

TANZANIA

Seed Multiplication

Project Paper Revision

621-0092

February 1977

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: C A ADD, C CHANGE, D DELETE

2. DOCUMENT CODE: PP, 3

3. COUNTRY/ENTITY: Tanzania

4. DOCUMENT REVISION NUMBER: 4

5. PROJECT NUMBER (7 digits): 621-0092

6. BUREAU/OFFICE: AFR, 1

7. PROJECT TITLE (Maximum 40 characters): SEED MULTIPLICATION

8. ESTIMATED FY OF PROJECT COMPLETION: 80

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 70, B. QUARTER 2, C. FINAL FY 79

10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$1 -)

A. FUNDING SOURCE	through 9/30/76			LIFE OF PROJECT		
	B. FX	C. L/C	D. TOTAL	E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL	2,142	120	2,262	4,813	400	5,213
(GRANT)	(2,142)	(120)	(2,262)	(4,813)	(400)	(5,213)
(LOAN)	()	()	()	()	()	()
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY	30	2,695	2,725	50	5,368	5,418
OTHER DONOR(S)						
TOTALS	2,172	2,815	4,937	4,863	5,768	10,631

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY ^{to} <u>date</u>		H. 2ND FY <u>77</u>		K. 3RD FY <u>78</u>	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) FN				2,262		728		1,347	
(2)									
(3)									
(4)									
TOTALS				2,262		728		1,347	

A. APPROPRIATION	N. 1ST FY <u>79</u>		Q. 5TH FY _____		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULED
	O. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1) FN	876				5,213		MM YY 11 77
(2)							
(3)							
(4)							
TOTALS	876				5,213		

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 = NO
 2 = YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: *John M. Cornelius*

TITLE: John M. Cornelius, Agricultural Development Officer

DATE SIGNED: 01 28 77

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

PROJECT PAPER

SEED MULTIPLICATION AND DISTRIBUTION

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PROJECT PAPER

SEED MULTIPLICATION AND DISTRIBUTION

I. Summary and Recommendations

A. Recommendations

Authorization of a grant total of \$5,213,000 for the project (an increase of \$1,693,000 over the currently approved total).

B. Purposes of this PP Revision

- a) To put the project in the new PP format;
- b) to take into account the 1975 Evaluation Recommendations;
- c) to add an agro-mechanic for the third seed farm and a technician for the fourth seed farm;
- d) to delete three production agronomists from the project and to change the duty station and responsibilities of the fourth;
- e) to delete the procurement specialist position from the project;
- f) to add 12 participants (7 long-term and 5 short-term) to the project;
- g) to add short-term technical assistance in machinery planning and in developing a spare parts procurement system;
- h) to add a logistical/management expert to head the Contract Services Support Unit;
- i) to provide additional commodities;
- j) to increase contract funding to reflect higher costs; and
- k) to revise the life-of-project budget to reflect the above changes.

C. Description of the Project

1. Scope and Inputs

This activity aims to assist Tanzania in developing a system which can provide the quantities of improved/high quality food crop seeds necessary to satisfy national demand. To achieve this purpose three foundation seed farms will be fully developed, and a fourth farm

partially developed. Certain support capabilities (seed certification, seed laboratory, etc) will also be established as will a seed multiplication capability on the Island of Zanzibar. To perform the above, AID will provide contract technical assistance staff (\$3,308,000), participant training (\$452,000) commodities (\$670,000), funding for certain local and other costs (\$352,000) and inflation/contingency (\$431,000). These inputs will be combined with TanGov inputs of land, facilities, operating budgets, training costs, trust fund contribution and inflation/contingency valued at \$5,418,000. Specifically the project will provide:

A. AID

1. Technical Assistance

- a) Project Coordinator - Dar es Salaam
- b) Farm Manager - Arusha -
- c) Farm Manager - Msimba -
- d) Farm Manager - Kibaha
- e) Agro-Mechanic - Arusha
- f) Agro-Mechanic - Msimba
- g) Agro-Mechanic - Kibaha
- h) Seed Farm Technician - 4th Farm
- i) Production Agronomist - Zanzibar
- j) Logistics/Management Specialist - Dar es Salaam
- k) Consultants

2. Participant Training

- a) 14 B.S. degrees
- b) 11 M.S. degrees
- c) 5 Short-term

3. Commodities

- a) Vehicles
- b) Miscellaneous

4. Other Costs

- a) Houses
- b) Supplemental Furnishings
- c) Vehicle operating costs
- d) Miscellaneous (local air travel, local per diem, etc.)

B. TANGOV

- 1. Land, Facilities and Equipment
- 2. Operating Budgets
- 3. Training Costs
- 4. Trust Account

2. Implementation

The project is under active implementation and being carried out within the Crop Development Division (CDD) of the Ministry of Agriculture. The activities on Zanzibar will be carried out within the Agriculture Department of the Ministry of Agriculture and Lands, Zanzibar. Field staff will be posted at the five field sites. The Project Coordinator (and Contract Team Leader) will be stationed at MinAg Headquarters. Within the CDD the Deputy Director exercises primary executive and administrative responsibility. On Zanzibar, the Production Agronomist will be directed by the Assistant Principal Secretary in the Department of Agriculture.

The AID funded technical staff are being provided through contract with Experience Incorporated. USAID/Tanzania handles the participant training and most of the commodity procurement with the contractor obtaining emergency spares directly.

Outputs expected from the inputs are: (a) three functioning foundation seed farms with a fourth farm under development; (b) foundation seed production adequate for national needs; (c) Seeds Act and regulations being competently enforced; (d) seed testing/certification laboratory

established and operating effectively; (e) seed certification program competently implemented; (f) Seed Multiplication Program staffed and managed by Tanzanians; (g) Tanzanians trained to operate Seed Certification system; (h) an improved research system and a seed multiplication and distribution system on Zanzibar; (i) an operational plan for procuring spare parts and replacement equipment, and (j) a Contract Support Unit established under direction of the Logistics/Management Specialist.

Given the magnitude of the inputs, the time frame over which they are provided and the direct relationships involved, all of the outputs can be reasonably expected to result.

If the outputs are achieved then the relationships indicate that the project purpose "to assist Tanzania in developing a system which can produce the quantities of improved/high quality food crop seed necessary to satisfy national demand" will also be achieved.

At the end of the project it is expected that the following conditions will exist: (a) The Tangov has established and developed its technical and managerial skills and is budgeting support sufficient to produce foundation and "certified" seeds and to encourage seed distribution; (b) large food crop acreages are planted with certified seed mainly by small farmers; (c) all foundation seed produced is being used for multiplication; and, (d) growing volume of certified seed required annually by farmers

C. Summary Findings

The project is currently being implemented successfully, and is well along the path toward achieving many of the outputs and conditions expected at the end of the project. Assistance in seed multiplication is important to Tanzanian efforts to increase food production because of the key role high quality seed plays in improved production package. The number of farms being developed is the minimum given Tanzania's range of ecological conditions while the size of the farms, the quality requirements and several other factors make it necessary to employ mechanized methods. Staff numbers reflect experience gained in establishing the first two foundation seed farms. The techniques being utilized in operating the seed multiplication program are suitable for Tanzania. The direct environmental effect of the project will be negligible while secondary effects (an improved seed is used extensively) are likely to be positive.

The direct social impact of the project is minimal due to the project's role as a producer and not a distributor of seed. However, as improved seed is utilized more widely several social effects are possible primarily due to differing access and adoption rates. The effect of improved seed on women could either be positive (more food for the same labor) or negative (more labor required).

Since the seed farms are designed to cover their costs from production, the long run financial demands of the project on the TanGov will be small. The project appears to be cost effective in that in-country production of foundation and improved seed is cheaper than importing the necessary quantities.

Implementation is well underway. Contractor (Experience Incorporated) performance has been satisfactory although there have been some problems in providing staff. However, no particular future problems are foreseen. An in-depth evaluation is scheduled for FY 1978 and regular evaluations (annual) should help improve project implementation.

D. Issues

Possible issues include: a) assistance to the 4th Seed Farm; b) assistance to Zanzibar; and c) assistance to a Contract Support Unit. The conclusion reached in each case is that assistance should be provided. Discussion of the issues and the reasons for a positive conclusion in each case are presented in the Project Analyses Section (Part IV) of this paper.

* II. Background, Progress to Date and Continuing Validity

A. Background

The Seed Multiplication project is a direct outgrowth of the July - October 1967 Agriculture Sector Reconnaissance Phase I Study which identified seed improvement as a critical need in Tanzania and which developed a scope-of-work for a comprehensive study of the situation. The Phase II study conducted in FY 1969 formulated the detailed, time phased, development plan for the project, confirmed the project's latent potential and technical feasibility, and confirmed that Tanzania's project input requirements were within its resources/limitations.

The initial PROP covering a 10-year period, 1970-79, was submitted November 6, 1969, and approved by AID/W January 24, 1970. It provided for 66 person-years of technical assistance, 32 person-years of training, vehicles, a small amount of commodities, other cost funding and had a price tag of \$1.9 million. The project agreement was signed in May 1970 and a contract with Experience, Incorporated, was signed November 23, 1970. The first four contract staff arrived in December 1970.

An Agriculture Support Loan I was approved in February 1971 providing \$500,000 for farm machinery and equipment for the project. The first participants departed in April 1971. After some delay the first foundation seed farm, Msimba located at Ilonga, was assigned in July 1971. In November 1971 the PROP was amended to substitute an agro-mechanic for a research specialist. The Tanzania Seed Company was formed in October 1972 and the second farm at Arusha, mid-elevation, was assigned in December 1972.

In June 1973 Project Revision No. 2 was approved. This revision changed the number and type of farms to be established under the project from the original concept of two foundation seed farms and five certified seed farms to four foundation seed farms, one for each major ecological zone in Tanzania and eliminated project responsibility for seed distribution. Seed from the farms was to be (and is) sold to the Tanzania Seed Company which through contract seed growers handles multiplication and final distribution to farmers. Under the revision each of the foundation seed farm was to be staffed by a U.S. Farm Manager and Production Agronomist; two farms, Msimba and Arusha, in addition were to have an Agro-Mechanic to insure that the farm and seed processing equipment was maintained and operable. These staffing alterations changed the type of specialists and the number, from a maximum of 10 to 11, over the remaining life of the project. In addition the total cost of the project was increased to \$3.5 million reflecting higher technician costs, additional personnel, additional training and commodities and increased other cost support.

The Agricultural Projects Support Loan II was signed in July 1973. This loan provided an additional \$1,020,000 for farm machinery and equipment primarily for the Arusha Seed Farm. The Seeds Act was signed into law in December 1973.

Early in 1975 an outside evaluation of the project was conducted. The majority of the recommendations are incorporated into this PP revision. Agricultural Sector Loan I was signed in 1975 and \$200,000 was allocated to this project for irrigation development. In June, 1976 a third seed farm, Kibaha was assigned.

B. Progress to Date

The following are indicators of project progress:

- a) Two seed farms established, equipped and functioning with Msimba viewed by the TanGov as the premier, most productive maize farm in Tanzania.
- b) Third farm has been assigned with preliminary work such as land clearing and facility development underway.
- c) The site for the fourth farm has been tentatively identified.
- d) Roughly 3,000 acres now under cultivation to produce foundation seed.
- e) The Seed Law has been passed and seed regulations adopted.
- f) Twelve participants have returned and been assigned to the project.

- g) Six participants will return in FY 1977.
- h) Seed processing equipment in use on seed farms with permanent buildings under construction.
- i) Central Seeds Laboratory established and equipped.
- j) Arrangements for irrigated acreages on first two seed farms (200 acres each) in process.
- k) Approximately 1,400 tons of foundation and 2,100 tons of certified seed produced in 1976.

C. Continuing Validity of a Seed Multiplication Effort

The Seed Multiplication Project is based on the assessment that increasing the supply of improved seed for distribution to farmers is an efficient method of increasing agricultural production. In turn this assessment reflects agricultural research in Tanzania which has shown that the poor genetic quality of indigenous seed is a factor in the low, average yields obtained by most farmers for most food crops. If land and labor were not constraints, low yields could be offset by increased acreages leading to the desired higher production levels. However, land and labor are constraints which means a high proportion of any production increases must come from existing acreages utilized more effectively. More effective use implies a combination of items including improved, adapted seed, good crop husbandry practices, proper management, use of off-farm inputs and the provision of adequate incentives. Experience in other areas clearly indicates that hybrid seed, an important yield increaser by itself, can be the leading edge for the introduction of the equally important production practices essential to increasing yields.

The importance of increasing yields and production, initially emphasized by the slower than population growth in food production from 1968 onwards, has been accentuated by the experience in 1973-74 when poor weather made large food imports necessary. The 1976 DAP, written when the food situation was serious, identified certified seed as an important component of increased yields and indicated that "Investment in more and more of the same low quality seed is not a profitable proposition. The high payoff inputs that hold real promise for increased production must come from outside of traditional agriculture in the form of genetically superior

plant... varieties." ^{1/} The DAP further noted that "Improved seeds via the network being established under the Seed Multiplication Project are of vital importance to any production oriented effort." ^{2/}

More recently, the 1976 evaluation team which was charged with developing a conceptual frame work for USAID agricultural assistance in Tanzania ^{3/} recommended an Integrated Village Development Program and said "The Seed Multiplication Project can also provide inputs into the Integrated Village Agricultural Development Program. That program can also be used as a means for verifying results of the use on farms of the seeds produced and a basis for deciding on varieties to be produced." ^{4/}

Taken together the above items amply demonstrate that the seed multiplication effort is of continuing priority and importance and worthy of continued support.

III. Detailed Description

A. Goal

The Seed Multiplication Project is one element supporting an overall sector goal "to assist Tanzania achieve self-sufficiency in the food-crops sub-sector." Assumptions to achieving this goal are:

- a) Essential financial, manpower organizational and policy issues will be resolved by the TanGov so as to provide the environment necessary for increased food production;
- b) necessary research, extension, credit, storage, transport and marketing programs will be forthcoming;
- c) TanGov and donor financial and manpower resources are made available for food crop production efforts and have the desired impact in food production.

B. Purpose

The purpose of the project is "to assist Tanzania in developing a system which can produce the quantities of improved/high quality food crop seeds necessary to satisfy national demand." At the end of the project it is expected that the following conditions will exist:

^{1/} DAP Annex I Page 23.

^{2/} DAP Annex I Para 42

^{3/} Hutchinson, Edward C and Mann, Fred L. A Conceptual Framework for USAID Agricultural Assistance in Tanzania, Contract No. AID/afr-c-1142, WO No. 17, October, 1976.

^{4/} IBID Page 16

- a) The TanGov has established and developed its technical and managerial skills and is budgeting support sufficient to produce foundation and "certified" seeds and to encourage seed distribution;
- b) large food crop acreages are planted with certified seed mainly by small farmers;
- c) all foundation seed produced is being used for multiplication; and,
- d) growing volume of certified seed required annually by farmers.

Achievement of the purpose and conditions expected at the end of the project rests on assumptions that:

- a) the agricultural research program provides new and better varieties for inclusion in the seed multiplication program;
- b) TanGov sets up, provides financing for and operates a spare parts and replacement system for seed multiplication equipment;
- c) Tanzania Seed Company undertakes necessary promotion, extension and seed distribution efforts, including a system of utilizing contract growers for multiplication of foundation seed.
- d) TanGov established required conditions/environment for widespread acceptance of improved seed by farmers (Cooperatives, extension service, production planning, marketing system) and
- e) TanGov provides necessary funding for continued operation of seed multiplication effort.

C. Outputs ^{5//}

The outputs of the project will be:

- a) three functioning foundation seed farms with a fourth farm under development;
- b) foundation seed production adequate for national needs;

^{5/} For additional definition and output magnitudes see Logical Framework

- c) Seeds Act and regulations being competently enforced;
- d) seed testing/certification laboratory established and operating effectively;
- e) seed certification program competently implemented;
- f) Seed Multiplication program staffed and managed by Tanzanians;
- g) Tanzanians trained to operate Seed Certification system;
- h) an improved research system and a seed multiplication and distribution system on Zanzibar;
- i) an operational plan for procuring spare parts and replacement equipment; and
- j) a Contract Support Unit established under direction of the Logistics/Management Specialist.

Assumptions are that:

- a) weather is favorable;
- b) equipment is delivered and installed in a timely manner;
- c) budget support is forthcoming;

D. Inputs and Phasing

The major AID input to the project (shown in Table 1) is technical assistance (\$3,308,000) with much smaller amounts provided for participant training (\$452,000), commodities (\$670,000) and other costs (\$352,000). Inflation and contingency add \$251,000 and \$180,000 respectively for a total value of AID inputs of \$5,213,000. Facilities (\$1,771,620) and operating budgets (\$2,816,530) are the primary TanGov inputs with lesser amounts for training (\$28,000) and the Trust Account contribution (\$108,000).

Support has also been provided to the project under Agricultural Support Loans I (\$500,000) and II (\$1,020,000) and Agricultural Sector Loan II (\$200,000).

Table 1 - Total Cost - Seed Multiplication Project

Unit \$ 000

A. AID

Technical Assistance	\$3,308
Participant Training	452
Commodities	670
Other Costs	<u>352</u>
Sub Total	4,782
<u>6/</u> Contingency and Inflation	<u>431</u>
Total AID	5,213

B. TANZANIA

Facilities and Land	1,772
Operating Budgets	2,817
Training	28
Trust Account Contribution	<u>108</u>
Sub Total	4,725
<u>7/</u> Contingency and Inflation	<u>693</u>
Total Tanzania	5,418
Total Project	<u>\$10,631</u>

Technical assistance staff phasing is shown in Table 2. Some adjustments to the indicated dates may occur over project implementation, particularly for the technician scheduled for the 4th Farm (See Technical Analysis Section for discussion). Evaluations could also alter the indicated time periods.

6/ Inflation at 10% in 1978 and 21% in 1979. Contingency @ 10% in both 1978 and 1979.

7/ Estimated at 15% at the total of Facilities and Land, Operations Budgets and Training.

Table 2 - Phasing of Technical Assistance Staff

<u>Position</u>	<u>Fiscal years</u>				Sub Total	(Cum to 9/30/76)	<u>Total</u>
	77	78	79	80			
Project Coordinator							Sept
Farm Mgr, Msimba							June
Agro-Mech, Msimba							June
Farm Mgr, Arusha							Sept
Agro-Mech, Arusha							Sept
Farm Mgr, Kibaha	Nov						Sept
Agro-Mech, Kibaha	March						March
Seed Tech. 4th Farm		Oct					Sept
Prod. Agronomist	July						Sept
Log/Mgmt Spec	April			March			
Consultants	(13 Mo)	(4 Mo)					
Staff Months	93	118	117	23			
<hr/>							
Obligation Level	548,000	690,000	398,000	-	1,636,000	1,672,000	3,308,000
Inflation	-	69,000	83,000		152,000		152,000
Contingency	-	69,000	40,000		109,000		109,000
<hr/>							
	548,000	828,000	521,000		1,897,000	1,672,000	3,569,000

1/ From FY 78 Congressional Presentation

2/ From U-203 of 9.30.76

Most of the participant training has already taken place with 12 participants having returned and 6 additional participants scheduled to return in FY 1977. The following Table reflects this fact while showing only external training and not including in-country training provided by contract staff.

Table 3 - Participant Training (New Starts)

	<u>Through 9/30/76</u>	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	<u>TOTAL</u>
B.S.	9	3	2	-	14
M.S.	9	-	-2	-	11
Short-term	-	-	5	-	5
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Sub Total	18	3	9	-	30
Cost	\$290,000	\$58,000	\$84,000	\$20,000	\$452,000
Contingency	-	-	9,000	2,000	11,000
Inflation	-	-	8,000	4,000	12,000
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	\$290,000	\$58,000	\$101,000	\$26,000	\$475,000

The phasing of U.S. commodities and other costs for an obligation basis and the Tanzanian inputs on an expenditure basis is shown in Table 4.

Table 4 - Phasing of Commodities, Other Costs
and Tanzanian Inputs (\$000)

<u>A. AID</u>	<u>Through 9/30/76</u>	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	<u>Total</u>
1. Commodities	159	67	294	150	670
2. Other Costs	141	55	54	102	352
Inflation	-	-	35	52	87
Contingency	-	-	35	25	60
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	300	122	418	329	1,169
 <u>B. TANZANIA</u>					
1. Land, Facilities & Equipment	886	310	290	286	1,772
2. Operating Budget	1,408	469	470	470	2,817
3. Training (Part.costs)	18	3	7	-	28
4. Trust Account	67	13	14	14	108
5. Inflation & ^{8/} Contingency	346	117	116	114	693
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	2,725	912	897	884	5,418

8/ Estimated at 15% of the total of facilities and land, operating budget, and participant costs.

E. Linkages

1) Input-Output-Purpose-Goal Linkages

Because the project is ongoing and adjustments have been and are being made in the inputs to ensure output achievement, the input-output relationships are fairly clear. Furthermore, the experience gained in setting up the first two foundation seed farms, particularly the identification of the types and magnitudes of inputs required, will facilitate development of the third seed farm and provide operational guidelines for both the establishment of the fourth farm near Njombe and a foundation seed program in Zanzibar. The major inputs of technical assistance and equipment (supplied primarily under the Agricultural Project Support Loans) lead directly to the output of the foundation seed farms. The contract technical assistance staff planned and in their capacities as co-managers and agro-mechanics, inaugurated operations on the two foundation seed farms which are now operational. A similar contract input is projected, for a shorter period due to the experience available, for the third farm while for the fourth seed farm limited staff will be available to provide guidance as the TanGov assumes major responsibility for development and implementation. On Zanzibar the production agronomist, assisted by a limited basis by other contract staff, should be able to develop an improved program of food crop research and a seed multiplication and distribution system.

The technical assistance input has also resulted in the outputs of a Seed Act, a Seed Certification program and trained personnel to operate the certification program, to operate the farms and to run an effective seed testing/certification laboratory. The short-term experts will solve particular problems related to various outputs and actually develop a plan for a spare parts and equipment replacement system. Implementation of this system will, however, be largely up to the TanGov. The input of participant training leads directly to a staffed seed multiplication system but it also provides a qualitative factor in ensuring that the staff is better prepared and equipped to operate and manage the farms, the seed certification program and the seed laboratory.

As indicated above the commodity inputs link to functioning seed farms with adequate seed processing equipment, as well as to an equipped laboratory and a transport capability which enables proper management of a seed multiplication operation. The other cost input provides support to all outputs as spares are procured, certain operating costs are covered and the functioning of the system is facilitated. In all instances the value of the inputs and length of time they are provided, as already modified over the project life, leads to a high degree of confidence that the inputs will lead to the outputs.

At the outputs to purpose level the links are very straightforward. The outputs of seed farms, a research and seed multiplication/distribution program in Zanzibar, foundation seed, seeds act and regulations being enforced, a seed testing/certification laboratory, a seed certification program, a plan for processing equipment and spares and trained staff are obviously critical elements of "a system which can produce the quantities of improved/high quality food crop seed necessary to satisfy national demand" (purpose). Without any one of them the system could only operate at a lower efficiency level or do a less adequate job of producing required seed. The accomplishment of purpose is, however, dependent on a link outside the full and direct control of the project, namely the capability of the Tanzanian Seed Company to multiply the foundation seed and distribute the certified seed. Thus while the magnitude of the expected outputs and the given time frame are judged adequate to build the system up to the final multiplication and distribution stage, this final element cannot be guaranteed.

The purpose to goal link is also very clear. Improved seed is an important component in nearly all package efforts to raise production. Also, improved seed by itself can increase yields. "Self-sufficiency in food crops"(goal) requires improvements in production and yields. A system which can produce improved/high quality seeds which can boost yields obviously links directly to the goal.

2. Linkages with Other Projects and Organizations

The Seed Multiplication effort is closely linked to USAID-supported agricultural research effort which is and will be the major source of improved varieties for multiplication. The linkage is mutually beneficial and supportive since without the foundation seed farms the improved varieties developed by research would not become available to farmers and without the research the foundation seed farms have only existing varieties, which can be improved upon, to multiply. In addition to normal contacts within the MinAg organizational structure the links are strengthened by the Seed Production Committee which brings together not only seed multiplication and research staff but representatives from other interested and involved organizations such as the Tanzania Seed Company and the Faculty of Agriculture, Forestry and Veterinary Science of the University of Dar es Salaam.

The second critical link is between the foundation seed farms and the Tanzania Seed Company (See Annex III). The system is designed so that the Tanzanian Seed Company takes the output of the foundation seed farm and through contract growers multiplies the seed for subsequent distribution to farmers. In this system it is critical (a) that the TSC can utilize the seed produced for multiplication and (b)

that the seed farms produce adequate quantities of foundation seed for subsequent multiplication. Obviously a great deal of coordination is required with the TSC indicating to the foundation farms the quantities of particular varieties required in advance of planting. In turn this implies that the TSC has identified the acreages it will contract, based presumably on projections of the quantities of seed which are needed and which can be distributed. Alternatively, if all foundation seed cannot be used for multiplication it can be distributed to farmers although it is rather high cost and high quality seed for normal distribution. To-date the system has worked fairly well. Again, the Seed Production Committee acts as a formal mechanism to supplement the normal contracts.

Other less direct links also exist with the Agricultural Manpower Project which is training extension and management staff for the Ministry of Agriculture, agricultural parastatals and the Faculty of Agriculture, Forestry and Veterinary Medicine. These staff will play a major role in advising and training farmers on improved agricultural production techniques which include improved seed.

A final possible link, mentioned earlier, will be with the proposed Integrated Village Development project which would be a user of improved seed.

IV. Project Analysis

A. Technical

1. General

The experience to date indicates that there are no insurmountable technical problems to establishing foundation seed farms in Tanzania. The technology which has been introduced is applicable, understood and being utilized effectively by Tanzanian staff.

2. Rationale for Mechanized System

The technical requirements for producing foundation seed, the degree of purity required and the quantities involved, indicate that operations be capital/machinery intensive rather than labor-intensive. Hand labor could be used to prepare the land, plant, fertilize, cultivate and harvest the crop. However, proper and timely land preparation is essential for producing quality seed. This must be accomplished within a few weeks because seasonal rains crowd and dictate the planting season. Similarly, planting must be timely because research in Africa has shown there is a negative correlation between yield and advancing

planting dates beyond the optimum date. Uniform seed depth and proper fertilizer amounts and placing are also important. More consistency is possible with mechanical equipment. Necessary weeding could be done by hand but timely operations on the acreages involved would require a tremendous work force. Delayed harvest, which would inevitably result from hand picking unless excessive labor were employed, would damage in the field, and a rising incidence of theft.

There is also an inverse relationship between moisture content of the seed and its longevity under storage. Seed must be stored for a time following processing awaiting the next planting season before it is sold and planted. Therefore, mechanical dryers are required to rapidly and uniformly reduce the moisture content of the seed to a known and fixed level. Mechanical cleaners and graders deliver a uniform product free of dirt, chaff and foreign matter, having increased germinability because light weight and broken seeds which would germinate poorly or not at all are discarded. These machines also automatically apply chemical seed dressings which protect the germinating seeds/plants against attacks from soil-borne fungi and pests.

Some hand labor is inevitable for detasseling if hybrid maize is being produced and for removing off-type plants from fields. However, the increasing costs of labor and the volume of seed to be handled, preclude producing foundation seed by labor-intensive methods. Nevertheless, the operation remains more labor-intensive than it would be in the U.S. to reflect Tanzanian conditions.

3. Rationale for Number of Foundation Seed Farms

Questions have been raised as to the number of foundation seed farms that are necessary to produce the quantities of foundation seed required. The judgement that four such farms are necessary is based on the fact that in Tanzania, as in many tropical areas, altitude determines to a large extent, the environment and climate and therefore the growth characteristics of plants. Only those crops/varieties with the growth characteristics required for a given altitude/environment area will grow and produce well in that given area. When a crop variety is multiplied outside its area of adaption (altitude/environment zone) lower yields result. Utilizing unadapted seed also introduces the very real danger of changing the genetic make-up of the variety which would adversely affect its production performance when subsequently returned to and planted in the correct area of adaption. As an example, maize composites consist of a stable population of numerous genotypes. Growing a composite in an area for which it was not prepared (adapted) exerts selection pressure (natural selection) on certain components at the expense of others, and changes the frequency of genotypes in the population. For this reason it is essential that the seed demands of producers in a given altitude/environmental area be satisfied from

seed that is bred and multiplied in and adapted to the area. Hence, the minimum requirement (high altitude-arid, high altitude-moist, middle altitude and low altitude-coast) for four foundation seed farms in Tanzania.

A larger number might be even more desirable and able to take into account differences within the major altitude/environment zone but it is judged that the extra costs and strain on scarce resources (both financial and manpower) would not be offset by a corresponding major improvement in the suitability of seed. Also the areas involved are likely to be small making quantities of seed required and farm size uneconomic.

An exception to the above general conclusion is the proposed activities on Zanzibar. The agricultural research and seed increase support, while involving small acreages, will be drawing from another manpower and financial pool and be attempting to correct for the differences which exist between the low altitude areas of the mainland, and the varieties developed and under multiplication, and the environment on Zanzibar. Further, the activities are a logical follow-on to the varietal testing already underway on the island.

4. Support for the Fourth Foundation Seed Farm

It has also been suggested that a decision regarding U.S. support to more than three seed farms be delayed until after the evaluation planned for FY 1978 is completed. A decision delay until after the evaluation poses several difficulties and disadvantages. First, the critical period of assistance is as a farm in getting underway. It may well be that initial operations will be started and perhaps completed prior to the evaluation. Thus the opportunity to "get the farm off on the right foot" may be lost. Second, given the time required for recruitment, a delay until after the evaluation would mean that only a minimum period of assistance could be provided prior to project termination - probably about one year. Making the necessary logistic and other arrangements for a one-year tour would probably not be worthwhile. Third, since the additional seed multiplication actions for the climatic zone represented by the Njombe area are judged important, it is advantageous to inaugurate activities while other team members are available to provide additional support. In effect, fielding an additional team member prior to the evaluation increases the value and productivity of existing contract staff.

In addition, it should also be noted that the proposed support to the fourth farm consists of a one-man technical assistance input (2 years), logistical support and short-term assistance by other team members. These inputs will come only after the TanGov: a) establishes the farm; b) identifies and posts a Farm Manager and other staff; c) earmarks the funds necessary to equip (including water and electricity) and develop the farm; and d) supplies a house for the contract technician.

5. Rationale for Technical Assistance Inputs

a) General

The revised project design (Prop Revision #2) under which the project is currently operating calls for a project coordinator, four farm managers, four agricultural production agronomists and two agro-mechanics. This current revision maintains the project coordinator, reduces the number of production agronomists to one and alters his duty post and responsibilities, increases the number of agro-mechanics to three and calls for three farm managers and one "farm technician" who would be a combination manager/mechanic. In addition, a number of short-term specialists, and funding for a technician to head a Contract Services Unit are included. The specifics and rationale for these alterations and modifications are presented below.

b) Farm Managers

To establish and put a seed farm into effective operation expertise in managing a large mechanized farming operation is necessary. In Tanzania it was judged, and has proven to be the case, that U.S. farm managers would be the most effective source of the necessary skills and should be provided until Tanzanian staff have gained the necessary experience and can assume the responsibility. For the first two seed farms, the farm managers have proven to be invaluable and have succeeded in establishing effective operations. As their counterparts are ready to assume full management responsibility, these U.S. managers have more and more assumed the role of advisors to the Tanzanian managers. Phase out of these positions will occur in FY 1979.

For the third seed farm, a manager is scheduled from November 1976 until project phaseout in FY 1980. This will be a shorter period of time reflecting the greater experience of both the contract team and in-country in setting up a seed farm. During this period, the contract farm manager will need to pay particular attention to training and developing his counterpart to take over after a relatively short period.

c) Agro-Mechanics

Since the seed farm operations, for reasons detailed elsewhere, are largely mechanized and many operations must be performed in a short period, it is important that the equipment be properly maintained and repaired. Often it is a case of repairing and putting into operation new equipment which has somehow been damaged in shipment. Repair and maintenance is further complicated by the fact that U.S. equipment is being used which is sometimes slightly different from the normal equipment of European manufacture used in Tanzania. For these reasons it was decided, and after some experience, that an agro-mechanic should be provided to each seed farm while Tanzanian staff is being trained.

Providing less than one per farm, e.g., two agro-mechanics for three farms, means a less efficient and productive operation. The distance between farms also make this type of coverage impractical. Projected phaseout is FY 1979 for the Arusha and Msimba agro-mechanics and FY 1980 for this position at Kibaha.

d) Farm Technician

Above, the argument has been made for both a farm manager and an agro-mechanic at each seed farm. However, for the fourth foundation seed farm, it is judged that a single individual to provide both types of skills would be more appropriate and sufficient. First, experience is being gained and lessons learned from the first three farms. Therefore, establishing the fourth farm should be more routine. Second, it seems advisable to give the Tanzanians more of the responsibility for establishing one farm. The contract staff have played a very major role in establishing the third. The test of whether the Tanzanian expertise has been developed or not will be shown on the fourth farm.

The Contract input will be for only 30 months and be only one instead of two contract staff members, assisted by staff of the other farms as necessary. But the critical difference will be that the MinAg will be expected, through a Tanzanian Farm Manager, to take the major role in development. Hopefully, the single contract technician will be able to fill any gaps that appear and help make this farm operational.

e) Production Agronomist

In the 1973 PROP Revision, four Agricultural Production Agronomists, one each for the four areas served by the four foundation seed farms were proposed. These agronomists were to work with the contract growers of the Tanzania Seed Company and with the Regional and District Agricultural Officers. In essence, they were to act as extension agronomists. However, since that time it has been determined that this job is best performed by research and extension staff provided by the TanGov.^{9/} Nevertheless, it is proposed that one production agronomist be provided to work with the Ministry of Agriculture on the island of Zanzibar. As detailed in the job description (Annex III) the production agronomist would assist the Zanzibar Ministry of Agriculture in monitoring agricultural research links, in setting up seed multiplication farms and in developing and disseminating production packages for maize and sorghum. The decision to post a production agronomist in Zanzibar is based on the keen interest of the Zanzibar Government in seed multiplication as a method of substantially improving yields, thus reducing their annual

^{9/} The project did provide a production agronomist to serve the first two Farms. However, TanGov and Mission concluded there was no need to continue the position to serve these Farms as returned participants could effectively carry out these responsibilities.

food deficit, and the climatic differences which reduce the productiveness of mainland seed varieties. It will also enable AID to respond to a growing interest in assisting Zanzibar.

f) Contract Services Unit Manager

One of the problems which confronts all contract teams in Tanzania is the need for logistic support. Port and customs clearances, visas, work permits, housing, licenses and numerous other items must be taken care of if the team members are to operate efficiently or at all. Making the necessary arrangements, filling in the proper forms and performing the often needed follow-up requires a great deal of time, often at the expense of the technical assistance job to be done. Because of the large number of contract staff in the country, it was decided to form a contract support unit to handle administrative/logistical chores. A contract support unit composed of local AID employees, was attempted but proved to be unsatisfactory. Therefore it is now proposed that a U.S. manager for a Contract Support Unit be provided. Until Mid FY 78, he will be supported under the Agricultural Marketing Project where he was originally assigned, then he would be funded under the Experience Incorporated Contract until the end of this project. At that point, he would probably be picked up under another contract. It is important to emphasize that the manager would provide services to all contracts and contract staff, not only seed multiplication staff, and would free the Contract Team Leaders and individual technicians from the logistical problems which now consume much of their time. The Experience Incorporated Contract was chosen for this purpose because of the recently improved performance of the Contractor.

g) Short-term Staff

A total of four short-term or consultant staff are proposed. A seed processing specialist and laboratory testing expert are programmed in support of the seed farms and the seed laboratory operation. A spare parts expert will assist in setting up a procedure and system for identifying, obtaining, inventorying and controlling the spare parts necessary to support seed farm operations. The machinery expert will inventory all equipment, develop a procurement and replacement plan for needed equipment and assist in developing specifications for housing the machinery and equipment. The systems developed, if they are suitable, may eventually be extended to all spare parts and machinery/equipment procurement of the MinAg.

h) Project Coordinator

With the exception of the project coordinator all contract staff are currently located outside Dar es Salaam. For efficient liaison with the MinAg and to provide assistance in the central planning that is

required for a seed multiplication effort, one man is required in Dar es Salaam. In addition, the coordinator provides assistance to the seed certification program and to the seeds laboratory. This position will be continued until project phaseout.

B. Environmental Examination

1. Project Direct Effect on the Environment

As described in other sections of this paper, the seed multiplication activities per se will have only a minimal impact on the environment. At full development, the foundation seed farms will occupy less than 10,000 acres or a very small area. Because the farms are designed for sustained production over an extended period of time, soil and water conservation combined with measures to maintain and improve soil fertility are normal practice. Construction is limited to necessary storage, workshops, housing and ancillary facilities and is nearly completed. Irrigation on limited acreages will be of the overhead type and will be carefully controlled and monitored.

2. Possible Environmental Impact as Improved Seed is Used More Widely

Assessing and discussing the possible environmental impact of the wider use of improved seed is complicated by the diversity of conditions found in Tanzania. As Berry states in his paper, "Environmental Impact of Agricultural Development in Tanzania" (1975), "the range of conditions in the country includes moist, humid tropical climate along the coast; moist, cool mountain climates; and extensive, dry, semi-arid grassland and savannah in the interior. There are thus a number of distinct ecological zones."^{10/} Within and sometimes across zones there are also a variety of major agro-economic systems operating. Conyevs, reported in Berry, described 15 separate systems with each system influenced to a large extent by the local environment and facing different problems. With this range of conditions possible general environmental problems would include soil erosion and depletion, water pollution from fertilizer or pesticide run off (if these are part of a package with improved seed) and other health hazards from pesticides use. Incidence and severity would vary depending on prevailing conditions. Of course, the environmental impact will also depend on the type of improved seed being used. Maize and sorghum are planted on extensive acreages while the other crops occupy much smaller areas. Similarly certain crops extract more from the soil than others, e.g., maize compared to soybeans.

^{10/} See Berry paper for detailed environmental analysis.

A final point is that the use of improved seed, fertilizer and chemical insect control has become more important now that farmers are concentrated in villages. Prior to the formation of villages, farms were scattered and the slash and burn system of cultivation was followed. With the formation of villages, land will be continually or regularly cropped as farmers, for physical reasons, cannot seek out new land on a regular basis. In the absence of improved seed, fertilizer and insecticides, production on these continuously cropped lands can be expected to decline rapidly with serious effects on both the environment and farmers.

With the above in mind, it is believed that improved seed will ultimately have a positive impact on the environment. In time, higher yields due to improved seed would allow some of the more marginal lands to be taken out of crop production. Improved seeds with a higher yield potential also make economic and feasible the use of fertilizers and soil conservation techniques. However, it should be noted that while the effect can be positive it is clearly beyond the scope or responsibility of the project to ensure positive environmental results from an expanded supply of foundation seed.

C. Social Analysis

1. Introduction

In itself, as a producer of only foundation seed for subsequent multiplication and distribution by the Tanzania Seed Company and other groups, the project has very little social-cultural impact. However, as the second component in a chain which seeks to provide higher quality seed of better crop varieties to thousands of small farmers, the seed multiplication project does raise important socio-cultural questions.

In the following, the possible effect of greater quantities of improved seed being made available is examined in terms of a) sociocultural feasibility; b) the diffusion of the innovation; c) social consequence and benefit incidence; d) changes in power and participation and e) effect on women.

2. Sociocultural Feasibility

There are no inherent features of the Tanzania socio-cultural setting which make the production or use of improved seed infeasible. The most common food crops are involved. The improved varieties being developed and to be multiplied have been proven acceptable to farmers. It will be up to the agricultural research network to continue developing acceptable and more productive varieties. Additional production of food crops to a society that is often hungry or food-short is desired.

The feasibility issue really is whether the Government can multiply and distribute the quantities of improved seed which would appear to be needed if Tanzania is to maintain food self-sufficiency in the face of a growing population and a growing demand.

Regarding the seed farms in particular, the technology introduced is not alien to the Tanzanian setting. Similar technology and techniques have been and are being successfully employed on other mechanized agricultural operations throughout the country. The systems do require a higher degree of discipline and attention to detail than is perhaps the norm but this is a learning and experience process. Based on the results to date, it is clear that with adequate financing the establishment of seed farms is socioculturally feasible.

3. The Diffusion of Innovation

The basic responsibilities for spreading the use of improved seed rest with the Tanzania Seed Company and the TanGov agricultural extension programs. Since the value of improved seed is already widely known and the programs to expand its use are underway, with demand exceeding supply in most areas, (it appears that in areas where not all of the available improved seed was utilized that the problem was with the distribution system - the seed arrived too late or farmers were unaware of the availability), diffusion efforts should be relatively simple. The constraints will be quantities of seed available and the system of distributing both knowledge and necessary inputs. The concentration of the farmers in Ujamaa Villages is a positive factor which should facilitate the spread of improved seeds as it is possible to work with groups rather than individuals. (Whether they farm collectively or not the villagization allows more people to be contacted.) Obviously there will be differences between villages in information availability and adoption rates for new ideas but overall the diffusion system which can facilitate the diffusion of improved seed is in place or is moving into place. The TanGov is committed to developing an extension effort which reaches all areas and which is not heavily biased toward any particular area. This should further spread and speed the use of improved seed. Clear evidence of the rate of diffusion will be provided by seed sales and distribution records of the Tanzania Seed Company.

The seed farm network of 4 farms on the mainland and a small network on Zanzibar is so limited that ideas are easily transmitted within the network. The centralized control exercised by the MinAg further facilitates the transfer.

4. Social Consequence and Benefit Incidence

As with any innovation, there is a possibility that the "haves" or the relatively more progressive farmers will be the ones to successfully

adopt improved seed at the expense of the "have nots." Credit from official sources will probably not be a factor in the adoption since only village credit, rather than individual credit, is being provided. However, to maximize the productiveness of the improved seeds and varieties additional inputs such as fertilizers and weeding are required. A villager's relative resource position would affect his ability to obtain the necessary inputs. Similarly an area serviced by a more effective distribution system might be able to benefit to a greater extent than another area where the seeds are not extensively available. Finally, because different agro-climatic zones require different varieties produced by seed farms in a similar agro-climatic zone, the lack of a seed farm in a zone, or its less-developed state, will mean certain areas will have access to improved seed prior to its availability in other areas.

The project seeks to address the possible problem of disadvantaged areas by developing seed farms in each of the four major agro-climatic zones on the Tanzanian mainland and assisting in seed expansion efforts in Zanzibar. While not being developed simultaneously, in the sense that each is at the same stage of development, at project end three of the mainland farms will be operating at a full-scale level with a fourth underway and on Zanzibar initial multiplication efforts will have been started. Thus any benefit accruing to certain regions or areas due to availability/non-availability of improved seed for multiplication should be temporary.

The other benefit incidence features mentioned above are not addressed directly by the project but in the Tanzanian setting they should not prove to be highly detrimental. First, the TanGov is seeking to ensure that the infrastructure necessary to make seed delivery possible is in place in all regions. Again, there are differences but over time these variations in capacity should be reduced. Similarly the TanGov is seeking to ensure that additional inputs to expand food crops production are available when, where and in the quantities needed. Over time this effort will encompass all food crop areas.

At the village level, improved seed would have no negative effect on the internal distribution of income in those areas where land is farmed collectively. In the more normal areas where blocks are cultivated individually those farmers who use the improved seed will probably earn the largest income. In time this could skew income distribution. However, it is more likely, given the overall government philosophy, that such an occurrence would be discouraged and blocked.

On the possible effect of improved seed on the role of women, see subsection 6.b. below. Regarding labor, in general additional yields imply additional labor at least at harvest. To utilize the genetic potential

of both varieties may also require additional labor in weeding and soil preparation. Whether the farmer will be willing to provide the additional labor resources will undoubtedly depend on what he views as the benefit. It is our judgment that the benefits from improved seed will be sufficiently obvious to the farmer, as evidenced by the demand for improved seed already experienced, that he will be willing to meet the additional labor requirements.

A final point is that while the farmers will benefit from improved yield due to better seed, it is also probable that consumers will also benefit as greater quantities of maize are available. Since prices are administratively determined, greater production will not necessarily mean lower prices.

5. Changes in Power and Participation

As indicated above, while improved seed might hold the potential to benefit a particular group it is likely that the TanGov will not permit such an alternation in power and participation, based on wealth, to occur.

6. Effect on Women

a. Background ^{11/}

Traditionally women have been viewed as mothers or housewives who keep the home and food shamba (garden) operating while many of the menfolk work in cash crops and off-farm activities. In reality, women have been required to provide labor for subsistence production and farm management skills as males have migrated to urban areas or other areas of employment opportunity. But women normally have not had full access to development resources. Although there are active attempts to correct the situation within the Ujamaa village structure and through training programs for women's group leaders, guidance, determination and resources which are important to the women's role as agricultural producers are insufficient. Extension services in Tanzania favor the male farmer. Technological innovations, mechanical equipment and other devices to increase productivity and lighten the labor load of farmers apply less to food crops than cash crops. Men have been favored for agricultural credit and the cooperative organizations through which such credit is available are largely male-controlled. Women have traditionally played more active roles in the marketing of agricultural produce but this has been largely on an informal basis in local markets.

^{11/} Based on D. R. Reynolds "An Appraisal of Rural Women in Tanzania" REDSO/EA, December, 1975.

b. Discussion

The Reynolds report clearly points out the inferior status of women in traditional Tanzanian society. The report also makes the case that the move away from subsistence agriculture and the beginning of wage labor worked to the detriment of women - at least in the rural areas. But Reynolds also states that TanGov policy is equality of opportunity and role between the sexes, and that legal barriers to achieve it have largely been removed. Beyond that, the TanGov has taken many positive steps to promote and encourage the development of women, few of which are mentioned in the paper.

In general, the continuing inferior social/economic/political status of women results not from government policy and efforts at equalization but largely long standing and deeply ingrained attitudes - men's and women's - particularly in the rural areas. In fact, Tanzania, in respect to the role of women, is not too far different from the United States prior to industrialization and the explosion in mass education.

Changing a social system is a complex and difficult task, and if not done with care will cause disruption and chaos detrimental to the end sought. Of the measures open to the TanGov, education and overall development are the two that are most likely to be used. This means slow evolutionary changes, measured in decades rather than a sudden revolutionary ripping of the social fabric. For AID this dictates patience and support to TanGov programs. It also means learning much more than is now known about rural Tanzanian society - particularly Ujamaa villages - before sensible suggestions that will lead to social change can be put forward.

c. Conclusion

With the above in mind, what will be the effect of a seed multiplication effort? Increasing food production through improved seed can require major changes in the techniques of agricultural production. How this will affect rural women is only dimly perceived by the TanGov and ourselves. Reynolds fears increased workload and lessening of status. Also it may depend on whether the food crops are grown for family consumption or sale. If they become cash crops it is conceivable that men would sell the benefits of women's labor. These are (based on worldwide experience) concerns which could well materialize without offsetting compensations.

However, it should be noted that Tanzania is more sensitive to women's rights than most LDCs. And while AID will attempt to ensure that the project's technological inputs do not have a negative result on the role of women, there is some question whether a relatively small foreign donor can deal with a basic cultural pattern in Africa until the whole society is ready to move. At a minimum, AID will not support activities that discriminate against women. By TanGov policy any credit from AID

sources (outside the project) will be equally available to both men and women. Finally, AID's evaluations will examine social issues and the role of women and seek to adjust activities if social concerns are not receiving attention sufficient to maximize social benefits.

D. Economic Considerations

As with many projects that are of an institutional development (in this case foundation seed farms) rather than of a production nature, standard economic analysis techniques are not very suitable for analyzing the seed multiplication activity. Improved seed is but one element in production increases and there are several steps between the foundation seed farms and the benefits of increased production from the farmers yields. Determining the attribution of benefits in this situation is an almost impossible task.

But if the very reasonable assumption is made (based on its role as a component of highly economic production packages)^{12/} that improved seed is an economically sound proposition, the question becomes how to obtain the necessary supplies in the most economical manner. The only two alternatives appear to be local production or importation. For climatic reasons the importation of seed that is precisely adapted to the varying micro-climes is not possible. But, if importation from neighboring countries with similar climates is assumed to be a viable alternative, then how do the costs compare? In 1976 the foundation seed farms, which attempt to operate at a break-even point, were able to provide foundation maize seed to the TSC at T.Shs. 1.65 per kilogram. Maize seed imported from Kenya costs T.Shs. 3.85 per kilogram. No data for other crops is available but, based on the very reasonable costs of production which are being achieved on the foundation seed farms, it appears that similar results would prevail. Thus producing the foundation seed in Tanzania is a cost-effective method of obtaining the necessary seed.

Turning to the methods employed to develop the seed farms it appears they too are cost-effective. The combination of inputs has allowed functioning farms to be established in a relatively short-period. Fewer contract staff, less training and/or fewer commodities would have slowed the rate of implementation. Additional inputs might have allowed more rapid progress but the ability of the TanGov to cope would become questionable.

^{12/}For example, the maize production package developed for the National Maize Program.

To conclude, while there are few absolute figures which prove that investment in seed multiplication is justified, it appears that the returns to the seed multiplication project are substantial and that local production is the most efficient method of obtaining seed. The experience in other countries supports this conclusion.

E. Financial Analysis and Plan

1. Recurrent Budget Analysis of the MinAg

With decentralization and the continuing financial squeeze, the total recurrent budget of a Ministry of Agriculture has declined over the past few years to a level of about \$12 million (1975/76). However, within the MinAg the budget of the Crop Development Division rose to roughly \$4 million in 1975/76. The funding for the seed multiplication effort has remained rather low at roughly \$350,000 in 1974/75 and \$435,000 in 1975/76. In part this reflects the growing financial self-sufficiency of the seed farms. In 1974/75 the value of the sales was roughly \$484,460 while in 1975/76 it is projected to be \$538,300. Adding new foundation seed farms would increase the funding requirement but if the strategy of making the farms financially self-sufficient is continued, the long-term recurrent drain on MinAg funds will be minimal. Given the TanGov concern with food crops and the interest in improved seed, there is no reason to believe that the multiplication efforts will not receive necessary funds which should be less than current support levels.

2. Financial Plan/Budget Table

The following table indicates the total financing required to carry out the project. Additional information on the funding may be found in the Inputs Section of the Detailed Description.

(See Page 30)

TABLE 5 - Summary Cost Estimate and Financial Plan
(\$ 000)

	AID			TANZANIA			TOTAL		
	FX	LC	Total	FX	LC	Total	FX	LC	Total
1. U.S. Staff and Consultants	3,308	-	3,308 ^{4/}	-	-	-	3,308	-	3,308
2. Training	452	-	452	-	28	28	452	28	480
3. Facilities, Land and Equipment	670	-	670	44	1,728	1,772	714	1,728	2,442
4. Operating Budgets ^{1/}	-	-	-	-	2,817	2,817	-	2,817	2,817
5. Other Costs ^{2/}	-	352	352	-	108	108	-	460	460
6. Inflation and Contingency ^{3/}	383	48	431	6	687	693	389	735	1,124
TOTAL	4,813	400	5,213	50	5,368	5,418	4,863	5,768	10,631

^{1/} Includes salaries of Tanzanian staff working on project

^{2/} Includes Trust Account Contribution

^{3/} On U.S. inputs calculated inflation = 10% in 1978 and 21% in 1979; contingency = 10% for both 1978 and 1979.

^{4/} Based on the following calculation:

\$1,672,000 - cumulative obligation FY70-TQ from U-203 of 9/30/76

\$1,636,000 - projected requirements FY77-79 from FY78 Congressional Presentation

\$3,308,000 - Total

V. Implementation Arrangements

A. Analysis of the Recipients AID's and Contractors
Administrative Arrangements

1. General

The project is being implemented through a contract with Experience Incorporated who provide all technical assistance personnel - both long and short-term. AID handles all participants and has directly procured the major commodity items with the contractor providing spare parts and miscellaneous items. The project is under the Crop Development Division of the Ministry of Agriculture. Project Agreements are signed by the Ministry of Finance after clearance by the Ministry of Agriculture.^{13/} No change in the above general arrangements for the remainder of the project are proposed.

2. Ministry of Agriculture (Recipient)

a. Mainland

As indicated above, the seed farm program falls under the Crop Development Division (CDD) of the Ministry of Agriculture. Day-to-day operational control is exercised by the Deputy Director of the Division. Additional guidance is provided by the Seed Production Committee which is chaired by the Deputy Director and includes representatives from research, TSC and other concerned organizations. Supervision of contract field staff members is carried out by the contract project coordinators in consultation/coordination with the Deputy Director.

Because the seed farms are directly controlled and supervised by the MinAg, project activities are well integrated and coordinated with overall MinAg programs. Annual work plans assist in this integration/coordination. However, due to the level of project staffing and the presence of a project coordinator, the administrative demands on the Ministry have been low. Also the fact that the foundation seed farms are designed to operate at a breakeven financial level after initial start-up years means the farms tend to be more self-sufficient than normal Ministry operations. Necessary budget inputs, nevertheless, do come from the CDD and are requested based on plans developed with and by the project contract coordinator. As seed farms staff are regular MinAg employees and subject to normal MinAg promotion and transfer procedures there remains a high interest on the part of all staff to maintain close contact.

^{13/} The proposed assistance on Zanzibar will be to the Department of Agriculture

Generally the above arrangements have worked satisfactorily. MinAg staff have devoted sufficient time to administrative details. The problem of sufficient numbers of suitable and qualified staff is being solved as participants return and the staff profit from on-the-job training.

b. Zanzibar

On Zanzibar the assistance will be to the Agriculture Department of the Ministry of Agriculture and Land. Since this will be the first USAID assistance to this Department, it is difficult to judge administrative capability. Given the small staff and low level of training, some problems are foreseen. However the enthusiasm and interest shown are expected to make implementation feasible.

3. Contractor

The contractor TA team is headed by a Project Coordinator in Dar es Salaam who acts as the contact point for both the MinAg and the USAID. The coordinator, in addition to planning and supervising the implementation of activities and conducting the preparation of workplans, budgets and commodity lists, has also been clearing and forwarding project commodities, securing visas, work permits, etc., and working with MinAg staff in the more general area of seed multiplication and seed certification. He is also responsible for preparing quarterly progress reports on the project.

On the first two foundation seed farms there has been a contract manager and a Tanzanian co-manager. This system will be continued for the third seed farm but for the fourth, no full-time contract manager will be provided. Instead the technician assigned will act only as an advisor.

4. AID

AID has assigned a project manager to the project who acts as primary contact point for the contract Chief of Party. He is responsible for ensuring that annual workplans, annual project appraisal reports and all AID documentation are prepared in a timely manner. The Project Manager is also responsible for bringing issues or problems to the attention of senior Mission management. The Project Manager is under the direct supervision of the Food and Agriculture Officer or his designee.

B. Implementation Plan

The following implementation plan begins with the submission of the current Project Paper Revision. For historical events the reader is referred to the Background Section of this Revision. In addition to

input achievement and management items, the plan provides indicators of output achievement, also shown on the PPT Network (Annex II), which can be used to measure project performance.

<u>Date</u>	<u>Action</u>	<u>Responsible Organization</u>
1/77	Project Paper Revision submitted	USAID
2/77	Agro-mechanic for Kibaha Farm arrives	Contractor, TanGov
3/77	Revision approved	AID/W
3/77	Facility Construction completed on Arusha farm	TanGov, Contractor
6/77	Six additional degree participants returned	USAID, TanGov
6/77	Site for fourth farm identified and land obtained	TanGov
6/77	Short-term Consultants develop spare parts and equipment replacement plans	Contractor, TanGov
7/77	Production Agronomist arrives	Contractor, TanGov
8/77	Two hundred acre irrigation installations completed at Arusha and Msimba	TanGov, Contractor
8/77	Seeds Laboratory Functioning effectively in new building	Contractor, TanGov
10/77	4th Seed Farm technician arrives	Contractor, TanGov
11/77	Facility Construction completed on Msimba Farm	TanGov, Contractor
2/78	In-depth evaluation	USAID, Contractor, TanGov
7/78	Five short-term participants return	USAID, TanGov
7/78	Seed multiplication started in Zanzibar	Contractor, TanGov
11/78	3,200 M.T. of certified and 1,800 M.T. of foundation seed produced from 5,200 acres on 3 farms	Contractor, TanGov
6/79	Spare parts and equipment procurement system implemented	TanGov
11/77	2,000 M.T. of certified and 1,600 M.T. of foundation seed produced in three farms from 4,200 acres	TanGov, Contractor
11/77	Area obtained for Fourth Farm	TanGov

<u>Date</u>	<u>Action</u>	<u>Responsible Organization</u>
7/79	Three degree participants return	USAID, TanGov
9/79	Contract Personnel for Arusha, Msimba, Kibaha and Zanzibar have departed	USAID, Contractor TanGov
11/79	4,000 M.T. of certified and 2,200 M.T. of foundation seed produced from 5,700 acres on 4 farms	Contractor, TanGov
7/80	Two degree participants return	USAID, TanGov
3/80	Logistics Management Specialist switched to different contract	USAID, TanGov, Contractor
3/80	4th Farm technician departs	"
8/80	Final Contract Technician Departs	"
11/80	6,100 acres under cultivation on 4 farms	TanGov

C. Evaluation Arrangements

Evaluation has already proved to be an important component in the successful implementation of this project. The external evaluation conducted early in CY 1975 and the resulting performance appraisal report identified numerous modifications in project goal, purpose, outputs and inputs which would make the project more effective. Many of the suggested modifications have already been implemented while certain others are described in this PP revision and will be implemented upon revision approval.

A second in-depth evaluation utilizing outside experts is scheduled for early in CY 1978. This evaluation will provide a final opportunity to identify any changes required if project targets outputs and project purpose are to be achieved. It will also indicate to the TanGov those areas where greatest attention needs to be focused if the foundation seed farms are to continue functioning effectively after project phaseout.

In addition to the above evaluation, regular annual assessments of project performance will also be conducted. These evaluations will specifically address input provision, contract effectiveness, TanGov support, progress toward achieving outputs and AID backstopping. As necessary, the results of the evaluation will be used to adjust project inputs, method of operation and strategy.

The information and data required to conduct the evaluations will normally be available from Contractor, MinAg and AID reports and records. This will be supplemented, as required by special reports, on site investigations and appropriate meetings. All evaluations will involve the TanGov and the Contractor in addition to AID.

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PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY _____ to FY _____
Total U. S. Funding _____
Date Prepared: _____
ANNEX I 1

Project Title: SEED MULTIPLICATION, 621-0092

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project or Sector Goal: The broader objective to which this project contributes: To assist Tanzania to achieve self-sufficiency in the food-crops sub-sector.</p>	<p>Measures of Goal Achievement:</p> <p>Imports of crops produced in Tanzania are reduced.</p> <p>Annual production of maize reaches 900,000 tons.</p> <p>Domestically produced food-crop products are available in sufficient supply and properly marketed and distributed to meet national demand.</p>	<p><u>Sector Goal:</u></p> <p>TanGov Statistics.</p> <p>Annual PARs.</p> <p>Special Evaluations.</p>	<p>Assumptions for achieving goal targets:</p> <p>Essential financial, manpower and policy issues will be resolved by TanGov so as to provide an environment for increased food production.</p> <p>Necessary research, extension, credit storage and transport, markets, price incentives, trained manpower, etc., will be forthcoming.</p> <p>TanGov and donor Financial and Manpower resources are made available for food crop production efforts and have the desired impact on food production.</p>
<p><u>Project Purpose:</u></p> <p>To assist Tanzania in developing a system which can produce the quantities of improved/high quality food-crop seeds necessary to satisfy national demand.</p>	<p><u>Conditions that will indicate purpose has been achieved:</u></p> <p>TanGov has established and developed its technical and managerial skills and budgeting support sufficient to produce foundation and "certified" seeds and to encourage seed distribution.</p> <p>All foundation seed produced is being used and multiplied.</p> <p>Tanzania Seed Company (TSC) succeeds in selling and distributing the volume of "certified" seed required annually by farmers.</p> <p>Large acreages are planted, mainly by small farmers, using "certified" seed and other combined inputs, etc., credit, fertilizer, and improved cultural practices.</p>	<p><u>Project Purpose:</u></p> <p>TanGov, MOA and E-I reports.</p> <p>Records of TSC, TFA and TRDB.</p>	<ul style="list-style-type: none"> - Research program provides new and better varieties. - TanGov provides Financing for and operates a spare parts and replacement system for equipment. - TanGov provides necessary Funding for continued operation of seed farms. - Seed Company undertakes promotion extension, and multiplication efforts. - TanGov establishes required conditions/environment for widespread acceptance of seeds by farmers.

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Life of Project: _____
 From FY _____ to FY _____
 Total U. S. Funding _____
 Date Prepared: _____
 ANNEX I 2

Project Title: SEED MULTIPLICATION, 621-0092

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Outputs:</p> <p>Three functioning foundation seed farms in operation with a fourth farm under development.</p> <p>Foundation seed production adequate for national needs.</p> <p>TSC operating nationally with appropriate facilities and personnel.</p> <p>Seeds Act and regulations being completely enforced.</p> <p>Seed testing/certification laboratory established and operating effectively.</p> <p>Seed certification program competently implemented.</p> <p>Seed multiplication program staffed and managed by Tanzanians.</p> <p>An operational plan underway for procuring spare parts and equipment.</p> <p>A Contract Support Unit established under direction of Logistics Management Specialist.</p>	<p>Magnitude of Outputs:</p> <p>Farms at four sites in four major ecological zones cultivating about 7,000 acres.</p> <p>2,200 tons foundation seed produced.</p> <p>4,000 tons "certified" seed produced on project farms.</p> <p>Seed Company operating effectively.</p> <p>Seed Law passed and seed certification supported by effective seed laboratory and regulatory actions.</p> <p>28 participants trained and working in program.</p>	<p>PARs and Special Evaluations</p> <p>TanGov, MOA and E-I reports.</p> <p>Records of Tanzania Seed Company.</p>	<p>Assumptions for providing outputs:</p> <p>Weather is favorable.</p> <p>Equipment is delivered and installed in timely manner.</p> <p>Budget support is forthcoming.</p>

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

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

Project Title: SEED MULTIPLICATION, 621-0092

ANNEX I 3

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs:	Implementation Target (Type and Quantity)		Assumptions for providing inputs:
A. <u>United States</u>			
1. <u>Personnel</u>	1. Personnel \$ 3,308,000	1. USAID, Contractor and TanGov records.	
a. Project Coordinator	2. Participant Training 452,000	2. Observation	
b. Farm Manager (three)	3. Commodities 370,000	3. Evaluation.	
c. Agro-Mechanics (three)	4. Other Cost 352,000		
d. Seed Farm Technician (one)			
e. Production Agronomist	Sub total 4,482,000		
f. Logistics/Management Specialist	Contingency Inflation 431,000		
g. Consultants: including	TOTAL AID \$ 5,213,000		
Seed Processing Specialist			
Parts Inventory "			
Machinery "			
Lab. Testing "			
2. <u>Participants</u>			
A total of twenty-eight (28) participants, twenty-three (23) degree and five (05) non-degree. This includes nine (09) MSc. degree participants and fourteen (14) BSc. level trainees.			
3. <u>Commodities</u>			
a. Vehicles (26)			
b. Seed Processing Equipment			
c. Agr. Support Loans provided			
addition commodity support funds:			
1) 621-H-015 (1970) - \$500,000			
2) 621-H-017 (1973) - \$1,020,000			

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: _____
From FY _____ to FY _____
Total U. S. Funding _____
Date Prepared: _____
ANNEX I 4

Project Title: SEED MULTIPLICATION, 621-0092

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Inputs:</p> <p>4. <u>Other Costs</u></p> <p>a. Houses at Arusha Farm (2).</p> <p>b. Demonstration and training supplies/materials.</p> <p>c. Travel costs (local, invitational, medical, emergency).</p> <p>d. Miscellaneous local costs.</p> <p><u>TANGOV INPUTS</u></p> <p>1. Financial: \$5,418,000 (life)</p> <p>2. Staff:</p> <p>a. Co-farm manager 3</p> <p>b. Field Officers 9</p> <p>c. Co-extension officers 4</p> <p>d. Station manager/adm officers 4</p> <p>e. Co-agro mechanics and assistants 10</p> <p>f. Seed test officers 4</p> <p>g. Central Seed Lab 6</p> <p>h. Regulatory enforcement personnel 5</p> <p>i. Secretaries 5</p> <p>j. Tractor drivers 20</p> <p>k. Seasonal farm laborers N/A</p> <p>3. Buildings</p>	<p>Implementation Target (Type and Quantity)</p> <p>1. Budget support.</p> <p>2. All positions filled or in the process of being filled.</p> <p>Building constructed or under construction or active plans operative.</p>	<p>TanGov / USAID / Experience Incorporated records and on site inspection.</p>	<p>Assumptions for providing inputs:</p>

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: _____
From FY _____ to FY _____
Total U. S. Funding _____
Date Prepared: _____
ANNEX I 5

Project Title: SEED MULTIPLICATION, 621-0092

NARRATIVE SUMMARY				OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs:				Implementation Target (Type and Quantity)		Assumptions for providing inputs:
3. Buildings (cont'd)						
	<u>Arusha</u>	<u>Msimba</u>	<u>3rd Farm</u>	<u>4th Farm</u>		
House	13	15	10	to		
Workshop	1	1	1	be		
Storehouse	1	1	1	deter-		
Processing	1	1	1	mined		
Dryer	1	1	1			
Crib	1	1	1			
Mach. Shed	1	1	1			
Land	1200A	6000A	1200A	Land under cultivation, being cleared or obtained;		
Irrigation				Water source found and equipment ordered.		

JOB DESCRIPTIONPRODUCTION AGRONOMISTResponsibilities

1. To follow closely research trial plots set up on Zanzibar by the Tanzania Agricultural Research Project, and give assistance to the Zanzibar Ministry of Agriculture in the management of such plots as requested.
2. To give guidance and assistance in the development of seed farms, and the processing and distribution of seed produced from these farms.
3. To develop and disseminate data on the most appropriate production package for maize and/or sorghum, food legumes based on results of the research trials conducted on Zanzibar.

Qualifications

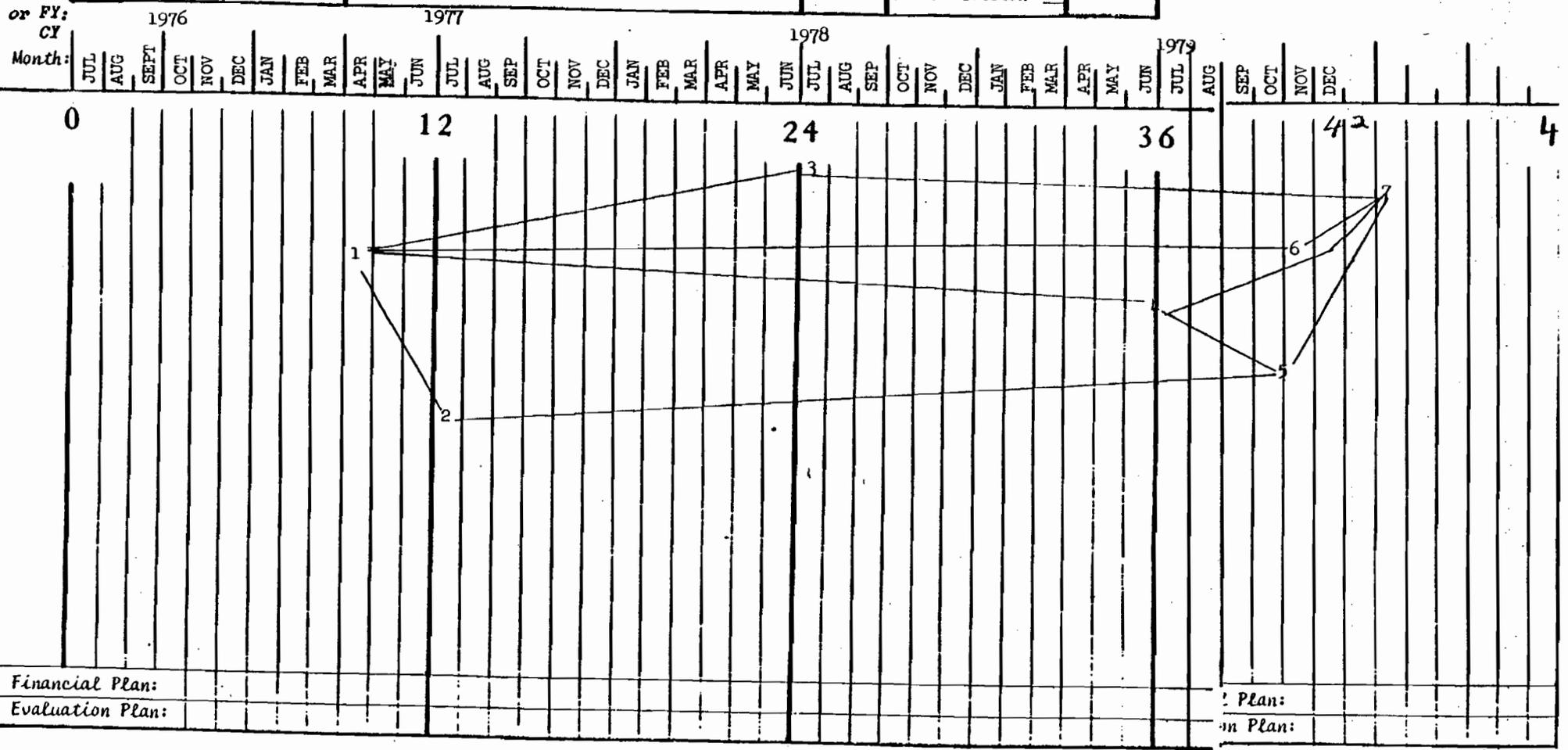
Technical and production skills are a requisite as the technician will need to participate in both research and production. The Island of Zanzibar presents unique problems in soils, therefore, college work or equivalent background.

Experience

A minimum of five years field experience is required because of the "one man team" and on-the-job training required for the Zanzibarian staff. Farm management or actual farming experience is required to assure success of the seed farm operation.

There will be no international or English language elementary schools in the area of assignment. Therefore, technician with no children or who favor children attending boarding schools should be considered. The technician and his dependents must be flexible and prepared/able to adapt to living and working conditions and cultures considerably different from the United States.

Count: 1	Project No:	Project Title:	Date: / / Original	PPT app
			/ / Revision #	



PROJECT PERFORMANCE NETWORK

PROJE

Country: Tanzania	Project No: 621-11-130-0092	Project Title: SEED MULTIPLICATION	Date:	/ / Original /X/ Revision #	Appvd: JFrancis
<u>CPI DESCRIPTION</u>					Alterian
<ol style="list-style-type: none"> 1. Full contract team on board. 2. Decision regarding 4th farm made by USAID and TanGov. 3. Permanent seeds laboratory facility constructed at Morogoro by TanGov. 4. Facilities for Third Farm completed. 5. 4000 metric tons of certified seed and 2200 metric tons of foundation seed grown on project farms. 6. All participants returned and working in project. 7. Project completion. 					JCornelius

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