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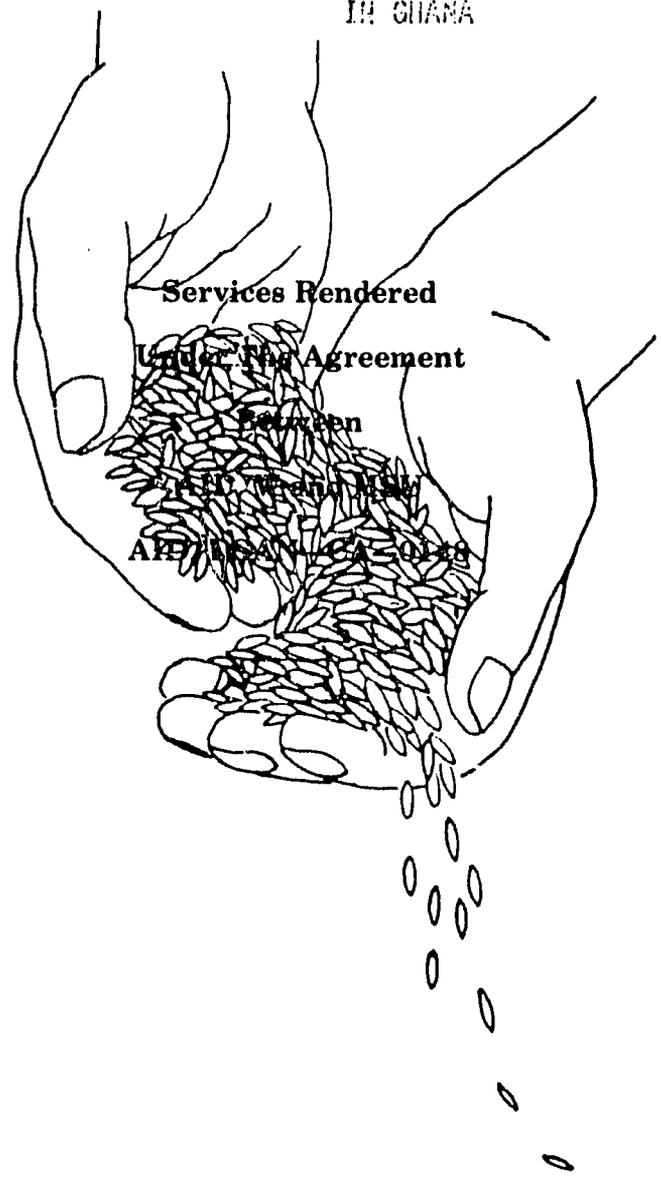
RE-DESIGN OF SEED COMPONENT

OF

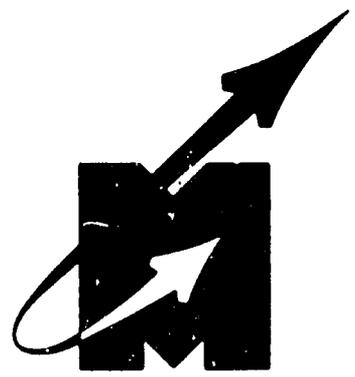
MIDAS II

IN GHANA

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G200



SEED TECHNOLOGY LABORATORY  
MISSISSIPPI STATE UNIVERSITY  
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Report to USAID/G and AID/W  
on  
RE-DESIGN OF SEED COMPONENT  
OF  
MIDAS II IN GHANA

Services Rendered Under the  
Agreement between AID/W  
and MSU  
(AID/DSAN-CA-0148)

SEED TECHNOLOGY LABORATORY  
Mississippi Agricultural and Forestry Experiment Station  
Mississippi State University  
Mississippi State, MS  
January, 1983

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The consultants are especially indebted to the team leader, Mr. George Hazel, Project Officer-Africa Bureau, USAID Washington, D. C., for his efficient manner, friendliness and patience in outlining and explaining the objectives and scope of work. We particularly enjoyed working under his leadership.

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## REPORT SUMMARY

**TITLE:** Re-design of Seed Component of MIDAS II for Ghana

**CONTRACT:** MSU/AID/DSAN-CA-0148

**CONSULTANTS:** C. H. Andrews and C. E. Vaughan  
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**PERIOD OF CONSULTATION:** October 31 - November 18, 1982

### Summary

In 1980 a re-design team spent 30 days in Ghana attempting to salvage and re-direct emphases of the original PP for MIDAS. MIDAS II was developed to reduce the scope of work and concentrate efforts on a regional level. MIDAS II called for a mid-phase review and after on-site observations by USAID indicated that little progress was being accomplished on MIDAS, they requested a re-design once again. In fact, of the original seven components of MIDAS II, only the Seed Component and possibly small farmer credit appeared to be the only survivors of the severe economic strain in Ghana.

Thus, two consultants from the MSU contract traveled to Ghana to examine carefully the existing conditions, perform a complete technical review of the Seed Component and make recommendations in a re-design effort. The report contained herein addresses the re-design analysis and recommendations for the Seed Component of MIDAS II.

## TERMS OF REFERENCE

The terms of reference were outlined in a cable from USAID/Accra (unclas accra 09876-Oct. 82) as follows:

1. Review and redesign the MIDAS II Project and prepare an amended project paper - specifically review the seed component of the MIDAS II Project.
2. Review proposals regarding suitable technology for production, processing, storage and distribution of improved seeds of maize, rice, groundnuts and vegetables.
3. Assess and recommend organizational structure, management strategy and scope of operation consistent with the development of a viable seed program.
4. Assess the technical assistance needs and equipment, staffing, training requirement consistent with the scale of operation.
5. Develop detailed recommendations, implementation plans, seed production targets to insure overall viability of the Ghana Seed Company.
6. Prepare appropriate reports as part of a MIDAS PP Amendment.

## II. Project Description

### A. Background.

The MIDAS I project, which was authorized and obligated in FY 76 (\$10 million loan of which \$2.3 was deobligated 9-30-82) and a \$5.2 million grant), was designed to be the initial stage of a national program to develop and strengthen national and regional Agriculture institutions to provide coordinated services and goods to small scale farmers. The project consisted of six basic components: credit expansion, fertilizer procurement, processing and distribution, seed multiplication, small farm systems research, marketing and demonstration/extension. The overall goal was to increase agricultural food production through the small scale farmers which would have a favorable effect on the incomes and living standards of the farmers. However, as implementation of MIDAS I proceeded it became apparent that the goals and objectives of the project were too complex for successful completion. For example, (a) moderate institutional improvement in the Agricultural Development Bank (ADB) through technical assistance was offset by the lack of credit funds for the farmers; (b) substantial progress was made in strengthening the home extension program but no progress was made in crop extension, research and fertilizer. This uneven pace of progress in implementation of MIDAS I took place during growing political instability and poor economic management. The project had to deal with four different governments. Related to the political instability was the poor economic management resulting in distorted cost/price relationships. These distortions reduced production incentives. As MIDAS I concluded the small farmer sector faced the same problems that existed at the time the project was designed. The project was designed to address the problems but not the causes which surfaced as a result of the political instability and poor economic management.

As the Ghanaian economy continued to decline a series of discussions and negotiations with the GOG and foreign donor community led to a revised agricultural strategy by the GOG and donor countries. The essential elements of this strategy were that the GOG would address macro-economic policy issues and negotiate a series of stabilization measures with the IMF. In addition, the GOG requested that donor assistance in the agriculture sector be provided through regional-wide integrated development projects targeted towards more manageable areas. This resulted in the development of the MIDAS II project which would channel USAID's assistance towards the Brong-Ahafo region except for the seed component which would continue on a national level, while other donors (U.K., IBRD, Germany and FAO) would undertake projects in the Upper, Northern and Volta regions.

MIDAS PHASE II - The MIDAS II project was authorized August 21, 1980 at an AID input level of \$21,117,000 of which \$9,405,000 was grant funded and \$11,712,000 loan funded with a PACD of September 30, 1983 (3 year period). The PACD was subsequently changed to September 30, 1984.

Obligated as of November 30, 1982 was \$12,450,000 (loan \$7,000,000; grant \$5,450,000). The breakdown of the obligated grant funds as of September 30, 1982 is as follows:

Obligated as of 9-30-82	=	\$5,450,000
Less disbursement as of 9-30-82	=	<u>1,469,819</u>
Undisbursed 9-30-82	=	\$3,980,181*

\*\$1.3 million of undisbursed funds have not been earmarked as of 9-30-82

Of the \$7 million in loan funds obligated on 8-29-80 only \$369,000.00 was disbursed. The goal and purpose of the MIDAS II project were in principle the same as in MIDAS I except AID's inputs under MIDAS I were channeled to the agricultural sector on a national level whereas under MIDAS II AID would concentrate its resources in a specific region. Unfortunately, there has been very limited progress on the MIDAS II phase since the project was authorized and obligated. For various reasons, the GOG has never adequately addressed its macro-economic stabilization issues. As the economic decline accelerated, the cooperating Agriculture institutions in the MIDAS II project were pressed to maintain staff and support levels and were unable to strengthen their institutions by increasing inputs and services as projected in the MIDAS II PP. The MIDAS project activities, as is true with all economic activities, have not been able to receive adequate support from the Ghanaian cooperating institutions. In addition, the MIDAS II project has six components which are closely related to each other and in most cases dependent on the other components of MIDAS II for successful implementation. Inaction or deficiencies in one component created a negative impact on all. For example, the failure of the fertilizer distribution system had serious adverse effects on the credit and extension components.

Compounding the implementation problem of phase II of the MIDAS project was the coup on December 31, 1981 which resulted in the fifth change in the GOG administration since MIDAS I was approved in 1976. During CY 1982 the economic decline has accelerated with inflation reaching 140% a year and the parallel market rate of exchange for the cedi ranging from 25 cedis to 40 cedis and more for \$1.00 U.S. With the official exchange rate at ₵2.75 to \$1.00 U.S., the credit and savings system is being quickly eroded. With the foreign exchange reserves fully depleted, basic consumer goods are almost non-existent. (For more information on this subject, see the economic analysis section.) With implementation almost at a standstill, caused in part by the economic and political instability, the Mission began an intensive review and dialogue of the MIDAS project with the participating agricultural sector agencies and the Ministry of Finance and Economic Planning. From these

discussions there is an agreement in principle (see Annex C) to modify certain components and to completely discontinue other components of the MIDAS PHASE II project. A summary of the proposed changes follows:

1. RESEARCH - This component was to assist the Ministry of Agriculture (MOH) establish a research capability to improve and expand linkages between the MOH and other institutions providing services to small farmers. During the time period of MIDAS I and II (six years) the GOG has failed to provide the land and buildings for the research center. Accordingly, the AID funded contract with IITA will be terminated on March 31, 1983 and this component will be dropped from the MIDAS II project.

2. FERTILIZER - Under this component AID was to provide TA to a planned Ghana fertilizer company which was to be established as a fertilizer procurement and distribution organization to make fertilizer more accessible to farmers. As is true with the Research component, the GOG has taken no action during the MIDAS I and II time period to implement this component. The fertilizer component will be dropped from the MIDAS II project.

3. EXTENSION SERVICES - This component was divided into two categories, (a) extension service to help the small farmer increase production which was to be carried out by the MOA's extension division, and (b) the home extension unit which was a nutrition education program for small farm families to be implemented by the Home Science Department of the University of Ghana. A major handicap to the MOA's extension service to the small farmers was its direct link to the Research component which the GOG failed to provide. This coupled with the MOA's failure to adequately staff the extension division made this part of the extension component of MIDAS II unworkable. Because of the above reasons, the Mission terminated the service of the extension specialist, who had been working on the project for 18 months, on August 31, 1982. However, the home extension services has proven to be effective and AID will continue to support this activity which will cost no more than \$250,000 over the life of the project.

4. CREDIT - The credit component consists of two parts, technical assistant to the ADB and expansion of credit to the small farmers through the ADB. The technical assistance to improve the institutional capacity of the ADB has been effective and will be continued. However, expansion of credit, which was to be funded in part by the local currency generated from the importation by AID of small farmer tools/equipment, will not be implemented. The triple digit rate of inflation which is decapitalizing the purchasing power of the ADB credit fund and the lack of farmer supply items such as fertilizer, pesticides, etc., eliminates the need for the component in the MIDAS II project.

5. MARKETING - This component was designed to improve food marketing through, (a) working capital loans to traders, (b) a service repair center workshop, and (c) improve the physical facilities of district market centers. The ADB is the implementing organization. This component has had mixed results but the GOG is anxious to attempt to implement (b) and (c) above. Because of the GOG interest and the small amount of funds (\$224,000) required from AID for tools, equipment and a few Ghanaian salaries, the Mission has agreed to continue this component.

6. SEED - The GSC is the only component of the six year MIDAS I and II project which has enjoyed reasonable progress in implementation and is developing the institutional capacity to serve as the foundation for any efforts the GOG may take to overcome its food shortage problems. There will be some minor modifications in the implementation plan for the GSC as outlined in the PP but the objective to establish a nationwide processing and distribution system for improved seeds remains unchanged.

In summary, this amendment to the MIDAS II project is to, (a) provide full support to the GSC, (b) U.S. technical assistance to ADB, and (c) funding support for Ghanaian TA, tools and equipment for the home extension and marketing components.

## B. Detailed Description of the Project Amendment

### 1. Revised Project Goal

To help the GOG become self-reliant in food production and improve the living standards of the small farm families.

### 2. Revised Project Purpose

The major purpose is to improve and expand the institutional capacity of the Ghana Seed Company to become a viable, independent profit making company. A secondary purpose is to provide nutrition information and market services to small farm families and management assistance to the ADB.

### 3. Revised Project Strategy

The strategy to achieve the above goal and purpose, within the PACD of September 30, 1984, centers on the following planned actions agreed to by the GOG, GSC and AID:

a. To have the Winneba seed plant (approximately 50% complete after two years of construction) in full operation by December 1, 1983.

b. U.S. TA will be provided until September 30, 1984.

c. Participant training will continue to be provided for the management staff of the GSC.

d. AID will purchase tractors and spare parts through the MIDAS loan component for leasing to seed contractor associations.

e. Most of the equipment for the Winneba seed plant under construction and the expansion of the Kumasi and Tamale seed plants has been purchased but any additional equipment needed for these plants will also be given priority by the GOG and AID.

f. Purchasing of trucks for transporting maize, rice, etc. to the processing plants and seeds to the distribution center will also be given a high priority by the GOG and AID.

#### 4. Revised Project Outputs

The project when completed is expected to have achieved the following results:

a. A viable and independent private sector seed processing and distribution company.

b. An improved and more efficient ADB.

c. An improved home extension/nutrition service for small farm families.

d. A more effective, efficient food crop marketing system.

#### 5. Revised Project Inputs

AID will provide project funding for the following inputs:

a. For the purchase of machinery equipment, vehicles and spare parts - \$4.6 million.

b. For participant training, contractor support and other costs - \$4.8 million.

c. For the cost of two U.S. contractors to provide TA to the GSC and ADB - \$3.0 million

## 6. Intended Results

The project is expected to result in the long run, but probably not within the two remaining years of the MIDAS II project, with a viable, private sector seed company which is urgently needed to assist the GOG in its efforts to meet the food production needs of Ghana. The revised MIDAS II project should have a positive effect on the management of the ADB, the home extension services and the marketing components.

### III. Project Analysis

#### A. Technical Analysis

##### 1. GENERAL

Seeds are basic to agriculture. They must be available for planting every acre of land that goes into production each year. Seeds are made available by various means: (a) the farmer saves his own seed; (b) private seed companies produce and market the seed; (c) a government agency produces and makes available seed to the farmers. In most of the developed world seed production and supply is handled through the private sector. In the developing world, however, incentives are not great enough nor the climate right to encourage the development of a private seed industry. Yet, since seeds are essential to agriculture, they must be made available by the government.

Ghana organized a Seed Multiplication Unit as a part of the Ministry of Agriculture soon after independence (1961) to provide for production and distribution. Seed production and distribution increased dramatically during the first ten years of the program.

In 1973 the Government of Ghana (GOG) requested USAID to finance a study to assess the seed program then being implemented by the Seed Multiplication Unit (SMU). Following an analysis by Mississippi State University (MSU) the GOG requested assistance in strengthening the SMU and in developing an indigenous private certified seed production program.

During 1975, the MIDAS Project was designed. The seed component was incorporated into the design from recommendations made by MSU on the organization, staffing and facilities of SMU. The objective was to strengthen the capabilities of the SMU to provide sufficient quantities of improved and proven varieties of seed. This was to be done at a cost reflecting real market value and acceptable to Ghanaian farmers so as to enhance their productive capacity. When USAID financed consultants from Experience Incorporated arrived in 1977 they carefully

reviewed the MSU recommendations with the GOG and USAID officers. This review resulted in changes (particularly with regards to types and combination of facilities) in the implementation plans presented in the MIDAS I PP based on the changing economic deteriorating implementation environment in Ghana.

In the course of implementation of Phase I it became apparent that while progress was being achieved as planned, severe shortages of building materials and contract arrangements in the construction of the seed processing plants delayed completion of the facilities.

Organizationally the SMU continued to improve its operations and competency and in 1979 was converted to the Ghana Seed Company (GSC), a parastatal company which operates under charter mandating GSC to produce and distribute improved seed. The seed should be sold at real market value to cover all production, processing, storage and distribution costs, plus a profit not to exceed 20 percent.

As stated earlier the objective of the seed component of the MIDAS I and MIDAS II Projects was to establish a nationwide processing and distribution system for improved seeds. Under MIDAS I, four processing plants were to be constructed by the GOG. USAID was to finance seed production and processing equipment and provide technical assistance. USAID has to date financed sufficient equipment for two seed processing plants. In the design of MIDAS II the GOG agreed to construct two additional processing plants while USAID agreed to finance requisite commodity procurement and technical assistance. At this time only one of the proposed processing plants at Winneba is under construction. It is about 50% complete, 18 months behind schedule, and not likely to be finished before early 1984.

## 2. PRODUCTION

The production of high quality improved seed to enhance the productivity of the agricultural sector requires more time and inputs (expense) than does the production of "farmer grain" for the general commercial market. Seeds of greater production potential of new hybrids, varieties, composites, synthetics, etc. are continually introduced into a Seed Program by researchers (IITA, CIMMYT, Crops Research Institute, Grains Development Board), and must be maintained genetically and mechanically pure to insure their continued higher production potential. Thus, an orderly and systematic scheme must be set up for the production and maintenance of high quality seeds into foundation and certified seed classes.

In Ghana the GSC has been organized and designated as the agency to produce foundation seed, the first generation increase of breeder seed supplied by the research agencies. To accomplish this, foundation seed farms have been established at strategic centers in major crop production regions in Ghana. Table 1 shows the location, acreage and production potential of the foundation seed farms presently operated by the GSC.

The production capability of these foundation seed farms is about at the desired level to sustain the anticipated growth in certified seed production generated by this project. To sustain this level of production capability, additional farm machinery will be purchased as indicated in Table 2. This machinery will be available through a lease agreement between the GSC and the Contract Growers Association to enhance the production of certified seed.

The second stage in the systematic seed multiplication system, that of producing certified seed (second generation from breeder seed and first generation from foundation seed) has been delegated to private farmers or contract seed growers. These farmer-seed growers plant foundation seed from the GSC and produce certified seed which then becomes available for mass distribution to small farmers and home gardeners throughout Ghana.

Certified seed growers are rigidly screened and selected based upon their resources and production capabilities to maintain and produce high quality certified seed with genetic potential similar to that of the original high yielding breeder seed. Some of the more rigid criteria for certified growers are at least 50 acres of land, adequate equipment, accessibility to roads, available financing and loyalty. Even though circumstances may develop whereby some growers divert their seed to other markets, more rigid contracts, additional grower applicants and pricing structure has tended to stabilize the supply of certified seed.

The production of certified seed is rigidly supervised by the GSC. Not only are the contract growers selected with precision but also their production practices are closely scrutinized. Seed inspectors of the GSC usually make at least four visits to the certified grower during the production season—during land preparation and planting, weeding and spraying (six weeks after planting), roguing during flowering, and during harvesting.

Table 3 shows the number of growers, location, acreage, current production capability, and projected production potential as a result of project inputs. Table 4 shows the estimated demand for certified seed. It is apparent that current capabilities for certified corn seed production falls 35,000 bags short of the estimated demand, while certified

rice seed production is approximately on target at 40,000 bags. However, with the anticipated emphasis of this project revision in both the Winneba and Tamale regions, the estimated production goals should be attainable and/or maintained..

The certified seed growers who produce seed for the GSC automatically comprise a Seed Growers Association. These are experienced farmers who cooperate with the GSC in developing and expanding the seed industry in Ghana. It appears that these grower organizations could enter into some type of lease agreement with the GSC to utilize the farm equipment which is designated for the operation of the GSC foundation seed farms. Such cooperation could conceivably enhance the production of certified seeds.

Further analysis of the production component revealed that in many cases growers were located too distant from the regional centers, especially at Tamale and Kumasi. In addition, growers lacked transportation to deliver the certified seed to the processing center. These issues have resulted at times in either added costs for GSC to pick up the seed, delay in getting seed to the processing center, or the growers disposing of the seed to other markets.

To overcome this problem the Mission will be having discussions with the GSC regarding the need to locate contract growers within a radius of 10-15 miles of the seed processing plants. The purpose of this is to reduce transportation costs and to enable the GSC to adhere to the terms of their contracts with the seed growers associations by collecting and transporting the seed according to the terms of the contracts.

Table 1. Ghana Seed Company Foundation Seed Farms, Acreage and Production Potential.

LOCATION	CROPS									
	MAIZE		RICE		GROUNDNUT		SORGHUM		COWPEA	
	ACREAGE	PROD. (bags)	ACREAGE	PROD. (bags)	ACREAGE	PROD. (bags)	ACREAGE	PROD. (bags)	ACREAGE	PROD. (bags)
WINNEBA										
Okyereko	150	900								
KUMASI										
Kwadaso	48	240						2	10	10
Ejura	120	480								4000
										5
										1000
										4
										800
TAMALE										
Nyankpala	20	120								
Nabogo	20	120			5	30		5	15	
Kpome	20	120	100	800						
			200	1,600						
BOIGATANGA										
Nasia			200	2000						
Yea	27	135								
Joba	10	50						5	25	
Tono	8	40								
					9	72				
HO										
Iogba	100	700								
Asikuma	14	70								
Kpetoe										
TOTAL	537	2,975	500	4,400	14	102		12	50	19
										5,800

Table 2. Certified Seed Growers, Acreages, Current and Projected Production

LOCATION	CROPS																	
	MAIZE						RICE						GROUNDNUT					
	Current			Projected			Current			Projected			Current			Projected		
	No.	Ac.	Prod. (bags)	No.	Ac.	Prod. (bags)	No.	Ac.	Prod. (bags)	No.	Ac.	Prod. (bags)	No.	Ac.	Prod. (bags)	No.	Ac.	Prod. (bags)
Winneba	21	1900	3500	21	4000	25000												
Kumasi	15	650	1200	15	1520	5000												
Tamale	21	500	4000	25	1000	8000	44	4000	40,000	50	5000	50,000	45	500	4000	45	500	4000
<b>TOTAL</b>	<b>47</b>	<b>3050</b>	<b>8700</b>	<b>61</b>	<b>6,500</b>	<b>43,000</b>	<b>44</b>	<b>4000</b>	<b>40,000</b>	<b>50</b>	<b>5000</b>	<b>50,000</b>	<b>45</b>	<b>500</b>	<b>4000</b>	<b>45</b>	<b>500</b>	<b>4000</b>

Table 13. Demand for Certified Seed of Improved Varieties

CROP	YIELD <sup>1/</sup> (Bags/Ac.)	TOTAL Ac. (000)	SEEDING RATE (lb./Ac.)	NAT'L SEED Requirement (Bags)	Expected Farmer Replacement Rate (%/yr.)	Estimated Farmer Demand Certified Seed <sup>2/</sup> (Bags)
MAIZE	5	1200.0	25	136,363	33	45,000
RICE	8	200.0	75	83,333	50	41,666
GROUNDNUTS	5	400.0	80	400,000	25	100,000- <sup>3/</sup>

<sup>1/</sup> Maize = 220lb/bag  
 Rice = 180lb/bag  
 Groundnuts = 80lb/bag (unshelled)

<sup>2/</sup> Read - Expected farmer replacement rate x national seed requirement

<sup>3/</sup> Peanuts in shell

### 3. Processing

The basic capability to process seeds for upgrading quality and maintaining both genetic and mechanical purity has existed in Ghana since the early to middle 1960s. In fact, seed processing capabilities gradually improved and became somewhat centered in four major regions - Winneba, Kumasi, Tamale and Ho. Prior to any USAID commitment (MIDAS I, II) the capability to process seed with the facilities which existed at these four locations is shown in Table 2. The vision of MIDAS I and subsequently MIDAS II proposed to further increase the processing capability of these four centers to meet the ever increasing demand for improved seeds in Ghanaian agriculture. The rationale behind this approach was based upon the fact that seed processing capability had already been established at these regional centers through limited assistance from previous donor organizations. Thus, a logical approach by both MIDAS I and II was to capitalize upon the existing capabilities in these locations and upgrade the capabilities through additional facilities and equipment.

Initial emphasis was designed to provide for new processing facilities, first at Winneba and then at Kumasi. Depending upon timely completion of this phase, the Tamale facility was to be included later (and possibly Ho). The Winneba unit was considered critical and essential as it is located near Accra and in a profitable maize producing area. Both proximity to Accra for logistical and raw material support and availability of seed sources made this site selection quite favorable. Hindsight, however, revealed that Kumasi should not have been chosen as the second site, but rather Tamale. Production capability, existing facilities and climate should have been over-riding factors leading to the choice to Tamale over Kumasi.

Of course, the continuation of declining economic conditions were unpredictable at that time and if these conditions had either stabilized or taken an upturn, then there was ample reason to assume that all three selected sites could have been completed within the timeframe of MIDAS II. It is now quite apparent that construction capabilities are almost non-existent or obviously seriously delayed. Consequently, not even the first facility at Winneba is complete. It is two years behind schedule and is now approximately 50 percent complete.

The completion of this processing facility is of utmost importance. Its operational features and successful completion would give a tremendous boost to the credibility of the seed program. The successful completion of this unit could well serve both USAID and GOG objectives and strategy in the agricultural sector. With this in mind USAID will assist the GSC to obtain the necessary construction materials for completion of the building.

Under this revised FP, the proposed facility construction at Kumasi will be cancelled and all equipment ordered for the Kumasi center will be diverted to the Tamale site for immediate installation and use. Annex E:

lists recommended equipment procurement for the Tamale unit. This together with the re-location of basic processing equipment already in country (procured for Kumasi under MIDAS II) will upgrade Tamale and facilitate increased capacity.

Table 4 shows the processing equipment already in Ghana which will be moved to Tamale.

The acquisition of the supplemental equipment for Tamale, the re-location of existing equipment to Tamale, and the completion of the Winneba facility will provide the necessary capacities to fulfill the project seed demand during the life of this project.

Table 4.

Equipment to be Re-located to Tamale Region		
Quantity	Description	Remarks
2	Hart No. 3 Indent Cylinder separators	1 each originally ordered for Winneba and Kumasi - will not be needed for corn - Re-locate in Tamale to remove <u>Rothbollea</u> weed from rice.
1	390 bushel surge bin, floor mounted	Re-locate in Tamale to serve the air and screen cleaners.
1	Elevator, 34' ht	Re-locate in Tamale to serve the air and screen cleaners.
2	Gravity separators, oliver model 160	Re-locate to Tamale to remove <u>Rothbollea</u> weed from rice.

#### 4. Drying and Storage

The drying system for the GSC is a batch type drying system that is utilized in two separate ways. One is the use of trailers which are equipped with perforated floors and air plenum chambers that can be taken directly to the seed production fields where they are loaded from the bulk bin of the combines. The loaded trailers must then be taken immediately to a shelter (drying shed) where the drying fans are located. One drying fan is designed to dry two drying trailers simultaneously. The plenum chambers of the drying trailers are connected to the fan by means of canvas ducts. During the drying operation, a competent technician must monitor the air flow and moisture content to assure drying and prevent damage to the seeds. Samples are taken at regular intervals during drying and tested for percentage moisture. After the seeds are dried, they will be moved while still in the drying system is used at the Winneba plant.

The second type of batch drying system is similar to the first except that the bins where the drying takes place are permanent and stationary. The monitoring of temperature and moisture content is carried out in the same way. Stationary dryers as described here are used both at Winneba and Kumasi.

A third type of drying system that can be used in drying seed is a tower type drying in which the seed can be dried in a continuous flow. This type of drying system has been acquired and is ready for installation at Winneba when the building is complete. After installation of this system, four of the eight wagon-type (trailers) will be transferred to Kumasi. This will approximately double the drying capacity at the Kumasi location.

The Tamale processing plant is located in an area where climatic conditions at harvest time are such that drying is not required. Therefore, drying systems are not in use at this processing location.

The storage of seed does not appear to be a major constraint at this time. At Winneba sufficient storage space has been rented to satisfy storage needs until the new processing plant is completed. Upon completion of the new plant, storage space will be adequate for years to come.

At Kumasi storage in terms of space is also adequate. However, the storage area is tightly enclosed with little or no aeration. This makes this area suitable to conditioning for improved storage. With repair of units already in place the storage area could be cooled and dehumidified which would enhance the quality of the storage environment. Storage of uncleared seed at the time of receiving for processing is a problem at Kumasi. A prefabricated building on concrete slab would be suitable for storage of this type.

The storage area at Tamale also appears to be adequate at the present time. Two warehouses are available, one with a 10,000-bag capacity, the other with a capacity of 30,000 bags.

If, however, projected seed goals are reached in the Tamale area there will be a need for storage of 62,000 bags of maize, rice and groundnuts. The present 40,000 bag storage area will then be inadequate.

#### 5. Marketing and Distribution

Effective distribution of certified seed continues to remain as probably the weakest link in the developing seed program in Ghana. A number of reasons contribute to this, somewhat similar and no doubt repetitious to those plaguing other segments of the program. These include inadequate communication, difficulties, need to increase farmer acceptance of improved seed, and pricing policy. It is encouraging to note, however, that some advances have been made towards improving the system of marketing. These include the recruitment of additional sales agents, one in particular with previous sales experience to head up the overall sales program. In addition a national "Seed Appreciation" week is scheduled for early January 1983 for educational and promotional purposes. It is anticipated that the proper GOG administrative officials will interact in this program and will support the GSC and its marketing efforts and pricing policy.

A major issue in the marketing scheme will be the determination of seed pricing policy. Successful seed programs depend upon selling seed for twice (2x) the official price of commercial grain. This fact is well documented world wide. GSC has received some strong GOG opposition to a mere 20 percent price differential. Efforts will be made to help the GOG understand the importance of premium pricing for seed.

Another major issue in marketing will be resolved to some extent by the acquisition of the new vehicles already authorized. These vehicles should allow more timely distribution to a wider range of markets.

Some possible marketing advances are as follows:

1. Continue seed sales at all GSC area offices.
2. Promote seed sales at regional and district agricultural offices.
3. Make concerted effort to identify and recruit additional sales agents and design sales incentives.
4. Technical assistance (short term) expert in pricing structure analysis.
5. Contact agencies for possible assistance - FASCOM, APPLE, GOVA Commercial banks, German Technical assistance program.
6. Participate in regional market days.

## 6. Quality Control

In any seed program it is imperative that the seeds produced be of high quality (physical purity, genetic purity, germination, etc.) or else the seed are no better than farmer produced seed. High seed quality is generally insured through seed inspection and certification procedures. Normally an organization producing seed will have its own quality control division, complete with procedures and standards for achieving the desired quality. Verification of quality however, is accomplished by seed inspection performed by another agency, usually the seed control agency in the area in which the seed are produced.

In MIDAS II the responsibility for seed inspection and certification was to have been removed from the Ghana Seed Company, precluding inspection and certification of its own product. The Ghana Seed Inspection Service (GSIS) was to have been established, autonomous from the GSC, and responsible for inspecting all aspects of foundation and certified seed production, processing, storage, and testing. The GSIS, however, did not get off the ground. It was established in name only but never became functional. The necessary equipment to operate the GSIS was ordered under MIDAS II and received into the country. Since the GSIS is not functional it is recommended that the equipment and supplies acquired under MIDAS II be transferred to the GSC, quality control division. This will expand the capability of this division and the GSC to supply high quality seed to the farmers of Ghana. Even though there will be a transfer of equipment under this plan some additional equipment and supplies are needed. A recommended list is attached.

## B. ADMINISTRATIVE ANALYSIS

### 1. Ghana Seed Company

The Ghana Seed Company was organized in 1979 as a parastatal company charged with the responsibility of producing and distributing improved seeds for Ghana's agriculture. The company is organized into the following divisions for efficiency of operation: (a) Administrative, (b) Production, (c) Processing, (d) Quality Control, (e) Sales and distribution, and (f) Research.

In the administrative division there is a Chairman of the Board, a Managing Director who is in charge of day to day operations, a General Manager, and an Accountant - Bookkeeper. With supporting staff they give overall guidance to the direction of the company.

The manager of the production division is responsible for coordinating production of both foundation and certified seed in Ghana. He is also responsible for the registered grower program and the making of contracts for the necessary production of seed.

The processing manager is responsible for the transformation of the harvested seed into the product ready for marketing and distribution. He is also responsible for record-keeping in the processing area to permit cost analysis.

The quality control manager has responsibilities in two major areas. One is in the area of evaluation of quality. Standardized procedures are available, and in use throughout the world, for evaluation of the quality of seed ready for marketing. The second major area of emphasis in quality control is the implementation of procedures to achieve higher quality standards of the seed being produced.

Sales and distribution is the vital link between the Ghana Seed Company and the farmers of Ghana. The Manager of this division is responsible for the sales program and for organizing the distribution of seed throughout Ghana.

The work of the research manager and his division is more basic than that of other divisions but nevertheless as important. He is responsible for the evaluation and development new varieties that will make an impact on the agriculture of Ghana and enter into production and distribution program of the Ghana Seed Company.

For better control throughout the various regions of Ghana, the company has area managers located at Tamale, Kumasi, Bolagtanga, and Winneba. Each area manager has an officer in charge of production, processing, quality control and sales and distribution within that area.

Key personnel of the Ghana Seed Company are shown in the following table:

Key Personnel of the Ghana Seed Company

Position	Name	Years of Service	Remarks
Chairman of Board	Prof. E.V. Doku	3	Dean of Faculty of Agriculture, University of Ghana
Managing Director	J. Wobil	16	Master of Science in Agronomy
General Manager	E. Blay	16	Master of Science in Plant Pathology
Production Manager	P.K. Opoaku	20	National Diploma in Agriculture; Seed Testing in Australia
Processing Manager	F. Hammond	8	Trainee Diploma in Agricultural Mechanization
Quality Control Manager	A. Amihere	?	Bachelor of Science in Gen. Agric.; Seed Training Course Miss.
Sales and Distribution Manager	A. Gyamerah-Amankor	1	
Research Manager	Dr. V.K. Ocran	?	Ph. D. in Plant Breeding
Chief Accountant	F. Erzuah-Nyenzah	?	Professional Qualifications
Area Manager Tamale	H. Akanko	13	National Diploma in Agriculture; Seed Training Course-Miss.
Area Manager Kumasi	T. Konney	10	Master of Science in Agronomy - Seed Technology
Area Manager Bolgatanga	L. Delimini	10	Bachelor of Science in Agronomy - Diploma Seed Technology
Area Manager Bannu	F. Hesse-Owusu	14	National Diploma in Agriculture; Seed Training Course-Miss.

Years service with both the Seed Multiplication Unit of the Ministry of Agriculture and the Ghana Seed Company.

Best Available Document

The technical analysis of the Ghana Seed Company reveals that the company is organizationally sound and fully capable of producing and distributing seed for the country. There are some factors, however, that limit the effectiveness of personnel within the company. One is poor communication within the organization, particularly between headquarters and the area offices. Some of this is due, no doubt, to inadequate means of communication (no telephone, no radio contact).

Another factor limiting the effectiveness of personnel is lack of sufficient training for most personnel in the company. There are two areas in which training would be beneficial. Management training is needed by those responsible for day-to-day operation of the company. This, perhaps, includes all those identified in Table. Technical training is needed by those responsible for divisional activities such as seed production, processing, quality Control, etc. Some of the key personnel has received some seed technology training but more is needed.

Contrary to some opinions voiced, seed production, processing and distribution requires knowledge and skills not part of the usual background and experiences of agronomists. Persons with backgrounds and experiences in these areas are excellent prospects for training - but they must be trained.

Two levels of training are essential for the orderly future development of the seed program in Ghana.

- a. In-depth Professional Training - Needed for specialists who will plan, implement and manage seed program activities and resolve the technical problems that arise. This type of training can best be obtained in specialized training institution in the developed countries. Ghana Seed Company should make provision and schedule the following types of in-depth professional training.
  - (1) Special Courses in Management. (Three months required for completion.) Candidates for training at this level should be those in Management positions to the company.
  - (2) Special Courses in Seed Technology. (Approximately three months required for completion). Candidates for this type of training are the technical officers associated with some aspect of the seed program such as production, processing, drying, storage, testing, etc. Mississippi State University conducts a course of this type annually, for International participants. Over the next two years the Ghana Seed Company should schedule at least four candidates for this course.
- b. On-the-job-Training - Needed for workers manning operational units of the seed program. This type of training can be done by those receiving professional training in (1) above.

## SEED CONTRACTOR ASSOCIATIONS

- C. Seed growers attempted to establish a country-wide association about 10 years ago, but this attempt was never completely successful due to inadequacy of communication and transportation. No doubt lack of GOG support at this early date also contributed to a low level of enthusiasm. With the emergence of the GSC, however, the dependency upon contract growers has steadily increased to where now competition to become a contract grower is rather keen. With the need for contract seed production the growers have found renewed enthusiasm for belonging to and supporting a "Growers association". The association is made up of only those growers who produce certified seed under contract to the GSC. At the present time there are three contract seed growers associations in Ghana. The association in Winneba currently consists of 14 members and will be increased to 21 for the next growing season. This will increase the acreage under contract from 1900 to 4000. The Tamale Seed Growers Association currently consists of 21 members and will be increased to 25 with an increase in acreage from 500 to 1000. The Kumasi seed growers association will remain at 15 members but the contract acreage will increase from 650 to 1520.

The above figures to certified corn production but there have also been similar increases in Tamale regarding rice production. See Table 2 for statistics.

The relationship between the GSC and the "Seed Growers Association" is designed to be of mutual benefit. As an example, the growers willingly support each other by loaning equipment when needed, while the GSC is willing to pay a premium for the certified seed. Through a continued relationship with selected growers, a sense of loyalty develops which is essential in assuring an adequate supply of certified seed.

To further enhance the capabilities of the contract growers to produce high quality seed, the GSC will be leasing production equipment to the various regional associations. The GSC is considering leasing agreements contingent upon satisfactory fulfillment of production obligations.

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ANNEX A  
IMPLEMENTATION PLAN - GSC

Key Progress Benchmarks \*

- 12/82 Order spares for cylinder and gravity separators (USAID)
- 12/82 GOG complies with conditions precedent to additional disbursements
- 1/83 \* Transfer equipment from Winneba site to Tamale (GSC)
- 1/83 Technical assistance - pricing consultant (EI)
- 1/83 Order commodities as per Annex E (USAID)
- 1/83 First monthly progress report on Winneba plant construction
- 2/83 Identify 3 participants for 1983 MSU Seed Improvement Training Course (GSC)
- 3/83 First quarterly report on reaching project goals
- 4/83 \* Number of seed agents for distribution of seeds increased from 40 to 80
- 4/83 Identify 2 management training participants (GSC) for Washington, D. C.
- 5/83 \* Seventy five percent (75%) of construction of seed processing plant at Winneba completed
- 5/83 Departure of 3 participants to MSU summer course
- 5/83 \* Wagon dryers installed and operational at Winneba
- 6/83 Second quarterly report on reaching project goals
- 6/83 Departure of 5 short term credit trainees from ADB
- 7/83 Departure of 2 short term Management Trainees
- 8/83 \* Number of samples tested for quality control increased from 900 to 1,580
- 8/83 Return of 3 short-term participants from MSU short course
- 9/83 Third quarterly report on reaching project goals
- 10/83 Request 2 MSU contract consultants to conduct Seed Technology Training course at Winneba

## Key Progress Benchmarks \*

- 10/83 \* Foundation seed yield increased from 4 to 6 bags per acre
- 10/83 \* Certified maize seed production increased from 8,750 bags to 14,500 bags
- 10/83 Project evaluation
- 12/83 \* Completion of construction Winneba processing plant fully operational
- 12/83 Identify 20 participants for Winneba short course in processing, drying, storage and quality control
- 12/83 Fourth quarterly report on reaching project goals
- 12/83 Audit of GSC begun to determine adequacy of 20% markup
- 1/84 Transfer 4 wagon-type driers to Kumasi
- 1/84 In-country training course in Seed Technology at Winneba
- 2/84 Identify 3 short-term participants for MSU seed course
- 3/84 Fifth quarterly report on reaching project goals
- 4/84 Identify 2 short-term participants for Management Training (Wash., D. C.)
- 5/84 Departure of 2 short-term credit trainees from ADB
- 5/84 Departure of 3 short-term participants to MSU seed course
- 6/84 Final quarterly report on reaching project goals

ANNEX B - LIST OF COMMODITIES TO BE PURCHASED

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>	<u>PRICE CIF (\$000)</u>
1	Air Screen Cleaner Clipper Model 147 BD with 13ft height tandem elevators	i) Blount Agribusiness Group Ferrel - Ross Saginaw, Michigan 48602  ii) Or, other equivalent same specifica- tions.	\$23.0
16	Cylinders for Hart No.3 Indent cylinders separators	SIZE 11 - 8 each SIZE 13 - 8 each	\$10.0
1	Seed Treater (Model S - 100 SS)	SEEDBURO	5.0

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<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>	<u>PRICE CIF (\$000)</u>
1	# 5 Western Combined Maize Sheller/Cleaner	Union Iron Works	16.0
2	Portable Bag closers Model D, Fischbein	Dave Fischbein Company	2.5
2	Platform Scales Double beam - metric		1.5
2	Two wheel Minneapolis Type Bag Truck		.40
5	Aluminium Grain Shovel		.15
3	Cast Aluminium Scoops		.03
1	Tornado Industrial Vacuum Cleaner		2.0
1	Hand Electric Blower, Seedburo Model No. 9880		0.50
4	Bag Holders - Two Way Seedburo, Gripmasters Model No. 13		.80
3	Bag-Tag Staplers (ACE MODEL NO. 78200(82)		0.10
1	Air Compressor (Portable Electric) Heavy duty, capacity tank 20 gallons	Mc. Master Carr Catalogue 88	1.5

<u>QUANTITY</u>	<u>DESCRIPTIO</u>	<u>SOURCE</u>	<u>PRICE CIF (\$000)</u>
2 Sets	Make-Your-Own Stamp Kit	M.D. Ginn & Company	0.50
2	Universal Bag Holder, Seedburo Catalog No. 80		0.20
4	Deck type B, <del>Model</del> No. 160, Gravity Separator for cleaning paddy seed rice		6.0
		Sub Total	<u>\$70.18</u>

**B. VEGETABLE SEED PROCESSING EQUIPMENT**

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>	<u>PRICE CIF (\$000)</u>
2	Wet Vegetable Separator		4.0
2	Table Model Clipper Cleaner with Screens for Vegetable Seed Processing. Additional Screen for existing Clipper table model cleaners for vegetable seed processing.		1.2
2	Table Gravity Seed Separator		.8
			4.0
		Sub Total	10.0

**C. SEED CENTER ELECTRICAL EQUIPMENT FOR TAMALE,  
AND KUMASI**

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>	<u>PRICE CIF (\$000)</u>
1	Generator, 100KVA, 415/240 Caterpillar Model 3304T2 Diesel Set	From Code 899	\$35.0
1	Generator, 25KVA, 415/240V, Diesel Set	"	12.0
1	Transformer, Substation, 500KVA, 11,000/433V 3 Ph 50Hz PF 1500 RPM	"	40.0
1	Generator, 25KVA, 415/240V, Diesel Set		12.0
		Sub Total	99.0

**D. EXPENDABLE SUPPLIES FOR GHANA SEED COMPANY  
LABORATORIES**

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>	<u>PRICE CIF(\$000)</u>
6	Germination Paper Towelling 12" x 18" regular Weight	Anchor Paper Company	.252
6m	Germination Paper Towelling 12" x 18" heavy weight	"	.504
3m	Wax Seed Paper 12" x 18"	"	.189
3m	Envelopes and Opening Kraft	"	.052
36 boxes	Filter Paper Whatman	Science Kit International	.118
15	Forcep, medium point straight, 115m	"	.036
2 dozens	Pencil, China marking, red	"	.040
6	Rat & Mouse poison bait Warfarin 5lb can	WASCO W153538	.124
6	Insecticide, permethrin, 5% WP	FMC Corporation Philadelphia PA 1910	.084
Year I Sub-Total			1.4
Year II Sub-Total			2.0
Grand Sub-Total			3.4

**E. FARM MACHINERY REQUIREMENT**

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>	<u>PRICE CIF (\$000)</u>
5	Offset Disc Harrow, Width to be 10' 4" With notched 26" diameter blades, Mounted to fit category II 3-point Hitch	i) IH Model 770 ii) Other makes with equal Specifications	48.0
5	Field Cultivator	Vibra shank Mounted IH Model 45	23.0
3	Heavy Duty Rotary Cutter	Model GR-722	14.0
2	Moldboard Plow Semi-mounted, four bottom, 18" moldboard extra Hitch clearance	International Harvester	17.0
4	Wagons Running Gear and Barge Boxes	1) Model RGE-10T Unverferth MC Curdy, Kalida, Ohio  2) Other makes of same specifications	15.0
1	Low Boy Trailer	same as previously procured under PIO/C-0102-9-00046	6.0
1	Front End Loader.	1) New F-348 Model Loaders  2) Other make with equal or comparable specs.	4.0
1	Rear Mounted Blade for Attachment to Model 3288 IH tractor	Equivalent to IH Model 50 Blade	3.0
5 sets	Dual Wheels and Tires for tractors	IH 3288 Model	30.0

FARM MACHINERY CONTINUE

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>	<u>PRICE CIF(\$000)</u>
2	Corn Planter, Trailing Type	Same as previously supplied under PIOC 641-010Z-9-00046	24.0
			<u>184.0</u>
			Sub Total

F. SPARE PARTS FOR FARM MACHINERY AND TRACTORS

Spare Parts for Farm Machinery & Tractors

CIF(\$000)

1983

1984

50.00

50.0 Sub Total 100.00

G. SPARE PARTS REQUIREMENT

CIF(\$000)

CIF(\$000)

Spare Parts for Trucks

1983  
9.0

1984  
9.0

Spare Parts for Crew Cabs and Suburban

2.5

2.5

11.5

11.5

Sub Total

23.0

H. PESTICIDES

a. HERBICIDES

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>YEAR I</u>	<u>YEAR II</u>	<u>SOURCE</u>	<u>PRICE CIF(\$000)</u>
500 pints	Treflan 4EC (Trifluralin)	1.5	1.5	Elanco Products	3.0
	Eradicane (EPTC)	9.0	11.5	Stauffer Chemical Co.	20.5
To be in one or 5 gallon Containers	Prowl (Stomp)	5.0	5.5	American Cyanamid Co.	10.5
	Propanil (StamF-34)	7.5	9.0	Crystal Chemical Inter-American (Rohn & Hassco.)	16.5
		<u>\$23.0</u>	<u>\$27.5</u>		<u>50.5</u>

b. INSECTICIDE

In quart or litre ship amount equi-Bacillus Thuringiensis valent to sum		0.5	0.6	Abbot Laboratories Chemical & Agric. Prod. Div	1.1
"	Carbaryl (Sevin)	3.0	3.3	Union Carbide & Agric. Prod. Division	6.3
"	Diazinon	3.0	3.3	Ciba-Geigy Corp. Ag. Division	6.3
"	Malathion	2.0	2.2	American Cyanamid Co.	4.2
"	Phostoxin	3.5	3.9	Degesch American, Inc.	7.4
		<u>12.0</u>	<u>13.9</u>	Sub-Total	<u>25.3</u>

I. EQUIPMENT REQUIREMENT FOR QUALITY CONTROL DIVISION

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>SOURC</u>	<u>PRICE CIF(\$000)</u>
1	Tag Printer, manually operated Stielow E-10	Addressograph Errington Inc.	1.4
6	Desk Calculators, 220 volt W/printed read out tape	Canon U.S.A.	.42.
2	Laboratory Scales, 3-beam	Seedburo Equipment Co.	.28
2 sets	Hand screens, 9" 12 sieves with botton pan & storage rack	"	.42
10	Moisture Metres, portable, DC-9 Volt Dole 400	"	3.5
6	Bag Triers, 9" x 1 diameter	"	.17
5	Grain Probe 40" x 1 3/4 diameter	"	.56
576	Sample Containers 1/2 gallon plastic	"	.9
5	Graduate Cylinder, 50 MI Polypropylene	Scientific Kit Inc. N.Y.	0.070
6	Erimmeyer Flask 100 ml.	"	0.035
6	Erimmeyer Flask 500ml	"	0.025
120	Petri Dishes 4" diameter	Seedburo Equipment Co.	.30
1	Microscope Slides, plastic Laboratory Pack 50 slides	Scientific Kit Inc. N.Y.	0.015
5	Portable Balance, 101 gm Capacity x 0.01 gram.		.70
			<hr/> 8.795

J. CONSULTANT TEAM'S OFFICE EQUIPMENT & SUPPLIES

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>	<u>PRICE CIF (\$000)</u>
4 doz.	Legal Pads, 8" x 12 1/2" Canary colour	Ginns	.042
15	Plain 3-ring Binder, colour Green, 2	Wulcan Binder Cover Company	.060
48 sets	Plain Tabs, Standard 3-hole punched	"	.021
1	Three Hole paper Punch heavy duty	Ginns	.041
100 sheets	Graph Paper-Drawing size 11 1/2 x 16 1/2	"	.020
1 doz.	Assorted colours set pencils #5030023	"	.005
4 doz.	No.2 Lead Pencils	"	.010
300	Coml Envelopes, No. 93/7/8" 8/7/8"	"	.011
2	Desk Staplers, Swingline	"	.027
2 boxes	Swingline Staples	"	.007
2	Tape Dispenser	"	.011
5 Rolls	Cellophane Tape 3/4" Wide 1"	"	.005
5 Rolls	Transparent Scotch Tape, 1/2" wide	"	.009
2	Hand-Held Calculators, battery operated	Sears Roebuck & Company	.042
2	Aluminium Rulers, 15", 3ths and 16ths	Ginns	.007
5 doz.	Bic. Pens, Blue	"	.024
5	Papermate Pens	"	.028

CONT'D CONSULTANT TEAMS OFFICE EQUIPMENT & SUPPLIES

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>SOURCE</u>	<u>PRICE CIF (\$000)</u>
10	Refills for Paper Mate Pens	Ginns	.013
5	Wipe-out correction Fluid		.008
Year I Sub. Total			.391
Year II Sub. Total			.450
Grand Sub Total			\$ .841

X. EQUIPMENT MAINTENANCE (LOAN)

Mechanics tools  
Shop Equipment

YEAR I  
(KUMASI)

\$17.25

\$45.0

\$62.5

YEAR II  
(TAMALE)

20.0

50.0

\$70.0

Sub. Total \$132.3

L. SEED CENTER - RAW MATERIAL (LOAN) BAGS

Polypropylene Pellets  
for the manufacture of seed Bags

Year II \$45.0

Year III \$50.0

Sub. Total \$95.0

M. PROCUREMENT OF OFFICE SUPPLIES NOT AVAILABLE IN GHANA (LOAN)

	(\$000)
YEAR I	\$1.5
YEAR II	<u>\$1.5</u>
Sub. Total	<u>\$3.0</u>

N. REQUEST FOR STYROPORE P150 PELLETS (LOAN)  
FOR INSULATION - WINNEBA

Sub. Total \$50.0

O. SPARE REPLACEMENT PARTS - SEED GERMINATORS

YEAR I	\$1.5
YEAR II	<u>\$2.5</u>
Sub Total	<u>\$4.0</u>

P. FUNDING FOR PROCUREMENT OF VEGETABLE SEEDS (LOAN)

	(\$000)
Year I	\$263.0
Year II	\$318.0
Sub Total	<u>\$581.0</u>

GRAND TOTAL 1,350.316