

Industry Council for Development

THE DEVELOPMENT of TANZANIA'S  
NATIONAL SEED INDUSTRY

REPORT of the ICD/MSU MISSION  
December 1982

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LIST of ABBREVIATIONS USED

|          |   |
|----------|---|
| CDC      | Commonwealth Development Corporation                        |
| CIDA     | Canadian International Development Agency                   |
| CIMMYT   | International Center for Maize and Wheat Research           |
| DETS     | Division of Extension and Technical Services                |
| EI       | Experience, Incorporated                                    |
| GOT      | Government of Tanzania                                      |
| ICD      | Industry Council for Development                            |
| MOA      | Ministry of Agriculture                                     |
| MSU      | Mississippi State University                                |
| NAFCO    | National Agricultural and Food Corporation                  |
| NSTL     | National Seed Testing Laboratory                            |
| PIO/T    | Project Implementation Order/Technical                      |
| RD       | Research Division/MOA                                       |
| TanSeed  | Tanzania Seed Company                                       |
| Tan Watt | Tanganyika Wattle Company Limited                           |
| TARO     | Tanzania Agricultural Research Organization                 |
| TFA      | Tanganyika Farmers Association                              |
| TOSCA    | Tanzania Official Seed Certification Agency                 |
| USAID/T  | United States Agency for International Development/Tanzania |

## REPORT SUMMARY

Since 1971 the GOT and USAID/T have maintained a bilateral technical assistance project (621-0092) for the purpose of accelerating the development of a comprehensive seed industry to serve the needs of Tanzania's farmers. This project is scheduled to be terminated 31 December 1982.

The MOA/GOT and the USAID/T agreed that two senior seed industry development consultants should review that status and make recommendations for the continued development of Tanzania's seed industry. The consultants' scope of work placed strong emphasis on identifying means for involving the private sector in the seed industry. ICD arranged for the services of Mr. D. D. Walker, Chairman and President (retired), Funk Seeds International, as industry advisor for the mission. MSU provided the services of Dr. Howard C. Potts, Professor and Agronomist, MSU Seed Technology Laboratory, Mississippi State University.

The principal programs of a comprehensive seed industry, except for extension education, are present in Tanzania. The development, management and economic viability of these programs are in great disarray. Unless major adjustments are made rapidly, there appears little hope for development of a viable seed industry in this decade.

The recommendations in this report are presented in the three following sections: Technical Operations, Recommended Structural Changes, and Potential for U.S. and European Investment in the Tanzanian Seed Industry.

None of the measures recommended will resolve the problems of the seed industry in isolation from the others. The interrelated nature of the constraints highlights the need for the adjustments recommended.

The specific recommendations concerning the technical operations follow:

### Research

- 1) That TanSeed, with full support from the GOT, make every effort to obtain the parental lines for those maize hybrids developed by the Kitale Maize Program (Kenya Seed Company) since 1977.
- 2) That TARO and USAID/T project officers place special emphasis on the acceleration of the hybrid maize and hybrid sorghum breeding programs during implementation of the Farming Systems Research Project.

- 3) That responsibility for multiplication of parental lines for hybrid seed production be assigned to TanSeed.

#### Seed Multiplication/Production

- 4) That TanSeed make the necessary arrangement to insure its working capital is sufficient to pay contract growers in accordance with contract terms.
- 5) That TanSeed develop realistic cost estimates for converting a portion of its Morogoro seed storage warehouse into conditioned storage space and, as soon as economically feasible, make this conversion.

#### MOA Support Programs

- 6) That MOA provide the appropriate vehicles to seed inspectors to permit performance of all their assigned responsibilities.
- 7) That the Minister of Agriculture prepare and issue the appropriate legal authorizations to recognize the TOSCA and NSTL as official agencies of the GOT and provide credentials to those personnel specifically authorized to function as agents of the MOA.

Other technical problems exist in the areas of seed conditioning and marketing; however, their resolution is dependent upon managerial decisions to be made after the structural changes recommended have been made.

The recommendations for changes in the ownership, management and economic viability of TanSeed are as follows:

- 8) That Tanganyika Farmers Association be allowed to participate in the ownership of TanSeed.
- 9) That Commonwealth Development Corporation be invited to put more resources into TanSeed, either in the form of working capital or as capital investment.
- 10) That National Agricultural and Food Corporation reduce its percentage of ownership to permit participation by TFA and CDC.
- 11) That TanSeed operate as a private company with equal ownership by NAFCO, CDC and TFA, and with equal representation on the TanSeed Board of Directors.
- 12) That the operation of up to three of the seed farms be transferred to TanSeed. The transfer should be at nominal cost

and may be in the form of a long term lease if title transfer is not practical.

- 13) That financing for the new TanSeed be planned to commit U.S. \$2,000,000. over the next five years.

With regard to the possibility of equity participation by U.S./ European seed firms, the exploration of which was requested by the mission Terms of Reference, the following recommendation is made:

- 14) That investigation be made of the possibility of entering into a management contract for TanSeed with a private sector seed firm. A provision of the contract could include an opportunity for equity participation at some point in the contract period.

The general conclusion of the study team is that the Government of Tanzania is at a crucial decision point in the history of its seed industry. It must decide whether it is to maintain its support of the existing parastatal structure or allow the injection of techniques used by private sector management to develop a viable seed industry.

## 1. BACKGROUND and INTRODUCTION

### 1.1 Tanzanian Agriculture and Seed Industry -- December 1982

The agricultural sector of the Tanzanian economy is very important to the country because some 90 percent of the population derive their livelihood from farming. At the present time, even this large percentage of the people is not producing enough food to feed themselves and the remainder of the population.

Tanzania is in extreme need of increased agricultural production to help improve its balance of trade. At the present time much food is being imported. Hard currency for the purchase of essential capital goods is in short supply. In fact, there is not even sufficient hard currency to purchase spare parts for existing equipment. If food production could be increased to a point of self-sufficiency -- or even better, to arrive at an exportable surplus -- the economic health of the entire nation would be significantly improved.

The seed industry is key to improving agricultural productivity. Quality seeds with superior genetic characteristics are one of the most rewarding inputs of improved agriculture.

It is unfortunate that the agricultural sector of the Tanzanian economy is not progressing as fast as is desirable. It is equally unfortunate that the seed industry is not leading the way towards improved agricultural output. In fact, it is generally agreed that the agricultural situation is no better than it was 10 - 15 years ago, especially on a per capita basis. At the same time, many of the seeds being used by farmers today have the same genetic qualities as when introduced 8 - 10 years ago. This is especially true for maize and sorghum.

Tanzania is more fortunate than most countries because it has ample land available for expanded food production. It is also fortunate that the climatic conditions, while not perfect, are generally favorable for agriculture.

So the challenge is to put together a system for managing agricultural production to expand output by utilizing these available resources.

It is toward improving the Tanzanian seed industry and its contribution to the agricultural economy that this work is dedicated and that this report is addressed.

## 1.2 The Seed Project

The Government of Tanzania (GOT) and the United States of America (USAID/T) have maintained a bilateral technical assistance project (621-0092) for the purpose of supporting the development of a comprehensive seed program/industry since 1971. This project is now scheduled to terminate on 31 December 1982.

The project per se focused its efforts primarily upon three essential aspects of a comprehensive seed program. These were: 1) establishing seed production farms for the purpose of making the initial multiplications of seeds of improved varieties released by the Ministry of Agriculture's (MOA) Research Division (RD); 2) preparation and implementation of a National Seed Act which sanctioned both the seed certification agency (TOSCA) and the seed marketing regulatory programs; and 3) developing a corps of trained technicians having the capability of contributing to further development of the Tanzanian seed industry after the project terminates.

The Seed Project, Division of Extension and Technical Services (DETS), MOA, was the implementing agency for the GOT. A private consulting firm, Experience Incorporated, Minneapolis, Minnesota, was responsible for the American technical contribution under a contract with USAID/T.

The Tanzanian Seed Company, Ltd. (TanSeed), which operates as a parastatal company, was established late in 1972 and subsequently authorized as the agency responsible for the large volume multiplication and marketing of seeds of the cereal grains and several minor crops. The Project had no formal linkage with TanSeed or RD/MOA. In the mid-seventies, the national extension education program was decentralized. This action effectively isolated extension education from both research and the Technical Services operations of the DETS, including the Seed Project.

## 1.3 Seed Industry Advisors and Scope of Work

In October 1982, the USAID/T arranged for the services of two seed industry advisors for a period of three weeks. One advisor was to have extensive experience in the management and operations of a successful private sector seed company. Mr. Delmar D. Walker (formerly President, Funk Seeds International), a representative of the Industry Council for Development (ICD) was selected. Mr. Walker's services were financed in part by ICD's Commercial Seed Industry Development Program (CSIDP). The second advisor desired was a person with extensive experience in the

planning and technical implementation of seed programs in developing countries. Dr. Howard C. Potts, Professor and Agronomist, Seed Technology Laboratory, Mississippi State University was designated. The consultants worked in Tanzania during the period December 1 - 20, 1982.

The Consultants' Scope of Work was as follows:

1. Review the seed industry in Tanzania and suggest ways that both the U.S. and Tanzanian private sector can become more actively involved in seed production.
2. Provide recommendations on whether or not the four government-run seed farms should be placed under TanSeed or some other entity and a methodology for accomplishing this.
3. Ascertain the need and make recommendations for one entity (i.e., TanSeed) to have responsibility for all seed production in Tanzania.
4. Articulate the needs of the seed industry including funding (foreign exchange and local costs), facility and personnel requirements.
5. Assess the potential of the seed industry to export seeds (possibly horticulture and oil crop seeds) to earn foreign exchange.
6. Identify several U.S. private seed firms who might be interested in seed production in Tanzania and recommend and identify ways to encourage a joint venture arrangement.
7. Provide other recommendations to develop and maintain a viable self-sustaining seed industry in Tanzania.

The consultants' itinerary and list of contacts while in Tanzania are presented in Appendix I.

## 2. TECHNICAL OPERATIONS -- REVIEW and RECOMMENDATIONS

### 2.1 Introduction

This section deals primarily with the technical aspects of Tanzania's seed industry. The technical product of all seed industries is the seeds themselves. In a comprehensive seed industry the technical components are: varietal development research, seed multiplication, seed conditioning/storage, and seed marketing. Further, these four major components are normally supported by appropriate seed marketing regulations, seed certification programs and a broad based extension educational program directed toward the farmer-user of the seed. Except for extension, all of the technical components and programs exist in Tanzania, although there is great disparity in their stages of development.

There are several reports and papers which outline in great detail the past successes and problems encountered in bringing the Tanzanian seed industry to its present state of development. These background reports are listed in Appendix II. Thus, the major emphasis of this report is placed upon the current situation and the recommendations for actions which will lead to an accelerated development of Tanzania's seed industry. Technically, the seed industry must develop and maintain the capability to produce genetically superior varieties which meet the farmers' needs and be able to provide a continuous supply of high quality seeds of these varieties to the Tanzanian farmers when, where and in the quantities needed.

### 2.2 Variety Development Research

The TARO, a recently organized parastatal research organization, is now responsible for development of superior varieties and the farming systems which can maximize the usefulness of these varieties. This organization was preceded by a national research organization which was an integral part of the MOA. Technical assistance to support TARO during its developmental stages will be provided by the USAID/T through its Farming Systems Research Project (621-0156) which will concentrate on the major food crops. The CIDA will continue its "wheat research" project which also supports TARO's efforts.

The TARO/USAID project addresses one of the major constraints to development of the seed industry, i.e., the varietal

development and cultural practices research is not directed toward the solutions of farmer identified problems. We strongly support the overall strategy adopted by this project and encourage its full implementation.

The need for a farmer-responsive research program is most apparent in the maize breeding efforts. The major thrust of this program since the mid-seventies has been directed toward the development of composite varieties. This, in spite of the fact that farmers in the major maize producing regions (highlands) have used and continue to use hybrid maize seed when it is available. Thus, the hybrids the farmers are "forced" to use are those developed in Kenya more than 10 years ago. Indeed, responsibility for the maintenance of the inbred lines and single crosses, necessary for hybrid seed production, was not and has not been accepted by the national research organization.

Fortunately for Tanzania's highland maize producers, the Tan Watt Company accepted the responsibility for maintenance of the parental lines of the Kenya hybrids, but this company neither had nor has the resources and personnel required to develop new and better hybrids. Discussions with a regional representative of CDC, which is the principal owner of Tan Watt, revealed the desire of Tan Watt to divest itself of responsibility for maintenance of the parental lines.

Even the available composite varieties, planted by nearly one-half of Tanzania's farmers, are "old" in origin. Though clearly superior to the "local" varieties grown by farmers in the intermediate and lowland regions, the only new composite variety released in recent years, Tuxpeno, had to be recalled because of its susceptibility to "maize streak". A new variety will probably be released in 1983.

Of a positive nature, the maize research program is devoting some effort toward the development of hybrids which, if accelerated, should lead to locally developed and adapted maize hybrids within the next 8 to 10 years. However, in view of both the farmers' needs for new, superior hybrids and the currently declining production (kg/ha), it would be desirable if the TARO maize breeders would evaluate the performance of new hybrid varieties currently utilized in similar geographic zones from around the world. Among those hybrids which give superior performance, every effort should be made to obtain small quantities of the parental lines or inbreds for multiplication and subsequent hybrid seed production in Tanzania.

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The CYMMIT is providing technical assistance to the maize program. Since this organization maintains the world collection of maize germ plasm, it was surprising that the "Kenyan" germ plasm and inbred lines apparently had not been introduced through this channel.

The need for new varieties and/or hybrids of sorghum/millet is only slightly less than that for maize, and this is only because these crops are not as widely cultivated as maize. At present, the sorghum/millet breeding program is primarily limited to screening of varieties developed outside Tanzania. There was no indication that the development and introduction of sorghum hybrids were under serious consideration, although the potential for increase in productivity through the use of sorghum hybrids is equal to or greater than that of maize. The grain of the only white seeded sorghum variety, Lulu D, released in recent years, weathers very badly before the farmer can harvest. A second sorghum variety, Serena, was released, but tannin in the seed coat imparts bitterness to the food products made from its grain.

Of the major food grains, only the wheat breeding program has been both responsive to farmers' needs and effective in supplying a sequence of superior varieties, through the seed industry, to its farmer clientele.

Improved varieties of the "minor crops" including rice, cowpeas, green gram, sim sim (sesame), sunflower and beans are available to and used by some farmers. The need for superior varieties of these crops will continue; however, the breeders must be sensitive to the farmers' needs for varieties of these crops which can be used as monoculture or for intercropping.

Recommendation 1: That TanSeed, with full support of the GOT, make every effort to obtain the inbred lines for those maize hybrids developed by the Kitale Maize Program (Kenya Seed Company) since the release of hybrids H622 and H632.

Obtaining seeds of these Kenyan lines is the key to the earliest possible release of new maize hybrids, although limited testing of these "new hybrids" will be necessary, if it has not already been done. Historically, maize hybrids adapted to the Kenyan highlands have performed well at equal altitudes in Tanzania. The past insensitivity of the maize breeding program to the needs of Tanzania's most productive maize producers is seen as a major contributing factor to the continued decline in maize production (kg/ha).

Recommendation 2: That the TARO and USAID/T project officers place special emphasis on the acceleration of the hybrid maize and hybrid sorghum breeding programs during implementation of the Farming Systems Research Project.

At the current level of effort, 10 to 15 additional years of breeding effort will be required to develop the lines and test a Tanzanian maize hybrid. An increased emphasis on hybrid development, even at the expense of the composite variety program, could result in "local" hybrids being available in 8 to 10 years. The historical record clearly shows that only in those countries, developed or developing, where farmers over the long term have utilized maize hybrids and the associated cultural systems, has productivity (kg/ha) substantially increased. While it is true that composites have a place in the evolution of a maize seed industry, the ultimate objective of the breeding program should be directed toward the development of hybrids.

#### 2.2.1 Supply of Breeders Seed Stocks

All of the TARO breeders have been very sincere and effective in the maintenance and provision of breeders grade seed for further multiplication to the seed farms. This vital service must continue.

The only major problem identified in supplies of breeders seed is that the Tan Watt Company is willing to divest itself of responsibility for the multiplication and production of the parental lines for the available maize hybrids. Inbred multiplication and single cross hybrid production is a time consuming and expensive activity which can only be accomplished by trained, knowledgeable personnel.

Recommendation 3: That responsibility for multiplication of parental lines for hybrid seed production be assigned to TanSeed.

The above recommendation is made as an integral part of the realignment of responsibilities and management of TanSeed. Since the major goals of the realignment are to reduce the division of responsibilities and to align variety availability with farmer demand, assigning this responsibility to TARO would be inconsistent with the shift of the seed industry from a production to a market orientation.

At present, the TanSeed, with support from The World Bank, is seeking an expatriate agronomist to work with its seed

production operations. One of the responsibilities of this individual could be the inbred and single cross multiplication. If the reorganization recommended in Section 3 is accomplished, this work probably would be accomplished at the Dabaga Seed Farm.

### 2.3 Seed Multiplication/Production

At present, responsibility for multiplication of improved varieties is divided between four MOA Foundation Seed Farms and TanSeed. The seed farms were developed and mechanized as part of the MOA/USAID-T Seed Multiplication Project and have primary responsibility for production of the foundation grade of pedigreed seed. TanSeed is the sole purchaser of foundation grade seed and has the responsibility for multiplying seeds of the recommended varieties into the volumes necessary to meet farmer demand.

Tanzanian farmers have two other sources of seed. The single most important source of seeds of non-hybrid varieties in Tanzania is the farmers who save their seed from the preceding crop. This is equally true in countries with developed seed programs. Periodically, some of the regional and/or district level GOT agencies and TFA reportedly produce common grade seeds for distribution within their areas of influence. (See Section 2.6)

#### 2.3.1 Foundation Seed Farms

The Foundation Seed Farms all have land area far in excess of that needed to produce the required foundation grade seed. Because these farms are large, highly mechanized and staffed with personnel trained in seed production, their principal activity is production of certified class seed under contractual arrangements with TanSeed. Except for the farm at Kibaha, which is located in an area climatically and agronomically unsuitable for producing high quality seed, the utilization of these farms for seed production is sound practice. They provide a solid base of production acreage and are currently producing about one-third of TanSeed's certified seed requirements. At the Dabaga and Msimba Seed Farms over 1000 ha of additional Class I and II land is yet to be developed for seed production.

The major constraint to maintenance or expansion in production capacity of the three suitable seed farms is the lack of and/or difficulty in obtaining spare

parts and replacement equipment. This problem is not unique to the seed farms. The expatriate agro-mechanic who has worked toward resolution of the "spare parts problem" estimated that U.S. \$100,000. per year will be required to maintain the equipment (primarily of U.S. origin) for continued mechanized operation of the seed farms. The GOT has not or possibly cannot allocate sufficient hard currency to maintain the seed farm operations. Technically the alternatives are evident; either maintain the equipment or lose the productive capacity of the seed farms. The best apparent solution to this problem is through the reorganization recommended in Section 3.

### 2.3.2 Seed Production by TanSeed

All seed produced by TanSeed is grown by private farmers or parastatal organizations under a contractual arrangement. The kinds, varieties, qualities and production locations of the seeds produced are TanSeed's responsibility. Some input into making these decisions is made by various other governmental agencies.

The numbers of farmers and/or farms equipped for large scale seed production is limited. The numbers of farmers with knowledge of and experience in seed, rather than grain, production is even more limited. Further, these farms are widely scattered which increases the difficulty in providing the needed technical assistance to seed producers and significantly increases transportation costs.

Compounding these technical difficulties is the fact that TanSeed has not been able to maintain sufficient working capital to pay the seed producers when the seeds are delivered according to the terms of their own contract. As a direct result of this factor, many qualified seed growers are not willing or financially able to produce seed. Since ample production acreage is available in most regions of Tanzania, resolution of the "contract grower repayment problem" will encourage increased cooperation and participation by qualified seed producers sufficiently to permit production of all seeds required in much more concentrated areas.

Recommendation 4: That TanSeed make the necessary arrangements to insure its working capital is sufficient to pay all contract growers in accordance with contract terms.

## 2.4 Seed Conditioning and Storage

A modern seed industry not only produces seeds in large quantities, it often dries and always cleans the seed produced to remove excess moisture, small insect- or disease-damaged seeds, seeds of other crops and weeds, and inert materials. As an integral part of seed conditioning, insecticides and/or fungicides are applied to prevent damage or aid farmers in crop stand establishment. The final step of conditioning is packing the seeds in containers which, when sealed, protect the integrity of the seed and provide a convenient unit for handling by the farmer-buyer. Because of the large volumes involved, seed conditioning must be mechanized.

Storage of seeds in environmental conditions which permit maintenance of the seed's viability from harvest until planting is vital to the success of the seed industry. Not only must the seed be protected from rain, rodent and insect damage, the "unseen killer" of seeds, extended exposure to relative humidities above 65% in combination with temperatures above 25° C, will reduce the seed to grain in a few weeks. This is a particular problem for farmers and seedsmen operating in the lower (less than 1000 m) elevations of Tanzania.

### 2.4.1 Seed Conditioning

There are six general purpose seed conditioning units in Tanzania, not including the special purpose units associated with the private sector bean and vegetable seed operations in the Arusha region. Three of these units are located on the seed farms and three are owned and operated by TanSeed. The estimated capacity of these six units is nominally placed at 10,000 MT/year or 30% greater than currently required.

It is unfortunate that the buildings housing the conditioning units located at the Arusha and Msimba Seed Farms were not constructed according to design. Because of this error, the capacity of the Arusha unit is only one-half that of the designed capacity. The cleaning equipment at the Msimba Seed Farm has not been installed due to the same inappropriate building construction and failure to receive all parts of some of the equipment. The Dabaga Seed Farm has only a small capacity "Bobby" air-screen cleaner.

Under the present operational procedures, the Seed Farms only condition the foundation class seed they produce. Thus, the functional equipment is vastly underutilized. On the other hand, TanSeed transports the field-run certified class seed, produced on the Msimba Seed Farm, over 100 km, (Msimba to Morogoro) for processing. A portion of these seeds is then returned to the Msimba-Ilonga area for marketing. The preceding practice is but one example of a problem resulting from the lack of having a cohesive, fully integrated seed production-conditioning-marketing organization.

For the short term, no specific recommendation concerning the relocation and/or installation of the processing equipment is made. At some time during the next five years, the management of the reorganized TanSeed must make the decision concerning the need to relocate or complete installation of the seed processing equipment at Msimba.

#### 2.4.2 Seed Storage -- Primary Warehouses

A seed is in storage from the time it matures, while still on the mother plant, until it dies or it is planted and grows. As any living organism, a seed respire and reacts to the environment into which it is placed. Seeds will maintain their viability much longer when stored in a cool, dry atmosphere than in a warm, humid atmosphere.

Because of the range of natural environments in Tanzania, conditioned by elevation and proximity to the ocean, seeds of the major crops have the ability to retain some germinative capacity from harvest until the next planting season. However, there is a great difference between seeds maintaining some germinative capacity, when considering the small quantity of seeds saved by an individual farmer, and that of high quality seed to be marketed by the seed industry. In 1979 TanSeed suffered a T.Sh. 30,000,000 (approximately U.S. \$3,000,000.) loss when chemically treated seeds stored at its Morogoro warehouse lost their viability and had to be burned.

The need for high quality seeds by farmers in the lowlands is probably more acute than for their highland counterparts. This need must be satisfied. Because of the large volume, low unit value and expense involved, it is too costly to produce seeds

required by the lowland farmers in their area, transport the seed to locations having a desirable atmosphere for the storage period and then re-transport the seed to the area of use for marketing.

In addition to the specific storage problem incurred in the warm, humid lowlands, significant losses of germination can occur in seed lots which are not sold during the planting season after production (carry-over) or seeds intentionally held in reserve as a hedge against natural disasters, drought or flood.

Clean seeds of good initial quality, 85% or higher germination, will normally maintain satisfactory (above 80%) germination levels when stored under atmospheric conditions similar to those of an air-conditioned office or house. The frequently cited formula:  $\%RH + \text{Temp } ^\circ F = 100$  is not required for intermediate term, 18 - 24 month storage. This formula was developed for long term (5 years or more) seed storage.

For intermediate term storage of carry-over or reserve seeds, the formula should read:  $\%RH + \text{Temp } ^\circ F = 120$ ; further, the minimum RH should not be below 30% nor the maximum temperature above 90° F (32° C). The costs of operating an air-conditioned storage warehouse maintained at, for example, 50% RH and 22° C (72° F) is usually 25% that of maintaining 50% RH and 10° C (50° F). The requirements for cooling and dehumidification must be calculated specifically for each location.

Recommendation 5: That TanSeed develop realistic cost estimates for converting a portion of its existing Morogoro seed storage warehouse into conditioned storage space and as soon as economically feasible, make the conversion:

Assistance in developing the necessary design specifications is available through USAID/T from Mississippi State University and possibly other sources. To provide the design specifications, TanSeed should supply the following information:

- a) Average temperature and relative humidity by month at Morogoro for a 5-year period.
- b) The actual dimensions (length, width and height) of the area to be conditioned.

- c) The type vapor-proof material (plastic sheeting - 6 ml. minimum -- tar, asphalt paint) locally available.
- d) The composition (styrofoam, cork, prelite) and thickness of available insulation materials.
- e) The anticipated monthly schedule and total volume of seed to be placed into and removed from the conditioned storage area.
- f) The material used for wall, floor and ceiling construction of the building.

## 2.5 Seed Marketing

The key to the success of any seed organization, and therefore the seed industry, is marketing. Until large numbers of farmers plant seeds of improved varieties, the variety development, research and seed production/conditioning efforts have no impact upon agricultural productivity. Company and industry management must also judge the price that farmers can and are willing to pay for the seed and be able to produce at costs below the price.

What is seed marketing? Simply stated, it is the transfer of ownership of seeds from the producer to the farmer-consumer. This simple definition does not reveal the multitude of activities and decisions required by the seed industry and the farmer before this transfer of ownership occurs.

Seed marketing places primary emphasis upon the farmer-consumer. On the other hand, the research, production and conditioning activities of a seed industry place primary emphasis upon the seed. This change of emphasis, from the product-seed to the farmer-consumer, is not well understood or appreciated by many agricultural research and production technicians. Basically, it means that the seed industry must serve the needs of the farmers as opposed to the farmers seeking seeds and services from the seed supplier. Seed enterprises, including research, which are not responsive to the farmers' needs, will fail economically.

What are the responsibilities of a seed marketing organization? There are five major responsibilities:

- 1) Determination of the real demand for each kind, variety and quality grade of seed.

This is the most difficult task of all seed marketing organizations. What kind, variety and quality of seeds are needed? How much is needed? When are they needed? Where are they needed? What is the technological level of the farmer? What is the influence of promotional efforts? Can the farmer pay cash or trade for the seed? These are important questions which must be answered by marketing research. There is a great difference between the real demand and the perceived demand for seeds in Tanzania.

- 2) Accumulation of the seeds to meet the real demand.

This is simply the production or purchase of the seeds and services necessary to meet the demand.

- 3) Communication (a) to farmers concerning the kinds, varieties and quality level of the seeds available, their price, performance characteristics and finally the actual sale; and (b) from the farmer-user concerning the performance of the seed purchased and his needs for different (improved) varietal characteristics.

It is important to note that market communication is a two-directional system. It includes promotion both by the seed organization and public extension educational organizations; public relations by all members of the organization; and actual sale of the seed and the return flow of market information. The industry must recognize the difference between selling seeds and having seeds for sale.

- 4) Distribution of the seed using the most efficient marketing channel in each geographic region to assure that adequate volumes of the kinds, varieties and quality levels of seed are locally available to the farmers at the time that they need them.

The logistics of moving the seed from central warehouses to the farmers' village are often overwhelming and very costly when roads are poor, communication is slow and demand estimates inaccurate. This often results in the supplies being either limited or excessive in various locations. Transport of seed is expensive, but to the farmer, the value of seed of a specific variety transported 500 km is no greater than seed of the same variety grown on his own farm. Although the marketing organization would have a greater investment in the seed, the farmer will not pay more for the seed.

- 5) Seed pricing is management's most delicate instrument for determining the success or failure of a marketing operation.

The actual price that a farmer will pay for his seeds depends almost entirely upon his perception of the benefits he will receive from buying the seed rather than saving his own. This is the seeds' value. Farmers are not concerned with the costs of production and marketing incurred by the selling organization. The selling price is the owner's estimate of the amount the farmer will pay for the seed. A sale is made only when the farmer places a higher value on obtaining the seed than the seller prices the seed.

Clearly, price influences the volume of seed farmers will buy; however, the notion that even traditional farmers will not or cannot pay 5, 10 or 20 times the grain market price for seeds when they believe they will be of benefit has been invalidated in nearly every country in the world.

The discourse above is included because it is our perception that the complexities of marketing in Tanzania are often not fully understood. This lack of understanding is reflected in the research program, and the performance of the seed pricing committee. In spite of the fact that TanSeed has never sold all of the seed produced, many persons interviewed by the mission implied that seeds are in short supply and priced too high.

No specific recommendation concerning the technical aspects of seed marketing are made. It is our belief that acceptance of the recommendations presented in Section 3 will bring necessary marketing expertise, additional market outlets (godowns) and sensitivity to the farmers' needs into TanSeed. Certainly helpful cooperation from GOT officials and technicians, as sources of market information, and the MOA's Technical Services personnel, the marketing of seed can be greatly enhanced to the benefit of all the farmers.

## 2.6 Seed Legislation and MOA Technical Services

Under the Seeds Act of 1973, the Minister of Agriculture was authorized to organize and implement a program directed to regulate the minimum quality of all seeds offered for sale in Tanzania. The regulations under this law place major emphasis upon the Tanzania pedigree grade (certified) seeds; however, the Law and Regulations also apply to seeds of the "common grade" (noncertified).

The basic philosophy of the Law and Regulations is "truth in labeling", although minimum standards for purity and germination of all seed are specified. Except for certain changes necessary for clarification and uniform interpretation (specific recommendations have been made by E.I. consultants), the Law and Regulations appear applicable to the Tanzanian situation.

The MOA has established a "Seed Branch" in the Technical Services Division of the DETS. Personnel of the Seed Branch have responsibility for implementation of both seed marketing regulation and the seed certification program.

#### 2.6.1 Tanzanian Official Certification Agency (TOSCA)

The TOSCA has primary responsibility to provide an impartial quality control service for the production and conditioning (cleaning and treating) of genetically pure seeds. Based on personal observations, verbal contacts and the reference materials, this organization performs this valuable service in an excellent manner.

From all reports, the TOSCA field inspectors are well trained, dedicated and honest individuals who take their responsibilities seriously. To their credit, these field inspectors also serve as seed analysts at the national seed testing laboratories during periods when no field work is required.

Two major constraints were identified as impediments to the operations of the Seed Branch. The most serious technical constraint is insufficient transportation to assure the inspector's presence at the seed production fields at the time when the seed fields must be inspected. Timeliness of inspection is critical to assurance of varietal purity in all crops and absolutely essential for cross-pollinated crops such as maize and bullrush millet. If the MOA is serious about assuring that the farmers receive seeds which are genetically pure and of good physical quality, TOSCA inspectors must be provided transport.

Recommendation 6: That the MOA provide the appropriate vehicles to seed inspectors to permit performance of all their assigned responsibilities.

Due to the distance between and difficulty in reaching some seed producers, travel by motorcycle or public transport is not practical; therefore, four-wheel drive vehicles are required. On the other hand, the seed processing plants and some seed producers are accessible by use of motorcycles. A combination of transport types is suggested to minimize costs.

A second constraint to the overall effectiveness of both TOSCA and NSTL inspectors is that the inspectors are not officially authorized to perform the work to which they have been assigned. To date, because of the limited size of the seed industry, the lack of official recognition and credentials has not been serious to the organizations or personnel. However, as the industry grows in volume and numbers of crops, this lack of official recognition will be a problem, particularly as it relates to implementation of the seed regulatory program, which covers all seeds, certified and common, and any international seed trade or certification.

Recommendation 7: That the Minister of Agriculture prepare and issue the appropriate legal authorizations to officially recognize the TOSCA and NSTL as official agencies of the GOT and provide credentials to those personnel specifically authorized to function as agents of the MOA.

#### 2.6.2 Seed Marketing Regulation

The personnel, analysts and inspectors at the MOA's National Seed Testing Laboratories at Morogoro and Arusha are well trained, and their facilities are excellent. However, they will have minimum impact upon the quality of seed being sold to farmers until they can legally inspect and draw samples and determine the quality of seeds of all grades sold or offered for sale at any time, at any place and by any organization in the country. (See Recommendations 6 and 7)

Seed marketing regulations in Tanzania are designed to protect both the farmer and the legitimate seed marketing organizations from unscrupulous traders. This is an essential part of building a comprehensive seed industry.

We were repeatedly informed that various GOT and private sector organizations were producing and

selling noncertified seeds. Reportedly, these seeds are rarely labeled as to kind, variety or quality as required under the Law. The common grade or commercial seed can and should fill a vital role in the total seed supply system for Tanzania's farmers. However, all seed sold or offered for sale to farmers by any organization, government or private, should be labeled according to the Law. As has been repeatedly emphasized, the farmer seed-buyer should be free to purchase either certified or noncertified seed. The MOA has the responsibility for assuring that the seed package is truthfully labeled.

The farmers of Tanzania should recognize they are more likely to suffer stand failures or other forms of crop losses from using common grade seeds than certified grade seed. This is particularly true when the common grade seeds are not labeled or the truthfulness of the label verified. Not having to meet the minimum requirements of the seed law provides an unfair competitive advantage to the seller of these nondescript seeds when compared to those who comply with the Law's provisions.

The reasons given for failure to apply the seed Law uniformly to all seed sellers is that the inspectors do not have the proper credentials and a lack of transportation. (See Recommendations 6 and 7)

## 2.7 Extension Service -- Educational Programs

At present, there is no coordinated national extension education service to extend new knowledge concerning improved seeds and agricultural practices to the Tanzanian farmers. Reportedly the President, in a speech before the Party Congress in November, outlined in general terms the reformation of a nationally coordinated agricultural extension service (copy of the speech was not available).

Discussions with the Director of Extension and Technical Services, MOA, revealed that the specific details of the proposed reorganization were still under consideration. It was the Director's opinion that the new extension model would be made officially public in January 1983.

In general terms, the expected model will follow the usual pattern, i.e. national headquarters, regional offices staffed with subject matter specialists, district offices and ward offices. Individual agents may serve only one or several villages in close proximity to the ward office. Extension-Research liaison committees which will meet on a regular

frequent schedule will be the primary link for information transfer.

In principle, the consultants support the proposed model, specifically because of the two important roles that extension agents can play. First, they can make farmers aware of and promote the benefits to be gained by use of good seeds of superior varieties in association with other inputs and farming practices. A second and very important role of extension workers is they cumulatively reflect the farmers' needs with reference to varietal needs in a geographically identifiable area.

The current Director of the Seed Project, who presumably will continue as chief administrator of the MOA's Seed Branch, could be assigned specific responsibilities for development of educational materials concerning the use of good seed, farmer interpretation of the required seed label, and for recommending varieties. He could also act as the principal link between the Extension Service and the national seed industry.

### 3. RECOMMENDED STRUCTURAL CHANGES

This section is devoted to the structure of the ownership and management of the Tanzanian seed industry and the changes in this structure which are recommended by the mission.

#### 3.1 Present Structure of the Industry

The Tanzanian seed industry has gone through a developmental period of about 12 years, during which the several functional areas of the industry have developed in varying degrees of sophistication. Throughout this period a number of entities have been created to carry out specific seed industry operations. These entities tend to operate in isolation from each other with different styles of management. The result is a virtual absence of cohesive management in the Tanzanian seed industry.

Marketing - Seed marketing is the responsibility of TanSeed. The company uses TFA as agents and relies heavily upon the association for its marketing efforts.

Production - Seed production is also the responsibility of TanSeed. The company owns processing and related facilities and relies on contractual arrangements for the growing of the seeds. Contracts are made with individual farmers, many of whom are members of TFA. Contracts are also made with the seed multiplication farms which are operated by the Tanzanian Ministry of Agriculture.

Foundation Seed - Foundation seed is produced by two means: 1) The Tan Wattle Company produces the maize foundation seed stocks (the multiplication of Kenya lines and single crosses) for hybrid maize seed production; 2) The MOA seed multiplication farms produce the foundation seed stocks and the certified seed for the other seed crops marketed by TanSeed. These seed farms are operated by the Ministry of Agriculture, using government employees.

Research - Seed research is carried out by a number of agencies, most of which are supported by organizations from outside of Tanzania. Maize and sorghum research is done by CIMMYT. Wheat research is done by the Canadian International Development Agency. Other research on grains, legumes and oilseeds is supported by different organizations.

The following structural changes in Tanzanian seed industry operations are recommended:

### 3.2 TanSeed

Some very fundamental changes are recommended for TanSeed. Although it was chartered as a private company, it now operates as a parastatal with approximately 62.5% of the shares controlled by National Agricultural and Foods Corporation (NAFCO), an agency of the Tanzanian government. The remaining 37.5% of the shares are owned by Commonwealth Development Corporation (CDC) which is supported by the British government and which aids industrial development in Third World countries, most of which were formerly part of the British Commonwealth.

The suggested changes are outlined as follows:

### 3.3 Tanganyika Farmers Association (TFA) Participation

The TFA is an association of some 3,500 Tanzanian farmers who pay an annual dues for membership. One of the services it offers to its members and other farmers is the operation of several outlets for selling farm supplies such as seeds, fertilizers, chemicals and petroleum products. Members are entitled to patronage refunds based upon their purchases.

The association operates under the provisions of a private company and has not chosen to act as a cooperative under Tanzanian law.

The TFA has indicated a willingness and desire to become partial owners of TanSeed. They presently are a major distributor for TanSeed. They have available local currency for the purchase of shares. This money would be very helpful to TanSeed for working capital, especially for paying contract growers, which is now a major problem for TanSeed.

It is our belief that ownership participation by TFA would be desirable for several reasons:

1. To provide working capital.
2. To provide expertise in management and policy direction. The TFA has proved itself to have good management. We have examined the financial statements contained in the 1981 Annual Report of TFA and find that it is a profitable operation and sales are expanding.
3. To improve relations with contract growers. Many of the TanSeed contract growers are members of TFA. It is believed that these growers might show greater interest in TanSeed if TFA had ownership in the corporation.

4. To improve distribution of TanSeed products. While TFA is now distributing TanSeed products in their areas of operation, plans are being made to expand warehouses and improve market coverage. This is greatly needed by TanSeed.

Recommendation 8: That Tanganyika Farmers Association be allowed to participate in the ownership of TanSeed.

### 3.4 Increased Ownership by Commonwealth Development Corporation (CDC)

The CDC has indicated that potential exists to increase its participation in TanSeed. They may have funds available for working capital expansion and possibly capital expenditures.

They have indicated the possibility of their increased participation being in the form of debt instruments -- debentures, for example.

The CDC also has managers currently participating in the operation of TanSeed who should be able to make a contribution in developing an aggressive company expansion program.

Recommendation 9: That the Commonwealth Development Corporation be invited to put more money into TanSeed, either in the form of working capital or as capital investment.

### 3.5 Reduced Ownership by National Agriculture and Food Corporation (NAFCO)

It is obvious that if ownership of TanSeed is increased on the part of TFA and CDC, that there must be a reduction in the percentage ownership by NAFCO.

Recommendation 10: That National Agricultural and Foods Corporation reduce its percentage membership in TanSeed to allow for participation by TFA and CDC.

### 3.6 The New TanSeed Ownership and Structure

It is our recommendation that the new ownership of TanSeed consist of equal shares (33-1/3%) divided among NAFCO, CDC, and TFA.

We feel it would be very desirable for TanSeed to operate as a private company with the implied incentives for efficiency and cohesive management. We believe that TanSeed

can become a profitable company if full implementation of this report is accomplished. If operational efficiencies are also considered, there is strong reason to believe that better seed at lower cost will be provided to Tanzanian farmers.

We also recommend that the Board of Directors of TanSeed be expanded to reflect the new ownership participation. Our suggestion is that the Board be expanded to six members, two selected by each of the owners. Consideration should be given to a rotating chairmanship with each term being no less than two years.

Recommendation 11: That TanSeed operate as a private company with equal membership by NAFCO, CDC and TFA. Board representatives should consist of two members from each owner with the chairmanship rotating each two years.

### 3.7 Transfer of Seed Multiplication Farms

At present, four seed farms are owned and operated by the MOA. These farms are used to produce foundation seed (a relatively small percentage of total acreage), the contract growing of maize seed for TanSeed and the growing of certified seed of seed grains (wheat, rice, millet and sorghum), cowpeas, sunflower and sesame, also for contract with TanSeed. A certain amount of milling quality grain is produced as a result of isolation requirements and from seed grade-out.

Two of these farms have capacity for seed drying and processing beyond that now being utilized. The farms also have additional acreage capacity for expanded operations by TanSeed, which should help overcome TanSeed's constraint of obtaining qualified contract growers.

The employees at the seed farms are hired and paid by the Ministry of Agriculture. The farm managers seem to be highly qualified. All have received training at U.S. universities and have degrees in agriculture. They are handicapped in exercising effective management because of the lack of incentives that exists for government workers.

A major problem exists for the farms with regard to purchasing and maintaining the equipment for field work, transportation and processing. Since there is such a shortage of hard currency, it is difficult to order and pay for the necessary parts and equipment from the U.S. and Europe. The parts and equipment are not available within Tanzania. This will require capital inputs as described in 3.9 below.

It is our recommendation that the farms be transferred to TanSeed. We are not recommending that all of the farms be transferred to TanSeed. We feel that the maximum number transferred should be three: Arusha, Dabaga, and Msimba. However, before a final determination of the number is made, there should be consultation with TanSeed management.

The transfer price should be nominal since the present financial condition of TanSeed does not permit an outlay of significant money or the assumption of large debt.

If it is not possible to transfer title of the farms to TanSeed, then a long-term lease arrangement, perhaps 25 years, could be arranged at a nominal annual rental rate.

Recommendation 12: That the operation of up to three of the seed farms be transferred to TanSeed. The transfer should be at nominal cost and could be in the form of a long-term lease if title transfer is not practical.

### 3.8 Tanganyika Wattle Company Limited (Tan Watt) Operations

Tan Watt is a company which is controlled by CDC, devoted primarily to the growing of trees for the harvesting of bark for tannin extraction. Through contractual arrangement with TanSeed, they maintain and multiply certain inbred lines and single crosses used in producing hybrid maize. It is our recommendation that this operation be assumed by TanSeed and transferred to one of the seed multiplication farms. (See Recommendation 12 above) Tan Watt is willing to have this transfer made. In addition, if inbred lines and single crosses are under the control of TanSeed, costs could also be noticeably reduced.

### 3.9 Capital Inputs

It has been pointed out that TanSeed is short of both working capital and hard currency for supporting parts and equipment purchases. The additional ownership by TFA should help eliminate the working capital problem. It is also indicated that CDC may be willing to add working capital and/or hard currency if the new ownership arrangement is effected.

However, this is not sufficient to make TanSeed and the farms viable and efficient. There must be an infusion of capital for equipment and parts purchases. In the case of both TanSeed and the farms, present equipment is degenerating due to the inability to support maintenance and

repair programs.

We have conferred with both USAID and The World Bank representatives about this problem. While neither of these organizations was able to make a commitment at this time, it is our impression that no capital funds will be forthcoming unless significant managerial and operational changes are made to improve the efficiency and economic viability of TanSeed.

A very rough estimate of the capital investment requirements of TanSeed for the next five years is as follows:

|   |                        |
|---|------------------------|
| 1. Spare parts needs - 5 years<br>at U.S. \$100,000./year | US \$ 500,000.         |
| 2. Equipment replacement                                  | 750,000.               |
| 3. Processing plant completions                           | 500,000.               |
| 4. Warehouse storage modernization and expansion          | <u>250,000.</u>        |
|   | US <u>\$2,000,000.</u> |

Recommendation 3: That financing be planned to commit U.S. \$2,000,000. into TanSeed over the next five years.

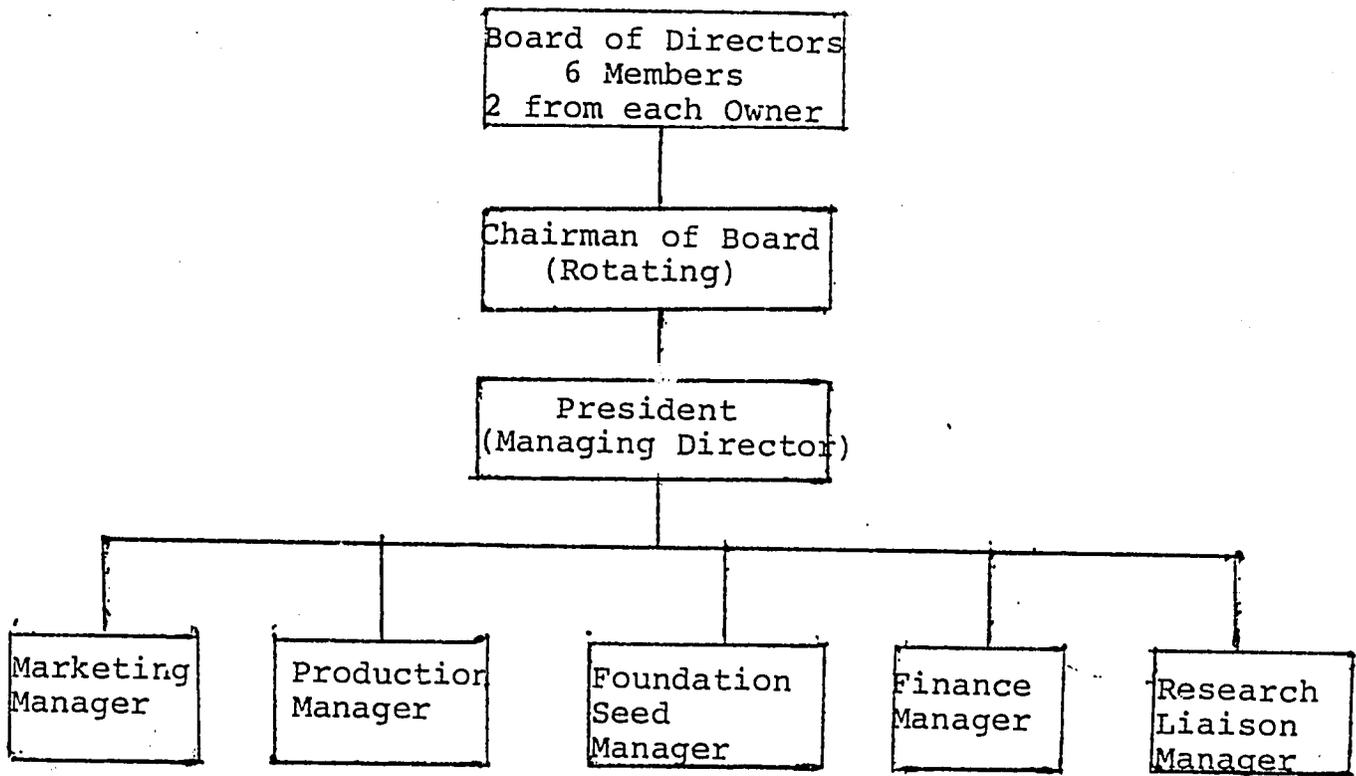
### 3.10 Structural Value of the Plan.

The essential elements of a successful seed venture are research, foundation seed multiplication, commercial seed production, marketing and finance. The most successful seed operations have all of these elements under the control of a single cadre of capable managers. Thus, the decisions made by the managers are their own, the responsibility rests with them and they have a clear idea of linkages between the several elements of seed industry operations.

We feel that the proposed reorganization of TanSeed with respect to ownership and management, coupled with the transfer of the operations of the farms and Tan Watt accomplishes the consolidation of most of these functions. The only exception is research which is not practical to effect at this time.

### 3.11 New Organization Structure for TanSeed

Assuming that the ownership and management changes are made as recommended in this report, a possible organization chart for TanSeed could be developed as follows:



At the operating level, this represents two additional functional managers: The Foundation Seed Manager and the Research Liaison Manager. We feel the responsibility of the maintenance of inbred lines and foundation seed production is so important - and new to TanSeed - that it warrants consideration for a manager of this function alone.

The function of the Research Liaison Manager is to keep abreast of the research work on all crops pertinent to Tanzania, and thus to TanSeed. He should make inputs to company management for formulating growth plans for TanSeed. He can also be helpful in forwarding information gained from the operations of TanSeed, especially marketing and production, to the various organizations doing research work.

#### 4. THE POTENTIAL for U.S. and EUROPEAN INVESTMENT in the TANZANIAN SEED INDUSTRY

Consistent with the scope of work outlined for the mission, the team has investigated three possible avenues of U.S./European investment in the seed industry of Tanzania.

##### 4.1 As Independent Operators or as Participants in TanSeed

Firms which we considered for this approach are Pioneer Hi-Bred International, DeKalb AgResearch and Funk Seeds International (CIBA-Geigy), all of which are prominent in the agricultural seed industry. All are especially active in hybrid maize and hybrid sorghum research, production and marketing.

A major drawback to their participation is the monopoly position granted by the government to TanSeed for production and distribution. We feel that most of these firms would not be willing to give up their research material (inbred lines) without being assured that the products marketed from them would bear the respective company trademarks.

An additional consideration is the fact that there is little likelihood that they would have hybrids of corn or sorghum that would be immediately marketable in Tanzania. Thus, they would be beginning a research effort that might require 10 or more years to develop salable products.

Finally, the currency restrictions for transferring profits or dividends out would be a great deterrent to these profit-oriented companies.

Therefore, it is our conclusion that the reorganization of TanSeed as outlined in Section 3 represents the most efficient and most rapid route to progress under the conditions that exist today in Tanzania.

##### 4.2 Captive Production of Seeds for Distribution Outside Tanzania

U.S./European companies that might have an interest in this type of an operation are Northrup King and Company (Sandoz), Ferry Morse Seed Company and the Asgrow Seed Company (Upjohn).

There is one major Dutch firm, Sluis Brothers (E.A.) Ltd., which is producing large quantities of edible bean seed for export to their customers outside Tanzania. Their headquarters are located near Arusha. We visited this location and spent considerable time with the manager.

We judge that this company has had difficulty with the foreign exchange problems and perhaps is operating today only because of its long tenure and land ownership in Tanzania.

The manager indicated to us that the main purpose that the operation served was to assure supplies of bean seed to their customers and that the company was not realizing hard currency profits from the operation.

With this background, and again with the present government attitude toward the transfer of profits out of Tanzania, we do not feel we would recommend that either U.S. or European companies should begin this type operation.

#### 4.3 Management Contract with TanSeed including a Provision for Equity

A concept has been developed by which an American or European company might be invited to participate in TanSeed management and equity. The same companies mentioned in 4.1 and 4.2 could become candidates for this participation. It begins with and assumes the reorganization of TanSeed as outlined in Section 3:

Step 1: A management contract would be entered into between TanSeed and the private firm. The contract would run for a minimum of two years. The private firm would furnish an executive with power to act (Chairman, President or General Manager), using the principles of management that has made his firm successful and that he deems applicable to the TanSeed situation. He would use this two-year period to put in place the new organization structure for TanSeed.

Step 2: At the end of the two-year period, the managing private seed firm would have the option of taking an equity position in TanSeed. This would provide incentive for good management and allow additional private sector involvement in TanSeed.

It should be noted that it is imperative that the designated executive have power to act. If this is not completely understood, the plan will not succeed.

Recommendation 14: That investigation be made of the possibility of entering into a management contract for TanSeed with a private sector seed firm. A provision of the contract could include an opportunity for equity at some point in the contract period.

## 5. PRIORITIES for IMPLEMENTATION

We suggest the following priorities be established for the implementation of this report:

### 1. Restructuring of TanSeed Ownership

As soon as possible, approval of the new ownership structure should be obtained from the Ministry of Agriculture. Once this important step has been accomplished, CDC and TFA should be approached for their participation.

### 2. Management Organization Structure

The next step is to put into place the management organization structure with emphasis on market orientation and operational efficiency. At this point it must be decided whether or not to pursue the management contract approach.

### 3. Transfer of Seed Multiplication Farms

Negotiations for the transfer of the seed multiplication farms should be done simultaneously with negotiations for the new TanSeed ownership structure. We should strive for both changes. However, if there must be an alternative, we feel the change in TanSeed ownership/management should take priority.

### 4. Transfer of Tan Watt

This is the last of the priority items in the structural schedule and should come relatively easily after the first three have been accomplished.

It is the general conclusion of the study team that the Tanzanian seed industry is at a crucial decision point in its history. In order to progress, it must take aggressive steps to make the industry more efficient and management conscious. We have outlined what we consider to be the most logical steps to bring about a compact, cohesive management structure.

The ultimate objective is to develop an industry that will provide improved seeds to the farmers of Tanzania at costs which allow them to increase agricultural output. We believe the starting point is the development of an industry structure that permits good management and efficient operations.

APPENDIX I

ITINERARY and CONTACTS

| <u>Day/Date</u>     | <u>Principal Activity and Personal Contacts</u> <sup>1/</sup>  |
|---------------------|--|
| Tuesday<br>Nov. 30  | Initial meeting to outline schedule of contacts, review of Mission documents.<br><br>Mr. Ken Lyvers, Agricultural Development Officer, USAID/T<br>Mr. Michael Mashelle, Director, Seed Multiplication Project, MOA<br>Mr. Ronnie Daniel, IDI - Agricultural (Contract Officer) USAID/T<br>Mr. Roger Engstrom, Agro-Mechanic, P.S.C., USAID/T |
| Wednesday<br>Dec. 1 | Discussions with Director, Seed Multiplication Project, about Tanzanian agriculture and background information. Documentation review.<br><br>Mr. Ralph Mizambwa, Assistant to Director, Seed Multiplication Project, MOA   |
| Thursday<br>Dec. 2  | Visited Kibaha Seed Farm<br><br>Mr. Paschal Mseke, Farm Manager  |
| Friday<br>Dec. 3    | Travel to Morogoro. Conferences with General and Branch Managers of TanSeed Company. Visited National Seed Testing Laboratory and TanSeed - Morogoro.<br><br>Mr. Bahari Lusewa, General Manager, TanSeed Company<br>Mr. M. Kibada, Manager, Morogoro Branch, TanSeed Company<br>Mr. Joseph Mallva, Director, NSTL and TOSCA/MOA, Morogoro    |
| Saturday<br>Dec. 4  | Conference with Principal Secretary, MOA. Visited Seed Project spare parts procurement center.<br><br>Mr. D. Masanja, Principal Secretary, MOA<br>Mr. Cornell Ishengoma, Manager, Spare Parts Procurement Center   |
| Sunday<br>Dec. 5    | Free time  |

<sup>1/</sup> Names of persons contacted are listed on date of initial contact only.

Monday  
Dec. 6            Discussions with Director-General, TARO, and General  
                  Manager, NAFCO (TanSeed Company Board Chairman). De-  
                  part for Arusha 1950.

                  Dr. J. N. R. Kasembe, Director-General, TARO  
                  Mr. A. L. Kaduri, General Manager, NAFCO

Tuesday  
Dec. 7            Discussions with Managing Director, TFA, management  
                  personnel TanSeed Company, Regional and Manager  
                  Arusha Seed Farm.

                  Mr. Charles Mmari, Manager, Arusha Seed Farm  
                  Mr. E. R. K. Mshiu, Managing Director, TFA  
                  Mr. C. D. Else, Secretary and Financial Manager,  
                  TanSeed Company  
                  Mr. Michael Badden, Seed Production Manager,  
                  TanSeed Company  
                  Mr. John Rhodes, Regional Agricultural Officer,  
                  CDC, Nairobi

Wednesday  
Dec. 8            Discussions and visits with private sector horti-  
                  cultural seed company and Arusha Branch of NSTL  
                  and TOSCA. Return to Dar es Salaam 1730.

                  Mr. J. A. Smit, General Manager, Rotian Seed Co. Ltd.  
                  Mr. Joseph Matemu, Director, Arusha Branch NSTL  
                  and TOSCA

Thursday  
Dec. 9            Travel to Kilosa (Tanzanian Independence Day).

Friday  
Dec. 10           Visit Msimba Seed Farm and Ilonga Research Center.

                  Mr. M. D. Mwanjoli, Assistant Maize Breeder, IRC  
                  Mr. Chitti Babu, Agri-Engineer (CIMMYT), IRC  
                  Mr. E. J. Lujuo, Farm Manager, Msimba Seed Farm  
                  Mr. Everest Malini, Agro-Mechanic, Msimba Seed Farm

Saturday  
Dec. 11           Conferences with Extension Service Director, The  
                  World Bank Agricultural Advisor and ADO/USAID/T.

                  Mr. S. Khamisi, Director, Division of Extension  
                  and Technical Services, MOA  
                  Mr. John Greenfield, Agricultural Advisor,  
                  The World Bank, N.Y., NY

Sunday  
Dec. 12           Free time

Monday  
Dec. 13      Report preparation. Visit with The World Bank evaluation team member.  
  
                    Shah M. Suliman, Policy Division, The World Bank,  
                    Washington, DC

Tuesday  
Dec. 14      Report preparation. Discussions with TRDB/USAID advisor and USAID Mission Director. Report preparation.  
  
                    Mr. Charles Bennett, Advisor (USAID), TRDB  
                    Mr. Arthur Handly, Mission Director, USAID/T

Wednesday  
Dec. 15      Discussion of draft report with U.S. Ambassador and USAID personnel. Report preparation. Visit with Farm Manager, Dabaga Seed Farm.  
  
                    Mr. David C. Miller, Jr., U.S. Ambassador to Tanzania  
                    Mr. Barry Riley, Assistant Mission Director, USAID/T  
                    Mrs. Margaret Bonner, Program Officer, USAID/T  
                    Mr. Charles Bundala, Manager, Dabaga Seed Farm

Thursday  
Dec. 16      Report preparation. Discussion with CDC Tanzanian representative.  
  
                    Mr. Ron Harvey, Project Manager, Agriculture, USAID/T  
                    Mr. Gordon Brown, CDC/Tanzanian representative

Friday  
Dec. 17      Report preparation. Discussions with MOA Seed Project Director.

Saturday  
Dec. 18      Report preparation. Presentation of draft report to Principal Secretary, MOA.

Sunday  
Dec. 19      Free time

Monday  
Dec. 20      Consultants' approval of final draft.

Tuesday  
Dec. 21      Consultation with CDC, London, UK.  
  
                    Mr. Theo Jones, OBE, Natural Resources Section

APPENDIX II

REFERENCE DOCUMENTS

1. "Project Paper - Farming Systems Research Project" (621-0156). Authorized 9 August 1982. USAID/T.
2. "Tanzania Seed Multiplication Project - End of Project Report" 1982. Experience Incorporated, Minneapolis, MN.
3. "National Maize Research Program" 1982. J. Deutsch, Coordinator, NMRP, Ilonga Research Station, Tanzania.
4. "Directors' Report and Statement of Accounts", October 1981. Tanganyika Farmers' Assoc. Ltd.
5. "Accelerated Development in Sub-Saharan Africa - An Agenda for Action", 1981. The World Bank, Washington, D.C.
6. "Future Needs of the Seed Industry in Tanzania", 1981. L. D. Sandager, Coordinator, Seed Multiplication Project, E.I., Minneapolis, MN. (Dar es Salaam)
7. "Seed Multiplication Project Paper Amendment #6", Project No. 621-0092, May 1980, USAID/T.
8. "Tanzania Seed Industry Survey: Report of Evaluations and Recommendations", April 1979, University of Missouri.
9. "Agriculture in Tanzania", 1978. FAO, Rome.
10. "Rules, Regulations and Certification Procedures", 1978. Tanzania Official Certification Agency, MOA, Dar es Salaam.
11. "Tanzania Seed Multiplication Project Paper Revision (621-0092)", July 1977, USAID/T.
12. "Subsidiary Legislation Supplement No. 6", February 1976. The Seeds (Regulation of Standards) Act of 1973. Government Notice No. 29. MOA, GOT, Dar es Salaam.

APPENDIX III

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