit of production of raw material input.

### Effluent Controls

32. Reduction of waste effluents to meet applicable discharge standards can be accomplished by in-plant measures (process changes, good house-keeping, etc.), treatment systems, or some combination.

33. Measures for reducing gaseous effluent contaminants include (1) operational improvements; (2) increasing stack height; (3) removal of gases by adsorption, absorption, catalytic conversion, or other methods; and (4) particulate removal systems such as filters, sedimentation, centrifugal separators, electrostatic precipitators, wet scrubbers or other equipment.

34. Techniques applicable for liquid effluent disposal include in-plant measures and process changes, discharge to municipal treatment systems, or on-site treatment facilities designed to reduce specific contaminants. When releasing liquid effluents, precautions must be taken to avoid contamination of adjacent aquifers, particularly in the case of deep-well injection. Thorough tests, using tracer dyes or other methods, should be conducted at each specific location where it is planned to use this method.

35. Handling and disposal of solid wastes must give attention to the land at the disposal site, as well as the effect of disposal methods on air and water resources. Sites should be designed and operated to prevent, or minimize or properly channel runoff. Runoff collection and settling have been effective for this purpose. Latex films covering waste piles have also been effective. Unprotected waste piles are subject to leaching which may result in acidic or alkaline effluents percolating to streams or aquifers used for water supply.

36. Appraisal missions should make certain that engineering designs for the project have incorporated necessary treatment equipment and controls to achieve predetermined acceptable levels of effluent quality. The mission should also make certain that equipment cost is included in project funding, and is properly scheduled for procurement and delivery. Plans should also be developed for the training or employment of personnel to efficiently use the equipment. The sampling and analysis program should be critically reviewed to assure complete coverage of industrial operations, including night shifts and weekends.

37. Supervision missions should ascertain that pollution control equipment has been installed, that it is being efficiently operated, and that adequate monitoring is being provided to assure continuing conformance with control requirements.

38. In all cases, proposed or actual handling of waste materials and final effluents should be completely described. This is particularly important with large projects involving several contractors. Where treatment elements are being planned and designed by different organizations or agencies, it must be ascertained that these elements are compatible with each other and will result in an overall system that reduces plant discharges to acceptable levels.

#### ENERGY CONSIDERATIONS

39. Energy needs for the individual plant must be considered. The fuel requirements for optimum operation of a plant have been determined for a number of industries: Fuel consumption for new plants should readily meet the established levels or ranges. Failure to meet these limitations should be fully explained by the Bank's missions.

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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) ?  

Congressional Notification to be made before authorization Assistance is within OYB.
  
2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be:  

Yes.

  - (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?
  
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 receive to 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.

The project complements a multi-donor financial program in oilseeds sector processing refining, bottling and distribution.
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 assists the development of cooperatives and 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 and 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 The Burmese Government investment in rural development in Burma and may therefore indirectly encourage U.S. private trade investment. It is planned that project procurement will be the U.S. except when or unless suppliers there cannot supply items needed. Technical assistance from U.S. firms will be funded under the project.

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 33 percent of the cost of this project. No procurement is planned in countries, other than Burma, 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?
- As Burma is an excess currency country, any local currency required for the project will be purchased from US accounts
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?
- Yes.
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

ANNEX

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 efficiency and output of small agribusinesses in rural areas and will directly assist in developing cooperatives.

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 improve programs to modernize small existing facilities in rural areas and to introduce new technology when appropriate.

- 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 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.

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 centum 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.

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

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 administered 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; (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; (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; (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.

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 organizations 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.