

658-0001

SAO TOMÉ

Crop Production + Diversification  
Phase II

Project PAPERS

Phase I + II

FY 77-80

PROJECT PAPER

CROP PRODUCTION AND DIVERSIFICATION (PHASE II)

SAO TOME AND PRINCIPE



PROJECT PAPER

SAO TOME AND PRINCIPLE: CROP PRODUCTION

AND DIVERSIFICATION (PHASE II)

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B. Recommendation

A grant of \$600,000 is recommended to finance a Phase II continuation of the Sao Tome and Principe (STP) Crop Production and Diversification Project (658-0001) signed on September 30, 1977. The purpose of the Phase II continuation is to extend for an additional three years this very successful project activity (see Project Evaluation attached as Annex D), broadening the scope slightly and providing necessary additional financing.

C. Description of Project

The original STP Crop Diversification and Production project provided a grant of \$300,000 to assist the GOSTP to identify land areas of marginal utility for export cash crop production which might be profitably converted to food crop cultivation, and to carry out appropriate experimentation in systems for land clearing and cultivation as well as food crop variety testing. Inputs under the project were technical assistance and training administered through a contract with the International Institute of Tropical Agriculture (IITA), and modest acquisitions of appropriate farm equipment and pesticides arranged under a procurement contract with the Afro-American Purchasing Center.

Although the original project still has not expended all of the funds made available to it (due largely to long delays in identification, procurement and shipment of appropriate farm implements), it has already met two of its three objectives. The first project

objective (to clear and carry out food crop field trails on some 40 hectares of land by the end of FY-79), has been exceeded. The GOSTP currently has 48 hectares cleared and planted with improved crop varieties. In the process some 50 less successful varieties have been discarded and the better yielding, more pest resistant varieties identified. The second project objective (to train two individuals in crop production for later installation as technical supervisors) also met with success through a several month long training program at IITA in Nigeria. Both individuals are now employed in the Ministry of Agriculture Directorate of Research, one heading the corn/bean production program and the other heading the rice production program. Progress toward meeting the third project objective (an improved balance of trade) is not measurable at this point as the land area concerned is too small to allow significant impact.

Building on this base, the purpose of this Phase II Project is to continue work toward identification and clearing of land areas appropriate for food crop production (452 additional hectares) while also continuing testing and application of improved food crop varieties and related farming systems (labor/machine mixes, pest management, irrigation, storage, etc.) Toward these ends a grant of \$600,000 is required to finance (1) a technical assistance and training contract with a US institution strong in tropical food crops production and (2) a procurement contract with the Afro-American Purchasing Center to arrange for acquisition of appropriate farm implements and pesticides/herbicides.

D. Summary Findings

The project analysis team visited STP in September, 1979 to evaluate progress under the original Crop Production and Diversification Project and to review GOSTP plans for a possible follow-on project. Based on these findings the proposed Phase II Project is found to be sound according to the following conventional project analysis tests:

1. Technical Analysis Progress under the original food crop production project with regard to varietal testing and application of improved varieties exceeded expectations, with much improved varieties of corn, rice and beans already under cultivation or multiplication. Use and maintenance of project equipment has presented slight difficulties due to lack of related technical assistance and training, but in general the citizens of STP appear to have considerable mechanical facility and a modest investment in teaching the use of new farm implements is expected to alleviate such problems in the future.

2. Financial/Administrative Analysis The GOSTP has given high priority to its food crops diversification project in the past, providing all the personnel, equipment and land resources it has required. Indications are that with its initial successes such GOSTP financial support will remain as strong as ever.

3. Social Analysis The project analysis team noted no apparent social impediments to project success. Because all lands

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proposed for development are on government owned plantations, and all personnel are salaried employees, the usual questions regarding incentives to participate in the process are not relevant. (Also see Economic Analysis)

4. Economic Analysis Review of recent studies concerning profitability of food crop production on lands of marginal utility for traditional export crop production (mainly cacao) reveal that significant portions of the lower, dryer areas of STP (perhaps as much as 5,000 hectares) may be more appropriately and profitably dedicated to cultivation of corn, beans, rice and onions. Assuming output at levels already proven possible by varietal testing experiments, some 2,400 hectares would have to be cleared and cultivated to render STP completely self-sufficient in the principal food crops. The impact of such an eventuality would be a substantial improvement in the diet of the average Sao Tomean and a savings in foreign exchange of \$2 million per annum is a significant sum in the economy of Sao Tome.

The scope of the proposed project (a total of 500 hectares brought into production) is limited in macroeconomic terms, but will provide for significant progress toward the GOSTP's overall subsector goal, with continued success in development of varieties and farming system it may well pave the way.

5. Environmental Analysis Evaluation of environmental effects of the Phase I activity indicate that the impacts of switching from cacao production to food crop production on the relatively low and dry land areas of STP do not pose any environmental problem so long as such land areas are relatively flat. GOSTP officials involved in the project are very aware of the potential environmental dangers from water run-off (on hilly lands) and soil nutrient leaching (where rainfall is greater) and have made no mistakes with regard to the environment to date.

## II. Project Background and Detailed Description

### A. Background

#### 1. Geography, Climate and People

On July 12, 1975, the Democratic Republic of Sao Tome and Principe became an independent country after nearly 500 years of Portuguese rule. The country, one of Africa's smallest, is comprised of two islands, Sao Tome and Principe, located about 440 and 280 kilometers (275 and 175 miles), respectively, off the northern coast of Gabon near the equator. Oval shaped Sao Tome is approximately 48 kilometers (30 miles) long and 32 kilometers (20 miles) wide while Principe is roughly rectangular - 6 kilometers (4 miles) wide and 16 kilometers (10 miles) long. Both islands are part of an extinct volcanic mountain range. Sao Tome is the most mountainous, with one peak of 2,000 meters (6,650 feet) above sea level. Swift mountain streams cross both islands which are generally covered by lush rain forest.

The climate is hot and humid at sea level, with average yearly temperature of about 80° F and little daily variation except in the rainy season. At higher altitudes the average yearly temperature is 68° F and the nights are generally cool. There is a pronounced rainy season from October through May when most rainfall occurs. Geographic variation in annual rainfall is extreme with more than 6,000 MM (200 inches) in the southwestern slopes to less than 1,000 MM (40 inches) on the northern lowlands.

The population of Sao Tome and Principe in 1975 was estimated to be about 75,000 with approximately 70,000 on the Island of Sao Tome. The labor force is estimated to be 22,500 with 80 percent engaged in agriculture, five percent in industry and the remaining 15 percent in services. The birth rate is

high (3.6 percent per year) but health conditions are poor; thus, the rate of infant mortality is so high that the rate of population growth is perhaps as low as 1.5 percent. A recent study (1977 utilizing FAO data and a WHO specialist's judgements, estimates an average caloric deficiency of 700 calories per day. This deficiency could be overcome as follows:

Protein ( $\frac{1}{2}$ animal)	15%
Edible Oils & Fats	13%
Cereals and Tubers	68%
Vegetables & Fruits	4%

## 2. Infrastructure

Unlike most developing countries, STP has an adequate infrastructure - especially on the Island of Sao Tome. There is an extensive road system, most of it asphalted, which links the plantations and outlying communities with the port and airport at the capital of Sao Tome. In addition, many of the plantations have their own secondary and tertiary roads, which are generally all-weather, and some have narrow gauge railroads with small diesel engines.

In the capital city of Sao Tome there is an airport capable of serving small jet aircraft. (Currently there is one roundtrip flight per week from Luanda, Angola.) The main harbor in Sao Tome is quite shallow so most freighters must be unloaded by barge from anchorage a kilometer offshore, thus reducing efficiency. Warehousing capacity is inadequate for long term cereal storage due to the hot and humid conditions. There is a relatively good set of buildings for public administration and services, including schools and hospitals.

Most of the Island of Sao Tome has electricity and telephone/telegraph services and the city of Sao Tome has a water and sewer system. In addition, many of the interior

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towns and plantations have water systems. While the internal telephone/telegraph system is reasonably good, international communications are poor.

### 3. The Economy and Agriculture

The economy of STP continues to be heavily dependent on the export of cocoa, copra, coffee and palm kernels, all produced on relatively large plantations. Such plantation agriculture comprises over 80 percent of the best cultivated land, with 28 of these plantations accounting for over 90 percent of export crop production. The balance of more marginal cultivated land (5,000 hectares) is used for production of subsistence crops such as manioc, vegetables, bananas and breadfruit, and barnyard livestock (chickens, ducks and pigs). Given a population of 75,000, the area currently in food production amounts to approximately .06 hectares per person.

Given the relatively small area devoted to food crops, as well as inefficient production practices, a high level of food imports are required. Current data are not available, but it appears that even after relatively high levels of imports, food consumption levels are low. For example, Dutch experts derived the following estimate of requirements of important foods:

<u>Food Product</u>	<u>Average Imports 1970-73<sup>a/</sup></u>	<u>Shortfall Based On Caloric Requirements (Metric Tons)</u>
Corn	1,505	
Corn Flour	580	2,336
Rice	1,565	
Beans	800	1,314
Potatoes	650	4,672 <sup>b/</sup>

<sup>a/</sup> Another report indicates availabilities were even less in 1976.

<sup>b/</sup> Rootcrops, including yams, sweet potatoes, cassava, etc.

Source: Agriculture and Livestock Production in Sao Tome and Principe, Foundation for Agricultural Plant Breeding, Wageningen, The Netherlands, 1977.

The economic and social organization of agriculture has been substantially modified since independence (July 12, 1975). Under Portuguese colonial rule, agriculture was for production of export crops and almost all food needs were imported from Angola and Europe. Each plantation was autonomous, with the owner exporting his production and importing food and consumer goods for resale to workers through plantation-owned stores. Production of food crops on these plantations was prohibited and workers were forced to buy from the plantation store to supplement their meager subsistence consumption.

The GOSTP drastically changed the structure of agriculture by nationalizing 70 percent of the plantations, which resulted in the sudden departure of many Portuguese managers and technicians. The remaining 30 percent of the plantations are relatively small and are owned by residents of Sao Tome. (Under the agrarian reform no one is allowed to own more than 100 hectares.) The new organizational structure is still along the lines of plantation agriculture, but it is strongly socialist in nature with all nationalized plantations owned by the Government, which hires both the farm administrator and labor directly.

Each plantation is operated by a Manager and his directors of agricultural production, agricultural technology, equipment operation and maintenance, the school and the hospital. Labor is hired at a wage set by the Government (currently \$2.40 per day). Material inputs (fertilizers, etc.) are provided from a central storehouse (in Sao Tome) and some large equipment (such as heavy tractors) is provided from a pool. Each plantation has its own set of equipment for routine operations. All expenses of the operation are debited against the account of the plantation in the newly created Central Bank.

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The GOSTP controls the marketing of all agricultural produce in a two-price system. The export crop production of each plantation is purchased by the GOSTP Ministry of Commerce at a fixed price (below world market price) and credited to the account of the plantation. It is not clear what happens to profits (losses) if any. Export crops are then resold on the world market, with the spread between buying and selling costs accruing to the GOSTP itself. Crops produced for domestic consumption are sold in the local markets by the plantations themselves. Prices there are also regulated - these by the Ministry of Agriculture - and are maintained at a level which is substantially below the local black market food prices. Imported foods are sold at their landed costs.

The GOSTP's approach for meeting the challenges facing STP's agricultural sector contains three components:

(1) To increase the yields of cacao, copra, coffee and palm kernels in order to assure a continued high level of employment of rural people and concurrently to earn for the GOSTP the foreign exchange needed for food and other imports essential to the country's survival.

(2) To diversify crop production on the nationalized plantations into other export crops in order to make the economy less dependent on cacao (with its fluctuating price) and to assure a more dependable and stable level of foreign exchange; and

(3) To increase production on the nationalized plantations' lands of marginal suitability for high value export crops of basic food crops for domestic consumption in order to save scarce foreign exchange currently expended on imports of foodstuffs (especially rice, beans, corn, onions, and potatoes) and to increase total food availabilities, thereby improving the nutritional intake of the population.

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The initial AID Phase I project was designed to assist the GOSTP in an early phase of the third component of the above agricultural strategy.

#### 4. Other Donor Activity

Since 1976 the Government of Holland's International Technical Assistance Department has been involved in a bilateral assistance effort in Sao Tome and Principe, focusing its efforts on technical assistance in the areas of food crop research and testing, soils analysis and livestock production. Toward this end the Government of Holland has sent several technical experts to STP for short missions, and currently maintains three full-time advisors, one in each of the above areas. The initial AID project was based on this earlier effort by the Dutch Technical Assistance Department. As AID technical assistance, training and equipment deliveries took place, they fit nicely into the overall STP effort. Optimization of the AID inputs was much assisted by the on-site Dutch technicians, and future activities in the proposed project are also expected to benefit from the presence of these very capable, on-site Dutch technicians.

#### B. Detailed Description

This proposed Phase II Project will continue work begun in Phase I by identifying (through soil and crop testing and rainfall analysis) for food crop production and clearing 452 additional hectares of land currently either unused or of marginal productivity for export cash crops. Field trials to identify the most successful varieties for such lands will be continued, along with related testing of pest control methods and other management aspects of a complete farming system. Toward these ends a grant of \$600,000 is required to finance (1) a technical assistance and training contract with a U.S. institution strong in tropical food crops production and (2) a procurement contract with the Afro-American Purchasing Center to arrange for acquisition of appropriate farm implements and pesticides/herbicides. Following is a detailed description of

the proposed project activity presented in logical framework format:

1. Goal

To achieve self-sufficiency of the principal food crops now being imported, e.g., corn, rice, beans and onions. It should be noted, however, that increased production is likely to lead first to increased consumption of these foods (thereby improving nutritional levels) and only later to reduced imports.

2. Purpose

Building on the base established with the Phase I project, identify (through soils and climate analysis) and clear 452 additional hectares of land area (currently unused or unprofitably employed in traditional cash crop production) and develop on such area appropriate and efficient food crop production systems. (See yield projections under Outputs, below.) Production systems development will involve testing and application of improved food crop varieties and of related farming systems, i.e., labor/machine mixes, pest management, irrigation, storage, etc.

3. Outputs

a. Selection of Improved Food Crop Varieties:

	Yield in Tons/Hectare	
	Traditional	Improved
corn	0.75	2.00
rice	--	2.00
beans	--	1.00
onions	--	10.00

b. Area Under Commercial Production

	<u>Area in Hectares</u> <sup>1</sup>	
	<u>From</u>	<u>To</u>
<u>corn</u>	28	100
<u>rice</u>	10	200
<u>beans</u>	10	100
<u>onions</u>	--	(88)

<sup>1</sup>Total of 500 hectares in production, including 48 hectares developed under Phase I project. Onions are planted on the same land between the two normal planting seasons.

4. Inputs

a. Technical Assistance:

(1) Project Manager trips (two per year)	\$40,000
(2) Four short term consultations at two weeks each for crop variety assistance	32,000
(3) Two short term consultants at two weeks each for equipment maintenance and use	16,000
(4) Hydraulic engineer for irrigation systems development (two weeks)	8,000
(5) Unspecified technical assistance <sup>1/</sup>	16,000
(6) Feed production and storage	<u>8,000</u>
	SUB TOTAL
	\$120,000

b. Training:

(1) Short term training (six weeks each) on corn, rice, beans and onions - four trainees	\$32,000
(2) Short term training in equipment maintenance systems (six weeks each) - four trainees	32,000
(3) Unspecified training	<u>16,000</u>
	SUB TOTAL
	\$80,000

<sup>1/</sup> Including, inter.alia, providing the GOSTP with important technical reference materials purchasing subscriptions to some key technical publications (all in Portuguese, if possible.)

c. Commodities:

(1)	Caterpillar D-6 (1)	\$50,000
(2)	Tree removal attachment for Caterpillar D-6 (2)	10,000
(3)	Tree rake attachment (1)	4,000
(4)	Rock rake attachment for Caterpillar D-6 (2)	10,000
(5)	Tractors Massey Fergusson #245 (3)	30,000
(6)	Tractors Massey Fergusson #265 (3)	36,000
(7)	Tractor mounted sprayers (4)	8,000
(8)	Disk plows 3-5 disks (6)	18,000
(9)	Disk harrow eight foot (3)	9,000
(10)	Disk harrow ten foot (3)	9,000
(11)	Row crop cultivator (4)	12,000
(12)	Tractor mounted corn picker sheller (2)	20,000
(13)	Tractor mounted rice harvester (2)	20,000
(14)	Bean harvester (2)	20,000
(15)	Garden tractor 10 HP with implements	10,000
(16)	Jeep Toyota land cruiser (3)	30,000
(17)	Motorcycles (2)	4,000
(18)	Spare parts allowance (25%) + equipment manual in Portuguese, if possible	75,000
(19)	Pesticides	<u>25,000</u>
		--
	SUB TOTAL	\$400,000
	TOTAL	<u>\$600,000</u>

### III. Project Analysis

#### A. Technical Analysis

##### 1. Crops and Production Methods

Crops to be produced within the project are corn, upland rice, beans, and onions. Improved varieties of both corn and rice were selected under a project partially supported by a previous USAID grant. Results from that project indicate that 2000 kg/ha season are entirely feasible for both corn and rice when grown in monoculture. Seed multiplication for both these crops is in progress. Likewise, results from several seasons indicate that selected varieties of "feijao mukunde" (cowpeas) perform well in STP and will produce average yields of 1500 kg/ha.

Common beans, *Phaseolus vulgaris*, the preferred food bean in Sao Tome and Principe, have not been tested sufficiently to establish a level of yield performance. More variety testing and management research is required before production of this species is initiated. However, extensive cultivation of beans in northern South American and in parts of Central America, areas having soils and climatic conditions similar to those in Sao Tome and Principe, attest to the technological possibility of beans in the projected areas.

Onions also require further testing, but more to quantify levels of productivity than to establish its feasibility. Field trial yields of 10,000 kg/ha have been accomplished with this crop in STP and should be replicable under conditions of irrigation and good management.

Crops can be grown for approximately 8-9 months out of each year under rainfed conditions. In Sao Tome, this period is divided into two seasons, the first starting in March and the second in October. The first is the longest season and receives the most rainfall (see Table III.A.3). It is separated from the second by a 3-4 month dry period which provides good conditions for crop harvest. Because of the greater length of

the first season and the larger amount of rainfall received, corn should be planted during this season followed by beans, a shorter season crop, during the second season. This is reflected in the crop schedule given in Table III.A.2.

Onions, where grown, can be started during the March season and transplanted so as to bulb during the June-August dry season. Thus, where onions are grown, land use will be essentially continuous. Supplemental irrigation will be required, but crop quality will be good. Water for irrigation appears to be available, but technical assistance may be required to design an appropriate distribution system.

It is proposed that upland rice production be concentrated in Principe. Rainfall is substantially higher than in Sao Tome areas available for food crop production. The relatively extensive expanse of flat land available will enhance application of the management practices proposed. Again, two crops per year are entirely possible.

Application of a modern, mechanized food crop production system is proposed due to the extremely limited labor supply in STP. Historically, food production was suppressed on the islands so that all labor would be available for plantation operations. While some improved technologies are now available for plantation crops, topography and random plant spacings in existing plantings prevent rapid introduction of more efficient methods. Thus, plantation operations continue to be labor intensive and occupy essentially all agricultural workers on the island.

For a food-production project to be successful, it should use no more labor than required for production of export crops. Labor requirements for cacao are estimated to average 80 man-days/ha in STP. Production of a single crop

of corn, rice, or beans is estimated to require 154, 152, or 110 man days/year, respectively, when traditional farming methods are used. Therefore, within the labor environment of STP, successful expansion of intensive food crop production does not appear likely without extensive use of mechanization.

## 2. Land Areas

Five sites have been selected by the GOSTP for expansion of food crop production. All are on plantations which were nationalized by the Government after independence. In terms of topography, rainfall distribution, or soil characteristics, these sites represent four distinct conditions, as follows:

a. Pinheira. Pinheira is gently to steep rolling (5-10% slope) at an altitude of from 70-110 m. Annual rainfall averages 1280 mm. Rainfall distribution is similar to that at Sao Tome airport (Table III.A.3). At present, approximately 18 hectares are cleared but only 8 are available for food production. Expansion of area will require removal of cacao. Considerable area could be cleared for row crops, but erosion control measures will be necessary. Trees should be left along drainage-ways and on steeper slopes. Contour planting and possibly terraces will be desirable. The soil is of a low PH (4.5-5.0) and will require applications of fertilizer, phosphorous and potassium. However, with proper management the site should be productive of both corn and beans and suitable for mechanization.

b. Ferreira Governo and Canavial. These are neighboring sites in a low rainfall (900-1100mm) area. Distribution is as at Rio do Oro (Table III.A.3). The elevation of Ferreira Governo is approximately 10-30 m and that of Canavial 6-70 m. Slopes at both sites are slight to moderate (5-10%) with no obvious impediments to large scale mechanization. Soils are fertile, deep, and well

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drained. The highest yield of corn so far recorded in STP (9000 kg/ha in experimental plots) was produced on these soils. Water for irrigation is available at both sites via gravity flow from a spring-fed stream. Land presently cleared at each site is 10 ha. Expansion of these limited areas will require removal of cacao and/or oil palm.

c. Agua Casada. Agua Casada is a low elevation (0-80 m), low rainfall (1000 mm) site, having considerable flat, but quite rocky area. Cleared land is extensive because of recent tree removal to increase the Sao Tome airport's runway visibility. The soil is shallow but fertile. A great many small to large rocks are present and will impede utilization of the land by mechanical means. Although development of this land for mechanization will entail considerable initial cost, that cost should be more than offset by reduced future recurring costs of hand labor. The plantation crop in uncleared areas surrounding the site is coconuts. In terms of available land area at sites in Sao Tome, expansion at the Agua Casada location appears the easiest to achieve. From the standpoint of workability (rocks present) and potential productivity (low rainfall, shallow soil), however, it is the least desirable.

d. Sundy. Sundy is on the island of Principe and was not visited by the Project Analysis Team. This site is reported to have a flat, mechanizable area in excess of 200 ha. Present vegetation is abandoned plantation crops, primarily coffee. Rainfall (Table III.A.3) is adequate to support two crops of upland rice each year and, at present, only rice production is proposed for the location. Rice variety trial results support expectations of yields in the order of 2,000 kg/ha.

The proposed project development plan (Table III.A.1) calls for clearing and putting into cultivation, 160

hectares in 1980 and 292 ha in 1981. Timely acquisition of additional equipment will be required if this objective is to be achieved. Land clearing can proceed on Sao Tome with machinery acquired, or to be acquired, under the present AID grant, but no progress appears possible on Principe with existing equipment. Training for equipment operators and guidance in machinery management would also appear helpful in achieving the project objective. Using current methods, an estimated 18 hours are required to clear each hectare. With instruction, it should be possible to reduce this to 6 hours per hectare. Also, multiple shifts would greatly increase productivity of machinery. Currently, machines are operated for a single 8-hour shift (6-6.5 effective hours) each day.

Table III.A.1.

PROJECT DEVELOPMENT  
(Hectares Opened to Cultivation)

<u>Project Sites</u>	<u>Status 9/79</u>	<u>To Be Opened to Cultivation</u>				<u>Total In Cultivation</u>
		<u>Mar 80</u>	<u>Oct 80</u>	<u>Mar 81</u>	<u>Oct 81</u>	
Pinheira	8	--	50	14	28	100
Ferreira Governo	10	20	--	50	20	100
Canavial	10	20	20	--	--	50
Agua Casada	10	--	--	20	20	50
Principe	<u>10</u>	<u>--</u>	<u>50</u>	<u>50</u>	<u>90</u>	<u>200</u>
TOTAL	48	40	120	134	158	500

Table III.A.2.

## a. Zones Opened by Seasons and Crop

Zones	1980				1981			
	March		October		March		October	
	Ha	Crop	Ha	Crop	Ha	Crop	Ha	Crop
Pinheira	--		50	Corn	64	Beans	92	Corn
Ferreira Governo	20	Onions	20	Beans	70	Onions	90	Beans
Canavial	20	Beans	40	Corn	40	Beans	40	Corn
Agua Casada	--		--		20	Corn	40	Corn
Principe	--		50	Rice	100	Rice	190	Rice
TOTAL -	40		160		294		452	

## b. Hectares To Be Planted, by Crops and Seasons

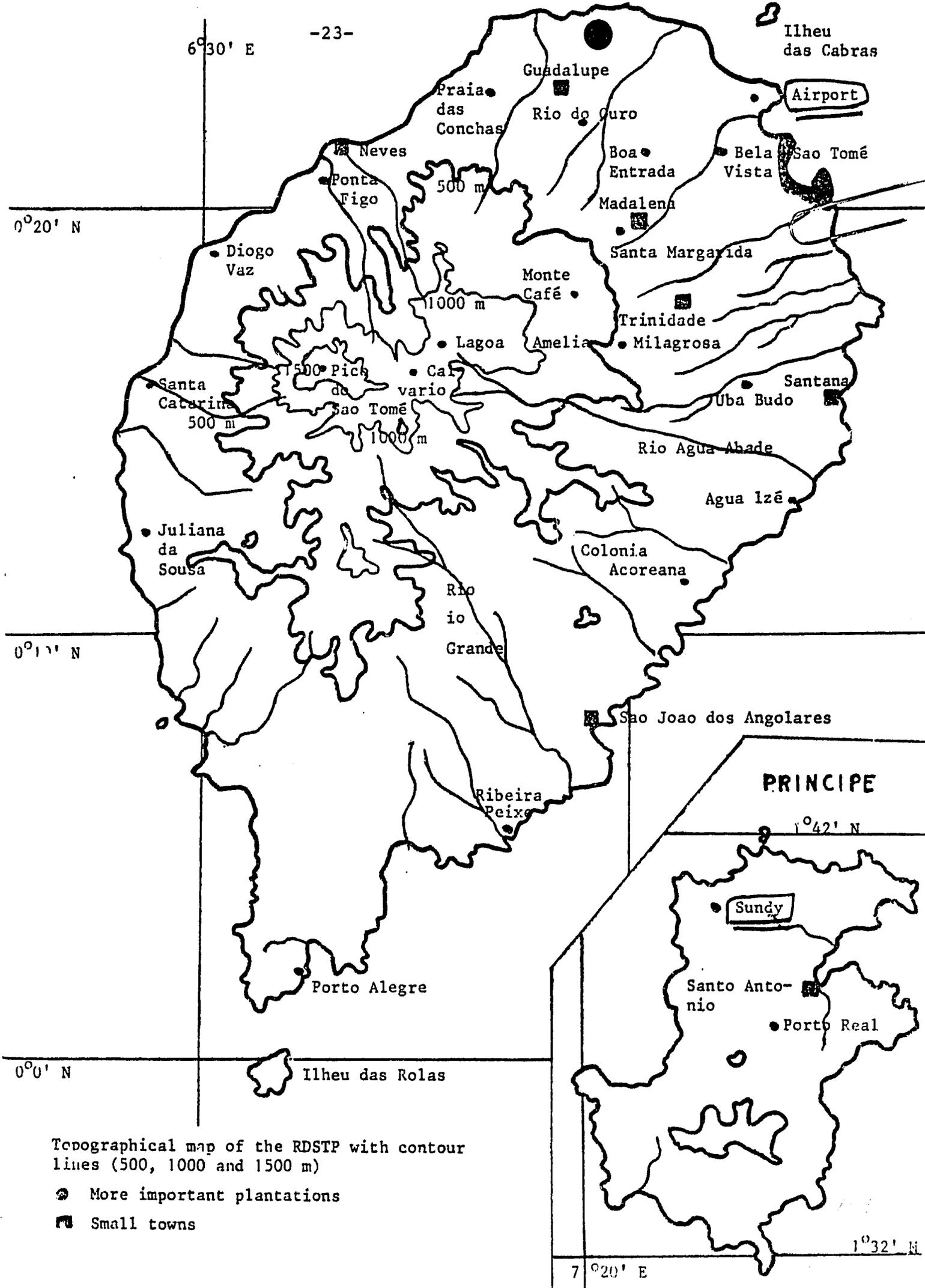
Crops	1980		1981	
	March	October	March	October
Beans	20	20	104	90
Corn	--	90	20	172
Rice	--	50	100	190
Onions	20	--	70	--
TOTAL	40	160	294	452

TABLE III.A.3.

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SAO TOMÉ

PRINCIPE

	Temp				Temp				Temp				Temp			
	max	min	SH	Rain	max	min	SH	Rain	max	min	SH	Rain	max	min	SH	Rain
	Airport (23 yrs)				Monte Café (8 yrs)				Aqua Izé (7 yrs)				Sao Antonio (13 yrs)			
	Altitude sea level				Altitude 640 m				Altitude sea level				Altitude sea level			
jan.	29.8	21.7	4.9	83	25.3	19.9	2.5	164	29.3	22.6	4.7	138	30.1	21.9	3.5	147
feb.	30.3	21.8	5.3	79	26.2	20.0	3.0	190	30.0	22.8	5.9	113	30.9	22.2	4.2	114
mch.	30.5	21.9	4.7	134	26.5	20.0	2.6	265	29.9	22.7	5.3	192	30.9	22.2	3.9	201
apr.	30.3	22.0	4.8	142	26.4	20.0	3.2	352	29.9	22.8	5.3	209	30.7	22.2	3.9	252
may	29.6	22.0	4.8	142	25.8	19.9	3.6	267	28.7	23.1	4.5	268	29.9	22.2	3.7	292
june	28.2	20.8	5.8	4	24.2	18.5	3.8	5	26.1	22.2	4.0	11	28.9	21.5	4.7	89
july	27.8	19.9	5.4	0	23.1	17.6	2.6	3	25.3	21.5	3.2	23	28.0	21.1	3.2	30
aug.	28.1	20.1	4.6	1	22.8	17.8	1.6	20	25.5	21.6	2.5	64	27.9	21.1	2.2	51
sept.	29.0	20.8	4.1	14	23.1	18.4	1.4	145	26.5	21.9	3.0	116	28.2	21.4	1.7	204
oct.	29.1	21.3	4.1	97	23.9	19.0	2.0	301	27.2	22.3	3.7	193	28.6	21.5	2.0	376
nov.	29.2	21.4	4.4	107	24.7	19.3	2.3	282	27.9	22.5	4.2	168	29.3	21.6	3.2	168
dec.	29.3	21.6	5.0	97	25.2	19.5	3.0	151	28.4	22.4	5.1	201	29.9	21.7	3.7	120
jan.	29.8	21.7	4.9	83	25.3	19.9	2.5	164	29.3	22.6	4.7	138	30.1	21.9	3.5	147
feb.	30.3	21.8	5.3	79	26.2	20.0	3.0	190	30.0	22.8	5.9	113	30.9	22.2	4.2	114
av.	29.3	21.3	4.8	899	24.8	19.2	2.6	2145	27.9	22.4	4.3	1696	29.4	21.7	3.3	2044
	Rio do Ouro (8 yrs)				Morro da Trindade (8 yrs)				Juliana de Sousa (6 yrs)				Sundy (7 yrs)			
	Altitude below 500 m				Altitude below 500 m				Altitude sea level				Altitude below 500 m			
jan.	29.0	21.8		122	28.7	22.1		153	28.6	23.0		559	29.1	22.9		173
feb.	29.7	22.0		112	28.9	22.3		126	29.3	23.4		409	29.5	22.9		109
mch.	29.5	22.0		167	29.9	22.3		199	29.4	23.2		455	29.6	22.8		340
apr.	29.4	21.9		206	29.8	22.3		240	29.8	23.2		417	29.7	22.9		306
may	29.0	21.6		189	29.5	21.9		179	28.8	23.1		621	28.9	22.5		409
june	27.7	20.4		2	28.4	20.2		2	27.1	21.9		39	28.0	21.7		29
july	26.8	19.8		0	27.5	19.4		1	25.7	21.0		57	27.0	21.0		41
aug.	27.1	20.2		3	27.4	19.7		6	25.4	21.1		187	26.9	21.2		74
sept.	27.4	20.6		25	27.8	20.2		64	25.7	21.7		594	26.8	21.6		292
oct.	27.7	20.9		123	28.4	20.9		215	26.4	22.3		920	27.1	21.8		425
nov.	28.0	21.1		108	28.7	21.3		186	27.1	22.5		962	27.9	22.2		186
dec.	28.3	21.4		68	28.6	21.6		140	27.8	22.9		642	28.7	22.7		150
jan.	29.0	21.8		122	28.7	22.1		153	28.6	23.0		559	29.1	22.9		173
feb.	29.7	22.0		112	29.9	22.3		126	29.3	23.4		409	29.5	22.9		109
av.	28.3	21.1		1127	28.7	21.2		1512	27.6	22.4		5863	28.3	22.2		2534
	Ponta Figo (8 yrs)				Santa Catarina (8 yrs)				Lagoa Amélia (7 yrs)				Porto Real (7 yrs)			
	Altitude below 500 m				Altitude below 500 m				Altitude 1400 m				Altitude below 500 m			
jan.	28.9	22.3		96	28.6	22.9	3.8	265	21.8	15.3		190	29.5	22.4		148
feb.	29.5	22.7		111	29.2	23.1	4.5	225	22.9	15.3		215	30.3	22.5		141
mch.	29.3	22.5		236	29.3	23.1	3.7	290	22.8	15.3		278	30.4	22.4		286
apr.	29.2	22.5		237	29.4	23.1	4.0	338	22.4	15.4		330	30.5	22.7		235
may	28.8	22.2		180	28.6	23.0	3.8	395	21.3	15.3		362	29.7	22.4		344
june	27.5	20.8		1	27.3	21.8	4.9	12	21.1	14.1		15	28.7	21.7		76
july	27.0	20.4		0	26.4	21.2	4.8	11	20.3	13.4		21	27.6	21.4		49
aug.	27.4	20.9		0	26.2	21.5	3.5	45	19.6	13.8		49	27.2	21.6		120
sept.	27.7	21.3		40	26.1	21.7	2.3	205	20.2	14.3		255	27.4	21.6		272
oct.	27.8	21.4		119	26.5	22.1	2.0	532	21.0	14.7		420	27.9	21.8		470
nov.	27.7	21.5		113	27.0	22.4	2.4	481	20.9	14.9		413	28.6	22.0		164
dec.	28.2	21.8		75	28.0	22.7	3.8	239	21.2	15.0		179	29.2	22.2		118
jan.	28.9	22.3		96	28.6	22.9	3.8	265	21.8	15.3		190	29.5	22.4		148
feb.	29.5	22.7		111	29.2	23.1	4.5	225	22.9	15.3		215	30.3	22.5		141
av.	28.2	21.7		1210	27.7	22.4	3.6	3036	21.3	14.7		2727	28.9	22.1		2424



Topographical map of the RDSTP with contour lines (500, 1000 and 1500 m)

- More important plantations
- Small towns

B. Financial Analysis

1. Financial Rate of Return

The internal rate of return has been calculated in the economic analysis in Section D., below.

2. Recurrent Budget Analysis of the Implementing Agency

Although GOSTP officials in the Ministry of Agriculture were extremely cooperative and forthcoming with regard to most aspects of the project analysis team's technical work, they continue (as was noted in the Phase I Project Paper) to be reserved about sharing of financial data. As a result, no budget was attained either for the Ministry of Agriculture overall, or for the Food Crops Program. Although it is common knowledge in STP that the Government has some sort of national development plan into which the proposed project fits, this plan also seems to be for official eyes only. Therefore, some of the financial analysis information usually provided is unavailable.

That said, it is the opinion of the project analysis team that the financial environment for the proposed project is quite favorable. GOSTP officials dealt with during the project analysis mission (both from the Ministry of Agriculture and the Ministry of Foreign Affairs) were knowledgeable about the project and obviously eager to continue with a Phase II effort. Key contacts in the Ministry of Agriculture/Directorate of Research (the principal project implementation agent) are pragmatic, hard working individuals who have a clear understanding of what they must accomplish as well as a good notion of how to do so. The missing ingredients (some technical assistance, training and equipment) should be very well utilized by these individuals.

The GOSTP inherited a good agricultural research infrastructure from the Portuguese and it has maintained the system. During Phase I, the GOSTP established new departments in the Ministry of Agriculture with appropriate funding and staffing. It also provided all the local currency requirements for the Phase

I project on a timely basis. Given this record, the fact that the Phase II project is part of a priority GOSTP program and that the expected benefits from the project are exceptionally high, there seems to be no reason to doubt that the necessary GOSTP inputs (funds and personnel for training) will be made available when needed.

### 3. Financial Plan/Budget Tables

The Project Budget is presented in Table III.B.1., below. The total cost of the project is estimated to be \$1.3 million, not including the value of the land being put into food crops by the GOSTP. The U.S. share of the project is just under 45 percent. The Supporting Services and Project Administration, as well as most of the labor component of the Land Clearing and Direct Production Costs, represent "in kind" contributions by the GOSTP since the project sites are located on already staffed and functioning government plantations and the agricultural supporting services are also already functioning. Additional GOSTP funding will be required, however, for equipment operating costs, seeds, fertilizer and some additional insecticides/herbicides.

Table III.B.1.

## PROJECT BUDGET

(US \$1,000)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Total</u>
A. <u>A.I.D. Grant</u>				
1. Technical Assistance	\$120	---	---	\$120
2. Training	80	---	---	80
3. Equipment (including spares)	375	---	---	375
4. Pesticides/Fungicides	25	---	---	25
	<u>\$600</u>	<u>---</u>	<u>---</u>	<u>\$600</u>
B. <u>G.O.S.T.P.</u>				
1. Land Clearing	20	38	---	58
2. Direct Crop Production Costs	40	160	190	390
3. Supporting Ag Services <sup>1/</sup>	20	70	80	170
4. Project Administration <sup>1/</sup>	16	54	54	124
Sub-Total GOSTP	<u>96</u>	<u>322</u>	<u>324</u>	<u>742</u>
5. Land (hectares) <sup>2/</sup>	<u>(160)</u>	<u>(292)</u>	<u>---</u>	<u>(452)</u>
TOTAL PROJECT COSTS	\$696	322	324	1,342

<sup>1/</sup> Calculated at 20% of Items 1+2+3.

<sup>2/</sup> Additional area to be brought into cultivation during the project.

### C. Social Analysis

#### 1. Background

Under the Portuguese colonial administration a highly successful, plantation-based, export-oriented economic system was developed on the two islands known as Sao Tome and Principe. From the very outset of STP's settlement by Portuguese entrepreneur farmers, acquisition of adequate labor was a problem. The islands had no previous population, so a labor force was imported from Africa and employed as slaves. Subsequently, with the abolition of slavery, the practice of holding people on the plantations was continued, but by different means. A secure, fixed daily wage considered to be sufficient for living, housing, health care and schools were provided for plantation workers and their families. To limit the possibility of erosion of the export crop system, plantation workers were discouraged from developing small farm plots to supplement their fixed income.

Ready availability of large numbers of plantation laborers was absolutely essential to survival of the export economy because the principal crop (cacao) lends itself to virtually no mechanization. Planting, which is done only occasionally since trees can produce for decades, is a manual operation. Pruning and spraying can only be done by hand, and the same is true of harvesting. A recently completed analysis of labor productivity on STP cacao plantations estimates that one laborer is required for every 2.5 hectares of trees. Add to this the supporting cast required to run such large farming/social infrastructure operations and you have plantations such as the one visited at Rio do Oro which have 2,000 workers looking after 2,500 hectares of cacao (1.25 hectares per worker).

Yet cacao is an immensely profitable crop, yielding in STP a net profit per hectare of some \$3,000 (based on 1977 cacao prices) -- all in foreign exchange. With some 25,000 hectares of land suitable for cacao production, and a total STP population of only 75,000, it is little wonder that labor is in short supply.

## 2. Beneficiary Analysis

It is only in light of this background that a beneficiary analysis of the impact of the proposed project can be made. The realities of the STP export crop economy did not suddenly change with independence. The system is still very much intact, and despite some emigration of Portuguese technical personnel, it continues to operate reasonably well. The only difference seems to be that now the larger of STP plantations (all of which were owned by absentee owners/corporations) are now state enterprises. The labor shortage, the fixed daily wage for agricultural workers, even policies to discourage growth of independently owned small farms, all continue.

The GOSTP effort to develop food crop production on unused land, or on land of marginal utility for cacao, will thus only have an indirect effect on individual Sao Tomeans. Workers on such farms will be plantation employees, not independent farmers, and they too will earn the plantation wage. Mechanization of food crop production appears to be profitable in the STP environment, so labor shortages should not be significantly exacerbated. Therefore, to the extent that lands devoted to food crops are more productive than they were previously, the first direct project benefit should be increased income and profitability of GOSTP plantations.

Whether such project impacts will be converted into benefits to the citizens of STP is very much a function of GOSTP policy. In theory, at least part of such productivity gains should be passed through to the people in the form of increased wages or improved social services. With the new government only four years old, and cacao production and world prices (thus foreign exchange earnings) having slumped in the past two years, it is too soon to tell what GOSTP policies will be in this regard. Regardless of GOSTP policy, it is likely that the workers on the plantations in the project will manage to improve their diet. The second

expected major project benefit is a reduction in food imports and, to the extent that the foreign exchange value of food crop output exceeds the cost of imported inputs (machinery, pesticides, etc.), and savings in foreign exchange. Given, however, the lower than desirable levels of per capita food consumption, it is probably that there will be an increase in food availabilities during Phase II rather than a reduction in food imports (more likely to occur in a third phase). With increased food availabilities, there is likely to be some fall in black market prices for food (an indirect benefit) as well as a reduction in the number of people who are forced to go to the black market to buy their food needs.

The project analysis team feels that at this point in time the appropriate approach for AID is simply to assist the GOSTP as necessary in development of a suitable food crops production technology, and wait and see how the fruits of any productivity increases are shared. Any attempted intervention in economic and social policy at this point in time would not be acceptable to the newly formed government, and there is every reason to believe (based on overall government posture) that an equitable sharing of productivity increases will be forthcoming when they are realized.

#### D. Economic Analysis

Project economic analysis is handled on two levels: (1) an internal rate of return analysis of predicted Input, Output and Purpose relationships, and (2) a general analysis of overall production requirements to meet the Project Goal.

##### 1. Input, Output, Purpose Level

Direct economic benefits from the proposed project are defined as any increase in output (measured by dollar value of produce) from the land areas utilized. Thus where previously unutilized land is brought into production, the entire dollar value of the output is treated as a benefit. Where project fields

are carved out of areas previously devoted to sub-marginal cacao production, the excess of the value of food crop production over cacao production is treated as the benefit. For simplicity's sake, no indirect benefits are attributed to the project, though these may indeed be substantial (e.g., training, demonstration of improved production systems, better use of equipment, etc.).

On the other side of the ledger, the items included as project costs for purposes of calculating the IRR are: (1) AID inputs of technical assistance, training, and commodities (incurred in year 0); (2) a sinking fund equal to ten percent of initial equipment costs, beginning in year one, for equipment maintenance and repairs; (3) land clearing costs (other than equipment costs); and (4) labor and other production costs for the project areas not now in production. Production costs for the project areas being taken out of marginal cacao production are not included as they are estimated to approximate the costs that would have been incurred under continued farming of the sub-marginal cacao. For the purposes of the IRR computation, the supporting services and project administration contributions of the GOSTP are also not included since these services are already in place.

For purposes of computing an internal rate of return for the project, a ten-year economic life is assumed. No salvage value is attributed to project equipment, and the cleared project land is assumed to have the same value as it had prior to clearing.

Table III.D.1.

COSTS AND BENEFITS FROM STP CROP PRODUCTION AND DIVERSIFICATION PROJECT (PHASE II)  
(US \$1,000)

Year	COSTS <sup>1/</sup>					BENEFITS <sup>2/</sup>						Net Benefit Stream
	USAID	GOSTP			Total	Corn	Rice	Beans	Onions	Lost Cacao Production	Total	
		Land clearing	Prod. Costs	Sink. Fund								
0	600				600							[600]
1		20	8	30	58	65	70	24	200	[90]	269	211
2		38	44	30	112	138	406	116	700	[191]	1,169	1,057
3			57	30	87	153	532	133	900	[191]	1,527	1,440
4			57	30	87	153	532	133	900	[191]	1,527	1,440
5			57	30	87	153	532	133	900	[191]	1,527	1,440
6			57	30	87	153	532	133	900	[191]	1,527	1,440
7			57	30	87	153	532	133	900	[191]	1,527	1,440
8			57	30	87	153	532	133	900	[191]	1,527	1,440
9			57	30	87	153	532	133	900	[191]	1,527	1,440
10			57	30	87	153	532	133	900	[191]	1,527	1,440

The IRR is 114.6

<sup>1/</sup> USAID costs are detailed in Section II.B.4. GOSTP costs, other than the sinking fund are from Tables III.D.2. and 3., which follow.

<sup>2/</sup> Benefits figures are from Table III.D.4., below.

## LAND CLEARANCE COSTS

A. Hectares to be Cleared<sup>1/</sup>

<u>Zone</u>	<u>Actual</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Total</u>
Pinheira	18 <sup>2/</sup>	40	42	100
Ferr. Governo	10	20	70	100
Canavial	10	40	--	50
Agua Casada	50 <sup>3/</sup>	--	--	50
Principe	10	50	140	200
	98	150	252	500

B. Cost Calculations

	<u>Year 1</u>	<u>Year 2</u>
1. Estimated # of Work Hours <sup>4/</sup>	1,500	2,520
2. Gas & Oil for Equipment - Rate	\$2.50	\$2.75
3. Amount	3,750	6,930
4. General Labor Costs - Rate	\$6.00	\$6.60
5. Amount	9,000	16,632
6. Supervision/Skilled Labor - Rate	\$5.10	\$5.60
7. Amount	7,650	14,112
8. Total Costs (3+5+7)	<u>\$20,400</u>	<u>\$37,674</u>

<sup>1/</sup>Based on Tables III.A.1. and 2.

<sup>2/</sup>Only 8 hectares currently in production.

<sup>3/</sup>Only 10 hectares currently in production. Although cleared of trees, considerable rock removal is still required.

<sup>4/</sup>At 10 hours per hectare. Current is 18 but should eventually get to about six by end of project.

PRODUCTION COSTS  
(RICE LANDS ONLY - PRINCIPE)<sup>1/</sup>

	<u>Year 1</u>		<u>Year 2</u>		<u>Year 3, 4, etc.</u>
	1st	2nd	1st	2nd	
Additional Hectares Planted	---	(50)	(100)	(190)	(190)
Production Costs, excluding Labor <sup>2/</sup>	---	5,000	10,000	19,000	38,000
Labor Costs <sup>3/</sup>		<u>2,500</u>	<u>5,000</u>	<u>9,500</u>	<u>19,000</u>
Total		7,500	15,000	28,500	57,000
		<u>\$7,500</u>	<u>\$43,500</u>		
To Table III.D.1. (in \$1,000)		8	44		57

<sup>1/</sup> Lands already abandoned in contrast to other areas generally being taken out of cacao. Assume new costs incurred in marginal cacao lands equal cacao production costs foregone.

<sup>2/</sup> Calculated at \$100 per season or \$200 per year based on data provided in a Dutch T.A. report of 1977. Costs are included for fertilizer, seeds, herbicides + fuel + oil for equipment.

<sup>3/</sup> At \$100 per year hectares (\$50 per season).

PROJECT BENEFITS

I. Food Crop Income

<u>Crop</u>	<u>Ha Put in Food Crops<sup>1/</sup></u>			<u>Yield</u> (kilo/ha)	<u>Price</u> (\$/kilo)	<u>Gross Food Receipts</u>		
	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3+</u>			<u>Year 1</u>	<u>Year 2<sup>2/</sup></u>	<u>Year 3+</u>
Corn	90	192	212	2,000	0.36	65	138	153
Beans	40	194	222	1,000	0.60	24	116	133
Rice	50	290	380	2,000	0.70	70	406	532
Onions	20	70	90	10,000	1.00	200	700	900

II. Lost Cacao Production<sup>3/</sup>

	<u>Ha Taken from Cacao</u>							
	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3+</u>					
Cacao	100	212	212	300	3.50	90	191	191

<sup>1/</sup>Based on data in Tables III.A.1. and 2.

<sup>2/</sup>Per \$1,000

<sup>3/</sup>Marginal cacao lands being cleared for production of food crops under proposed project.

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## 2. Goal Level

An analysis of the feasibility of achieving food crops self-sufficiency and the foreign exchange impact of increased local food production is included in a report (in French) which was done in 1977 by a Mr. Bredero for the Government of Netherland's Technical Assistance Department. Because that analysis focuses directly on the needs of this Project's goal level analysis, there follows a short summary of the Dutch study.

Bredero analyzed food requirements to 1986, taking into account various possible trade-offs between foods to meet income and protein requirements. He concluded that to meet requirements from domestic production, it would be necessary to produce some 2,400 tons of rice, and additional 2,700 tons of corn up to 3,300 and 1,500 tons of beans. To do this, he calculated a need for the following cultivable land areas (hectares): irrigated rice 200, rainfed rice 670, corn 1,320 and beans 1,500. Allowing for double cropping and crop rotation between corn and beans, total area needed for these food crops would be less than 2,400 hectares. Bredero found that some 2,000 hectares could be developed rapidly. With some mechanization, he did not believe that manpower would be a constraint.

Bredero also compared the foreign exchange requirements for achieving self-sufficiency of the principal food imports with the project savings of food imports. He calculated that foreign exchange savings (using 1977 import prices) would amount to \$2.7 million while the increase in exchange costs from local production would be only \$692,000 or a net savings of \$2 million.

Thus, it appears that the project goal is both technically and economically feasible. Achieving self-sufficiency also implies increased per capita food availabilities because Bredero's figures allow for a needed increase in per capita consumption of the food cited. Achieving the project goal would also result in increased foreign exchange availability, thereby permitting

the GOSTP to increase imports of other foods (e.g., wheat flour) which cannot be grown on the islands economically.

E. Environmental Analysis

Due to the lowland topography of the area identified for expanded food crop production, and its moderate and well distributed rainfall pattern, there appear to be minimal environmental hazards involved with the project. On one site where there is a possibility of erosion, plans are being made for strip cropping. Further, trials with reduced tillage systems are in progress to gain experience with soil conserving management practices. Dutch teams have counseled Sao Tomean officials on the potential for erosion and this apparently has influenced the selection of sites for intensive cultivation. Rotations between legume (bean) and cereal (corn) crops are also planned as a soil conservation measure.

Leaching of nutrients is common in high rainfall environments, occurring under both forest and crop canopies. The result is an acid soil condition, accompanied by nutrient deficiencies, toxicities and tie-ups. At one site on Sao Tome (Pinheira), replacement of nutrients used by plantation crops or leached out over centuries will be required. At the remaining site in Sao Tome, soil fertility is currently adequate and economics should limit fertilizer application to replacement of those nutrients used by the food crops. Fertilizer response trials are being started this season to determine the needs of food crops and to define response curves.

Irrigation water, where used, is derived from spring-fed streams. Water quality is reported to be excellent. No standing or very slowly moving water which might harbor organisms harmful to human health (mosquitos, snails, etc.) was apparent.

Not all pesticides required for the project have been identified. Herbicides specifically requested -- Attazine, Prowl, Proponil and Paraquat -- are short-lived ( 1 year) in the soil and should present no hazard with proper use. It is anticipated that all insecticides will be acquired on the US market and will be approved by the Environmental Protection Agency for their intended use.

See Annex B (Initial Environmental Examination) for further data concerning project environmental impacts.

IV. Implementation Plan

A. Administrative Arrangements

1. GOSTP

The implementing agency for this project will be the Ministry of Agriculture working through its Directorates of Research, Agriculture and Forestry, and Logistical Support. Title to all project commodities will be taken by the Ministry of Agriculture, their care and maintenance will be Ministry responsibility, and all equipment operators will be Ministry employees.

The project sites themselves are individual, state-owned plantations which are operated as semi-autonomous profit-making enterprises under the supervision of on-site managers. General plantation policies, however, emanate from the Ministry of Agriculture so cooperation of the plantations in devoting designated areas for food crop cultivation and providing work crews is assured. The harvest from project crops, except for that amount required by the Ministry for seed, will thus remain with the plantation and will be marketed as part of its overall agricultural output.

It is expected that this basically paternal relationship between the Ministry of Agriculture and project site plantations (with the Ministry providing technical expertise, equipment and agricultural inputs and the plantations providing land and labor) will continue until the food crop farming systems are well established, profitable operations. Evolution of the overall system beyond this point is not clear, but it seems likely that eventually the plantations themselves will take on more of the responsibility for equipment acquisition, operation and maintenance, seed storage and other routine agricultural functions.

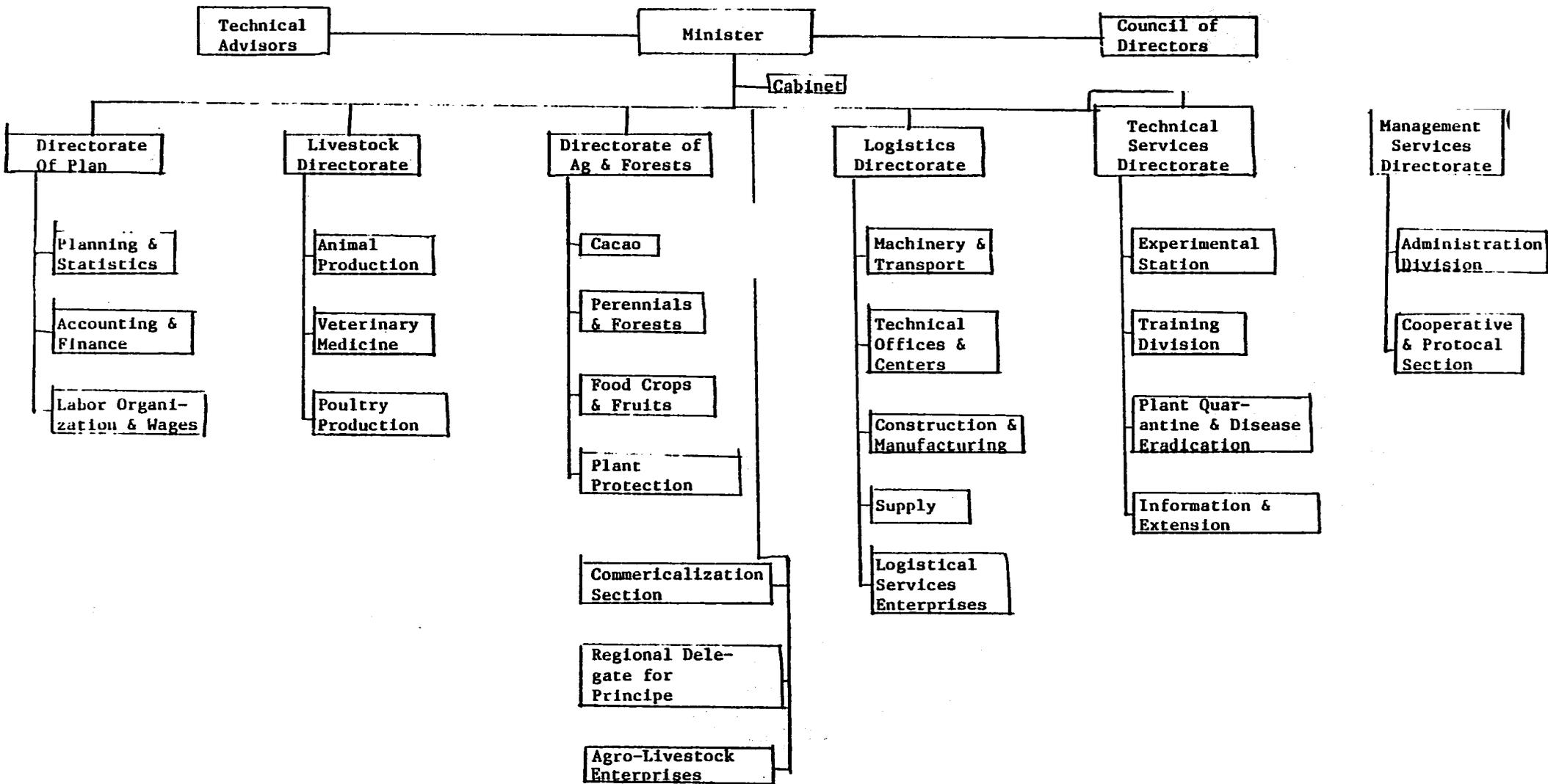
The officials relating to the Phase I project have changed dramatically (Ministers of Economic Coordination and Agriculture as well as Director of Agricultural Research);

yet despite such disruptions, work under the project exceeded expectations. Now, with the Government in its fourth year of operations, turnover is less notable and better technicians have moved into key positions.

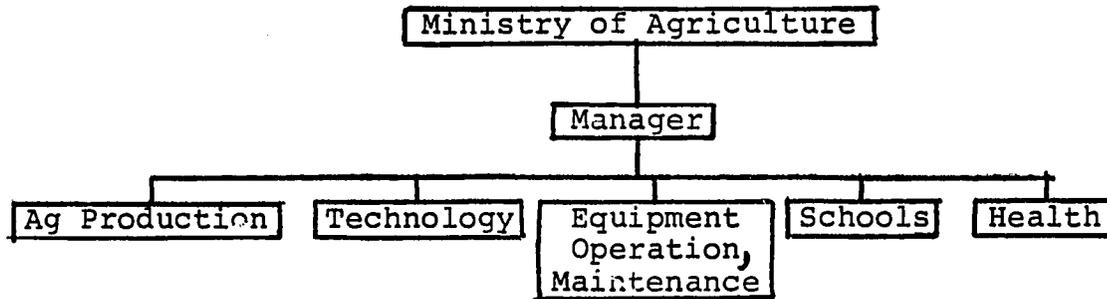
The proposed Phase II project will also start off with the advantage of having two key Department Heads (Marie Odele, Chief of Corn Research and Agostino Doris, Chief of Rice Research) returned from brief but valuable training stints at IITA and working full time on the project. In addition, it will continue to enjoy the very positive influence of the two capable Dutch technical advisors working on the same project activities (William Heemskerk, Food Crops Advisor and Harco Hellema, Soils Scientist). Additional Dutch assistance is expected to follow in the next several years in the areas of agricultural economics and farm management. As far as the project analysis team was able to determine, there is absolutely no rivalry between the two parallel efforts, but rather a very fortunate complementarity.

Following is an organizational chart of the Ministry of Agriculture and a chart indicating the super-structure of the typical GOSTP-owned plantation.

ORGANIZATION OF THE GOSTP MINISTRY OF AGRICULTURE



Organization of GOSTP Owned Plantations



2. AID

Because of the difficulty of living and working in STP at this time, the modest size of the proposed project, and lack of any official US representation in-country, no permanent technical assistance presence is proposed. Rather, it is proposed that all necessary technical assistance be handled through a US-based agent (possibly a University contractor) serving the project with short-term consultations. Technical training would also be administered through this contractor, although it is unlikely that much, if any, of the individual training assignments would be accomplished at the contractor's own facilities. The GOSTP/Ministry of Agriculture has very specific needs, mostly for short-term, practical training, and individuals proposed for such assignments are not expected to have any facility in English. Desired training sites are thus likely to be in Portuguese-speaking countries. It will be the job of the project contractor to identify such sites, arrange for assignment to appropriate programs, and facilitate delivery of trainees to the sites. There will be no AID support to this effort other than any general guidance the Office of International Training in AID/W might be able to give to the project contractor.

The current Crop Production and Diversification project in STP is administered from AID/W, acting through the US Embassy in Libreville, Gabon. Technical assistance is provided from the International Institute of Tropical Agriculture (IITA) in Nigeria, and commodity procurement by

the Afro-American Purchasing Center in New York. Although the technical assistance and commodity procurement tasks have worked reasonably well, the arrangement for general administration from AID/W has not been satisfactory and may have contributed somewhat to the long delays in equipment procurement. It seems likely that this situation will be remedied by transferring general project monitoring responsibility to the REDSO/WA in Abidjan, or failing that, to a nearby USAID such as the Mission in Yaounde. Either of these alternatives seems preferable to the present arrangement of project monitorship from AID/W.

Within 30 days following the first Project Contractor visit, the Contractor will submit as its first report a revised (if necessary) and more detailed implementation plan, including work plans for training and provision of technical assistance. Semi-annually thereafter, the Project Contractor will submit a report of progress in relation to the revised implementation plan in all aspects of project development, including equipment procurement and utilization. The Project Contractor's reports shall be submitted to the AID project monitor in West Africa (five copies), the American Embassy in Libreville (two copies), the STP Country Desks in AID/W (two copies) and the responsible AFR/DR division in AID/W.

B. Implementation Plan

Project Authorization	December 1, 1979
Project Agreement	February 1, 1980

[AID Agricultural Equipment Specialist and Procurement Specialist shall accompany AID Project Agreement signing team and shall spend three days with GOSTP officials viewing sites and finalizing equipment selection. It is essential that

WJ

a complete line of Massey Fergusson and Caterpillar equipment catalogues (preferably in Portuguese) be brought along on this mission, along with price lists. Equipment Specialist should also assist GOSTP in development of a plan for more intensive equipment use (see IV.D., Conditions and Covenants)]

PIO/C Issued in AID/W	February 15, 1980
RFP for Project Contractor (TA and Training)	March 1, 1980
Project Contract Awarded	June 1, 1980
First Project Contractor Visit	July 1, 1980
[Familiarization with site and development of TA and Training work plan].	
Equipment delivery	December 1, 1980
Project Evaluation	December 1, 1981
[Assess progress during first two project years, during only one of which equipment will have been on site and in use, and determine feasibility of further assistance in a larger scale, third and final project phase which could result in food crop self-sufficiency for STP - the Project Goal.]	
Phase II Project Close	December 1, 1982

C. Evaluation

A third-party evaluation (indicated in the Implementation Plan above) shall be carried out approximately one year (two crop seasons) after project equipment has been delivered to

site. This evaluation should be conducted by an AID Project Officer accompanied by appropriate agricultural technicians, and its objective should be to assess progress toward Output, Purpose and Goal achievement and feasibility of any Phase III follow-on project.

D. Conditions and Covenants

As a condition precedent to execution of a PIO/C for project equipment, the GOSTP will present to AID a satisfactory plan for more intensive use of such equipment, which plans shall include provisions for double shifting of equipment operation during planting and harvesting periods and continually during land clearing (Caterpillar D-6's only), as well as plans for transport of operators to equipment locations and provision of maintenance services on a 24-hour basis.

ANNEX A

Logical Framework

4

**PROJECT DESIGN SUMMARY**  
**LOGICAL FRAMEWORK**

Annex A

Life of Project:  
From FY 1980 to FY 1983  
Total U.S. Funding \$600,000  
Date Prepared: October 16, 1979

Project Title & Number: Crop Production and Diversification (Phase II)  
Sao Tome and Principe 658-0001

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS												
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>To achieve self-sufficiency of the principal food crops now being imported, e.g., corn, rice and beans.</p>	<p>Measures of Goal Achievement:</p> <p>Self-sufficiency requires higher per capita consumption of the three foods, e.g., 23.5 kilos of rice, 32.4 kilo of corn and 14.7 kilos of beans, plus reduction of imports of these foods to virtually zero. An intermediate indicator would be per capita food availability (imports and production).</p>	<p>GOSTP import and production statistics. Reduction or elimination of black market in food would be a positive development, but could develop solely as a result of increased imports or possibly changes in price policy.</p>	<p>Assumptions for achieving goal targets:</p> <ol style="list-style-type: none"> <li>(1) No severe climatic changes</li> <li>(2) GOSTP maintains its commitment to the self-sufficiency goal</li> <li>(3) Mechanization of food crop production in STP is feasible.</li> </ol>												
<p>Project Purpose:</p> <p>Identify (through soils and climate analysis), clear and put into production (corn, rice and beans) 452 additional hectares of land which is currently unused or unprofitably employed in traditional export crops.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <p>Five hundred hectares (including 48 from Phase I project) will be in production and producing:</p> <table border="0"> <tr> <td>Corn</td> <td>500 tons</td> </tr> <tr> <td>Beans</td> <td>250 tons</td> </tr> <tr> <td>Rice</td> <td>800 tons</td> </tr> </table>	Corn	500 tons	Beans	250 tons	Rice	800 tons	<p>GOSTP statistics -- either Ministry of Agriculture or the GOSTP plantations where the project sites are located.</p>	<p>Assumptions for achieving purpose:</p> <ol style="list-style-type: none"> <li>(1) Project sites will be cleared by the end of Year 2 of the project, which depends upon:</li> <li>(2) AID-financed equipment arrives on schedule.</li> <li>(3) Plant varieties can be selected and seeds produced for planting by the time lands are cleared.</li> <li>(4) Plantation management attention and other inputs will be provided on a timely basis.</li> </ol>						
Corn	500 tons														
Beans	250 tons														
Rice	800 tons														
<p>Outputs:</p> <ol style="list-style-type: none"> <li>(1) 500 Hectares in food production</li> <li>(2) Crops yielding the outputs expected</li> </ol>	<p>Magnitude of Outputs: Actual Steps</p> <ol style="list-style-type: none"> <li>(1) Areas in production:           <ul style="list-style-type: none"> <li>Corn/Beans - 300 Ha</li> <li>Rice - 200 Ha</li> </ul> </li> <li>(2) Yields (kilos per hectare)           <ul style="list-style-type: none"> <li>Corn - 2,000 ha</li> <li>Rice - 2,000 ha</li> <li>Beans - 1,000 ha</li> </ul> </li> </ol>	<p>GOSTP statistics -- either Ministry of Agriculture or plantations where project sites are located.</p>	<p>Assumptions for achieving outputs:</p> <p align="center">Same as above</p>												
<p>Inputs:</p> <ol style="list-style-type: none"> <li>1. <u>AID Grant</u> <ol style="list-style-type: none"> <li>a. Equipment</li> <li>b. Technical Assistance</li> <li>c. Training</li> <li>d. Fungicides/Pesticides</li> </ol> </li> <li>2. <u>GOSTP</u> <ol style="list-style-type: none"> <li>a. Land Clearing</li> <li>b. Direct Crop Production Costs</li> <li>c. Supporting Ag Services</li> <li>d.&amp;e. Project Management &amp; Land.</li> </ol> </li> </ol>	<p>Implementation Target (Type and Quantity)</p> <p>See Section IV for Implementation Details</p> <table border="0"> <tr> <td>(1) \$600,000</td> <td>(2) \$742,000</td> </tr> <tr> <td>(a) 375,000</td> <td>(a) 58,000</td> </tr> <tr> <td>(b) 120,000</td> <td>(b) 390,000</td> </tr> <tr> <td>(c) 80,000</td> <td>(c) 170,000</td> </tr> <tr> <td>(d) 25,000</td> <td>(d) 124,000</td> </tr> <tr> <td></td> <td>(e) 500 Ha</td> </tr> </table>	(1) \$600,000	(2) \$742,000	(a) 375,000	(a) 58,000	(b) 120,000	(b) 390,000	(c) 80,000	(c) 170,000	(d) 25,000	(d) 124,000		(e) 500 Ha		<p>Assumptions for providing inputs:</p> <ol style="list-style-type: none"> <li>(1) That equipment can be transported to Sao Tome in time to meet project targets</li> <li>(2) That periodic visits of technical assistance personnel will be effective and adequate</li> <li>(3) That no AID in-country presence is needed</li> </ol>
(1) \$600,000	(2) \$742,000														
(a) 375,000	(a) 58,000														
(b) 120,000	(b) 390,000														
(c) 80,000	(c) 170,000														
(d) 25,000	(d) 124,000														
	(e) 500 Ha														

ANNEX B

Initial Environmental Examination

Initial Environmental Examination

Project Location: Sao Tome and Principe  
Project Title: Crop Production and Diversification (Phase II)  
Funding: FY 1980: \$600,000  
Life of Project: \$600,000  
IEE Prepared By: Richard R. Solem AFR/DR/CAWARAP with input from  
Harry C. Minor, Consultant, Experience, Incorporated,  
October 16, 1979

Environmental Action Recommended:

Negative Determination

Concurrence:

Date:

Larry Bond AFR/DS/CAWARAP

Assistant Administrator's Decision:

Approved: \_\_\_\_\_

Disapproved: \_\_\_\_\_

Date: \_\_\_\_\_

Richard R. Solem, AFR/DR/CAWARAP

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Identification and Evaluation 2/

Impact Areas and Sub-areas 1/

A. LAND USE

- 1. Changing the character of the land through:
  - a. Increasing the population -----     N
  - b. Extracting natural resources -----     N
  - c. Land clearing -----     L
  - d. Changing soil character -----     N
- 2. Altering natural defenses -----     N
- 3. Foreclosing important uses -----     N
- 4. Jeopardizing man or his works -----     N
- 5. Other factors
- \_\_\_\_\_
- \_\_\_\_\_

B. WATER QUALITY

- 1. Physical state of water -----     N
- 2. Chemical and biological states -----     L
- 3. Ecological balance -----     L
- 4. Other factors
- \_\_\_\_\_
- \_\_\_\_\_

1/ See Explanatory Notes for this form.

2/ Use the following symbols:

- N - No environmental impact
- L - Little environmental impact
- M - Moderate environmental impact
- H - High environmental impact
- U - Unknown environmental impact

IMPACT IDENTIFICATION AND EVALUATION FORM

C. ATMOSPHERIC

- 1. Air additives -----   N
- 2. Air pollution -----   N
- 3. Noise pollution -----   N
- 4. Other factors
- \_\_\_\_\_
- \_\_\_\_\_

D. NATURAL RESOURCES

- 1. Diversion, altered use of water -----   N
- 2. Irreversible, inefficient commitments -----   N
- 3. Other factors
- \_\_\_\_\_
- \_\_\_\_\_

E. CULTURAL

- 1. Altering physical symbols -----   N
- 2. Dilution of cultural traditions -----   N
- 3. Other factors
- \_\_\_\_\_
- \_\_\_\_\_

F. SOCIOECONOMIC

- 1. Changes in economic/employment patterns -----   M
- 2. Changes in population -----   N
- 3. Changes in cultural patterns -----   N
- 4. Other factors
- \_\_\_\_\_
- \_\_\_\_\_

4/1

IMPACT IDENTIFICATION AND EVALUATION FORM

G. HEALTH

- 1. Changing a natural environment -----   N
- 2. Eliminating an ecosystem element -----   N
- 3. Other factors
- \_\_\_\_\_
- \_\_\_\_\_

H. GENERAL

- 1. International impacts -----   N
- 2. Controversial impacts -----   N
- 3. Larger program impacts -----   N
- 4. Other factors
- \_\_\_\_\_
- \_\_\_\_\_

I. OTHER POSSIBLE IMPACTS (not listed above)

- 1   \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

See attached Discussion of Impacts.

INITIAL ENVIRONMENTAL EXAMINATION

I. Examination of Nature, Scope and Magnitude of Environmental Impacts

A. Description of Project

The proposed project is directed toward crop diversification and improved cultural practices in a three year effort. Its focus is on assisting the GOSTP to direct marginal and unused land into the production of import substitute crops on five agricultural areas on the islands of Sao Tome and Principe. To this end, the project proposes to finance: (1) equipment, including tractors and basic agricultural implements; (2) some fungicides/pesticides; (3) technical assistance; and (4) training. Financing for this project will be by a direct AID grant of \$600,000 and \$742,000 and from the GOSTP for land clearing, production costs, agricultural supporting services, management, etc.

Five sites have been selected by the GOSTP for Phase II of the Crop Diversification Program. All the sites are on plantations that were nationalized by the GOSTP after independence. One has been cleared, but the clearing of the others will be part of the project -- three with old cacao, oil palm or coffee trees, one with large rocks. The five sites are Pinheira, Ferreira Governo, Canavial, Agua Casada and Sundy. The physical characteristics of these sites are described in Section III.A.2. of the Project Paper.

B. Identification and Evaluation of Environmental Inputs

1. Land Use

The project, per se, is expected to have very limited impact on land use. Of the land to be put into food (452 hectares), 50 hectares have been cleared. The balance will be cleared over a two year period. Half of the area to be cleared is an abandoned coffee grove; the balance is largely in marginal cacao with some oil palm. Half of the area is flat with the balance of slight to moderate slope (5-10%). Erosion control measures are expected to be required only at the Pinheira site.

2. Water Quality

Water quality is not expected to be negatively affected by this project.

First, there are not major drainages near the land to be planted to diversified crops and most rainfall on such land will either infiltrate the soil, or be evaporated. Since culinary water is almost exclusively from fast flowing mountain streams near this island's interior the project poses no threat to culinary water supplies either from sedimentation or pollution from the limited fertilizers to be utilized.

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### C. Atmospheric

The limited inputs provided the project are not expected to have an adverse effect on the atmosphere.

### Natural Resources

The major natural resources impact is altered use of land. However, such land has not been fully utilized, being in old cacao or waste. Its reclamation for producing diversified crops will provide a substantial benefit to the Sao Tomeans. No negative environmental impact is anticipated since erosion is not expected to present any problem in most areas, and the GOSTP is technically able and motivated to take necessary measures to guard against erosion where potential problems might arise.

### Cultural

No cultural impact is foreseen.

### Socio-economic

Some positive socio-economic impacts are foreseen. Present farming practices do not include production of basic food crops (which are mainly imported). Consequently plantation workers will have to learn to cultivate these new crops and to utilize the appropriate mechanical technology. The increase in availability of basic foods is a positive socio-economic impact.

### Health

The major health benefit from the project is also positive, albeit, indirect. Increased domestic production of basic foods should increase the level of nutrition of the relatively poor population.

### General

Only extremely limited amounts of fertilizers and insecticides/fungicides will be used, and minimal changes in resource use introduced. Our best judgement is that negative environmental impacts are minimal and should not limit the viability of the project. Therefore, a negative determination is recommended.

## II. Recommendation-Environmental Action

Limited amounts of fertilizers will be used, perhaps none on some sites. The sites generally are not near a river where possible soil erosion might contaminate the water. The land to be used for intensive agriculture is generally level, some less than 5% slope, some between 5 and 10%. Any application of fertilizer would be used at the recommended rates. The small amounts of fertilizers that will be used will not result in contamination of the environment. Therefore, a negative determination is recommended.

ANNEX C

Statutory Checklist

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STATUTORY CHECKLIST

ANNEX C

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6C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Security Supporting Assistance funds.

A. GENERAL CRITERIA FOR COUNTRY

- |  |  |
|--|--|
| 1. <u>FAA Sec. 116.</u> Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights?   | Probably, through production of basic foods. In any case, no human rights problem. |
| 2. <u>FAA Sec. 431.</u> Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? | No   |
| 3. <u>FAA Sec. 620(a).</u> Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba?  | No   |
| 4. <u>FAA Sec. 620(b).</u> <u>If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?</u>   | Yes  |
| 5. <u>FAA Sec. 620(c).</u> If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?  | No   |
| 6. <u>FAA Sec. 620(e) (1).</u> If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?   | No   |

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7. FAA Sec. 620(f); App. Sec. 108. Is recipient country a Communist country? Will assistance be provided to the Democratic Republic of Vietnam (North Vietnam), South Vietnam, Cambodia or Laos? No
8. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? No
9. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? No
10. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason? No, nor should he
11. FAA Sec. 620(o); Fishermen's Protective Act, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters,  
a. has any deduction required by Fishermen's Protective Act been made?  
b. has complete denial of assistance been considered by AID Administrator? No fishing problems
12. FAA Sec. 620(q); App. Sec. 504. (a) Is the government of the recipient country in default on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds, unless debt was earlier disputed, or appropriate steps taken to cure default? No
13. FAA Sec. 620(s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).) No current budget data available, but PPC advises that there is no 620(s) problem.

- A
- 14. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? No
  - 15. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget? No outstanding contributions to regular budget.
  - 16. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? No
  - 17. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA? No
  - 18. FAA Sec. 669. Has the country delivered or received nuclear reprocessing or enrichment/equipment, materials or technology, without specified arrangements on safeguards, etc.? No
  - 19. FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate? No

**8. FUNDING CRITERIA FOR COUNTRY**

**1. Development Assistance Country Criteria**

a. FAA Sec. 102(c), (d). Have criteria been established, and taken into account, to assess commitment and progress of country in effectively involving the poor in development, on such indexes as: (1) small-farm labor intensive agriculture, (2) reduced infant mortality, (3) population growth, (4) equality of income distribution, and (5) unemployment,

The Government of Sao Tome and Principe is now developing its economic and social development plans. Its stated principles are to improve the general welfare of all its people. Reliable information on socio-economic indicators is not available yet. STP has a labor force shortage, so (1) is not appropriate.

b. FAA Sec. 201(b)(5), (7) & (8); Sec. 208; 211(a)(4), (7). Describe extent to which country is:

(1) the country is engaged in a program of crop diversification to reduce its dependence on food imports. The French Government is assisting the GOSTP in upgrading its food storage/warehousing facilities.

(1) Making appropriate efforts to increase food production and improve means for food storage and distribution.

(2) STP is a socialist state.

(2) Creating a favorable climate for foreign and domestic private enterprise and investment.

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11b

(3) Increasing the public's role in the developmental process.

(4) (a) Allocating available budgetary resources to development.

(b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations.

(5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.

(6) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

c. FAA Sec. 201(b), 211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made?

d. FAA Sec. 115. Will country be furnished, in same fiscal year, either security supporting assistance, or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs?

2. Security Supporting Assistance Country Criteria

a. FAA Sec. 5029. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? Is program in accordance with policy of this Section?

b. FAA Sec. 531. Is the Assistance to be furnished to a friendly country, organization, or body eligible to receive assistance?

c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?

(3) No Information

(4) a) About 70 percent of the GOSTP's 1976 budget was related to Government activities in education, health, ag and similar development oriented activities.

b) No

STP is a new country. Its socio-economic reforms are evolving.

See 4 and 5 above

Yes

No

NA

NA

NA

NA

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6C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: 'IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b) by special notification letter.
  - (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project;
  - (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure plus 10%)?
2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance? N.A. However, plans necessary to carry out this assistance have been completed and there is a reasonably firm estimate of the cost to the US of the assistance.
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance? None required.
4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)? N.A.
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project? N.A.

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## A.

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multi-lateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multi-lateral organizations or plans to the maximum extent appropriate?
- No
- The project is coordinated with IITA, FAO, UNDP and technicians of the Government of the Netherlands.
7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.
- Project will improve technical efficiency of agriculture.
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).
- NA
9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.
- NA
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?
- No.

B. FUNDING CRITERIA FOR PROJECT1. Development Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?

The project will be implemented in rural areas only in line with GOSTP objective of increasing agriculture productivity and diversify agricultural production.

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

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

Project seeks to increase productivity and production of basic food crops for local consumption.

(2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;

N.A.

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

N.A.

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

N.A.

(a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;

(b) to help alleviate energy problem;

(c) research into, and evaluation of, economic development processes and techniques;

(d) reconstruction after natural or manmade disaster;

(e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

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- (5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries. No
- c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)? The GOSTP contribution (including in-kind) is estimated at 5% of the project's total cost.
- d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing? No
- e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy. The project supports the GOSTP self-help efforts to increase production of basic foods for internal consumption and reduce its dependence on imports. The project will benefit indirectly all the country's population.
- f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government. Not geared to 281(b) concerns.

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B\*

g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-(3) and -(8). Does the activity give reasonable promise of contributing to the development: of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

The project is directly related to the Government's long-range objective of achieving self-sufficiency in food production. Project concludes favorably on projects economic and technical soundness.

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.

The project could eventually result in increased demand (albeit limited) for U.S. farm equipment. Project should have no detrimental effects on U.S. economy.

2. Development Assistance Project Criteria (Loans only)

NA

a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.

b. FAA Sec. 201(b)(2); 201(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.

c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?

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e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

3. Project Criteria Solely for Security Supporting Assistance NA

FAA Sec. 531. How will this assistance support promote economic or political stability?

4. Additional Criteria for Alliance for Progress NA

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

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6C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by exclusion (as where certain uses of funds are permitted, but other uses not):

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

Procurement

- |   |  |
|---|--|
| 1. <u>FAA Sec. 602.</u> Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?   | Yes.   |
| 2. <u>FAA Sec. 604(a).</u> Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?   | Yes.   |
| 3. <u>FAA Sec. 604(d).</u> If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed?  | Yes.   |
| 4. <u>FAA Sec. 604(e).</u> If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?   | No offshore procurement of agricultural commodities will be financed under this project. |
| 5. <u>FAA Sec. 608(a).</u> Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?  | Yes  |
| 6. <u>MMA Sec. 901(b).</u> (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. | Yes.   |
| 7. <u>FAA Sec. 621.</u> If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized,  | Yes.   |

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are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

8. International Air Transport. Fair Competitive Practices Act, 1974 Yes

If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest? NA
2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable? NA
3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million? NA

C. Other Restrictions

1. FAA Sec. 201(d). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter? NA
2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights? NA
3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-Bloc countries, contrary to the best interests of the U.S.? Yes
4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the U.S. or guaranty of such transaction? Yes

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5. Will arrangements preclude use of financing:
- a. FAA Sec. 114. to pay for performance of abortions or to motivate or coerce persons to practice abortions? Yes.
  - b. FAA Sec. 620(g). to compensate owners for expropriated nationalized property? Yes.
  - c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs? Yes.
  - d. FAA Sec. 662. for CIA activities? Yes.
  - e. App. Sec. 103. to pay pensions, etc. for military personnel? Yes.
  - f. App. Sec. 106. to pay U.N. assessments? Yes.
  - g. App. Sec. 107. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending). Yes.
  - h. App. Sec. 501. to be used for publicity or propaganda purposes within U.S. not authorized by Congress? Yes.

ANNEX D

Phase I Project Evaluation

## Evaluation of Agricultural Diversification

Project #658-0001-6-6177820

During the period September 17 to October 4, progress under AID Project 658-0001-6-6177820 (hereafter referred to as the project) was evaluated. The period occurred between cropping seasons so, except for small areas of onions and sweet potatoes, none of the crops supported by the project were seen in the field. Therefore, the bases for judgements made during this evaluation were a study of available data, discussions with technical staff associated with the project, and visits to field staff.

### I. Background

In 1975, the Democratic Republic of Sao Tome and Principe (STP) gained its independence from Portugal. In 1977, a grant of \$300,000 was made to the GOSTP for partial support of a food-crop diversification program. Historically, the agriculture of STP has been dominated by the production of export oriented plantation crops, most recently cacao, coffee, coconuts, and oil palm. Production of food crops was suppressed in order to maximize the availability of valuable land and cheap labor. Thus, with the possible exception of breadfruit, bananas, and some vegetables, production of food crops was less than required to meet the nutritional needs of the country's population and food importation was routinely required.

At the time of initiation of the current project, a three phased program was being developed by the GOSTP to meet the needs of the country's agricultural sector. Specific objectives<sup>1/</sup> of the program were:

1. To increase the yield of cocoa, copra, coffee, and palm kernels in order to assure employment of rural people and improve their standard of living, and to concurrently earn the foreign exchange needed for assorted food imports and other priority imports essential for the country's economic development;
2. To diversify crop production on the nationalized plantations into other export crops in order to make the economy less dependent on cocoa with its fluctuating price and assure a more dependable and stable level of foreign exchange; and
3. To diversify crop production on the nationalized plantations into basic food commodities for domestic consump-

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<sup>1/</sup>As identified in the original project paper.

tion, in order to save scarce foreign exchange currently expended on imports of foodstuffs (especially rice, beans, corn, onions, potatoes, and sweet potatoes) and in order to improve the nutritional intake of the population.

The project grant was directed at the third objective of this program and proposed to finance (1) acquisition of equipment including tractors; (2) necessary seeds, fertilizer, and other materials; (3) limited technical assistance during critical project implementation periods; and (4) training to insure continuity of the project. The anticipated input of the GOSTP into the project was valued at \$593,000. In general, principal outputs were to be approximately 40 hectares of land directed to the production of import substitute and nontraditional export crops (beans, corn, onions, rice, and sweet potatoes) during each of the two planting seasons each year and intensive training of two technicians in the production of the target crops. The objective of this report is to evaluate progress towards achievement of these project outputs.

## II. Persons Consulted

### 1. U.S. Embassy, Libreville, Gabon

--Edward Tienken, Ambassador  
--John W. Yates, Deputy Chief of Mission

### 2. Government of Sao Tome-Principe Officials

--Ministry of Agriculture  
--Arlindo Gomes Braganca, Minister  
--Osvaldo Sena Martins, Director of Research  
--Maria Odete Costa, Head, Food Crops Research-Corn  
--Antonia Albertino Afonso Dias, Head, Section of Cooperation  
--Leonel S. Barros, Director, Logistical Support  
  
--Ministry of Foreign Affairs  
--Rafael Branco, Secretary General  
--Ovidio Barbosa, Coordinator, Cooperative Program  
--Leonel Aguiar

### 3. Dutch Technical Team

--William Heemskerk, Agronomist  
--Harco Jellema, Soil Scientist  
--Reinoud Post, Animal Scientist

### III. Progress Towards Objectives

1. Food crop diversification. Target crops identified for the project were corn, beans, rice, onions, and sweet potatoes. Each of these crops is an important constituent of the local diet, and all except the latter are imported in substantial quantities (Table 1). Available data on sweet potatoes/cassava do not indicate a deficiency. Production of corn during the period 1974-76 averaged approximately 500 tons/year while production of beans, rice, and onions was nil. Combined importation plus production placed annual availability during this interval at approximately 1600 tons corn, 700 tons beans, 1500 tons rice, 120 (?) tons onions, and 4000 tons sweet potatoes/cassava. An FAO report covering the year 1971-1972 indicated higher consumption of both corn (2085 tons) and beans (800 tons) during that period suggesting that availability of these products has decreased. This observation is supportive of statements by technicians that supplies of these imported food products are generally inadequate to satisfy the demand.

The current food diversification project envisioned the introduction and/or increased local production of food crops now imported. Adaptability of corn and sweet potatoes was known on the basis of previous experience. Corn yields, however, were low (700-800 kg/ha) so a substantial margin for improvement in productivity appeared possible. Information on the adaptability of beans, rice, and onions to the ecological conditions of STP was limited. Much of the technical assistance provided under the project has been directed towards assessing the production potential of corn, beans, and rice. Progress to date is reviewed on the following page, by crop.

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Table 1. Quantities<sup>1/</sup> of corn, beans, rice, onions, and sweet potatoes imported by Sao Tome-Principe, 1974-1976.

Product	Importation (Tons)		
	1974	1975	1976
Corn (grain)	1087	835	300
Corn (flour)	378	539	225
Beans	704	620	760
Rice	1316	1453	1677
Onions	----- (120-1700) <sup>2/</sup> -----		

<sup>1/</sup> Planning section.

<sup>2/</sup> An import figure of 120 tons was suggested by Bredero, et al. (cited below) and 1700 tons by Osvaldo Martins, Director of Research, STP, during our visit. However, it seems unlikely that the GOSTP would put as much or more resources into import of onions at a stated value of nearly \$1.00/kg as in the more basic food crops, rice and beans. Therefore, in the absence of data, it is suggested that the actual quantity of onions imported is at the lower end of the range.

Bredero, J. Th., W. Heemskerk, and H. Toxopeus. 1977. Agriculture and livestock production in Sao Tome and Principe (West Africa). Wageningen, Foundation for Agricultural Plant Breeding. 35 p.

Corn: During 1978, replicated variety tests were established in both Sao Tome and Principe. Each test included 20 entries selected to represent a wide range of materials, both in terms of adaptation and resistance to diseases. Detailed observations were made only at locations in Sao Tome.

Incidence of virus diseases (streak, strips, and mottle), blight, and rust were observed to be high in Sao Tome and severely reduced the yields of all nonresistant material. This factor permitted the rapid detection of material markedly superior to the disease susceptible local varieties. Based on 1978 data, the best materials yield as much as three times more than local entries. Two varieties, both developed at IITA in Nigeria and carriers of multi-disease resistance, were selected and multiplied during the past season. The 500 kg of seed produced will be used to plant approximately 20 ha during the next month. Anticipated yield from this area is 2000 kg/ha, although yields as high as 9000 kg/ha have been recorded in experimental plots at one

location. While individual estimates varied, as much as 100 additional hectares of corn may also be planted on Government farms during the coming season. Seeds of selected varieties are not available for this additional area.

Beans: Trials with beans (Phaseolus vulgaris) were not initiated until early 1979 when a collection of 25 varieties was received from CIAT in Columbia. Then, low seed viability resulted in irregular stands and prevented a valid comparison of varieties or an estimate of yield potential of the crop. A sufficient number of plants was obtained, however, to produce seed for new tests and to alert researchers to management requirements of the crop. Specifically, most varieties flowered early with the result that plant growth was limited. High plant populations may be required to compensate for the limited yield potential of each individual plant. Effects of the many insect and disease pests which affect beans under tropical conditions may also be accentuated by the limited capacity of most of the varieties to compensate for adverse conditions. Therefore, careful attention to pest control will be required.

Visual quality of the seeds produced was good. However, few of the introduced varieties have the light seedcoat color preferred in STP. Additional introductions would therefore be desirable at this point in the evaluation effort.

Insufficient information is currently available to support a conclusive recommendation relative to the potential for bean (Phaseolus vulgaris) production in STP.

Cowpeas (Vigna unguiculata) have also been evaluated as a potential food diversification crop. Ten introductions from IITA formed the basis of initial trials. Growth was satisfactory under conditions on Sao Tome and results available thus far indicated that yields of 1.5-2.0 tons/ha can be obtained with proper management. At present, timely control of insects appears to be the critical step in successful cultivation of the crop.

In contrast to common beans, cowpeas are not currently widely accepted as a food in STP. Only one segment of the population--immigrants from Cape Verde--eat cowpeas as a part of their traditional diet. Seed produced last season will be used to plant approximately 10 ha in the coming season and it is presumed that production of cowpeas will be expanded if they are accepted as a food.

Rice: Upland rice varieties have been tested over a period of three seasons. Two varieties were selected and multiplied last season and ten entries are being continued in variety evaluations. In the most recent trials in northern Sao Tome, entries were reported to be disease free, probably because of successful selection for disease resistance in previous tests. Early maturing materials (<120 days) appear to be best adapted to this short growing season area. Yields

as high as 4500 kg/ha were recorded in experimental plots at one location and 2000 kg/ha is estimated to be an achievable yield level on larger areas. At two locations in southern Sao Tome where rainfall is 3000-4000 mm/year, satisfactory yields were recorded for several varieties although production problems, particularly those related to soil fertility and diseases, appear to be greater in the south than in the north.

Evaluation of rice under this project has been limited to upland conditions. The Peoples Republic of China provided a team of ten specialists for three years to assist with the development of paddy rice cultivation. The infrastructure developed under the project appears to be only partially utilized and no expansion is evident.

Discussions with the Minister of Agriculture revealed two features of paddy rice cultivation, as introduced, which are considered unsatisfactory in STP:

1. The production techniques are extremely labor intensive, thus not attractive within the agricultural system in STP. The need for a more modern technology was expressed.
2. Agricultural laborers in STP have no tradition of working in the mud and do not willingly work in paddy rice.

Upland rice production would suffer from neither of the above objections, but problems relating to fertility requirements and disease, insect, and bird control (see Bredero, et al., previously cited) are not unique to paddy rice production and would require solution before upland rice production can be entirely successful.

Onions: No data on onions were available but one planting of four varieties was observed at Ferreira Governo in northern Sao Tome. Development of the bulbs was good. Previous experiences in Sao Tome suggested that onions could be successfully grown during the dry season (June-September). In most countries where onions are produced, planting is timed so that bulbing takes place during the season of longest days. STP is so near the equator that variation in daylength will be minimal and not a critical factor in determining planting dates. Yet, it may be necessary to restrict planting to time intervals which will permit harvest and curing during a rain-free period. Until further experience is gained, it is suggested that transplants be grown and planted during the March-May rainy season so that harvest will take place during the dry season.

Production of onions in STP will require a different set of inputs than the other target crops of this project. First, seeds are imported since onions do not normally flower and produce seed unless the tubers are exposed to a period of low temperature. The low temperature requirement can be met during storage; methodology for doing this was discussed. Second, during the dry season, successful production of onions will require supplemental irrigation. Irrigation water was

available at several sites visited. Quantities appeared to be limited, but the possibility of readily increasing flow was indicated. Third, onions require conditioned storage for prolonged preservation under tropical conditions; availability of conditioned storage is very limited in the country. Thus, a set of inputs not considered in the original project may be required if the year-round demand for onions on STP is to be met. However, the currently high local-market price (approximately \$1.00/kg) would appear to justify the necessary inputs.

Sweet potatoes: Work with sweet potatoes was not being actively pursued by the food-diversification staff. A desire to concentrate on corn, rice, beans, and onions was cited as the reason. A contributing factor probably relates to the reasonably adequate supply of this crop (when considered with taro and cassava) from locally grown sources. Still, observations of a sweet potato harvest revealed a level of productivity markedly below the potential of the crop. It could not be ascertained whether the deficiency was the result of poor management or use of a low yielding variety, but both reasons are suspected.

Summary: The rather modest goal of establishing production of import substitute and nontraditional export crops on 40 ha during each of the two planting seasons each year will easily be met by the end of the project, although the distribution of hectares among crops will not correspond to that described in the project document. In fact, at this time, it is not even certain whether or not all the target crops can be successfully grown on STP. Additional work needs to be done with beans, particularly, to determine its adaptability to the islands. All crops will benefit from research to identify optimum production practices.

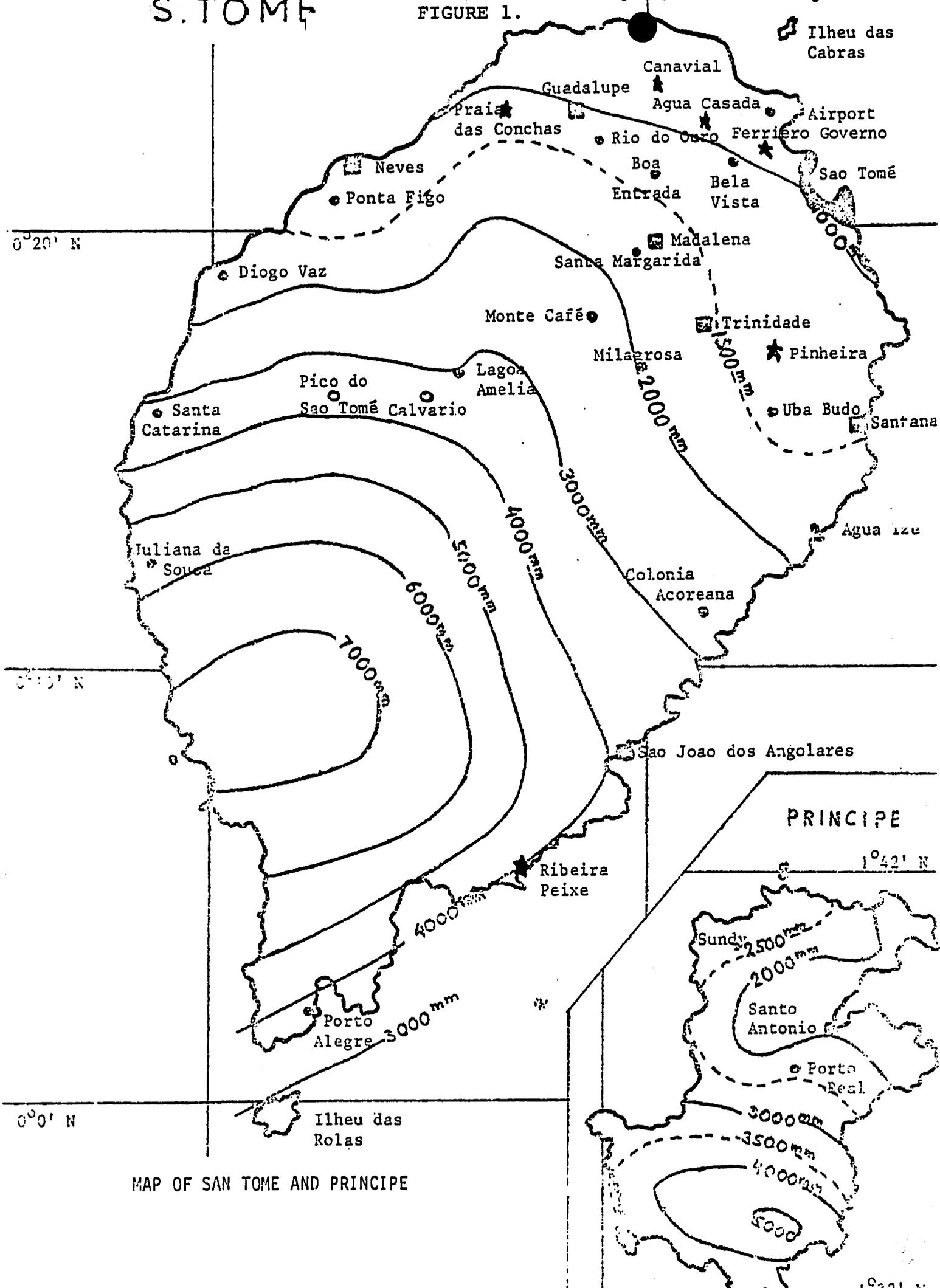
Screening for varieties is but a first step in development of a farming system. Planting dates; plant spacing; fertility practices; weed, insect, and disease control methods; harvest techniques; and storage requirements are all components of the package needed to optimize returns from a crop production effort.

To date, there has been little risk in the effort undertaken, but export crops (cacao, oil palm, or coconut) must be replaced if the area in food crop production is to expand. Suggestions throughout technical reports indicate a series of problems that require attention in order to assure realization of anticipated yields on a consistent basis. The 'thin' technical staff in STP has done an admirable job of crop variety evaluation but will need increased support to develop the complementary package of production technology. It is my recommendation that any follow-up on the project include a relatively steady stream of specialists to assist with problems as they arise. Initially, these will be related to basic machinery use and maintenance and the adoption of modern production technology (fertilizers, herbicides, etc.). Later, attention to seed processing and produce storage will be required. Throughout a follow-up project, the GOSTP should be encouraged to identify and

allocate people for training abroad so that, eventually, the technological know-how to manage the systems will be available locally.

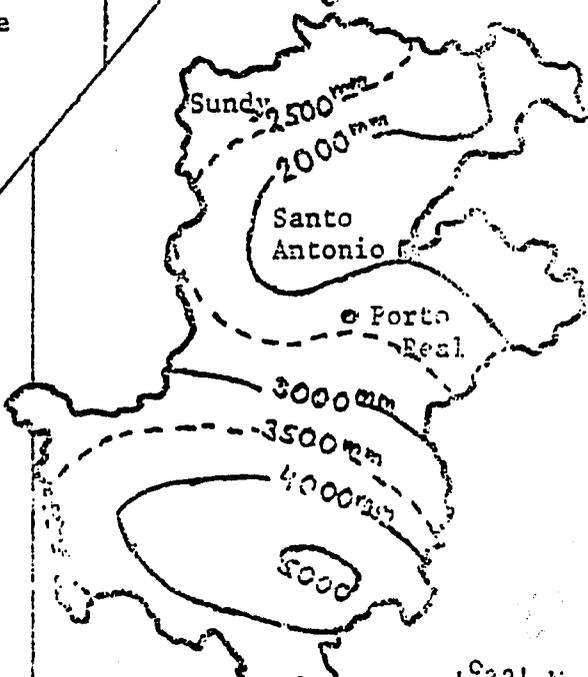
2. Selected production sites. The initial project identified three locations (Canavial, Bela Vista, and Ribeira Piexe) to start the crop diversification program. Sites visited during this evaluation are described below. Their approximate locations are shown in Figure 1, along with average yearly rainfall isoletes. Appropriateness of each area for the purpose of mechanized food crop production is indicated.

- Ribeira Peixe: a low elevation (50-70 m), high rainfall (4100 mm) location of nearly flat topography. Some large, loose stones were present but not so many that they couldn't be easily cleared to permit mechanization. The land area currently cleared is approximately 60 ha. Further expansion of area would apparently require removal of cacao which appeared to be somewhat marginal under the high rainfall conditions. Nutrient deficiency symptoms had been observed on experimental plots of corn and rice by previous technical teams. Soil tests just completed indicated a pH of 4.5-5.0 and low levels of P and K. Bananas interplanted with taro had been established on 3 ha of the cleared land. Availability of land for project target crops at Ribeira Peixe within current Government plans was uncertain.
- Pinheira: a gentle to steeply (5-10% slope) rolling area at from 70-110 m altitude with an annual rainfall of 1280 mm. Approximately 8 hectares were available for food crops. The surrounding were all planted to cacao which was said to be marginal because of the low rainfall. Considerable area could be cleared for row crops but erosion control measures would be necessary. Trees should be left along waterways and on steeper slopes. Contour planting and, possibly, terraces would be desirable. In general, however, the site appears suitable for mechanized production of upland rice, corn, and beans.
- Monte Cafe Saudade: an upland (700 m), high rainfall (2300 mm) site in an area generally characterized by steep (>10%) slopes. The small area cleared was largely in vegetable production. Possibilities for extensive mechanization appear limited and, in fact, should be discouraged because of the high erosion hazard. Rational use of the area would include continued production of plantation crops (coffee) and production of high value horticultural crops on selected flat areas. The choice of economic crops will be conditioned by the high labor requirement for all cultural operations.
- Ferreira Governo and Canavial: neighboring sites in a low rainfall (900-925 mm) area. The elevation of Ferreira Governo is approximately 10-30 m and that of Canavial, 60-70 m. Slopes at both sites are slight to moderate (5-10%)



PRINCIPE

1° 42' N



MAP OF SAN TOME AND PRINCIPE

with no obvious impediments to large-scale mechanization. Soils are fertile, deep, and well drained. Water is available via gravity flow for irrigation, but the quantity was not determined. Surface structures were present for conducting irrigation water at both locations.

Land cleared at each location was 10 ha. Plantation crops with which food crops would have to compete are cacao and/or oil palm. Cacao in the area was stated to yield approximately 300 kg/ha. The highest yield of corn and rice so far recorded in STP (9000 kg/ha and 4500 kg/ha, respectively) were produced at these locations.

--Agua Casada and Praia das Conchas: low elevation (0-80 m), low rainfall (750-925 mm) sites having considerable flat, but quite rocky area. Cleared land at Praia das Conchas is approximately 30 ha; at Agua Casada the cleared land is considerably more extensive because of recent tree removal to increase the Airport's runway visibility. At both sites, however, the great number of small to large rocks present will impede utilization of the land, at least by mechanized means. Development for mechanized use will entail considerable cost; however, a high initial cost may more than offset the future recurring costs of hand labor to manually conduct cultural operations in food production.

Summary: Of the northern sites visited, those at Pinheira, Ferreiro Governo, and Canavial can be most easily put into food crop production. Planting dates and cropping systems outlined in the original project analysis are appropriate with the exception of onions as noted above. Further, with normal management, these locations should support continuous production without undue hazards of erosion.

Land currently cleared and available for food production is extremely small when compared to that which would be necessary to produce the quantities of food now imported. For example, production of 1600 tons of corn at 2 tons/ha would require 400 ha during each of two seasons. Essentially all relatively level land which is free of impediments to mechanization is now planted to export crops. Therefore, expansion of food production much beyond its current low level will require a careful analysis of land use alternatives and, as mentioned previously, will involve some risks.

#### IV. Technical Assistance and Training

Provisions for technical assistance and training in the project were modest. Assistance was provided only during critical project implementation periods such as at planting or during variety evaluation prior to harvest. Intensive training was provided for two technicians so as to insure continuity of the crop production effort after the end of the project. For meeting these objectives with rice, corn, and beans,

the International Institute of Tropical Agriculture (IITA) was contracted to provide intensive training to two persons and technical advice over a two-year period.

Discussions with Sao Tomean officials indicate that the technical support and training provided by IITA has been excellent. Field staff servicing the program were highly qualified and made significant contributions to the program. The rapid progress made in identification of improved corn and rice varieties attest to this. The less rapid progress with field beans (Phaseolus vulgaris) can be attributed to an unanticipated and lengthy acquisition period for a seed collection. To some extent, the delay with this crop has been overshadowed by the opportunity to closely evaluate cowpeas (Vigna unguiculata), for which no provisions had been made in the original project. Technical support for onion and sweet potato production were not part of the contract with IITA and were not provided from any other source.

Two persons received two months of intensive training each at IITA in Nigeria. Maria Odete Costa, Head, Food Crop Research-Corn, received training in corn production and Agostinho Doria, Head, Food Crop Research-Rice, received training in rice production. Only Maria Odete Costa was available for interview during this project evaluation. The training was considered excellent; only language was somewhat of a barrier. Even though a translator was provided, the exchange was not considered as good as if the instruction had been offered in Portuguese.

#### V. Equipment Purchase

Equipment and supplies to support the project objectives were a considerable part (81%) of the grant budget. It was recognized at the initiation of the project that for full achievement of goals, inputs including equipment and materials must be provided in a timely manner. Yet, provision of equipment has been the least satisfactory component of the project, with more than one-third of the equipment still to be ordered at the time of this evaluation. The reasons for slow acquisition are diverse but relate mostly to the lack of an effective means of communication between the many parties involved. Occasional visits to the project site by the purchasing agency to assist with equipment selection, particularly when acquisition deviated from that specified in the original project, would have apparently resolved the problems observed.

Discussions held during this evaluation revealed the following to be an acceptable allocation of the equipment fund remaining in the project.

1. Exchange the MFD 400 tractor to be supplied out of Italy for an equivalent value in wheel tractors, model MF 245, plus implements. Implements should include a two-bottom disk plow and 8' disk harrow for each tractor. This exchange is desired because the MFD 400 is inadequate for the job (desflorestation) to be done. A Caterpillar D-6 is needed (see item 6, below).

2. Acquire draw bars for each tractor.
3. Purchase additional spare parts for each MF 245 tractor acquired under the project. A list of specific requirements, as well as part numbers, was supplied.
4. Proceed with purchase of two corn shellers and two rice/bean threshers. This equipment should be tractor mounted.
5. Complete delivery on chain saws, hoes, and other hand tools already purchased but not yet received.
6. Purchase a Caterpillar D-6 equipped with blades, etc. for deforestation.
7. Purchase herbicides for corn (atrazine) . . . . . beans (Prowl), and rice (Propanil) with any surplus funds.

## VI. Conclusions

1. The project has significantly contributed to the rapid selection of improved corn and rice varieties adapted to STP. The area to be planted to these two crops during the next year will exceed the goal (40 ha/season/year) for increased area in production of diversified food crops. However, progress in the evaluation of new varieties of dry beans, onions, and sweet potatoes has been essentially nil. Evaluation of cowpeas, not originally envisioned in the project, was undertaken and the crop found to be promising in STP.
2. Land areas initially identified for diversified crop production have been found satisfactory for the crops to be tested, but alternative uses are still being considered. However, all discussions with officials of STP during this evaluation suggested that those areas found most appropriate for mechanized use are, in fact, those receiving primary consideration for food crops.
3. Technical assistance provided under the project was considered satisfactory but expertise was not made available for all the target crops. Additional technical inputs were needed. This was not a result of a failure of IITA to meet the terms of its contract to provide technical assistance, as onions and sweet potatoes were not included in the agreement with that Institute.

4. The intensive training provided was satisfactory. A desire for future training to be in Portuguese speaking countries was expressed.
5. Equipment acquisition was the only unsatisfactory phase of the project. At this point, only one-half of the funds available for equipment have been spent. The manner in which the Sao Tomeans would like the remainder of this project phase handled is specified in the evaluation (Section V).
6. While meeting its production objectives, the scale of the project has been too small to impact on amount of funds expended for import of food crops. However, the productive potential of STP is great and self-sufficiency in food crop production appears to be an achievable objective.

ANNEX E

GOSTP Request for Phase II Project Assistance

85

República Democrática  de S. Tomé Príncipe

Ministério dos Negócios Estrangeiros e Cooperação

Gabinete do Ministro

UNIDADE DISCIPLINA TRABALHO

Ambassador Arthur Tienken  
Embassy of the United States of  
America  
Libreville

Gabon

Dear Mr. Ambassador,

The Government of the Democratic Republic of Sao Tome and Principe is currently engaged on an effort to develop food crop agriculture on lands previously unused or of marginal appropriateness for traditional cash crops. The cooperation of the Government of Holland technical assistance agency since 1975 and the United Agency for International Development since 1977 has been helpful in this program. The overall objective of these joint efforts is to achieve food crop self sufficiency in Sao Tome without reducing foreign exchange earning from the traditional cash crops.

Since independence the DRSTP has made significant progress toward its food self sufficiency objective. Experiments have been carried out with corn, beans and rice and more successful varieties identified. At the same time studies have been carried out to identify some 1,000 hectares of land which can be economically developed or converted for food crop production and some 50 of such hectares has already been cleared and prepared for planting.

Accomplishment of the overall objective of food crop self sufficiency will require some 2,700 hectares cleared, a great deal more research toward variety development, and much experimentation also in farming systems and resource administrations. Such task may well require continuing efforts on the scale of the past four years for another decade.

The purpose of this letter is to request additional assistance from your government as a follow-up to your current effort in Sao Tome. Needed during the next several years to maintain momentum in our agricultural diversification

program is additional short term technical assistance for special requirements, technical training, and some additional farm implements to perform tasks not suitable for hand labor in the Sao Tome environment.

My staff and I have been pleased to work with your project evaluation team Messrs. Richard Solom and Harry Minor, these past two weeks, and have come to a preliminary understanding with them regarding the above requirements. I ask your assistance, now, in forwarding this request to your government and in supporting it when it is considered for funding.

Sincerely yours

P.P. Maria de ANDRIM  
Minister of Foreign Affairs and  
Cooperation

A handwritten signature in black ink, appearing to read 'Rafael Branco', written over a horizontal line.

Rafael BRANCO  
Secretary-General

Project Paper

Phase I

13

*Return to D, A, L*

AGENCY FOR INTERNATIONAL DEVELOPMENT  <b>PROJECT PAPER FACESHEET</b>		1. TRANSACTION CODE <div style="border: 1px solid black; display: inline-block; padding: 2px;">A</div> A ADD C CHANGE D DELETE		PP  2. DOCUMENT CODE 3
3. COUNTRY ENTITY Sao Tome and Principe		4. DOCUMENT REVISION NUMBER <span style="border: 1px solid black; display: inline-block; width: 20px; height: 15px;"></span>		
5. PROJECT NUMBER (7 digits) <div style="border: 1px solid black; display: inline-block; padding: 2px;">658-0001</div>	6. BUREAU OFFICE A. SYMBOL <b>AFR</b> B. CODE <div style="border: 1px solid black; display: inline-block; padding: 2px;">06</div>		7. PROJECT TITLE (Maximum 40 characters) <div style="border: 1px solid black; display: inline-block; padding: 2px;">Crop Production and Diversification</div>	
8. ESTIMATED FY OF PROJECT COMPLETION  FY <div style="border: 1px solid black; display: inline-block; padding: 2px;">7</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">9</div>		9. ESTIMATED DATE OF OBLIGATION A. INITIAL FY <div style="border: 1px solid black; display: inline-block; padding: 2px;">7</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">7</div> B. QUARTER <div style="border: 1px solid black; display: inline-block; padding: 2px;">4</div> C. FINAL FY <div style="border: 1px solid black; display: inline-block; padding: 2px;">7</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">7</div> (Enter 1, 2, 3, or 4)		

10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$)						
A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. TOTAL	E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL	300		300			300
(GRANT)	300		300	300		300
(LOAN)						
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY		297	297		593	593
OTHER DONORS						
<b>TOTALS</b>						<b>893</b>

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)									
A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY <u>77</u>		H. 2ND FY		K. 3RD FY	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) 496(a)	142	011		300					
(2)									
(3)									
(4)									
<b>TOTALS</b>				<b>300</b>					

A. APPROPRIATION	N. 4TH FY		O. 5TH FY		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULE
	D. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1) 496(a)					300		VM <u>0</u> <u>8</u> VV <u>7</u> <u>9</u>
(2)							
(3)							
(4)							
<b>TOTALS</b>					<b>300</b>		

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

1 = NO  
2 = YES

14. ORIGINATING OFFICE CLEARANCE SIGNATURE <i>S. Jeanis Lopez</i> TITLE <i>Director, AFR/IA</i>				15. DATE DOCUMENT RECEIVED IN AID W. OR FOR AID/W DOCUMENTS. DATE OF DISTRIBUTION DATE SIGNED MM <u>05</u> DD <u>16</u> YY <u>77</u>			
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AGENCY FOR INTERNATIONAL DEVELOPMENT  
PROJECT IDENTIFICATION DOCUMENT FACESHEET

To Be Completed By Originating Office

1. TRANSACTION CODE

A = Add  
 C = Change  
 D = Delete

PID

2. DOCUMENT CODE

1

3. COUNTRY/ENTITY

Sao Tome and Principe

4. DOCUMENT REVISION NUMBER

5. PROJECT NUMBER (7 digits)

658-0001

6. BUREAU/OFFICE

A. Symbol  
AFR

B. Code  
 06

7. PROJECT TITLE (maximum 40 characters)

Crop Production and Diversification

8. PROPOSED NEXT DOCUMENT

A.  3  2 = PRP  
 3 = PP

B. DATE

MM YY  
 05  77

10. ESTIMATED COSTS

(\$000 or equivalent, \$1 = )

FUNDING SOURCE		Life of Project
a. AID Appropriated		300
b. OTHER	1.	
U.S.	2.	
c. Host Country		593
d. Other Donor(s)		
TOTAL		893

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION

a. INITIAL FY  77

b. FINAL FY  77

II. PROPOSED BUDGET AID APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. FIRST FY 77		LIFE OF PROJECT	
		C. Grant	D. Loan	F. Grant	G. Loan	H. Grant	I. Loan
(1) 496 (a)	142	011		300		300	
(2)							
(3)							
(4)							
TOTAL				300		300	

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each)

071  072  075  079

13. SPECIAL CONCERNS CODES (maximum six codes of four positions each)

Tech.  Lab.  Nutr.

14. SECONDARY PURPOSE CODE

122

15. PROJECT GOAL (maximum 240 characters)

To increase the production of key crops for the domestic and export markets.

16. PROJECT PURPOSE (maximum 480 characters)

Provide the GSP with the necessary equipment and materials to diversify production of basic food crops and increase yields of cocoa on the government-owned plantations of Ribeira Peixe, Bela Vista and Canavial.

17. PLANNING RESOURCE REQUIREMENTS (staff/funds)

Agricultural Economist (2 weeks) - \$5,000  
Agronomist (1 week) - \$2,800  
Program Development and Support Funds.

18. ORIGINATING OFFICE CLEARANCE

Signature

Title

Date Signed  
MM DD YY

19. Date Document Received in AID/W, or for AID/W Documents, Date of Distribution

MM DD YY

AGENCY FOR INTERNATIONAL DEVELOPMENT <b>PROJECT AUTHORIZATION AND REQUEST                  FOR ALLOTMENT OF FUNDS PART I</b>		1. TRANSACTION CODE <input checked="" type="checkbox"/> A ADD <input type="checkbox"/> C CHANGE <input type="checkbox"/> D DELETE	PAF 2. DOCUMENT CODE 5
3. COUNTRY/ENTITY Sao Tome and Principe		4. DOCUMENT REVISION NUMBER <input type="checkbox"/>	
5. PROJECT NUMBER (7 digits) <input type="checkbox"/> 658-0001 <input type="checkbox"/>	6. BUREAU/OFFICE A SYMBOL AFR B CODE <input type="checkbox"/> 06 <input type="checkbox"/>	7. PROJECT TITLE (Maximum 40 characters) <input type="checkbox"/> Crop Production and Diversification <input type="checkbox"/>	
8. PROJECT APPROVAL DECISION ACTION TAKEN <input checked="" type="checkbox"/> A APPROVED <input type="checkbox"/> D DISAPPROVED <input type="checkbox"/> DE DEAUTHORIZED		9. EST. PERIOD OF IMPLEMENTATION YRS. <input type="checkbox"/> 0 <input type="checkbox"/> 2 QTRS <input type="checkbox"/> 8	

10. APPROVED BUDGET AID APPROPRIATED FUNDS (\$000)									
A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY <u>77</u>		H. 2ND FY		K. 3RD FY	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) 496(a)	142	011		300					
(2)									
(3)									
(4)									
TOTALS				300					

A. APPROPRIATION	N. 4TH FY		O. 5TH FY		LIFE OF PROJECT		11. PROJECT FUNDING AUTHORIZED		A. GRANT	B. LOAN
	C. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	(ENTER APPROPRIATE CODE(S)) 1 - LIFE OF PROJECT 2 - INCREMENTAL LIFE OF PROJECT			
(1) 496(a)					300				1	
(2)										
(3)										
(4)										
TOTALS					300					79

12. INITIAL PROJECT FUNDING ALLOTMENT REQUESTED (\$000)			13. FUNDS RESERVED FOR ALLOTMENT  TYPED NAME (Chief, SER/FM/FSD)  SIGNATURE  DATE		
A. APPROPRIATION	B. ALLOTMENT REQUEST NO. <u>1</u>				
	C. GRANT	D. LOAN			
(1) 496(a) *	300				
(2)					
(3)					
(4)					
TOTALS			300		

14. SOURCE/ORIGIN OF GOODS AND SERVICES  
 000  941  LOCAL  OTHER \_\_\_\_\_

15. FOR AMENDMENTS, NATURE OF CHANGE PROPOSED  
 \* Portugal and Portuguese Colonies

FOR PPC/PIAS USE ONLY	16. AUTHORIZING OFFICE SYMBOL	17. ACTION DATE MM   DD   YY	18. ACTION REFERENCE (Optional)	ACTION REFERENCE DATE MM   DD   YY

Participants in Project Development Process

Project Design Team (Field work: April 15-April 22, 1977)

A.I.D.: Angel M. Diaz, O.I.C., AFR/RA/PSA  
James Maher (PL-480 Proposal)

Consultants: Dr. Morris Whitaker, Agricultural Economist,  
Utah State University, Logan  
Dr. Dale Bandy, Agronomist, University of North Carolina

Project Review Committee

AFR/RA, E. Dennis Conroy  
AFR/RA/PSA, Mable S. Meares  
AFR/RA/PSA, Angel M. Diaz  
AFR/DR, Ray Solem  
AFR/DR, Woodrow Leake  
AFR/DP, Kathy Gray  
AFR/GC, Edward D. Dragon  
SER/COM, John Shollenberger

Field Interviews and Meetings

1. U.S. Embassy Libreville, Gabon
  - Ambassador A. L. Steigman
  - Edmund De Jarnette, DCM
  - Cornelia Bryant, Economic/Commercial Officer
2. Government of Sao Tome Officials:
  - Albino Da Fonseca, Secretary of State for Agriculture
  - Miguel Lisboa Trovoada, Prime Minister and Minister of Economic Coordination, Cooperation and Tourism
  - Celestino Rocha da Costa - Minister of Education
  - Mr. Torres - Ministry of Economic Coordination
  - Mr. Wharton Perreira - Office of Protocol
  - Raul, Agronomist - Ministry of Agriculture
3. UNDP, Libreville, Gabon
  - Mr. Boukari D'Jobo, Resident Representative
  - Mrs. Joan C'Lemenceau, Program Officer
  - Mr. Willem Standaert
4. Economic Counsellor - French Embassy, Gabon
5. Mr. Diallo - WFP and UNDP Representative in Sao Tome

6. Mr. Adelino Pagnossin, FAO Representative in Sao Tome
7. Mr. Francois Chevillote - Advisor to Commercialization Fund, GOSTP
8. Joachim W. Dost - West German Embassy, Gabon
9. Edward Pulver - Agronomist, IITA, Nigeria

Special acknowledgment is hereby made of the excellent support provided by the U.S. Embassy in Libreville. The many meetings arranged with other donor agencies and countries in Gabon, the logistic support, and the briefings provided by Ambassador Steigman, Edmund DeJarnette, and Cornelia Bryant were extremely helpful.

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B. Recommendations

A grant for \$300,000 is recommended to finance the U.S. contribution to this project. This amount is the balance remaining from the \$10.0 million earmarked by the 1975 Foreign Assistance and Related Programs Appropriation Act, Section 496(a), to help the newly independent Portuguese-speaking countries of Africa. This U.S. contribution represents 34 percent of the total project cost, not including the value of the land in three target areas where the project will be implemented.

C. Description of the Project

This project provides a grant of \$300,000 to the GOSTP to improve cultural practices in the production of cacao and to divert marginal and hitherto unused land into the production of import-substitute and non-traditional export crops on three government owned plantations. To this end the project proposes to finance: (1) requisite agricultural equipment and materials; (2) training; and (3) short-term technical assistance.

The project will be implemented by the Ministry of Agriculture, Division of State Farms, GOSTP. A short-term technical advisor will assist in the planting of the first crop at the beginning of the rainy season (September-October) and again at the harvest of the first crop and the planting of the second crop (January-February). Two Sao Tomeans will be trained in production of the import-substitute and non-traditional export crops and will be responsible for direct technical supervision of the project in the second and ensuing agricultural years.

The deterioration of equipment, depletion of stocks of variable inputs (repair parts, seeds, fertilizers, etc.), intermittent surface transportation of agricultural inputs associated with independence have resulted in reduced yields of traditional export crops, and increasing uncertainty about requisite food imports. Provision of the proposed agricultural equipment and materials, in a timely manner, will lead to increased yields of cacao on 396 hectares, and significant domestic production of food crops that have traditionally been imported -- dry beans, corn, onions, rice, and sweet potatoes, on 40 hectares of land diverted to such food crops. This will assure attainment of the purpose of the project -- the diversification of agricultural production to include principle food crops previously imported, and non-traditional export crops, and to increase yields of cacao on three target areas. The end of the project status will be increased yields on 396 hectares of cacao, 40 hectares of land in diversified crops, resulting in improved balance of payments and 2 men trained in such crop production.

#### D. Summary Findings

The technical analysis indicates the project is technically feasible with excellent soil and climatic conditions and relatively good stands and varieties of cacao. The financial analysis finds the GSTP is willing and able to implement the project. The social analysis indicates that the entire population of STP will benefit directly from the project because of a more adequate and reliable source of basic food crops, and indirectly from increased levels of foreign exchange for financing import of commodities, for improving educational and health services, and promoting the development of non-agricultural sectors. The economic analysis suggests the project is completely viable with an internal rate of return of 28 percent from direct project benefits.

### 2. Project Background and Detailed Description

#### A. Background

##### Geography, Climate and People

On July 12, 1975, the Democratic Republic of Sao Tome and Principe became an independent country after nearly 500 years of Portuguese rule. The country, one of Africa's smallest, is comprised of two Islands, Sao Tome and Principe, located about (275) and (175) miles, respectively, off the northern coast of Gabon near the equator. Oval shaped Sao Tome is approximately (30) miles long and (20) miles wide while Principe is roughly rectangular--four miles wide and 10 miles long. Both islands are part of an extinct volcanic mountain range but Sao Tome is the most mountainous with one peak of 6,640 feet above sea level. Swift mountain streams cross both islands which are generally covered by lush rain forest.

The climate is hot and humid at sea level with average yearly temperature of about 30°F with little daily variation except in the rainy season. At higher altitudes the average yearly temperature is 68°F and the nights are generally cool. There is a pronounced rainy season from October through May when most rainfall occurs. Geographic variation in annual rainfall is extreme with more than 200 inches in the south-western slopes to less than 40 inches on the northern lowlands. The population of Sao Tome and Principe in 1975 was estimated to be about 75,000 with approximately 70,000 on the Island of Sao Tome. The birth rate is high--3.6 percent per year but health conditions are poor and the rate of infant mortality high so the rate of population growth is much less, perhaps as low as 1.5 percent. The labor force is estimated to be 22,500 with 80 percent engaged in agriculture, five percent in industry and the

remaining 15 percent in services.

### Infrastructure

Unlike most developing countries, STP has an adequate infrastructure especially on the Island of Sao Tome. There is an extensive road system, most of which is asphalted, that links the plantations and outlying communities with the port and airport at the capital of Sao Tome. In addition, many of the plantations have their own secondary and tertiary roads which are generally all-weather and some have narrow gauge railroads with small diesel engines.

In the capital city of Sao Tome there is an airport capable of serving ~~medium-size~~ jet aircraft. (Currently there are ~~two~~ roundtrip flights per week from Libreville, Gabon, and three from Luanda, Angola). The main harbor in Sao Tome is not a deep water port and larger freighters must be unloaded from their anchorage by barge which generally reduces efficiency. There is some warehousing capacity but this is inadequate for cereal storage for long periods because of heat and humidity. There is a relatively good set of buildings for public administration and services including schools and hospitals--a legacy from the Portuguese. In addition, at independence the new government "inherited" a number of private buildings--homes, hotels, clubs, apartments and theaters which are being utilized as offices.

Most of the Island of Sao Tome has electricity and telephone/telegraph services and the city of Sao Tome has a water and sewer system. In addition, many of the interior towns and plantations have water systems. While the internal telephone/telegraph system is reasonably good, international communications are quite poor.

### The Economy and Agriculture

The economy of STP has been and is heavily dependent on the export of cocoa, copra, coffee and palm kernels produced on relatively large plantations. Plantation agriculture comprises over 80 percent of the best cultivated land and 28 large plantations account for over 90 percent of the production of the export crops. The balance of more marginal cultivated land (5,000 hectares) is used for production of subsistence crops such as manioc, vegetables, bananas and breadfruit, and barnyard livestock (chickens, ducks and pigs). Given an agricultural labor force of 22,500, this amounts to about .2 hectares per worker.

The economic and social organization of agriculture has been substantially modified since independence (July 12, 1975). Under Portuguese colonial rule, agriculture was for production of export crops and almost all food needs were imported from Angola and Europe.

Each plantation was autonomous and the owner exported his production and imported food and consumer goods which were sold to workers through plantation-owned stores. Production of food crops on these plantations were prohibited and workers were forced to buy from the plantation store to supplement their meager subsistence consumption.

The GSTP has drastically changed the structure of agriculture by nationalizing 70 percent of the ~~large~~ plantations. (The other 30 percent are relatively small plantations owned by <sup>resident</sup> Sao Tomean ~~citizens~~. Under the agrarian reform no one is allowed to own more than 100 hectares.) The new organizational structure is still along the lines of plantation agriculture but is strongly socialist in nature with all nationalized plantations owned by the Government ~~which hires both the farm administrator and labor directly.~~ However, the production technology utilized by the GSTP is still highly <sup>mechanized</sup> and is virtually unchanged from the colonial period. Furthermore, the GSTP has affirmed its intention to continue to utilize this technology as reflected in its priority list of agricultural inputs--principally mechanical in nature (tractors, motorized sprayers, chain saws, and repair parts). The highly mechanized agriculture reflects the reality of the basic resource endowment of Sao Tome which apparently has a large amount of land relative to its labor force. This was reflected in discussions with plantation managers who all indicated they had severe peak load demands on labor during harvest and other major cultural practices.

For example, the Portuguese had long utilized chain saws for trimming shade trees on cacao plantations. This, by itself, suggests that labor was relatively scarce for performing this task, since the Portuguese, operating in a free market economy adopted the mechanical technology which is by nature labor saving. Consequently, the project proposed below is designed within the reality of this economic environment, and many inputs are replacements for worn-out agricultural machinery.

Each plantation is operated by a Committee of five including a general manager, an accountant, and three field foremen. Labor is hired at a wage set by the Government (currently \$88.00 per month). Material inputs (fertilizers, etc.) are provided from a central storehouse (in Sao Tome) and some large equipment (such as heavy tractors) is provided from a pool. Each plantation has its own set of equipment for routine operations. All expenses of the operation are debited against the account of the plantation in the newly created Central Bank.

The GSTP controls the marketing of all agricultural produce in a two-price system. The production of each plantation is purchased by the Government at set price and credited to the account of the plantation (it is not clear what happens to profits (losses) if any). A higher price is set for produce which is to be sold on the local

market in order to cover the costs associated with marketing (e.g., transportation, storage, packaging, inventory and retailing). Almost all produce for domestic consumption is sold in central markets while export crops are sold through commercial channels at the prevailing world prices.

The political travail surrounding independence and the subsequent nationalization of the large plantations ~~has~~ resulted in ~~sharply~~ <sup>some</sup> ~~decreased~~ production of principal export crops, principally because of decreased yields. For example, in 1974 (the last year reliable data are available) ~~Cocoa~~ production <sup>in upwells</sup> ~~decreased by 77 percent~~, ~~copra~~ production by 16 percent, palm kernels by 40 percent, and coffee by 4 percent all relative to the 1966-73 average. <sup>1975 and 6,000 in 1970. The trend seems to have reversed itself in 1977 with an estimated output of 1,000 tons, and expectations are that output has increased slightly since then though data from the GOSTP are not forthcoming.</sup>

This decrease in production is due to two principal causes. First, the Portuguese owners, anticipating the advent of independence and loss of their lands, ceased to make capital improvements during the early 1970's. Machinery, tractors and implements were not replaced and maintained, spare parts inventories were depleted, and aged and diseased trees were not replaced. As a consequence, yields have declined precipitately to around 1/2 metric ton per hectare where as yields of up to 2.0 tons per hectare are possible on a modern cocoa plantation.

The second major reason for the decline in production is the sudden departure of the Portuguese managers and technicians. The importance of the entrepreneurial class cannot be ignored. Without their administrative and management experience, it is not surprising that production declined; when the decapitalization of the plantations is also considered, the sharp declines in production are understandable.

The GOSTP is developing a three-phased approach for meeting the challenges facing STP's agricultural sector:

- (1.) To increase the yields of cocoa, copra, coffee and palm kernels in order to assure employment of rural people, and improve their standard of living, and to concurrently earn the foreign exchange needed for assorted food imports and other priority imports essential for the country's economic development;
2. To diversify crop production on <sup>the</sup> nationalized plantations <sup>from hands of</sup> ~~into other export crops~~ in order to make the economy less dependent on cocoa with its fluctuating price and assure a more dependable and stable level of foreign exchange; and
3. To diversify crop production on the nationalized plantations <sup>(on lands of marginal productivity for high value cash crops)</sup> ~~into basic food crops~~ for domestic consumption, in order to save scarce foreign exchange currently expended

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on imports of foodstuffs (especially rice, beans, corn, onions, potatoes and sweet potatoes) and in order to improve the nutritional intake of the population.

Within this three-phased approach, the priority needs of the Government are for equipment for the cocoa and copra industries, and farm equipment, seeds, fertilizer and technical assistance for the crop diversification.

### Other Donor Activity

Several bilateral and international donors have been providing assistance to agriculture on STP since independence 21 months ago including the Peoples Republic of China, United Nations agencies, the International Institute of Tropical Agriculture (IITA) and the United States.

The Peoples Republic of China (PRC) extended \$10.0 in credits to STP in December 1975 to purchase consumer goods, agricultural equipment and machinery and provide for 15 PRC technicians, 10 of whom are advising STP in the production of paddy rice and vegetables.

The FAO currently has two experts advising the Ministry of Agriculture in agrarian reform and crop diversification. The IITA is planning to establish field experiments in Sao Tome in corn and beans. Trainees will be selected and will monitor and manage experiments under the direction of IITA agronomists from Nigeria who periodically will visit their field experiments.

## B. Detailed Description

### Introduction

The proposed project is directed toward crop diversification and improved cultural practices designed to contribute to achievement of GOSTP priorities discussed above in a two year effort. Its focus is on assisting the GSTP to increase the yields and improve cultural practices in production of cocoa, and direct marginal and unused land into the production of import substitute and new export crops on three government-owned plantations: Ribeira Peixe, Bella Vista and Canavial. To this end, the project proposes to finance: (1) acquisition of equipment including tractors; (2) necessary seeds, fertilizer and other materials; (3) limited technical assistance during critical project implementation periods, i.e., planting and harvesting to assure effective use of inputs, especially seeds, fertilizer and herbicides; and (4) training to insure continuity of the project. Financing for this project will be by a direct A.I.D. grant of \$300,000 for equipment and materials and limited technical assistance and training, and \$593,000 from GOSTP for administration, labor

*(40 hectares currently in use plus 460 additional hectares)*  
*on top of two hundred hectares of land of marginal use in cash crop production.*

and regular salaries of technicians from STP's Ministry of Agriculture.

### The Project

A narrative synopsis of the project is presented in this section (the Project Design Summary Logical Framework is presented as Annex A of this paper).

### The broad sector goal to which this project contributes is:

To increase the production of key crops for the domestic and export markets.

Because of decreased production of export crops, principally from falling yields, and large outlays for imports of several basic food crops which can be produced and domestically, the GSTP has expressed its top priorities for agriculture:

(1) increased production of traditional export crops of cocoa, coffee, copra and palm oil; (2) diversification of agriculture to non-traditional export crops; and (3) diversification of agriculture to import-substitute crops.

While the proposed project contributes to the achievement of these goals it should be pointed out that full achievement of the goals depends on the effective coordination and implementation of other programs and projects for agriculture under the direction of the Ministry of Agriculture of STP. The project can only contribute to achievement of the goal; by itself it cannot lead to full achievement.

### Consequently, the basic purpose of this project is:

To provide the GOSTP with a package of equipment and materials, improved seeds and related agricultural inputs, and requisite technical assistance and training necessary to diversify crop production to include principal import substitute and non-traditional export crops and increase yields of cocoa on the government-owned plantations of Ribeira Peixe, Bela Vista and Canavial.

The three government-owned plantations - Ribeira Peixe, Bela Vista and Canavial - have been selected as the project area because of their location in different climate and geographic zones which permits several basic import substitute and non-traditional export crops to be considered. For example, both grain corn (for human consumption) and upland rice will be produced on Ribeira Peixe, while beans, onions, grain corn, and sweet potatoes will be produced on

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Bella Vista and Canavial. As indicated in the background, rice, corn, beans and onions are among the most important food crops now imported while all these crops and sweet potatoes can be exported to the market in Gabon.

The principal outputs which will result from this project are:

- (1) Improved cultural practices implemented on approximately 396 hectares of cocoa on the three plantations resulting in an increase in yields from .5 metric tons/hectare to 1 metric tons/hectare.
- (2) Approximately 40 hectares of land on these three plantations will be directed to the production of import substitutes and non-traditional export crops (two crops per year or equivalent of 80 hectares) as follows: (a) beans 14.5 hectares; (b) corn 31 hectares; (c) onions 2 hectares; (d) rice 24.5 hectares; and (2) sweet potatoes 8 hectares.
- (3) Two technicians will be given intensive training by IITA in the production of rice, corn, beans, and vegetable crops.

There are several assumptions which must be met if project outputs are to be realized. First, inputs including equipment and materials, improved seeds and related agricultural inputs and requisite technical assistance must be provided in a timely manner. Second, the GSTP must provide adequate administrative and logistical support. Third, technicians of the Ministry of Agriculture must receive intensive training in production of basic crops if long run benefits are to be obtained from project investments.

The principal inputs which will lead to project outputs include:

- (1) An A.I.D. grant of \$300,000 for the purchase/financing of:
  - (a) three medium sized tractors with disc plows, roto tillers, sprayers and 5 years of repair parts
  - (b) 65 chain saws
  - (c) 100 sets hand tools
  - (d) improved seeds
  - (e) fertilizer

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- (f) 2 mm of technical assistance
- (h) training of 2 participants for about 3 mm each.

(2) GSTP

- (a) logistical support for short term technical advisors
- (b) land for crop diversification
- (c) management and administration of the three plantations and all equipment
- (d) labor for crop production

(A more detailed list of inputs is presented in the technical analysis which follows).

- (e) salaries of 2 trainees.

The A.I.D. inputs will be provided as follows. The three tractors, their equipment and spare parts, chain saws and enough seeds, fertilizer and related agricultural inputs to plant the land currently available for diversified crop production will be shipped in time to be in Sao Tome for the planting period beginning in early September of 1977. A technical advisor will be assigned to spend 2 to 4 weeks in Sao Tome at this time. His principal task will be to advise the plantation managers in the planting of the crops and to leave detailed instructions for dealing with common problems in their culture. He should be assigned two counterparts who will then be sent to IITA for intensive training.

A second shipment of seeds, fertilizers, etc., will be made in time for the second planting season in February 1978 and the technical advisor will return for 2-4 weeks in order to assess the results of the previous seasons efforts and to supervise the planting of the crops for the current season.

During the second year of the project only seeds, fertilizers and related agricultural inputs will be supplied once again for two planting seasons, one in October 1978 and one in February 1979. Shipments are planned in advance of each planting season during the project because STP does not have air-conditioned storage facilities necessary to store seeds. This will also provide a basis for controlling the disbursement of equipment and materials to assure proper use of U.S. funds.

The tractors and their equipment will be used both in the improvement of cacao and the production of import-substitutes and non-traditional

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export crops. Tractors will be used for spraying fertilizers, cultivation, mulching, and harvest of cocoa, and for seed-bed preparation, planting, cultivation and harvest of crops. All plantations have necessary maintenance workshops and mechanics. Provision of 5 years worth of spare parts should insure the viability of critical capital inputs.

Table II. Recommended Equipment and Materials for Project and Budget Cost<sup>a</sup>

<u>Item</u>	<u>Description</u>	<u>Quantity</u>	<u>Cost</u>	
			<u>Unit</u>	<u>Total</u>
1.	Tractor and Accessories	3	44,375	127,750 <sup>b</sup>
2.	Chain Saws	65	330	21,450
3.	Planet Junior Seeder	20	200	4,000
4.	Grain Sheller for Corn	20	50	1,000
5.	Hand Tools	100 sets	60	6,000
6.	Consumable Items (fertilizer and seeds)			
	(a) Beans	29.0 hectares	520	15,080
	(b) Corn	62.0 hectares	520	32,240
	(c) Onions	4.0 hectares	550	2,200
	(d) Rice	49.0 hectares	520	25,430
	(e) Sweet Potatoes	16.0 hectares	530	8,800
7.	Training	2 trainees	6,000	12,000
8.	Technical Assistance	2 MM	7,000	14,000
9.	Shipping Costs	(Estimated)		22,000
10.	Contingency			8,000
11.	Total			\$300,000

<sup>a</sup>See Table 11a for a detailed breakdown of each item.

<sup>b</sup>Two tractors with all accessories listed on Table 11a and one tractor with all accessories listed except the corn sheller, tiller, sprayer and mower.

Table 11a. Unit Cost of Equipment, Materials, Training and Technical Assistance

<u>Item</u>	<u>\$ Dollars</u>
1. Tractor, MF Diesel, 30-45 hp tractor and accessories:	15,000.00
disk plane (3 disk)	2,500.00
harrow	1,500.00
cultivator (2 row)	2,000.00
row maker or furrower	1,500.00
bulk fertilizer spreader	1,500.00
rotary mower	1,500.00
roto-tiller	3,500.00
4-wheel wagon	2,000.00
stationary corn sheller	2,500.00
sprayer	2,000.00
spare parts for 5 years (25%)	<u>8,875.00</u>
Sub-total	44,375.00
2. McCullough or Homlite chainsaws (17")	277.95
-- replacement chain (17")	26.50
-- replacement sprocket nose guide bar (17")	<u>24.95</u>
Sub-total	329.40
3. "Planet Jr." Seeder	<u>200.00</u>
Sub-total	200.00
4. Grain Sheller for corn hand operated	<u>50.00</u>
Sub-total	50.00
5. Hand Tools	
-- hoes	10.00
-- machettes	10.00
-- pruning knives	10.00
-- kook knives	10.00
-- small curve bladed sythes	10.00
-- hand files (2 flat - 1 round)	<u>10.00</u>
Sub-total	50.00

<u>Item</u>		<u>\$ Dollars</u>
6. Consumable Items		
(a) Beans/hectare		
Fertilizer		
N	100	
P	150	
K	150	
Ca	35	
Mg	25	
Zn	10	
Mn	10	
B	10	
Mo	<u>10</u>	500.00
Seeds		<u>20.00</u>
Sub-total		520.00
(b) Corn/hectare		
Fertilizer		
N	200	
P	100	
K	100	
Ca	35	
Mg	25	
Zn	10	
Mn	10	
B	10	
Mo	<u>10</u>	500.00
Seeds		<u>20.00</u>
Sub-total		520.00
(c) Onions/hectare		
Fertilizer		
N	250	
P	110	
K	100	
Ca	25	
Mg	25	
Zn	5	
Mn	5	
B	5	
Mo	<u>5</u>	530.00
Seeds		<u>20.00</u>
Sub-total		550.00

<u>Item</u>		<u>\$ Dollars</u>
6. Consumable Items (continued)		
(d) Rice/hectare		
Fertilizer		
N	200	
P	100	
K	100	
Ca	35	
Mg	30	
Zn	10	
Mn	10	
B	10	
Mo	<u>5</u>	500.00
Seeds		<u>20.00</u>
Sub-total		520.00
(e) Sweet potatoes/hectare		
Fertilizer		
N	200	
P	100	
K	100	
Ca	35	
Mg	25	
Zn	10	
Mn	10	
B	10	
Mo	<u>10</u>	500.00
Seeds		<u>50.00</u>
Sub-total		550.00
7. Training		
-- Specialists in food crop production (1 corn, 1 rice, beans-onions-sweet potatoes) 3 months intensive		6,000.00
8. Technical Assistance (MM)		7,000.00

## B. Financial Plan and Analysis

1. Financial Rate of Return/Viability -- The financial return to the beneficiaries has been calculated in the economic analysis in Section D below and consequently will not be repeated here.

### 2. Recurrent Budget Analysis of the Implementing Agencies.

Based on discussions with GSTP officials, it is assumed that the GSTP will: (a) provide effective management of the three plantations where project resources are to be utilized; (b) make available for training two technicians who will take over the technical aspects of production of beans, corn, onions, rice, and sweet potatoes after the short term technical assistance; (c) maintain capital equipment; and (d) invest in fertilizer, seeds, and other related variable factors of production after the two year disbursement period of the project.

Unfortunately, the GSTP has not provided to international donors any data on its financial capability. The newly independent country has been extremely reserved in its limited contacts with prospective donor agencies and is only beginning to evolve its modus operandi for coordinating and implementing foreign donor assistance.

Yet, based on discussions with GSTP officials and other donor technicians the project design team concludes that the GSTP will meet the qualifications raised above. First, each state owned plantation is managed by a board of five persons who have each had many years of experience working in the agriculture of the area in question. If the material inputs are provided, cocoa yields will increase and crop diversification will go forward. As an example, all project managers identified the same set goals and priorities in terms of necessary inputs. Furthermore, about 30 hectares of land for crop diversification has been partly cleared, and some of it plowed and planted to native corn varieties.

Second, the GSTP already has four trainees in agriculture in Puerto Rico through an A.I.D. financial training program with the Afro-American institute. The Secretary of State for Agriculture was completely supportive of training two people to supervise the project after USAID disbursements are complete.

Third, all the plantations have good maintenance workshops and at least two experienced mechanics. They asked for tractors and chain saws by brand names (International Harvester and Massey Ferguson, and McCullough or Homelite), indicating their familiarity with U.S. equipment. The principal problem has been that existing equipment is worn out and has not been replaced because of political and financial factors.

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Finally, the GSTP is firmly committed to increasing cocoa yields and production of import substitutes and new export crops. (Chain saws for pruning and cutting shade trees and improved cultural practices are expected to increase cocoa yields as shown in the economic analysis). Relatively high cocoa prices and donations of basic foods have assured a relatively strong balance of payments for both 1976 and 1977 and so foreign exchange for importing most of these inputs will be available. Assuming positive results during the first two years of the project, the team judges that the GSTP will purchase the necessary variable inputs for assuring continued generation of project benefits.

### 3. Financial Plan/Budget Tables

The financial plan is presented in Table 12, which is a summary of the project's total cost including host country and USAID contributions. The total cost of the project is \$893,000, not including the value of land being provided by GSTP. The U.S. share of the project is approximately 34%. Most of the GSTP input is "in kind," i.e., the labor and land are already in place, as are administrators, and will not require additional expenditures during the USAID disbursement period.

TABLE 12

COSTING OF PROJECT OUTPUTS/INPUTS  
(1,000 U.S. Dollars)

Project Inputs	<u>Project Outputs<sup>a</sup></u>			Totals
	(1)	(2)	(3)	
A. A.I.D. Grant				
(1) Equipment and Materials	65	179	-	244
(2) Training			12	12
(3) Technical Assistance	4	10	-	14
(4) Transportation and Contingency	<u>8</u>	<u>22</u>	<u>-</u>	<u>30</u>
Sub-Total	77	211	12	300
B. GSTP				
(1) Administration	15	10	-	25
(2) Labor <sup>b</sup>	214	354	-	568
(3) Land	<u>396<sup>c</sup></u>	<u>40<sup>c</sup></u>	<u>-</u>	<u>-</u>
Sub-Total	229	364	-	593
TOTAL	<u>306</u>	<u>575</u>	<u>12</u>	<u>893</u>

<sup>a</sup>1 = cocoa yields improved by pruning; 2 = crop diversification and 3 = training

<sup>b</sup>348 laborers costed at \$816/year, the GSTP wage for rural workers for two years

<sup>c</sup>Land in hectares - No value can be assigned

The GSTP will, however, have to purchase approximately \$55,990 of fertilizers, and other related inputs after the USAID disbursement (in each of years 3, 4, and 5) if the productivity of capital equipment is to be maintained. At that point, all capital equipment will need to be replaced.

C. Social Analysis

The principal beneficiaries of this project are the residents of the island of Sao Tome, although the residents of Principe will also benefit indirectly. As indicated above, the agricultural economy has been substantially modified by nationalization of the plantations by the government and their subsequent operation as state farms.

While there is a limited amount of subsistence agriculture, most Sao Tomeans are employed on the state farms and purchase most of their basic non-durable consumption goods, including most basic food commodities. While reliable data do not exist, it is estimated that less than 10-15 percent of the average rural family's food intake is produced on their subsistence plots.

The production of approximately 43 tons of bean, 248 tons of corn, 48 tons of onions, 172 tons of rice, and 320 tons of sweet potatoes expected under the project will directly benefit Sao Tomeans by assuring them a more stable and cheaper supply of basic food needs. More importantly it will save some foreign exchange earnings which can then be utilized for other critical social programs, especially in health care and education.

The project will provide another steady source of employment and strengthen and expand the country's agricultural base, which has been traditionally limited to the cacao plantations.

D. Economic Analysis

The internal rate of return to investment in the project is utilized as a measure of the economic viability of the project. For purposes of analysis it will be assumed that the project has a five year life (USAID disbursements will be made in years 1 and 2 and the GSTP will continue to provide necessary inputs to maintain the project). The five year life is based on the expected useful life of capital inputs being provided by the project. All product prices are for 1975 (the most recent year for which data were available in STP) while costs are in current 1977 prices.

The project is expected to produce benefits from: (1) more efficient practices and careful pruning of shade trees on approximately 372 hectares of cacao over one area resulting in increased yields of 150 kg/hectare; and increased yields of 500 kg per hectare in another 24 hectares of cacao in another area in an agricultural year (2 crops);

and (3) production of import-substitute and non-traditional export crops on 40 hectares of reclaimed cacao land and hitherto uncultivated land.

The project costs are those to USAID in supplying the equipment, materials (fertilizer, et.), training and technicians in years 1 and 2, and costs to the GSTP for materials in subsequent years of the project. Labor costs of the GSTP are not counted since such costs are currently being incurred and labor requirements will not be increased as a result of the project. Also, costs of land are not included since such land has no other alternative use. In essence, the USAID investment of \$300,000 provides inputs necessary to increase the productivity of land and labor in the project area. Thus, the rate of return to the project is to the marginal investment necessary to increase the productivity of land and labor. All costs are assumed to be incurred at the beginning and benefits at the end of each year.

The internal rate of return calculated below is probably understated since indirect benefits from the project are not included. Yet, the increased production will have a multiplier effect throughout the economy. Furthermore, there will be increased flexibility to invest in the non-agricultural sectors because of the savings of foreign exchange from increased production of import substitutes (corn, rice, onions and sweet potatoes) and increased savings of foreign exchange from increased production of cacao.

Also, the internal rate of return is a modest estimate of the economic viability of the proposed project because of conservative assumptions made about yields and land area. For example, in the analysis it was assumed that only one-fourth of all land in cacao was pruned and that yields were increased by only 150 Kgs per hectare (from 500 to 650). According to the team agronomist, proper pruning should result in an increase in yields of at least 250 Kgs per hectare. Furthermore, the amount of equipment being provided can easily cover over one half the land area in cacao. Also, it was assumed that improved nursing practices and simultaneous pruning would increase yields by only 500 Kgs (from 500 to 1,000) when such practices should increase yields by 1,000-1,500 Kgs according to the team agronomist. Finally, yields on diversified crops were the averages from IITA field trials without fertilizers and only one half the total land available for diversified crops was assumed to be utilized. In fact, diversified cropland will be adequately fertilized and equipment will be available for utilizing all the land for diversified crops.

The costs and benefits of the project are presented in Table 13. The internal rate of return to investment in the project is 28.5 per cent, suggesting the project is economically viable. Detailed information on benefits is presented in Tables 13 A-D, while cost information is from Table 11.

TABLE 13

## COSTS AND BENEFITS FROM STP BASIC CROP PRODUCTION AND DIVERSIFICATION PROJECT

Year	Costs			Benefits <sup>a</sup>					Net Benefit Stream <sup>b</sup>	Present Value of Net Benefit
	USAID	STP	Total	Cacao			Diversified Crops	Total		
				Pruning	Improved Nursing Practices and Pruning	Total				
0	244,010	-	244,010	-	-	-	-	-	(244,010)	
1	55,990	-	55,990	47,570	10,188	57,758	95,458	153,216	97,226	75,691
2	-	55,990	55,990	47,570	10,188	57,758	95,458	153,216	97,226	58,926
3	-	55,990	55,990	47,570	10,188	57,758	95,458	153,216	97,226	45,875
4	-	55,990	55,990	47,570	10,188	57,758	95,458	153,216	97,226	35,714
5	-	-	-	47,570	10,188	57,758	95,458	153,216	97,226	27,804

<sup>a</sup>See Tables 13 A-D for detail on the calculation of project benefits

<sup>b</sup>The rate of return that makes the present value of the net benefit stream equal to the initial investment (244,010) is 28.5%.

<sup>c</sup>The sum of the present value of net benefits (at 28.45%) is \$244,010.

TABLE 13A

POTENTIAL AREA FOR IMPROVEMENT OF CACAO  
AND FOR CROP DIVERSIFICATION IN PROJECT AREA

Plantation	Land in Cacao (Hectares)	Land Suited for Diversification (Hectares)
Ribeira Peixe	965	6
Bella Vista	304	62.5
Canavial	218	9.5
TOTAL	1,487	78.00

Table 13B. Production and Value of Beans, Corn, Onions, Rice, and Sweet Potatoes Produced on Diverted Cacao Land in 1 Agricultural Year (2 Crops)

Crop	Hectares/Plantation				Average Yields (kg ha)	Production (Metric ton)	Price <sup>a</sup> (CIF Import)	Value of Increased Production
	Ribeira Peixe	Bella Vista	Canavial	Total				
1. Beans	0	6.0	8.5	14.5	1,500	21.75	357.62	7,778
2. Corn	20.0	5.0	6.0	31.0	4,000	124.00	149.89	18,586
3. Onions	0	0	2.0	2.0	12,000	24.00	318.55	7,645
4. Rice	24.5	0	0	24.5	3,500	85.75	450.00	38,588
5. Sweet Potatoes	<u>4.5</u>	<u>1.0</u>	<u>2.5</u>	<u>8.0</u>	<u>20,000</u>	<u>160.00</u>	<u>142.88</u>	<u>22,361</u>
6. Total	49.0	12.0	19.0	80.0 <sup>b</sup>	--	--	--	95,458

<sup>a</sup>1975, 4th trimester, dollars per metric ton at current exchange rate of E<sub>s</sub> 37: U.S. \$1

<sup>b</sup>40 hectares in total with two crops in each Agricultural year.

Table 13C. Increased Production and Value of Cacao from Pruning in 1 Agriculture Year

Plantation	Hectares Improved <sup>a</sup>	Yields/hectare		Increase in Production (Metric tons)	1975 Price <sup>b</sup>	Increase in Value
		Before Project	After Project			
1. Ribeira Peixe	241	.5	.65	36.15	852.53	30,818
2. Bella Vista	76	.5	.65	11.40	852.53	9,718
3. Canavial	<u>55</u>	<u>.5</u>	<u>.65</u>	<u>8.25</u>	<u>852.53</u>	<u>7,033</u>
4. Total	372	-	--	55.80	-----	47,570

Source: Calculated from data from the Ministry of Agriculture, Sao Tome/Principe.

<sup>a</sup>4th trimester, dollars per metric ton at current exchange rate of Esc. 37: U.S. \$1.

<sup>b</sup>Assumed to be one fourth of all cacao land on each plantation.

Table 13D. Increased Production and Value of Cacao from Improved Nursing Practices and Pruning in 1 Agriculture Year

Plantation	Hectares Improved	Yields/hectare		Increase Production (Metric tons)	1975 Price	Increase Value
		Before Project	After Project			
1. Ribeira Peixe	15.50	.5	1.0	7.75	852.53	6,607
2. Bella Vista	4.90	.5	1.0	2.45	852.53	2,089
3. Canavial	<u>3.50</u>	<u>.5</u>	<u>1.0</u>	<u>1.75</u>	<u>852.53</u>	<u>1,492</u>
4. Total	23.90	-	-	11.95	852.53	10,188

#### 4. Implementation Planning

##### A. Administrative Arrangements

###### 1. Recipient

The implementing agency for this project will be the Ministry of Agriculture with the newly organized Division of State Farms being directly responsible for administering the project. This Division is responsible for management of the system of state-owned plantations. Each plantation, in turn, is managed by a committee of five (see Detailed Description). The chairmen of these management committees of the three plantations in the project, a representative of the Division of State Farms, and the Subsecretary of Agriculture worked closely with A.I.D.'s technical assistance team in the design of the proposed project.

Based on the experience of the technical team, the following observations can be made regarding the capability of the Ministry of Agriculture (STP) to effectively implement and manage the proposed project:

- (1) Management at the plantation level should be relatively good, especially in cacao production. The management committees have extensive experience in cacao production but only limited experience as farm managers. Also, there is only limited experience in the production of field crops.
- (2) The GSTP is in full agreement to train two agronomists in the production of rice, corn, beans and other import-substitute crops. Also, they are in agreement with the provision of short term technical advisory services during the initial year of the project. The training and technical services should overcome the lack of experience in field crops.
- (3) While limited managerial experience is a drawback, it is not expected to be a significant deterrent to achieving the purpose of the project. The GSTP has demonstrated a deep resolve to operate the publicly owned plantations efficiently and have already begun training of farm managers under an A.I.D.-financed program with the African-American Institute.

- (4) The GSTP already has an existing capability--facilities and mechanics--to maintain and repair the equipment to be provided under this project. This capability exists in each of the three geographic areas where the project will be implemented.

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