AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) — Amendment Number: _____

DOCUMENT CODE: 3

2. COUNTRY/ENTITY: Thailand

3. PROJECT NUMBER: 493-0326

4. BUREAU/OFFICE: Asia — 04

5. PROJECT TITLE (maximum 40 characters): Seed Development II

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 08 DD 31 YY 86

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

A. Initial FY 82 B. Quarter 1 C. Final FY 82

8. COSTS ($000 OR EQUIVALENT $1 = 21 baht)

A. FUNDING SOURCE	FIRST FY 82 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	4,920	1,280	6,200	4,920	1,280	6,200
(Grant)	(100)	(-)	(100)	(100)	(-)	(100)
(Loan)	(4,820)	(1,280)	(6,100)	(4,820)	(1,280)	(6,100)
Other U.S. 1.						
Other U.S. 2.						
Host Country	-	2,500	2,500	-	13,050	13,050
Other Donor(s)	-	-	-	-	-	-
TOTALS	4,920	3,780	8,700	4,920	14,330	19,250

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) FN	210	312	312	-	-	100	6,100	100	6,100
(2)									
(3)									
(4)									
TOTALS						100	6,100	100	6,100

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

B. Amount

13. PROJECT PURPOSE (maximum 480 characters)

A comprehensive seed program that efficiently and cost-effectively increases farmers' use of higher quality seed while steadily increasing the role of the private sector to supply this seed.

14. SCHEDULED EVALUATIONS

Interim MM 02 YY 93 MM YY

Final MM 08 YY 85

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: [signature]

Title: Director, Office of Program and Project Development, USAID/Thailand

Date Signed: MM 05 DD 22 YY 87

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

MM DD YY

Thailand
Seed Development II
Project Paper

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ABBREVIATIONS AND ACRONYMS

APAC	-	Asia Project Advisory Committee
ARD	-	Accelerated Rural Development
BAAC	-	Bank for Agriculture and Agricultural Cooperatives
BOI	-	Board of Investment
CIMMYT	-	Centro International De Mejoramiento De Maiz Y Trigo
DA	-	Department of Agriculture
DOAE	-	Department of Agricultural Extension
DSB	-	Development Support Bureau
EEC	-	European Economic Community
ETO	-	Express Transport Organization
FAO	-	Food and Agriculture Organization of the United Nations
IBRD	-	International Bank for Rural Development
ICRISAT	-	International Crops Research Institute for the Semi-Arid Tropics
IEE	-	Initial Environmental Examination
IFB	-	Invitation for Bid
INTSOY	-	International Soybean Program
IRRI	-	International Rice Research Institute
JICA	-	Japanese International Cooperative Agency
KU	-	Kasetsart University
MOF	-	Marketing Organization for Farmers
MSU	-	Mississippi State University
NCSP	-	National Corn and Sorghum Project
OECF	-	Organization of Economic and Financial Cooperation

RF - Rockefeller Foundation

RTG - Royal Thai Government

SD - Seed Division

USAID - United States Agency for International Development

USAID/T - USAID/Thailand

WCA - Working Capital Account

Terms

Changwat = Province

Amphoe = District

Tambon = Sub-District (the level above village and below Amphoe)

Muban = Village

Tang = 10 Kg. of rice

Currency Equivalents

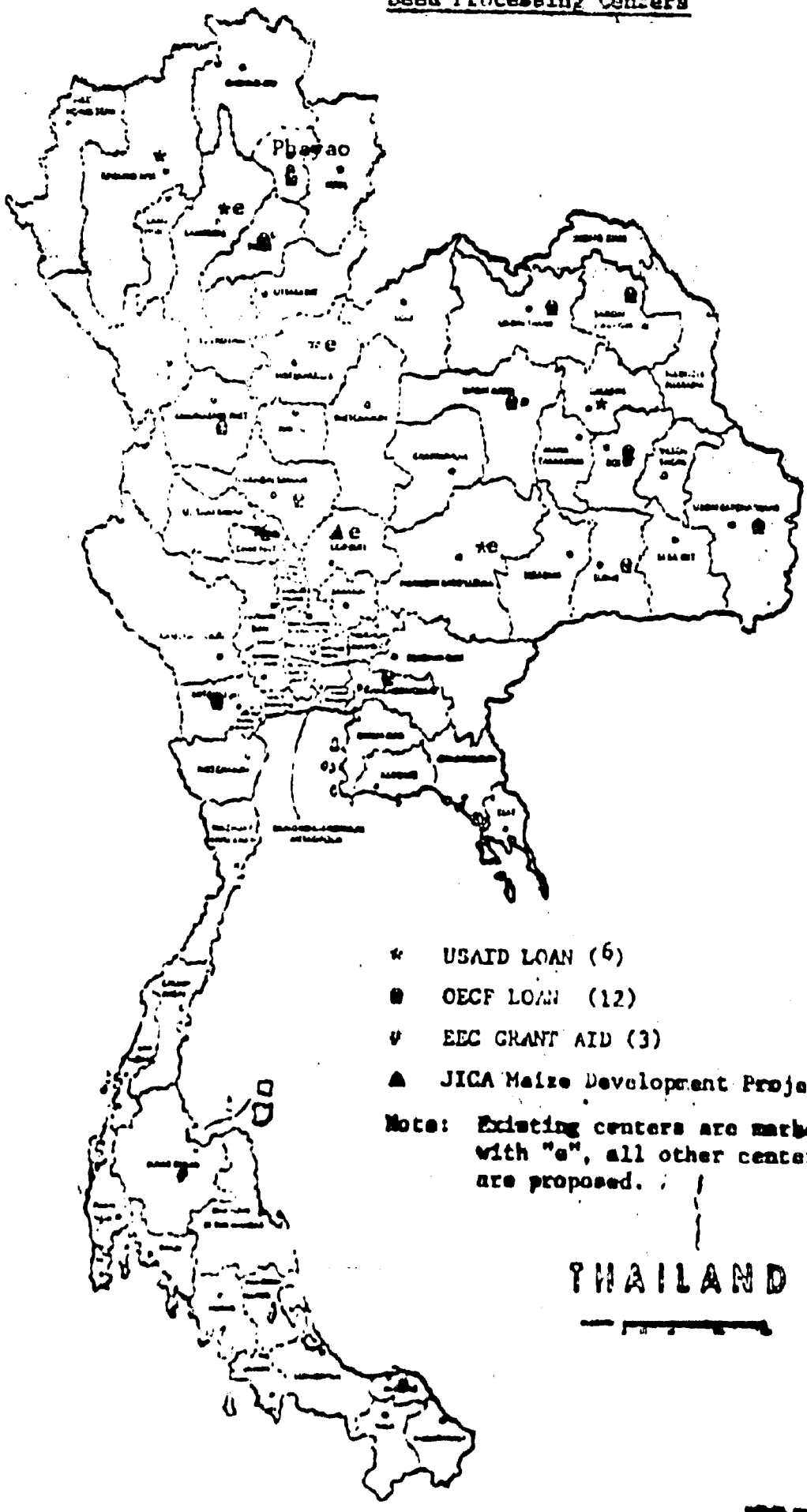
U.S.$ 1 = Baht (฿) 21

Area Equivalents

1 rai = 0.16 hectares (1,600 m^2)

1 hectare = 6.25 rai

Fig. 1 Proposed and Existing Seed Processing Centers



PROJECT AUTHORIZATION

Name of Country: Kingdom of Thailand

Name of Project: Seed Development II

Number : 493-0326

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Seed Development II Project for Thailand involving oblgations not to exceed $6,100,000 in loan funds and $100,000 in grant funds over a five year period from date of authorization, to help in financing foreign exchange and local currency costs for the project.

2. The project will complete the institution building process begun under Seed Development I Project so that Thailand will be able to maintain a comprehensive and efficient seed program that cost effectively increases farmers' use of high quality seed while increesing the role of the private sector in this process.

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

4.a Interest Rate and Terms of Repayment

The Kingdom of Thailand shall repay the loan to A.I.D. in U.S. Dollars within forty (40) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Kingdom of Thailand shall pay to A.I.D. in U.S. Dollars interest from the Date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin and Goods and Services

Goods and services financed by A.I.D. under the loan shall have their source and origin in the Kingdom of Thailand or in countries included in A.I.D. Geograhic Code 941 except as A.I.D. may otherwise agree in writing. Goods and services except for ocean

shipping, financed by A.I.D. under the grant shall have their source and origin in the United States or in the Kingdom of Thailand, except as A.I.D. may otherwise agree in writing.

Ocean shipping financed by A.I.D. under the Grant shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States.

Signature: Robert S. Queener

Authorizing Officer
Director
USAID/Thailand

RLA:O/PPD:DRobertson/JATennant

Clearances: A/D:RSQueener: (draft) date: 3/15/82
O/PPD:BJOdell: (draft) date: 3/14/82
O/FIN:JWCoughlin:(draft) date: 3/9/82
O/ARD:DBathrick: (draft) date: 3/9/82

Funds Available:

John W. Coughlin
Office of Finance

Date: 4/14/82

Part I Summary and Recommendations

A. Project Data Sheet

See previous page

B. Recommendations

It is recommended that a loan of $6.1 million of FAA Section 103 funds be authorized for the Seed Development II (Seeds II) Project. Loan terms are to be 40 years including 10 years grace, 2% during grace, 3% thereafter.

C. Summary Description

This five year Project is aimed at contributing to the financial status and nutrition of Thailand's rural inhabitants through the selective support of a comprehensive seed program which began in 1976 under an earlier AID-assisted project (Seeds I). The Project should directly result in farmers using increased quantities of high quality field crop and vegetable seed and a steadily increasing role for the private sector in supplying this seed. Major Project objectives include: an improved management capability within the implementing agency (the DOAE Seed Division); a more effective linkage between RTG seed agencies and farmers; enhanced support for private sector efforts; and support for an improved foundation seed program. Total cost of the Project is estimated at $19.15 million with AID providing $6.1 million of that amount.

D. Issues

General issues identified in the PID approval cable (State 287336, Annex I) include: (1) a concern that the Project be a part of a comprehensive public/private sector strategy, (2) need for the PP to provide a clear indication of how the Project will increase private sector participation in seed production/marketing, (3) need for a vegetable seed element that also stresses the role of the private sector, (4) need to limit subsidies in the pricing system, (5) need for a strong rationale for continued AID contributions to the working capital account, (6) pesticide issues (addressed separately), (7) need for a comprehensive procurement plan or procurement service agent, (8) need for maximum loan funding, (9) need for an analysis of benefit incidence, (10) need for analysis of DA equipment requirements, (11) need for detail on seed regulation anticipated, and (12) status of problems encountered in Seeds I.

Each of the above issues has been addressed in the body of the PP, and no outstanding issues remain.

E. Summary Findings

This Project is considered socially and technically sound and administratively feasible. Cost estimates are reasonable and firm. The Mission Director has certified to the capability of the RTG to maintain and utilize the Project (Annex VIII). The Project meets all applicable statutory criteria per Annex IX.

Part II - Project Background and Detailed Description

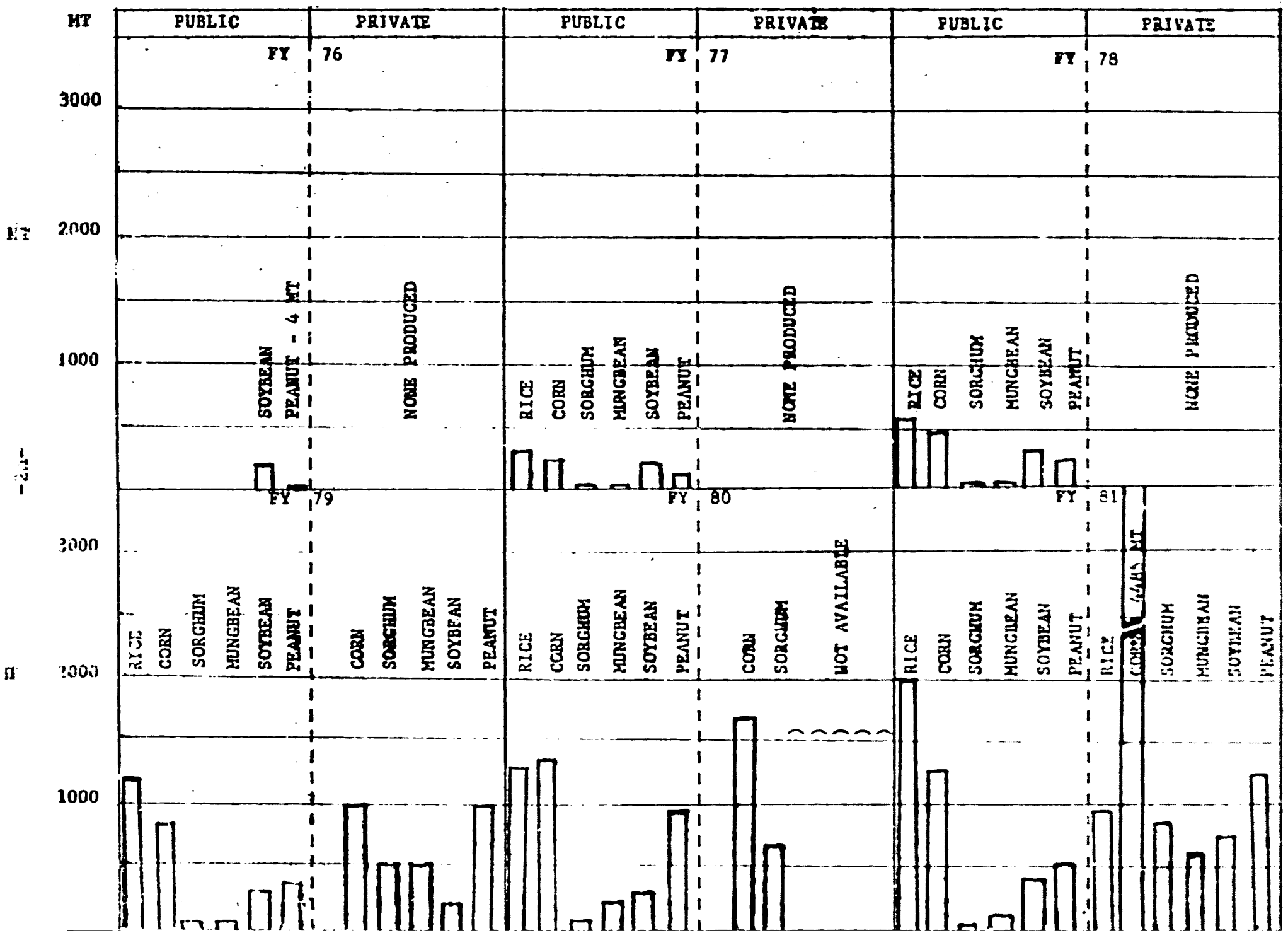
A. Background

The background of the seed program in Thailand is well-documented in the PP for the 1976 Seeds I Project (No. 493-T-017) and in the 1978 and 1980 project evaluations. To summarize, crop yields in Thailand are considerably below their potential, and a major constraint to improving yields is the difficulty in obtaining viable seed of higher yielding varieties . To adequately address this problem an integrated seed program is needed to produce foundation seed of genetically superior varieties of important crops that meet farmers' needs'; to multiply these seed, condition seed to meet reasonable germination and purity standards; and promote/market the seed so they are desired by farmers and available when the farmers need them. Up to 1976, no such program existed in Thailand

The Seeds I Project responded to the need for an integrated seed program by providing equipment, technical assistance, training, and a working capital account for a field crop seed program in the public sector. The result has been the establishment of a Seed Division within the Ministry of Agriculture and Cooperatives and the necessary facilities (including 4 seed processing centers), operations and organization to initiate a basic seed multiplication, conditioning and distribution program for six important crops. Figure II A-1 shows this progress over the life of Seeds I.

Although Seed II will not meet most of the very optimistic targets anticipated in the 1975 PP, the project has been a resounding success. (Note: It will meet the revised targets established in 1978.) Seed production by the Seed Division has expanded more than 25 fold from 176 MT in FY 76 to an estimated 4,500 MT in FY 81. Demand for most varieties of improved seed exceeds supply: in FY 80 all 1,300 MT of the Seed Division's corn seed were distributed two months before

Fig IIA TONS OF IMPROVED CONDITIONED SEED SOLD BY PUBLIC AND PRIVATE SECTOR



the planting season. Since approximately 40 percent of the seed was sold directly to farmers, this indicates that farmers are prepared to accept proven varieties of project seed.

Encouraged by the demand for improved seed, several private sector firms have begun operations in seed production and marketing since Seeds I was initiated. Most interest to date has been in corn where Cargill International, Pacific Seeds, and Bangkok Seeds have operations. Total private sales of corn seed have been increasing rapidly. Conservative estimates indicate that sales in 1981 will exceed 4,000 MT, or more than triple public sector direct sales to farmers. (See Fig. II A-1). Other private sector firms with investments in the seed sector include the Chia Thai Co. and Agricultural Co., Ltd. whom together sell about one-half the vegetable seed in the country (most vegetable seed are imported but seed of some local farmers are also purchased, packaged, and sold).

As the private sector develops its capabilities and assumes greater responsibility for producing and marketing quality seed, this, will generate a rapidly expanding demand for foundation seed for new, improved crop varieties within the next several years. The Seed Division could well utilize its existing and planned facilities to help meet this need. These facilities also should become increasingly important as training centers and sources of technical assistance for emerging private companies.

Thus, although the Seed Division's importance as a source of improved seed to the farmer - either directly or indirectly through other RTG agencies - is likely to decrease for most types of seed in the foreseeable future, its importance as a source of seed and advice for the private sector should increase commensurately. The institution strengthening components of this Project will accordingly have both short-term and long-term benefits and should in no way become obsolete as the private sector develops.

Finally, the Seed Division is expected to remain indefinitely an important source of improved rice seed, since private sector firms have expressed little interest in this low margin business. In a survey of farmers done for this Project farmers preferred to exchange rice seed with Government agencies rather than the traditional practice of exchanging rice seed with their neighbors because they found the Government seed was higher quality. The accelerated RTG Rice Exchange Program was initiated in 1980 to get improved varieties of rice seed to the largest number of farmers possible. It calls for exchanging up to 5 kg/rai of improved

seed for farmers' grain. (This has been administratively limited to 5-15 kg/farmer in view of the high demand). The program in FY 82 expects to exchange 3,500 MT, but only about half can be produced by the Seed Division, and the rest will be produced by the DA Rice Division's 22 experiment stations. The increased seed production capacity planned by the RTG in conjunction with the OECF and EEC (see Part II.B.2) will largely be devoted to producing rice seed for this important program.

Thus despite the excellent progress under Seeds I there are still several key areas in the seed program that should be strengthened to meet these new opportunities:

1. Management: Several management components of the Seed Division need improvement to have a smoothly functioning system that can produce, condition and market seed on a timely and cost effective basis. For example, The Working Capital Account (WCA) has been practically depleted under Seeds I in large part due to bad debts from contract seed producers and from RTG agencies who purchase the seed for redistribution.

Also, the efficiency of purchasing and processing operations has been impeded by problems in planning and coordinating grower planting patterns and varieties of seed. There have been also long time - lags (3-4 weeks) between inspection and acceptance of seed grown by contract growers for the Seed Division, and production/purchase ratios have been low in many cases. Payments to contract growers have often been delayed due to procedural or financial constraints. Sales prices of seeds are not sufficient to recover direct costs of producing/marketing the seed.

The rapid expansion of the Seed Division to date has not permitted the development of management system adequate to deal with these and other operational constraints. This is particularly important as the Division assumes expanded responsibilities planned under this Project and by other donors.

2. Seed Promotion/Marketing: One area that has received little attention under Seeds I has been the promotion and marketing of improved seed. This has been due primarily to the more immediate concerns associated with establishing a new organization and production base. However, a major impediment to the acceptance and use of processed seed of improved varieties is the lack of awareness of the difference in quality and yield between seed (a production input) and grain (a consumption product). Field interviews conducted during Project design revealed that many farmers were not well

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informed about characteristics of even readily available improved varieties of rice seed or of possible sources of supply. "Seed awareness" needs to be emphasized with agents and other concerned RTG personnel as well as among the farmers. Training and other promotional activities are planned to instill the required awareness among these target groups.

In conjunction with the promotion of good seed to increase demand, there needs to be a continuous determination of the quantities and kinds of seed farmers want as well as feedback from the farmers on the performance of various varieties. Farmers must also have a reliable means to obtain information on the types and quality of seed available, their cost, and the source and timing of availability. Finally, reliable marketing channels must be established that meet farmers' needs on one hand and that are efficient and economical on the other.

3. Private Sector Development: Up to the present (1981) the combined public/private sector seed production has been very small in comparison to total national seed needs. As more private sector investment is attracted to the seed industry, however, the likelihood of some conflict between the public and private sectors will increase unless care is taken to limit the Government's role to a complementary rather than a competitive or unduly restrictive one.

The RTG already has articulated a policy of strong support for the development of private sector seed enterprises. This policy generally provides that the Government's role should be limited to those functions/crops in which the private sector is not interested due to presumed inadequate financial rewards. Moreover, the Board of Investment has granted promotional privileges for private sector seed investment and the Seed Division has helped private firms technically through assistance in planning and designing processing and storage facilities, identifying good locations, resolving technical problems, and training private sector personnel in its training courses.

A good beginning thus has been made toward public-private sector cooperation, but several sensitive policy issues such as levels of public sector production, pricing, regulation and information sharing will need careful attention over the next several years.

4. Vegetable Seed Component: Although the RTG Department of Agriculture and Universities have developed more than 20 improved varieties of high yielding vegetable crops

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there is no public or private organization engaged in the systematic or scientific multiplication or marketing of these crops. Private marketing companies mostly import seed as noted above. Moreover, few farmers have been trained to produce vegetables as a seed crop, and the most widely used packaging materials, paper envelopes, cannot protect the viability of these seed against the deteriorative effects of Thailand's tropical climate (20 percent or lower germination rates are not uncommon). In addition, home gardeners and farmers generally lack awareness of the benefits obtainable from the use of improved vegetable seeds. A comprehensive vegetable seed program is needed to resolve the unique technical problems associated with the production, extraction, packaging and storage of vegetable seed.

5. Foundation Seed: The RTG's Department of Agriculture has been unable to meet the increased demand from the Seeds Division for Oil Crops foundation seed (soybean, mungbean, peanuts) and has inadequate facilities and personnel to respond to demand for foundation seed of vegetables.

B. Detailed Description

1. Project Approach: The Seeds II Project will address each of the above key constraints to a comprehensive and effectively functioning seed program by providing: technical assistance; academic and management intern training, equipment for a national vegetable seed center in Northern Thailand (Chiang Mai) and a peanut sub-center in Northeast Thailand (Lampao), data processing equipment, a portion of a working capital account to purchase seed and supplies, equipment for seed technology training centers that will be constructed by the RTG, and facilities and equipment for the Department of Agriculture to process and store additional foundation seed for oilcrops and vegetables.

The above AID-financed inputs, in conjunction with the necessary policies, funds, exchanges with the private sector (including support for a bipartisan seed association), construction activities, promotional activities, organizational changes, equipment and management effort from the RTG, should lead to a seed program that efficiently and cost effectively meets the needs of other Government agencies on a sustained basis for emergency and welfare seed distribution as well as for promotional activities. It should also provide technical support and help stimulate farmer demand for private sector seed industry products. A project of this nature will provide an important link in the RTG's Fifth Plan efforts to intensify agricultural development, and should significantly contribute

to improving the financial status, as well as the nutritional health, of farm families. Moreover, since the export of rice is Thailand's most important source of foreign exchange, and since more than half of Thailand's corn and sorghum is exported and most of its edible oil is imported. The increased production of these crops supported under Seeds II should have a beneficial impact on the country's balance of payments.

The Project will be carried out through the same institutional arrangements as for Seeds I: the Department of Agricultural Extension's (DOAE) Seed Division will be the implementing agency for all components except for production of foundation seed and inoculum for legume crops. These latter two activities will be carried out by the Department of Agriculture (DA) as has been done in the past. Thai Universities will supplement DA services and are expected to play a more important role in Seeds II through varietal development, provision of foundation seed when it is not available from DA, and consulting and training services when needed.

Other agencies that will contribute to the Project include the Crops Promotion Division, the Plant Protection Division and the Finance Division of the DOAE. These agencies will support the Project through extension/distribution services, treatment of crop diseases and insect problems, and financial support services, respectively, as they did under Seeds I.

Without the additional assistance proposed in this Project it is unlikely that the major constraints identified in Part IIA can be overcome in the near future. The Seed Division has no previous experience with large scale production/marketing activities and no pool of manpower with the necessary skills is currently available. Cooperative relationships between the public and private sectors which are somewhat tenuous can be strengthened through the framework of the Project. Processing vegetable seed requires new techniques and procedures that have never been utilized in Thailand.

2. <u>The Role of AID and Other Donors</u>: The U.S. has developed a comparative advantage for providing the proposed assistance: Our participation in the Seeds I Project has given us a unique understanding of the problems and strengths of Thailand's seed program. Moreover, the strong relationship between the Seed Division and Mississippi State University is an asset that has stood the test of time and that provides a firm base for future activities between the two institutions. Most of the key personnel of the Seed Division have been trained at MSU and other U.S. institutions.

Other donors also have proposed assistance to the seed sector, but the final form of the assistance has not yet been worked out. The Japanese are considering assistance for twelve new seed processing facilities that will be dedicated primarily to rice seed production for the Government's Rice Exchange Program. So far only the facilities have been discussed and no technical assistance or training package has been developed. In addition to the seed centers, the Japanese may expand the Department of Agriculture foundation seed facilities for corn at the Prabuddhabat field crops station in 1982. The EEC is also expected to finance four diversified seed centers in Southern Thailand. Funds for one center have reportedly been approved.

The above plans by other donors make even more relevant the proposed Seeds II Project. As facilities expand, training and management concerns will become more important to operational success, and a cooperative relationship with the private sector will be a necessity if conflict is to be avoided. It is expected that other donors' assistance will be facilitated by the enhanced planning and institutional arrangements embodied in this Project. USAID has already entered into a dialogue with the Japanese on assistance to the seed program, and plans among donors will continue to be coordinated in the future. The RTG is also concerned about donor coordination for the seed program, and a committee chaired by the Minister of Agriculture was recently formed to help coordinate the seed program and donor inputs. (See Part IV.B and C).

The proposed Seeds II Project complements AID's other development efforts. Virtually all of AID's ongoing and proposed rural development projects for Thailand will benefit from reliable supplies of improved seed. Some, such as the Northeast Small Scale Irrigation Project (493-0312), explicitly assume a direct linkage with the Seed Program (NESSI farmers will be used as contract growers whenever possible). Seed is a critical input for all farmers, and the use of improved seed can increase yields by 15-20 percent even without changing other traditional practices. This increase can be greatly multiplied by the interventions proposed under other AID-funded projects.

Besides rural development projects, projects in the health/nutrition sector will be affected by the Seeds II Project. Nutrition projects will particularly benefit from the improved vegetable seed that will result from Seeds II, since

these projects generally emphasize home garden vegetable production as a means to improving rural nutrition.

Both Kasetsart University (KU) and the Asian Vegetable Research and Development Center (AVRDC) in Taiwan have expressed strong support for Seeds II since a greater supply of quality vegetable seed will directly support their recently initiated Outreach Program. This program, also to be supported by the Asian Development Bank, will emphasize crop research and training for vegetable production and extension. Both KU and AVRDC have agreed to coordinate their program with the Seeds II Project.

This Project cannot reasonably be expected to address all the seed related problems that farmers may be having. Some issues such as agricultural practices, complementary suitability of soils for certain crops, availability of inputs, etc. have a bearing on seed use and yields but are being separately addressed by other projects (e.g. AID/IHRD Agricultural Extension Outreach and AID North East Rainfed Agricultural Development Projects). In addition, the proposed FY 83 Rainfed Agricultural Intensification (RAI) Project is expected to emphasize the further strengthening of service delivery capacities of RTG agencies in the agricultural sector. Such strengthening is needed if the seed production capacity of both the public and private sectors is to have a maximum impact.

3. <u>Private Sector Development</u>:

This Project is particularly notable for its concern that the private sector be a major beneficiary of growth in the demand for seed. The Project's strategy is to provide a phased approach to private sector involvement: most public sector emphasis is placed on providing and promoting improved seed varieties that have little or no current attraction for the private sector, and then gradually decreasing promotional activities and production as demand for the seed develops and the private sector begins to meet the demand.

While the public sector promotes improved seed it continues to test the seed under different conditions to gather data on suitability. It also seeks feedback from farmers on the seed's adequacy to meet farmers' needs. This information is to be shared with the private sector through a bipartisan seed association that provides a forum for discussing RTG policies and other topics of mutual interest. Throughout the whole process sketched above, the public sector can aid the private sector through demonstrations of effective techniques,

technical assistance, training opportunities, promotional privileges, access to foundation seed, a pricing and regulatory system that provides adequate incentives for investment, and other policy support.

The above role of the public sector is meant to minimize risks for private sector seed firms so that they may quickly, effectively initiate and/or increase seed production in Thailand. At the same time the Project will draw upon the most efficient U.S. seed firms to help upgrade management of the RTG's seed operations and help to transfer this technology to domestic seed firms. This cycle of information and assistance between the public and private sectors should benefit both sectors and ultimately provide Thailand's farmers with a plentiful supply of improved seed that they appreciate and are capable of utilizing for their own betterment.

4. Project Targets: The Project's primary purpose is to complete the institution building process begun under Seeds I so that the RTG will be able to maintain a comprehensive and efficient seed program that cost-effectively increases farmers' use of high quality seed while steadily increasing the role of the private sector in this process. Several indicators have been developed to determine Project success:

a. Government agencies able to obtain improved seed on a timely basis: Since improved seed is in short supply, many RTG agencies must purchase grain rather than improved seed for their promotional and welfare activities. By the end of this project, due to better management practices, the Seed Division in conjunction with the private sector should be able to meet all but the most unexpected demands for improved seed from the public sector.

b. Farmers' demands for improved seed increasing annually. An indication of the success of promotional activities and the adequacy of Project seed to meet farmers' needs should be the incremental increase in demand from farmers for the seed. This process should continue until a majority of farmers are using the seed.

c. Private Sector role in meeting farmers' demands for improved seed increasing annually. Annual increases in the total percentage of seed needs met by the private sector will indicate a healthy trend toward a viable private sector seed industry, and they will also indicate that reasonable accomodations have been made in public sector pricing and production targets.

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d. Vegetable Seed facilities producing at least fourteen varieties of high quality vegetable seed that are being used for promotional activities. The vegetable seed component is an innovation under Seeds II designed to address Thailand's need for quality improved vegetable seed and to support the RTG's rural nutrition program. For this component fourteen vegetables were selected on the basis of nutritional balance, Thai preference, and suitability for production under Thailand's climatic conditions. It is anticipated that the quality of the Seed Division product will stimulate the private sector to improve their product.

e. Working Capital Account is self sufficient. If pricing structures are adequate to recover operational costs and management has improved control over operations adequately, then the WCA should need no additional subsidies by the end of the Project. This indicator thus provides evidence of management efficiency.

f. Overall operating efficiency of seed processing increasing by a minimum of five percent annually until a minimum of 85 percent operating efficiency is achieved. This indicator reflects the efficiency and cost effectiveness of the processing operation. The current rate of operating efficiency (operating time of equipment divided by time available for operation x 100) is approximately 50 percent. This means that equipment is only in use one-half of the available time. With improved management of production and processing operations this rate could be increased to an optimum of 85-90 percent. (Note: This target would only apply to centers in operation at least two years.)

In order to achieve the Project Purpose it is important that RTG policy continue to favor private sector involvement in the seed program and that rural development is maintained as a priority national objective. The RTG Fifth Development Plan (1982-1987) provides support for these important assumptions. Another necessary assumption for meeting Project targets includes the maintenance of a favorable price structure for farmers to purchase seed and the private sector to sell seed at a reasonable profit. So far these conditions have existed, but careful monitoring of prices should be maintained into the future as production and use of the seed expands.

5. Project Components: Several output packages will be developed under the Project in order to address the key

constraints to achieving the Project Purpose. These constraints were discussed briefly in Part IIA as problems in management, promotion/marketing, private sector participation, vegetable seeds program, and adequate foundation seed supply. Each component of the Project is described below in relation to its impact on each of the problem areas and with respect to necessary inputs. The Annexes contain a more detailed breakdown of each component.

a. Management. Several Project components are directed at improving the management of the Seed program.

(1) Management Interns. Four senior Seed Division staff who already have a technical background will be trained under a "management intern" program. Trainees will be placed with private seed companies in the U.S. for approximately 6 months each so that they can learn about private sector management techniques including planning, operations, inventory control cost control and marketing.

(2) Workshops/Training. Four management skills development workshops are planned in Thailand to sensitize lower level Seed Division staff to management concerns. These workshops are expected to be conducted at various locations by short-term consultants and with the close supervision of the long-term consultants.

General technical training in all aspects of seed technology will be continued for all staff responsible for the day to day operations of the seed program. One course is planned each year. The courses will last for about 3 weeks each and will include practical training in seed technology including drying, processing, storage, quality evaluation and technical administration (planning, managing, records and reports). Space will be allocated for participants from private sector seed companies. Participation will be limited to approximately 30 persons per class, with instruction given only by persons having positive operational experience.

Skills development training courses will be given in seed drying and processing, seed analysis, quality assurance, seed production, and field inspection. These 1-3 week courses for public and private sector operational personnel will emphasize learning and refining specific techniques and skills required for efficient performance. Skills development courses will include no more than 15-30 participants, since emphasis will be on practical application. Certain of these courses require technical consultant assistance which will be available under the Project.

Seed producer training will be conducted primarily by the fieldmen in the field on an informal personal contact basis. However, to make contract seed producers aware of their important role in the total seed program, each seed center will conduct at least one training meeting each Project year. This one-day meeting can be used effectively to present "new" or improved concepts and practices of seed production, threshing, and farm-level seed storage and handling. Each training session will be limited to 50 participants.

(3) Participants. Two master's degree participants will major in Agriculture Marketing and/or Management. In addition, it is planned that another six participants majoring in seed technology will include at least one formal course in Management Principals during their U.S. training program. Upon return to Thailand, the eight participants and the four management interns should provide sufficient expertise along with the seven master's participants trained under Seeds I to form the management "core" of the Seed Division.

Besides the above degree training, technical and management training courses of 3 months duration will be required for 16 professionals directly responsible for, and actively involved in, current DOAE/SD operational activities. The purpose of these training courses is to permit an intensified up-dating of current practices and techniques used by commercial companies and government agencies in more developed countries. Training is expected to be conducted by the USDA in the U.S.

(4) Management Information System Operational. A mini computer system will be installed under the Project in order to help manage the complex seed multiplication and purchasing process in conjunction with equipment operations and market demands. In conjunction with the system, the Project will finance three months of assistance in programming training and seed system program development under the MSU technical assistance contract. Additional assistance as needed will be provided on the MSU campus from their computer programmers.

(5) Working Capital Account Fully Funded. The WCA has proven invaluable for purchasing multiplied seed from contract growers and purchasing other supplies on a timely basis, but bad debts from some growers who purchase foundation seed plus debts from Government agencies who purchase multiplied seed, in conjunction with a subsidized pricing system, have badly depleted the account.

Some steps have already been taken to correct this and others are planned during Seeds II. The management accounting system installed under Seeds I has helped correct some of the problems by keeping better track of the poor credit risks. Improved field managememt also will minimize future losses from farmers. The Seeds II Project will implement a seed pricing policy which permits a sufficient margin between purchase price and sales price to allow the Seed Division to recover all direct costs, this will be an Agreement Covenant.

Such a policy would not necessarily mean that seed for all crops would have to be sold at a high enough price to cover costs, but only that the total costs would be recovered. Thus, depending on promotion and program requirements some seed could still be sold at a loss if it were recovered elsewhere.

While seed prices are being gradually adjusted (to avoid price shocks to farmers) and management improved, it is proposed that AID provide an additional $1.0 million for the WCA. This will contribute approximately 12.5% of the account. By the end of the Project, no additional AID funds should be required since the WCA will have been stabilized.

(6) Lampao Subcenter Equippad, Staffed and Operating In order to better manage the processing of peanut seed a subcenter of the Korat Seed Center will be constructed at Lampao (see map at front of PP). This will allow processing of the high volume, difficult to transport peanut seed, 300 km closer to the prime growing area for peanuts (Kalasin province), and thus cut transport costs and field management problems considerably.

Project inputs to the Lampao subcenter include construction, equipment, staff and training.

Equipment required and buildings and facilities to be constructed are listed in the Annexes. Tentative arrangements have been made for the use of existing housing and offices at Lampao, but seed facilities must be constructed. Building costs will be from the RTG budget.

Personnel requirements for the Lampao Center will be similar to that of existing centers and sub-centers. Twelve additional staff will need to be hired. New employees

will receive specialized training and will also gain experience through on-the-job training. Some Korat Seed Center staff working with peanut seed growers near Kalasin will be assigned to the Lampao Sub-Center. Technical consultants will supervise both equipment installation and training of new personnel as was the case under Seeds I.

(7) Training Facilities Constructed, Staffed and Operating. The DOAE/SD has already built one training building specifically to serve Project in-country training needs, at Pitsanulok. Additionally the DOAE plans to build a general use training building on the sites of the other five centers as funds become available. The Project will supply the basic training equipment for all Centers. A list of the equipment needed for all training centers appears in the Annexes.

(8) Organizational Changes. The Project proposes several organizational and administrative revisions to strengthen management of the Seed Division and these are discussed in Part IV. To summarize, the Seed Division will reorganize its Bangkok operation to provide an organization that more closely parallels its field operation, two assistant directors will be added to help the Division Director better manage the Project, authorities will be delegated more to the field level, and stronger organizational arrangements will be made for coordinating the Project with other agencies and the donor community. A new sub-division is also being added to the Seed Division and this is more fully discussed immediately below.

In order to adequately support all of the above management outputs, it is expected that two of the Project's short term consultants will be management experts. In addition, the fulltime senior seed specialist consultant will be expected to devote much of his time to on-the-job training in management techniques and procedures.

b. Seed Promotion and Marketing. Under this component a new sub-division of the DOAE Seed Division will be formed, called the "Marketing and Promotion Sub-Division". The sub-division will have sections for market research and production planning, market channel development, seed sales, and seed promotion and education. Each Seed Center will also have a Marketing and Promotion Section in addition to its regular organizational structure (See Part IV for organizational arrangements).

One of the principal tasks of the new sub-division will be to develop "seed awareness" among farmers

so that they will understand and appreciate the value of improved seed and be more familiar with characteristics of improved varieties and source of supply.

Seed awareness training will be directed primarily at those persons whose normal activities place them in direct contact with farmers. This will include Extension Agents at all levels; Crop Promotion Division personnel; BAAC farm loan supervisors; ARD farm advisors; D.A. researchers (particularly those at rice and crops research stations), etc. Until these professionals are aware of the advantage of good seed of superior varieties, they cannot be expected to motivate large numbers of farmers to use the seed.

Through about 16 short courses (4 days) approximately 500 persons will be trained, by demonstration and practical exercises, to identify and determine differences between seed and grain and to demonstrate such differences practically. They will also be taught the characteristics of the major improved varieties of crops, market characteristics, basic concepts of seed production, the influence of the environment on seed quality, and the influence of seed quality on grain production. Emphasis must be placed upon the practical advantages to farmers of using good seed. Experience in other developing seed programs has shown that when farmer advisors are aware of and make a distinction between seed and grain, they quickly include this information in their daily contacts with farmers. Training will be conducted by experienced Seed Division personnel with assistance, when required from MSU technical advisors.

Besides the above training, the Marketing and Promotion Subdivision will prepare educational materials for use in promotion activities, help prepare radio/TV campaigns, and coordinate with the private sector on providing farmers with necessary informaton on seed availability and new varieties.

In the area of marketing, the new subdivision will need to carefully monitor demand for seed and coordinate promotional activities so that these activities decrease as demand begins to match the capacity of both the public and private sectors. Advice from farmers will be sought through extension agents and other sources to determine what varieties of seed are most in demand by farmers so that appropriate seed may be made available. This attention to farmers' felt needs will be a new emphasis of the Project and will result in a much better assessment of the types of seed that can be most successfully promoted by the Government as well as by the

private sector, however, care must be taken that it is done in conjunction with seed awareness training so that farmers are familiar with seed types.

To help facilitate two-way communication sixteen farmer field days are planned for approximately 1,600 farmers (4 per year x 4 years x 100 farmers each time) to allow them to observe the benefits of improved seed from farmers who have already adopted the seed. The field days will also be used for obtaining feedback from farmers on seed problems and on the types of seed they most desire.

Since the RTG's policy is that the private sector is responsible for commercial seed production and distribution whenever possible, Project seed will be sold primarily to Government agencies. The purpose of such sales will be to:

(1) Aid in the economic improvement of poor farmers, who cannot directly be considered as part of the cash market for seed.

(2) Provide relief to farmers afflicted by natural disasters.

(3) Promote the acceptance of superior varieties by farmers in such a way as to develop a growing market for improved seed.

One important promotional activity for improved seed is the Crop Promotion Department's seed multiplication effort with village farmer volunteers. The CPD currently works with about 3,500 farmers who have agreed to multiply the Seed Division's improved varieties of seed for sale and exchange with other farmers. The potential of this program is considerable. For example, there are approximately 450 farmers in 71 provinces that participate in the rice multiplication program. These farmers have dedicated 1,760 hectares to the program. If only average yields are gotten these farmers can be expected to produce more than 4,000 MT of seed for sale and exchange to other farmers. Other volunteers are multiplying corn, sorghum, soy beans, peanuts, and mungbean.

In order to avoid competing with the private sector, RTG policy is that no more than 40 percent of Project seed can ordinarily be sold directly to farmers who come to the seed centers to purchase it. (See Fig. II.B.1 for marketing channels). Such sales are further limited to a small quantity per farmer, and prices are higher than for RTG agencies and on a cash basis.

As the total seed produced by the Project is very small in relation to total national seed needs, there has been little concern to date about market demand except as it applies to varieties suited to specific uses. The primary marketing problem has been to secure effective transportation to get seed to farmers. However, as Project production increases and the private sector becomes more active, the seed supply in Thailand could potentially face the same problem encountered by other developing seed industries -- expansion of the seed supply faster than the expansion of farmer acceptance of improved seed. Too rapid expansion of production capacity creates a surplus of improved seed and disrupts both private and public sector seed industry development activities. Since the prices of seed offered by the Seed Division will have an impact on both the financial viability of the Division's operations as well as potentially on the seed prices in the private sector, the new sub-division will also need to monitor production costs of both the public and private sector operations. This information will be used to assure that the Seed Division prices for cash crop seeds at a minimum cover production costs and are not unfairly competing with reasonably priced private sector seed. The Project provides $45,000 for local expertise that could be used to help determine market demand and production cost data as well as impacts of pricing on farmers.

It is thus especially important that the new sub-division closely monitor supply/demand and adjust promotional activities and supply projections accordingly.

Materials and supplies necessary for the preparation of promotional materials are available through the DOAE. See the Annexes for a detailed breakdown of equipment and personnel needs for the new sub-division.

c. Private Sector Development. As noted in Part IIA, several private sector firms have begun seed production operations since the initiation of the Seeds I Project. The RTG has assisted these operations with promotional privileges, technical assistance and training. These activities will continue under Seeds II with personnel from private sector companies being encouraged to participate in training courses, technical assistance freely offered to companies who request it, and promotional privileges extended (Figure II B-2 contains a listing of Government support activities to the private sector). Other activities that will facilitate private sector development are briefly discussed below.

(1) Pricing and Promotion

The pricing policy mentioned in Section II B-4a will also benefit the private sector. Experience in other countries has shown that because of more efficient management, fewer bureaucratic constraints and freedom to choose market areas, the private sector can earn an equitable profit whenever public sector operations sell seed at a sufficiently high level to recover all direct costs, as is planned under this Project. It is also expected that the promotion and market research activities of the new sub-division, discussed above, will assist the private sector by assessing felt needs and increasing demand for improved seeds. In addition to the above activities efforts will be made to publicize the opportunities for private sector investment in the seed industry in Thailand by contacting U.S. private seed industry associations.

(2) Seed Association

The consultant assistance provided under Seeds I and during the design of Seeds II has had an important catalytic effect on the proposed establishment of a bipartisan "Seed Association". Such an association, composed of representatives of all interested private sector seed companies plus concerned public sector agencies, would provide a forum for mutually beneficial exchanges of technical information and would provide a mechanism to reduce public/private sector distrust. It would also provide a means to develop ethical industry quality standards and trading practices. Project support for the association will primarily be through encouragement and organizational assistance by the Seed Division and the long term consultants. The primary organizational thrust for the association is expected to come from the private sector.

(3) Regulation

As private sector participation in the seed industry expands and becomes more diverse, appropriate seed regulations will become increasingly important to honest businessmen and consumers. Some established firms have already noted that their maize seed packages are being imitated by others who fill the containers with regular grain instead of improved seed. A fair and well-administered seed regulation system could thus encourage private sector investment from honest firms and also build consumer confidence in the dependability of improved seed.

Thailand has a Seed Act passed in 1976 that provides for minimum standards of physical purity and germination, labeling of seed, and licensing of dealers authorized to sell controlled seed. (The Act does not affect seed produced by the Government.) A Seed Regulatory Section (SRS) has been established under the Agricultural Regulatory Division of the Department of Agriculture to administer the Act, and it is in the process of being staffed and equipped. Currently the SRS employs a chief and 10 technicians, inspectors and analysts. The Agricultural Regulatory Division also is responsible for fertilizer and pesticide regulation, but the regulation of seed is relatively new function for them.

It is expected that the RTG will continue its progress toward a sound seed regulatory system. In order to help this process and help ensure it is not unduly restrictive for the private sector, the Project proposes to provide a short-term consultant to help evaluate needs and provide recommendations for an orderly phasing of regulations. The need for additional consultant assistance and/or training in this important area will be continuously assessed as the Project progresses.

(4) Other Policy Support

The RTG Fifth Development Plan (1982-1987) indicates 246 of the country's poorest districts where public sector programs will be concentrated, and this Project's seed production output is expected to be directed primarily to those areas. The Plan also specifies that the private sector will assume a major role in developing the rest of Thailand's 600 districts. This policy provides private seed companies both a mandate and an extra advantage for their operations in the specified areas. At the same time it concentrates the Government's activities in the poorer areas that will likely benefit the most from seed distribution and welfare activities of RTG extension agencies.

The Seed Division plans to limit production increases of corn and sorghum to about ten percent annually in order to concentrate on larger production increases of the more commercially unattractive but economically important rice and oil seed. Seed production targets for these latter crops are planned to increase by more than 20 percent annually for rice and even more for some of the oil crops. Figure II.B.3 below shows the current Seed Division production targets from 1981-1985. That these targets will be revised occasionally

depending on the demands of farmers, the needs of other Government agencies and the speed that the private sector increases its production of various seed.

Although the Government's plan to continue to produce (and even increase) production of corn and sorghum seed may be questioned in view of strong private sector interest in these crops, it should be noted that private firms are mostly interested in producing seed for hybrid corn and sorghum. Hybrid seed must be purchased every year for maximum yield, and it provides a higher return to seed producers than non-hybrid varieties due to its relatively high value added. Thus, the Government plans for continuing to produce the lower cost varieties of corn and sorghum seed will help ensure that poorer farmers can still get this seed even if private firms devote their production capacity to hybrids. Should this expectation prove wrong and private firms do continue to rapidly increase output of corn and sorghum seed varieties as well as (or instead of) hybrid seed, then the Seed Division plans to hold steady or even decrease production of seed for these two crops so that it is only sufficient to meet the needs of Government programs.

d. Vegetable Seed Component. The Project will transfer a highly specialized technology in the vegetable seed production and processing component. The major output will be a functioning seed processing center, at Chiang Mai in Northern Thailand, with the necessary staff, equipment, and complete program that will enable the center to produce and promote vegetable seed. The Project will need to train a select group of Thai farmers in the techniques of producing high quality seed of improved varieties of vegetables; demonstrate to all interested private sector enterprises the existing risks and opportunities for vegetable seed production/marketing and provide an outlet for locally adapted genetically superior vegetable varieties developed by Thai horticultural researchers.

As noted in Part II A, the private sector is already involved in production, processing, and distribution of vegetable seed in Thailand. However, the private sector vegetable seed industry has serious problems with genetic purity and viability of their product. Briefly, Project assistance will be afforded in variety selection, production training, processing, storage, plant design and operation, and particularly packaging for protection against high humidity and temperature. The small size of the project processing and packaging plant presents no threat to the private sector seed industry, but rather seeks to assist and motivate them to provide a superior local product. Even at maximum production

the center could supply only a few percent of rural needs. The plant should produce only about 2.5 million packets of seed per year by the end of the Project. Only limited direct seed sales to farmers and other rural population from the vegetable seed center will be permitted; the major portion will be channeled through Government assisted programs, nutrition programs, extension demonstration programs, etc. As with field crops, it is expected that the quality of seed channeled through RTG programs will develop a market demand for improved seed which the private sector will satisfy. It should be noted that Thailand has a comparative advantage in the labor intensive vegetable seed industry due to low labor costs, and with the catalytic effect of this Project it is quite possible that vegetable seeds could become an important export for Thailand in the future. At least one U.S. firm already has developed a vegetable seed export business in Thailand and the results have been promising.

(1) General Scheme. The multiplication of seed from foundation seed obtained from universities and DA research stations will be a major function of the Chiang Mai Seed Center. Production will be by farmers on a contract basis. Since vegetable seed production has specific climatic requirements, some vegetables may of necessity be produced at considerable distance from the Seed Center. This should not be a problem since vegetable seed are low-volume and high-value and distance is not as important as with fieldcrop seed.

(2) Manpower. The anticipated production area for about 14 species of vegetables planned for the Project's fourth year is only 58 rai. However, because vegetable seed production is highly labor intensive and the producers will require very close supervision it is expected that as many as 250 farmers will be required to contract this small acreage. Further, a minimum of five fieldmen will be required to supervise this production.

(3) Training requirements. Training in production must be initiated during the Project's first-year. This will be accomplished through the cooperation of the DA and KU vegetable crop breeders at the research stations, and the US technical assistance team and short term consultants. Two vegetable seed consultants are expected to be provided in vegetable seed production and in seed extraction and conditioning for one month each.

e. Foundation Seed. Although there is expected to be adequate supplies of foundation seed available from the Department of Agriculture for rice and most field crops during

the life of Seeds II, the increase in demand for foundation soybeans, peanut and mungbean from 20 MT a year in 1974 to nearly 152 MT in 1979 already has overwhelmed the available personnel and facilities needed for these difficult to process varieties. Those foundation seed facilities will accordingly be assisted under Seeds II in order to improve their capability to support the Project.

One foundation seed facility will be established at the Mae Jo Crops Research Station for processing and storing soybean and mungbean seed. Facilities will also be established on crops research stations at Kalasin and Sakon Nakhon, primarily to handle peanuts, but they will also be equipped to process and store soybean, mungbean and other crop seed.

This Project will provide the needed equipment (see Annexes) for these facilities. The long term equipment consultant will work with DA personnel to train them in its proper operation. The Field Crops Division will assume responsibility for construction costs, personnel and an operational budget. The Division is expected to strengthen the organization, staffing, budgeting, and technical support necessary to establish an oilcrops foundation seed section to ensure its capability to supply adequate amounts of high-quality foundation seed.

Foundation seed programs producing rice, corn, and sorghum have some trained personnel working at present. These will intensify continuous formal and on-the-job training for new personnel. Some personnel of the Oil Crops Section have expertise in seed production but will receive training in drying, processing and storage procedures and equipment operation at the existing DOAE/SD seed centers and through specialized in-country training courses to be conducted under this Project.

6. Inputs

AID inputs will be limited to working capital account funds, technical assistance, U.S. participant training, equipment, and data processing equipment. Equipment is listed in the annexes.

Figure II.B.4. summarizes the training requirements of the Project. Although in-country training courses will not be directly AID-financed they will require AID consultant input plus equipment financed by AID. All courses shown in Figure II.B.4. have been discussed under their respective output package, above.

Figure II.B.5. shows the expected consultant requirements to be financed under the AID assistance. It should be noted that the specific disciplines and timings for the consultants are illustrative and may change depending on needs as the Project evolves. Most consultants are expected to be provided by Mississippi State University.

The Project expects to finance up to 30 person months of short-term local services in the areas of management, training, financial services, etc. in order to follow-up recommendations made by short-term expatriate consultants, conduct possible market research and assist in developing and conducting training courses. Expected sources for these services include the Thai National Institute for Development Administration (NIDA), local market research and accounting firms, and local Universities.

7. Beneficiaries

The potential beneficiaries of direct and indirect effects during the life of this Project are some 15 million persons living in the 246 official "poor amphoes" of the country. If recommended production and distribution targets can be met, about 7 million of these should be able to receive some significant direct benefit. This is also the approximate population of the "very poor" amphoes (about 45% of the total "poor amphoes"). For this reason, the Project could best focus on these "very poor" amphoes, rather than on all poor amphoes. If this is done, the vast majority of beneficiaries may be expected to fall within World Bank definitions of the "absolute poor" in Thailand (see 1981 CDSS). If the entire 246 "poor amphoes" are to be the target, more "less poor" people will benefit. However, if distribution within these 246 amphoes is equal or equitable (not biased by income), the average income, of the recipient population should still be within USAID definitions of poverty, and perhaps a majority would still be below the World Bank "absolutely poverty line" as well.

Part III Project Analyses Summaries (See Annexes for more detailed information)

A. Financial Analysis and Plan

1. Financial Analysis

The total cost of the Seeds II Project is expected to be $19,150,000. Costs to be financed from the AID loan include $1,710,000 for technical assistance (8.9%), $905,000 for U.S. participant training (4.7%), and $1,580,000 for equipment (8.3%), $1,000,000 for the working capital account (5.2%), plus $905,000 for contingency and inflation (4.8%). Total U.S. contribution is $6.1 million, which represents 32% of the expected overall project costs.

Attributed RTG contributions in US$ equivalents are $115,000 for in-country training (0.6%), $7,000,000 for the working capital account (37%), $330,000 for equipment (2%), $680,000 for vehicles (3.5%), $4,005,000 for construction of facilities (21%), and $1,250,000 for personnel and operations (6.5%). The total RTG contribution is 68% of expected overall costs, thus exceeding by a wide margin the 25% requirement of FAA Section 110(a).

The U.S. contribution contains a 10% contingency item and an inflation factor of 10-20% per year depending on component. Since the equipment package does not have an inflation factor built into the line item estimate, a separate line item is provided which allows for a 20% annual rate. All RTG figures contain a similar allowance for inflation and contingency.

2. Financial Arrangements: More than 80% of the AID contribution is for foreign exchange costs of technical assistance, participant training and equipment, and these items are expected to be financed through traditional direct payment procedures with direct L/COMMs or equivalent. AID will also finance housing, local travel/per diem costs of the long term consultants.

The AID contribution to the working capital account represents only 12.5% of estimated total requirements over a four year period. Annual needs are estimated at Baht 32.6 million of which AID will contribute Baht 4.09 million. After the first year, each annual AID contribution will be made only when satisfactory evidence is presented to show an improvement in the seed sale price structure and better management control of disbursements and recoveries for the fund.

Improvement of the pricing arrangement is particularly critical if the WCA is to be self-supporting. In 1980 the margin between purchase and sales price of seed was 23% but losses were considerable (see Economic Analysis for discussion of subsidies).

B. Technical Analysis

1. Technical Concerns

Thanks to the institution building efforts under Seeds I most of the technical questions relating to choice of technology, technical capability of the implementing organization, and general feasibility of a seed improvement program in Thailand have been answered in the affirmative. As noted in the Project Description, additional training, technical assistance and equipment will be provided under the Seeds II Project to ameliorate the few remaining deficiencies apparent in the seed production system and help ensure that the private sector is able to expand its role in accordance with Government policy. Annex IV summarizes the results of the technical review that led to the Seeds II Project.

2. Feasibility of Project Approach: As noted above, the Project intent is to develop within the SO a system management capability for the efficient supply of high quality improved seed in response to demand. The emphasis on system management capability is warranted in view of the impending increase in Seed Centers. The Project approach to effective management is primarily through training, both local and U.S. For the first time under AID Seed Project assistance two M.S. candidates will major in marketing/business administration/management while all other candidates will be expected to take appropriate management related courses. Additionally, a few management interns will undergo 6 mos. each on-the-job training in seed system management with large U.S. seed companies. Two one-month consultancies are scheduled to advise the Project on appropriate management techniques and organization as well as conduct local management training sessions for Project Officers. As a management tool a small computerized system will be established to help in all phases of seed processing quality of control, production costs and data processing. This is a feasible and adequate approach to develop a nucleus of management capability upon which the Project can expand.

A second major Project purpose is to develop a

market demand for improved seed that will stimulate greater private sector seed industry investment. The Project approach to increase both demand and private sector involvement is based on several interacting factors as follows: (a) spread effect from farmer-to-farmer following distribution through government assistance programs; (b) farmer education based on extension contacts, crop demonstrations, TV and radio programming, field days; (c) BOI promotional privileges; (d) training and technical assistance offered to the private sector; and (e) a Seed Industry Association for exchanging mutually beneficial industry information including investment opportunities.

The technical production operations for both field crops and vegetable seed are, in most cases, already known within Thailand or used in the Project and present no major implementation problems. Adequate training is provided within the Project to bridge gaps in technical expertise such as vegetable seed extraction, processing, and packaging.

All construction and equipment installation will be done using procedures developed under Seeds I. Costs are considered reasonable and firm based on current experience.

3. Environmental Concerns: AID/W approved a negative determination for the IEE contained in the Seeds II PID (see Annex IV for cable exchanges).

C. Economic Analysis Summary

The purpose of the financial and economic analysis is to evaluate the impact of the Seeds II Project in terms of the return to the recipient farmers, the level of subsidy cost to the Government and the financial and economic returns to the capital investment.

The return to the recipient farmer is high. The estimated benefits will reach 163.7 million baht by year 9 without additional cost to the farmers at the present seed prices. Should the seed prices be upwardly adjusted, the return to the farmers will be decreased by the additional cost of seeds.

At the present seed prices and taking into consideration only the prices paid to contract growers plus operating cost, the government subsidizes rice corn, sorghum and peanut seeds at the expense of mungbean and soybean seeds. If depreciation and interest on working capital were accounted for, the level of subsidy cost to the government would be much higher. (See Figure III.C.1.)

The Seeds II Project is not financially attractive in the commercial sense. The IRR is low. The IRR can be increased by raising the seed prices. However, looking at it in a wider perspective, the Project is economically sound. The direct benefit to the economy is favorably high. The Government can recoup its financial loss elsewhere. Figure III.C.2 illustrates the expected returns of the Project to the seed centers (financial IRR), the economy (economic IRR), and the farmers (benefit/cost ratio).

It is recommended the pricing of seeds should be periodically reviewed. Selective adjustment may be necessary taking into consideration the level of private sector involvement, the relative position of the crops concerned and the rate at which the government would like to recover its capital expenditures.

D. Social Analysis Summary

The Project will target on the 246 "poor amphoes" identified by the RTC Fifth Five-Year Plan. Figure III.D.1 shows some characteristics of these amphoes, and Fig. III.D.2. shows the regional distribution. Sixty-percent of these are in the Northeast, comprising over 90% of the region. Since 246 amphoes represent about half the amphoes in the country, this is too large a population to "focus" the project. Of the "poor amphoes" however, about 45% of the 246 poor amphoes (66 amphoes in the Northeast) are "very poor amphoes. These would be an appropriate priority focus for the Project. In order to materially affect production in these "very poor amphoes" through the introduction of improved seed, the project will have to increase seed production by 3 to 10 times. Further, since most of these amphoes are rainfed, production of rice seed (the major part of the project) will have to be shifted from the current emphasis on non-photoperiod sensitive non-glutinous varieties to an emphasis on photoperiod sensitive varieties, especially glutinous varieties. A range of "weights" will be required in these varieties. Details are discussed in the Social Analysis Annex and in a separate report (Grandstaff 1981).

A number of feasibility issues were raised from the social point of view, to include the need to emphasize rice, to utilize an exchange program for the distribution of rice, to put greater emphasis on photoperiod sensitive varieties to be grown in the wet season in poorer rainfed areas, etc. The intent of the Seeds II Project is laudable in satisfying all these concerns. Remaining concerns are thus not so much with

the social issues themselves as with the organizational feasibility issues needed to effect the intended program. Identified as being of special concern are (1) a system to identify needs annually and set production targets by seed type and quantity; (2) increase overall production of the particular seed types needed; (3) establish efficient distribution channels to get the right seeds to the right places, in the quantities, needed, at the right times each year.

If the Project proceeds as intended there is every expectation that great benefit will result. Effects on poverty, on equity, on woman interests, on population, and on environment are all expected to be significantly positive. Spread effects will be significant, through seed exchange among farmers themselves, but its volume cannot be estimated. (See Social Analysis Annex for details.)

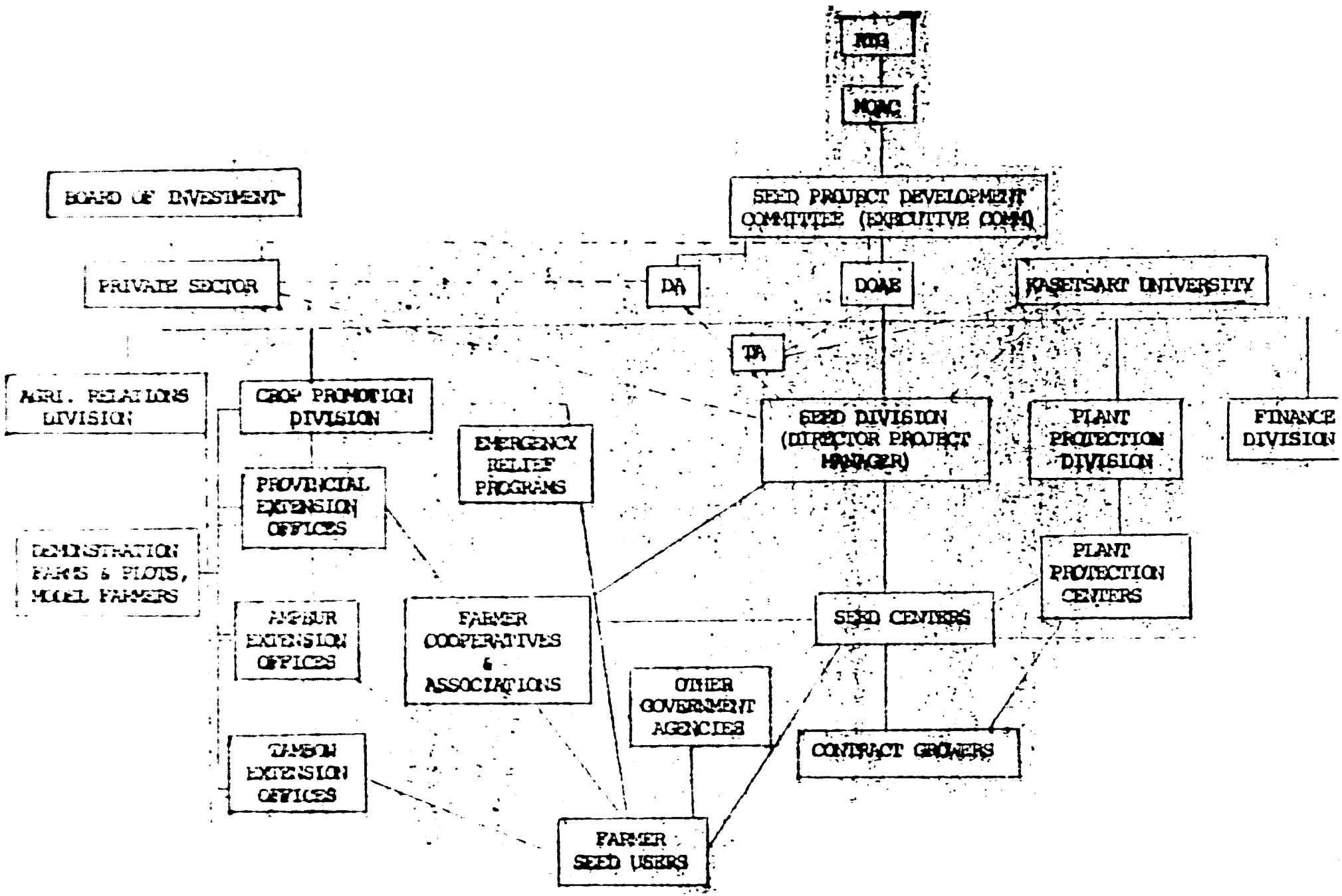
Part IV Implementation Analysis and Arrangements

A. Organizational and Administrative Analysis

During the various evaluations and reviews conducted on Seeds I and design work done for Seeds II, several basic observations were made on the organization and administration of the Seed Division as these factors relate to the objectives of the Division. One common observation has been that the Division is hobbled by weak management of the seed centers that has necessitated strong central control from Bangkok. The centralization of management requires the operating field units (the seed centers) to obtain advance Bangkok concurrence on a case by case basis for virtually all matters concerned with funds disbursement over Baht 10,000 ($500) and other administrative matters related to money (e.g. sales of waste material, disposition of funds received, etc). This has caused many delays in disbursing funds to contract farmers and reimbursing the working capital account from the sale of waste material particularly. As the number of seed centers expands, the need for efficient decentralized management will become even more important.

Another general problem relates to the disaggregation of the various functions required in the development, production, and distribution of seed. The Department of Agriculture and Universities provide research and foundation seed, but the Department of Agriculture Extension must multiply and condition

Figure IV.A.1 Interim Chart of the Seed Institute



the seed (Seed Division), extend the seed (Crop Promotion Division) and assist in spraying and other plant protection activities (Plant Protection Division). Moreover, promotional activities through the media depend on the Agricultural Relations Division, access to funds requires the participation of the Finance Division, and access to some markets is provided by the Marketing Organization of Farmers (MOF). Figure IV.A.1 shows the various interest groups that are involved in the seed system. Although all the agencies mentioned above are within the Ministry of Agriculture and Cooperatives and coordination has generally been good in the past, the number of agencies involved in the seed system increases the likelihood of administrative delays and breakdowns. Evidence of this may be seen in the failure of the MOF to repay the Seed Division for seed delivered to it and problems in planning for adequate amounts of foundation seed for extension demands.

One other problem caused by disaggregation is that the agencies removed from distribution have had little access to farmer feedback on types of seed varieties most appropriate to various locations, performance/suitability of existing seeds and similar information that might lead to production of more suitable seed varieties.

In view of the importance of the private sector to the RTG's seed development plans, it is surprising that no formal coordination mechanism exists between the private and public sectors. Such a mechanism to provide a system of basic information sharing and complementary planning appears essential to the effectiveness of both sectors if they are to maintain a collaborative, non-confrontational method of operation.

Finally, a viable method of coordinating the various donor inputs into the seed system is becoming increasingly important in view of the scale of assistance planned by the Japanese, EEC, and USAID. There is some danger that such inputs, if provided too rapidly and without regard to absorbtive capacity, might overwhelm the fragile administrative capability of the relatively "young" Seed Division. The growth of the Government's participation in the seed system must be carefully planned with regard to long term objectives as well as availability of donor funds.

B. Proposed Organizational Arrangements

In order to address the general constraints identified above several approaches are proposed in the Project.

1. As the management capability of the seed center managers is strengthened, authorities will be delegated to the maximum extent allowable. The Seed Division is currently reviewing the legal requirements that constrain certain delegations, and a Loan Covenant will provide for the delegation of all authorities to the seed centers consistent with the laws of Thailand. It is also planned that the seedcenter manager position will be upgraded to level 7 (from 6) in order to attract the level of expertise needed for the positions.

2. Assistants to the Project Director will be appointed for technical operations and administration. These two assistants will relieve the pressure on the Seed Division Chief who is also Project Director and should reduce delays for necessary Bangkok approvals considerably. It is expected that the assistants will spend much of their time in the field helping to sort out problems at seed centers. Only persons of proven administrative ability will be assigned to these positions.

3. A National Seed Committee is being formed to supervise, guide and coordinate the planning, implementation and operations of all RTG Seed Development projects. This committee, chaired by the Minister of Agriculture and having the administrators of concerned agencies as members, should provide the necessary authority to coordinate all MOAC seed projects and obtain necessary staff and funding for proper implementation. The Committee also will work toward encouraging private sector investment (private sector representatives are expected to participate in relevant sub-committees), planning national seed policy, and supervising the implementation of the Seed Loan.

The Committee will establish subcommittees for each seed project, including the USAID Project, to ensure that its policies are carried out. A Director of Seed Development Projects will also be appointed under the Committee to coordinate the activities of each project.

4. The Seed Division will develop a new promotion/marketing sub-division. This sub-division, described elsewhere in this PP, will directly address the problems that the Seed Division has had in obtaining farmer feedback and reliable data for planning production needs. It will also provide a locus of responsibility for training programs and media campaigns.

5. Formation of a Thai Seed Association will provide a linkage between the public and private sectors. As noted in Part II, the Seed Association should be an important contribution to good relations between the two sectors.

The responses to administrative and organizational constraints discussed above should serve to make the Project administratively sound as designed. The general organization of the Project is described below.

C. General Organizational Plan

An organizational diagram of the Project is shown in Figure IV.C.1. This Project's organization has evolved from the organization proposed under Seeds I in order to improve the overall management. The National Executive Committee under Seeds I was chaired by the Under-Secretary of Agriculture while the revised Committee will be chaired by the Minister and have generally higher level representation and greater responsibility. The Directorate of Seed Projects is a new position that will increase the coordination capability of the Government among seed projects. The formation of a seed industry association will provide a forum for exchanges between the public and private sectors. It should be noted that arrangements under Seeds I generally conform to the arrangements proposed here except for the above innovations, and no major problems are accordingly expected in implementing the organizational plan. A more detailed discussion of the role of each agency concerned in the Project is contained in Annex VI.

The organization of the Seed Division is shown in Figure IV.C.2. Several improvements in the SD organization are being made which improve the organizational base developed under Seeds I. As noted above, two assistant directors for administration and technical operations will be appointed to assist the Project Director. In addition, several new sub-divisions are being added to the Bangkok operation. These are shown in Fig. IV.C.2. Only the Marketing and Promotion Sub-Division represents a new function; the other sub-divisions are existing elements that are being formed into new sub-divisions in order to parallel the seed center organizations and thus simplify the general lines of administration.

D. Implementation Plan

This Project is divided into two major sub-sectors: (a) development of management/operational skills to maximize the effectiveness of facilities and technical operations initiated under Phase I and (b) the initiation or increased emphasis upon vegetable seed production, seed awareness training and private sector encouragement. A detailed implementation plan for these activities has been developed. A summary plan is shown in Figure IV.D.1.

1. Pre-Implementation

Pre-implementation steps include approval of the Project Paper and Loan Agreement, selection of procurement agent and preliminary negotiations with the technical assistance contractor. To meet the planned U.S. participant training schedule, personnel for the 1982 academic year will have to be placed in English language training by 1 September 1981. Preliminary arrangements will need to be initiated for the Management Intern program prior to the Project's initiation. Specifications for most equipment procurement should also be developed.

2. Early Implementation Activities

First year implementation will focus principally upon arranging technical assistance and training components and carrying out procurement and organizational activities necessary to the success of later Project operations. These early activities will include:

a. Negotiation of technical assistance contract and appointment of long term staff.

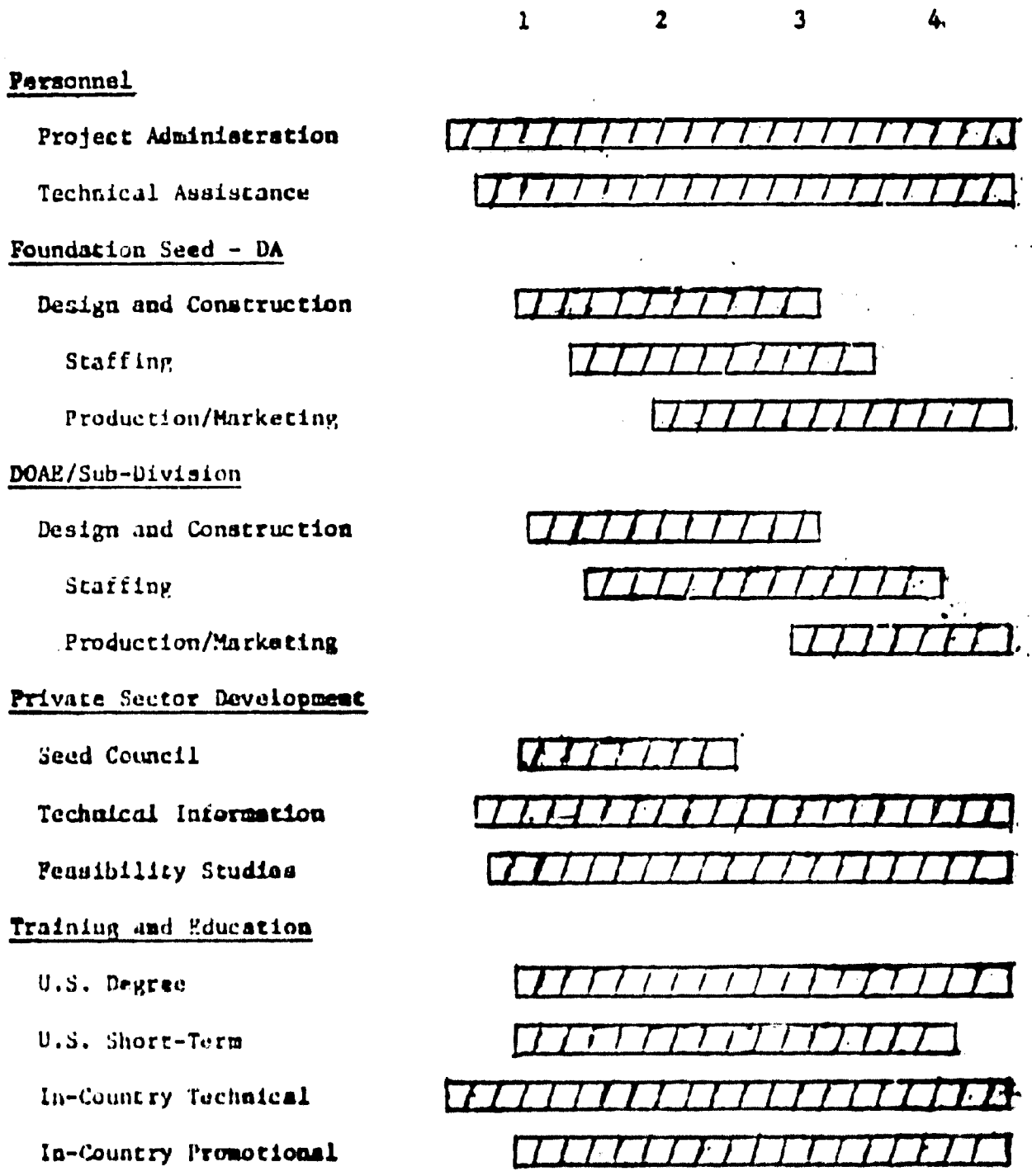
b. Finalize arrangements for the management intern program.

c. Development of preliminary engineering design and construction drawings for all new facilities.

d. Requests and approval of RTG budgets for continuing Phase I operations and construction of new facilities.

e. Request bids for priority equipment needs.

Figure IV D-1 Summary Implementation Schedule



f. Initiate formal discussions with private sector seed industry leaders concerning establishment of a Seed Association.

g. Select and send initial management intern, five short term participants to USDA/AID IC 130-3 course and two master's degree candidates to U.S

h. Plan and prepare first year in-country technical training program for Seed Division and private sector personnel.

i. Reorganize DOAE/SD to provide seed promotion and marketing sub-division.

j. Initiate Seed Awareness training for non-DOAE/SD farmer advisors at each Seed Center.

k. As requested, provide private sector with technical assistance and information and assist BOI in conducting feasibility studies.

l. Evaluate and make needed adjustments in on-going Seed Division management and technical operations in production, conditioning and marketing.

m. Determine what type of computerized record keeping system is required and develop software package in conjunction with equipment specifications.

The first year implementation activities, summarized above, are crucial to meeting the projected deadlines. Previous experience indicates that approximately 24 months are required to: plan, obtain budgets and construct facilities; obtain approval, budget for and hire additional personnel; prepare equipment specifications, obtain bids and receive equipment from the U.S. With the exception of obtaining additional staff, all these activities require support from T.A. contract personnel. Thus, any delay in negotiating or staffing the T.A. contract will result in a delay of all new facilities and the production/marketing associated with them.

3. <u>Subsequent Emphasis</u>

The second and succeeding years will involve the annual production of the target field crop seed and the

initiation of production of seed of 14 selected vegetable crops. It is expected that most construction activities will commence in the second year, and that all construction will be completed in the third year. Equipment procurement should proceed apace, with all contracts let before the middle of the second year. The Seed Association should be established and most additional staff requirements met before the end of the third year. Training activities should be established by the second year and the two Master's degree candidates sent to the States.

It should be noted that the last two Master's candidates are not expected to be placed until the fourth year of the Project and thus will not complete their degrees until the end of the fifth year. This necessitates a five year project assistance completion date, although all other activities should be finished by the end of the fourth year.

E. Implementation Arrangements

1. Technical Assistance/Training

It is anticipated that the Mississippi State University will be the prime contractor for both technical; assistance and training due to MSU's special seed expertise and experience under Seeds I. A predominant capability waiver for MSU was approved in State _____ (see Annex I.)

For management expertise and intern training the Project will coordinate with the Industry Council for Development's Commercial Seed Industry Development Project (CSIDP) and experienced local management specialist. It is expected that a portion of the consultants and internships will be arranged with the cooperation of the American Seed Trade Association (ASTA).

2. Procurement of Equipment

In order to relieve the Seed Division of the large burden of procuring the $1.6 million equipment package and to facilitate this procurement to the maximum extend possible, it is planned to use the services of a procurement services agent for all offshore equipment. Numerous problems arose during the equipment procurement process under Seeds I, and these required that the AID project manager, MSU consultants and top management of the DA and the Seed Division devote a considerable amount of time and effort that could not, therefore, be spent on more relevant technical and administrative concerns. The use of a quality procurement

services agent should also virtually eliminate the extensive delays in obtaining needed equipment under Seeds I.

Since the amount of procurement will be extensive, the Project will request interested agents to submit proposals that can be evaluated in terms of fee structure and experience with seed equipment procurement. This will be done as soon as possible after PP approval.

3. AID Monitoring Arrangements

One USAID direct hire development officer will be assigned to the Project on a half-time basis. A USAID project committee was formed to help monitor the Seeds I Project, and this committee consisting of a loan officer, project accountant, agriculture development officer, and local legal specialist will continue to function under the Seeds II Project.

The above arrangements are expected to be adequate for this Phase II project, particularly with the assistance of a procurement services firm. Procedures for AID/RTG liaison have already been worked out under Seeds I and this background of experience has resulted in a good understanding and firm relationship with the Seed Division.

F. Monitoring/Evaluation Plan

1. Project Monitoring

The RTG project manager will submit to USAID monthly reports on those production/distribution factors listed as inputs and outputs in the logical framework. These would include, for example, progress of training arrangements, construction status, staffing progress, and financial/operational progress. The report format and data required is expected to be specified in Project Implementation Letter No. 1.

Following the purchase and installation of the computer system mentioned in Section II, it is planned that the monthly report format will be based on a computer print-out of specified Project status indicators.

To assure a more complete understanding of Project problems, progress, etc., the USAID Project Manager will be expected to visit every AID-assisted Seed Center regularly. Additionally, the RTG Project Manager, USAID Project Manager, and the Project Technical Advisors will hold scheduled, but informal, meetings each month to discuss the previous month's report and various project implementation problems.

2. Project Evaluations

Evaluations will be conducted as required for Project management decisions. The Ministry of Finance, MOAC and USAID will jointly determine the need for an evaluation; draw up scopes of work; and select an evaluation team. AID will participate in the evaluation along with other Thai agencies such as Bureau of the Budget, Civil Service Commission, MOAC and Ministry of Finance. The final evaluation report will be agreed upon by the project committee, and disposition and follow-up on recommendations will be the project committee's responsibility.

An evaluation could be called for anytime there was an indication of a need for information to make management decisions, however, on the assumption that no major Project problems will be encountered in the early life of the Project, it is expected that a mid-term evaluation will be useful to obtain an overview of Project direction and impacts, and make any mid-term adjustments that might be necessary.

A second evaluation might be called for near the end of Project life if there is an indication that the Project might continue in some form. This would be determined by the Ministry of Finance loan portfolio manager in conjunction with the Project committee.

G. Conditions Precedent, Covenants and Negotiating Status

The following CP's and covenants are anticipated for the Loan Agreement. The need for these items has been discussed between USAID and RTG staff and no significant delay is expected for executing the Agreement after the Project is authorized.

1. Initial CPs to Disbursement (90 days)

a. Legal Opinion.

b. Designation of Authorized Borrower's Representatives.

c. Contract with prime consultant.

2. Secondary CPs to Disbursement (180 days)

a. Implementation plan and financial plan for all major project elements.

b. Coordination plan showing relationship between Seeds II Project and seed projects planned to be financed by other donors.

3. CP to initial disbursement for the Working Capital Account

Plan of operation for the WCA that indicates specific actions being taken to avoid losses from purchasers of seed.

4. CPs to Each Disbursement for the Working Capital Account After Initial Disbursement

a. Evidence that RTG seed prices are being adjusted so that costs of seed production (at a minimum) will be covered before the end of the Project.

b. Evidence that the WCA is being managed adequately to minimize avoidable losses, including potential losses from bad debts and unsold but saleable waste materials.

5. Special Covenants

a. The RTG agrees to facilitate private sector participation in the seed production system to the maximum extent possible, and agrees to actively sponsor and participate in a bipartisan Seed Association.

b. The RTG agrees to permit the delegation of authorities to the operational level of the Seed Division to the maximum extent consistent with the laws of Thailand as management capability is improved at that level.

c. The RTG agrees to work toward the establishment of monitoring arrangements during the life of the Project that provide all agencies in the seed production system with regular feedback on farmers' seed needs and problems.

d. Distribution of Project seed will be targeted on the country's poorest districts as identified in the Fifth Development Plan.

Figure II-B.1 Project Seed Marketing Channels

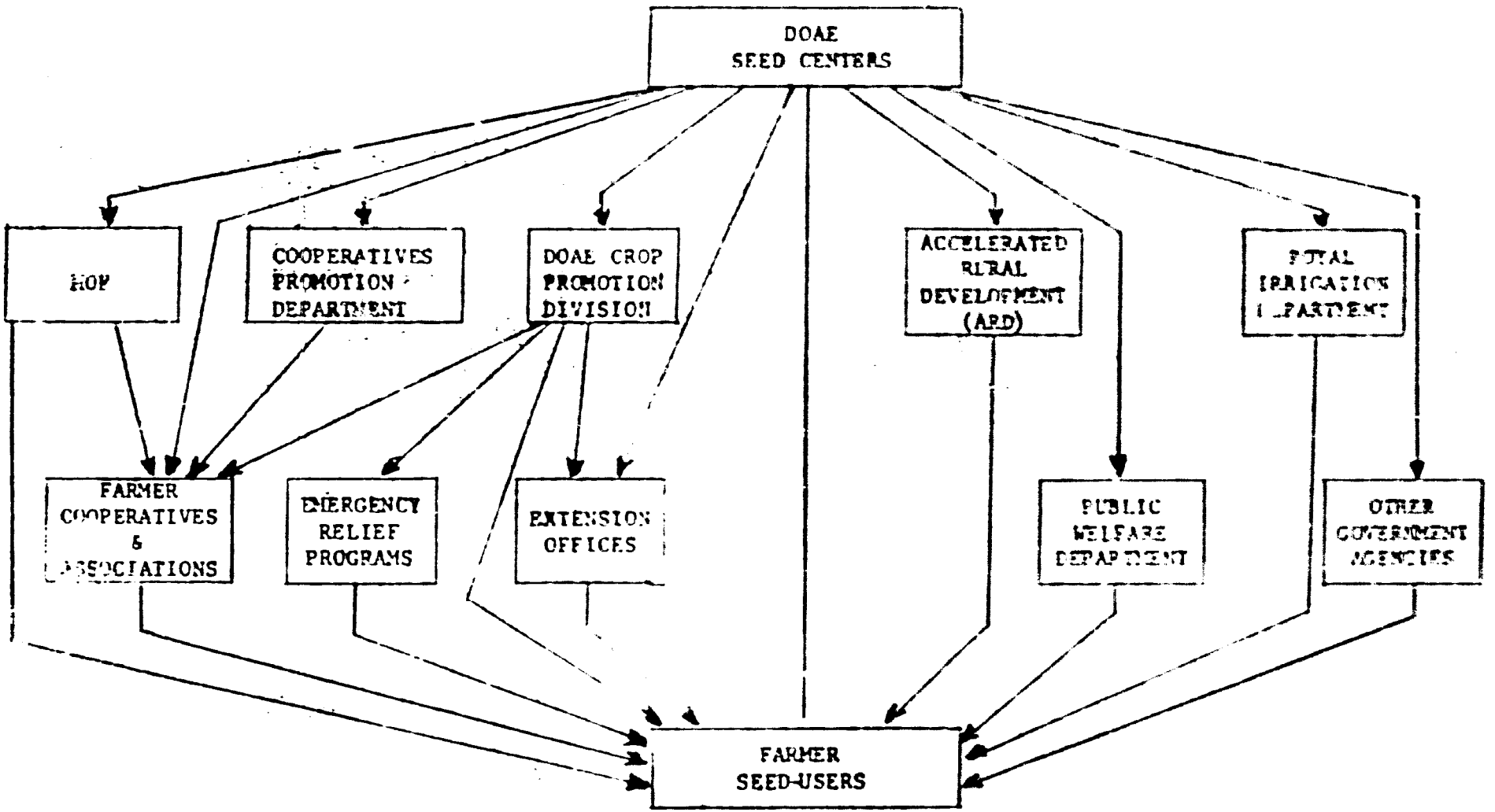


Figure II-B.2

SUPPORT TO PRIVATE SECTOR DEVELOPMENT

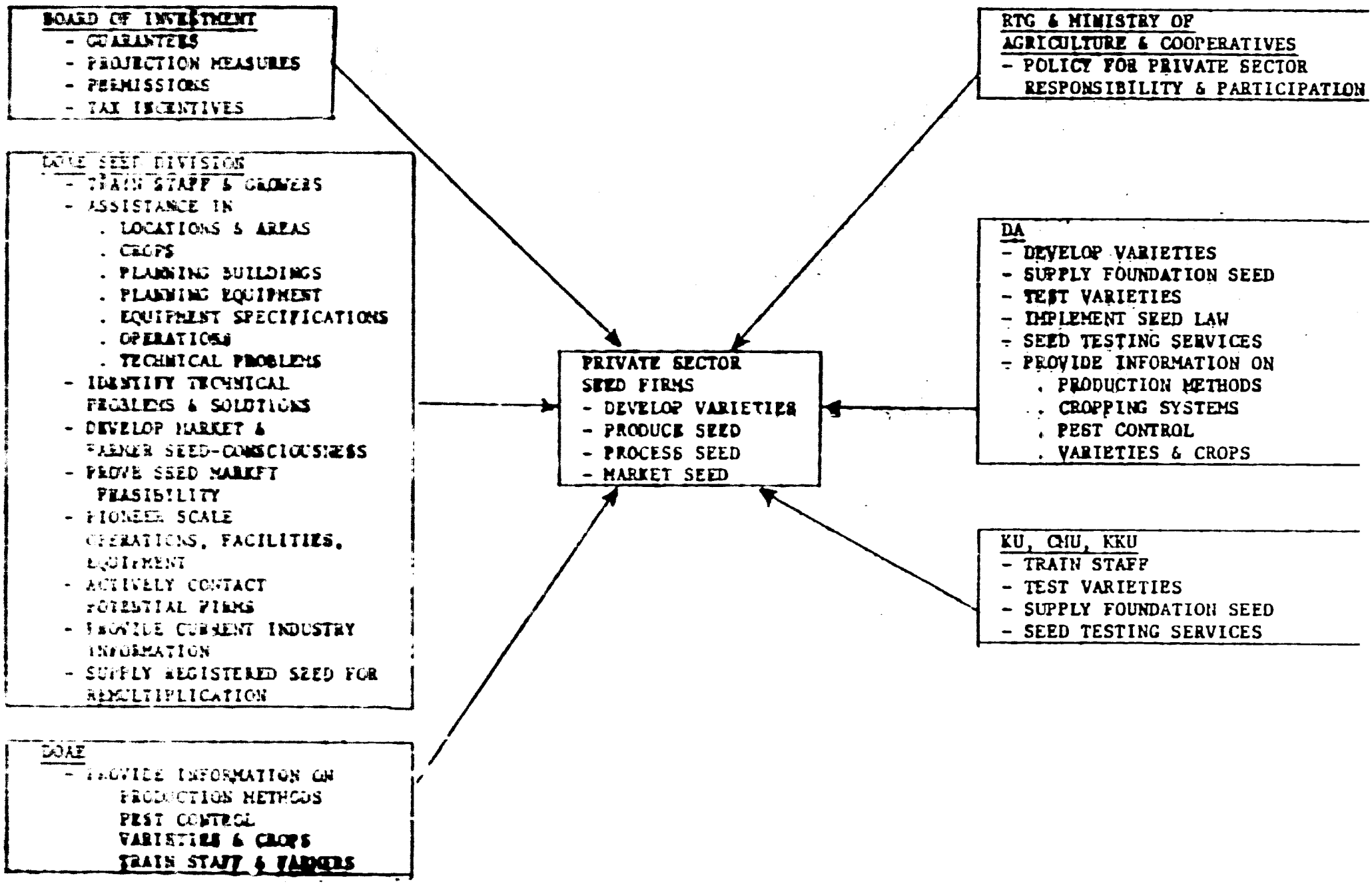


Figure II.B.3 Estimated Project Seed Production -- Field Crops

Crop	Anticipated Seed Production (MT)				Portion of Seed Supply 4/	
	1981/82	1982/83	1983/84	1984/85	Total National (%)	Estimated Demand (%)
Rice	1,700	2,300	2,900	3,500 3/	0.6	5.9
Corn 1/	1,200	1,300	1,400	1,500	3.7	11.3
Sorghum 1/	50	50	55	60	2.5	25.2
Soybeans 2/	350	400	450	550	6.3	31.7
Peanuts 2/	550	600	700	1,000	5.8	36.7
Mungbeans	150	175	200	250	2.2	22.2

1/ DOAE/SD increases in these crops is restricted due to increasing private sector production.

2/ Volume produced by DOAE/SD limited do to limited availability of foundation seed stocks until 1984/85.

3/ RTG/USAID Project only. DOAE/EEC and DA rainfed rice programs will also produce seed.

4/ Final year of Project period.

Figure II.B.5. Summary of Seeds II Consultant Requirements

Activity	Duration (Days)	Cost (US $)	Project Year 1	2	3	4	Total Cost (US $)
Long Term Consultants (Senior Seed Specialist and Seed Conditioning Specialist)	8 p.y.	$1,350,000	X	X	X	X	$1,[illegible]
Short Term Consultants:							$186,357
1. Vegetable Seed Production	30	13,230		X			
2. Vegetable Seed Extraction & Conditioning	30	13,230		X			
3. Computer (Installation Program Development Training)	60	23,520	X				
4. Computer (Installation Program Development Training)	30	13,230		X			
5. Management (Management Design & Training)	60 (30)	28,311	X		X		
6. Seed Marketing	30	13,230		X			
7. Seed Law and Regulations	30	11,760	X				
9. Seed Pathology and Treatment	30	14,958			X		
10. Soybean Seed Production	30	11,760	X				
11. Quality Control	60 (30)	28,311		X		X	
Local consultants in training, finance, management, etc.	20-30 p.m.	45,000	X	X	X	X	$ 45,000

Figure II.b.4. Summary of Seeds II Training Programs

Activity	Duration	Participant Numbers	Participant Cost (US$ each)	Project Year 1	2	3	4	Total Cost US $
In-country Training Courses:								$115,000
1. Seed Awareness	4 days	30/course	50	4	4	4	4	24,000
2. Skills Development								
Drying and Processing	3 weeks	15/course	200	1	1	1	1	12,000
Quality Assurance	3 weeks	15/course	200	1	1	1	1	12,000
Production & Inspection	1 week	30/course	50	4	4	4	4	24,000
Seed Producers	1 day	50 each	10	5	5	6	6	11,000
3. Seed Technology - General	3 weeks	30/course	200	1	1	1	1	24,000
4. Field Days and Observation Groups	1 day	100/group	5	4	4	4	4	8,000
Participant Training:								$907,262
1. Study Tour								
Seed Programs & Improvement TC 130-3	3 mo.	16	(a)	4	4	4	4	231,896
2. Degree Training (MS or MA)								475,366
Management	24 mo.	2	(a)	1	-	1	-	
Vegetable Seed Production	24 mo.	2	(a)	1	-	-	1	
Seed Processing & Handling	24 mo.	1	(a)	-	1	-	-	
Seed Production	24 mo.	1	(a)	-	1	-	-	
Quality Assurance	24 mo.	2	(a)	-	-	1	1	
3. Non-Degree (On Job)								
Management Intern	6 mo.			1	1	1	1	200,000

(a) Information in the Annexes provides the bases for estimates.

Figure III.A.1. ESTIMATED PROJECT COSTS

US$ 000

Item	AID		RTG		Total
	FX	LC	DOAE	DA	
I. Technical Assistance					
A. Long Term (MSU)	1,350	125			1,475
B. Short Term					
1. MSU	135				135
2. Other	55	45			100
II. Training					
A. US Participant					
1. M.S. (8)	475				475
2. TC 130-3 (16)	230				230
3. Mgmt. Intern (4)	200				200
B. In-Country					
1. Seed Awareness			25		25
2. Skills Devel.			80		80
3. Field Days			10		10
III. MCA					
A. Field Crops		750	5,250		6,000
B. Vegetable Crops		250	1,750		2,000
IV. Equipment					
A. Foundation Seed Facilities	465			110	575
B. Seed Centers	900		220		1,120
C. Education - Promotion	115				115
D. Data Processing	100				100
E. Vehicles			220	130	350
V. Construction					
A. Seed Centers			2,570		2,570
B. Foundation Seed Facilities				1,210	1,210
C. Training Centers (1)			225		225
VI. Personnel & Operations			1,250		1,250
Sub-Total	4,025	1,170	11,600	1,450	18,245
Contingency	415	110	-	-	525
Inflation (Equipment)	380	-	-	-	380
Total	4,820	1,280	11,600	1,450	19,150

Figure III.C.1 Subsidy Cost to Government for Seed at Present Prices
(in Baht: 21 Baht = $1)

Crops	Present Seed Price Per Kg.	Cost of Seed Per Kg.*	Level of Subsidy
Rice	5.50	7.04	1.54
Corn	6.50	6.85	0.35
Sorghum	5.00	6.64	1.64
Mungbeans	15.00	12.71	-
Soybeans	15.00	12.16	-
Peanuts	15.00	17.22	2.22

*Price paid to contract growers plus operating cost exclusive of depreciation and interest.

Figure III.A.2. ANNUAL FINANCIAL SUMMARY

AID CONTRIBUTION

($000)

Project Component	Year 1	Year 2	Year 3	Year 4	Total
1. Technical Assistance	365	405	425	515	1,710
2. US Training	170	200	240	295	905
3. Working Capital Account	250	250	250	250	1,000
4. Equipment	215	1,365	-	-	1,580
Sub-Total	1,000	2,220	915	1,060	5,195
Contingency/Inflation	125	655	55	70	905
Total	1,125	2,875	970	1,130	6,100

Note: In addition to the amounts shown above, the DOAE will need to budget an amount equal to approximately 85 percent of the advisors' salaries for Thai income taxes and an additional 20 percent will need to be budgetted for customs duties and related fees for imported equipment. These figures are not shown in the tables because they are transfer payments and not real costs to the RTG.

Figure III.C.2 Financial and Economic Returns and Returns to the Farmer

Methodology	Basic Return	20% Increase in Field Crop Seed Prices	40% Increase in Rice/Corn Sorghum Seed Prices	10% Operating Cost Increase
Financial Return	-4.47	5.08	4.96	-6.44
Economic Return	151.37	133.12	133.35	147.33
Benefit/Cost to Farmers*	High Benefit at no incremental cost.	11:95:1	12:51:1	NA

*Discounted at 14%.

Figure III.D.1. SOME CHARACTERISTIC'S OF THE OFFICIAL "POOR AMPHURS" IN THE NORTHEAST*

	Wet Rice Land Holding Size	% of Rainfed Wet-Rice Land in Total Holding	Rice Yield (tang/rai)
Very poor Amphurs (Av. pov. index 93.1)	14.5	86.6	26.5
Medium Poor (Av. pov. index 70.3)	16.0	71.5	29.0
Less poor (av. pov. index 40.0)	12.7	38.1	31.6

* Unweighted average of amphur averages.

Figure III.D.2. REGIONAL DISTRIBUTION OF "POOR AMPHURS" IDENTIFIED IN THE 5TH 5-YEAR PLAN

Region	# of Provinces (%)	# of Amphurs (and "King amphurs") (%)
Northeast	16 (43)	147 (60)
North	16 (43)	72 (29)
South	5 (14)	27 (11)
Center	0 (0)	0 (0)
Total	37 (100)	246 (100)

Table I: Estimated Project Costs
(US$000)

ITEM	AID		RTG		
	FX	LC	DOAE	DA	TOTAL
Technical Assistance	1,304.7	-	-	-	1,304.7
I. Training					
A. U.S. Participant	907.2	-	-	-	907.2
B. In-Country	-	-	115.0	-	115.0
II. Working Capital Account	-	1,000.0	2,070.8	-	3,070.8
V. Equipment	2,349.7	-	440.0	240.0	3,029.7
Construction	-	-	2,795.0	1,210.0	4,005.0
I. Personnel and Operations	-	-	1,250.0	-	1,250.0
II. Evaluation (Grant)	70.0	30.0	-	-	100.0
Sub-Total	4,631.6	1,030.0	6,670.8	1,450.0	13,782.4
Contingency (Including Inflation Equipment)	538.4	-	-	-	538.4
Total	5,170.0	1,030.0	6,670.8	1,450.0	14,320.8

Figure IV.C.1. ORGANIZATIONAL ARRANGEMENT FOR SEEDS II PROJECT

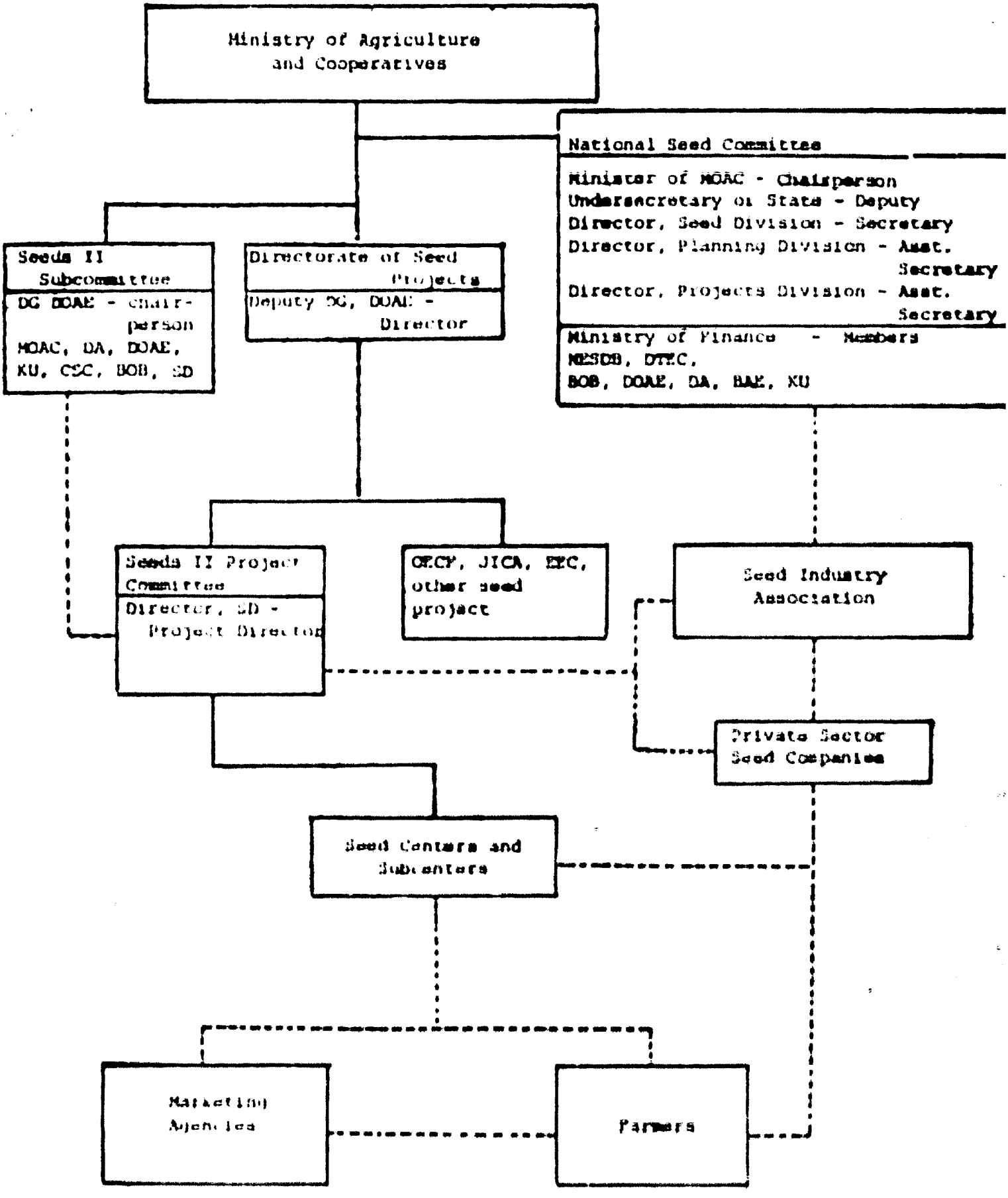
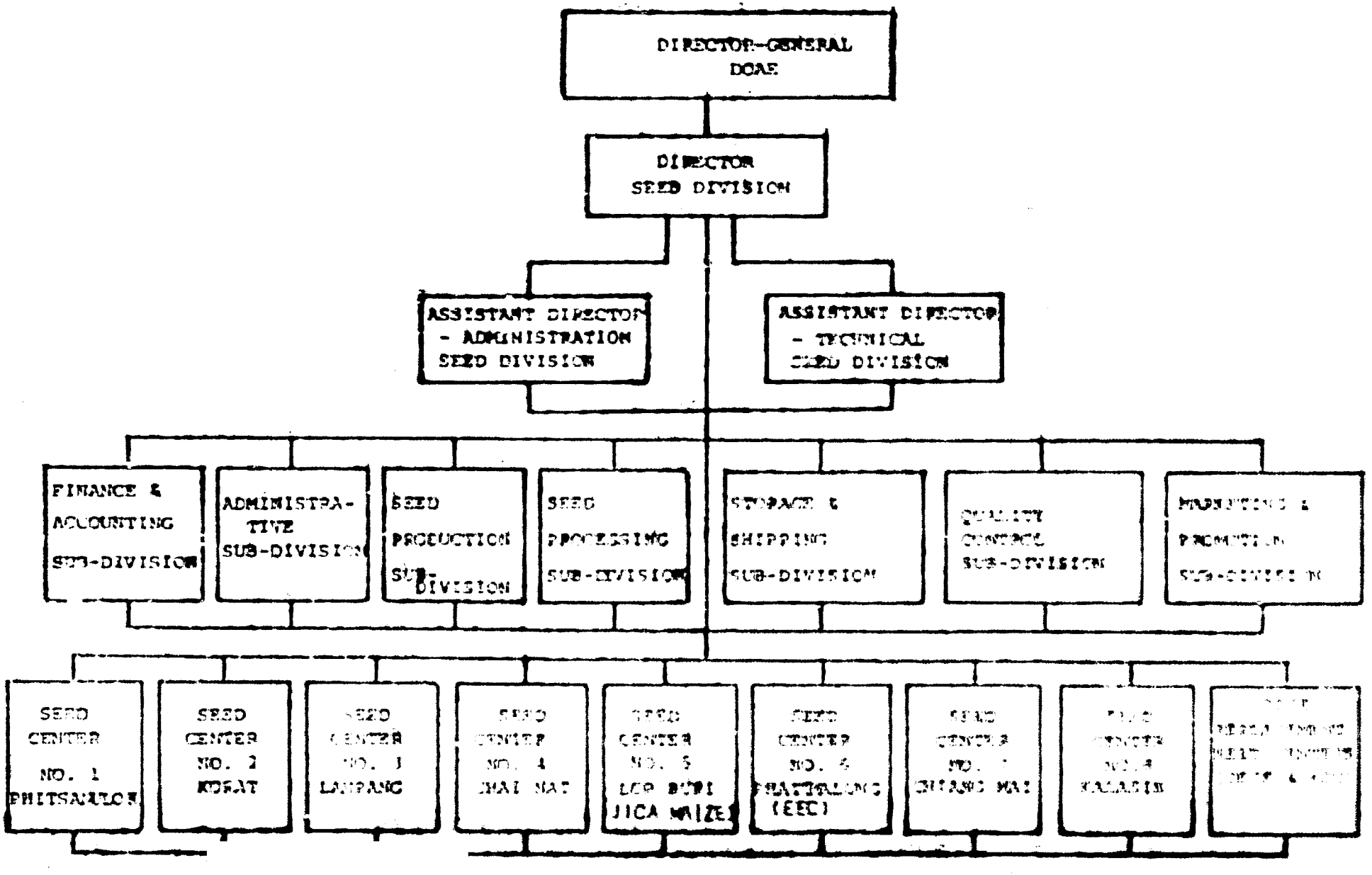


Figure IV.C.2 Organization of Seed Division



ANNEXES

Seeds II Project Paper

I. Approval Cables

A. PID Approval Cable

B. Predominant Capability Waiver Request and Response

II. Logical Framework

III. Financial Breakdowns

A. Summary Breakdowns

B. Comprehensive Breakdown of Costs for Chiang Mai Seed Center as Example

C. Training Equipment List

IV. Technical Analysis Backup

A. Description of Seed Production System and Soundness of Constructing and Equipping the Facilities

B. Seed Definitions

C. Environmental Soundness Cables

V. Economic Analysis

VI. Description of Participating Agencies

VII. Social Analysis

VIII. Section 611(e) Certification

IX. Statutory Checklist

X. Application for Assistance

ANNEX SECTION I

Approval Cables

IMMEDIATE UNCLASSIFIED STATE 287336 1/2

BK0810
OO RUEHOA
DE RUEHC #7336/01 3020405
ZNR UUUUU ZZH
O 282226Z OCT 80
FM SECSTATE WASHDC
TO AMEMBASSY BANGKOK IMMEDIATE 3047-48
BT
UNCLAS STATE 287336

Received
28 OCT 1980

28 OCT 80
TOR: 0410
CN: 64141
CHRGE: AID 4
INFO AMB DCM ECO
CHRON 8/FSV

IMMEDIATE
AID/ KHON SOPAVADEE
OFFICE/PERSON CALLED
DATE/TIME CALLED: 28/1145L
CALLER'S INITIALS:

AIDAC

E.O. 12065: N/A

TAGS:

SUBJECT: SEED DEVELOPMENT II PID

1. THE APAC MET ON 15 OCTOBER 1980 AND APPROVED SUBJECT PID. APAC DECISION WAS THAT THIS SHOULD BE PREPARED AS A NEW PROJECT RATHER THAN AS AMENDMENT TO SEED DEVELOPMENT I. USAID DIRECTOR IS DELEGATED AUTHORITY TO AUTHORIZE THE PROJECT AT THE PID FUNDING LEVEL AND SUBJECT TO CONDITION THAT NOT LESS THAN 75 PERCENT OF AID FINANCED COSTS BE LOAN FUNDED. ALONG WITH ISSUES IDENTIFIED IN PID, THE FOLLOWING CONCERNS SHOULD BE ADDRESSED DURING DETAILED PROJECT DESIGN AND REFLECTED IN PP.

2. PROJECT STRATEGY. MAJOR APAC CONCERN WAS THAT PROJECT BE PART OF COMPREHENSIVE THAILAND STRATEGY WHICH, INTER ALIA, DEFINES DIVISION OF LABOR BETWEEN PUBLIC AND PRIVATE SECTORS IN SEED OPERATIONS. PID IS NOT CLEAR ON THIS STRATEGY AND PP MUST DO. WORLDWIDE EXPERIENCE SHOWS THAT VERTICALLY INTEGRATED, GOVERNMENT-RUN SEED OPERATIONS ARE RARELY AS EFFECTIVE AS PRIVATE SECTOR ONES: GOVERNMENTS HAVE MORE DIFFICULTY PRODUCING THE RIGHT AMOUNTS OF HIGH QUALITY SEED WHEN AND WHERE FARMERS NEED IT. (SEE, E.G., AID'S IMPACT EVALUATION ON KITALE MAIZE.) THUS, IN DEVELOPING PROJECT, USAID/RTC SHOULD CLEARLY DIFFERENTIATE BETWEEN ROLES IN SEED SYSTEMS THAT ARE PROPERLY THE DOMAIN OF GOVERNMENT AND THOSE MORE APPROPRIATE FOR THE PRIVATE SECTOR.

3. PRIVATE SECTOR ROLE IS A PRIMARY CONCERN OF STRATEGY. APAC UNDERSTANDS RATIONALE FOR ROAE CONTINUING TO PROMOTE MORE RISKY AND PRESENTLY LESS PROFITABLE SEEDS SUCH AS SOYBEANS AND MUNG BEANS. PP SHOULD INDICATE APPROPRIATE POLICIES AND PLANS FOR EVENTUALLY SHIFTING THESE TYPES OF SEED MARKETS INTO PRIVATE SECTOR. PLANS SHOULD ALSO BE DETAILED IN PP FOR FURTHER TURNOVER TO PRIVATE SECTOR OF SEED TYPES ALREADY MOVING IN THAT DIRECTION, E.G. CORN. AID PARTICIPATION IN SEED DEVELOPMENT II HINGES ON A VIABLE AND REALISTIC STRATEGY, SEED CROP BY SEED CROP, OF MOVING PRIVATE SECTOR (OVER VARYING TIME FRAMES) INTO SEED MARKETS AND THE PP SHOULD ADDRESS HOW RTC CAN EFFECTIVELY WORK WITH THE PRIVATE SECTOR TO SUPPLY SEED TO FARMERS.

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4. APAC SUPPORTS MOVE TO VEGETABLE SEED PRODUCTION AND BELIEVES IT TO BE A KEY ELEMENT OF PROPOSED PROJECT. CURRENT DEARTH OF TROPICAL VEGETABLE SEEDS NEEDS TO BE ADDRESSED AND THIS PROJECT SEEMS AN APPROPRIATE VEHICLE, PARTICULARLY IF USAID/RTC CAN BUILD IN COMPLEMENTARY SUPPORT OF OTHER AGENCIES (E.G., EXTENSION SERVICE) NEEDED FOR EFFECTIVE AGRICULTURAL DIVERSIFICATION. PP SHOULD, AS IN CASE OF CEREAL SEEDS, STRESS ROLE OF AND EVENTUAL DEVOLUTION OF THIS INTERVENTION TO THE PRIVATE SECTOR. FYI, APAC NOT IN ACCORD WITH ALTERNATIVE DISCUSSED PAGE 9 OF PID INVOLVING LARGE SCALE IMPORTATION AND REPACKAGING OF FOREIGN VEGETABLE SEEDS EVEN AS A CATALYST TO LOCAL PRODUCTION OR AS AN INTERIM MEASURE.

5. SUBSIDY. CLOSELY RELATED TO ABOVE STRATEGY CONCERNS IS SUBSIDY. APAC QUERIED WHETHER RTC SUBSIDY IS CONSISTENT WITH A STRATEGY OF DEVELOPING THE PRIVATE SECTOR TO PRODUCE AND THEN MARKET SEEDS, AND NOTED CONTRADICTION BETWEEN SIGNIFICANT OR UNDUE PRICE SUBSIDIES AND OBJECTIVE OF DRAWING THE PRIVATE SECTOR INTO SEED MULTIPLICATION, WHOLESALE AND RETAIL SALES. WE THUS RECOMMEND THAT SPECIFIC CRITERIA BE DEVELOPED AND NEGOTIATED WITH RTC, DURING PP PREPARATION, THAT PRESENT A CLEAR DESIGN FOR LIMITING SUBSIDIES TO THOSE INSTANCES WHERE A CLEAR RATIONALE EXISTS, E.G., NEW OR UNPROVEN (THUS RISKIER) SEED CROPS, AND PHASING OUT OR ELIMINATING SUBSIDIES WHERESUCHRATIONALE NO LONGER EXISTS.

6. WORKING CAPITAL ACCOUNT (WCA). THE APAC REVIEWED PID'S QUESTION OF WHETHER OR NOT AID SHOULD CONTINUE CONTRIBUTIONS TO THE WCA. IN VIEW OF BROADER CONCERN ABOUT SUBSIDIES, APAC RECOMMENDS THAT NEW AID FUNDS NOT BE USED FOR SUCH CONTRIBUTIONS. AID FINANCING MIGHT MORE APPROPRIATELY GO TO ADDITIONAL LOCALLY-MADE EQUIPMENT AND SIMILAR ITEMS. IF AID CONTRIBUTIONS TO WCA ARE DEEMED ABSOLUTELY NECESSARY, PP RATIONALE MUST BE STRONG AND A RAPID PHASE-OUT PLAN NEGOTIATED WITH THE RTC. AN ANALYSIS OF THE VIABILITY OF THE WCA AND MEANS OF IMPROVING ITS FINANCIAL POSTURE WOULD ALSO HAVE TO BE INCLUDED IN THE PP.

7. IEE. TO COMPLY WITH REGULATION 16 AND AID ENVIRONMENTAL PROCEDURES, THE IEE MUST CONTAIN ADDDITIONAL INFORMATION REGARDING PESTICIDES. MUCH OF THIS INFORMATION CAN BE OBTAINED AND ADDED TO THE IEE IN AID/W. HOWEVER, WE WOULD APPRECIATE USAID RESPONSES TO THE FOLLOWING:

A. THE BASIS OF SELECTION FOR THE PESTICIDES TO BE USED IN PROJECT.

B. THE PROPOSED METHODS OF APPLICATION, INCLUDING AVAILABILITY OF APPROPRIATE APPLICATION AND SAFETY

EQUIPMENT. IN PARTICULAR, AID/W WOULD LIKE TO KNOW IF MANUFACTURER'S INSTRUCTIONS FOR USE OF PHOSTOXINARE BEING FOLLOWED.

C. THAILAND'S ABILITY TO REGULATE OR CONTROL THE DISTRIBUTION, STORAGE, USE AND DISPOSAL OF THEREQUESTED PESTICIDES.

D. PROVISIONS MADE FOR TRAINING OF USERS AND APPLICATORS.

E: PROVISIONS MADE FOR MONITORING THE USE AND EFFECTIVENESS OF THE PESTICIDES.

8. PROCUREMENT. APAC FELT THAT, BECAUSE OF NUMEROUS IMPLEMENTATION PROBLEMS EXPERIENCED UNDER SEED DEVELOPMENT I, PP SHOULD CONTAIN COMPREHENSIVE PROCUREMENT PLAN TO COVER PURCHASE OF EQUIPMENT TO BE SPECIFIED IN PP. SER/COM/ASIA CAN PROVIDE ASSISTANCE IN PREPARING PROCUREMENT PLAN IF USAID/RTG DESIRE. IT WAS ALSO SUGGESTED THAT THE POSSIBILITY OF CONTRACTING PROCUREMENT TO A PROCUREMENT SERVICE AGENT BE EXPLORED. TO AVOID PROBLEMS INRESPONSIVE BIDS, ALL IFB'S SHOULD BE REVIEWED BY SER/COM.

9. FUNDING REQUIREMENTS. APAC REQUESTS THAT USAID AIM TO FINANCE AS MUCH OF PROJECT AS POSSIBLE WITH LOAN FUNDS. CONSIDERATION COULD BE GIVEN TO LOAN FINANCING OF PROJECT COMPONENTS LIKE PARTICIPANT TRAINING, TRAINING EQUIPMENT, ETC. IN ANY EVENT, THE LIMITATION TO THE DELEGATED AUTHORITY TO APPROVE THIS PROJECT IS THAT NOT LESS THAN 75 PERCENT OF AID-FINANCED COSTS MUST BE LOAN-FINANCED.

10. MISCELLANEOUS:

A. BENEFICIARIES. APAC FELT THAT, IN VIEW OF LIMITED DOCUMENTATION REGARDING THE ECONOMIC IMPACT OF THE EXISTING PROJECT ON SEED PRODUCERS AND USERS, PP SHOULD EXPLICITLY ANALYZE EXPECTED BENEFIT INCIDENCE OF PROJECT. THIS ANALYSIS CAN HELP PROVIDE JUSTIFICATION IN TERMS OF DIRECT LINKAGE TO NEEDS OF THE POOR MAJORITY. IN PARTICULAR, OTHER CONSTRAINTS OPERATING ON FARMERS (OTHER THAN UNAVAILABILITY OF SEEDS) SHOULD BE EXAMINED AND DISCUSSED. SINCE SCALE OF RTG SEED PRODUCTION PER SE IS NOT ENOUGH TO SUGGEST SIGNIFICANT IMPACT ON THE RURAL POOR, THE ANALYSIS SHOULD BE CAST IN TERMS OF PUBLIC/PRIVATE SECTOR STRATEGY FOR PROJECT NOTED ABOVE.

B. USAID SHOULD DECIDE, DURING PP PREPARATION, THE APPROPRIATENESS OF FINANCING SEED PROCESSING EQUIPMENT FOR THE DEPARTMENT OF AGRICULTURE.

C. APAC AGREED THAT A SYSTEM OF APPROPRIATE SEED REGULATION HAS MERIT AND THAT THE TIME HAD COME IN THIS PHASE II PROJECT TO BRING THE RTG INTO THE INSPECTION

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CHRGZ: AID 05/02/81
APPRV: PPD:BJODELL
DRFTD: PPD:JATENNANT:V
CLEAR: 1.D/ARD:SBOWENS
2.D/ARD:DBATHRI
DISTR: CHRON USAID

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E.O. 12065: NA
SUBJ: SEEDS II PROJECT NO. ([illegible])
PREDOMINANT CAPABILITY WAIVER

1. SUBJECT PP NEARING COMPLETION AND WILL BE REVIEWED/ APPROVED BY USAID. PRIOR TO FINAL APPROVAL AND AUTHORIZATION, HOWEVER, WE WOULD LIKE AID/W TO PROVIDE WAIVER OF COMPETITION FOR SERVICES OF MISSISSIPPI STATE UNIVERSITY UNDER THE PROJECT. THIS WILL ALLOW US TO STRUCTURE PRE-IMPLEMENTATION PLANS ACCORDINGLY AND EXPEDITE EXECUTION OF CONTRACT AFTER AGREEMENT SIGNED.

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2. JUSTIFICATION FOR SERVICES OF MISSISSIPPI STATE INCLUDES THEIR ONGOING INVOLVEMENT IN THE SEEDS I PROJECT (BOTH PROJECT FINANCED AND CENTRALLY FUNDED) WHICH HAS ENABLED THEM TO DEVELOP A SPECIAL RELATIONSHIP WITH THE MIC SEEDS DIVISION. THIS RELATIONSHIP WILL BE IMPORTANT TO NURTURE THE EVOLVING INSTITUTIONAL DEVELOPMENT OF THE SEEDS DIVISION DURING THE SEEDS II PROJECT, AND SUCH DEVELOPMENT IS A MAJOR COMPONENT OF THE PROJECT PURPOSE.

3. BESIDES THE ABOVE SPECIAL CAPABILITY THAT MSU HAS DEVELOPED BY VIRTUE OF THEIR EXPERIENCE WITH THE SEEDS DIVISION, MSU IS RECOGNIZED AS HAVING THE MOST COMPREHENSIVE SEED TECHNOLOGY PROGRAM IN THE WORLD AND IS THUS QUALIFIED TO PROVIDE THE NECESSARY TECHNICAL ASSISTANCE/ TRAINING UNDER THE SEEDS II PROJECT ON THE BASIS OF PREDOMINANT CAPABILITY. MSU IS THE ONLY U.S. UNIVERSITY THAT HAS HELD LONG-TERM PROGRAM DEVELOPMENT CONTRACTS DEALING WITH SEED PROGRAM/INDUSTRY DEVELOPMENT. SINCE 1950 STAFF OF THE MSU SEED TECHNOLOGY LAB HAVE BEEN PROVIDING SERVICES TO OVER 50 AID COUNTRY PROGRAMS THROUGH A CENTRALLY FUNDED CONTRACT.

4. THE TOTAL PROGRAM OF THE MSU SEED TECHNOLOGY LAB IS UNIQUE THROUGHOUT THE WORLD. APPROXIMATELY 50% OF THE STAFF TIME IS DEVOTED TO CONDUCTING RESEARCH UNDER THE AUSPICES OF THE MISS. AGRICULTURAL EXPERIMENT STATION. ONE-THIRD OF THE PROGRAM'S EFFORT IS DEVOTED TO INTERNATIONAL TECHNICAL ASSISTANCE, ON-CAMPUS AND OVERSEAS. ONLY 18% OF THE STAFF TIME IS DEVOTED TO ACADEMIC TEACHING.

5. ADMINISTRATIVELY IN THE AGRONOMY DEPARTMENT, THE SEED TECHNOLOGY LAB STAFF ALSO INCLUDES ONE SENIOR STAFF MEMBER ASSIGNED FROM EACH THE AGRICULTURAL ENGINEERING AND AGRICULTURAL ECONOMICS DEPARTMENTS. THE MISS. AGRICULTURAL

ROLE TO ASSURE THAT SEED IS OF SPECIFIED QUALITY AND CLEANLINESS. RTC AND PP SHOULD DETAIL PRESENT ROLE OF THE DOAE SEED DIVISION IN SEED REGULATION WITHIN CONTEXT OF SHIFTS IN OPERATIONS TO THE PRIVATE SECTOR.

D. PP SHOULD REVIEW AND DISCUSS STATUS OF PROBLEMS ENCOUNTERED IN IMPLEMENTATION OF PHASE I OF THE PROJECT.

E. THERE ARE A NUMBER OF AID/W PERSONNEL WITH PRIOR EXPERIENCE IN SEED PRODUCTION/MARKETING; IF THEIR EXPERIENCE WITH SIMILAR PROJECTS CAN BE OF USE IN DESIGN OF THIS PROJECT, PLEASE ADVISE. CHRISTOPHER

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EXTENSION SERVICE'S SEED SPECIALIST , AN ADJUNCT PROFESSOR OF SEED TECHNOLOGY AND IS REGULARLY UTILIZED AS A CONSULTANT UNDER THE DSP CONTRACT. ADDITIONALLY, THE MISS. AGRICULTURAL EXPERIMENT STATION FOUNDATION SEED SECTION IS LOCATED IN THE SEED TECHNOLOGY LAB BUILDING. THE OFFICIAL SEED REGULATORY LABORATORY AND THE MISS. SEED CERTIFICATION AGENCY ARE IN BUILDINGS ADJACENT TO THE SEED TECHNOLOGY LAB.

6. THE ABOVE COMBINATION OF EXPERIENCED PERSONNEL AND FACILITIES INVOLVED IN A SERVICE, RESEARCH AND ACADEMIC ACTIVITIES SPECIFICALLY ASSOCIATED WITH STATE, NATIONAL AND INTERNATIONAL SEED INDUSTRY MAKES MSU UNIQUELY QUALIFIED AS THE SOURCE OF THE TA REQUIREMENTS OF THE SEEDS II PROJECT.

7. THERE ARE ONLY TWO OTHER U.S. UNIVERSITIES WHICH HAVE MORE THAN ONE STAFF MEMBER DEVOTING A MAJOR PORTION OF THEIR TIME TO SOME ASPECT OF SEED TECHNOLOGY, OREGON STATE AND IOWA STATE. NEITHER OF THESE HAVE IN-DEPTH OVERSEAS EXPERIENCE IN SEED TECHNOLOGY. OREGON STATE HAS A STAFF OF FOUR PROFESSIONALS AND PLACES MAJOR EMPHASIS ON THE PRODUCTION OF FORAGE AND TURFGRASS SEED PRODUCTION, SEED BIOCHEMISTRY, PHYSIOLOGY AND QUALITY EVALUATION.

8. IOWA STATE HAS THREE STAFF MEMBERS WHOM SPECIALIZE IN SEED PHYSIOLOGY, BOTANY AND, SINCE 1979, CONDITIONING (PROCESSING). OTHER U.S. UNIVERSITIES AT WHICH STUDENTS CAN RECEIVE SPECIALIZED TRAINING IN SEED TECHNOLOGY INCLUDE CORNELL, MICH. STATE, OHIO STATE, KENTUCKY, N.C. STATE, COLORADO STATE, NORTH DAKOTA AND ARIZONA. GENERALLY AT THESE UNIVERSITIES THERE IS ONE PROFESSIONAL SEED TECHNOLOGIST. ALL THESE UNIVERSITIES ARE ASSOCIATED WITH THE STAFF OF SEED CERTIFICATION AGENCIES, REGULATORY AGENCIES AND FOUNDATION SEED ORGANIZATIONS. WE UNDERSTAND THAT NONE OFFER DEGREES IN SEED TECHNOLOGY.
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9. SERVICES FOR WHICH THIS WAIVER APPLIES WILL BE TWO FULL-TIME EXPERTS (ONE IN SEED TECHNOLOGY AND ONE IN SEED EQUIPMENT DESIGN AND OPERATION) AND SEVERAL MAN MONTHS OF SHORT-TERM ASSISTANCE IN SEED RELATED SPECIALTIES SUCH AS SEED PATHOLOGY, SOYBEAN SEED PRODUCTION, SEED MARKETING,
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AND SEED LAW AND REGULATIONS. TOTAL COST FOR SERVICES COVERED UNDER THIS WAIVER SHOULD BE APPROXIMATELY DOLS 1.5 MILLION. IN ADDITION, IT IS EXPECTED THAT MSU WILL PROVIDE MASTERS LEVEL TRAINING FOR EIGHT (8) PARTICIPANTS.

10. FOR THE ABOVE SERVICES, NO OTHER SINGLE INSTITUTION HAS THE BREADTH AND DEPTH OF SEED EXPERTISE OR THE EXPERIENCE OF MSU TO MEET THE PROJECT REQUIREMENTS PARTICULARLY WHEN ONE CONSIDERS MSU'S IN-DEPTH KNOWLEDGE OF SEEDS I AND II PROJECTS PLUS EXCELLENT RAPPORT AND SPECIAL RELATIONSHIP WITH THE SEED DIVISION.

11. WE DO FORESEE THAT SOME SERVICES PROCURED UNDER MSU CONTRACT MAY COME FROM OFF CAMPUS, BUT WE DO NOT THINK THIS WEAKENS PREDOMINANT CAPABILITY OF MSU TO PROVIDE TOTAL PACKAGE OF SERVICES. WE SUBMIT THAT EXCELLENT CONTACTS WITH OFF CAMPUS SOURCES, PLUS INSTITUTIONAL EXPERIENCE IN ARRANGING FOR A VARIETY OF SHORT-TERM CONSULTANCIES STRENGTHENS JUSTIFICATION FOR MSU AS PRIME CONTRACTOR UNDER SEEDS II PROJECT.

12. IT SHOULD BE NOTED THAT NOT ALL PROJECT SERVICES ARE EXPECTED TO BE OBTAINED UNDER THE MSU CONTRACT. SOME, SUCH AS GENERAL MANAGEMENT AND ACCOUNTING CONSULTANCIES WILL BE CONTRACTED LOCALLY AND/OR THROUGH OTHER MECHANISMS (SEPTEL REQUESTS INFO ON ONE POSSIBILITY - ICD).

13. WOULD APPRECIATE YOUR EXPEDITIOUS HANDLING OF THIS WAIVER REQUEST. ABRAMOWITZ
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ANNEX SECTION II

Logical Framework

Project Title & Number: MID DEVELOPMENT (Rv)-G12u

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: From FY 1982 to FY 1987
Total U.S. Funding: $6.1 million
Date Prepared: July 1981

PAGE 1

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: (A-1) Improved financial status and nutritional health of farm families and other rural poor. Subgoal: Strengthen PVO's and private sector's institutional capacity for intensification of agricultural development	Measures of Goal Achievement: (A-2) 1. Increased farm production associated with project seed. 2. Increased home garden vegetable production associated with project seed. 3. Increased farm income. 4. Improved child health related to better nutrition. Farm utilization of improved varieties.	(A-3) 1. MOAC, MOHD and PVO statistics on farm and home garden production. 2. Nutritional health statistics on child weight. 3. GOL, MOFAD, and USAID social-economic surveys. 4. PO baseline data. Project and private sector distributions and sales records.	Assumptions for achieving goal (Program) (A-4) 1. Increased crop production increases farm family income. 2. Increased home garden vegetable production results in increased vegetable consumption and improved nutrition.
Project Purpose: (B-1) A comprehensive seed program that efficiently and cost-effectively increases farmers use of higher quality seed while steadily increasing the role of the private sector to supply this seed.	Conditions that will indicate purpose has achieved End of project status: (B-2) GOL 1. Farmers' demands for improved seed increase annually until majority are seeking this seed. 2. Private sector role in meeting farmer's demands for improved seeds increasing annually. 3. GOL Field Crops Seeds personnel capable of meeting sustainable demands for improved seed by other Government agencies on a timely basis. 4. Vegetable seeds facilities producing at least 24 varieties of high quality vegetable seed that are being utilized for commercial marketing. 5. Working capital demands self-sufficient. 6. Overall marketing efficiency of seed processing increasing because of the percent commodity until position of GOL project completed	(B-3) 1. Record of public and private sector seed sales. 2. Newspaper, public and private sector records. 3. Seed plant records.	Assumptions for achieving purpose (B-4) 1. GOL policy continues to favor the private sector in the seed program and favors rural development in general. 2. Price structure favorable for purchase of improved seed.
Outputs: (C-1) 1. Seed division and private sector personnel trained in management and seed technology 2. Plant health improve seeds and produce to plant 3. Management information system operating 4. Working capital demand fully funded and private adequate to meet needs 5. Adequate administrative staffed, equipped and operating 6. Processing facilities constructed and operating. 7. Seed production program staffed, equipped and operating on all functioning state farms. 8. Seed demonstration farms and Public and Private sector farmers receive demonstration information 9. Vegetable seed processing facilities staffed, equipped and operating 10. Production seed facilities improved and staff trained and to place	Magnitude of Outputs: (C-2) 1. 8 management trainees trained in U.S. 8 management skills workshops a 30 participants. 8 seed technology workshops a 20 participants. 20 technical skills development courses a 15-30 participants 8 seed production training courses a 30 participants 15 participants trained at short term courses. 2. 20 MOA's in marketing/management. 8 MOA's in seed technology 3. New seed management system operationalized. 4. Working capital generated a sustainable self-financing. 5. New seed information. 6. 3 processing facilities modernized 7. 8 seed production workers operating. 10 seed enterprises averaging a 20 participants. 10 farmer field days a 200 participants. 8. New seed communication with public and private sector representatives. 9. Seed varieties seed varieties to change seed plant enhancement programs. 10. 3 processing centers constructed for distribution seed.	(C-3) 1. GOSS records. 2. Seed division records. 3. GOL records.	Assumptions for achieving outputs (C-4) 1. GOSS will continue focus assessment of advantages of improved seed through effective field and pilot demonstration. 2. Rate of training of new personnel will not exceed local production. 3. Varietal development and testing research adequate to support projects. 4. Government seed and/or PVO to GOSS on a timely basis. 5. GOS continually increase capacity as seed distribution need to satisfy large demand. 6. Seed regulation system checkers as required.
Inputs: (D-1) 1. Technical assistance 2. Commodities (seed) 3. Training 4. Commodities (PVO) 5. Equipment 6. Plant and working capital to seed 7. Plants and operations (PVO) 8. Subsidies (GOL)	Implementation Target (Type and Quantity): (D-2) See financial plan	(D-3) Project records, U.S. consultant, and Ministry/State records.	Assumptions for providing inputs (D-4)

ANNEX SECTION III

Financial Breakdowns

ANNEX III. FINANCIAL BREAKDOWNS

Chiang Mai Seed Center Component
(Field Crops & Vegetable Seed)

		AID	RTG
1.	Processing Equipment & Supplies	$653,740.-	$151,900.-
2.	Buildings & Construction	-0-	$1,775,000.-
3.	Vehicles: 3 Truck, 6 MT 6 Trailer, 4-wheel flat-bed 3 Pickup Truck 12 Motorcycles	-0-	$123,600.-
	Total	$653,740.-	$2,050,500.-

Lampao (Kalasin) Seed Center Component

		AID	RTG
1.	Processing Equipment & Supplies	$201,250.-	$54,900.-
2.	Building & Construction	-0-	$785,250.-
3.	Vehicles: 3 Truck, 6 MT 2 Pickup Truck 8 Motorcycles	-0-	$95,400.-
	Total	$201,250.-	$935,560.-

Supplementary Equipment for Existing Centers

		AID	RTG
1.	Processing Equipment & Supplies	$43,680.-	-0-

Supplementary Data Processing Equipment

		AID	RTG
1.	Mini Computer, 64 K	$100,000.-	-0-

Foundation Seed Component

I. Mae Jo Research Station
(Field Crop Seed)

		AID	HMG
1.	Processing Equipment & Supplies	$147,460.-	$41,550.-
2.	Buildings & Construction	-0-	$394,525.-
3.	Vehicle: 1. Truck, 6 MT 2. Pickup 5. Motorcycle	-0-	$43,000
	Total	$147,460.-	$479,075.-

II. Kalasin Research Station
(Field Crop Seed)

		AID	HMG
1.	Processing Equipment & Supplies	$143,800.-	$36,770.-
2.	Buildings & Construction	-0-	$300,000.-
3.	Vehicles: 1 Truck 1 Pickup 4 Motorcycles	-0-	$35,200.-
	Total	$143,800.-	$371,970.-

III. Sakon Nakhon Research Station
(Field Crop Seed)

		AID	HMG
1.	Processing Equipment & Supplies	$119,380.-	$13,070.-
2.	Buildings & Construction	-0-	$250,000.-
3.	Vehicles: 1 Truck 1 Pickup 3 Motorcycles	-0-	$34,400.-
	Total	$119,380.-	$296,470.-

IV. Fang Research Station
(Vegetable Seed)

		AID	HMG
1.	Processing Equipment & Supplies	$57,110.-	$16,160.-
2.	Buildings & Construction	-0-	$265,000.-
3.	Vehicles: 2 Pickup Truck 1 Motorcycles	-0-	$16,400.-
	Total	$57,110.-	$297,560.-

Buildings and Construction Required for the Chiang Mai Seed Center-DOAE

Item	Description	Number Required	$ Total Cost	$ Total Cost
1	Pad for drying bins	2	60,000	120,000
2	Bag dryer and shed	2	750,000	1,500,000
3	Tray dryer and shed	1	750,000	750,000
4	Building (room between processing and conditioned storage) for dehumidified dryers	1	500,000	500,000
5	Drying/threshing floor	2	200,000	400,000
6	Field crops processing plant	1	3,000,000	3,000,000
7	Vegetable shelling-threshing-extraction shed	1	1,000,000	1,000,000
8	Vegetable seed processing (large lots, small lots) plant	1	2,500,000	2,500,000
9	Field crops pre-processing and receiving storage	1	2,000,000	2,000,000
10	Vegetables, receiving (wet and dry fruits) storage	1	1,500,000	1,500,000
11	Ambient warehouse 1,000 MT capacity	2	2,500,000	5,000,000
12	Conditioned vegetable seed storage (6 rooms, each 3 x 8 x 10 M with hall antechamber)	1	3,000,000	3,000,000
13	Vegetable seed packing	1	900,000	900,000
14	Quality control lab	1	750,000	750,000
15	Office building	1	750,000	750,000
16	Truck shed	1	250,000	250,000
17	Thresher shed (16 spaces)	1	360,000	360,000
18	Shop	1	350,000	350,000
19	Water tank, pump, pump house	1	750,000	750,000

Item	Description	Number Required	$ Unit Cost	$ Total Cost
20	Fence and guard posts	1	800,000	800,000
21	Officer houses	20	200,000	4,000,000
22	Worker houses	5	400,000	2,000,000
23	Training building	1	1,500,000	1,500,000
24	Land preparation		300,000	300,000
25	Roads, paving, drainage		2,000,000	2,000,000
26	Electrical system	1	1,000,000	1,000,000
27	Dryer fuel storage and supply tanks (10,000 liters each)	4	20,000	80,000
28	Truck scale shed	1	200,000	200,000

Equipment Procured Locally under RTG Budget
Chiang Mai Seed Center DOAE-SC7

Item No.	Description	Number Required	Est. U.S.$ Cost Unit Cost	Est. U.S.$ Cost Total Cost
1	Support stand for air-screen cleaner	2	500	1,000
2	Bin, holding (air-screen)	2	1,400	2,800
3	Support stand for gravity separator	2	200	400
4	Bin, holding (gravity)	2	1,200	2,400
5	Support stand for seed treater	1	200	200
6	Bin, holding (treater)	1	1,200	1,200
7	Bagging bin	3	1,200	3,600
8	Support stand for bag cleaner	1	200	200
9	Truck, 6 MT	3	25,000	75,000
10	Trailer, 4-wheel flat-bed	6	3,000	18,000
11	Purity workboard	6	100	600
12	Seed sample/germination pans	500	4	2,000
13	Air conditioning/refrigeration units	12	2,000	24,000
14	Air compressor	2	1,000	2,000
15	Forklift	3	15,000	45,000
16	Support stand, disc separator	1	400	400
17	Bin, holding (disc)	1	1,200	1,200
18	Pallets, wood, doubleface	1,000	30	30,000
19	Support stand (corn sheller)	1	400	400
20	Hopper (corn sheller)	1	100	100
21	Ducting & cyclone (corn sheller)	1	400	400

Item No.	Description	Number Required	Est. U.S.$ Cost Unit Cost	Est. U.S.$ Cost Total Cost
22	Support stand (peanut cleaner)	1	400	400
23	Dust fan	6	600	3,600
24	Pickup truck	3	7,000	21,000
25	Motorcycles	12	800	9,600
26	Dehumidified tray dryer cabinet	10	3,000	30,000
				$275,500

Project-Supplied Equipment for Multiplication Seed
Chiang Mai Seed Center-DOAE-SC7
(Field Crops and Vegetable Seed)

Item No.	Description	Number Required	Est. U.S.$ Cost Unit Cost	Total Cost
1	Dryer burner/fan unit	8	6,000	48,000
2	Air-screen cleaner (vegetable seed)	1	32,000	32,000
3	Ducting and cyclones for air screen cleaner (Item 2)	1 set	800	800
4	Elevator assembly	3	2,800	7,400
5	Gravity separator (vegetable seed)	1	8,000	8,000
6	Vibrator spout	5	1,100	5,500
7	Elevator assembly	10	2,100	21,000
8	Treater	1	4,100	4,100
9	Bagging-weighing-sewing system	1	13,000	13,000
10	Bag Cleaner	1	2,300	2,300
11	Warehouse platform scale	1	3,000	3,000
12	Scale, platform	2	500	1,000
13	Bag conveyor	1	2,300	2,300
14	Dehumidifier	22	2,500	55,000
15	Vacuum cleaner	1	900	900
16	Blower	1	400	400
17	Step-down ladders	8	600	4,800
18	Bag truck	6	400	2,400
19	Bag holder	10	100	1,000
20	Aerosol generator	1	900	900

Item No.	Description	Number Required	Est. U.S.$ Cost Unit Cost	Total Cost
21	Filter masks	25 boxes	40	1,000
22	Chemical and dust respirator	6	20	120
23	Gas Mask	2	400	800
24	Spring return twister	2	600	1,200
25	Floor brush	6	30	180
26	Grain scoops	6	30	180
27	Bag closer	2	1,900	3,800
28	Hand picking belts	2	1,200	2,400
29	Mobile filed pulper-extractor	5	5,000	25,000
30	Conveyor-elevator (tomatoes, etc.)	2	2,500	5,000
31	Air-screen cleaner for small lots	1	6,800	6,800
32	Air-screen cleaner; sample size	1	2,100	2,100
33	Gravity separator, small lot	1	12,400	12,400
34	Balance, torsion analytical	2	600	1,200
35	Gram scale	4	100	400
36	Heat sealer	2	1,000	2,000
37	Seed Moister Tester, dielectric	1	1,100	1,100
38	Moisture Tester, portable	10	400	4,000
39	Bagger-weigher	1	2,000	2,000
40	Heated-air oven	1	1,000	1,000
41	Divider	1	600	600
42	Test weight apparatus	1	500	500
43	Germinator	2	700	1,400

Item No.	Description	Number Required	Est. U.S.$ Cost Unit Cost	Est. U.S.$ Cost Total Cost
44	Sprayer, knapsack	2	200	400
45	Triers	3	50	150
46	Blower, seed sample	1	1,500	1,500
47	Spiral separator, double	1	1,000	1,000
48	Spiral separator, laboratory size	1	400	400
49	Deadlock tag fasteners	20 boxes	30	600
50	Color sorter	1	10,000	10,000
51	Thresher, 1211 friction-belt	3	20,000	60,000
52	Seed Debearder, laboratory size	1	3,600	3,600
53	Microscope, stereo	2	700	1,400
54	Aspirator, laboratory	1	2,400	2,400
55	Dazor magnifier/light	6	300	1,800
56	Black light (Ultra-violet) tester	1	500	500
57	Scale, bulk, portable	2	1,600	3,200
58	Hygrothermograph	8	900	7,200
59	Sling psychrometer	2	100	200
60	Forceps, flat point	12	10	120
61	Forceps, sharp point	12	10	120
62	Hand test screens (set)	1	3,000	3,000
63	Seed counter, electronic	3	5,000	15,000
64	Tag printer	2	750	1,500
65	Air-screen cleaner (crop seed)	1	32,000	32,000
66	Drying/storage bin assy	2	10,000	20,000

Item No.	Description	Number Required	Est. U.S.$ Cost Unit Cost	Est. U.S.$ Cost Total Cost
67	Conveyor, tubular	1	4,000	4,000
68	Conveyor	1	1,400	1,400
69	Conveyor	2	1,300	2,600
70	Bin Thermometer	1	100	100
71	Rice Miller, sample	1	1,200	1,200
72	Trier, deep bin	1	170	170
73	Disc separator	1	15,000	15,000
74	Gravity separator (Crop seed)	1	10,000	10,000
75	Conveyor, Drag	2	1,200	2,400
76	Conveyor, flat belt	2	1,400	2,800
77	Earcorn conveyor, portable	3	1,200	3,600
78	Corn sheller	1	10,400	10,400
79	Earcorn sorting belt	1	4,000	4,000
80	Peanut cleaner	1	19,000	19,000
81	Seed can sealer	2	5,000	10,000
82	Pneumatic separator	2	6,000	12,000
83	Seed packet filler	2	50,000	100,000
	Total			$453,740

Audio-Visual Training Equipment

(Each Item Includes Spare Parts, Extra Components, etc.)

Item No.	Description	Number Required	Est. U.S.$ Cost Unit Cost	Est. U.S.$ Cost Total Cost
1.	Kodak Carousel slide projector, with tape synchronization	7	1,100	7.700
2	Slide trays for Carousel projector	180	18	3,240
3	Portable screen with stand	7	250	1,750
4	Overhead projector (for large transparencies)	7	900	5,400
5	35 MM single-lens reflex camera W/standard, wide-angle, and zoom lenses, electronic flash, case.	7	600	4,200
6	16 MM sound movie projector	7	3,250	22,750
7	Opaque projector (for non-transparencies)	7	1,000	7,000
8	Public-address system with amplifier, 2 speakers, 4 microphones	7	4,000	28,000
9	Portable megaphone amplifier	14	150	1,050
10	Tripod, Camera	7	125	875
11	Camera Bag	7	150	1,050
12	Floodlights, complete set w/stands	7	600	4,200
13	Storage cabinet, steel	14	200	2,800
14	Self-contained semi-automatic slide projector-viewer, suitable for slides in carousel trays, with tape synchronization.	14	1,200	16,800
15	Cassette tape recorder synchronized with slide projector	7	750	5,250
	Total			$ 112,065

SEED DEVELOPMENT II

TECHNICAL ASSISTANCE BUDGET

LINE ITEM & SUB-ITEM	1982		1993		1984		1985		TOTAL	
	SUB-ITEM TOTAL	LINE ITEM TOTAL	SUB-ITEM TOTAL	LINE ITEM TOTAL	SUB-ITEM TOTAL	LINE ITEM TOTAL	SUB-ITEM TOTAL	LINE ITEM TOTAL	SUB-ITEM TOTAL	LINE ITEM TOTAL
ALARIES	-	140,300	-	160,929	-	155,243	-	162,775	-	619,247
On-campus	17,300	-	19,029	-	20,933	-	23,026	-	80,288	-
Long-term consultants	99,000	-	108,900	-	119,790	-	131,769	-	459,459	-
Short-term consultants	24,000	-	33,000	-	14,520	-	7,980	-	79,500	-
RAVEL & TRANS.	-	66,940	-	80,250	-	70,380	-	89,056	-	[illegible].626
International Air Fare & Perdiem	32,940	-	46,050	-	36,960	-	26,394	-	142,344	-
Local Travel	32,000	-	32,000	-	31,000	-	30,000	-	125,000	-
Storage & Shipment	2,000	-	2,200	-	2,420	-	32,662	-	39,282	-
LOWANCES:	-	20,640	-	24,768	-	29,722	-	47,636	-	122,766
QUIPMENT:	-	1,500	-	1,650	-	1,815	-	1,996	-	6,961
HER DIRECT COSTS:	-	23,045	-	26,339	-	25,706	-	27,078	-	102,168
DIRECT COSTS:	-	105,875	-	135,083	-	143,110	-	178,429	-	562,497
TOTALS	-	358,300	-	429,019	-	425,976	-	506,970	-	1,720,265

SEED DEVELOPMENT II

TECHNICAL ASSISTANCE SCHEDULE

ITEM	1982 (Man-Months)	1982 (Man-Months)	1984 (Man-Months)	1985 (Man-Months	TOTAL (Man-Months)
Long-Term Consultants	24	24	24	24	96
Short-Term Consultants	4	5	2	1	12
Campus Support	6	6	6	6	24
Sub-Totals	34	35	32	31	132
USAID Project Officer	6	6	6	6	24
Project Committee (Estimated)	3	3	3	3	12
Sub-Totals	9	9	9	9	36
TOTAL	43	44	41	40	168

ANNEX SECTION IV

Technical Analysis Backup

Annex IV - Technical Analysis

1. The Seed Production System

The seed production system in Thailand and elsewhere requires that research programs produce breeding stock quality that is then multiplied into adequate quantities of foundation seed to meet the needs of the producers (private and public sectors) who then multiply and process the seed for distribution to the farmers. Each of these steps is described below with reference to Project interventions.

a. Crop Improvement Research and Breeders Seed: Thailand's field crop development and research programs have provided superior varieties of the Project's six field crops. Both the DA and KU have experienced plant breeders who maintain linkages with the primary international crops research centers and also utilize international germplasm collections. Thailand's development and testing research is clearly adequate to support the Project's field crop seed activities.

Vegetable breeding is primarily the responsibility of the DA's Horticultural Division and KU's Horticultural Department. Of the improved varieties developed in their programs, 14 have been selected for Project multiplication and distribution based on nutritive value, suitability for production in Thailand, breeder and foundation seed availability, and established use in Thai cuisine. The vegetable research programs directly support the Project seed needs.

b. Foundation Seed: Maintenance of Foundation seed is the responsibility of the agency that originally develops the crop variety. (In most cases DA and KU as noted above.) The DA's Rice Division has been providing all the Project's rice foundation seed needs. However, if the Japanese construct several additional rice Seed Centers, part of the rice seed produced under Seeds II may also be used as foundation seed for the Japanese program in order to meet the increased need.

DA's Corn and Sorghum Section and KU's Suwan Farm independently produce "registered" corn seed, but neither is adequately equipped at present to assure delivery of the Project's annual need of approximately 50 MT plus private sector needs. The Japanese provision of processing and conditioning storage facilities to the DA's Prabuddhabat Field Crop Station in 1982 should remove this constraint.

The DA's Oil Crop Section is also not equipped to provide the Project's 4 year requirement of 1,190 MT. The Project will provide the Mae Jo Crops Research Station with processing and storage equipment for soybean and mungbeans and also to the Kalasin and Sakon Nakhon Stations for peanuts. The Project will also provide each station with the necessary operating technical assistance and training; the RTG will furnish funds for construction, personnel, and operations. As these facilities and operations are improved under the Project, they should be able to meet the need for increased amounts of oil crop foundation seed for both the public and private sectors.

Foundation seed for the Project's selected vegetables will be produced at the Mae Jo Experiment Station, the Fang Horticultural Research Station and KU. Both Mae Jo and Fang require drying, processing, and storage equipment, as listed in the Annex, and to be provided by the Project. Station personnel will be trained by the Project in drying, processing, storing and packaging seed.

c. Seed Multiplication: Farmers are contracted for multiplication on the basis of ability, location, farmer concentration, cooperation, compliance with previous contract, etc. Each center distributes foundation seed, supervises the planting and cultural practices, and furnishes other needed technical assistance. Each field is inspected every two weeks to assure the use of appropriate agronomic and seed practices. Seed which meets standards are harvested and delivered to Seed Centers as soon as possible; a 20% price premium is paid for such seed if it meets all requirements.

By careful distribution of varieties and changing and coordinating the planting dates, the harvest period for each crop can be doubled. This improves the threshing, transport, drying and processing efficiency and facilitates increased seed output. Additionally, improved management will help eliminate non-compliant contract farmers and reduce the 20% loss in MCA due to non-payment for foundation seed.

The Project's increased seed production activities necessitate additional staff. Approximately 62 additional civil servants and an equal number of permanent workers will be required to staff the new facilities at Chiang Mai, and Lampao and about 70 more will be recruited for the new marketing/promotion function. To prepare new personnel for their assigned tasks, the required training will be conducted both in Thailand and in the U.S. Additional training will be offered to contract farmers.

The new "vegetable seed production" component will be the responsibility of the Chiang Mai Center that is being proposed under the Project. The multiplication-contracting procedures will be similar to field crops except, because of the low volume and high cash value, production sites can be allowed at greater distances from the Center.

Because of the special skills required in vegetable seed production, fieldmen must be specially trained to recognize genetic deviations, use of proper cultural practices, use of bees, disease and pest control measures, proper field isolation, rouging, harvesting, etc. Such training is planned under the Project.

d. Seed Processing and Packaging: The proposed Project will emphasize operational efficiency (operating time/total time x 100) through continued on-the-job training and improved operational management. Operational efficiency should increase at a minimum of 5%/year from the present 50% to a maximum of 85-90%. Efficiency increases can be made by staggering the irrigated crops planting and harvesting dates and thus extend by two weeks the two periods for receiving seed. This action will increase the plant drying capacity by 50%.

Seed processing generates a waste product which has value as feed and other uses. Recently RTG regulations were revised to allow disposal of waste materials. Rapid sales will be emphasized with resulting money returned to the MCA.

The processing procedure may include application of fungicides and/or insecticides. Appropriate training to assure the safe application and utilization of such materials is scheduled. Bagged treated seed will have appropriate warnings and an attached label listing the specific fungicide applied.

The new Chiang Mai Seed Center will serve as a national center for vegetable seed and a regional center for rice and soybean. The new Lampao (Kalasin) Sub-Center will serve as the primary peanut seed production/processing unit. Its establishment will substantially reduce peanut transportation costs. Personnel requirements and staffing patterns will be similar to that of existing centers. New employees will receive both the appropriate specialized training and on-the-job training.

Vegetable seed harvesting and processing

techniques vary considerably. Wet fruit seed will be extracted at the Center to avoid undue delay between extraction and drying; this assures better germination. Quality standards for vegetable seed should be followed.

High temperature and humidity cause a rapid loss in seed viability. To prolong its life seed is dried to a low safe moisture content and placed in conditioned storage or in moisture proof containers. To meet these needs, Project vegetable seed will be packed in vaporproof foil packets and will be distributed through government-sponsored programs. Small quantities will be sold directly from the Seed Center. The maximum production will be less than 1% of the rural home garden vegetable seed needs.

e. Inoculant: The previous Seed Project recognized the importance of inoculants for increasing the yields of the Project's oil seed crops. Accordingly, funds were provided to equip an inoculum plant in the DA for production of 200 MT/year. Although the plant is not completely operational, present production is adequate to meet foreseeable needs. The Project will only purchase an amount necessary for use by contract growers and for use with direct seed sales from the Centers (the Project assumes 50% of the farmers purchasing soybeans, peanuts, or mungbeans will use inoculant).

f. Marketing and Distribution: Although in the past the Project has sold almost all seed produced, it must now emphasize production in response to demand. Seed targets should increase no more than 10% per year until the real demand is met. Continuous monitoring of the production to sales ratio is required; this ratio should generally fluctuate between 1:1 to 1.1:1. A ratio of 1.2:1 could signify over production.

The SD's marketing/distribution system recognizes that commercial seed production is primarily a private sector function. Accordingly, 60% of Project seed is distributed through government agencies for: (a) assisting poor farmer, (b) crop disaster relief (floods, drought, etc.), (c) demonstration/education to promote farmer demand for improved varieties. The remaining 40% is sold directly to farmers from the Seed Centers. A major part of Project seed is used to develop a market which can sustain a private sector seed industry.

Since the marketing/promotion function currently has no "home" in the Seed Division, a proposed reorganization provides a "Marketing and Promotion" Sub-Division which includes sections for: (a) market research and production

planning, (b) market channel development, (c) seed sales, (d) seed promotion and education. Each Center will also have a marketing and promotion section.

Demonstration and education promotion is essential to marketing by both the public and private sectors. The SD should closely cooperate with all agencies promoting the use of improved seed.

The private sector primarily markets seed through local merchants in rural areas. Seed is often provided on consignment to reputable merchants and on a cash basis to those who have no established reputation or record with the companies. Seed that are not sold can generally be returned to the producers at no penalty. This system has been successful for producers of improved seed and it provides a sound basis for market expansion as production capacity increases.

2. Technical Soundness of Constructing and Equipping the Facilities: Seed drying, processing and storage facilities as well as training facilities will be constructed using procedures effectively employed in the Seeds I Project. Layout drawings for buildings and equipment installation for Seeds II will be prepared by the same processing specialist, who did these designs for Seeds I. Regular RTG design/construction procedures will be followed under the Project: drawings will be submitted to the Architectural Section of the Planning Division of the Public Works Department or a private company architect for preparation of construction blueprints. Completed blueprints will be reviewed and accepted by appropriate RTG authorities.

Construction contracts will be awarded on a bid basis to private contractors. An experienced inspector will be assigned to monitor all stages of construction, and periodic inspections will be made by responsible personnel of the Division for whom the construction is being performed. Completed construction will be inspected by committees established by DOAE or DA prior to acceptance.

Construction required is of a type common to local building contractors. Buildings to be constructed are of standard warehouse type and require no special construction features or skills not readily available to a competent

building contractor. Construction required will be nearly identical to that already completed under the Seeds I Project. Prior to issuance of building contracts, contractors will be subjected to screening procedures commonly followed by the DA and the DOAE.

Construction and equipment cost estimates were prepared by Seed Division personnel based on experience gained from the Seeds I Project and recent discussions with seed specialist, and personnel in the Planning Division of the Public Works Department, Ministry of Interior. Detailed cost information and equipment lists are contained in the Annexes.

Equipment installation will be done following the same procedure employed in the Seeds I Project. Installation will be by personnel of the Agricultural Division of the DA and/or the Seed Division of the DOAE. Both have demonstrated this capability under the Seeds I Project. Equipment installation at all facilities will be under the overall supervision of a seed processing specialist and trained DOAE technologist with prior experience. All equipment will be checked out after installation by a processing specialist and experienced DOAE staff.

The above arrangements have been tested under the Seeds I Project and found to be sound from an engineering standpoint. Costs are considered reasonable and fair for all equipment and construction activities since they are based on current experience. The Project is accordingly considered technically feasible in all engineering respects.

SEED DEFINITIONS

The following definitions of the classes of certified seed are used by the Association of Official Seed Certifying Agencies:

Breeder seed are seed or vegetative propagating material directly controlled by the originating plant breeder or sponsoring institution, and which provides the source for the initial and recurring increase of foundation seed.

"Foundation seed, including elite in Canada, shall be seed stocks that are so handled as to most nearly maintain specific genetic identity and purity and that may be designated or distributed by an agricultural experiment station. Production must be carefully supervised or approved by representatives of an agricultural experiment station. Foundation seed shall be the source of all other certified seed classes, either directly or through registered seed."

"Registered seed shall be the progeny of foundation or registered seed that is so handled as to maintain satisfactory genetic identity and purity and that has been approved and certified by the certifying agency. This class of seed should be of a quality suitable for the production of certified seed."

"Certified seed shall be the progeny of foundation, registered or certified seed that is so handled as to maintain satisfactory genetic identity and purity and that has been approved and certified by the certifying agency."

Breeder seed generally remains exclusively in the hands of the orginiating plant breeder or institution and is limited in amount.

Foundation seed usually is under the control of the State agricultural experiment station. Sometimes this control is vested in an organization that produces foundation seed. The agricultural experiment station has some degree of control over the organization. Various state and national programs are responsible for the production and maintenance of foundation seed.

Registered seed, usually one generation advanced from the foundation seed, is used as planting stock for the production of the certified seed.

Registered and certified seed are distributed through regular seed trade channels.

There is no seed certification program in Thailand. However, the terminology associated with a certification program is widely used and RTG agencies utilize some of the production technique closely akin to an officially sanctioned, legally establish certification program. The key factor, "paper-track" system of pedigree lineage of the origin of every bag of seed back to the originating breeder or organization, has not been established. Since this pedigree system is the most effective manner for assuring the genetic characteristics of a variety released by the public sector, there can be no certification of genetic purity.

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CLASS: UNCLASSIFIED
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APPRV: DIR:DDCOREN
DRFTD: ED:SABOWERS:P
CLEAR: 1.PPD:BJOBELL
2.TGRANDSTFF
DISTR: CHRON USAID

E.O. 12065: NA
SUBJECT: SEED DEVELOPMENT II PID

REF STATE 287336

1. MISSION WELCOMES APAC APPROVAL OF SUBJECT PID.

2. APAC CONCERNS ON (A) DIVISION OF LABOR BETWEEN PUBLIC AND PRIVATE SECTOR; (B) PLANS FOR SHIFTING LESS PROFITABLE SEED INTO PRIVATE SECTOR; (C) PLANS FOR TURNOVER TO PRIVATE SECTOR SEED TYPES ALREADY MOVING IN THAT DIRECTION (E.G. CORN); (D) HOW RTG CAN EFFECTIVELY WORK WITH PRIVATE SECTOR TO SUPPLY SEEDS TO FARMERS; (E) EVENTUAL DEVOLUTION OF VEGETABLE SEED PROCESSING TO PRIVATE SECTOR; (F) SEED SUBSIDIES; (G) WORKING CAPITAL ACCOUNT; (H) BENEFICIARIES; (I) EQUIPMENT PROCUREMENT; AND (J) SEED REGULATION WILL, AS SUGGESTED IN REFTEL, BE ADDRESSED IN PROJECT PAPER.

DISTRIBUTION

ACT		
	D	✓
	EXO	
	O/TM	✓
	O/PPD	✓
	O/EST	
	O/HHLD	
	O/HO	✓
	O/NPN	
	O/HRT	
	TRG	
	CMS	
	C&R	✓

3. AS PER PARAGRAPH 7 OF REFTEL RESPONSES TO PESTICIDE CONCERNS ARE:

A. PROJECT PESTICIDES ARE SELECTED ON BASIS OF EFFECTIVENESS OF MATERIALS, SAFETY OF USE, AND RECOMMENDATIONS BY RTG'S PLANT PROTECTION DIVISION. THE PROJECT USES ONLY THOSE PESTICIDES WIDELY USED IN PRESENT U.S. SEED INDUSTRY.

B. MANUFACTURERS RECOMMENDATIONS FOR APPLICATION AND USE OF PESTICIDES, INCLUDING PROSTOXIN, ARE STRICTLY FOLLOWED. RECOMMENDED SAFETY EQUIPMENT IS AVAILABLE; IT HAS BEEN AND IS BEING PURCHASED AND USED. IT IS NOTED, HOWEVER, THAT PROCUREMENT PROBLEMS WITH A PARTICULAR AMERICAN SUPPLIER HAS DELAYED DELIVERY FOR GAS MASK CANNISTERS. HOWEVER, SUPPLIES ON HAND ARE SUFFICIENT FOR PRESENT NEEDS.

C. IT IS HARD TO JUDGE "THAILAND'S" ABILITY TO REGULATE OR CONTROL THE DISTRIBUTION, STORAGE, USE, AND DISPOSAL OF "REQUESTED" PESTICIDES. THE PROJECT IS MOSTLY INVOLVED WITH THE PLANT PROTECTION DIVISION OF THE DEPARTMENT OF AGRICULTURAL EXTENSION (DOAE). THIS DIVISION PROCURES, SUPPLIES, AND SUPERVISES USE OF PESTICIDES WITHIN THE DOAE OF WHICH THE SEED DIVISION AND SEED PROJECT ARE MEMBERS. THE PLANT PROTECTION DIVISION IS STAFFED WITH TRAINED SPECIALISTS WHO INDEED ADHERE TO

ALL LEGAL AND SAFETY REQUIREMENTS FOR HANDLING PESTICIDES. THIS DIVISION WORKS VERY CLOSELY WITH THE SEED PROJECT ON PESTICIDE MATTERS.

D. TRAINING: PROPER USE OF SEED TREATMENT IS COVERED IN PROJECT TRAINING COURSES. FOR THIS PURPOSE DR. J. SINCLAIR, INTSOY PLANT PATHOLOGIST, WAS RECENTLY BROUGHT TO THAILAND UNDER A DSB CONTRACT TO TEACH SEED TREATMENT IN THE CURRENT SEED PROJECT'S TTMS TRAINING COURSE. ADDITIONALLY, NUMEROUS PROJECT PERSONNEL HAD TRAINING IN SEED TECHNOLOGY AT MSU; THEIR TRAINING INCLUDED THE USE OF PESTICIDES. ALSO, IN 1979 THE MANUFACTURER OF PHOSTOXIN CONDUCTED EXTENSIVE TRAINING AND PRACTICE IN ALL ASPECTS OF PHOSTOXIN USE FOR ALL PROJECT PERSONNEL. IN JANUARY 1981 THREE WEEKS REPEAT TRAINING WILL BE GIVEN TO BOTH NEW AND OLD PROJECT PERSONNEL IN THE USE AND APPLICATION OF FUMIGANTS WITH DEMONSTRATIONS AT EACH DOAE SEED CENTER. TRAINING WILL AGAIN BE GIVEN BY SPECIALIST FROM THE MANUFACTURER OF PHOSTOXIN.

E. PROVISION FOR MONITORING PESTICIDE USE: ALL TREATMENTS AND APPLICATIONS ARE MADE UNDER THE SUPERVISION OF RESPONSIBLE AND TRAINED PROJECT OFFICERS WITH COOPERATION AND ADDITIONAL SUPERVISION FROM THE DOAE PLANT PROTECTION DIVISION. LEVIN

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TOR: 1519
CN: 09667
CHRGE: AID 4
INFO EC DCM CHRON

AIDAC

E.O. 12065: N/A

O/PROG ACTION

TAGS:

SUBJECT: APPROVAL OF IEES FOR RECENT PIDS

IEE THRESHOLD DECISIONS OF NEGATIVE DETERMINATION HAVE BEEN APPROVED FOR THE FOLLOWING PROJECTS:

(A) RURAL WATER AND SANITATION (493-0322)

(B) SMALL-SCALE HYDROELECTRIC ADAPTION (493-0324)

(C) EXPANDED POPULATION PLANNING (493-0325)

(D) SEED DEVELOPMENT II (493-0326) CHRISTOPHER
BT
#7974

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STATE 327974

DISTRIBUTION

ACT		INFO
	D	✓
	EXO	
	O/FIN	✓
✓	O/PPD	
	O/EST	✓
	O/DHUD	
	O/RD	✓
	O/HPN	✓
	O/HRT	
	TRG	
	EMB	
	C&R	✓

ANNEX SECTION V

Economic Analysis

Annex V Economic Analysis

1. Benefit and Cost to the Recipient Farmers

The direct benefits to the farmers who use seed produced by the Project are the increased yields of crops grown. If good quality seed are used, yields can increase 10-15 percent without increasing use of other inputs. Since the use of seed is not confined to any particular areas but widespread, the use of the national average is appropriate for the estimates of yield increase. To be conservative, a 10-percent increase in yields is used in the estimates for all crops except glutinous rice in the less developed areas. Due to intensified Government activities in the less developed areas, a 12.5 percent or the mid-range is used instead.

At present seed prices charged by the Project and under present practice in seedling preparation and planting, there will be no additional cost to the farmers. However, should prices of seeds be raised, the price difference is the additional cost that the farmers will incur from using the seed

The overall direct benefit to the recipient farmers is very high. The estimated benefits will reach 163.7 million baht by year 9. If prices of all field crop seed increase 20 percent the benefit cost ratio to recipient farmers is estimated at 11.95:1 at a discount rate of 14 percent. A 40-percent increase in prices of only rice, corn and sorghum seeds changes the benefit-cost ratio to 12.51:1 at the same rate of discount. Since the estimates for yield increase used in the analysis are conservative, these benefit-cost ratios can be considered as minimum.

2. Subsidy Cost to the Government

At present, the Government subsidizes the rice, corn, sorghum and peanuts farmers. Seed of these crops are sold at prices below costs (operating cost plus cost of seed). The subsidy cost to the Government ranges from 0.35 baht/kg. of corn to 2.22 baht/kg. of peanut seeds. Only prices of mungbeans and soybeans seed are above cost. However, no depreciation of the facilities and interest on working capital are accounted for in the estimated cost. If depreciation and interest were to be included, the subsidy cost to the government would be much higher.

The present pricing of seed subsidizes not only the farmers but also the Department of Agricultural Extension. Although it is beneficial to the farmers and the Department of

Agricultural Extension, it is not conducive to the development of the seed industry. The present relatively low prices for seed charged by the public sector likely discourage the private sector involvement in the production and distribution of most types of seed.

3. Financial Returns to the Seed Centers

At present seed prices, the Government's seed centers operate at a loss. The loss to the total investment is estimated at 4.47 percent per year. This loss can be recovered either by raising seed prices or reducing operating costs. The internal rate of return is sensitive to changes in seed prices but less sensitive to changes in operating cost. A 20-percent increase in prices of field crop seed causes a change in the IRR from minus 4.47 to plus 5.08 percent. A 40-percent increase in prices of rice, corn and sorghum also shifts the IRR from minus 4.47 to plus 4.96 percent. A 10-percent increase or decrease in operating costs causes a change in the IRR of less than 2 percent in the opposite direction.

The above figures show that pricing of seed should be critically reviewed taking into consideration the involvement of the private sector in the development of the seed industry, the potential for pricing to have an adverse impact on the use of the good quality seed by farmers, the political risk that the government has to take and the extent to which the cost of the capital investment should be recovered.

Based on the IRR, the Seed II Project is not financially attractive in the commercial sense. However, there are other direct benefits of the Seed Project which cannot be quantified and are not explicitly treated in the analysis. These benefits are not confined only to this Seed Project but will spill over to other projects and other sectors of the economy. For example, technical assistance, training and management improvement will be beneficial to the economy as a whole. Such investment should be regarded as social investment. Moreover, if technological problems can be overcome, there is a real potential for Thailand to produce vegetable seeds for export considering her relatively low cost of labor. Also, since the selection of the kinds of vegetable seed to be produced is based on its nutritional value, the increase in vegetable production is likely to result in the improvement in the nutrition of the rural population. Taking these benefits and other indirect benefits into account, the investment in the Project has a better return than the IRR indicates.

4. Economic Returns

The overall economic internal rate of return for the seed project is a highly favorable 151.37 percent. The IRR is not sensitive to changes in operating costs but sensitive to changes in seed prices. A 10-percent increase in operating cost reduces the IRR only 4 percent. On the other hand, a 20-percent increase in prices of field crop seeds or a 40-percent increase in prices of rice, corn and sorghum seeds reduces the IRR by about 18 percent. The direct gross benefit to the beneficiaries is projected to reach 185,304,000 baht by year 9.

Comparing all the above results, the Seeds II Project is economically sound. The Government can recroup its financial loss elsewhere. The increased production as a result of farmers' use of good quality seed will likely contribute to increases in export and foreign exchange earnings, generate more employment in the related industries and facilitate a more equitable distribution of income between urban and rural areas.

Cash-flow for Financial Analysis of Seed Centers

(1,000 baht)

Year	Investment				Operation					Net Project Benefit
	Facilities	Working Capital	Technical Assistant	Total Investment	Seed Purchase	Operating Cost	Total Cost	Seed Sale*	Net Benefit	
1	53,979	13,850	6,750	74,579	27,701	11,264	38,965	36,885	-2,080	-76,659
2	15,983	2,382	11,430	29,795	32,494	13,587	46,081	43,377	-2,704	-32,499
3	29,483	2,766	11,430	43,679	37,996	16,065	54,061	50,730	-3,331	-47,010
4	16,216	4,799	11,430	32,445	47,594	19,328	66,922	64,098	-2,824	-35,269
5	5,100	4,818	4,660	14,598	57,231	22,605	79,836	76,879	-2,957	-17,553
6	3,200	663	4,660	8,543	58,537	22,648	81,205	80,699	- 506	- 9,049
7	-	718	-	718	59,994	22,691	82,685	84,779	2,086	1,368
8	2,820	1,095	-	3,915	62,184	22,763	84,947	91,579	6,632	2,717
9	-	-	-	-	62,184	22,763	84,947	91,579	6,632	6,632
10	1,200	-	-	1,200	62,184	22,763	84,947	91,519	6,632	5,432
11	3,576	-	-	3,576	62,184	22,763	84,947	91,579	6,632	3,056
12	3,240	-	-	3,240	62,184	22,763	84,947	91,579	6,632	3,392
13	-	-	-	-	62,184	22,763	84,947	91,579	6,632	6,632
14	1,620	-	-	1,620	62,184	22,763	84,947	91,579	6,632	5,012
15	3,424	-	-	3,424	62,184	22,763	84,947	91,579	6,632	3,208
16	3,240	-	-	3,240	62,184	22,763	84,947	91,579	6,632	3,392
17	1,712	-	-	1,712	62,184	22,763	84,947	91,579	6,632	4,920
18	1,620	-	-	1,620	62,184	22,763	84,947	91,579	6,632	5,012
19	-	-	-	-	62,184	22,763	84,947	91,579	6,632	6,632
20	2,400	-	-	-48,576	62,184	22,763	84,947	91,579	6,632	55,308
	(-19,985)	(-31,091)								IRR = 4.47%

*at present field crop seed prices

Cash-flow for Financial Analysis of Seed Centers

(1,000 baht)

Year	Investment				Operation					Net Project Benefit
	Facilities	Working Capital	Technical Assistant	Total Investment	Seed Purchase	Operating Cost	Total Cost	Seed Sale*	Net Benefit	
1	53,979	13,850	6,750	74,579	27,701	11,264	38,965	37,585	-1,380	-75,959
2	15,983	2,382	11,430	29,795	32,494	13,587	46,061	51,202	5,121	-24,674
3	29,483	2,766	11,430	43,679	37,996	16,065	54,061	59,835	5,774	-38,105
4	16,216	4,799	11,430	32,445	47,594	19,328	66,922	75,308	8,386	-24,059
5	5,100	4,818	4,680	14,598	57,231	22,605	79,836	90,149	10,313	- 4,285
6	3,200	663	4,680	8,543	58,557	22,648	81,205	93,979	12,774	4,231
7	-	718	-	718	59,994	22,691	82,685	98,059	15,374	14,656
8	2,820	1,095	-	3,915	62,184	22,763	84,947	104,859	19,912	15,997
9	-	-	-	-	62,184	22,763	84,947	104,859	19,912	19,912
10	1,280	-	-	1,200	62,184	22,763	84,947	104,859	19,912	18,712
11	3,576	-	-	3,576	62,184	22,763	84,947	104,859	19,912	16,336
12	3,240	-	-	3,240	62,184	22,763	84,947	104,859	19,912	16,672
13	-	-	-	-	62,184	22,763	84,947	104,859	19,912	19,912
14	1,620	-	-	1,620	62,184	22,763	84,947	104,859	19,912	18.292
15	3,424	-	-	3,424	62,184	22,763	84,947	104,659	19,912	16,488
16	3,240	-	-	3,240	62,184	22,763	84,947	104,859	19,912	16,672
17	1,712	-	-	1,712	62,184	22,763	84,947	104,859	19,912	18,200
18	1,620	-	-	1,620	62,184	22,763	84,947	104,859	19,912	18,292
19	-	-	-	-	62,184	22,763	84,947	104,859	19,912	19,912
20	2,400	-	-	-48,676	62,184	22,763	84,947	104,859	19,912	68,588
	(19,985)	(-31,091)								IRR = 5.08%

*At prices of field crops seed increase 20 percent

Cash-flow for Economic Analysis

(1,000 baht)

Year	Investment				Operation					Net Project Benefits
	Facilities	Working Capital	Technical Assistant	Total Investment	Operating Cost	Incremental Farm Cost	Total Cost	Incremental Value of Production		
1	-	13,850	6,750	20,600	11,264	-	11,264	-	-11,264	-31,864
2	15,987	2,382	11,430	29,795	13,587	-	13,587	81,886	68,299	38,504
3	29,483	2,766	11,430	43,679	16,065	-	16,065	102,759	86,694	43,015
4	16,216	4,799	11,430	32,445	19,328	-	19,328	123,922	104,594	72,149
5	5,100	4,818	4,680	14,598	22,605	-	22,605	147,638	125,033	110,437
6	2,200	663	4,680	8,543	22,648	-	22,648	172,903	150,255	141,712
7	-	718	-	718	22,691	-	22,691	176,536	153,845	153,127
8	2,820	1,095	-	3,915	22,763	-	22,763	179,926	157,163	153,248
9	-	-	-	-	22,763	-	22,763	185,304	162,541	162,541
10	1,200	-	-	1,200	22,763	-	22,763	185,304	162,541	161,395
11	3,576	-	-	3,576	22,763	-	22,763	185,304	162,541	158,965
12	3,240	-	-	3,240	22,763	-	22,763	185,304	162,541	159,301
13	-	-	-	-	22,763	-	22,763	185,304	162,541	162,541
14	1,620	-	-	1,620	22,763	-	22,763	185,304	162,541	160,921
15	3,424	-	-	3,424	22,763	-	22,763	185,304	162,541	159,117
16	3,240	-	-	3,240	22,763	-	22,763	185,304	162,541	159,301
17	1,712	-	-	1,712	22,763	-	22,763	185,304	162,541	160,829
18	1,620	-	-	1,620	22,763	-	22,763	185,304	162,541	160,921
19	-	-	-	-	22,763	-	22,763	185,304	162,541	162,541
20	2,400	-	-	-48,676	22,763	-	22,763	185,304	162,541	233,980
	(-19,985)	(-31,091)								IRR=151.37%

Cash-flow for Economic Analysis

(1,00 baht)

Year	Investment				Operation					Net Project Benefits
	Facilities	Working Capital	Technical Assistant	Total Investment	Operating Cost	Incremental Farm Cost*	Total Cost	Incremental Value of Production	Net Benefit	
1	-	13,850	6,750	20,600	11,264	-	11,264	-	-11,264	-31,864
2	15,983	2,382	11,430	29,795	13,587	6,700	20,287	81,886	61,599	31,804
3	29,483	2,766	11,430	43,679	16,065	7,825	23,990	102,759	78,869	35,190
4	16,216	4,799	11,430	32,445	19,328	9,105	28,433	123,922	95,489	63,044
5	5,150	4,818	4,680	14,558	22,605	11,210	33,815	147,638	113,823	99,225
6	3,200	663	4,680	8,543	22,648	13,270	35,918	172,903	136,985	128,442
7	-	716	-	716	22,691	13,280	35,971	176,536	140,565	139,847
8	2,620	1,095	-	3,915	22,763	13,280	36,043	179,926	143,883	139,968
9	-	-	-	-	22,763	13,280	36,043	185,304	149,261	149,261
10	1,200	-	-	1,200	22,763	13,280	36,043	185,304	149,261	148,061
11	3,576	-	-	3,576	22,763	13,280	36,043	185,304	149,261	145,685
12	3,240	-	-	3,240	22,763	13,280	36,043	185,304	149,261	146,021
13	-	-	-	-	22,763	13,280	36,043	185,304	149,261	149,261
14	1,620	-	-	1,620	22,763	13,280	36,043	185,304	149,261	147,641
15	3,424	-	-	3,424	22,763	13,280	36,043	185,304	149,261	145,837
16	3,240	-	-	3,240	22,763	13,280	36,043	185,304	149,261	146,021
17	1,712	-	-	1,712	22,763	13,280	36,043	185,304	149,261	147,549
18	1,620	-	-	1,620	22,763	13,280	36,043	185,304	149,261	147,641
19	-	-	-	-	22,763	13,280	36,043	185,304	149,261	149,261
20	2,600	-	-	-48,636	22,763	13,280	36,043	185,304	149,261	197,937
	(-19,985)	(-31,081)								IRR=133.12%

*At price of field crop seed increases 20%

Annex VI - Description and Roles of Participating Agencies

This Annex gives a brief description of agencies participating in the Seeds II Project.

1. Department of Agriculture (DA). This Department is the research arm of the MOAC. It consists of 14 divisions, numerous research stations, and 3,117 personnel. Included with the Department's research responsibilities are crops research, variety development, and Breeder/Foundation seed maintenance. The Department cooperates with the Agricultural Universities in these research areas, particularly with corn and sorghum.

The Department's varietal development program includes both local breeding and introduction of foreign varieties. The existing program can provide all identified Project varietal needs if coordinated with the Universities.

Crop research is divided among a number of different DA Divisions. The Rice Division has enjoyed many years of technical assistance from "Rockefeller" and consequently has an enviable reputation for varietal development. The Rice Division operates the country's rice research stations, and will provide foundation rice seed for the Project.

The DA's Field Crops Division has research responsibilities for field crops other than rice. While this Division has done a creditable job in developing various crop varieties, the previous Seeds Project encountered some problems with both the quality and quantity of foundation seed provided. These problems primarily resulted from lack of equipment, storage facilities, an organized foundation seed section, funds, and personnel. Under this Project, processing equipment and storage facilities will be furnished to three field crop stations to upgrade their capability to provide foundation seed.

Vegetable crop research and varietal development is conducted in the Vegetable Crops Section of the DA's Horticultural Crops Division.

Climatic requirements for vegetable seed production are more specific than for fields crops. Consequently, seed production is limited to cooler northern regions. The major portion of foundation seed will be produced at the Fang and Mae Jo Research Stations. The Project has no previous working experience with the Horticulture Division. Inspection of their

field stations indicated a need for processing equipment, storage facilities, and training to upgrade their capacity to produce foundation seed. This Project will provide these necessary components for the Fang and Mae Jo Stations.

The Project requires Rhizobium inoculant for use in production of the leguminous seed crops; i.e., soybeans, peanuts, and mungbeans. The source of such inoculant is the DA's Plant Pathology and Microbiology Division. The Division has a present production capacity of 5,000 packets per month (1.0 MT) working 5 days per week or 7,000 packets per month (1.4 MT) working 7 days per week. Production can be initiated within 7 days of receipt of an inoculant order.

Under Seeds Development I equipment was ordered to increase inoculant production to 75-100 MT per year. At this writing, delivery of equipment is still in process; the new plant should be operational in late 1982 or early 1983.

2. Kasetsart University. The Horticulture Department of Kasetsart University has also been active in varietal development research. Here, also, the Project has no prior work relation or experience with this Department but proposes and has been encouraged by KU breeders to use it as a source of vegetable foundation seed. The Department has excellent production facilities at Kasetsart's new campus and has sufficient qualified personnel to produce the seed required by the Project.

3. DOAE Seed Division. The Seed Division has primary responsibility for Project Implementation. During its four year existence it developed a viable organization, trained a staff of 350 people, developed a field production network of 3,500 contract growers, built for operational Seed Centers and one Sub-Center, and established a distribution system.

The Seed Division has indeed made extraordinary progress. It is an experienced operational seed organization producing a much desired and used product. However, in view of the intended expansion in numbers of the Seed Centers, improvement in system management capabilities is warranted and indeed is a primary purpose of the proposed Project. The present Project recognized this need when a more efficient financial and record keeping system was developed for the Project in 1979-80.

With the supporting long-term and TDY technical assistnce proigrammed for this POroject, expertise will be available to build and develop all the management, operational

and technical skills, and plant facilities needed to maintain efficient seed support to government programs.

4. Department of Agricultural Extension (DOAE). The DOAE consists of 10,400 trained personnel spread through 15 Divisions of which the Seed Division is one. The DOAE, though still an expanding and developing organization, has achieved a farmer-oriented reputation and effectiveness.

Those DOAE Divisions most closely associated with the Seed Division and this proposed Seed Development II Project include the Crops Promotion Division, the Plant Protection Division, and the Finance Division. The Crops Promotion Division has been a large purchaser of Project seed for use in their crop demonstration and farmer programs. Under the expanding National Extension Improvement Program, Tambon Extension Agents will have the capability of conducting demonstrations in any village in Thailand. With Crops Promotion assistance in plot demonstrations, the use of high quality seed will be promoted in the various regions in accordance with Project plans for building an improved market demand. The Crops Promotion does have the orgnizational ability and expertise to promote both improved seed and new superior varieties.

DOAE's Crop Protection Service Division also provides support to the Seed Division in terms of providing Project contract farmers protection against crop pests and diseases. The Division maintains trained agents in all provinces who on request from Project fieldmen diagnose pest or disease problems in contract grower crops and make the required treatment.

Additionally, the Crop Protection Service Division supports the Project by providing the appropriate seed treatment and fumigation chemicals as well as offering backup technical advice and assistance in the proper safe use of these chemicals.

5. Provincial Governor's Office. The Offices of the Provincial Governors coordinate all government activities within the province, especially financial. The Seed Project has received excellent coopention in the past from the Governors.

6. Marketing Organizations. The Seed Division maintains working relations with numerous government agencies in terms of providing seed for their particular programs. Previously, the Marketing Organization for Farmers (MOF), semi-autonomous government enterprise, was assigned the seed marketing

responsibilities. However, MOF did not have sufficient funds or resources to develop and maintain an efficient marketing and distribution system; consequently serious inefficiencies were encountered in seed marketing and return od funds to the DOAE/SD's WCA.

As a result of the March 1980 Project "Review/Redesign" the Seed Division began directly selling to concerned Government agencies and those agencies have provided their own seed distribution. Agencies and channels to which the Project provides seed include:

(a) DOAE-Crops Promotion Division

(b) Provincial Extension Offices and Programs

(c) Marketing Organization for Farmers (cash basis only)

(d) Farmer Cooperatives and Associations

(e) Cooperative Promotion Department

(f) Emergency and Disaster Relief Programs

(g) Accelerated Rural Development Program

(h) Public Welfare Department

(i) Royal Irrigation Department

(j) Direct sales to farmers only from Seed Centers

(k) Other government agencies.

With exception of the support given by the OA in providing foundation seed and inoculum, the Project is housed within the DOAE.

(a) Seed Division. Within DOAE the Project is housed within the Seed Division. The Division already has the basic facilities and organizational capability to produce, process and distribute. In effect this Program extends and expands the duties and responsibilities conducted by this Division over the past four years.

The primary organizational change will be the position of Project Director. Previously, the Director-General of DOAE was officially designated as Project Director.

However, because of the numerous other duties assigned the Director-General, he is frequently removed from the day-to-day planning and decision making within the Project. The Project proposes that the Project Director's position will be filled by the Seed Division Director. He will be the day-to-day contact point for both the USAID Project Manager and the Technical Advisors and must have authority to make all operational and implementation decisions for the Project. The Project Director will have as support assigned technical advisors both long-term and TDY.

(b) Crops Promotion Division. This Division, as discussed above, will serve the Project support function of educating farmers to the benefits of high quality improved seed for the purpose of building a greater market demand. This will be done through both farmer meetings and demonstration plots at the farmer level as well as at demonstration farms at the provincial level.

The Crops Promotion Division also interacts with the Seed Division through its purchase of seed and subsequent distribution through Farmer Cooperatives and Associations and Tambon Agents.

(c) Plant Protection Division. This Division through its Regional and Provincial Centers will, at the request of the Seed Centers, diagnose and provide an apply the appropriate treatments to crops of contract growers where disease or insect problems exist. Additionally, this Division supports the Seed Centers with technical assistance in treating and fumigating seed.

(d) Finance Division. The function of the Finance Division is to provide the RTG budget funding for Department personnel and operational costs including the WCA.

Department of Agriculture (DA)

The DA supports the Project in three primary ways. First through its research and varietal development it provides most of the improved field crop and vegetable varieties used in the Project. Secondly, from its various field stations, it supplies the Project with the necessary foundation seed. Third, its inoculum production plant, for which equipment was provided through the Seed Development I Project, will furnish the Project with Rhizobia inoculant for use by contract growers producing leguminous seed and for use by farmers purchasing leguminous seed directly from the Seed Centers.

Kasetsart University

As with the DA, Kasetsart University supports this Projects through development of improved vegetable varieties and foundation seed.

ANNEX VII. SOCIAL ANALYSIS

I. Beneficiaries

This section will discuss beneficiaries of the Project in 2 ways: first, beneficiaries of the current Seeds I Project and second, how Project personnel have indicated emphasis will be shifted under Seeds II. Despite three separate studies on the beneficiaries of the Seeds I Project we are unable to say definitely what groups benefitted, to what extent, etc. Part of the reason for this is the lack of data, or conflicting data (Seeds I did not set up a system to monitor these concerns). Other reasons are due to shortcomings of the three studies (In one the data on which a computer study was based was found to be unreliable for the purposes needed. In the other two studies local level observations could only be conducted in a few small areas due to time and funding limitations - it is doubtful whether many of the results of these local studies can be used to represent larger beneficiary population). Nevertheless, it would be inappropriate to move ahead with Seeds II without at least some idea of where the seeds went under the existing project. Despite the data problems, certain conclusions can be drawn, although not all important questions can be answered.

Data provided by the Department of Agricultural Extension and all studies conducted so far tend to support the finding that regional, provincial and local distribution of seeds, under the Seeds I Project was highly skewed, especially for rice, the largest seed type distributed. Table 1 shows rice seed distribution by program. Some distribution data are available for the two largest programs, Disaster Relief and Rice Seed Exchange, together accounting for 85% of the rice seed distributed in 1980. Table 2 shows that rice seed distributed under the Disaster Relief Program (66% of the total rice seed distributed) was sent to only four provinces, all in Central Thailand, Auythaya alone absorbing 44% of the seed distributed under this program. Seed provided through the Rice Seed Exchange Program, although only 19% of the total amount distributed, was somewhat more equitably spread on a regional basis (Table 3A). Within most regions, however, only a few provinces received the seed, especially in the South, which appears to have been very underrepresented or unrepresented in all types of seed programs. In the Northeast, however, exchange program distribution among provinces was not as bad (Table 3B), although the three top provinces received 44% of the seed distributed in the region, whereas the bottom 3 received only 3%.

Table 4 shows the type of rice produced by the Seed Center programs for distribution. Note that 78% is non-photoperiod sensitive and 89% is non-glutinous. This helps to explains much of the distribution pattern discussed above. Most of the RD1, 7, 9 and 11, being non-photoperiod sensitive was distributed to the Central Region where these varieties can be used in the dry season wherever water control allows. Dry season irrigation is predominantly in the Central Region. Lasts year's wet season floods, however, were especially destructive in Chainat and Ayuthaya, where most of this type of rice was then sent in order that farmers could plant it in the dry season to make up for wet season losses. We have no data on how much of it was planted and how much directly consumed, however.

Table 3B demonstrates that three main types of rice were distributed in the Northeast: the glutinous staple Niew Sanpatong; RD6, a glutinous variety useful for earlier harvesting on higher ground; and Khao Dok Mali, the non-glutinous rice preferred as a cashcrop in many areas of the Northeast. All three are photoperiod sensitive for use in the wet season (few northeast farmers have access to dry season water to grow the non-photoperiod sensitive varieties). Nearly all of the Niew Sanpatong (56 out of 64.5 tons) was distributed to the Northeast through the exchange program, while a quarter of the RD6 and an eighth of the Khao Dok Mali also reached the Northeast under this program (compare Table 3B with Table 4). In total then, the three varieties seemingly most important to the Northeast made up 20% of the 1980 production, and 7%, or less than half of this, was actually distributed to the Northeast. All above analysis indicates that for rice, distribution of seeds from Seeds I Project has been rather skewed on an area basis. Since ethnic groups are also distributed in Thailand on a regional basis, one can conclude the distribution has also been skewed ethnically with the Central Thai benefitting most, followed by Northern Thai, Northeastern Thai benefitting somewhat and Southern Thai benefitting very little indeed. It is important to note that the distribution of rice seed under Seeds I was not simply a matter of the distribution system within a program nor even of the type of program, although obviously, since most of rice went into disaster relief it is not surprising that its distribution concentrated in disaster areas. However, the pattern of distribution on a regional basis and even, to some extent on a provincial and sub-provincial basis is more directly explained, as discussed above, by the rice seed varieties produced, the emphasis on non-photoperiod sensitive, non-glutinous varieties meaning that the seed would be employed in areas with good control of water, especially in the dry

season, i.e. in the areas of irrigation concentration in the Central Plains. Well-known farmer emphasis on the importance of the subsistence crop also suggests that adoption would favor non-glutinous rice eaters, again concentrated predominantly in the Central Plains.

For field crops, data on regional distribution of seed is also problematical. For each data set, however, a certain amount of skewing is evident, although not so much as with rice. Table 5 displays a typical example. In this case the North received most, over half the total, the Northeast received a third and the South again received very little. Field crop distribution is also at least partially explained by crop type. Corn, for example, is grown primarily in the North, although it is also a much more important crop in the Northeast than its share indicates. The vast majority of corn seeds are purchased on the market, however, in all regions of the country.

With respect to distribution of Seeds I benefits by income class we have no definitive data on which to base an analysis. A study of several small areas in the North and Northeast (Chaiwat Khonjing, Report to USAID, 1981) found in general that the poor were not disadvantaged in distribution, although there is reason to believe the small populations surveyed may be somewhat unrepresentative (gross crop sales was used as a proxy for income but rainfed farmers outearned irrigated farmers in the Northeast areas studied by a considerable amount, suggesting rather a unique situation). Data from the NERAD household survey was analyzed for users and non-users of improved rice seed (Grandstaff, 1981). This analysis showed that in the eight rainfed NERAD tambons, distribution was greater the higher the income class (Chaiwat's data on the rainfed area alone also supports this finding). However, it was determined that not all households that used improved seed were coded as such (Niew Sanpatong and Khao Dok Mali were sometimes coded as native varieties), thus the data is unreliable. In general, for rice at least, the concentration of production on the non-photoperiod sensitive varieties and their distribution to farmers in irrigated areas, predominantly in Central Thailand, should logically mean that farmers who are somewhat better-off received the major benefits.

In order to make the Seeds II Project of greater assistance to the poor, it is the aim of the Royal Thai Government to (1) concentrate most rice seed resources in the rice seed exchange program and (2) target the majority of seeds produced by the project on the 246 amphurs identified by the 5th 5-year Plan as the country's "poor amphurs." Rice received

back from farmers through exchange would then be used for the disaster relief program. This section will examine these "poor" amphurs, then, as the potential beneficiaries poplulation of the Seeds II Project. The 246 "poor amphurs" are about half the total number of amphurs in the country, located in 37 provinces, again about half those in the country. Their regional distribution (Table 6) approximates the distribution of per capita poverty. 60% of the amphurs identified as "poor" are in the Northeast, 29% in the North, 11% in the South. Data is not yet available on classification criteria, except for those provinces in the Northeast.

In the Northeast, a total of 147 out of 159 amphurs (92%) made the poverty list. In effect, then, the entire Northeast is classified poor. If the Project is to aim at the poor amphurs, then, in effect it should direct 60% of its seeds to the Northeast, but in order to have the best effect, it would have to subclassify the amphurs in the Northeast. This has already been done by NESDB (see Figure 1). NESDB used a formula based on average amount of wet-rice land, productivity of rice, and % of total land holding in rainfed wet-rice land to classify amphurs into "very poor, medium poor, and less poor". By this formula, the list consists predominantly of medium poor amphurs (50%) and very poor amphurs (45%), with only 5% of the list being less poor amphurs. By this criterion, if the project targets most of its seed toward those 66 amphurs classified as "very poor" by NESDB, it should have a beneficial impact on poverty, if the seed is appropriate to meeting the needs of poor, rainfed farmers in these areas (discussed under Feasibility below).

The "poor amphurs" identified by NESDB have not yet been analyzed in detail, thus little can yet be said about the characteristics of their populations. Data on these amphurs is available from various sources, however, and soon will be assembled in order to portray the characteristics of these amphurs. Some data is available on the Northeastern amphurs, however (Table 7), the information upon which the poverty formula was based. Note that even if "medium poor" as well as "very poor" amphurs are targetted as the beneficiaries population (Figure 1), the program will be targetting on predominantly rainfed rice regimes. In light of the above analysis, this would necessitate a major reorientation in the varieties of rice produced under the project. The types of rice needed, the means of getting them to rainfed farmers, etc., will be discussed in the next section.

II. Feasibility

From a social analysis point of view there are two broad issues of major importance for Seeds II: (1) Will the types of seeds produced be those that are most appropriate to farmers' needs, especially to poor farmers in rainfed areas; (2) Will the right types of seeds be accessible at the right times to the farmers who need them, especially to the poor farmers in rainfed areas. The report "Rice Varieties in NERAD Tambons in Chaiyaphum and Roi Et" (Grandstaff, 1981) covers these issues in detail and makes programmatic recommendations. We will discuss the two major issue areas together here (they are interrelated), in terms of the Seeds II Project's ability to satisfy both of these concerns.

As pointed out above, targetting on the country's poor amphurs will mean a major reorientation in the type of rice seeds produced under the project. The same may also be true for vegetables and field crops, although there has not been sufficient time to examine these in as much detail as has been done with the major crop type, rice. For rice, the issue is how to determine, on an annual basis, what varieties of rice should be produced in what quantity. This will primarily be the responsibility of the Marketing and Promotion Subdivision of the Seeds Division - a new subdivision to be created under the project. The "Rice Varieties" report (Grandstaff, 1981) discusses the general needs, for a group of photoperiod sensitive rice types, both glutinous and non-glutinous, that cover a range of growing conditions and harvesting times. It cannot be determined without further study whether existing varieties meet these conditions well enough or whether new varieties should be developed. It seems likely that many existing varieties will in fact be suitable but that these can be further improved once the development of seed varieties is more closely targetted on needs in rainfed areas. It is difficult to be too specific without further study, but one could certainly say that there is a need for Niew Sanpatong and Khao Dok Mali in rainfed areas of the Northeast - in much greater quantity than is now reaching these areas. There also appears to be a need for an improved "heavy" (able to be harvested late) non-glutinous rice that can perform as well as Niew Sanpatong in flood-prone areas. There is also a need for several types of "lighter" glutinous rice, with a range of early to mid harvesting times. RD6 may help, if it is has no other disadvantage compared to native varieties currently serving these needs.

The second part of the production issue is in what quantity should each type be produced. This will depend on some method to classify local needs annually by type and amount. The information gathered can be used both to set production targets and to specify what amounts of each type will be sent to each amphur in the program. It is difficult to imagine how a newly formed, small subdivision will be able to handle this information gathering task on its own. In all probability the local amphur or tambon agricultural officials will be needed to assist in the task. The best that can be done at this stage is to raise the issue of establishing an annual information system (what seed types needed where in what amounts) as the key feasibility issue that must logically be resolved if the project is to be able to meet farmers' needs.

If annual needs by seed type, location, and quantity can be established, the principal issue in accessibility will be the nature of the distribution system. Field study (Grandstaff 1981) has indicated that exchange, tang for tang, is probably the most appropriate method from the farmer's point of view and is likely to be met with widespread acceptance and enthusiasm if the right types of seed can be made available, at the right times in the year, in the right quantities. Farmer preference concerning quantity and timing is for 10 kilograms per rai, available in the village, well prior to planting. Because of the unpredicatability of the rains in the Northeast, rice seeds should reach the village by early May. Distribution by late May or early June may be too late. The ability of the Rice Exchange Program to get the right seeds in the right amounts from the Centers through amphurs to the villages on this schedule is not a social issue, but it is certainly an institutional and organizational issue of vast proportions and one on which the entire success of the Seeds II Project will depend, at least from the farmer's point of view.

Finally, the issue of differential access at the village level should be addressed. It seems likely that if all the above issues can be resolved so that needed amounts of needed seed types arrive on time in the village at no cost to the farmer, differential access should not be a problem. To the extent that local quantities are insufficient that transportation cost must be borne locally, or that information about seed type or availability is limited, differential access can be expected. If a "system" is set up for local officials to follow, and if the system is monitored and evaluated, fairness can be maximized. Within the village, rice seeds will probably eventually reach all, through internal exchange,

although quality may be diluted (villagers prefer to exchange with the government rather than with each other for this reason). For field crop and vegetable seeds, however, especially those types which require new seed to maintain quality, the Project will need to pay attention to the issue of fairness in access. Since the seeds are to be sold, rather than exchanged, this may be problematical and the issue will have to be studied in detail in order to set up an equitable system.

III. Effects

The widespread use of improved seeds can be expected to raise productivity over the longer term (5 yrs.+). For rice, for example, improved varieties, if matched against local rice "niches" will allow better use of farm resources and greater production, perhaps 15 to 30% when averaged over a period of several years, since the new varieties will survive better, allow more integrated labor schedules, and their greater productivity (about 15% higher without increased inputs) and market price will result in better returns to farmers (See Grandstaff 1981).

We can make a very rough estimate of the extent of these effects using the following computations. First, to estimate the total need. Focusing on the 66 "very poor" amphurs in the Northeast, the average wet-rice holding size is 14.5 rai (Table 7) and the population is approximately 66/159 x 2.7 = 1M households. (Figure 1, and assuming NE pop. is about 2.6 M. households). Therefore, the total target rice area is about 15M rai, for these 66 amphurs alone. At 10 kg rai, 15M x 10/1000 = 150,000 metric tons. Assuming the Northeast will receive about 60% of the output of the project (it has about 60% of the "poor amphurs" in the country), the total production needed for blanket rice seed coverages of "very poor" amphurs in Thailand is about (100/60 x 150,000 MT = 250,000 metric tons. However, NERAD data show that farmers only plant approx. 80% of their wet rice land in any given year, thus .8 x 250,000 = 200,000 metric tons would meet current needs. Farmers prefer to renew rice seed (at least the staple Niew Sanpatong) every 3 years. To estimate conservatively, however, assume the program should provide renewal every 4 years and, very conservatively, only 5 kg., instead of (farmer estimated) 10 kg/rai; 5/10 x 1/5 x 200,000 = 20,000 metric tons of rice seed per year. For widespread effect, then, this should be the total production target of the Seed Centers, roughly ten times their current rice seed production. A target of even half or a quarter of

this could still be expected to have widespread effect on the country's "very poor" amphurs. To the extent that all the "poor" amphurs are targeted, production would have to be further increased (probably tripled) in order to have a similar effect, all this assuming, of course, that the right seeds were produced in the right proportions and distributed on time to the right places. In sum then, the effectiveness on rice production and income will depend overwhelmingly on basically organizational concerns: the targeting of amphurs, the identification of production of the needed seeds, and the ability to increase seed production significantly beyond current levels (3 to 10 times).

If these basically organizational tasks can be accomplished, effects on production in the "very poor" amphurs should be evident in 3 to 5 years after receiving the seed. Equity in distribution should not be a problem if the production targets can be met and the organizational tasks successfully accomplished. The increased production itself, perhaps 15 to 30 percent over time, could indeed result in effects on population movement. A stronger resource base in these areas will help make farming more attractive and decrease outmigration, perhaps somewhat less than the percent of production increase however, perhaps a 5-10% decrease in what outmigration would have been in 6 years, or alternatively, an ability to support an increased population of 5 to 10% on the same land resources, due to the Seeds Project alone. This would be a significant contribution in these "very poor amphurs," where population pyramids are already such that increasing numbers of households will have to be supported over the next 5 to 10 years.

Effects on women are more subtle and have not been thoroughly investigated. Peak female labor in wet-rice farming is in June-July (planting) and Nov.-Dec. (harvesting). Since women have a primary role in harvesting, seed varieties that can offer scheduling flexibility should be of benefit to them, reducing workloads and allowing some alternative use of time. The female role in the farm household, however, should be studied in relation to proposed modifications such as new seed varieties in order to understand the effects.

The introduction of new seed varieties will have a much <u>greater</u> effect than that discussed above <u>if</u> a number of other farm needs can also be addressed. These are discussed in a separate report (Grandstaff 1981) and will be addressed under separate projects. Briefly, farmers face a number of critical problems that affect production: flooding, drought, pests and disease, etc.

In and of itself Seeds II Project should have little or no environmental effects. The seed types to be introduced are mostly improvements or purification of varieties already in use in these areas. The diversified landforms and "niches" on the local farmstead will undoubtedly continue to result in diversified cropping patterns. In this sense, a change in focus onto vegetables and a range of photoperiod-sensitive rice varieties will be environmentally safer than Seeds I emphasis on a few non-photoperiod sensitive varieties to be used in year-round cropping, irrigated regimes. The possible negative effects on environment will be more likely with inputs other than seeds, such as fertilizer and insecticides. These do not come under the current project, however.

Spread effects from Seeds II are difficult to estimate without study but they will certainly be considerable. Farmers always did and will trade seeds with each other. Exchange is greatest within the village, where, for subsistence rice seed at least, it can partially offset insufficient government supply. Among villages it is much less common but still significant. Over distances above say, 25 kilometers seed exchange only seems to exist along special channels, such as among close relatives. Nevertheless, if the seeds distributed under the project are seen as very useful by the farmers, a great deal of informal exchange can be expected. If the project targets on the "very poor amphurs" this would have the added benefit of increasing the prestige (and perhaps a degree of economic return) of poor families through informal exchange.

In sum, the project is considered socioculturally feasible. Its emphasis on poor amphurs and on the rice seed exchange program is highly laudable and should result in great benefit if all the (sizeable) organizational tasks these aims imply can be successfully accomplished.

Table 1. Seeds Centers 1980 Rice Seed Distribution by Program

	(metric tons)	(%)
Farmers Marketing Organization (MOF)	125.2	(9%)
Direct Sales to Farmers	82.3	(6%)
Disaster Relief Program	975.8	(66%)
Rice Seed Exchange Program	284.8	(19%)
Total	1,467.9	(100%)

Source: Department of Agricultural Extension

Table 3A. Rice Seeds Provided Through Rice Seed Exchange Program 1980
(metric tons) (%)

Region	Variety			Total
	Khao Dok Mali	Niew Sanpatong	RD6	
North Thailand	52.6	38.1	47.5	138.2 (49%)
Northeast Thailand	28.6	55.9	22.0	106.5 (37%)
Central Thailand	38.6	1.0	0.5	40.1 (14%)
Total	119.8	95.0	70.0	284.8 (100%)

Source: Department of Agricultural Economics

Table 7B. Northeast Thailand Rice Seeds
Provided through Rice Seed Exchange Program 1980
(metric tons)

Province	Variety			
	Khao Dok Mali	Niew Sanpatong	RD6	Total
Nakon Ratchasima	-	0.5	-	.5
Chaiyaphum	-	2.0	-	2.0
Buriram	-	2.0	2.0	4.0
Surin	-	0.5	-	.5
Srisaket	2.0	2.0	1.5	5.5
Ubonrachatani	5.2	10.4	7.0	22.6
Udonthani	0.4	7.0	1.0	8.4
Nongkhai	3.4	2.0	1.0	6.4
Sakonnakon	2.5	4.0	1.0	7.5
Nakonphanom	1.4	5.5	1.5	8.4
Khon Kaen	1.2	3.0	1.0	5.2
Mahasarakham	5.0	4.0	-	9.0
Kalasin	1.0	5.0	-	6.0
Roi-et	5.3	6.0	4.0	15.3
Yasothon	1.2	2.0	2.0	5.2
Total	28.6	55.9	22.0	106.5

Source: Department of Agricultural Economics

Table 4. Seeds Centers 1980
Rice Seed Production by Type
(metric tons) (%)

RD1*+	246.2	(15%)
RD6	84.7	(5%)
RD7*+	802.7	(50%)
RD9*+	68.9	(4%)
RD11*+	148.2	(9%)
Niew Sanpatong	64.5	(4%)
Khao Dok Mali+	183.4	(11%)
Total	1598.6	(98%)

*(non-photoperiod sensitive) +(non-glutinous)

Table 5. Distribution of Field Crop Seeds from the Four Seed Multiplication Centers in 1980
(metric tons) (%)

Region	Corn	Sorghum	Soybean	Peanut	Mungbean	Total
North	232.8	-	69.1	63.1	17.2	382.2 (51%)
Northeast	95.4	0.7	5.1	145.7	4.3	251.2 (33%)
Central	7.2	0.3	74.4	18.9	3.1	103.9 (14%)
South	1.3	-	-	2.4	9.1	12.8 (2%)
Total	336.7	1.0	148.6	230.1	33.7	750.1 (100%)

Source: Chaiwat Khonjing
Report to USAID, 1981,
Table 8

Table 6. Regional Distribution of "Poor Amphurs" Identified in the 5th 5-Year Plan

Region	# of Provinces (%)	# of Amphurs (and "King Amphurs") (%)
Northeast	16 (43)	147 (60)
North	16 (43)	72 (29)
South	5 (14)	27 (11)
Center	0 (0)	0 (0)
Total	37 (100)	246 (100)

Table 7. Some Charactoristics' of the Official "Poor Amphurs" in the Northeast
(unweighted averages of amphur averages)

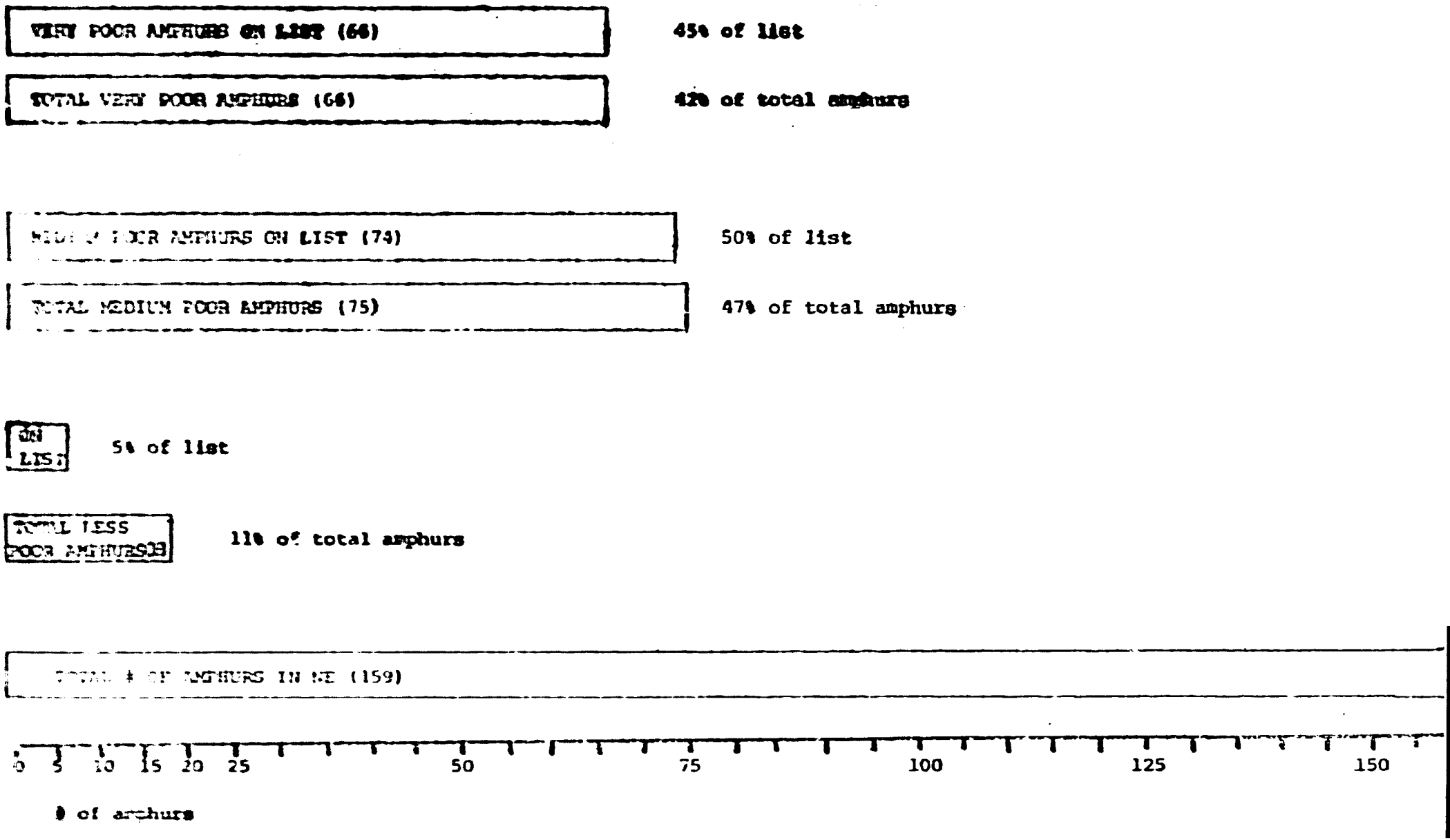
	Wet rice Land Holding Size	% of Rainfed Wet-rice Land in Total Holding	Rice Yields (tang/rai)
Very poor Amphurs (av. pov. index 93.1)	14.5	86.6	26.5
Medium Poor (av. pov. index 70.3)	16.0	71.5	29.0
Less Poor (av. pov. index 40.0)	12.7	38.1	31.6

Table 7. Disaster Relief Program 1980 (and Feb. 1981)
Distribution of Rice Seeds by Provinces
(metric tons)

Provi	Variety				
	RD1	RD7	RD9	RD11	Total
Ayuth	-	290	60	80	430
Chain	180	175	-	-	355
Angt	-	171	-	-	171
Phich	-	20	-	-	20
	180	656	60	80	976

Department of Agricultural Extension

Figure 1. CLASSIFICATION OF AMPHURS IN THE NORTHEAST BY POVERTY INDEX (VERY POOR, MEDIUM POOR, LESS POOR) AND BY WHETHER OR NOT THEY ARE ON THE OFFICIAL POVERTY LIST



ANNEX VIII

CERTIFICATION PURSUANT TO SECTION 611 (e) OF THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, Donald D. Cohen, the principal officer of the Agency for International Development in Thailand, having taken into account, among other things, the maintenance and utilization of projects in Thailand previously financed or assisted by the United States, do hereby certify that in my judgment Thailand has both the financial capability and the human resources capability to effectively maintain and utilize the capital assistance to be provided by the proposed Seed Development II Loan.

Donald D. Cohen
Director

Date: July 23 1981

ANNEX SECTION IX

Statutory Checklist

SEEDS II
CHECKLIST OF STATUTORY CRITERIA

PROJECT CHECKLIST

A. GENERAL CRITERIA FOR PROJECT	A. GENERAL CRITERIA FOR PROJECT
1. Continuing Resolution Unnumbered; FAA Sec. 653(b); Sec. 634A.	
(a) Describe how Committees on Appropriation of Senate and House have been or will be notified concerning the project;	Congressional Notification will be forwarded to Committees.
(b) Is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure)?	Yes.
2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the United States of the assistance?	Financial and technical analysis have been prepared. See Part III Project Paper.
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); Continuing Resolution Sec. 501. If for water or water-related land resource construction, has the project met the standards and criteria as per the Principles and Standards for Planning Water	N/A.

and Related Land Resources dated October 25, 1973?

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

The Mission Director has so certified.

6. FAA Sec. 209. Is project susceptible of execution as part of a regional or multilateral project? If so why is project not so executed? Information, and conclusion whether assistance will encourage regional development programs.

No.

7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, 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 is directly targetted on improving the efficiency of the seed processing industry and increasing the role of the private sector in the industry.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and how it will 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 build in linkages to the U.S. private sector through placing Thai interns with U.S. seed companies and arranging for technical assistance from U.S. companies.

9. FAA Sec. 612(b); Sec. 636(h) Continuing Resolution Sec. 508. 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 United States are utilized to meet the cost of contractual and other services.	The Royal Thai Government contribution to the project will exceed 60% of total requirements.
10. FAA Sec. 612(d). Does the United States own excess foreign currency and, if so, what arrangements have been made for its release?	There are no U.S. owned local currencies available for this Project.
11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes.
12. Continuing Resolution Sec. 522. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?	N/A
B. FUNDING CRITERIA FOR PROJECT	FUNDING CRITERIA FOR PROJECT
1. Development Assistance Project Criteria	
a. FAA Sec. 102(b); 111; 113; 281 (a). Extent to which activity will: (i) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive	(i) Project will provide rural poor with greater access to improved seed.

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 of development on a sustained basis, using the appropriate U.S. institutions; (ii) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward a better life, and otherwise encourage democratic private and local governmental institutions; (iii) support the self-help efforts of developing countries; (iv) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (v) utilize and encourage regional cooperation by developing countries?

(ii) No direct effect planned.

(iii) Project will assist RTG's seed development program.

(iv) No differential effect on women is foreseen.

(v) N/A.

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: (include only applicable paragraph: e.g., 1, 2, etc.,--which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source).

(1)(103) for agriculture, rural development or nutrition; if so extent to which activity is specifically designed to increase productivity and income of rural poor; (103A) if for agricultural research, is full account taken of needs of small farmers;

The Project will increase farmer's use of improved seeds. Use of such seeds can result in an increase in productivity of 15% or more.

placed on use of appropriate technology?	
c. 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 has the latter cost-sharing requirement been waived under Sec. 124(d) for a "relatively least-developed" country)?	Yes.
d. 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 recipient country "relatively least developed?"	N/A
e. 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 development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.	The Project is consistent with the RTG's own development plans and is based on satisfying farmer's needs for an essential input - good seed.
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, productive capacities of farmers should be improved significantly through the use of improved seed.
2. Development Assistance Project Criteria (Loans Only)	Repayment prospects are excellent.
(a) FAA Sec. 122(b). Information and conclusion on capacity	

of the country to repay the loan, including reasonableness of repayment prospects.	
(b) FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?	The agricultural commodities resulting from this loan will not so compete with U.S. production.
3. Project Criteria Solely for Economic Support Fund	
(a) FAA Sec. 531(a). Will this assistance support or promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102?	N/A
(b) FAA Sec. 533. Will assistance under this chapter be used for military, or paramilitary activities?	N/A

ANNEX X

EXPRESS

No. MF. 0304/10404

Ministry of Finance,
Bangkok.

March 11, 1982

22 MAR 1982

DISTRIBUTION

Mr. Donald D. Cohen,
Director,
U.S. Agency for International Development,
2498 Petchburi Road,
Soi Sompraseng 3,
Bangkok 4.

Dear Mr. Cohen:

Re: Seed Development II Project

The Ministry of Finance wishes to refer to the discussions between the officials concerned of the Thai Government and USAID regarding the Seed Development II Project in which it has been mutually agreed that the Thai Government should submit an official request for a loan for financing partial costs of the Project from the United States Government in order to obtain authorization of the Loan from AID.

On behalf of the Thai Government, we hereby apply for a loan from the Agency for International Development of Washington under the United States Development Assistance Program for Thailand up to the principal amount of about US $6.1 million for financing partial costs of the Seed Development Project. The Government agrees to provide sufficient Baht counterpart fund for financing the remaining costs of the Project.

We trust that our request will have your early and affirmative reply.

With best regards.

Yours sincerely,

P. Vasuvikul

(Phaichitr Vathavikul)
Deputy Minister of Finance
Acting Minister of Finance