AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY

1. SUBJECT CLASSIFICATION

A. PRIMARY: Food production and nutrition — AF00-0000-G136

B. SECONDARY: Plant production--Ethiopia

2. TITLE AND SUBTITLE

Seed program/industry development in Ethiopia: technical aspects of a project paper; report to USAID/Ethiopia, AID/W and LSC/MOA

3. AUTHOR(S)

Potts, H. C.; Beck, J. M.

4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1979	69p.	ARC ET631.521.P871

7. REFERENCE ORGANIZATION NAME AND ADDRESS

Miss. State

8. SUPPLEMENTARY NOTES *(Sponsoring Organization, Publishers, Availability)*

(In TA 79-2)

9. ABSTRACT

10. CONTROL NUMBER

PN-AAG-108

11. PRICE OF DOCUMENT

12. DESCRIPTORS

Seed production
Varieties
Storage
Project design
Ethiopia

13. PROJECT NUMBER

931020300

14. CONTRACT NUMBER

AID/ta-C-1219 GTS

15. TYPE OF DOCUMENT

AID 590-1 (4-74)

105

PN-AAG-108

REPORT TO:

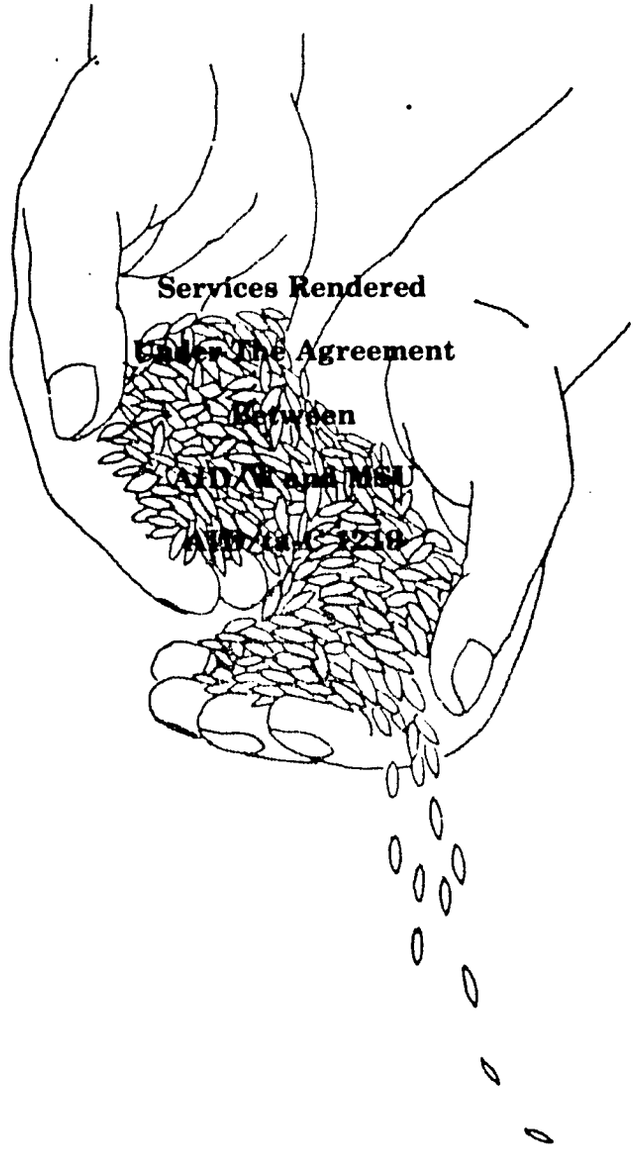
TA 79-2

USAID/E, AID/W
AND ESC/MOA

ET
631.521
P871

SEED PROGRAM/INDUSTRY DEVELOPMENT
IN
ETHIOPIA

TECHNICAL ASPECTS OF A PROJECT PAPER



Services Rendered
Under The Agreement
Between
AID/W and MSU
AID/ta-C-1218

SEED TECHNOLOGY LABORATORY
MISSISSIPPI STATE UNIVERSITY
MISSISSIPPI STATE, MISSISSIPPI

REPORT TO:

USAID/ETHIOPIA, AID/W and ESC/MOA
ON
SEED PROGRAM/INDUSTRY DEVELOPMENT
IN ETHIOPIA

Services Rendered
Under the Contract
Between
AID/W and MSU
Contract AID/ta-C-1219

SEED TECHNOLOGY LABORATORY
Mississippi Agricultural and Forestry Experiment Station
Mississippi State University
Mississippi State, MS 39762

February, 1979

Report Summary

TITLE: Seed Program/Industry Development in Ethiopia - Technical Aspects of a Project Paper

CONTRACT: AID/ta-C-1219 with Mississippi State University

CONSULTANTS: Dr. Howard C. Potts and Mr. James M. Beck
Seed Technology Laboratory, MAFES,
Mississippi State, MS

PERIOD OF CONSULTATION: January 8 - February 2 (Potts)
January 8 - February 6 (Beck)

Summary

The USAID/E and AID/W requested and the Project Officer approved an approximately four-week assignment for a seed program development specialist and a seed processing engineer. This assignment was to work cooperatively with USAID/E, REDSO-EA and Ethiopian officials in the preparation of a Project Paper to support the development of a comprehensive national seed program/industry for Ethiopia. Additionally, the seed processing engineer worked with the engineer of the Ethiopian Seed Corporation (ESC) to assure immediate utilization of some available seed processing equipment of U.S. manufacture.

The organizational and technical infrastructure of the national seed program in Ethiopia was judged to be the best encountered in Africa, except for Kenya, among the eight countries in which the consultants had previously worked. The national research program has and continues to develop and release effective, superior varieties. At the farmer education level, the EPID has continued to expand its effectiveness in a pattern which has proven successful for Ethiopia's stages of agricultural development over the past 15 years. The supply of the chemical

production inputs and farmer credit has been developed to a satisfactory level in these areas where the transportation and communication infrastructure are available. Further, the market for the peasant farmer's produce has been well above the government's minimum support price for the past several years.

Efforts to develop a comprehensive seed program capable of multiplying the seed of the superior adapted varieties into quantities sufficient to impact productivity and place these seed into the input supply system were negligible until July, 1978. After a two year internal study the National Seed Council recommended and the PMGSE implemented the necessary actions and policies to charter the Ethiopian Seed Corporation (ESC). The ESC is initially responsible for implementing the technical and coordinative aspects of seed production, processing and quality control. It is anticipated that the ESC will be assigned responsibility for seed marketing at the wholesale level as soon as the other phases are effectively under implementation.

In recognition of the need for technical assistance to assist the nacent ESC, the PMGSE and the UNDP/FAO signed an agreement which supports one long term (3 year) seed expert, a limited out-of-country training program and the equipment for one small seed processing unit. The expert, whoe had previously assisted in the development of a subregional seed project in Ethiopia, worked with the U.S. project design team and the Ethiopian counterparts to assure that the USAID and FAO projects supported the ESC in a complementary, non-duplicative manner.

The project proposed for USAID support will impact principally in two techical areas, (a) one long-term technician to assist in the proper

installation and training of ESC personnel in the managment of four regional seed production, processing/storage centers, and (b) a modest U.S. and third country but an extensive in-country, multi-level training program. These are the two areas of least impact by the FAO project.

In addition to working on the technical aspects of the project paper, the seed processing consultant developed detailed recommendations and instructions on proper installation of a series of U.S. seed processing machines which had been transferred to the ESC from a re-designed USAID project which no longer required these machines. Though the initial installation will be temporary, the equipment will be available for use by the ESC to process a portion of the seed to be produced during 1979.

Acknowledgements

The authors are particularly grateful to Ato Emmanuel K. Mariam, General Manager, Ethiopian Seed Corporation; his department heads, Atos Gugsa Endeshawe, Tesfay Odem, Debebe Seyoum and Chief Administrative Dagnatcheu Wolde for their complete cooperation and open discussion of their ideas and problems.

To Dr. Ken Sherper and Mr. John Rose of the Mission's Office of Agriculture, our thanks for making the necessary arrangements and the freedom to express in writing our professional judgement. For their interest, cooperation and hospitality a special thanks to Mr. Tom Lofgren, Design Officer, and Mr. George Rublee, Asst. Director of REDSO/EA. It was refreshing to work with "problem solvers".

To Olle Svensson, FAO Seed Expert, we wish the greatest success and trust that the friendship made will continue through the years both professionally and personally.

Howard C. Potts
James M. Beck
Mississippi State, MS

Table of Contents

	Page
REPORT SUMMARY	i
ACKNOWLEDGEMENTS	iv
1.0 INTRODUCTION	1
1.1 Terms of Reference	2
2.0 CURRENT SITUATION	2
3.0 TECHNICAL BACKGROUND	4
3.1 Government Seed Policy	4
3.2 Varietal Development and Research	7
3.3 Variety Release	8
3.4 Ethiopian Seed Corporation (ESC)	9
3.5 Seed Technical Committee	10
3.6 Seed Multiplication and Production	11
3.7 Seed Processing and Storage	12
3.8 Seed Marketing	14
3.9 Quality Control and Regulation	15
3.10 Technically Training Personnel	15
3.11 Other Reports Related to the Seed Project	17
3.12 UNDP/FAO Cereal Seed Production and Quality Control Project	18
4.0 DETAILED DESCRIPTION	19
4.1 Project Description/Strategy	19
4.2 The Technical Program	25
4.2.1 Organization	25
4.2.2 Multiplication Program	26
4.2.3 Processing and Storage	27
4.2.4 Marketing	28
4.2.5 Pricing	29
5.0 ADMINISTRATIVE FEASIBILITY	29
5.1 Seed Stocks Revolving Fund	30
5.2 Short Term Credit	31

Table of Contents, continued

Page

5.3 Seed Marketing ---------- 32

6.0 DIRECT TECHNICAL ASSISTANCE ---------- 33

ANNEXES

I. Itinerary and Appointments ---------- 35

II. General Lists of Equipment and Building Requirements --- 38

III. Job Description for Seed Processing Engineer ---------- 57

IV. Anticipated Staffing Pattern by ESC for Facilities and Programs under USAID/ESC Project ---------- 59

Report To

USAID/E, AID.W and ESC/MOA
on
Seed Program/Industry Development in Ethiopia
The Technical Aspects of a Project Paper

1.0 INTRODUCTION

A well organized, effective seed program/industry is as important to continued agricultural progress as are programs for supplying fertilizers, pesticides, credit and mechanical equipment. The seed program is even more basic to Ethiopian agricultural progress because, unlike the other production inputs, the seed of most of the superior crop varieties adapted to Ethiopian conditions can only be produced in Ethiopia.

Ethiopia has established an excellent varietal development, testing and introduction program which has demonstrated what can be accomplished by a dedicated, intergrated research organization. At the other end of the supply chain and through the efforts of the EPID Minimum Package Programs and the AMC, an acceptably effective system for delivery of the production inputs to the peasant farmers has been and continues to be developed. However, until July, 1978, no organization had been assigned the vital task of multiplying seed of the superior varieties into quantities sufficient to have an impact upon agricultural productivity and assure that the peasant farmers will have access to seed of high genetic and physical quality when they are required for planting. The Ethiopian Seed Corporation was chartered to bridge the gap between research and the "retail" level distribution system.

1.1 Terms of Reference

The assigned terms of reference for this consultation were:

(a) to assist the USIAD/E mission in the technical evaluation of the Ethiopian national seed program.

(b) to work with USAID/E, REDSO/EA, ESC and FAO personnel in the design of a project which would provide the additional trained personnel, facilities and financial support necessary for the development of a comprehensive seed program in Ethiopia.

2.0 CURRENT SITUATION

Geographically Ethiopia is a highly varied country. The central and western two-thirds of the country is mostly a high plateau, 1,500-3000 m above sea level, and mountains. The plateau is dissected by gorges and valleys and surrounded on the east and south by lowlands. The major area of crop production is the plateau. Agriculture in the lowlands consists primarily of the goat and cattle herds of nomadic pastoralists. The country is sub-divided into six ecological regions ranging from the desertlike lowlands to near alpine conditions in the high mountains. The generally mountaneous terrain of the ariable portions of the country is a serious obstacle to internal transportation, communications and economic development.

The population is estimated at 27 million, although a complete census has never been undertaken. The birthrate is estimated at 2.2% and 89% of the population lives in rural areas.

Ethiopia has approximately 8,800 km of all weather roads and 23,000 kms of dry weather roads. Rural access roads are limited, thus pack animals and human porterage are the dominant means of trans-

port in much of the rural area.

Agriculture is the mainstay of the Ethiopian economy, contributing 54% of the GNP and over 90% of all exports. An estimated 85% of the population depend directly on agriculture for their income. The large majority of these are small peasant cultivators engaged in subsistence farming with little surplus to sell. In spite of its relatively abundant land and low population density, Ethiopia is not self-sufficient in food production. This is attributable to the extremely low productivity in the traditional sector of agriculture where modern inputs are lacking, the level of technology is low and in the past the land tenure system was often incentive-killing. Added to these are the inadequate methods of storage, the difficulties in domestic trade and marketing of farm products, and the often prohibitive costs of transportation. The present inadequate marketing system often results in low, disincentive producer prices during the immediate post-harvest period and high pre-harvest prices.

Until Government's Land Reform Proclamation in 1975, about 50% of all smallholder farmers were tenants and were required to pay up to 50% of their crop production as rent. Since this principal discouragement for improving seasonal and in particular permanent crops has been removed, prospects are good for inciting larger number of farmers to improve production and introducing new technologies. All land had been declared Government property and farmers, including former tenants, have received free land use rights on the land they cultivate. A limit of 10 ha per family has been set and all land exceeding this limit, together with all land not cultivated by the former owner, has been expropriated.

Permanent employment of farm labor is no longer allowed. Peasant Associations to which every land cultivator in a village automatically belongs have been established and assigned responsibility for redistributing or cultivating the expropriated land.

Practically all tropical and temperate zone crops can be grown in Ethiopia because of the wide variety of climatic conditions. The main climatic limitations are the distribution and amounts of rainfall as indicated in Figure 1.

Only 6.5% of the country's 122 million hectares are devoted to crop production. Over 50% of the land is classed as being in permanent pasture and fallow. The most extensively grown crop, teff (*Eragrostis tef*) occupies nearly one-third of the total crop area. As is indicated by the statistics in Table 1, Ethiopia is primarily a grain producing country. Approximately 10% of the crop land is devoted to the production of high protein legumes, principally horse-beans, chickpeas, fieldpeas and haricot beans. Coffee is the major agricultural export crop.

3.0 TECHNICAL BACKGROUND

3.1 Government Seed Policy

The National Seed Council (NSC) was established in 1976 and charged with the following responsbilities:

(a) Formulating a realistic national seed program and related policies.

(b) Establishing a "National Seed Program" responsible for production, processing and marketing seed of released superior varieties.

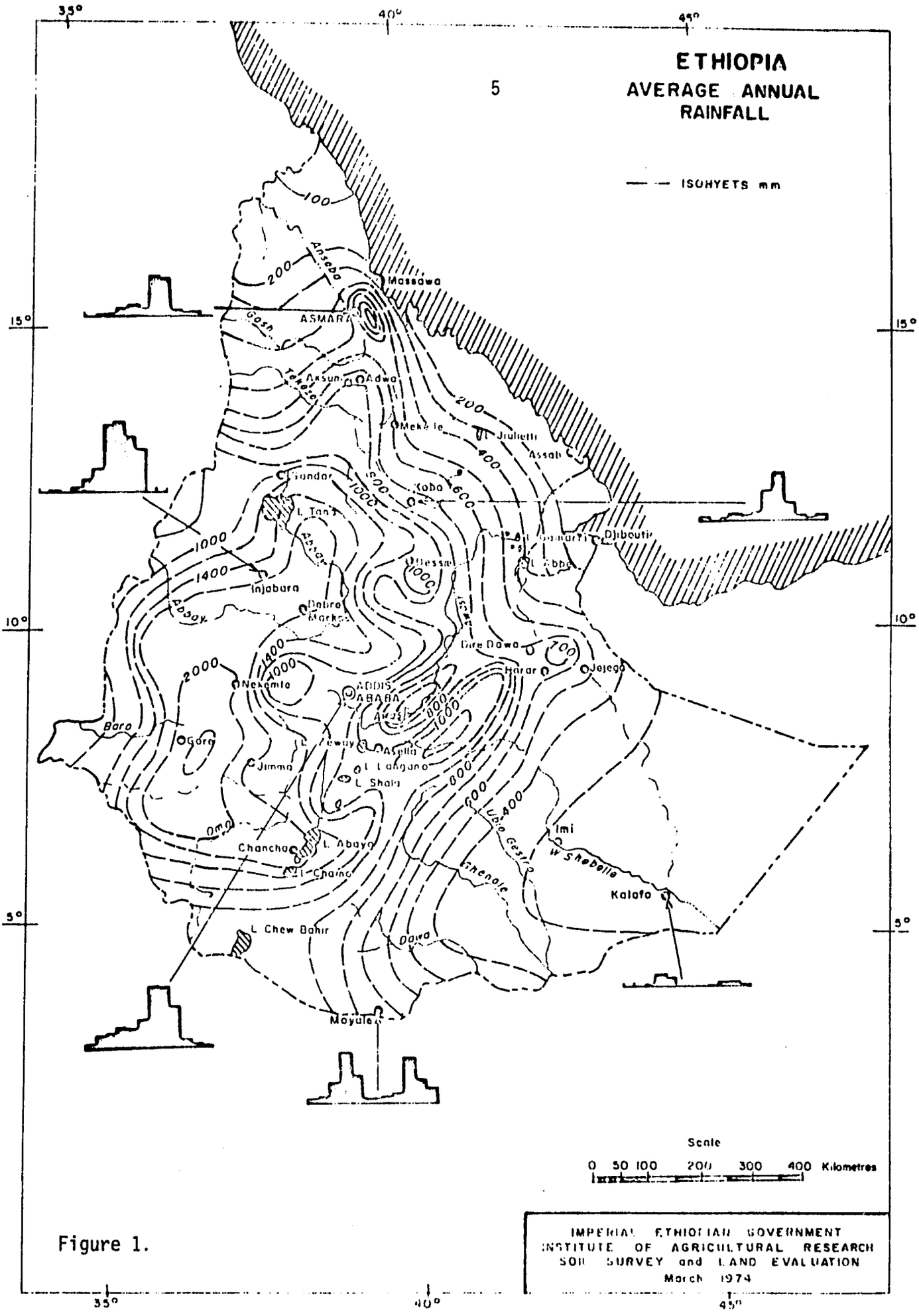

ETHIOPIA
AVERAGE ANNUAL RAINFALL
ISOHYETS mm
35°
40°
45°
15°
10°
5°
Massawa
ASMARA
Adwa
Mekele
Assab
Djibouti
Gondar
L. Tana
Injabara
Debra Markos
Dire Dawa
Harar
Jojega
Nekemte
ADDIS ABABA
Asella
L. Langano
L. Shala
Jimma
Gore
Baro
Chancho
L. Abaya
L. Chamo
L. Chew Bahir
Moyale
Imi
Kalafo
Scale
0 50 100 200 300 400 Kilometres
IMPERIAL ETHIOPIAN GOVERNMENT
INSTITUTE OF AGRICULTURAL RESEARCH
SOIL SURVEY and LAND EVALUATION
March 1974

Figure 1.

Table 1. Area, Production and Average Yield of the Ten Major Food Grains in Ethiopia

1976 - 1978

Crop	Area Planted (000 ha)	Production (000MT)	Yield/ha (Kgs)
Teff	1,466	976.5	666
Maize	728	778.4	1,069
Sorghum	665	578.1	869
Barley	705	632.7	896
Wheat	435	398.1	915
Millet	216	172.7	800
Horsebeans	236	237.1	1,005
Chickpeas	151	87.7	581
Field peas	116	107.9	930
Haricotbeans	30	17.7	590

Source: Crop Production Surveys, 1975/76, 1976/77, 1977/78. Statistics Division, Planning and Programming Dept., MAS.

(c) Imparting training and education in all aspects of seed.

(d) Ensuring close coordination among various organizations concerned with the national seed program.

The permanent Secretary, Ministry of Agriculture and Settlement (MOA), is Chairman of the 10 member NSC. Other members include the General Managers of the IAR, EPID, AMC, State Farms Authority and Ethiopian Standards Institute; Dean, Alemaya Agricultural College, University of Addis Ababa; Commissioner, Science and Technology Commission; Head, PPRD/MOA, and General Manager, ESC.

3.2 Varietal Development and Research

The Institute of Agricultural Research (IAR) is officially responsible for formulating the national policy for agricultural research and implementing the policy through coordinated programs of applied research.

The Field Crops Department of the IAR is its largest and most highly organized department. This Department is divided into five sections; cereals, pulse crops, oil crops, industrial crops and agronomy and crop physiology. The plant breeders are among the most enthusiastic supporters of the ESC program.

In 1976, research activities were integrated into crop oriented projects, rather than following the lines of specific scientific disciplines and a national coordinator was appointed for each crop. This plan is apparently working effectively because it integrated the research efforts of scientists of the University of Addis Ababa and ARDU with that of the IAR into a single national effort.

Varietal development and evaluation is conducted at seven centers located in different regions of the Country. Each center has two to five outlying substations.

Breeders seed of released varieties are already being produced under direct supervision of the responsbile breeders at the research locations indicated below:

Crop	Location
Teff	Debre Zeit
Sorghum	Nazareth
Maize	Alemaya, Bako, ARDU, Awassa
Barley	Holleta, Debre Zeit, ARDU
Wheat	Holleta, ARDU
Pulses	Nazareth

3.3 Variety Release

The National Crop Improvement Committee (NCIC) has the primary responsibility for evaluation of promising varieties, regardless of origin, on a national and uniform basis. This committee functions through task forces which are responsible for evaluating the problems of crop improvement, planning and coordinating research, evaluating research results and publishing information. In practice, the crop coordinator plans and reports on both the national program and supporting work for the crop or crops for which he is responsible. The "task force" for each crop meets on an ad hoc basis twice a year for purposes of review and planning. The NCIC meets once or twice each year. To date, distinctively superior varieties of wheat, maize and sorghum have been released. Significant, but lesser progress, has been

made in developing superior varieties of teff, barley and the pulse crops.

3.4 Ethiopian Seed Corporation (ESC)

In July 1978, the PMGSE officially authorized establishment of the Ethiopian Seed Corporation as an autonomous agency under the MOA to be headquartered in Addis Ababa. The General Manager of the ESC is its chief executive. The ESC is the central organization for implementing a comprehensive national seed program.

The initial charter assigned the ESC the following overall responsibilities:

(a) assessment of the requirements for "breeders" seed and making necessary arrangements with the responsible research organization for their production.

(b) assessment of the requirements for "basic" seed and making arrangements for the production of seed of this class.

(c) assessment of the demand for "certified" seed and arranging for production of certified seed on a contract basis with Peasant Associations, State Farms Corporation and others.

(d) processing and intermediate storage of seed of all classes.

(e) developing and implementing a program to assure the genetic, physical and biological quality of the seed.

(f) arranging for the training of the necessary technical personnel and seed producers.

During the ESCs formative years, responsibility for distribution and marketing will remain with the previously established AMC and EPID operations for supplying production inputs. Thus, other than sales made

directly to State Farms Corporations, certified seed will be sold to the AMC for distribution to the input supply centers.

To date, the ESC has a staff of 20 persons. In addition to the General Manager, the heads of four of the envisioned five departments, production, processing and storage, quality control, and administration have been employed. Additionally, five field inspectors and a support staff of 10 are operating in the ESC's temporary offices.

Prior to the official establishment of the ESC, the General Manager and Production Manager initiated the muliplication program in cooperation with the plant breeders responsible for teff, sorghum, maize, barley and wheat. During the 1978 crop season (April-November) breeders supplied seed of released varieties sufficient to plant slightly over 200 ha. for production of basic seed. Each seed production field was inspected by ESC personnel at least twice, the seed were harvested, purchased from the producer and though not yet processed apparently will be sufficient to plant over 4000 ha. for certified seed production during the 1979/80 crop year. To date the only functional processing and storage facilities are still under control of the research stations and ARDU but will probably be transferred ESC prior to the 1979/80 harvest.

3.5 Seed Technical Committee

The eleven member seed Technical Committee (STC) serves both as an advisory and technical support group to the ESC for implementation of seed multiplication of superior varieties recommended by the NCIC and to encourage farmer adaption of these varieties. This committee's principal responsibilities are to:

(a) select and recommend seed production areas and practices which will maximize the effectiveness of the multiplication program.

(b) assist the ESC in determining national needs for breeders and basic seed.

(c) evaluate the performance of new varieties under multiplication and recommend continuation or discontinuation of each variety on the basis of its performance under large scale production.

(d) provide advice concerning the preparation of seed quality standards and in the preparation of appropriate seed legislation.

(e) serve as an advisory team on all other technical matters related to seed multiplication, processing and certification.

Committee members include the Crop Coordinators for maize, wheat, sorghum and barley; a research entomologist, pathologist and weed control specialist; EPID's Head Agronomist, and ESC's General, Production, and Quality Control Managers.

3.6 Seed Multiplication and Production

Until the ESC was authorized, no organization had responsibility for the development and coordination of comprehensive seed program at the national level. The primary emphasis of the USAID and a collaborative FAO project is to assist the ESC in the development of its capability to implement a comprehensive national seed program. Previously, various specific regional and sub-regional programs; Pulse Project; CADU; ARDU; EPID; etc. established seed multiplication units to serve

each program's needs with varying levels of success. The ARDU program is the only truly effective effort but it only serves farmers in a part of one province (Arsi).

An example of the serious shortage of seed of improved varieties is indicated by the following data supplied ESC by the EPID.

Crop	Requested (MT)	Available (MT)
Teff	1,194.7	0
Sorghum	127.5	0
Maize	1,222.4	1,121.9
Barley	368.6	0
Wheat	1,092.1	0

Source: EPID Marketing Section (1977/78 crop year)

As is implied by these data the EPID like most projects designed to increase the productivity of the peasant farmers, has been limited to the use of partially recleaned, farmer-saved seed of traditional varieties, although, small quantities of breeders seed of superior varieties were available in Ethiopia.

3.7 Seed Processing and Storage

Weed seed, particularly wild oats and chess, are serious contaminants in farmer saved seed of wheat and barley often exceeding 1,000 weed seed per kilo. Because of the traditional threshing and winnowing methods, inert materials often exceeds 30% of the weight of teff grain (seed) and 10% in the pulses. Removal of these contaminating materials is critical to farmer acceptance of improved seed.

Generally favorable climatic conditions (cool and dry) in the highlands of Ethiopia permit farmers to save seed from one harvest to the next planting seasons without undue loss of viability in most years, provided they are stored in a clean, rain sheltered area.

Presently, there are five commercial capacity "seed" processing/storage units in operation.

(a) ARDU - (Kulumsa) one cleaner, rated capacity of four MT/hr and 1000 MT bag storage.

(b) ARDU (Asasa) one cleaner, rated capacity two MT/hr and 500 MT bag storage

(c) Awassa Agri. Development Corporation (Awassa) one grain scalper, rated capacity 30 MT/hr and 10,000 MT bulk storage

(d) IAR Station (Holetta) one cleaner, rated capacity two MT/hr and 300 MT bag storage

(e) IAR Station (Bako) maize seed processing plant rated at four MT/hr and 300 MT bulk and bag storage.

Site leveling was recently completed at the Awassa Agricultural Development Corporation in preparation for construction of a maize seed, rather than the presently used grain, processing facility. This facility of French design reportedly will have a capacity of 6 MT/hr.

In addition, the EPID has 10 small capacity, farm-type, air-screen cleaners on hand and through the MPP II project will obtain an additional 200 small cleaners. These small cleaners will be located at EPID input distribution centers and used primarily to clean farmer-saved seed which has been and will continue to be the most important source of non-hybrid seed in Ethiopia, as in the U.S.

3.8 Seed Marketing

The Input Procurement and Distribution Department of the Agricultural Marketing Corporation (AMC) currently is responsbible for the accumulation and distribution of all production inputs; seed, fertilizers, pesticides, to the 369 EPID centers located throughout Ethiopia. However, the AMC's primary responsibility is that of purchase, redistribution and price control of food grains.

Most of the seed distributed to date has been imported hybrid maize and vegetable seed. However, in 1978 the AMC distributed 1121 MT of seed of two composite varieties of maize which had been produced by the Awassa Development Coporation in cooperation with and under the supervision of the IAR maize breeder.

The current system for estimating the demand for seed of improved varieties is based upon advance estimates of seed requirements submitted by the major seed distributing programs, i.e., EPID, Settlement Authority, Coffee Improvement Project, Wolamo Agricultural Development Authority (WADU) and the State Farms Corp. Through 1978, the seed were distributed on a consignment basis to the EPID centers with AMC receiving payment only for the seed after they were sold to farmers. In some instances this consignment system lead to a gross oversupply at some input supply centers, a shortage at other centers. Because of the subsequent loss of quality the "seed" had to be used as grain, or if treated with fungicides, destroyed at a considerable financial loss to AMC. A plan to place financial responsibility for the seed ordered with the EPD-MPP II program has been agreed to by the Agricultural and Industrial Development Bank which is the financial agent for the MPP II program. The requests for seed for the 1979/80 crop season are pre-

sented in Table 2.

The AMC has neither personnel to either determine seed quality, to promote the use of superior varieties, nor separate warehouses in which to store seed, which are presently comingled with grain, fertilizers and herbicides, which can be harmful to seed viability.

Seed in the region included in the ARDU (Arusi Providence) are marketed through 37 input distribution centers. Because of their 15 years experience, the limited area and coordination between seed supply and demand, farmers in the ARDU area have ready access to good seed of improved varieties each year. Effective seed marketing was reportedly a significant factor in the reported 80% higher average annual income of the farmers in the ARDU region.

3.9 Quality Control and Regulation

With the exception of the seed produced by the ARDU; which are cleaned and tested for mechanical purity and germination at the ARDU laboratory at Kulumsa, there is essentially no effort to ascertain the quality of seed sold to farmers. There is no defined seed certification program to assure varietal purity of the seed nor seed marketing regulation to establish minimum quality levels for purity or germination. Indeed, the only legal restrictions apply to imported seed, and these refer only to the phytosanitary aspects of seed quality. The phytosanitary regulations are enforced by personnel of the Plant Protection and Regulatory Department (PPRD/MOA).

3.10 Technically Training Personnel

There are only two Ethiopians with in-depth (MS) training in seed technology. One, a former AID participant, is the General Manager of ESC and the other, a former SIDA participant, is head of the ESC's

Table 2. Requests for Seed by PMG-SE Organizations for 1979/80 Crop Season (Effective January 1979).

Organization	Crop (MT)						
	Wheat	Barley	Teff	Maize 2/	Sorghum	Pulses	Total
EPID 1/	2,827	0	7,422	4,121	1,119	0	15,489
Settlement Authority	0	0	0	498	0	0	498
WADU	10	0	100	50	0	0	160
CIPA	0	0	0	160	0	0	160
State Farms	1,640	32	32	1,093	147	79.5	3,023.5
TOTAL	4,477	32	7,554	5,922	1,266	79.5	19,330.5 3/

1/ 1977/78 crop year distribution totalled 4% of target goals due to over-estimation and lack of seed availability (SOURCE: EPID Fourth Quarter Progress Report - 8 April - 7 July, 1978).

2/ Includes requests for 1262 MT hybrid seed which is imported from Kenya.

3/ Conferences with ESC and IAR personnel indicated that based on the breeders and basic seed available only 4,500-5,000 MT of seed of improved varieties could be made available for the 1980/81 crop season. These requests indicate the preceived demand not the real demand.

SOURCE: ESC

Production Department. The General Manager was formerly chief agronomist for EPID and is credited with developing EPID's limited seed program. The Production Manager was formerly in charge of the ARDU seed program and later assistant general manager.of the ARDU. Several other technicians in the ARDU seed program have acquired various skills through on-the-job training in the ARDU seed program. These technicians will be transferred to ESC when the ESC assumes fiscal responsibility for the present ARDU seed program.

At present, there is no provision for training in any area of seed production, processing, marketing or quality control except that provided through the nacent FAO seed project and the one participant scheduled to participate in the USDA/IT "Seed Improvement Training Course" in June-July of 1979.

3.11 Other Reports Related to the Seed Project

As early as 1953 the Ethiopian Government recognized the need for a national seed program of some type. A number of studies were made toward this end by various international organization.

These were:

Subject	Sponsoring Agency	Expert
Report on Seed	FAO Report No. 191 November 1953	Mr. Michael and W. Millar
Cereal Seed Status	FAO, 1968	Dr. W.P. Feistritzer
A Seed Improvement Program in Ethiopia	USAID - 1972	Experience Incoporated Minneapolis, USA
Legislation and Quality Control of Agri. Seed	FAO Report No. TA 3092 March 1972	Mr. E.M. Sondergaard
Seed Multiplication Study in Ethiopia	Swedish International Development Agency November 1972	Mr. Bjoern Almquist

Proposal for Estab-tablishing a National Seed Program	Ministry of Overseas Development March 1972	Mr. J.W. Warren
A Seed Production, Certification and Marketing Scheme for Developing Countries with Particular Reference to Ethiopia	Canadian International Development Agency, 1976	Mr. Abebe Aboye
Seed Improvement and Development Program (SODP) Ethiopia	FAO Report AGP/SIDP/ 77/8 - November 1977	Mr. N. S. Maini

To date, only the latter study has resulted in significant action by an international agency.

3.12 UNDP/FAO Cereal Seed Production and Quality Control Project

The main objective of this project is to implement a National Seed Program for the production, processing, distribution and quality control of improved varieties of wheat, barley, teff, maize and sorghum, for increased agricultural production. The main thrust of this three year, US$542,360 project is to provide two experts to render technical assistance to the ESC during its initial stages of development. Less than 7% of the funds are designated for training, nearly 40% for equipment and 2.3% for miscellaneous purposes.

The FAO Project Leader from Sweden worked cooperatively with the USAID design team during the first 10 days of its efforts. The Project Leader served at technical advisor in the development of the ARDU Seed Program in the late 1960's and will start his current tour in July, 1979. The USAID project described below is complementary to this project with both projects supporting the development of a comprehensive national seed program.

4.0 DETAILED DESCRIPTION

4.1 Project Description/Strategy

The goal of this project is to increase crop productivity and food supply for the rural poor of Ethiopia through increased cereal grain and pulse production. More specifically, the purpose of this collaborative USAID/FAO project is to assist the PMGSE to establish a workable national seed production, processing, marketing and quality control program capable of multiplying seed of improved varieties of the target crops into quantities sufficient to assure their widespread availability.

The project's goal and purpose will be attained when the ESC attains and has the capacity to maintain on an annual basis a supply of high quality seed of improved varieties equal to approximately 6.6% of the nation's annual seed requirement for the target crops. The estimated annual demand for seed of superior varieties of each crop are presented in Table 3. All of the seed marketed under the auspices of the ESC program will be inspected both during its production and after processing to assure the using farmer that the seed are of the variety indicated and, further, each bag of seed sold will have a label indicating the kind, variety, physical purity and germination of the seed contained therein. Minimum standards for the production and processing genetically pure high quality seed will be established consistent with internationally recognized seed certification standards but starting at a level consistent with the climatic and technological restrictions existant in Ethiopia.

Five additional seed processing/storage facilities (4-USAID, 1-FAO) will be in operation to prepare sufficient seed of the quality

Table 3. Estimated Demand for Seed of Superior Varieties Produced and Marked by ESC in Fifth Project Year.

Crop	Total Area Planted 1/ (000 ha)	Seeding Rate (kg/ha)	Total National Seed Requirement (MT)	Estimated Farmer Acceptance Rate 2/ (%/yr)	Estimated Sales ESC Seed (MT)
Teff	1,466	30	43,980	2.0	879.6
Sorghum	665	8	5,320	13.0	691.6
Maize - (a) Composites	683	30	20,490	20.0	4,098.0
(b) Hybrids	45	30	1,350	100.0	1,350.0
Barley	706	100	70,600	2.0	1,412.0
Wheat	435	125	54,375	13.0	7,069.0
Horsebeans	236	200	47,200	2.0	944.0
Chickpeas	151	30	4,530	2.0	90.6
Haricot beans	30	60	1,800	2.0	36.0
TOTAL	4,417	-	249,645	-	16,570.8

1/ Three year average, 1976-78 (Source: Statistics Division, Planning and Programming Department, MAS)

2/ Based upon mode of pollination, availability and superiority of new varieties, ease with which farmers can save seed, average rate of contamination by other crop seed and weed seed.

described for distribution by the AMC to the 440 input supply centers. These facilities are in addition to the three presently in operation. A national seed testing laboratory will be in operation to verify the physical and biological quality of the seed before they are distributued (Figure 2). The equipment to be imported is listed in Annex II.

The PMGSE has been concerned about the non-availability of the seed input at the farmer level for several years. While continually seeking assistance from various international organizations over the past several years, the concerned officials of the MOA have developed and implemented the organizational infrastructure necessary for the implementation of a comprehensive national seed program. The chartering of the ESC in July, 1978, was the final link in the organizational chain to fill the vital gap which exists between varietal development research and the existing input distribution system.

The UNDP/FAO project, designed principally to provide technical assistance in the areas of seed production, quality control and operational management for the nacent ESC, was the first positive response to the PMGSE's efforts to gain support at the national level for the multiplication of the seed input. However, the UNDP/FAO project was not funded at a level sufficient to provide the needed training, facilities or technical assistance necessary for the ESC to fulfill its assigned responsibilities. The USAID project will complete the support necessary for the development of a comprehensive national seed program.

The long term U.S. technical assistance expert to be provided will have the major responsibility for proper installation of the four processing/storage facilities, and then in training those persons in the

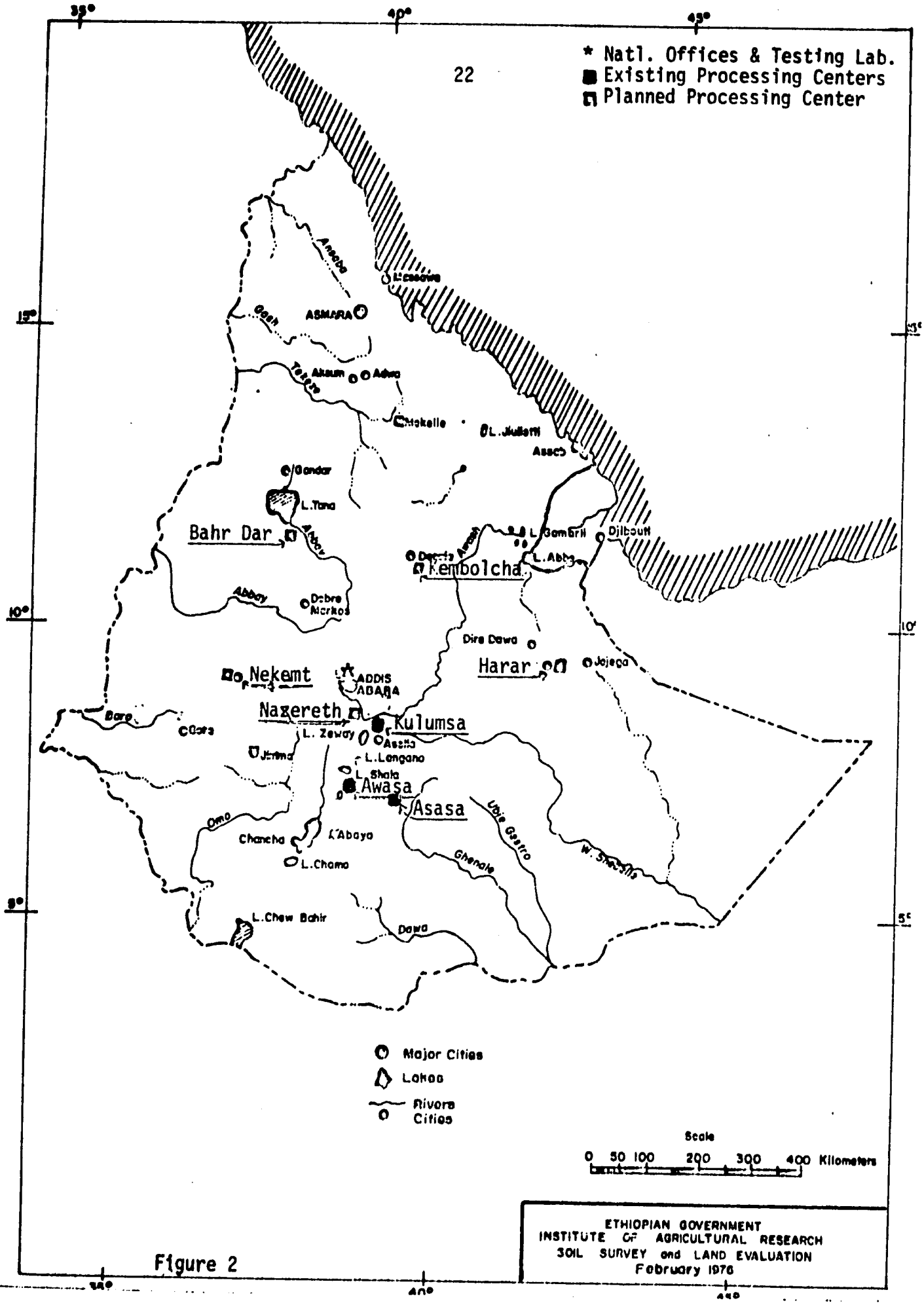

* Natl. Offices & Testing Lab.
Existing Processing Centers
Planned Processing Center
ASMARA
Adwa
Mekelle
L. Juletti
Assab
Gondar
L. Tana
Bahr Dar
Abbay
Debre Markos
Kembolcha
L. Gamgrii
Djibouti
L. Abbe
Dire Dawa
Harar
Jojega
Nekemt
ADDIS ABABA
Nazereth
Kulumsa
L. Zeway
Asella
L. Langano
L. Shala
Awasa
Asasa
Jimma
Gore
Baro
Omo
Chancha
L. Abaya
L. Chamo
L. Chew Bahir
Dawa
Ghenale
Ubie Gestro
W. Shebelle
Major Cities
Lakes
Rivers
Cities
Scale
0 50 100 200 300 400 Kilometers
ETHIOPIAN GOVERNMENT
INSTITUTE OF AGRICULTURAL RESEARCH
SOIL SURVEY and LAND EVALUATION
February 1976

Figure 2

proper operation and management of these facilities (see Annex III for the job description). The Swedish FAO expert, who will move to Ethiopia in July, 1979, will assist in training those persons assigned to the seed testing laboratory which will be constructed and equipped through the USAID project.

In concert with the ESC general manager and his staff, the two international technicians will cooperate in an intensive in-country, third country and U.S. training program. In addition to on-the-job training as the various facilties are completed, specific in-country training courses will be conducted to develop personnel with those technical skills necessary to assure proper understanding and implementation of the production, processing and quality control activities (see Annex IV for the ESC staffing pattern).

Carefully selected individuals will be sent to third country training courses to expand the base of technically trained personnel. A total of nearly 150 ESC, EPID, AMC, ARDU, IAR and State Farm corporation seed technicians will receive from three weeks to three months technical training in the various aspects of seed technology.

To provide the small core of individuals with the in-depth education necessary for continued development during and after this five-year project, four ESC personnel will be trained to the MS level in Seed Technology in the U.S. Intermediate level training, three months in the U.S., will be provided to eight ESC mid-level technicians such as the chief analysts, processing center managers and assistant managers.

A most important key to the successful implementation of a national seed program is widespread understanding of the role that good seed of

improved varieties can play in increasing agricultural productivity. Indeed, if those persons working with and advising the farmers are not fully aware of the importance and availability of good seed of superior varieties, farmer acceptance will lag to the point of making the varietal development research and seed multiplication activities of little value. To circumvent this potential problem, a minimum of 17, one-week, "seed appreciation" courses will be conducted by ESC personnel with support from the international technicians. The participants in these courses will be selected from the more than 440 input supply center managers from EPID, ARDU, Resettlement Programs, farmers cooperatives, etc. These courses will also provide for a continuous flow of information concerning seed needs from the "grass roots" back to the ESC and IAR.

A total of 15 pm short-term consultant services are provided during the five year project. Initially, these services will be needed in support of the in-country training activities and to assist in completion of the facilties. After the ESC has demonstrated its capacity to multiply and maintain high quality seed of the improved varieties, which will require at least three years, it is almost certain that responsibility for distribution and marketing of the seed will be transferred from AMC to ESC. This is a logical step in the developmental process. Thus, during the latter stages of the project, short term consultative services may be needed to develop skills in estimating demand, promotion and communication, and logistics of seed distribution.

The vehicles, equipment and buildings to be supplied are minimal in view of the relatively "advanced" stage of the seed program in Ethiopia

when compared with that of most other African countries. The vehicles specified can all be maintained and repaired through use of the existing commercial and/or government vehicle maintenance and supply facilities. The types of equipment for conditioning, processing, storage and testing the seed are currently in use in Ethiopia, although most is of Western European manufacture. Except for the seed testing laboratory-office building, which will be of conventional masonry construction, the processing/storage buildings will be of corrugated metal construction except for a small office area. The material support merely represents and expansion, coordination and improvement of existent technology rather than the introduction of new technology.

4.2 The Technical Program

4.2.1 Organization

As can be determined by a review of the Background section, the organization infrastructure for the seed program already exists except that of the EMC which necessarily will be developed as the project moves forward.

The physical location of the existing and planned ESC facilities are indicated on Figure 2. The ESC headquarters are located in Addis Ababa in keeping with its charter. The sites of three existing processing centers and the five new centers were all chosen on the basis of proximity to seed production areas, 24-hour availability of electricity, availability of verbal and highway communications, and proximity to support facilties. To date, the processing/storage facilities indicated as installed have not been officially transferred from ARDU or the State Farms Corporations to the ESC, although, this is a matter of operational

efficiency rather than administrative control. The NSC has the authority to make the transfer at the appropriate time.

4.2.2 Multiplication Program

During the 1978/79 crop season IAR and AAU plant breeders supplied sufficient breeders seed of 23 improved varieties of wheat, barley, teff, maize and sorghum to plant 275 ha. Thus, the basis for the establishment of a seed certification program has been established.

The ESC is financially responsible for the multiplication of both the breeders seed and basic seed because of a previous decision which specifically denited the research organizations funds for seed multiplication operations. Thus, in operation the ESC will make the necessary contractual arrangements with the concerned reserach organizations funds for seed multiplication operations. Thus, in operation the ESC will make the necessary contractual arrangements with the concerned research organizations for production of all breeders seed and, to the limit of the station's capability, basic seeds. This arrangement will permit the responsible plant breeder to observe the initial multiplication and provide an opportunity of ESC quality control personnel to become familiar with the varietal characteristics prior to large scale multiplication of certified seed.

The ESC will receive both the breeders and basic seed which were of acceptable field quality and be responsible for processing, storage quality control and redistribution for further multiplication. During the early years of the project the ESC will use all available basic seed as stock for further multiplication under its auspices. After the initial demand backlog has been met, the ESC will sell basic seed to those organizations (peasnut associations, state farms, etc) which

desire to enter into the production and marketing of certified seed. The ESC will provide quality control and processing services on a fee basis in such instances. Widespread implementation of "independent" certified seed production and marketing is not anticipated during the life of this project.

The ESC will contract for the production of all certifed seed with those organizations which have the equipment and personnel capable of implementing "modern" seed production and harvesting practices. Thus, initially the principal seed production contractors will be the various State Farm Development Corporations and ARDU which have the necessary capabilities. As the various peasant associations and cooperatives become established and capable, increasing acreages will be placed under contract with these organizations. One cooperative, (Nazarath Farmers Association Cooperative) signed a production contract for 10 ha wheat this year.

The ESC will inspect all seed production fields before planting and at appropriate times during the growing season to assure compliance with standards which will be developed and later an additional inspection of the processed, packaged seed will be made. All certified seed production which meets the field standards will be cleaned, packaged and stored at one of the eight ESC processing centers.

4.2.3 Processing and Storage

The Nazareth processing center will have a separate line of equipment to process those breeders and basic seed which cannot be cleaned satisfactorily at the research stations. Additionally, a small, 60-MT, conditioned storage room will be constructed at Nazareth to maintain a

reasonable quantity of breeders and/or basic seed of each variety for a period of two to three years. This will eliminate the need to produce a new supply of breeders seed of crops having a high multiplication rate every year and provide a reserve supply of genetic stocks in case of natural disaster at one or more of the research production sites.

Each of the four USAID funded seed processing centers will have sufficient processing and clean seed storage capacity to accommodate the approximately 2000 MT of seed. The processing/storage facilities are so designed to permit expansion, when the need arises, without affecting the efficiency of the on-going operations.

4.2.4 Marketing

Marketing the seed produced was specifically omitted from the ESC's original charter. This was done for two reasons. First, the AMC is chartered and has the responsibility for distribution of production inputs, i.e., seed, fertilizer, pesticides, Secondly, the NSC determined that the ESC should first concentrate on the proper production of the seed input before attempting the higher risk marketing operations. Nevertheless, the AMC General Manager stated his desire to transfer this responsibility to ESC, "at the earliest possible date."

Thus for the initial few years, the ESC will produce, process, and store the seed until it is distributed by AMC. The AMC will be billed for the seed as it is delivered from the ESC warehouses. The previously described system of pre-ordering the seed will be used until more definitive determinations of real market demand can be made.

Promotion is properly another function of marketing. Because of the paucity of seed of improved varieties in the past, there has been

little need to promote their use outside the areas adjacent to the research stations. It appears that by the third or fourth year of the project the current apparent demand should be satisfied and it will be necessary to initiate an active promotional effort to support that of the EPID program.

4.2.5 Pricing

No specific seed pricing policy has been established by the NSC or the ESC because the costs of operation can not be accurately estimated. The general pattern established for other similar, nonprofit, self-supporting organizations i.e., AMC, ARDU, State Farms, has been to set a price which covers all direct costs and establish a set overhead rate above the direct costs to cover the indirect costs.

Such a system could work for the ESC provided (a) the AMC pays for the seed within a reasonable period after receiving them, (b) the retail price of the seed does not exceed two times that of the farmer's selling price for the grain of the same crop, except for seed of hybrids and composite varieties which will be higher, (c) the price of seed to farmers is placed at a level at least slightly higher than the grain price at the time of delivery to the farmer and (d) the government and/or the AIDB provides ESC with the necessary short term (6-9 months) credit to permit prompt payment to the contracting seed producers and (e) the MPP-II credit program continues to provide the necessary credit for farmers to purchase seed of the varieties recommended by the NCIC.

5.0 ADMINISTRATIVE FEASIBILITY

As indicated in the project background the technical qualifications of the ESC General manager and his principal assistants are above that

normally encountered in the beginning stages of a developing country's seed program. The General Manager and Production Manager have each had prior experience in program and budgetary planning for EPID and ARDU, respectively. The ESCs administrative officer is trained and experienced in the PMGSE administrative and accounting routines.

There are three apparent administrative problems which will affect the technical implementation of the project. i.e., seed stocks revolving fund, short term credit, and, if and when ESC should assume full responsibility for marketing the seed at the wholesale level from AMC.

5.1 Seed Stocks Revolving Fund

The IAR and ARU plant breeders gave the initial small quantities of breeders seed to the ESC without charge. However, in 1978/79 the IAR also requested budgetary funds to cover the production costs of the necessary increased supply of breeders seed and were flatly refused on the basis that, "your job is research not seed multiplication. Unless the "Budget Office" changes its position the most viable alternative appears to be the establishment of a temporary revolving fund within the ESC which will enable the ESC to advance the research organizations funds to cover the costs of production of specific quantities of breeders and basic seeds of each improved variety. This fund must be sufficient to pay the production, processing, storage and redistribution costs of both the breeders and basic seed for a period of two crop seasons, 1978/79 and 1979/80. When the initial large volume sales of certified seed are made (1980 planting season), a calculable percentage of the direct cost of each bag of seed should be returned to the Seed Stocks Revolving Fund.

Based upon projected production (i.e., sales) figures, IAR production cost estimates and the current availability of breeders seed, the total amount necessary will be US$292,000 for the 1979/80 crop year and US$ 302,000 for the 1980/81 crop year; a total of US$594,000. Good fiscal management should permit the elimination (i.e. payment) of this revolving fund by August or September of 1981, although it may be desirable to continue the fund until the USAID project evaluation in early 1982.

It is reasonable to establish this fund on a 50% PMGSE-50% USAID basis because the PMGSE (Budget Office) must recognize its responsibility for providing ESC with its most important input, breeders and basic seed. The USAID/E officials recognize that without a continual supply of the genetic stocks of seed of superior varieties there is no real justification for the USAID project.

5.2 Short Term Credit

Because of the climatic conditions in Ethiopia the production and sales periods are not contigous. Therefore, each year the ESC will need sufficient funds at crop harvest time (October-January) to purchase all of the seed produced and pay for the supplies and utilities necessary to prepare the seed for marketing. Depending upon the actual price of grain and the premium paid to seed producers the need for short-term credit will approach US$4,000,000 when field production reaches 9,000 ha.

The primary sales (delivery) period for the seed at the wholesale level will be during March and April. If the AMC pays for the seed within 30 days of the billing date (there were several complaints of

slow payment between various government agencies), the ESC should be able to repay the "loan" by the end of its fiscal year (July 6).

The ESC has requested B$7,539,000 in its 1979/80 budget request to avoid borrowing the necessary funds from the AIDB at 12.5% interest. Regardless of the manner chosen, budget or bank loan, the account for purchase and sale of certified seed should be brought to zero at least once each year.

5.3 Seed Marketing

At present there is little concern on the part of PMGSE or ESC officers about marketing the seed. The current financial and physical distribution and recovery system should work for the initial two or three years of operation. However, as recognition of seed, rather than grain, as an essential production input becomes more widespread the pressure for higher seed quality, more efficient distribution and re-supply, and timely payment will increase logrithnically. In a relative sense, the production and processing of seed are simple when compared with such things as accurately estimating the quantity of seed of each new variety that will be needed two or three years in the future while at the same time maintaining the fiscal stability of the organization.

At present, essentially the entire focus of the ESC program is directed toward the production-processing function. This is proper, However, in view of the fact that the problems in these are operations technically solvable in a relatively short time frame. Marketing, on the other hand, does not lend itself to short term technical solution. According to past performance in both developed and developing seed operations, 90% fail due to the inability to balance the quantity of

seed accummulated (production) with actual sales at a margin sufficient to maintain the fiscal viability of the operation.

6.0 DIRECT TECHNICAL ASSISTANCE

One result of a previous USAID/MSU consultation (TA 75-03 and TA 75-03A) was the importation of some seed cleaning equipment designed to clean small lots of pulse seed. The program for which this equipment was originally ordered was redesigned, therefore, the equipment was never installed. When the ESC was chartered, the PMGSE with the consent of USAID/E transferred responsibility for this equipment and the building in which it is stored to the ESC. However, no additional U.S. technical assistance in seed processing had been available since the equipment arrived and the ESC engineer was not familiar with U.S. equipment.

Specific detailed instructions were given concerning the proper installation of the equipment and the ESC General Manager agreed to allocate the necessary funds and personnel to install this equipment on a temporary basis which will permit its use during the 1979/80 processing season.

Because this equipment was selected originally for cleaning pulse seed but will be used for cleaning small grains, a list of additional accessory parts was made by the consultant who prepared the detailed specifications after returning to his home station. The USAID/E agreed to order the parts needed to make the equipment functional for its newly intended use upon receipt of a pro-forma invoice from the U.S. supplier.

A major consideration in the design and layout of this equipment was the fact that it will be moved and installed as an integral part of

the seed processing center at Nazereth when the USAID/ESC seed project is implemented.

ANNEX I

ITINERARY AND APPOINTMENTS

Jan 10 Meet with Ethiopian Seed Corporation and USAID/E officials

Ato Emmanuel K. Mariam, General Manager
Ato Gugsa Endeshaw, Head, Production Division
Ato Tesfay Adem, Head, Quality Control Division
Ato Debebe Seyoum, Head, Processing and Storage
Ato Dagnatcheu Wolde, Administrator
Dr. Olle Svensson, FAO, Seed Consultant
Mr. Kenneth Sherper, Rural Development Officer/USAID/E
Mr. John Rose, Asst. Rural Development Officer/USAID/E
Mr. George McCloskey, Mission Director/USAID/E

Jan 11 Met with ESC and FAO personnel to discuss overall program.

Met with Institute of Agricultural Research and State Farms Development Corporation officials

Ato Taye Worker, General Manager, IAR
Ato Awel Mela, Assoc. General Manager, IAR
Ato Tegenu Yfru, Head of Planning, SFDC

Jan 12 Discussions with Extension and Project Implementation Department and USAID/AG personnel

Ato Teshome Waldesemaet, General Manager, EPID

Jan 13 Discussions with Agricultural Inputs and Marketing Corporation official

Ato Berhamu Disasa, General Manager, AMC

Jan 14 Initial draft of technical background information

Jan 15 Visit Debreziet Experiment Station, Ethiopian Sorghum Improvement Project (Nazereth) and Pulse Project Processing facility (Melkassa) to discuss varietal improvement in wheat, teff, sorghum and inspect USAID equipment.

Dr. Taye Bizureh, Director, Debreziet Exp. Sta., UAA/AC
Dr. Tesfaye Tesema, Chief, Agronomy Section, Debreziet E.S.
Dr. Berhane Gebre Kidan; Director, Ethiopian Sorghum Project

Jan 16 Travel to Asela and Kulumsa to visit ARDU headquarters and seed testing and processing facilities

Ato Alemayoh Mengistu, Asst. General Manager, ARDU
Ato Fetshi Berke, Chief, Seed Division, ARDU
Mr. Tom Lofgren, Design Officer, USAID/REDSO/EA

Jan 17 Travel to Awassa to observe operation of Awassa Agricultural Development Corp. (State Farm) in general and maize seed harvesting, processing and storage operations. Visit IAR research station.

Ato Taddesse Ablake, General Manager, AADC
Ato Bekelle Tuller, Head, Seed Section, AADC
Ato Tadasse O., Director, Awassa Expt. Station

Jan 18 Return to Addis Ababa. Initial discussions with USAID design officer concerning project paper

Jan 19 Discussions with USAID/E personnel and preparation of initial draft of log-frame

Jan 20 Preliminary review of log-frame with ESC

Jan 21 Preparation of second draft of technical background and initial preparation of facilities design and base data

Jan 22 Preparation of draft log-frame and flow diagrams for processing/storage facilities. Conferences with ESC personnel

Jan 23 Preparation of equipment lists, review of log-frame

Discussions with ESC General Manager concerning issues, problems, and GOE contributions

Jan 24 Preparation of equipment lists; staffing patterns, preliminary costing

Jan 25 Travel to Melkassa to assist ESC Processing Manager to inventory processing equipment and layout temporary processing installation (Beck)

Discussion of implementation plan with ESC General Manager and preparation of budget estimates, equipment lists, for the PP

Jan 26 Preparation of Project Paper and initial presentation of project to USAID/E personnel

Ms Margaret Bonner, Program Officer
Mr. Edward Hyribishi, Human Resources Officer

Jan 27 Present proposed project to the ESCs Seed Technical Committee for comments and suggestions

Dr. Dejene Mekonnen, Natl. Maize Coordinator, Alemaya College
Dr. Tesfaye Tesema, Natl. Wheat Coordinator, Debrezeit Expt. Station
Dr. Berhane G. Kidane, Natl. Sorghum Coordinator, Nazereth
Dr. Taye Teferedegu, Weed Specialist, Holleta Res. Sta, IAR
Ato Hailu Gebre, Natl. Barley Coordinator, Holleta Res. Sta, IAR
Ato Tefari Mekonnen, Head, Agronomy Section, EPID
Ato Lemma Kiflie, Pathologist, Halleta Res. Sta., IAR
Ato Tadasse G. Medkin, Entomologist, Halleta Res. Sta. IAR

Jan 28 Travel Addis Ababa, Ethiopia to Nairobi, Kenya

Jan 29 Consultation with REDSO/EA peronnel concerning project paper

Mr. .Alexander Love, Director, REDSO/EA
Mr. George Rublee, Asst. Director, REDSO/EA
Mr. Donald Reilly, Chief Enginner, REDSO/EA
Mr. Pushkar A. Brahmbhatt, Staff Engineer/REDSO/EA
Mr. Larry Hausman, Chief/Design Division/REDSO/EA

Jan 30 Preparation of project paper

Mr. Edward Greeley, Sociologist/REDSO/EA

Jan 31 Preparation of project paper

Feb 1 Preparation of project paper

Depart Nairobi, Beck to IITA, Ibadan Nigeria Potts to USA

Feb 2 IITA. Consultations with IITA Training Officers concerning training courses of value to Ethiopian seed project

Mr. Wade H. Reeves, Asst. Training Officer, IITA

Feb 3&4 Saturday and Sunday (free time)

Feb 5 Ibadan - Discussions with project manager of FAO Nigerian National Seed Project concerning training opportunities. Return to USA

Dr. Amir Singh, Natl. Seed Service, Moor Plantation

ANNEX II

General Lists of Equipment and Building Requirements

1. Seed Testing Laboratory and Office Building

The combination National Seed Testing Laboratory and Headquarters building should be of the conventional masonary construction used in Addis Ababa. There are no special requirements for lighting or plumbing in the office section of the building. Single story construction is suggested. The office section will occupy approximately 400 m^2.

The seed testing laboratory will occupy approximately 250 m^2 consisting of an office, a purity work room, which will include two germination rooms; a mechanical room, two dry storage rooms, and sanitary facilities. The "wet" room and both germination rooms will require floor drains. The purity work room and the two germination rooms will require sufficient flourescent lighting to provide 50ft candles intensity one meter above the floor. The inside walls, floors and doors of the two germination rooms must have a water proof finish.

The equipment ordered for the national headquarters is for use in the in-country training program.

A. Equipment for National Seed Testing Laboratory

Item No.	Item	Number	Unit Cost	Cost
1.	Divider, gamete	2	325	650
2.	Moisture tester, Stienlite RCT	2	1000	2000
3.	Hand screens, 9"x9" 24/set w/ract	4	360	1440
4.	(a) Seed Blower, South Dakota-complete	2	1100	2200
	Blowing columns for (4) (extra set)	3	125	375
5.	Purity workboards w diaphanascope	4	100	400
6.	Dozor lamp, disk type w magnifier	4	125	500
7.	Torsion balance, DLM2-1 w class parts	4	375	1500
8.	Gram Scales, w scoop pan	4	150	600
9.	Grain scales, w scoop pan and weights	1	600	600
10.	Test weight/volume apparatus	1	700	700
11.	Magnifier w stand, 7" lens	4	25	100
12.	Bag trier, 39" x 7/8" 6 opening	8	50	400
13.	Oven forced air	2	700	1400
14.	Binocular microscope 10 x 20 x lens	2	720	1440
15.	Binocular microscope 2,100 x oil lens	1	2200	2200
16.	Seed sample bottle, plastic w lid 1 liter	500	1.25	625
17.	Seed sample bottle, plastic w lid ½ liter	500	1.00	500
18.	Sling psychrometer w 6 thermometers	2	25.00	50
19.	Forceps, serrated	3 doz.	55/doz.	165
20.	Forceps, smooth	3 doz.	55/doz.	165
21.	Sample pan, spout type	18	12	216
22.	Sample pan, round	18	12	216
23.	Sample pan, triangular	18	12	216
24.	Seed grinder	1	300	300
25.	Dessicator jar w lid & stand	10	150	1500
26.	Seed Counting boards (large seed)	10	25	250
27.	Petri dishes, plastic	500	.30	150
28.	Air compressor unit	1	150	150
29.	Soil sterilization unit	1	800	800
30.	Autoclave	1	1000	1000
31.	Water distillation unit 4 liters/hr.	1	700	700
32.	Vacuum seed counter with heads	1	1400	1400
33.	Refrigerator	1	750	750
34.	Spear-envelopes 8 oz.	5000	70/m	350
35.	Spear envelopes 16 oz.	5000	90/m	450
36.	Vent hood, chemical with exhaust fan	1	700	700
37.	Transformer, 220 to 110 kz 50 cycle	5	100	500
38.	Analytical balance 1/10 mg - 200 mg	1	900	900
39.	Misc. (flasks, beakers, cylinders, spatulas, small tool kits, stock chemicals)			2000
40.	Air conditioner, 12,000 BTU	4	400	1600
41.	Heating elements w fans and automatic thermostat 10,000 BTU	4	300	1200
42.	Counter pan, steam table 20 ga stainless steel 20" x 12" x 4" inside dimension w 1" inch lip	200	12.50	2500
43.	Plastic crisper, w lid 7½ x 10½ x 3 3/4	100	4.00	400
			Subtotal	$36,258
			Accumulation (10%)	3,625
			Freight	14,503
			Total	$54,386

B. Equipment for ESC Headquarters

Item No.	Item	Number	Unit Cost	Total Cost
1.	Slide projector 35 mm manual or automatic operation	2	400	800
2.	Projection Screen, portable w/stand & carrying case	2	100	200
3.	Memograph machine	1	1000	1000
4.	Overhead projector	2	225	450
5.	Transparency copy machine w/1000 sheets negative, developing fluid	1	1200	1200
6.	Blackboard, portable reversable 4' x 5'	2	150	300
7.	Camera, 35 mm, one close up lens	2	600	1200
8.	Tag printer, manual operated w/1000 stencils	1	1500	1500
			Sub-Totals	$6,650
			Accumulation (10%)	665
			Freight (40%)	2,660
			Total	$9,310.00

2. EQUIPMENT FOR SEED PROCESSING FACILITY - NAZRETH

Item No.	Item	No. Req'd	Cost ($US)
Receiving			
A-1	Scale-2 ton platform type	2	8800
A-2	Dump Pit-Steel-plate, pre-cut	1	5500
A-3	Elevator-Re: Universal, Model D-1000	1	4600
A-4	Dump Pit-Steel-plate, pre-cut	1	1200
A-5	Elevator-Re: Universal, Model C2-175	1	2200
Bulk Storage/Drying			
B-1	Flat-bottom Corrugated Bin	1	11000
B-2	Same as B-1	1	10000
B-3	Conveyor-Drag-flight type	1	3000
Processing			
C-1	Holding Bin-Steel-plate, pre-cut	1	1800
C-2	Air Screen Cleaner-Re: Crippen H4-5460	1	25200
C-3	Elevator-Re: Universal, Model C2-175	1	2400
C-6	Holding Bin-Steel plate, pre-cut	1	2000
C-7	Elevator-Re: Universal, Model C2-175	1	2200
C-8	Holding Bin-Steel-plate, pre-cut	1	2000
C-9	Elevator-Re: Universal, Model C2-175	1	2200
C-12	Holding Bin-Steel-plate, pre-cut	1	2000
C-13	Elevator-Re: Universal, Model C2-175	1	2200
C-14	Holding Bin-Steel-plate, pre-cut	1	2000
C-15	Seed Treater	1	3000
C-16	Elevator-Re: Universal, Model C2-175	1	2200
C-17	Bagging Bin-Steel-plate, pre-cut	1	2000
C-18	Automatic Bagger-Re: Howe Richardson, Model G-17	1	1600
C-19	Sewing Machine Head w/Conveyor and Pedestal	1	4500
C-20	Disc Separator-Re: Carter-Day, Model 2527	1	7800
C-21	Debearder	1	2000

Item No.	Item	No. Req'd	Cost ($US)
Processing (cont'd)			
C-22	Holding Bin-Steel-plate, pre-cut	1	2000
C-23	Gravity Separator- Re: Oliver Model 160	1	6000
C-24	Conveyor - Vibrating Type	1	800
C-25	Elevator Re: Universal Model C2-175	1	2200
Bag Storage			
D-1	Bag Stacking Conveyor - Heavy Duty	1	6400
D-2	Bag Loading Conveyor - Heavy Duty	1	5200
D-3	Dehumidifier-Dessicant Type Re: Una-Dyn	2	4600
D-4	Airconditioner-Commercial Type	2	3000
D-5	Hygrothermograph	3	1800
Installation and Maintenance			
E-1	Tools and Supplies Examples: Wrenches and other hand tools, arc welder and welding rods, acetylene torch, electric grinders, drills, etc.		5000
Auxilliary			
F-1	Platform Scales	2	2600
F-2	Bag Trucks	6	1000
F-3	Weight per Unit Volume Tester	1	700
F-4	Moisture Tester	1	1000
F-5	Vacuum Clean-up Equipment	1	2200
F-6	Double Spiral Separator, Heavy Duty	1	700
F-7	Hand Tools for Seed Sampling and Handling Examples: Seed probes and triers, grain scoops, hand scoops, aluminum utility baskets, bag holders, etc.		1000
F-8	Exhaust Fans	4	3600
F-9	Collectors-Dust Control	2	5000
F-10	Sump Pump	2	300
F-11	Aluminum Extension ladders		1000

Item No.	Item	No. Req'd	Cost ($US)
Field			
G-1	Sheller, Maize Seed	2	30000
G-2	Conveyor, Cob Maize Sorting	1	2400
G-3	Trailers, 4-wheel Peanut Drying Type with one double trailer heater/blower fan	4	12000
	FOB Supplier		213,300
	FAS Vessel (plus 20%)		255,960
	CIF Ethiopia (plus 40%)		358,344

General Building Design and Site Considerations

Each Seed Processing Facility will be composed of three types of building components which can be the same structure or adjacent ones. The components are (1) seed receiving/processing plant, seed storage warehouse, and office space for the general manager, processing engineer and quality control area manager.

The seed receiving processing plant occupies about 890 square meters. The sidewall height of the receiving area (approximately 290 M^2) is 5.5 meters. The sidewall height of the processing area (20 M x 30 M) is 9.5 meters. All equipment will be supported from the concrete floor, but the elevator will require bracing from the roof support structure. The concrete floor should have a compressive strength of 2,750 pounds per square inch (after 27 days) and be reinforced with No. 6, 6 inch x 6 inch reinforcement wire.

The seed storage warehouse occupies about 600 square meters of floor space. Wall height is 5.5 meters. It can be constructed of locally available materials commonly used in conventional warehouses. The concrete floor should meet the same standards as the processing plant. A vapor barrier should be placed between the soil and the concrete floor. An area of approximately 100 square meters (20 M x 5) within the basic storage building will be modified to provide two conditioned storage rooms. This area will have a ceiling and walls that have been vapor-proofed and insulated to control the temperature and prevent infiltration of moisture vapor into the area.

The office building for the general manager and two assistant managers should also include ample space for reception/secretary, conference room, storage rooms for both office supplies and portable field equipment. Sanitary facilities must be provided for both the senior staff and the workers in the processing plant. Construction may be of locally available materials of conventional architectural design.

In selecting the site, take into account future expansion or development of the site. About one hectare of land should be available. Choose a location that is well drained and can be kept dry all year round. Avoid a sloping site, if not avoidable make one or more drainage trenches (cut-off drains) across the slopes uphill from the buildings to convey drained water around and away from the foundation. If possible orient the long axis of the store east-west to minimize heat absorption from the sun. Consider carefully disposal of rainwater collected by the roof. Let the rain run off the roof on to a wide concrete or stone path. Consider access by vehicles to the site and around the processing/storage facilities. Ensure adequate widths for large trucks on roads, turning circles,and concrete "aprons" in front of unloading/loading doors.

Equipment Installation and Electrical Considerations

The construction of the processing/storage buildings must be scheduled so that the equipment can be delivered directly to the designated site from the port. The equipment will be installed by a local contractor under the supervision of the Seed Processing Engineer.

Note: A detailed description of each item on the equipment list can be supplied upon request through an existing AID/TAB contract with Mississippi State University. Preliminary engineering drawings will also be supplied to show the equipment layout and electrical requirements. Funds must be available to contract the services of an electrical engineer or a private firm to design an electrical control console, prepare the detailed wiring diagrams, and write the specifications for the electrical components. (This service is not available from Mississippi State University; however, it is recommended that the design be submitted for review by MSU).

3. EQUIPMENT FOR SEED PROCESSING FACILITY - BAH DAR

Item No.	Item	No. Req'd	Cost ($U.S.)
Receiving			
A-1	2-ton Scale	1	4,400
A-2	Dump Pit, Steel-plate, pre-cut	1	5,500
A-3	Elevator - Re: Universal Model D - 1000	1	4,600
Bulk Storage/Drying			
B-1	Flat-bottom corrugated Bin	1	11,000
B-2	Same as B-1	1	10,000
B-3	Conveyor - Drag-flight Type	1	3,000
Processing			
C-1	Holding Bin, Steel-plate, pre-cut	1	1,800
C-2	Air Screen Cleaner - Re: Cripp n H4-5460	1	25,200
C-3	Elevator, Re: Universal Model C2-175	1	2,400
C-4	Holding Bin, Steel-plate, pre-cut	1	1,500
C-5	Sizer, Thickness, Re: Carter-Day Precision Grader	1	5,000
C-6	Holding Bin, Steel-plate, pre-cut	1	2,000
C-7	Elevator Re: Universal Model C2-175	1	2,200
C-8	Holding Bin, Steel-plate, pre-cut	1	2,000
C-9	Elevator Re: Universal Model C2-175	1	2,200
C-10	Holding Bin, Steel-plate, pre-cut	1	1,500
C-11	Sizer, Width Re: Carter-Day Precision Grader	1	7,000
C-12	Holding Bin, Steel-plate, pre-cut	1	2,000
C-13	Elevator Re: Universal Model C2-175	1	2,200
C-14	Holding Bin, Steel-plate, pre-cut	1	2,000
C-15	Seed Treater	1	3,000
C-16	Elevator Re: Universal Model C2-175	1	2,200
C-17	Bagging Bin, Steel-plate, pre-cut	1	2,000
C-18	Automatic Gross Bagger, Re: Howe-Richardson Model G-17	1	1,600

Item No.	Item	No. Req'd	Cost($U.
Processing	Cont'd		
C-19	Sewing Machine Head W/Conveyor & Pedestal	1	4,500
C-20	Disc Separator - Re: Carter-Day Model 2527	1	7,800
C-21	Debearder	1	2,000
C-22	Holding Bin, Steel-plate, pre-cut	1	2,000
C-23	Gravity Separator, Re: Oliver Model 160	1	6,000
C-24	Conveyor - Vibrating Type	1	800
C-25	Elevator - Re: Universal Model C2-175	1	2,200
Bag Storage			
D-1	Bag Stacking Conveyor - Heavy Duty	1	6,400
D-2	Bag Loading Conveyor - Heavy Duty	1	5,200
D-5	Hygrothermographs	2	1,200
Installation and Maintenance			
E-1	Tools and Supplies Examples - wrenches and other hand tools arc welder and welding rods, acetylene torch, electric grinder, driller, etc.		5,000
Auxilliary			
F-1	Platform Scales	2	2,600
F-2	Bag Trucks	6	1,000
F-3	Weight per Unit Volume Tester	1	700
F-4	Moisture Tester	1	1,000
F-5	Vacuum, Clean-up Equipment	1	2,200
F-6	Double Spiral Separator, Heavy Duty	1	700
F-7	Hand Tools for Seed Sampling and Handling Example: Seed probes and triers, grain scoops, hand scoops, aluminium utility baskets, bag holders, etc.		1,000

Item No.	Item	No. Req'd	Cost($U.S
Auxilliary Cont'd			
F-8	Exhaust Fans	4	3,600
F-9	Collectors - Dust Control	2	5,000
F-10	Sump Pump	2	300
F-11	Aluminium Extension ladder		1,000
Field			
G-1	Sheller, Maize Seed	2	30,000
G-2	Conveyor, Cob Maize Sorting	2	4,800
G-3	Trailers, 4-wheel, Peanut Drying Type with one double-trailer heater/blower fan	4	12,000
	Total: FOB U.S. Supplier		215,300
	FAS Vessel (plus 20%)		258,360
	CIF Ethiopia (plus 40%)		361,704

General Building Design and Site Considerations

Each Seed Processing Facility will be composed of three types of building components which can be the same structure or adjacent ones. The components are (1) seed receiving/processing plant, seed storage warehouse, and office space for the general manager, processing engineer and quality control area manager.

The seed receiving/processing plant occupies about 890 square meters. The sidewall height of the receiving area (approximately 290 M^2) is 5.5 meters. The sidewall height of the processing area (20 x 20 M) is 9.5 meters. All equipment will be supported from the concrete floor, but the elevators will require bracing from the roof support structure. The concrete floor should have a compressive strength of 2,750 pounds per square inch (after 27 days) and be reinforced with No. 6, 6 inch x 6 inch reinforcement wire.

The seed storage warehouse occupies about 600 square meters of floor space. Wall height is 5.5 meters. It can be constructed of locally available materials commonly used in conventional warehouses. The concrete floor should meet the same standards as the processing

plant. A vapor barrier should be placed between the soil and the concrete floor.

The office building for the general manager and two assistant managers should also include ample space for reception/secretary, conference room, storage rooms for both office supplies and portable field equipment. Sanitary facilities must be provided for both the senior staff and the workers in the processing plant. Construction may be of locally available materials of conventional architectural design.

In selecting the site take into account future expansion or development of the site. About one hectare of land should be availabl Choose a location that is well drained and can be kept dry all year round. Avoid a sloping site, if not avoidable make one or more draina trenches (cut-off drains) above the slopes uphill from the buildings to convey drained water around and away from the foundations. If possible orient the long axis of the store east-west to minimize heat absorption from the sun. Consider carefully disposal of rainwater collected by the roof. Let the rain run off the roof on to a wide concrete or stone path. Consider access by vehicles to the site and around the processing/storage facilities. Ensure adequate widths for large trucks on roads, turning circles, and concrete "aprons" in front of unloading/loading doors.

Equipment Installation and Electrical Considerations

The construction of the processing/storage buildings must be scheduled so that the equipment can be delivered directly to the designated site from the port. The equipment will be installed by a local contractor under the supervision of the Seed Processing Engineer.

Note: A detailed description of each item on the equipment list can be supplied upon request through an existing AID/TAB contract with Mississippi State University. Preliminary engineering drawings will also be supplied to show the equipment layout and electrical requirements. Funds must be available to contract the services of an electrical engineer or a private firm to design an electrical control console, prepare the detailed wiring diagrams, and write the specifications for the electrical components. (This service is not available from Mississippi State University; however, it is recommended that the design be submitted for review by MSU).

4. EQUIPMENT FOR SEED PROCESSING FACILITY - NEKMET

Item No.	Item	No. Req'd	Cost ($U.S.)
Receiving			
A-1	2-ton Scale	1	4,400
A-2	Dump Pit, Steel-plate, pre-cut	1	5,500
A-3	Elevator - Re: Universal Model D - 1000	1	4,600
Bulk Storage/Drying			
B-1	Flat-bottom corrugated Bin	1	11,000
B-2	Same as B-1	1	10,000
B-3	Conveyor - Drag-flight Type	1	3,000
Processing			
C-1	Holding Bin, Steel-plate, pre-cut	1	1,800
C-2	Air Screen Cleaner - Re: Cripp n H4-5460	1	25,200
C-3	Elevator, Re: Universal Model C2-175	1	2,400
C-4	Holding Bin, Steel-plate, pre-cut	1	1,500
C-5	Sizer, Thickness, Re: Carter-Day Precision Grader	1	5,000
C-6	Holding Bin, Steel-plate, pre-cut	1	2,000
C-7	Elevator Re: Universal Model C2-175	1	2,200
C-8	Holding Bin, Steel-plate, pre-cut	1	2,000
C-9	Elevator Re: Universal Model C2-175	1	2,200
C-10	Holding Bin, Steel-plate, pre-cut	1	1,500
C-11	Sizer, Width Re: Carter-Day Precision Grader	1	7,000
C-12	Holding Bin, Steel-plate, pre-cut	1	2,000
C-13	Elevator Re: Universal Model C2-175	1	2,200
C-14	Holding Bin, Steel-plate, pre-cut	1	2,000
C-15	Seed Treater	1	3,000
C-16	Elevator Re: Universal Model C2-175	1	2,200
C-17	Bagging Bin, Steel-plate, pre-cut	1	2,000
C-18	Automatic Gross Bagger, Re: Howe-Richardson Model G-17	1	1,600

Item No.	Item	No. Req'd	Cost($U
Processing	Cont'd		
C-19	Sewing Machine Head W/Conveyor & Pedestal	1	4,500
C-20	Disc Separator - Re: Carter-Day Model 2527	1	7,800
C-21	Debearder	1	2,000
C-22	Holding Bin, Steel-plate, pre-cut	1	2,000
C-23	Gravity Separator, Re: Oliver Model 160	1	6,000
C-24	Conveyor - Vibrating Type	1	800
C-25	Elevator - Re: Universal Model C2-175	1	2,200
Bag Storage			
D-1	Bag Stacking Conveyor - Heavy Duty	1	6,400
D-2	Bag Loading Conveyor - Heavy Duty	1	5,200
D-5	Hygrothermographs	2	1,200
Installation and Maintenance			
E-1	Tools and Supplies Examples - wrenches and other hand tools arc welder and welding rods, acetylene torch, electric grinder, driller, etc.		5,000
Auxilliary			
F-1	Platform Scales	2	2,600
F-2	Bag Trucks	6	1,000
F-3	Weight per Unit Volume Tester	1	700
F-4	Moisture Tester	1	1,000
F-5	Vacuum, Clean-up Equipment	1	2,200
F-6	Double Spiral Separator, Heavy Duty	1	700
F-7	Hand Tools for Seed Sampling and Handling Example: Seed probes and triers, grain scoops, hand scoops, aluminium utility baskets, bag holders, etc.		1,000

Item No.	Item	No. Req'd	Cost($U.S.
Auxilliary	Cont'd		
F-8	Exhaust Fans	4	3,600
F-9	Collectors - Dust Control	2	5,000
F-10	Sump Pump	2	300
F-11	Aluminium Extension ladders		1,000
Field			
G-1	Sheller, Maize Seed	2	30,000
G-2	Conveyor, Cob Maize Sorting	2	4,800
G-3	Trailers, 4-wheel, Peanut Drying Type with one double-trailer heater/blower fan	4	12,000
	Total: FOB U.S. Supplier		215,300
	FAS Vessel (plus 20%)		258,360
	CIF Ethiopia (plus 40%)		361,704

General Building Design and Site Considerations

Each Seed Processing Facility will be composed of three types of building components which can be the same structure or adjacent ones. The components are (1) seed receiving/processing plant, seed storage warehouse, and office space for the general manager, processing engineer and quality control area manager.

The seed receiving/processing plant occupies about 890 square meters. The sidewall height of the receiving area (approximately 290 M^2) is 5.5 meters. The sidewall height of the processing area (20M x 20 M) is 9.5 meters. All equipment will be supported from the concrete floor, but the elevators will require bracing from the roof support structure. The concrete floor should have a compressive strength of 2,750 pounds per square inch (after 27 days) and be reinforced with No. 6, 6 inch x 6 inch reinforcement wire.

The seed storage warehouse occupies about 600 square meters of floor space. Wall height is 5.5 meters. It can be constructed of locally available materials commonly used in conventional warehouses. The concrete floor should meet the same standards as the processing plant. A vapor barrier should be placed between the soil and the concrete floor.

The office building for the general manager and two assistant managers should also include ample space for reception/secretary, conference room, storage rooms for both office supplies and portable field equipment. Sanitary facilities must be provided for both the senior staff and the workers in the processing plant. Construction may be of locally available materials of conventional architectural design.

In selecting the site take into account future expansion or development of the site. About one hectare of land should be available. Choose a location that is well drained and can be kept dry all year round. Avoid a sloping site, if not avoidable make one or more drainage trenches (cut-off drains) above the slopes uphill from the buildings to convey drained water around and away from the foundations. If possible orient the long axis of the store east-west to minimize heat absorption from the sun. Consider carefully disposal of rainwater collected by the roof. Let the rain run off the roof on to a wide concrete or stone path. Consider access by vehicles to the site and around the processing/storage facilities. Ensure adequate widths for large trucks on roads, turning circles, and concrete "aprons" in front of unloading/loading doors.

Equipment Installation and Electrical Considerations

The construction of the processing/storage buildings must be scheduled so that the equipment can be delivered directly to the designated site from the port. The equipment will be installed by a local contractor under the supervision of the Seed Processing Engineer.

Note: A detailed description of each item on the equipment list can be supplied upon request through an existing AID/TAB contract with Mississippi State University. Preliminary engineering drawings will also be supplied to show the equipment layout and electrical requirements. Funds must be available to contract the services of an electrical engineer or a private firm to design an electrical control console, prepare the detailed wiring diagrams, and write the specifications for the electrical components. (This service is not available from Mississippi State University; however, it is recommended that the design be submitted for review by MSU).

5. EQUIPMENT FOR SEED PROCESSING FACILITY - KEMBOLCHA

Item No.	Item	No. Req'd	Cost ($U.S.)
Receiving			
A-1	2-ton Scale	1	4,400
A-2	Dump Pit, Steel-plate, pre-cut	1	5,500
A-3	Elevator - Re: Universal Model D - 1000	1	4,600
Bulk Storage/Drying			
B-1	Flat-bottom corrugated Bin	1	11,000
B-2	Same as B-1	1	10,000
B-3	Conveyor - Drag-flight Type	1	3,000
Processing			
C-1	Holding Bin, Steel-plate, pre-cut	1	1,800
C-2	Air Screen Cleaner - Re: Cripp n H4-5460	1	25,200
C-3	Elevator, Re: Universal Model C2-175	1	2,400
C-4	Holding Bin, Steel-plate, pre-cut	1	1,500
C-5	Sizer, Thickness, Re: Carter-Day Precision Grader	1	5,000
C-6	Holding Bin, Steel-plate, pre-cut	1	2,000
C-7	Elevator Re: Universal Model C2-175	1	2,200
C-8	Holding Bin, Steel-plate, pre-cut	1	2,000
C-9	Elevator Re: Universal Model C2-175	1	2,200
C-10	Holding Bin, Steel-plate, pre-cut	1	1,500
C-11	Sizer, Width Re: Carter-Day Precision Grader	1	7,000
C-12	Holding Bin, Steel-plate, pre-cut	1	2,000
C-13	Elevator Re: Universal Model C2-175	1	2,200
C-14	Holding Bin, Steel-plate, pre-cut	1	2,000
C-15	Seed Treater	1	3,000
C-16	Elevator Re: Universal Model C2-175	1	2,200
C-17	Bagging Bin, Steel-plate, pre-cut	1	2,000
C-18	Automatic Gross Bagger, Re: Howe-Richardson Model G-17	1	1,600

Item No.	Item	No. Req'd	Cost($U.
Processing	Cont'd		
C-19	Sewing Machine Head W/Conveyor & Pedestal	1	4,500
C-20	Disc Separator - Re: Carter-Day Model 2527	1	7,800
C-21	Debearder	1	2,000
C-22	Holding Bin, Steel-plate, pre-cut	1	2,000
C-23	Gravity Separator, Re: Oliver Model 160	1	6,000
C-24	Conveyor - Vibrating Type	1	800
C-25	Elevator - Re: Universal Model C2-175	1	2,200
Bag Storage			
D-1	Bag Stacking Conveyor - Heavy Duty	1	6,400
D-2	Bag Loading Conveyor - Heavy Duty	1	5,200
D-5	Hygrothermographs	2	1,200
Installation and Maintenance			
E-1	Tools and Supplies Examples - wrenches and other hand tools arc welder and welding rods, acetylene torch, electric grinder, driller, etc.		5,000
Auxilliary			
F-1	Platform Scales	2	2,600
F-2	Bag Trucks	6	1,000
F-3	Weight per Unit Volume Tester	1	700
F-4	Moisture Tester	1	1,000
F-5	Vacuum, Clean-up Equipment	1	2,200
F-6	Double Spiral Separator, Heavy Duty	1	700
F-7	Hand Tools for Seed Sampling and Handling Example: Seed probes and triers, grain scoops, hand scoops, aluminium utility baskets, bag holders, etc.		1,000

Item No.	Item	No. Req'd	Cost($U.S
Auxilliary Cont'd			
F-8	Exhaust Fans	4	3,600
F-9	Collectors - Dust Control	2	5,000
F-10	Sump Pump	2	300
F-11	Aluminium Extension ladders		1,000
Field			
G-1	Sheller, Maize Seed	2	30,000
G-2	Conveyor, Cob Maize Sorting	2	4,800
G-3	Trailers, 4-wheel, Peanut Drying Type with one double-trailer heater/blower fan	4	12,000
	Total: FOB U.S. Supplier		215,300
	FAS Vessel (plus 20%)		258,360
	CIF Ethiopia (plus 40%)		361,704

General Building Design and Site Considerations

Each Seed Processing Facility will be composed of three types of building components which can be the same structure or adjacent ones. The components are (1) seed receiving/processing plant, seed storage warehouse, and office space for the general manager, processing engineer and quality control area manager.

The seed receiving/processing plant occupies about 890 square meters. The sidewall height of the receiving area (approximately 290 M^2) is 5.5 meters. The sidewall height of the processing area (20 M x 20 M) is 9.5 meters. All equipment will be supported from the concrete floor, but the elevators will require bracing from the roof support structure. The concrete floor should have a compressive strength of 2,750 pounds per square inch (after 27 days) and be reinforced with No. 6, 6 inch x 6 inch reinforcement wire.

The seed storage warehouse occupies about 600 square meters of floor space. Wall height is 5.5 meters. It can be constructed of locally available materials commonly used in conventional warehouses. The concrete floor should meet the same standards as the processing plant. A vapor barrier should be placed between the soil and the concrete floor.

The office building for the general manager and two assistant

managers should also include ample space for reception/secretary, conference rooms, storage rooms for both office supplies and portable field equipment. Sanitary facilities must be provided for both the senior staff and the workers in the processing plant. Construction may be of locally available materials of conventional architectural design.

In selecting the site take into account future expansion or development of the site. About one hectare of land should be available. Choose a location that is well drained and can be kept dry all year round. Avoid a sloping site, if not avoidable make one or more drainage trenches (cut-off drains) above the slopes uphill from the buildings to convey drained water around and away from the foundations. If possible orient the long axis of the store east-west to minimize heat absorption from the sun. Consider carefully disposal of rainwater collected by the roof. Let the rain run off the roof on to a wide concrete or stone path. Consider access by vehicles to the site and around the processing/storage facilities. Ensure adequate widths for large trucks on roads, turning circles, and concrete "aprons" in front of unloading/loading doors.

Equipment Installation and Electrical Considerations

The construction of the processing/storage buildings must be scheduled so that the equipment can be delivered directly to the designated site from the port. The equipment will be installed by a local contractor under the supervision of the Seed Processing Engineer.

Note: A detailed description of each item on the equipment list can be supplied upon request through an existing AID/TAB contract with Mississippi State University. Preliminary engineering drawings will also be supplied to show the equipment layout and electrical requirements. Funds must be available to contract the services of an electrical engineer or a private firm to design an electrical control console, prepare the detailed wiring diagrams, and write the specifications for the electrical components. (This service is not available from Mississippi State University; however, it is recommended that the design be submitted for review by MSU).

ANNEX III

JOB DESCRIPTION FOR SEED PROCESSING ENGINEER

1. Position Objective

To provide guidance and technical assistance to the Ethiopian Seed Corporation in the installation of seed processing machinery and training of operators for four seed processing/storage centers. To develop a system for managing and coordinating the various operations in the multiplication of basic seeds and certified seed produced by contract growers for processing at the seed processing centers that will be operated by the Ethiopian Seed Corporation. To cooperate with ESC and FAO personnel in the planning and implementation of training activities.

1. Responsibilities

A. Direct and assist in the installation of the seed processing and related equipment at the four new seed processing centers to be constructed during the period of the assignment.

B. Develop a cadre of Ethiopians that will meet the seed processing storage needs of the Ethiopian Seed Corporation by giving on-the-job training and to assist in selecting candidates for United State and third country training.

C. Be responsible to the General Manager of the Ethiopian Seed Corporation and coordinate all seed processing/storage activities with the FAO Project Team Leader.

This position will require a person with training in seed technology associated with seed processing/storage. He must be mechanically inclined and have the ability to teach others the principle of seed processing/storage and the skills to manage and operate the processing/storage equipment.

A. Training

The minimum level of technical training should be a B.S. degree in agricultural industrial or mechanical engineering.

B. Experience

It is recommended that the person filling this position have had extensive experience in the installation and operation of seed processing/storage equipment, preferably with two or more years experience working in developing countries.

C. Travel

During the installation of the first processing/storage facility (approximately 6 months) little travel will be invdved; however, extensive local travel within Ethiopia will be required during the remainder of the assignment.

ANNEX IV

Anticipated Staffing Pattern by ESC for Facilities and Programs under USAID/ESC Project

	Total Number	Total (PM)	Project Year (PM) 1	2	3	4	5
I. Headquarters							
1. General Manager	1	60	12	12	12	12	12
2. Production Manager	1	60	12	12	12	12	12
3. Processing Manager	1	60	12	12	12	12	12
4. Market Manager	1	60	12	12	12	12	12
5. Quality Control Manager	1	60	12	12	12	12	12
6. Administrator	2	96	12	12	24	24	24
7. Accountant	2	96	12	12	24	24	24
8. Cashier	1	60	12	12	12	12	12
9. Head Scretary	1	60	12	12	12	12	12
10. Secretary	2	120	24	24	24	24	24
11. Support Personnel A 1/	6	252	24	48	48	60	72
B 2/	6	300	48	48	60	72	72
II. Seed Testing Laboratory							
1. Chief Analyst - purity	1	48	-	12	12	12	12
2. Chief Analyst - germination	1	48	-	12	12	12	12
3. Junior Analysts	4	96	-	-	24	24	24
4. Support A	1	48	-	12	12	12	12
5. Support B	4	144	-	24	24	48	48
III. Seed Processing of Storage Centers							
A. Nazareth (Jan. 1980)							
1. Manager	1	60	12	12	12	12	12
2. Asst. Mgr - Prod. & QC	1	60	12	12	12	12	12
3. Asst. Mgr - Prod. & Mkt	1	48	-	12	12	12	12
4. Plant Superintendent	1	48	-	12	12	12	12
5. Processing Technicians	5	225	-	45	60	60	60
6. Sec/Records Clerk	1	42	-	6	12	12	12
7. Truck Drivers	2	84	-	12	24	24	24
8. Support A	3	144	-	36	36	36	36
9. Support B	10	522	-	90	144	144	144
B. Bahr Dar (April 1981)							
1. Manager	1	36	-	-	12	12	12
2. Asst Mgr - Prod & QC	1	36	-	-	12	12	12
3. Asst Mgr - Proc. & Mkt.	1	36	-	-	12	12	12
4. Plant Superintendent	1	36	-	-	12	12	12
5. Processing Technicians	3	99	-	-	24	36	36
6. Sec/Records Clerk	1	30	-	-	6	12	12
7. Truck Drivers	2	60	-	-	12	24	24
8. Support A	3	90	-	-	18	36	36
9. Support B	10	300	-	-	60	120	120

1/ Support personnel with technical skills i.e. drivers, store keepers, etc.

2/ Unskilled labor, quards, messengers, cleaners.

		Total Number	Total (PM)	Project Year (PM) 1	2	3	4	5
C&D	Nekemt & Kembolcha (March 1982)							
1.	Manager	2	48	-	-	-	24	24
2.	Asst. Mgr - Prod & QC	2	48	-	-	-	24	24
3.	Asst. Mgr - Proc & Mkt	2	48	-	-	-	24	24
4.	Plant Superintendent	2	48	-	-	-	24	24
5.	Processing Technician	6	126	-	-	-	54	72
6.	Sec/Records Clerk	2	36	-	-	-	12	24
7.	Truck Drivers	4	72	-	-	-	24	11
8.	Support A	6	108	-	-	-	36	72
9.	Support B	20	360	-	-	-	120	240