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MOZAMBIQUE: AN ECONOMIC BASE STUDY WITH EMPHASIS ON AGRICULTURE

This sector assessment was undertaken in conjunction with the Southern Africa Development Analysis Project and has been used extensively, but not totally, in the Main Report and Country Papers

By
Richard L. Simmons
Professor of Economics
North Carolina State University

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PREFACE

In the process of preparing this report it was not possible to visit Mozambique. The work is based entirely on other published materials and verified in part by conversations with international aid technicians who have been there.

Data on Mozambique's agriculture is fragmentary and subject to error. Despite the presence of hundreds of foreign technical assistance personnel in the country, there were no feasibility studies, no economic analyses, no cost-benefit ratios and no resource inventories available to be consulted at the time of this writing. Many international aid organizations apparently do not feel the need to study and analyze a project before initiating it. Indeed, given the emergency situation existing in Mozambique at the time of independence, there was little time for project evaluation. The needs were obvious and compelling.

Although considerable research was accomplished in Mozambique prior to independence (mostly by Portuguese technicians), most of the research has been lost or transported to Lisbon. It is likely that some research results obtained prior to independence may be of limited value given the massive structural changes in input and output markets initiated by the Government of Mozambique. Indeed, the policies of the Government with respect to these markets are still undergoing change, and it would be difficult and possibly meaningless to accomplish the usual economic analysis based on production costs and internal commodity prices. The tentative supply projections presented in this report are based primarily on a rather hazy development schedule for irrigation projects and known

crop yields. Whether or not the projections will materialize depends on the goals of the Government of Mozambique and the success of the planning and implementation of these goals in the context of a mixed centrally-planned and market economy.

GLOSSARY OF TERMS AND ACRONYMS

DINAF	National Directorate of General Agriculture
DINAGECA	National Directorate for Survey and Geography
DINAP	National Directorate for Livestock
DINECA	National Directorate for Pricing and Marketing
DINOPROC	National Directorate for Organization of Collective Cooperative Production
ENACOMO	National Marketing Enterprise
FAO	Food and Agriculture Organization of the UN
FRELIMO	Front for the Liberation of Mozambique
GOM	Government of Mozambique
IAAM	Agricultural Institute of Mozambique
IPF	International Project Fund
LDC	Lesser Developed Countries
NOBEIRA	Private company in a city - storage
NORDIC	Six (6) Scandinavian countries
OAU	Organization of African Unity
SOCIMOL	Private storage
UN	United Nations
UNDP	United Nations Development Program
UNICEF	United Nations International Childrens Emergency Fund
USA	United States of America
US/AID	United States Agency for International Development
USSR	United Soviet Socialist Republic

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I. APPRAISAL OF EXISTING POLITICAL, CULTURAL AND ENVIRONMENTAL CONSTRAINTS

A. Political

1. Economic and Political Relations with Other Countries

Mozambique obtained independence from Portugal in June, 1975. The Front for the Liberation of Mozambique (FRELIMO), which led the fight for independence, took over control of the government, expressing intentions of creating a Socialist state based on the principles of Marx and Lenin and supporting other black liberation movements. The country's official name was made the "Peoples' Republic of Mozambique." All power was vested in the single party (FRELIMO) and a strongly centralized government was formed. Samora Machel was made President of the country in addition to being president of the Party. A 67 member Central Committee was formed at the head of the government, as well as a Council of Ministers (Cabinet).

There are 10 provinces further sub-divided into about 94 districts. Administration at all levels is appointed by the Central government.

a. Ties with Other Countries and Organizations

Mozambique is a member of a joint defense organization with Tanzania, Zambia, Angola and Botswana. The objective of the organization is mutual defense against Southern Rhodesia and South Africa.

Mozambique is a member of the United Nations, but not the World Bank nor the International Monetary Fund.

On March 31, 1977 the Soviet Union and Mozambique signed a 20-year treaty of friendship and cooperation promising further Soviet aid and calling for scientific, cultural and economic exchange between the two countries. Soviet military aid was implied but not defined, although Russian-made military equipment is sometimes displayed.

The Scandinavia countries are warmly regarded because of their support to FRELIMO during the fight for independence and their basic socialist ideology. The Nordic group responded quickly with economic aid after independence.

Mozambique is now accepting economic aid from a number of countries, principally the Scandinavian group, Italy, Eastern Europe and the Peoples' Republic of China. Despite strong Marxist overtones and the treaty with USSR, most observers agree that at present Mozambique seems anxious to remain non-aligned and open to receive aid from any source willing to provide it without political interference. An invitation was made for the return of Portuguese technicians who fled the country upon independence.

Mozambique strongly supports the black movement in Rhodesia (overthrow) and cut off economic ties with the white Rhodesian government in order to support the black movement there. A military base in Mozambique for Rhodesian guerillas is further indication of the policy. Mozambique also has declined political relations with South Africa, although close economic ties necessitate continuing economic relations with that country.

A fairly common feeling among observers is that while Mozambique is considerably closer ideologically to Russia and the Peoples' Republic of China than to the West, the main thrust will be towards an individualistic, African-style brand of socialism-communism, the exact dimensions of which are not presently clearly defined and may undergo substantial readjustment through time. During a trial and error period in which the outlines of this African-style socialism are developed, Mozambique will be reluctant to identify closely with any non-African country.

b. Economic Interdependence with Other Countries

Economic interdependence with South Africa is strong and likely to remain so. The relationship stems from the following factors:

- (i) An estimated 100,000 Mozambicans have been employed in South African mines. This figure seems to have diminished to 75,000 in 1976, and in 1977 was believed to be lower. While Mozambique considers this to be South African exploitation of Mozambican workers, the export of laborers to South Africa brought in needed gold to the G.O.M. until recently. South Africa was remitting gold at \$35 per ounce and the G.O.M. was selling it at the free market price.
- (ii) Important rail links allow South Africa access to the Indian Ocean through Mozambican ports.
- (iii) The Cabora Bassa dam was constructed to provide hydro-electric power for South African industry.

(iv) South Africa is the largest single source of Mozambique's imported food and imports, as well as a potential market for exports. South Africa provides about 15-20% of Mozambique's imports and absorbs about 10% of Mozambique's exports. Of course, Portugal was, by design, Mozambique's most important trading partner prior to independence. Trade with Portugal, having been based on fixed prices favorable to Portugal, has substantially diminished now that Mozambique is independent. South Africa will continue to be an important trading partner for the foreseeable future.

Rhodesia

Economic relations with Southern Rhodesia were significant before sanctions were applied in 1973. The types of relations with Southern Rhodesia were similar to the ties with South Africa. In a normal year about 4 million tons of freight moved to and from Southern Rhodesia through the ports of Beira and Maputo. Also, normally between 75,000 and 85,000 Mozambicans worked in Rhodesian mines. Commodity trade with Rhodesia consisted of exports of copper, asbestos, bauxite, petroleum products, timber and fertilizers, in exchange for imported maize, iron, tobacco, gypsum, equipment, and a wide range of chemical, paper and food products.

Other sources of interdependence with Rhodesia were the tourist trade (Mozambique provided seaside resorts for 50,000 Rhodesian tourists), and a north-south transport network that lay partly in Rhodesia, so that to travel from the north interior of Mozambique to the South it was necessary to connect with Rhodesian railways.

Finally, at the present time, about 35,000 Zimbabwean refugees are housed in Mozambican refugee camps.

In the event of the emergence of Zimbabwe with a black government, relations with Mozambique would likely be extensive.

Zambia

Before the 1973 sanctions against Rhodesia, Zambian freight was shipped to Mozambican ports via Rhodesian railroads. With the closing of Rhodesian borders the freight was diverted north through more distant ports in Tanzania and Zaire.

Swaziland

Maputo is the logical port of entry and exit for Swaziland's imports and exports.

Government Structure

The Popular Assembly is the supreme organ of the State and the highest legislative body. Until the composition and criteria for election of members of the Popular Assembly are determined, it consists of the following members:

- (i) members of the Central Committee of FRELIMO
- (ii) members of the Executive Committee of FRELIMO
- (iii) ministers and vice-ministers of the Government
- (iv) provincial governors
- (v) members elected by the Central Committee of FRELIMO from among the Armed Forces
- (vi) two representatives per province of the democratic mass organization, nominated by the Central Committee of FRELIMO
- (vii) members selected by the Central Committee of FRELIMO from among the cadres of FRELIMO

(viii) ten members selected by the Central Committee of FRELIMO from among suitable citizens.

The Popular Assembly has, according to the constitution, the following functions:

- (i) legislation on internal and foreign policy;
- (ii) approve the report on the general national economic plans, the budget estimates, and the implementation of the budget;
- (iii) define the bases for taxation policy;
- (iv) ratify and nullify international agreements;
- (v) approve the report on activities of the government;
- (vi) ratify the legislative acts of the Permanent Commission of the Popular Assembly. (This Commission consists of 15 members elected by the Popular Assembly from among its members who are proposed by the Central Committee of FRELIMO. The Permanent Commission is presided over by the President of the Republic.);
- (vii) grant amnesties;
- (viii) approve the suspension of congressional guaranties, when a state of siege or emergency is declared;
- (ix) authorize the President to leave the country.

Each province has a Governor who is responsible to FRELIMO, and a Provincial Assembly that legislates on matters of exclusive interest to the Province. The 1978 General Budget of the Government of Mozambique is given in Table 1. The Budget shows an expected

Table 1: 1978 Budget of the Government of Mozambique
(\$ million U.S. at 30 escudos)

Receipts	
Indirect Taxes	270
Revenue from State Enterprises	31
Revenue from Government Services	24
Total	<u>325</u>

Expenses	
Presidencia	3.3
Cabinet	6.3
Defence	91.7
Planning and Development	5.0
Interior	30.0
Overseas Business	2.6
Justice	7.4
Information	3.7
Education and Culture	34.7
Industry and Commerce	7.1
Agriculture	18.4
Finance	8.0
Labor	5.2
Transport & Commerce	10.0
Health	43.2
Public Works	22.9
Payment of Public Debt	19.7
General Expenses	13.9
Social Services	1.3
Subsidies to firms	25.0
Subsidies to provincial governments	48.4
Payment to FRELIMO	3.3

Source: Ministerio de Finanzas, Republica Popular de Mocambique,
"Orçamento Geral do Estado para o ano de 1978," Maputo, 1978.

deficit of about \$70 million (U.S.). The priorities are observable in the table. The Defense Ministry receives the largest appropriation followed by Health, Education and Culture, Interior, Public Works and Agriculture.

(d) General Economic and Foreign Trade Picture

The fairly rapid growth of Mozambique in the years prior to independence (approximately 7.5% per year in real terms) stopped abruptly as the Portuguese left the country in large numbers. Government revenues and expenditures dropped to less than half their pre-independence levels (see Table 2), production and exports fell drastically (see Table 3) and massive donations by the other U. N. countries were made on an emergency basis.

The economy appeared to recover slightly in 1978 but by a wide margin production had not yet reached pre-independence levels.

The balance of trade, which was always negative, turned sharply negative upon independence as the major export industries developed by the Portuguese were largely abandoned. Table 3 gives a partial history of the trade balance. The heavy commodity deficit has been partially mitigated in the past by significant receipts from transport services and workers remittance, both of which have diminished since independence. The balance of payments position is critical and most observers believe it will remain so for the next three or four years. South Africa's decision in March, 1978 to make its annual wage payment to Mozambique in gold at the fair market value instead of the lower, official rate will decrease income from migrant labor by 80%, and further aggravate the situation. (G.O.M. had been selling the gold at a profit.)

Table 2: Government Revenues and Expenditures^{1/}

	1971	1972	1973	1974	1976	1977 (est.)	1978 (budgeted)
Revenues							
Direct Taxes	55.6	67.1	83.8	83.2	53.1	46.8	104.3
Indirect Taxes	69.2	70.4	78.9	71.1	117.4	127.1	177.5
Other receipts	229.8	271.1	297.5	299.2	28.3	29.1	44.6
Total Revenues	355.6	408.6	460.2	453.5	198.8	203.0	326.4
Total							
Expenditures	369.4	445.3	547.0	642.3	235.3	323.0	396.4
Surplus/Deficit	-13.8	-36.7	-86.8	-188.8	-36.5	-120.0	-70.0

^{1/}1975 was omitted because it was the year of independence and data do not reflect government policies.

Sources:

1971-74: Contas da Gerencia e da Exercicio

1976, 77: Based on information provided to the United Nations by the Government of Mozambique, and published in The Front-Line States: The Burden of the Liberation Struggle, Commonwealth Secretariat, Marlborough House, London, undated but probably 1978.

1978: Ministerio das Financas, Republica Popular de Mocambique, Orcamento Geral da Estado para o ano de 1978, Maputo

Table 3: Balance of Trade for Mozambique
(\$ U.S. million)

	1971	1972	1973	1974	1975	1976	est. 1977
<u>Commodities</u>							
Exports	167	177	214	307	176	151	154
Imports	350	330	442	388	391	302	489
Balance of Trade	-183	-153	-228	-81	-215	-151	-335
<u>Invisibles</u>							
Receipts	--	--	--	--	--	--	198
Expenses	--	--	--	--	--	--	142
Balance	--	--	--	--	--	--	+56
Total Balance	-17	6	-9	-80	-49	-150	-289

Sources:

1971-1975 Transition in Southern Africa: Mozambique, U.S. AID Bureau for Africa, February 1977.

1976 American Embassy, Maputo, Foreign Economic Trends and Their Implications for the U.S., January 1978.

1977 Commonwealth Secretariat, The Front Line States: The Burden of the Liberation Struggle, London, 1978.

Mozambique trading partners are primarily Europe, Japan, USA, and South Africa. Trade with other African countries is negligible.

A detailed commodity breakdown of exports and imports is given in Tables 4 and 5.

Cotton exports continue to decline because of the difficulty in getting seed and other inputs to the 300,000 or more small farmers in the traditional sector who used to grow cotton. Tea production and export picked up slightly in 1977, and shrimp exports became a significant factor. Otherwise one has to look hard to find evidence of a bottoming out of the economy.

2. Domestic Policies of Significant Importance to Agriculture

a. General Policy

Before independence the agriculture of Mozambique was organized principally in three parts:

(i) The plantation sector.

These were very large estates ranging in size from 1,500 to 40,000 hectares, given by crown grant to large, commercial land companies to develop tea, copra, sugar and sisal. In 1970 the acreages in these crops were tea (17,476 hectares), sisal (40,995 has), copra (19,309 has) and sugar (47,536).. These plantations were all held by foreign companies on a long-term lease basis. Upon independence these estates were abandoned and, in some cases, partially destroyed. They have since fallen into considerable disrepair and are being rehabilitated by the government as state enterprises.

Table 5: Main Imports: Composition of Imports in Detail
(Value in million escudos)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (Partial Est. on Ten Month base)
Animal and Products	193.9	221.9	219.7	221.4	217.0	226.6	245.9	223.7	237.1	152.1	267.0
Fresh Fish	18.5	23.7	27.2	36.0	36.4	43.3	52.6	42.5	55.0	48.5	43.3
Dried and Other Fish	-0-	49.4	49.3	49.4	50.6	81.9	83.6	74.1	56.0	42.0	31.8
Milk, Butter, Cheese	95.4	107.6	103.1	95.7	84.3	82.8	82.1	91.9	106.4	110.3	153.9
Vegetable Products	252.1	278.2	327.5	326.4	375.2	423.2	441.8	405.7	530.1	529.3	1368.2
Wheat	77.1	105.2	127.6	99.6	119.4	145.9	174.1	159.9	336.1	313.9	722.8
Oil and Fats	55.3	60.5	67.0	65.6	72.1	71.3	88.3	77.5	96.1	79.4	150.0
Vegetable Oils (edible)	35.3	40.8	35.7	40.5	43.3	42.7	42.9	28.9	43.4	45.8	29.1
Manufactured Foods, Drinks, Tobacco	443.1	564.6	512.6	533.6	506.3	598.2	484.9	458.1	490.2	198.0	450.0
Liquors and Alcohol	240.1	264.8	233.2	269.5	238.1	221.2	152.9	178.2	200.9	181.5	143.2
Mineral Products	440.0	535.9	540.2	644.4	670.8	738.8	1010.0	832.4	836.9	1215.2	1490.4
Coal	43.0	34.3	32.6	46.7	60.1	58.2	67.8	41.1	45.1	52.7	53.6
Crude Oil	243.6	321.1	326.1	379.5	377.8	377.6	518.8	499.0	470.0	577.9	782.8
Petroleum Products ^{1/}	109.0	133.2	140.1	169.5	183.8	214.3	300.8	200.7	257.1	407.3	576.2
Chemical Products	334.0	349.7	373.3	444.8	557.0	656.8	726.7	687.4	863.4	867.6	845.9
Pharmaceuticals			108.1	129.6	150.2	172.8	193.6	225.7	318.7	262.1	258.0
Other Chemical Products	334.0	349.7	265.2	315.2	396.8	484.0	533.1	451.7	544.7	605.5	202.4
Plastic, Rubber, etc.	144.0	174.2	161.7	214.3	254.5	320.4	371.5	331.9	437.6	358.4	474.9
Tires (automobile)	64.1	80.3	48.1	70.3	86.5	97.1	125.1	101.4	120.1	127.0	172.3
Wood, etc.	47.3	39.4	41.6	54.3	60.2	88.4	58.8	34.8	35.4	15.2	29.1
Textiles and Products	816.9	834.2	800.6	1081.4	1068.7	1080.1	1011.2	892.2	1072.9	461.9	1149.5
Synthetic Fabrics	96.2	94.1	103.4	157.7	128.9	156.6	167.4	142.2	213.0	192.6	199.5
Cotton Fabrics	-0-	-0-	312.2	331.1	407.2	300.0	322.1	243.7	297.2	292.7	353.7
Clothing	-0-	-0-	170.5	-0-	298.7	295.1	207.8	158.6	172.8	97.9	135.2
Shoes	43.8	45.3	33.1	81.4	95.9	150.1	163.6	144.9	42.6	20.4	14.9
Paper and Products	116.9	121.9	145.2	167.7	196.8	237.0	257.5	239.1	308.9	219.9	373.6
Common Metals & Products	525.0	647.5	605.1	674.4	756.3	1054.9	1361.5	1219.3	1379.2	1153.7	1045.4
Iron & Steel Tubes, etc.	55.3	86.9	56.6	64.1	104.1	115.3	100.3	66.6	60.1	56.9	72.1
Railway Lines	23.6	54.0	8.1	70.2	47.9	56.0	12.8	-0-	48.5	47.5	30.0
Iron & Steel Sheets	-0-	-0-	88.6	81.4	95.9	150.1	163.4	144.9	250.1	201.8	75.2

Table 5. (continued)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (Partial Est. on Ten Month base)
Machinery & Electrical											
Apparatus	691.1	1044.2	942.5	1062.4	1209.7	1821.5	1744.1	1902.9	3118.7	2702.0	1952.6
Transportation Equipment	613.7	774.3	649.4	787.4	1063.8	1443.9	1280.8	1196.4	1533.5	1339.9	739.2
Tractors	66.8	78.4	61.7	80.3	171.5	180.8	176.5	165.5	175.9	184.5	70.4
Road Motor Vehicles	398.5	461.2	455.6	496.2	669.4	798.0	752.5	729.2	1003.3	857.9	428.7
Other Transport Equip.	148.4	234.7	132.1	210.9	222.9	465.1	341.8	301.7	354.3	297.5	240.1
Other	307.7	328.9	340.4	462.0	483.0	602.0	555.7	410.4	475.3	251.3	353.9
Total Imports	4981.0	5971.4	5726.8	6740.1	7491.0	9363.1	9638.7	8911.8	11415.3	9543.9	10743.6

^{1/} Petrol, Kerosene, diesel and lubricating oils and other combustibles.

Source: Estatístico Anuario, Mozambique; Boletim Mensal de Estatístico, Mozambique, October, 1975.

(ii) The European Settlement sector.

These were small and medium sized individual farms developed mostly by Portuguese settlers. They probably numbered over 4,000 farms and covered about 2.5 million hectares, of which only about .5 million hectares were cultivated. These were also abandoned upon independence. Most of them were producing rice, corn, cotton, vegetables, citrus, livestock, coffee, potatoes and tobacco.

(iii) Traditional sector.

There were about 1,600,000 farms in this sector, constituting about 2,490,000 hectares, for an average of less than 2 hectares each. These were low technology, subsistence type farms. This sector includes about 90% of all farms, but only half of the cultivated acreage.

b. Policy Towards Land Use.

Upon independence the Government of Mozambique claimed all land for the state and adopted a two-pronged policy towards land use. The plantations and abandoned commercial farms are being organized into state collective farms, staffed and managed by the state. The objective was to put them back into operation as soon as possible to alleviate the critical food shortages and improve the balance of payments. In addition, the GOM organized a number of other state farm activities in various areas, as will be discussed later.

It is commonly stated that the intent of state operation of the plantations and commercial farms was to operate them only during the transition period in order to meet emergency conditions, with the ultimate goal being to completely re-structure the economy to abolish the dualistic nature of production, to concentrate on domestic food requirements, and to base the production process upon collectively operated units such as "Aldeis Comunais" in the traditional sector and cooperatives in the former modern and plantation sectors.

The policy for the traditional sector is quite different. The objective is to organize traditional farmers into communes (aldeis comunais). This involved, in many cases, relocation of farmers into integrated socio-economic units with a central village located in the center of a farming area of less than 5 kilometer radius (a distance considered maximum walking distance from the village with sufficient time to accomplish cultivation activities after walking).

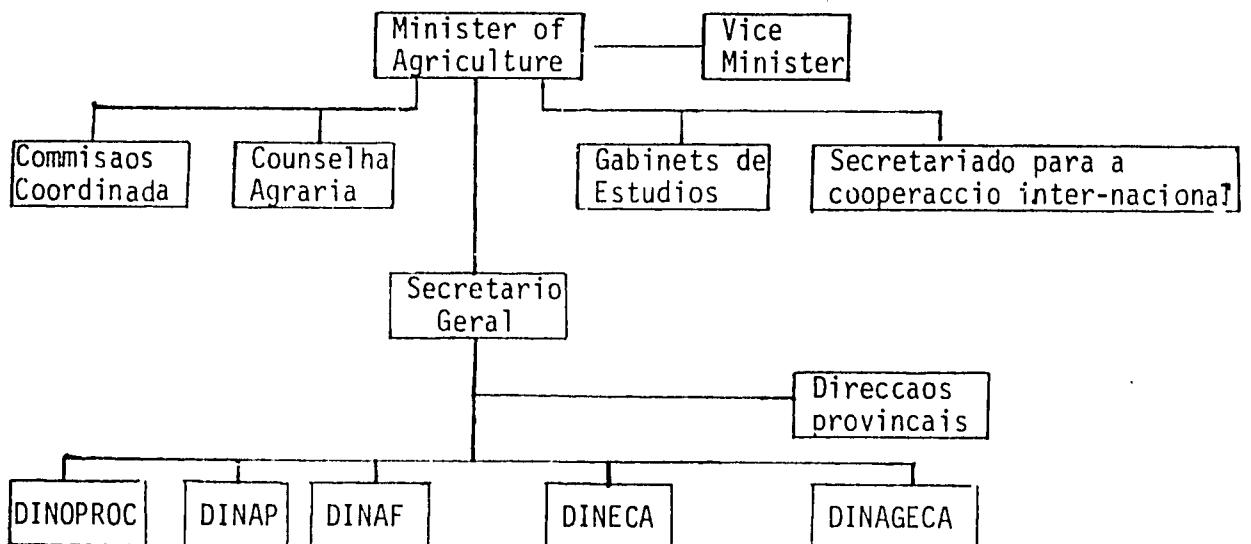
The land area would supposedly be sufficient to support the village, which was considered ideally to include 50 to 250 families and not more than 6,000 persons. The village would be a center through which a wide range of health, educational, cultural and commercial facilities could be channelled. In some cases 3 or 4 villages may share common facilities.

The land would be worked collectively, except that each family would be allowed up to 1/2 hectare for their private use (1 hectare in arid areas) and a few livestock, as well as 100 square meters **for** a house and garden.

It is not known how many communes have been established, nor how well they are working. Some were established in the last years of fighting for independence, but these were formed more for military security than for economic reasons, and some were not given sufficient land for support. The communes are supposed to be organized on a voluntary basis, and although some resistance is offered in some areas, the concept does not seem to be completely foreign to the majority of the people, since tribal organization and collective ownership of lands was common. However, in the tribal organization each family operated their land independently, whereas in the commune the land would be worked collectively.

Organization of Ministry of Agriculture

The Table of Organization of the Ministry of Agriculture is given below.



where

DINOPROC	= Directorio Nacional de Organization de Producao Colectivo
DINAP	= the organization for livestock
DINAF	= the organization for general agriculture
DINECA	= the organization for pricing and marketing
DINAGECA	= the organization for geography and cadastro.

Irrigation is in the Ministry of Public Works and food processing is in the Ministry of Industry and Energy. The placement of these two important agricultural activities in Ministries largely unrelated to agriculture is typical of LDC's and hampers efficient operation.

There is no Agricultural Development Bank. Agricultural activities are financed directly by the Central Bank located in the Ministry of Finance.

c. Policy Towards International Trade

A National Marketing Enterprise (ENACOMO) has been organized and capitalized at 200 million escudos (\$60 million U.S.). Objectives of ENACOMO are:

- (i) the purchase of consumer goods and equipment necessary to the public sector.
- (ii) importation of products for strategic stockpiles
- (iii) exportation of Mozambican products
- (iv) a systematic search for foreign markets
- (v) to support the National Bureau of Foreign Trade, the National Bureau of Domestic Trade and other government entities to insure efficient distribution, especially of imported products.

ENACOMO will be administered by a three-person Administrative Council, who will choose one member to be President of the Council.

A General Council, consisting mostly of members from other Ministries will advise the Administrative Council.

d. Policy for Agricultural Inputs, Marketing and Prices

A National Directorate for Agricultural Economics and Marketing (DINECA) was established in the Ministry of Agriculture. It is to be responsible for the organization and development of collection and marketing of agricultural commodities. It will also organize input supplies for agricultural production.

DINECA will absorb the existing Cotton Institute and Cereal Institute, an important task since so many small traders have ceased operation, leaving the collection of produce from the traditional sector in the hands of the Government. The efficient operation of DINECA is of crucial importance for the increase of production in the traditional sector; inputs and other commodities must be supplied and surplus production collected within reasonable reach of the majority of the production units.

Lack of staff, especially at the middle level, is a serious problem confronting the Directorate. In addition, the supply of spare parts, tools and small agricultural implements has become a major bottleneck requiring urgent action.

DINECA sets all input and commodity prices. In the absence of experience, an economic rationale (such as efficiency), and adequate data on which to base price fixing, the setting of prices is largely ad hoc. At times prices are fixed at the same level throughout the country with no regard given for costs of transport to remote areas.

e. Agricultural Credit

As yet there is no agricultural credit bank and no guidelines for agricultural credit. There is a Credit Institute for supplying credit to corporations but it is separated from the banking sector and has little technical competence.

B. Cultural

1. Traditional Attitudes and Practices which Affect Decision-Making

Mozambique is characterized by a diversity of people of varying origins, historical influences, social structure and dialects. The population is commonly divided into 10 groups according to commonality of language, culture, history and sometimes simple convenience. One of the largest groups is the Makua-Lomue.

These people comprise an estimated number of 3 million and occupy the major parts of Cabo Delgado, Nampula, and the eastern part of Niassa provinces. Their social organization is loose and tends to encompass small-scale groups such as extended families and very small villages. They pursue a subsistence type agriculture supplemented by hunting and fishing, and frequently move to new locations (although the move to newer, more fertile lands seems to be giving way to a more sedentary agriculture). Families are largely matri-lineal and political authority is largely vested along lineage lines. A matri-lineal group has a hereditary "chief." A group of lineages may form a council of chiefs presided over by the chief from the largest group. Women traditionally do the farming and house-keeping, while men do the land-clearing, hunting and house-building.

The second largest cultural group is the Tsonga, numbering about 1-3/4 million, who occupy primarily the area from Beira south.

Their political organization seems to depend on the "chief," who allocates land from a well-defined tribal area to the members of the tribe. Ownership of the land is collective and is re-assigned when abandoned. Succession to the chieftom is to the chief's brothers and finally to the chief's son. The agriculture tends to be commercial and sedentary.

Another large group is the Shona-Karanga, numbering about 3/4 million people, who occupy most of the area from Beira north almost to the Zambezi river--primarily Manica province. Economic activity is concerned with subsistence agriculture and herding. Groups of extended families form the social unit with a chief and council presiding. Communal land is allocated by the council, with no member of the group denied the use of land. If a man leaves his land to take a job in the city he can reclaim his right to the land on his return. Family structure is patri-lineal. Magic and superstition play a significant role in tribal life, as with most of the other ethnic groups in Mozambique.

From the discussion of these three groups some similarities and differences emerge. North of the Zambezi the people in general practice a subsistence, shifting agriculture, although this practice seems to be evolving into a more sedentary type. Family structure is primarily matri-lineal, but this, too, is changing. Because land is heavily forested in the north, requiring heavy work in clearing, men customarily concentrate on land-clearing, hunting and house-building. Women cultivate and harvest the crops.

In the south the people are more inclined to patri-lineal societies and a more sedentary agriculture. Land is still retained

for tribes, although families may obtain long-term rights of usage. Due to the relative absence of tsetse fly herding is common in the south, although a common use for livestock is simply wife-buying or storage of wealth.

Almost all groups until the last few decades, possessed certain common characteristics, whether matri-linear or patrilinear, whether dedicated to a shifting, subsistence agriculture or a more sedentary type.^{1/} All were organized socially and politically in an extended family group, at times crossed horizontally by age-groupings and secret societies. To this network of relations a multitude of obligations, authority lines, religious taboos and cults were interwoven. A hereditary chief, supported by a council, maintained political, military, judicial and religious functions. Religious magic related to the gods of ancestors are common practices. Appeasement of the gods was accomplished by sacrifices, rituals and amulets. Land was held in tribal association with each family being allocated land to use according to need.

This social structure has evolved faster in recent years due to intensified efforts by the Portuguese to alter the social and agricultural structure, the protracted struggle for independence (which forced relocation of many people), the migration of male workers to South Africa mines (principally from the southern half of Mozambique) and other factors. Chiefs frequently no longer possess the power and

^{1/}Ferreira, Antonio Rita, Promocao Social em Mocambique, Junta de Investigacoes do Ultramar No. 71, Lisbon 1964.

prestige formerly held. Communal solidarity is giving way to individualism. As more workers migrate to urban areas even family ties are weakened and the breakdown of the structural stability of family and tribe leaves a vacuum which must be filled by a new stabilizing force.

Implications for Agricultural Development

Families typically have use-rights to individual parcels of land within the tribal complex and, in addition, have access to other lands used commonly.

Individual ownership of land has not been an important characteristic of most of Mozambican agriculture. Long term occupation of rights to land, however, was and continues to be the dominant tenure institution. Recognition of long term rights should be sufficient claim to motivate land improvement through long term investment and conservation. The communal spirit is deeply ingrained in the social structure, but individual control over a parcel of land is also important. If family and tribal relationships are not broken in re-location programs, a communal organization of agriculture could be an effective mechanism for fostering technological improvement.

In most ethnic groups the woman plays a major role in agricultural production. Most of the cultivation and harvesting is done by women, while men do the "heavy" work or leave for periods of 6-18 months to work in industrial jobs.

Women also have a much stronger role in family life and child-rearing than males, and thus are in a better position to impart knowledge and values about sanitation and health to children. Unfortunately females are less likely to receive formal education and are thus less qualified to foster technological improvement.

II. Appraisal of Existing Supply Characteristics in Agriculture

A. Land Use Potential

1. Areas Presently Utilized

Reliable data are not available concerning areas presently in cultivation. Estimates range from 5 to 15 million hectares. The difficulty in estimating land use is in the traditional subsistence sector, which is scattered in very small units, and accounts for upwards of 90% of the total number of farms. Whatever the area is, it can be expanded greatly. There are large areas unutilized which can be developed. Development involves clearing and in some cases drainage and in other cases irrigation. Estimates of available arable land range from 20 to 50 million hectares.

Land development is expensive, however. Costs of land clearing alone would be a minimum of \$50-100 per hectare. If large, collective farms are developed, as is proposed by G.O.M., costs including buildings, land clearing, equipment and machinery could run \$700 per hectare.^{1/}

2. Potential Cropping Patterns

With irrigation the land can easily produce two crops per year. Yields have generally been low and can be increased with appropriate fertilizers and pesticide inputs.

^{1/}Estimates from F.A.O., "Report of the Mozambique State Farm Projects: Identification/Reconnaissance Report," 3 volumes, Dec. 1977.

B. Labor Inputs

1. Existing Skills

The manpower position in Mozambique is serious and continues to be of great concern to the Government. Prior to independence, many of the technical, skilled and semi-skilled posts were filled by expatriates. Large numbers of these have returned to Portugal. Manpower shortages are affecting both the public and private sectors. Agricultural production is severely affected because of inefficient production, marketing and distribution agencies.

Some of the most serious shortages are at the intermediate levels. The administrative system at the time of independence made very heavy manpower demands at the subprofessional level. The Government of Mozambique is not attempting to find replacements for all those who have left or are expected to leave. Instead, it is introducing administrative reforms and modifications in order to reduce the demands.

As a first step, massive intensive in-service training has been organized in most of the ministries and agencies. This is designed to give quick results, to allow the Government time to carry out necessary modifications and, at the same time, to introduce staff to new methods and procedures. A massive transfer of records and operations to a centralized computer is reducing the demands for clerical and accounting posts while introducing new staff to new methods. An example of the massive training effort is the programme in the Ministry of Finance under which between 300 and 400 persons are taking courses, lasting 8 to 10 weeks, in various aspects of public finance and financial

administration. In the provincial and regional administration, 200 people are taking three- to four-month courses in finance, administration and orientation. A number of courses are being offered in the field of management accounting, particularly for co-operatives and units of the state trading corporation.

As of 1977, more than 80 training programmes were being carried out by the Ministry of Labour in subprofessional fields. Among these are courses for electricians, carpenters, tinsmiths, metal-workers, typists, auto mechanics, welders, machinists and plumbers. The Department of Health is making a major effort to train medical and para-medical workers.

In spite of these efforts, there are still serious shortages in many areas. The most critical needs are for various kinds of high-level manpower, for people to assist in the training and for middle-level manpower to keep the economy operating while intensive training programmes are being carried out.

The Government has begun discussions with a number of Governments to supply urgently needed manpower on a bilateral basis. International organizations are also being approached for assistance. In addition, arrangements have been made with a number of non-governmental organizations to assist in locating and recruiting people to meet the most serious shortages, and a number of firms and agencies are advertising and recruiting abroad. In spite of this, however, there are critical shortages and Mozambique will require substantial amounts of technical assistance and a significant number of recruits from abroad.

The GOM has called for the voluntary return of Portuguese technicians and many are returning. It was recently reported that several hundred Portuguese had applied for return but delays in processing applications kept them waiting in Lisbon.

C. Environmental

1. Natural Constraints to Increased Agricultural Output

a. Land and Soil^{1/}

Mozambique is about twice the size of California, containing a total land area of 303,769 square miles. The entire eastern border of 1,737 miles joins the Indian Ocean. On the west and north Mozambique has a 975 mile border with Malawi, a 260 mile border with Zambia, a 765 mile border with Zimbabwe, a 305 mile border with South Africa, and a 65 mile border with Swaziland.

b. Topography

The topography of most of Mozambique is essentially flat to very gently undulating. About 44% of the land area is flat and often marshy. All of the land south of the Zambesi is less than 500 meters in altitude, with about 80% of it below 200 meters. The flat area extends north of the Zambesi in a continually narrowing coastal plain from 50 to 100 kilometers in width. Only isolated small areas extend above 3,000 feet, primarily the Angonian highlands in Niassa province close to Lake Malawi and in Tete province near the Zambia and Malawi borders. See Figure 1.

^{1/}Centro de Investigacao Cientifica Algodoneira, "Esboco de Reconhecimento Ecologico-Agricola de Mocambique," Vol. 3, 1955.

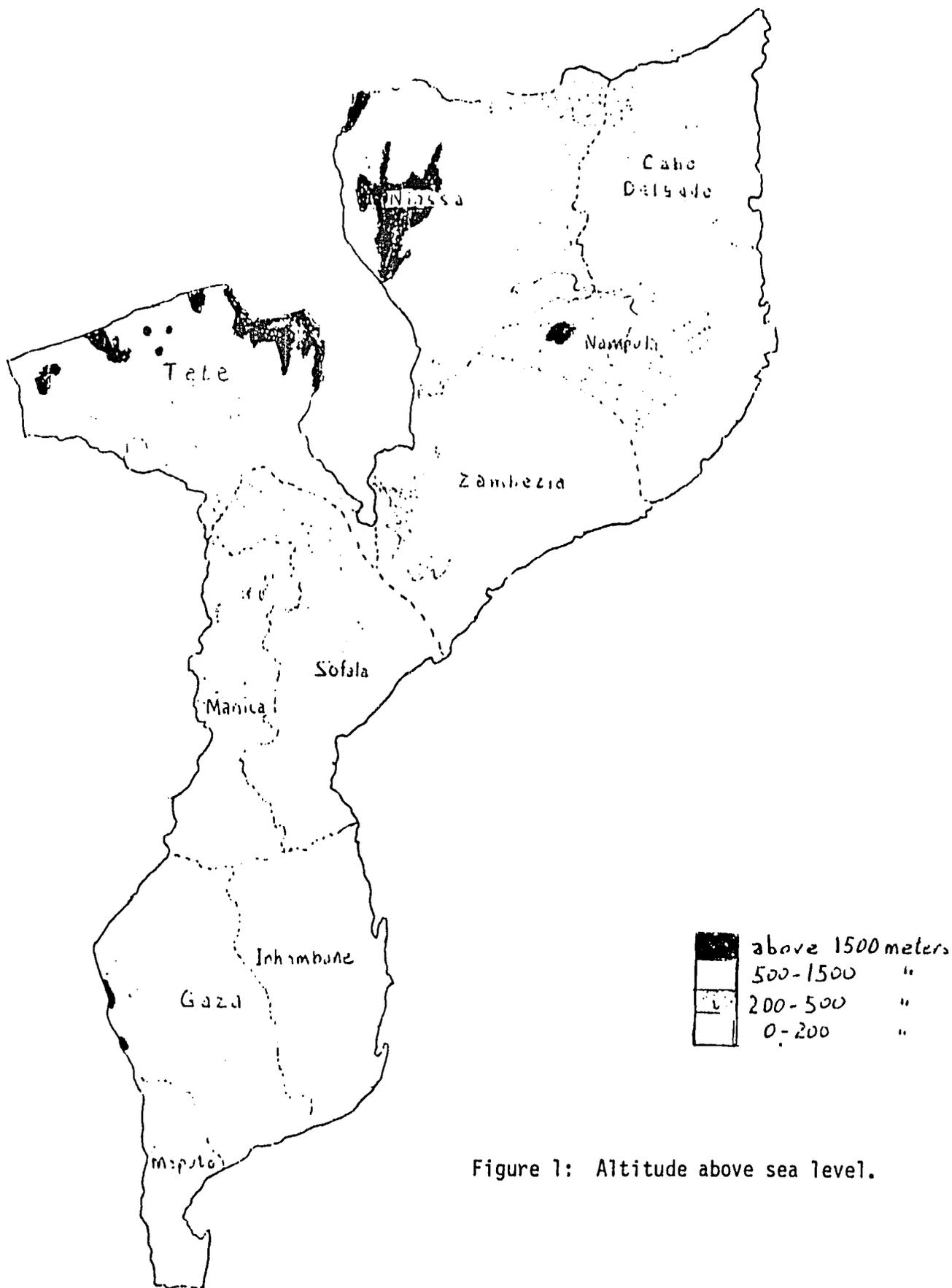


Figure 1: Altitude above sea level.

Without flood control the southern half of the country is subject to losses from flooding in the rainy season and poor drainage during much of the year. Figure 4 illustrates the topographical character of the country. Given an adequate dam and canal system, of course the land can easily be irrigated around the major rivers.

c. Rainfall

The southern half of the country has an inadequate total rainfall and an inadequate distribution of rainfall for dryland farming. The rainfall is heaviest in the Central Coast at Quelimane (48 inches annually) but decreases in the north and south. In the southern coast it averages between 30-40 inches, and the north coast gets from 24-48 inches. Inland there is more variation in rainfall according to altitude and local geographic features such as large lakes and topography. Along the Rhodesian frontier in northern Manica Province and near the Malawi border in Niassa province rainfall in places exceeds 64 inches, while a short distance north in the Zambezi Valley in Tete province it drops to 16-24 inches. See Figure 2.

Everywhere there is a wet season (October to April) and a dry season (April to September). In the north the wet and dry seasons are more distinct, with shorter transition periods between. In the south the rainy season is longer and the dry season differs considerably in intensity and length from locale to locale. The rains are intense when they occur. About 85% of the rainfall occurs in the wet season.

d. Temperature

There is not much variation in temperatures between months, and the average maximum monthly temperatures do not differ by more than

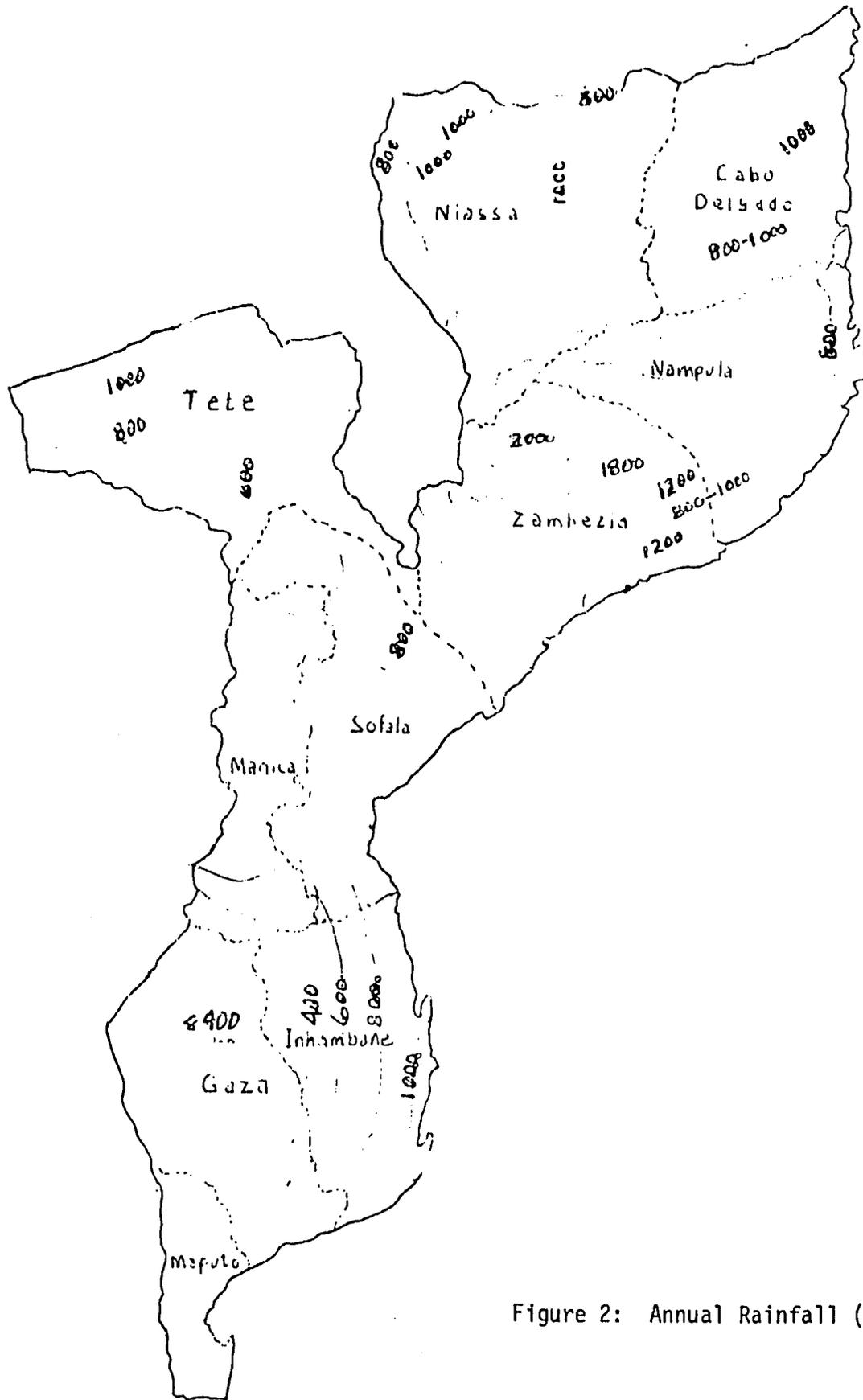


Figure 2: Annual Rainfall (in millimeters)

10° Centigrade from the average minimum temperatures. Although temperatures are slightly higher in the north it is quite warm all over the country (except at high altitudes). Temperatures do not often go above 90° F. and the usual maximum is 80-85. Temperature ranges are usually 75-85°F., although in Maputo in the dry season the temperature could go as low as 65° F.

e. Soils

There is a great variation in soil types and qualities. Even within small areas the local soil conditions can vary greatly. By and large the coastal areas are very sandy for up to 10-40 kilometers inland, with sandy soils going much farther inland in some areas. However, the sandy soils of the coast are interspersed with several alluvial deposits, principally the deltas laid down by the Buzi, Zambezi and Ligonha rivers. These three deltas are quite fertile.

Large inland areas in Zambezia, Niassa and Cabo Delgado provinces have fertile, clay soils ranging in color from red to brown. These soils have good water retention and support a general, rainfall agriculture.

South of the Save river sandy, rather non-fertile soils predominate. These soils drain rapidly and nutrients wash out rapidly.

2. Water Resources

There are considerable water resources available for irrigation but only a fraction has been presently developed. A number of small private reservoirs varying in capacity from a few hundred to over 2 million cubic meter capacity have been constructed throughout the country, mostly around Maputo and on the Buzi river. In terms of

formal settlement-irrigation schemes it appears that 100,000 hectares are under irrigation or about to be completed. This includes an existing 21,000 hectare colonization on the Limpopo river, 5,000 hectares on the Buzi river, and a new development of 60,000 hectares served by the new Massengir dam (also in the Limpopo basin).

The Limpopo river development is a potentially major irrigation scheme. On January 1, 1978 the USSR, Bulgaria and Mozambique signed an agreement to develop parts of the Limpopo River Basin. It is felt that the ultimate potential of the basin is about 250,000 to 300,000 hectares.

The newly completed Cabora Bassa dam on the Zambesi river is ultimately supposed to irrigate over a million hectares, although the feasibility studies which were once prepared have disappeared and new studies must be made to develop the project. Actual irrigation will not be achieved until several years in the future, since no canals have been designed as yet.

A third future development is the Incomati-Umbeluzi Valley Scheme near Maputo, which is also years away, since contracts for feasibility studies have only recently been concluded. The GOM has, however, decided to proceed with the construction of the Pequenos Limbobos Dam on the Umbeluzi river to irrigate 10,000 hectares near Maputo.

Table 6 indicates the major basins and the volume of water available as measured by average runoffs of water. Table 7 lists completed and proposed dams and irrigation potentials.

Table 6: A List of Major Water Basins and Average Runoffs

Name of Basin	Gauged Average Runoff million m ³ per year
Maputo	2,800
Umbeluzi	315
Incomati	2,300
Limpopo	5,330
Save	5,000
Buzi	1,450
Pungoe	3,080
Zambezi	103,380
Licungo	1,210
Molocue	865
Ligonha	820
Meluli	1,915
Monapo	1,005
Mecuuri	460
Lurio	7,330
Montepuez	195
Messalo	1,030

Source: C. des Bouvrie, "Land and Water Resources," a section in Mocambique: Report on FAO Participation in the Multi-Agency Programme Formulation Mission of the U.N., P.M.S. No. 4, Feb. 1975.

Table 7: A List of Completed and Proposed Dams for Irrigation

Name of Dam	River	Storage Capacity million m ³	Area Under Irrigation or proposed
<u>Completed</u>			
T. de Morais	Limpopo	15	30,000
Massengir	Olifantes	2,844	97,000
Cabora Bassa	Zambesi	63,400	
<u>Proposed</u>			
Giboia	Maputo	115	17,480
Pilibombas	Umbeluzi	450	12,000
Magor	Rib Major	1,380	15,854
Movene	Movene	15	10,164
Chuali	Lake Chuali	160	80,004
Corumana	Sabie	610	10,488
Mapai	Limpopo	11,200	160,000
Chimezi	Chimezi	27	3,400
Vanduzi	Vanduzi	54	10,600
Manjarevo	Manjarevo	142	10,980
Candezi	Nhamiringa	18	5,814
Revuboe	Revuboe	13	6,605
Luenha	Luenha	8	15,893

Source: C. des Bouvrie, op. cit.

D. Transportation and Storage Inputs

1. Road Infrastructure

Roads in Mozambique are classified by function rather than by quality of surface. First class roads constitute the principal network, establishing connection at borders of other countries, district capitals, major population centers and ports. Second class roads link major industrial, commercial, and agricultural centers, ports and railroad stations, and establish connection to first class roads. Third class roads are of regional or local importance, and unclassified roads are dirt tracts passable at times with 4-wheel drive vehicles.

Length of roads of these four classifications are as follows (1973 data):

<u>Class</u>	<u>km.</u>
First class	3,978
Second class	7,445
Third class	14,584
Unclassified	<u>12,553</u>
	38,560

Source: Economic Commission for Africa,
Summary of Economic Data for
Mozambique, 1975.

The major part of the road system tends to be east-west in direction along rivers or railroad lines. North-south construction is difficult because of the many rivers to be bridged.

Sanctions against Rhodesia have reduced communication between the southern and central interiors of Mozambique. Former traffic, which ran about 40,000 tons of foodstuffs annually, depended on Southern Rhodesian roads and railroads. Construction of the Espungama-Dombe-Chimoio Road has been started to remedy the situation.

Also, the Angonia district, one of the principle agricultural regions, is being counted on to replace some of the foodstuffs previously imported from Rhodesia. A road is being completed linking Angonia to the primary road system.

The road system is quite inadequate for agricultural development. Many so-called trunk roads are impassible in the rainy season, which means that major centers of communication are out of touch with each other. Transportation of agricultural products from food-surplus areas to food-deficit areas is difficult at the best of times and impossible during the rainy season. Many of the new settlements and development projects do not have adequate road connections.

Roads linking Mozambique with Zambia and Malawi are necessary now that sanctions have been applied to Rhodesia.

The GOM plans to build 2,500 km of dirt feeder roads over the next five years.

New sections of trunk roads proposed: ^{1/}

a. Milangi-Mocuba:

This road, which passes through the major tea growing area will link the tea plantation, with Mocuba and then with

^{1/} UN Economic and Social Council, "Assistance to Mozambique, a Note by the Secretary General," sixtieth Session, Agenda Item 12, May, 1976.

Quelimane for exports. The road will provide a link with Malawi and will support a needed feeder road system in Zambezia Province. The road will pass through a major livestock producing area. The length of this segment will be 220 km.

b. Litunde-Marrupa-Balame-Montepuez:

This proposed road would link the provinces of Niassa and Cabo Delgado. It is critical to the development of the entire northern regions and will pass through major settled agricultural areas. The road will be 466 km. in length.

c. Cuamba-Marrupa:

This is a proposed cross road to join the Lichinga-Pemba road with the road described in (2) above. The road will pass through agriculture and livestock producing areas and will make some of the newer settlements accessible.

d. Montepuez-Mueda:

This road will link Pemba, Mueda and Montepuez. This will be a second-class road and will pass through an important agricultural area where a large resettlement is planned. The road will be 140 km. in length.

e. Angoche-Momapo:

This road will facilitate development of the port of Nacala for the shipment of cashew nuts, cotton and copra, and will supply sawmills in the area of Namaponda.

f. Northeast highway :

This highway would be the main north-south artery connecting the provinces of Zambezia, Nampula, Cabo Delgado and Niassa. It would be 996 km. in length.

2. Road Maintenance

Road maintenance is difficult because of structural inadequacies in the initial construction (lack of bridge abutments, grading deficiencies, etc.). Maintenance capabilities are limited, as well. The only source of rock material for crushing seems to be in Maputo province, and no crushing equipment is available in the country.^{1/} The road conditions seem to be deteriorating rapidly as additional heavy freight loads increase and no maintenance is accomplished.

3. Storage Availability

Not surprisingly, taking into account the depressed state of agricultural production, no problems of storage space shortage in terminals are encountered presently, with the exception of temporary and localized problems in producing areas due to transport delays.

Details obtained for the port of Beira show the existence in public property of five warehouses of 200 by 25 metres, 2 of 100 by 25 and 2 of 175 by 20 metres. This adds up to 37,000 square metres groundspace or about 90,000 tons capacity, assuming that as a maximum 2.5 tons of bagged grain shipments up to 20 or 30,000 tons.

^{1/} Report by Consultant Dr. Eng. Pietro Mercurelli, "Proposal for Establishing a New System of Emergency Maintenance of Asphalt and Earth Roads in Mozambique," Rome, April, 1978.

In addition there is much storage space in the harbours of Maputo, Beira, Nacala and Quelimane. Until the transit trade with neighbouring countries will be resumed, there is considerable free space in these facilities.

Now under construction are 7 warehouses of 2,000 square m. surface each, to be used by DINECA or a new State Company that may eventually replace it.

A partial listing of silo's and warehouses, most in private property, is given below.

a. Silo's

<u>Location</u>	<u>Owner</u>	<u>Capacity</u>	<u>Produce Stored</u>
Matola (Maputo)	Industrial Company of Matola	17,000 tons	wheat, maize
Machaua	SOCIMOL	10,500 tons	wheat
Xinauana	Alfredo Luis	1,270 tons	wheat
Beira	NOBEIRA	12,000 tons	wheat,maize
Nacala	Industrial Cy of Matola	6,000 tons	wheat

b. Warehouses

<u>Owner</u>	<u>Total Ground Surface</u>	<u>Crops</u>
Private	187,160 m ²	rice maize, wheat 17,000 oilseeds 37,000 cashew 43,000
Public	91,088 m ²	miscellaneous

Source: FAO, "Report on State Farm Projects", op. cit.

The Netherlands has an agreement to build more storage centers in terminal locations and ports.

The GOM considers that the real storage problems are located in the production areas, and plans an extensive program of small godown construction in rural areas, primarily with local labor and materials.

III. Appraisal of Existing Demand Characteristics in Agriculture

A. Structure of Domestic Markets

1. Wholesale and Retail Markets

a. Traditional Sector.--The pre-independence marketing channels have largely broken down since many traders serving the traditional sector have ceased operations. The GOM has established DINECA to supervise the collection and marketing of produce from surplus areas. Regular channels have not been completely established as yet by DINECA. The GOM has requested the construction of 600 stores in rural areas to help collect commodities and distribute inputs. Many problems, including a lack of trained people to operate the marketing system, remain to be solved. FAO has proposed a project to aid DINECA in this task.

For many commodities, prices have been set by the GOM at all marketing levels. At times these fixed prices have provided insufficient margins for operation of private traders, forcing still more government intervention.

b. Commercial Sector.--The GOM has dismissed many managers of private firms processing and marketing commodities and have appointed Administrative committees to manage the businesses. The Administrative committees are purported to represent the workers. In addition, the marketing operations of the firms have been taken over by a central committee.

c. Foreign Sector.--All imports and exports are handled by a National Bureau of Foreign Trade (ENACOMO).

In summary, the government has assumed the major role in market for many products. This includes supervising the collection and distribution of commodities and fixing prices.

Such activities are severely hampered by transport and communications limitations. Shortages of products are always present in urban centers. Some commodities, such as bread, are rarely seen. Distribution to consumers is often accomplished at government or "people's" stores. The government has indicated that some products perish in production areas for lack of a mechanism to move them to consumption centers.

• B. Structure of Domestic Consumption¹

In the rural subsistence sector (which includes 85-90% of the people) the diet is primarily cereals and tubers. The main dish is a porridge accompanied by a sauce of beans, coconut or ground-nuts. Rarely a piece of meat or fish is included, along with some leaves. The cereal from which the porridge is made depends on what is produced in the area. In Maputo corn is the staple although rice is preferred. In the north manioc is more common. In Beira and low-level areas of Zambezia and Niassa the staple is manioc, sweet potatoes, sorghum or rice. In the higher elevations corn is used.

There is a widespread inadequacy of animal protein. Around the lakes and rivers people eat fish when available. Some of the more fortunate eat an occasional chicken or other small animal. If grain is scarce sweet potatoes or bananas replace cereal. Sometimes, in periods of scarcity, one meal

¹May, Jacques M., M.D., and Donna L. McLellan, The Ecology of Malnutrition In Seven Countries of Southern Africa and Port. Guinea, Studies in Medical Geog., No. 10, Hafner Publishing Company, New York, 1971.

per day is eaten rather than the normal two meals. It has been estimated that the average diet contains 3.4 kilograms of fish and about 2 kilograms of meat per year.

Obviously, the demand for food is related to income but it is impossible to predict which foods would be eaten if they were available and people had income to buy them. Beef, pork, mutton, and chicken are all preferred. Fruit is also preferred when trees are in the vicinity.

There is basically not enough energy and fat in the diet and insufficient diversity of amino acids. Vitamin A and calcium deficiencies are also widespread. Diet related diseases such as rickets, beri-beri, scurvy, and pellagra are common.

C. Potential for Exports

It is difficult to appraise potential exports in the absence of specific development plans. Pre-independence exports were based on trade terms and regulations favorable to Portugal (except possibly for citrus), and so are not good indicators for the changed conditions in the country. Exports since independence are based on transitory, disaster conditions. The GOM has a short-run policy of recuperating the level of exports attained prior to independence by rehabilitating abandoned plantations as state farms. It is not possible to compare costs of production in Mozambique with world prices because costs of production in Mozambique are based on artificial input prices set by the Government. Further, costs of production are not relevant in this situation since the GOM does not consider them in the production decision. The over-riding considerations in stimulating exports is the shadow price of foreign exchange, which is quite high, given Mozambique's adverse balance of payments and inadequate hard currency reserves.

Exports of sugar, tea, citrus and cashews probably will resume their pre-independence levels within five years. It is doubtful if exports of copra, sisal and cotton will achieve those levels.

The long-run potential depends on the rate of development of the Limpopo valley irrigation scheme, and the Cabora Bassa irrigation scheme. If those developments reach their ultimate potential--say in 10 years--Mozambique could be an exporter of rice and oilseeds in addition to the traditional exports.

The export elasticity of demand can be taken as infinite for all commodities except possibly cashews, and the demand for cashews should expand steadily because of a likely high income elasticity of demand.

D. Supply and Demand Projections

1. Crop Production

The list of principal crops are given in Tables 8 and 9. A discussion of most of these individual crops follows. It is useful to discuss the characteristics of production on a crop by crop basis in order to arrive at tentative supply evaluations.

a. Sugar Cane

In terms of export value sugar was the most important crop in 1974, accounting for 27% of total agricultural export value. Production was confined to some large cane-growing companies such as the Sena Sugar Estate at a tributary of the Zambezi River, the Companhia Colonial de Buzi, south of Beira, and the Sociada Agricola de Incomati, north of Maputo. Heavy investments in the sugar industry were made in the sixties to increase production. Sugar cane production prior to independence is shown in Table 10.

Table 8. Production of principal annual crops, 1970.

Crops	Area (hectares)	Production (tons)	Yield kg/ha
Cotton	351,284	138,909	396
Groundnut (unshelled)	253,818	55,188	217
Rice	76,893	98,757	1,284
Potatoes	5,611	39,413	7,028
Sweet potatoes	8,302	39,857	4,801
Sugar cane	47,536	2,571,377	54,093
Bean	181,436	62,196	343
Cassava	448,878	2,547,373	5,675
Maize	833,237	373,193	448
Sisal	40,995	29,800	727
Tobacco	6,012	4,435	738
Wheat	14,788	4,541	307
Sorghum	374,815	194,678	519
Millet	111,896	31,993	286
Total	2,755,501	6,191,800	76,862

Source: Instituto Nacional de Estatística, "Anuario Estatístico,"
Mozambique 1972.

Table 9. Production of principal permanent crops, 1970

Crop	Area or quantity		Production ('000 tons)
	'000 trees	Trees in production	
Tea (green leaf)	17,746 (ha)	n.a.	58.5
Copra	19,309	10,245	68.0
Cashew nut	61,154	35,632	200.0
Bananas	78,964	11,042	67.0
Oranges	3,122	1,392	15.0
Tangerines	2,300	866	1.0
Grapefruit	236	140	1.0
Lemons	374	177	1.0
Coffee	1,017	780	n.a.
Pineapple	196,140	35,969	n.a.
Mangoes	7,048	3,900	n.a.
Papayas	6,604	3,206	n.a.
Mafurreira	3,495	1,510	n.a.

Source: Instituto Nacional de Estatística. "Anuario Estatístico."
Estado de Mozambique, 1972.

Table 10. Sugar Cane Production

Year	Area '000 ha	Yield kg/ha	Production	
			'000 tons of cane	'000 tons of sugar
1961/65	31	47,501	1,488	171
1972	56	58,929	3,300	365
1973	57	63,158	3,600	390
1974	58	53,448	3,100	266

Source: FAO Production Yearbook, 1974.

The location of sugar estates on areas of flat alluvial deposits, and the use of irrigation water, create several problems which do not occur under more elevated, rainfed conditions. Of paramount importance is the provision of an adequate drainage system to remove water surplus, which sometimes presents difficulties owing to the topographic nature of the land; indeed there are occasions when it is necessary, both to pump water from the river to irrigate, and to pump drainage discharge back into the river. Further, the risk at some sites for soil salinisation must be recognized and prevented. High technical knowledge and crop management skill are required to be a successful producer under these conditions.

A disease of major importance is smut, which has been present in the older estates for a very long time and also occurs in the new plantations.

Sugar production dropped drastically upon independence because of land abandonment and reduced yields due to inability of unskilled technicians to deal with the difficult production conditions.

The GOM is trying to increase production of sugar to 300,000 tons annually, which would equal production before independence. Of the 300,000 tons, 20,000 tons will be directed to domestic consumption and the rest exported, probably most of it to the U.S. Realistically it would seem reasonable to expect that within 5-10 years the state collective farms could attain pre-independence production levels. With judicious use of repatriated Portuguese technicians and visiting experts, the previous technology could be re-attained. Processing capacity exists and present plants can be rehabilitated. It would seem difficult and costly to increase production much beyond 300,000 tons, since substantial expansion would necessitate additional facilities such as rail lines and roads. Marginal increases may be available from expansion of irrigation areas, but erratic conditions in world markets and competing countries would suggest that substantial investment in new facilities would not create a high expected return. The 300,000 ton level would thus seem achievable in about five years.

b. Cotton

The recent history of cotton cultivation is closely tied to the colonial policies of Portugal. Until a few years before independence, hundreds of thousands of Mozambique subsistence farmers were required by the colonial administration to grow cotton which was then sold at a concessionary price to Portugal. When this mandatory requirement was lifted, the decline in production by small landholders on non-irrigated land was compensated in large measure by increases in production from a number of plantation-like farms owned by Portuguese settlers in irrigated developments in the Zambezia province.

After these plantations were abandoned by their Portuguese owners, production fell drastically. Now, most of the large farms have been taken over by the Mozambique government, and the increase in production over 1975 levels is a sign that organization and productivity of state farms is improving. Cotton once rivaled cashews as Mozambique's leading export, and the government is emphasizing cash crop production on state farms in an effort to earn foreign exchange.

Table 11. Cotton cultivation and production statistics (1972/73-1976/77).
(Crop years: November 1 to October 31 of two consecutive years.)

Crop Years	Area Cultivated (Hectares)	Seedcotton Output (M.Tons)	Lint Cotton Output (M.Tons)	Seed Output (M. Tons)	Yield (Kilos per Hectare)	Seed for Planting (M.Tons)
1972/73	267,950	144,060	48,660	92,200	344	13,800
1973/74	245,690	133,210	45,630	85,250	347	8,600
1974/75	133,050	50,010	17,150	32,000	240	5,590
1975/76E	96,230	37,440	12,650	24,000	249	4,330
1976/77E	135,730	53,615	17,900	34,300	252	5,430

(E)--Indicates official estimates by the Direccao Nacional de Economia e Comercializacao Agrarias (DINECA), Ministerio da Agricultura, Maputo, Mozambique.

Source: (DINECA), Ministerio da Agricultura, Maputo, Mazambique.

The Mozambique cotton crop in 1976/77 was the largest in three years according to official estimates of the Ministry of Agriculture. Cotton production, however, remains at less than half of the pre-independence levels.

Total acreage cultivated reached 135,000 hectares in 1976/77, a 41% increase over the previous season, but barely equalling the last

pre-independence years, and well below figures for the early Seventies. The rather low average yields before independence are even lower now. The low yields obtained can partly be attributed to adverse climatic conditions and pests and diseases. Expert management is of crucial importance.

Cotton production on small farms prior to independence was supported by a very complete input-distribution and collection network supplied by the Cotton Institute. All inputs including technical assistance were provided, as were ready markets for the product. Since independence these services are not available and cotton production on small farms in the North will likely diminish further and may disappear.

The prospects for returning to pre-independence levels of production do not appear very good. While there is some rationale for attempting to increase production to utilize existing processing capacity, increases beyond the 18,000 ton mark may be difficult unless a determined program is pursued. The best land for cotton is the land north of the Zambezi River on land from 500 feet to 1,500 feet in altitude.¹ Plenty of this land is available in the 3 northern provinces but the land would have to be cleared and developed.

c. Cereal Crops

The main cereal crops in Mozambique are: maize, wheat, rice sorghum and millet. Their importance in 1973 in terms of production is presented below.

¹Bravo, Nelson Saraiva, A Cultura Algodoeira na Economia do Norte de Mocambique, Junta de Investigações do Ultramar, No. 66, Lisbon, 1963.

Crop	1973 Production ('000 tons)
Maize	565
Rice	108
Wheat	6
Sorghum	213
Millet	10

Source: FAO Production Yearbook, 1974.

(i) Maize

In 1974, about 500,000 tons were produced on traditional farms and plantations along the Beira railway, in the Limpopo plain, and Maputo province. In 1967, the export was about 25,000 tons of this cereal, and in 1968, it was 120,000. Today, the maize requirements must be supplied with imports (around 26,000 tons in October-December 1976).

Table 12. Maize Production

Year	Area '000 ha	Yield kg/ha	Production '000 tons
1961/65	409	833	361
1972	420	1,024	430
1973	500	1,130	565
1974	500	1,100	550

Source: FAO Production Yearbook, 1974.

Maize is produced on about 400,000 to 500,000 small farms, and on over 1,000 medium sized farms.

The yields per hectare have remained low. A seed program (hybrid maize) together with adoption of suitable farming methods would improve yield levels considerably. At present, there are few such efforts made in this area, however, because of the difficulties facing Mozambique. In fact, the level of production (for 1976 and 1977) is not expected to exceed the low figure of about 350,000 to 400,000 tons, and according to a FAO report, for the period January to June 1977, Mozambique will need to import 40,000 tons of maize.

(ii) Wheat

Wheat has been produced on a limited number of farms (5,600). The production is presented below in terms of area, yield level, and total quantity.

Table 13. Wheat Production

Year	Area ('000 hectares)	Yield kg/ha	Production ('000 tons)
1961/65	11	860	9
1972	9	1,000	9
1973	6	1,000	6
1974	6	1,000	6

Source: FAO Production Yearbook, 1974.

In the late 1960's a small number of medium farms (less than 200) with 9,000 hectares, produced almost 5,000 tons, or well over half of the total production in the country.

However, the total national production covers only about a tenth of the needs. In 1968, the country consumed about 70,000 tons and had consequently to import over 60,000 tons. The demand for wheat has increased. According to estimates the annual consumption was about 120,000 tons in 1976, which means that about 100,000 tons would have been imported.

The yield per hectare is low. In Gaza (1968) the average yield on small farms was 780 kg per hectare. The best result in that year was obtained in the Maputo province (over 1,000 kg per hectare), where irrigation was used. The main wheat areas are Gaza and Maputo with over 95% of the total wheat production.

Table 14. Wheat: Provinces, farms and production (1968)

Province	Modern Sector			Traditional Sector		
	Farmers Number	Area ha	Production M.T.	Farmers Number	Area ha	Production M.T.
Niassa	1	21	13	-	-	-
Tete	1	8	6	277	284	52
Zambezia	-	-	-	-	-	-
Manica e Sofala	6	28	45	265	980	340
Inhambane	1	10	2	-	-	-
Gaza	104	6,138	1,853	1,781	5,020	279
Maputo	37	2,231	1,949	24	68	2
Total	153	8,436	3,868	2,347	6,352	673

Source: Missao de Suguerito Agricola de Mocambique. "Estatisticas Agricolas de Mocambique," 1973.

Different varieties of wheat are used in the country and 2% of the wheat area is sown with certified wheat seeds. The low yields obtained in the wheat production can be attributed to: insufficiency and irregular rainfall; lack of agricultural inputs (fertilizer, seed and farm equipment); and diseases.

The IAAM was working with the problems in wheat production before independence. At the Experiment Station at Guija, trials on fertilization and cultivars of wheat were carried out. The best compared cultivars yielded a little more than 2,000 kg per hectare with five irrigations. In two fertilization trials there were no responses to phosphorus and potassium, while responses to nitrogen were highly significant.

It is estimated that an increased quantity of seed up to 150 kg per hectare of the best cultivars in conjunction with an early top-dressing of nitrogen could yield about 4,000 kg per hectare.

The best prospect for self-sufficiency in wheat would seem to be in the new irrigated areas in the Limpopo River basin. Self-sufficiency could be obtained by planting 40,000 hectares on irrigated land if a good supply of inputs is provided. It is doubtful, however, that an economic policy of self-sufficiency in wheat is justified in the near future because the scarce irrigated land could be used for higher-valued crops. Wheat can be purchased on the world market at low prices.

(iii) Rice

Before independence Mozambique was self-sustaining in rice. The production figures are presented in the table below.

Rice was produced by two different types of sectors--commercial and traditional. In the 1960's about 1,800 medium-sized enterprises with

approximately 30,000 hectares produced some 40,000 tons, and over 300,000 small farms with about 45,000 hectares produced some 40,000 tons.

After independence, because of floods, the abandonment of farms by the Portuguese, and the disruption of irrigation works, the level of production dropped to about 40,000 tons.

Table 15. Rice Production

Year	Area '000 tons	Yield kg/ha	Production '000 M.T.
1961/65	62	1,500	94
1972	65	1,538	100
1973	65	1,662	108
1974	65	1,846	120

Source: FAO Production Yearbook, 1974.

The main rice district is Gaza, in terms of medium-sized rice farmers, with some 1,600 farmers, and 44,000 tons. Zambezia is the center for the small farm rice production with almost 150,000 farms (see Table 16).

The completion of the Massengir dam to irrigate an additional 60,000 hectares in the Limpopo settlement area could boost rice production significantly. Also, a proposed drainage-irrigation scheme near Beira could increase production there significantly. Self-sufficiency in rice would seem achievable, although significant exports are not likely until irrigation projects are more fully developed.

Table 16. Rice Producing enterprises, 1970

Province	Modern Sector			Traditional Sector		
	Farmers Number	Area ha	Production M.T.	Farmers Number	Area ha	Production M.T.
Niassa	-	-	-	5,413	413	236
Gabo Delgado	5	18	16	18,327	2,100	1,538
Mozambique	57	1,221	1,352	78,698	7,086	8,833
Zambezia	78	1,941	3,329	148,192	1,277	22,094
Tete	1		0.5	4,938	627	538
Manica e Sofala	25	172	134	47,450	6,822	4,053
Inhambane	12	72	64	9,573	2,147	1,239
Gaza	1,572	20,217	44,230	6,111	2,994	2,184
Maputo	74	6,239	5,832	994	369	355
Total	1,824	29,887	55,010	314,696	43,843	41,368

Source: Agronomia Mocambicana, Vol. 7, No. 4, 1973.

d. Sisal

In 1974, about 22,000 tons of sisal were produced, and 11,200 tons were exported with a value of 89 million escudoes. In the table below, area, yield levels and total production figures are presented.

Table 17. Sisal Production

Year	Area '000 ha	Yield kg/ha	Production M.T.
1961/65	55	548	30,134
1972	50	480	24,000
1973	50	534	26,680
1974	50	436	21,792

Source: FAO Production Yearbook, 1974

Because of low world market prices in the late 1960's and early 1970's, this crop lost in importance and suffered from neglect. It is a typical plantation crop, concentrated in about twenty estates close to the ports in the Mozambique province.

The Government of Mozambique has apparently not stated any goals with reference to the production of sisal. Large plantations are required for efficient production, large quantities of difficult manual labor are involved, and the fluctuations in world markets and competition from other countries (mainly Brazil) make efforts to revive sisal production rather unattractive.

e. Vegetable Production

Vegetable production was traditionally carried out by foreign settlers in the most fertile and densely populated regions of Mozambique. About 635 ha in the areas of Marracuena, Moamba and Boane in Maputo Province (where most of the vegetables consumed in the capital were produced) and another 400 ha in Manica Province have now been abandoned by their foreign tenants, causing a substantial drop in vegetable production.

In the Manica area production units consist of small farms located throughout the province. In view of the government's policy of communalized production and the limited number of skilled personnel available, the solution would be to group as many units as possible under one unified management. However, the dispersed location of the small farms constitutes a major impediment, and as a result unemployment is rapidly increasing and nutritional levels are dropping.¹

¹FAO, "Agricultural Development Programme, Mozambique, Report UNDP-Nordic Mission.", Rome, 1976.

In order to re-establish production the necessary technical staff (e.g., specialists in irrigation, groundwater level control, crop husbandry and marketing) must be supplied to work in the abandoned farms. The Government has, therefore, planned a concerted program to provide the Manica and Maputo Provinces with managerial skills, farm inputs (such as seeds, fertilizers, pesticides) and services to rehabilitate vegetable production, and has allocated for this project 400 ha in Manica and 400 ha in Maputo Provinces. Assistance in irrigation and drainage should be provided for better utilization of water resources and better control of groundwater levels.

f. Citrus

Mozambique normally exports about 10,000 metric tons yearly of oranges and grapefruits, mainly to the countries of the European Economic Community, and Sweden. The production of citrus fruits in some different years is presented below.

Table 18. Citrus Production

Citrus	Production ('000 metric tons)			
	1961/65	1972	1973	1974
Oranges	11	15	15	16
Tangerines	10	17	18	18
Grapefruits	1	1	1	1
Lemons	1	1	1	1

Source: FAO Production Yearbook, 1974

There are almost 300,000 smallholders in citrus production, with about half of the production located in the coastal belts of Inhambane and Gaza Provinces. In this sector oranges represent about 750,000 trees (60% of total production), grapefruit include 450,000 trees, and lemons account for about 6% of the production.

Citrus estates occupy 5,000 hectares with over 800,000 graft trees, of which 65% are in the Manica, Sofala and Maputo Provinces.

Table 19. Citrus trees in different provinces and in different farm-type systems.

Province	Modern Sector Number of Trees		Traditional Sector Number of Trees	
	Total ('000)	In Production ('000)	Total ('000)	In Production ('000)
Niassa	0.2	0.1	1.0	0.3
Cabo Delgado	1.3	1.0	39.7	8.8
Mozambique	42.5	35.3	638.0	166.8
Zambezia	67.5	51.8	709.2	256.2
Tete	2.3	2.2	4.6	1.0
Manica e Sofala	561.8	230.5	194.5	85.2
Inhambane	28.4	22.0	3,013.7	1,302.9
Gaza	6.4	4.1	400.0	173.0
Maputo	271.1	230.9	50.0	13.9
Total	981.5	577.9	5,050.7	2,008.1

Source: Missao de Suguerito Agricola de Mocambique. "Estatisticas Agricolas de Mocambique," 1973.

The Ministry of Agriculture is managing plantations abandoned after independence. In the Chimoio area plantations cover 2,100 hectares. Irrigation is carried out 3 months per year by small earth dams and piping

devices. Processing and grading is done at a fully mechanized, modern plant with an annual processing capacity of 28,000 tons of oranges and the same amount of lemons and grapefruits. However, because of insufficient technical competence and lack of fertilizers and pesticides citrus production is still decreasing.

In Chimoio there is a well-equipped concentrated juice canning factory with considerable storage capacity.

Fruit is normally transported in boxes and cartons to Beira for export.

Plant diseases and pests are significant for citrus trees in Mozambique, making it necessary to apply good technologies and careful management. It is likely that the GOM policy of revitalizing citrus exports to the pre-independence level will be successful.

g. Coconut

There are nearly 18 million coconut palms in Mozambique, but the number of trees in production fluctuate around 10 million. The yearly production of copra reached about 60,000 metric tons in the 1970's.

Coconut palms are concentrated in the sandy coastal belts to a depth of 15-20 kilometers inland. The Zambezia Province has more than six million trees, Inhambane has almost seven million and Mozambique Province has somewhat over one million. Some of the largest plantations in the world are found around Quelimane.

Coconuts are cultivated by a great number of farmers. Many small farmers (300,000) use this crop in their subsistence agriculture in plots of 0.25 to 0.5 hectare, where they produce about 40% of Mozambique's copra. Five large plantations accounted for about half of total copra production in 1969.

Besides these two types of farms there are about 400 medium-sized farms producing coconuts.

In Zambezia the average yield per hectare is about 120 coconuts with 900 kg of copra, but in the rest of the country average production is not more than about 450 to 650 kg/ha. The low yield obtained in the production of copra can be attributed to various factors, such as unfavorable climate and soil conditions, and diseases. Further, in the coastal region there are less than 1,100 mm of rain annually, with an unfavorable distribution over the year, causing damages to the coconut production. In recent years a program of fertilization was initiated with good results. For optimum production coconut palms need at least 60 inches of rainfall fairly well distributed throughout the year. Only in Zambezia is this requirement met.

The major part of the harvest occurs from February through June. Yields on plantations range from 5 to 11 kilograms of copra per palm, compared to a range of 4-8 for all producers.

Of an estimated 450 million coconuts harvested annually (prior to independence) 280 million were transformed into copra, 8 million were sold as shredded coconut, 2 million were exported as fresh coconut and 60 million were consumed locally.

The large plantations dry the copra in kilns heated by burning coconut shells. Small producers rely on sun-drying, for which the weather is not suitable during harvest, so coconuts are often stored until the dry season, which lowers quality.

There are four plants equipped to refine coconut oil, two of which use solvent extraction. Coconut oil is not consumed in Mozambique.

Most is exported, but some is used in soap. A small part goes into margarine.

The health of the coconut industry is closely related to world prices. Heavy competition from Asian countries will keep pressure on palm oil prices in the foreseeable future. However, copra exports can achieve pre-independence levels with concerted effort by GOM.

h. Bananas and Plantains

For over 50 years, the alluvial soils at the mouth of the Incomati and Limpopo Rivers and the slopes near Vila Pery have been the main commercial banana production areas in Mozambique. The reason for planting bananas in these areas was the existence of adequate farm-to-market roads, but yields never exceeded 20 tons per hectare per year because soils and climate were not ideal for growth of the dwarf Cavendish banana. Lower than optimum temperatures and insufficient rainfall between May and September inhibit the growth of the banana plant. In addition, winds damage the leaves and reduce the efficiency of photosynthesis. Banana production for export, more recently established at the mouth of the Umbeluzi River south of Maputo, also suffers from the same limitations.

The best combination of soil and climatic conditions for banana production in Mozambique exists in only two areas: one is a strip of land along the coast from Beira north to Moma, but excluding a small area north of Quelimane; the other is a broad belt extending from the shore of Lake Nyasa east to the town of Chamba. Little commercial production has come from these best-suited areas because they have been isolated from the channels of trade.

Plantains are a product of the African traditional farming system in all districts. Yields have been low because the plants were allowed

to sucker out at will into large tufts, but even so, they provided a source of food involving little effort and attention.

It is recognized by the GOM that the demand for bananas both domestically and for export is large. The GOM wishes to develop a plantation near Maputo, even though climatic conditions are not completely suitable there. FAO has recommended further study.¹ Significant banana exports will require development of plantation-type areas in presently undeveloped land. Only by large investments by the government can this be achieved.

i. Cashews

Mozambique began exporting unshelled nuts to India after the First World War. India had a comparative advantage in hand shelling and processing the nuts.

The cashew tree grows in any soil but does especially well in the sandy coast. The tree requires about 5-6 years of growth and attains maximum productivity at 12 years. The tree produces a fruit, which is high in Vitamin C, and the nut is attached to the bottom of the fruit. The fruit is commonly used to produce an alcoholic drink.

The cashew is primarily gathered by the indigenous, small producers. A break-through in mechanical decortication came in 1962. In 1965 there were 11 companies with equipment to shell nuts mechanically. Their combined capacity was 260,000 tons of raw nuts annually.²

The cashew pear produces about 250 mg of ascorbic acid per 100 grams of raw material, making commercial production very feasible for

¹FAO - Nordic Study Mission, 1976.

²U.N. General Assembly, A/AC.109/L.334/Add. 1, September 1966.

manufacture of ascorbic acid for juices, jam, marmalade, spirits, etc.¹ Given the widespread deficiency of Vitamin C the government might well consider developing a soft drink fortified with ascorbic acid for wide-spread distribution.

Cashews, which accounted for 36% of Mozambique agricultural exports in 1975, are principally gathered from wild or semi-wild trees growing along Mozambique's coastal plain. This activity involves all or part of an estimated 700,000 Mozambique families, while 20,000 more workers are employed in cashew processing. In the past gatherers brought unshelled cashews to the roads, where they were sold to middle men, mostly of Indian origin, for 3 escudos (about 9 cents) per kilo. In 1976, this process broke down nearly everywhere. The crop was poor; the gatherers felt the price was too low; and many of the middle men had emigrated or could not find mechanics for their trucks. Mozambique had to import an estimated 25,000 tons of cashews from Tanzania to keep the shelling plants in operation, and still total output fell from about 190,000 tons in 1975/76 to 95,000 tons in 1976/77.

The Cashew Marketing Coordination Commission established in 1976, estimated that total production in 1977 would reach 180,000 metric tons. This production was expected to come from the following regions:

¹M. Herminia C. Lopes, "Composicao Quimica e Aproveitamento da Pera de Caju in Mocambique," Agronomia Mocambicana, Vol. 6, No. 2, April-June 1972.

Province	Output in Thousands of M. Tons
Nampula	107
Cabo Delgado	20
Zambezia	14
Sofala, Inhambane, Gaza and Maputo	<u>43</u>
Total	184

Primary producers were to be paid an official minimum price of 3.5 escudos (10½ U.S. cents) per kilo, but consumer cooperatives, People's Stores, wholesalers and cashew processing plants could buy 80-kilo bags from gatherers for up to Esc. 4,600 (US \$ 140) per metric ton, delivered. As a further incentive, the Government announced that it was shipping six million dollars worth of scarce consumer goods, such as cloth, radios, batteries, bicycles and shoes into the northern provinces, so that cashew gatherers could purchase these much-desired items.

Besides the Cashew Marketing Agency (Comissao Coordenadora da Comercializacao da Castanha de Caju), headed by an executive of the National Supply Commission, only ENACOMO (Empresa Nacional de Comercializacao), another state enterprise, is allowed to export raw (unprocessed) cashews. India is the chief buyer of this product. The FOB price per metric ton of raw cashews at the ports of Mocimboa da Praia, Pemba (ex-Porto . Amelia), Macala, Angoche (ex-Antonio Enes), Penane and Beira was set in 1977 at Esc. 5,300 (Type I) and 4,900 (Type II).

j. Tea

Tea has been an important commodity in Mozambique, particularly from the standpoint of export earnings. Total production and value from 1966-1975 are shown in Table 20. Exports are shown in Table 21.

Table 20. Tea Production, 1966-1975

Years	Weight in Metric Tons	Value in 1,000 Escudos
1966	13,805	292,404
1967	13,146	268,254
1968	14,251	334,237
1969	15,815	262,976
1970	16,824	314,638
1971	16,563	356,736
1972	18,678	357,736
1973	18,795	334,878
1974	17,592	289,000*
1975	13,141	n.a.

*Estimates

Sources: For 1966 to 1969: Estat. Indust. - 1969 - Lourenco Marques, 1971.
 For 1970 to 1971: Ibidem - 1971 - Lourenco Marques, 1974.
 For 1971 to 1972: Ibidem - 1972 - Lourenco Marques, 1974.
 For 1973 to 1975: Annual Report of Moz. Tea Growers Assn., Vila Junqueiro, Gurue, Zambezia.

Table 21. Tea Exports by leading destinations (1973 and 1974)

Destinations	Weight in Metric Tons		Value in 1,000 Escudos	
	1974	1973	1974	1973
United Kingdom	9,967.8	10,192.1	130,858	120,425
Netherlands	3,573.6	1,607.7	68,325	23,527
United States	2,869.5	3,208.2	43,696	45,384
Canada	596.4	785.8	10,480	11,084
Ireland	424.0	530.0	7,214	8,985
Malawi	337.2	225.4	4,834	3,009
Portugal	314.0	268.9	7,528	6,204
West Germany	177.2	183.4	3,053	2,929
South Africa	136.9	200.5	1,952	3,897
Angola	62.7	95.7	2,902	4,495
Israel	36.4	n.a.	768	n.a.
All Others	<u>103.4</u>	<u>147.0</u>	<u>1,226</u>	<u>2,075</u>
Totals	18,604.1	17,544.7	282,836	232,014

Sources: Boletim Mensal de Estatística, Lourenco Marques, issues of April 1974 and April 1975.

According to the 1975 Annual Report of the Mozambique Tea Growers Association in Gurue, Zambezia, overall black tea production in 1975 fell to 13,141 metric tons compared to 17,592 tons in the preceding year. The 1975 tea output was the lowest registered in Mozambique since 1966, when 13,805 tons of processed tea were produced, and matched the 13,146 tons produced in 1967. Details of tea output in Mozambique in the period 1966-1975 are presented in Table 20.

In 1975 there were 34 tea growers and 19 tea processors, the same number as in recent years. Tea was raised in the following four regions of Zambezia: Gurue, Tacuane, Socone and Milange. There was a general decline of tea production in all tea regions except Tacuane, which registered a 14% increase over 1974, as may be verified from Tables 22 and 23.

Table 22. Tea Output by regions (1974 and 1975)

Tea Regions	1975	1974	Percent Change (1975 vs. 1976)
Gurue	7,044	10,544	-33.2%
Tacuane	2,315	2,025	+14.3%
Socone	1,951	2,574	-24.2%
Milange	<u>1,831</u>	<u>2,449</u>	<u>-25.2%</u>
Totals:	13,141	17,592	-25.3%

On August 17, 1977 by joint decree of the Ministry of Development and Economic Planning, Ministry of Industry and Commerce and Ministry of Agriculture, an Administrative Commission was appointed for the purpose

of establishing a state tea enterprise and restructuring the tea sector.

The importance of tea derives from the number of workers it employs (approximately 60,000); from the total area under cultivation (more than 15,000 hectares); as well as from the total value exported.

The measures ordered by the Council of Ministers and announced by the Minister of Agriculture provide for the immediate implementation of a number of decisions in support of the tea sector--decisions designed to increase the influence of the state in the tea sector, pursuant to the economic and social directives of the Third Congress of FRELIMO.

The Administrative Commission has been charged with the following principal tasks:

- (i) Preparation of the economic and financial study in connection with creation of the state enterprise in the tea sector.
- (ii) Preparation of a production and investment plan for all the tea plantations and processing plants under its control.
- (iii) Initiation--in coordination with the various instrumentalities of the Ministry of Agriculture--of a study of ways to improve the living conditions of the workers.
- (iv) The exercise of control over private enterprises operating in the tea sector.
- (v) The marketing of all tea produced in Mozambique.

By virtue of the measures adopted, 12,670 hectares of the total area under cultivation to tea, and 17 of the 21 existing tea processing plants, will henceforth be administered directly by the state. Recuperation of tea exports to pre-independence levels seems feasible.

2. Livestock Production

Livestock production has played a minor role in the Mozambique economy, accounting for only 2.5% of the total agricultural production.

In 1973 there were an estimated 1.4 million head of cattle, .5 million head of goats, 220,000 head of pigs and 132,000 sheep.

a. Cattle --Tsetse fly has been a problem in the northern half of the country (except for higher altitudes) so most commercial cattle production occurred south of the Save River. The traditional sector had about 70% of the cattle, which were of the indigenous types, with low productivity. Many of the animals were kept for wealth and wife-buying purposes. The commercial part of agriculture had the other 30%, of which most were Cebu and slaughtered mostly for export. Most of the cattle were raised on rather low quality pastures with occasional droughts (and floods) causing frequent loss and reduction of stock. Range-type conditions predominated with no fencing.

The most serious problem limiting the exploitation of natural grasslands for beef production is the encroachment of bush. Since abandonment of the lands by Portuguese settlers the encroachment of bush has been severe. Dense bush is most rapidly and economically cleared by dragging a heavy chain between two large bulldozers. Four to six hectares can be covered in one hour at a cost of about \$30-\$35 U.S. per hectare. After a drying period the bush is burned and from this time on bush is controlled by carefully timed burning.

The abandoned cattle are being collected by the GOM into state collective farms, under the direction of the National Directorate for Organization of Collective Production (DINOPROC). Some of these projects are as follows:

(i) Mabalane

There are 60,000 hectares near the Limpopo River which could be developed into pasture. The main rail line runs along one side of this area. There are some 700 small farms in the area with a total of 13,000 cattle, 4,000 sheep and 9,000 goats. The GOM wishes to organize the scattered population into communal villages along the Limpopo where the steers can be finished on improved pastures. FAO estimates that the area could support 12,000 animal units with an off take of 1,000 tons of meat per year at full development (about 5 years).¹

(ii) Changalane

In the district of Changalane in Maputo province over 200,000 hectares of land and 4,500 head of cattle are available. Bush will have to be cleared and water facilities developed. The project should be producing 1,000 tons per year within a period of several years.²

(iii) Chimoio

After the Portuguese left there were 10,000 head of abandoned cattle in Chimoio, which is "relatively" free from tsetse fly. The slaughter facilities in Beira and railway links make this a promising area for beef production. A project has been initiated to develop a 27,000 ha and a 40,00 ha unit to carry 20,000 head. Considerable land clearing and construction of infrastructure will be required.³

¹FAO, "Report of the Mozambique State Farm Projects: Identification/Reconnaissance Report", 3 Volumes, December 1977.

²Ibid.

³Ibid.

(iv) Buzi

The area around Buzi has a large number of abandoned cattle, the existence of a large area of good grazing lands on abandoned farms, the availability of sugar cane by-products for feed and an excellent slaughterhouse and cold storage facilities in nearby Beira. There are a number of parasite problems and the possibility of tsetse fly, which would constitute problems of a technical nature requiring efficient management, but the GOM wishes to implement a program of integrated extensive and semi-intensive production units with an ultimate target of 18,000 animal units with an off-take of 3,000 head per year.¹

It has been estimated that Mozambique will consume about 13,000 to 15,000 tons of beef per year, which would require slaughter of roughly 75,000 to 100,000 animals per year. It does not appear likely that Mozambique will be self-sufficient in beef for some time.

For milk production the GOM has initiated various projects:

(v) Chimoio

This is the only area in Central Mozambique with good dairy potential. The project envisages development of 10,000 hectares-- 6,000 as natural pasture, 2-3,000 for improved pasture and the remainder for fodder and feed grain. The total number of cattle will be 3,000, of which 1,000 will be for milk production to produce an estimated 10,000 liters of milk daily. Considerable imports of dairy farm equipment, fencing materials, water pumps and piping will be required.

The government of East Germany has initiated a technical assistance project in crop and livestock production in Chimoio.

¹Ibid.

(vi) Chokwe

In the Limpopo area a dairy complex was abandoned and needs rehabilitation to provide milk to the Maputo-Gaza area. A 30,000 liter per day milk plant exists, as well as alfalfa drying facilities, feed mixing plant, etc. Several state farms of 500 cow herds will be established in the area.

While these two projects will help establish milk supplies for the coastal urban areas, the distribution of milk to rural areas is based on canned, reconstituted milk made with milk powder and butter oil or anhydrous milk fat imported from Australia and New Zealand. Probably 5,000 tons of milk powder will continue to be imported per year for this purpose.

b. Poultry--Up to the 1960's there was little commercial poultry production, but increasing tourism made it profitable after that. Modern poultry farms both for eggs and for broilers were developed around Maputo. These facilities need rehabilitation and further development. Hatching eggs are imported from South Africa at the rate of 48,000 per week.¹ A state collective farm has been proposed at Namaacha to house 40,000 layers to produce 22,000 eggs per week for consumption and 88,000 per week for hatching broilers.

Under the Division of Veterinary Services two poultry distribution centers are now operational at Lichinga and Pemba with a capacity to raise 1,000 day-old chicks per week to an age of 8 weeks. The need for a poultry industry is great but development will take a concerted effort by the GOM.

¹FAO, "Report on the Mozambique State Farm Projects, Identification/Reconnaissance Report," 3 Volumes, December 1977.

c. Institutions and Personnel for Livestock

There used to be about 23 livestock production stations distributed through the country. The number has since been reduced to almost 20. These stations are supposed to do research and extension on livestock management and disease control, as well as produce breeding stock for livestock producing units. Most suffer from lack of direction, trained personnel, and equipment. Cuba has trained 47 livestock technicians in a 6-month course and these trainees are now on state farms. Fifty more were entering training in late 1977.

Under the Ministry of Agriculture a National Direction for Livestock (DINAP) has been established with agencies in all of the provinces. DINAP has the following departments:

- Animal Production,
- Animal Health and Public Veterinary Hygiene,
- Wild Fauna Conservation, and
- Institute of Veterinary Investigation. This institute produces vaccines but production is inadequate because of lack of freeze drying activities and trained personnel.

Inadequate transportation for livestock apparently hampers development of the collective farms. Railway transport has not been dependable.

d. Forestry

Little is available in terms of reliable evaluation of forestry potential. FAO¹ reports that about 40 million hectares, or about half of the land surface of the country is covered by "forests." However, apparently only about 1½ million hectares are covered by closed, dense forests. The rest is savannah, with rather open, scattered trees. FAO

¹FAO-Nordic Study, 1976.

further reports that while 27,000 hectares have some commercial species as the dominant trees, in general the forests do not constitute a sound basis for industrial development. The closed forests occur primarily in Niassa Province where infrastructure for economic exploitation does not yet exist.

In certain areas valuable species such as rosewood, African ebony, blackwood, African sandelwood and iron wood are available and may become exploitable in the future.

While natural forests provide neither the volume nor the type of wood required for modern industrial development, considerable potential exists for plantations of quick-growing species. About 20,000 hectares have been planted, and about 6,000 hectares are ready for harvesting.

The GOM wishes to construct a plant in Chimoio for production of bleached pulp for export or later production of corrugated liner and possibly paper. Such a plant would require 35,000 hectares for economic production, and such plans are considered by many as premature.

There are some 90 sawmills and 3 veneer-plywood factories now in existence, and plans for the establishment of others. Most of this is exported to South Africa. Plantations for fuel are considered necessary for Maputo. Due to over-cutting in the Maputo area wood for cooking is now available only at a distance of 40-50 kilometers from the city and at a high price. 24,000 hectares are needed.

The costs of establishing eucalyptos and pine plantations vary between 3,000 and 5,200 escudos per hectare (\$60-\$104).¹ These costs

¹Swedish University of Agriculture, Forestry and Veterinary Medicine, International Rural Development Division, Mozambique, Food and Agriculture Sector: Preliminary Study, Uppsala, November, 1976.

include only the preparation of land for planting plus actual planting and nurseries. They do not include capital costs for preparatory investments in access roads, buildings, staff salaries nor maintenance and production costs. It would appear more conservative to assume an overall cost of 6,000 to 7,000 escudoes (\$120-\$140).

A complete inventory of forest resources has not been made and is needed. The Forest Service of Mozambique has not been completely organized and forest technicians in Mozambique are rare. FAO has initiated a project to study the development potential of wood products. The import demand for wood products in South Africa is large and increasing.¹ It is generally agreed that the long run potential for exports of wood products is good if plantations are well managed.

4. Fisheries²

The fishing industry was never developed by the Portuguese and remained basically a subsistence industry, despite considerable development potential. Per capita consumption of fish is estimated at only about 3.7 to 5 kilograms per year. Most of the consumption is near the coast, lakes and rivers, since there is practically no infrastructure to distribute the product in the interior. In a protein-deficient country it makes sense to develop marine resources if the potential exists, which it obviously does.

¹Stratten, P. M., "Short Rotation Forest Products in Southern Africa," South African Forestry Journal, No. 84, March 1973.

²This entire section on fisheries draws heavily on R. Aubray, "The Fishery of Mozambique," in FAO, Agricultural Development Programme, Mozambique: Report of the UNDP/FAP/Nordic Agricultural Formulation Mission, 9 June - 7 July 1976, Rome, 1976. Whole sections were copied verbatim from Mr. Aubray's report.

Industrial scale development has been developed only for shrimp and lobsters, which are now being exported. The National Director of Foreign Trade increased the minimum prices paid for shrimp by 40-60% in October, 1977, and increased the price for lobster by 94% in November, 1977, "in line with world price." The goal is to export 15,000 tons of shrimp for foreign exchange purposes. However, the principle policy of the GOM is to produce fish primarily for domestic consumption.

Mozambique has over 14 million hectares of marine resources including lakes, rivers, and fishable coastal waters. The largest inland lakes are Lake Malawi and the man-made Lake Cabora Bassa.

a. Lake Cabora Bassa

Completed in 1976, the man-made Lake Cabora Bassa stretches for 270 km over the middle Zambezi River as far as the Zambian border, and covers an area of 2,740 km² at its full height of 326 meters above sea level. It has an indented shoreline about 1,000 km long, forming five major basins. The north banks are relatively high and steep and the south banks show a gently shelving shoreline. Its maximum depth is 157 meters, its average depth 26 meters, and 51 percent of its surface area covers shallow waters, of less than 20 meters depth. A drawdown of up to 9 meters allows for the periodical emergency of considerable portions of shallow banks. No tree or bush clearing took place before the lake was filled except in very limited shore areas.

b. Lake Malawi (Nyasa)

Lake Nyasa occupies an area of 30,800 km², 75 percent in Malawi and 25 percent in Mozambique. Mozambique has about 150 km of shoreline on the lake. Lake Nyasa is 570 km long, and is one of the deepest lakes in Africa (695 meters maximum); its volume (8,400 km³) is second in importance to that of Lake Tanganyika.

The lake has a very narrow continental shelf with no more than 2 percent of its surface area showing depths of less than 20 m. It is famous for its sudden storms, which cause its waters to form waves of up to 3 m height.

Along the Mozambique waters of the lake the shore is steep and the continental shelf almost non-existent. However Metangula a former base of the Portuguese navy, offers good shelter for vessels as well as good facilities for their maintenance and repair.

c. Estimated Potential

Jackson¹ anticipated a minimum potential fish production in 1973 for Lake Cabora Bassa of 15 kg/ha, or 4,000 t in total. However, the average fishing potential of the five major man-made lakes of Africa, totalling 24,000 km², has been established through FAO studies at about 45 kg/ha, with a range of 30 to 70 kg/ha. The application of these figures to Cabora Bassa would give a potential of 8,000 t to more than 15,000 t per year. It should be noted that during the first year the productivity will be at its maximum level and that subsequently it will stabilize.

In Lake Nyasa past estimates put the maximum yield at 70,000 t/year (23 kg/ha), with a total potential possibly two to three times greater in the 11,000 km² of the southern basin than in the 20,000 km² of the northern area. The application of this figure to Mozambican waters would give a potential in the region of 10,000 t. In 1976 Turner²

¹Jackson, P.B.N., "Development of a Fishing Industry at Cabora Bassa," 1974.

²Turner, J., An Analysis of the Various Fisheries of Lake Malawi, 1976.

set the trawling potential at about 35 kg/ha within the 100 meter contour or 18,000 tons for the whole platform of the Malawi waters. An average of 14 tons per coastal kilometers was proposed for the narrow shelf of the northern area. The application of this figure to the 100 meter wide shelf area of Mozambique would give a trawling potential of about 3,000 tons.

Based on limnological data, in 1956 Cappart and Kufferath estimated the fishery potential of a network of 33,000 km of rivers and streams in the Congo basin at 25 kg/ha for the main rivers and 15 kg/ha for the small rivers. The application of these parameters to the small lakes and river networks of Mozambique would give a potential of about $(550,000 \text{ ha} \times 25 \text{ kg}) + (600,000 \text{ ha} \times 15 \text{ kg}) = 22,000 \text{ tons}$.

As a result of the above estimates the total potential of the inland waters of Mozambique would appear to be in the region of:

Lake Cabora Bassa	10,000 tons	(37 kg/ha)	(25%)
Lake Nyasa	10,000 tons	(13 kg/ha)	(25%)
Other Areas	20,000 tons	(18 kg/ha)	(50%)
Total	40,000 tons	(20 kg/ha)	(100%)

The estimated actual catch of freshwater fish of about 8,000 tons/year represents only 20 percent of this assumed standing potential.

Development Prospects for Inland Waters

About 50 percent of the estimated 40,000 tons of fishing potential of the inland waters of Mozambique lie in the major lakes of Cabora Bassa and Nyasa, which are fished very little. The maximum concentration of effort for the development of the fishery should therefore be

directed to these lakes. Action taken in this connection should also benefit the other water bodies of the country, and should be accompanied by efforts to upgrade fish culture in the rural areas which lack fish supplies.

The objectives for the development of the inland fishery sector of the economy may be tentatively set between 8,000 and 10,000 tons of additional fish production, 50 percent from Lake Cabora Bassa, 30 percent from Lake Nyasa and 20 percent from the other water bodies. Such a program would create up to 6,000 jobs for fishermen, lead to the construction of 1,000 new fishing craft, and to investment in the region of US\$ 4 million.

This program will require three to four years of international assistance. The project should be established as the National Inland Fishery Research and Development Center of Mozambique, with headquarters at Nova Chicua, Lake Cabora Bassa, and a major substation at Metangula, Lake Nyasa. The total cost of the project is expected to exceed US\$ 3 million.

d. Marine Fisheries

Mozambique has a shoreline of 2,500 km, of which about 50 percent are lined with mangroves. In the south, the bay of Maputo or Delagoa bay offers the best natural harbor of the East African coast; it is extended northward by a sandy and swampy coast with mangroves and bars.

The Sofala bay off the delta of the Zambezi River centers of Beira, the second large harbor of the country. Rocky cliffs, headlands, sandy stretches and coral formations are more abundant north of the Zambezi delta. Other important deltas are those of the Limpopo, Save, Buzi,

Lurio, Messalo and Rovima Rivers, which bring into the sea considerable amounts of fresh water during the rainy season.

Mozambique has an extensive continental shelf of about 120,000 km², 80 percent of which is constituted by the southern Sofala and Delagoa bay between 18° and 26° south. Except in the area off Maputo the 1,000 meter contour follows closely the 200 meter limit of the continental shelf, which in the north becomes very narrow and steep. Maximum depths of 3,000 meters are found in the Mozambique channel.

Much of the fishing carried out along the coast of Mozambique is of subsistence type, and is confined to the immediate coastal waters. However, over the last two decades an industrial shrimp fishery was developed for the exploitation of the crustacean resources of the continental shelf, and a semi-industrial fishery of handliners started exploiting the demersal resources.

The unreliability of the official statistics concerning the small-scale sector of the marine fishery is recognized. While the reported number of coastal fishermen exceeds 24,000 for a declared catch of less than 9,000 tons, representing about 350 kg fish/man/year, there is a consensus that the number of full-time fishermen may not reach 15,000 and that their catch may exceed 15,000 tons. The coastal fleet consists of about 5,000 small craft, including dugouts, planked boats and rafts (jangadas), between 3 and 8 meters in length, and various types of fishing gear including traps, beach seines and gill nets are used. In fact, the existing gill netting fleet of 25 boats of 8 meters/7 men carrying nets of about 350 meters x 5 meters represents the most advanced segment of the artisanal fishery. A stake net fishery operating in the mouth of the rivers forming barrages of 600 meters is reported to catch more than 50 tons of fish/year.

The fleet of handliners, of 14 to 20 m/160 hp/30 GT/10 crew, used to operate in the area known as the southwest sea, 60 miles southwest of Beira, and also in more southerly areas extending off Bilene, Xai Xai and Zaura. At depths of 100 to 200 meters, Epinephelus, Lethrinus, Scomberororus and Polysteganus were the main species caught by this fleet, which used baited lines geared with 5 to 15 hooks and caught up to 80 tons per year in trips of 2 to 3 days. 1975 marked the decline of this activity.

Beach seining is reported to be one of the major activities of the small-scale fishermen all along the coast. The nets used are about 80 meters long with ropes of 200 meters operated by about 12 men. In some areas ropes of 3,000 meters tugged by tractors are used.

(i) Shrimp Trawling

The continental shelf of Mozambique is reputed for the richness of its crustacean resources. Penaeus indicus (about 45 percent), Penaeus monoceros (about 40 percent) and Metapenaeus semisulcatus (over 10 percent) account for the bulk of the shrimp catches from the Mozambique waters. In total, nine species are found in the fishery, which is exploited the year round with a peak catch from March to June and a decline in landings from August to November. About 60 percent of the catch come from Delagoa bay and 40 percent from Sofala bay where the trawling grounds have long been exploited by vessels from different countries.

Most vessels are freezer trawlers of 24 meters/430 hp/17 men/100 GT, and are reported to catch more than 200 tons/year, of which 100 tons are shrimp, which are frozen, and 70 tons are fish, which are thrown back into

the sea. These vessels are equipped with double rig systems and undertake trips of one to two days during about 270 days/year. Official records indicate for 1974 a total catch of up to 10,000 tons by Mozambican vessels and there is an indication that the catch by Spanish and South African vessels may have exceeded 8,000 tons. Most shrimps are processed whole; exports of fresh shrimp equivalent exceeded 5,000 tons in 1974. Most of the 55 vessels which comprised the shrimp fishery in 1975 have now been nationalized, and it is expected that as a result of the arrival of new vessels the Mozambican fleet will fluctuate during the period 1976-80 between 40 and 50 units. In addition to the large trawlers, shrimpers of about 10 meters/10 GT have been operating in Delagoa bay.

(ii) Lobster Fishing

A survey made in 1965 by Moal and Gourong showed the existence in Mozambican waters south of Beira of sizeable resources of lobsters of the species Palinurus Gilchristis, P. Versicolor, P. longipes and P. orantus; these are currently fished in very limited amounts by canoe fishermen using traps, and also by divers. The average weight of the species caught is about 1 kg. Catches of 100 kg/hour were achieved in some hauls using trawls of 10 cm mesh size stretched and trawlers of 300 hp.

Up to 10,000 km² of trawling grounds were found to be suitable for fishing lobsters between Zavara and Maputo. In the early Seventies, a fleet of three trawlers equipped with trawls of 20 m headrope began to exploit these grounds and export up to 130 tons/year.

e. Estimated Potential

Very optimistic assumptions are often made about the possible maximum sustainable yield of the resources of the continental shelf of Mozambique. It has been suggested that the potential of fish could exceed 700,000 tons/year and of lobster 1,600 tons/year.

A recent estimate made by Burczynski, an FAO acoustic consultant using echo-acoustic integration techniques has shown for the whole continental shelf of Mozambique the existence of a fish biomass ranging between 180,000 tons and a possible maximum of 300,000 tons, of which 58 percent are demersal fish and 42 percent pelagic species. This biomass, which is mostly concentrated in Sofala bay (over 70 percent), could represent a fishing potential in the region of 120,000 tons, 65,000 tons of demersal species and 55,000 tons of pelagic fish. Ninety-seven percent of the catch was made in waters between 10 and 80 meters and less than 3 percent in waters between 100 and 200 meters. Sharks represented 3 percent of the captures, invertebrates 1 percent and bony fishes 96 percent.

On the basis of the known trends in the catch of shrimps, it may be assumed that the potential of these species may be near to 20,000 tons.

The following table is a tentative indication of the possible catches and potentials in the area in 1974/75:

	Estimated Catch (all vessels including foreign vessels)	Estimated Potential	Rate of Exploi- tation
Pelagic fish	6,000 tons (19%)	55,000 tons (39%)	12%
Demersal fish	9,000 tons (28%)	65,000 tons (45%)	14%
Crustaceans (shrimp/lobster)	17,000 tons (57%)	20,000 tons (15%)	76%
Total	32,000 tons (100%) per ha 8 kg	140,000 tons (100%) 12 kg	23%

It would appear from the present commercial catches that the species Cheimerius (robalo or sea bream), Chrysoblephus (marrêco or red roman), Epinephelus (garoups or grouper) and Otholitus (corvian or croaker) are the major components of the stock of demersal fish, which includes also in lesser quantities soles, rays, dorades, red snappers, and other fishes of high commercial value.

Perhaps 25 percent of the stock of pelagic and semi-pelagic fish consist of Pomadasydae and 20 percent of sardines of the species Pellona, Harengula and Sardinella jussieu. Rastrelliger canagurta (mackerel), Pomatomus saltatrix (anchovy) and horse mackerel (Caranx and Decapterus sp) exist also in relative abundance, together with sharks (Rhizoprionodon acutus and Carcharhinus) and tuna (skipjack and albacore).

In the 850 km² of mangrove areas, Chanos chanos (milkfish), Mugil sp and Pomadasys are also found in relative abundance, and this has led to the suggestion that aquaculture techniques could be developed in these areas.

The above figures, which have only an indicative value, show the need to undertake urgently biological research and stock assessment studies;

these are indispensable for proper management and development of the marine resources of the Mozambican coastal platform.

f. Development Prospects

On average the catch of the marine fishermen is believed to exceed 20,000 tons/year, of which one-third is supplied by some 60 industrial vessels, mainly concentrated at Maputo and Beira, and two-thirds by some 5,000 small fishing craft scattered along the coast. Available data on the marine potential would indicate that while the catch of shrimp is nearing its maximum yield, the fish stocks remain dramatically underexploited owing to lack of skill and of adequate means of production, and to poor infrastructure and marketing facilities.

The extension of the territorial waters will make available to the country an extra potential of perhaps 5,000 to 10,000 tons of shrimps, which have so far been exploited by foreign trawlers.

Any development program concerning the marine fishery will have to take into account:

- the need to develop and intensify research activities;
- the need to upgrade the situation of the small-scale fishermen, who, until 1975 have received little or no government support;
- the need to maintain and develop the industrial sector of the marine fishery, which can provide annually foreign currency earnings in excess of US\$ 15 million;
- the need to increase fish production in order to reduce imports of fish and to meet the urgent requirements of the population for protein.

Past studies have shown the importance of developing a fishery infrastructure, including new fishing ports and fishing shelters, boat construction and repair facilities, credit systems and training facilities for fishermen and the organization of an adequate system of transport and distribution of fish at the national level. The nationalization of a number of industrial firms and the need to set up a marine fishery administration call for immediate external support to the fishery sector.

In this connection the Directorate of Marine Fishery has requested international assistance for the implementation of projects (a) to train skilled fishermen for the industrial fleet, (b) to undertake a marine fishery research program aimed at ensuring proper management of the fishery, and (c) to set up the nucleus marine fishery administration that is indispensable for proper management of the fishery.

Preliminary estimates indicate that more than 100 shrimpers of medium size would be necessary if all the available shrimp resources of the continental shelf were exploited by Mozambican vessels. Should the modernization of the small-scale fishery double the present estimated catch of the canoe fishermen, room would still be left for the development of another industrial or semi-industrial fleet of more than 130 handliners, trawlers, and purse-seiners capable of harvesting annually some 30,000 to 60,000 tons of demersal and pelagic fish without endangering the resources. Although such a development cannot be contemplated within a short period, no time should be wasted in preparing the human and physical infrastructures for its achievement. In the first instance, it will be necessary to train a nucleus of fishery officers and researchers, including extension staff, as well as more than 1,000 masterfishermen,

ship's engineers and mates. In the second instance a national development plan will have to be prepared, indicating the amount of investment necessary to modernize and develop the fishery, and proposals for financing. In the traditional sector the aim should be to improve the fishery through labour-intensive techniques, in order to ensure the employment of a large segment of the population.

g. Fish Processing and Marketing

It is reported that 80 percent of the production of the small-scale fishermen is sun-dried on the ground, or salted in brine for two or three days. In the northern areas smoking takes place during the rainy season.

There is an indication that the price paid to the fishermen amounts to between US\$ 300 and 400/ton, except in some remote areas where it does not reach US\$ 200/ton. At the retail stage fresh fish exceeds US\$ 600 and processed fish US\$ 1,700/ton. Marketing is a complex process, with many fish traders and middle men exercising economic control over the fishermen.

A major difficulty is lack of transport facilities. The industrial catch of the handliners has experienced no marketing difficulty in the main towns in the past. The major part of the crustaceans caught by the large trawlers has been exported to Spain, Portugal, South Africa and Japan after grading, cleaning and freezing on board.

There is along the coast a cold storage capacity of 3,150 tons, 1,650 tons (52 percent) in Maputo and 20 percent in Beira.

From 1968 to 1974 the external trade in fishery products fluctuated as indicated in Table 23.

Table 23. Imports and Exports of fish (metric tons)

Year	Imports	Fresh Fish Equivalent (estimate)	Exports of shrimp	Fresh Fish Equivalent (estimate)
1968	15,000	22,000	355	390
1969	15,000	22,000	354	400
1970	14,000	21,000	346	395
1971	17,300	24,000	1,093	1,250
1972	14,800	20,000	1,654	1,900
1973	9,013	16,000	2,323	2,650
1974	7,020	13,000	4,635	5,500

In 1974 imports were divided as follows:

Weight of product:	canned fish	2,185	Equivalent	4,300 (33%)
	stockfish	940	weight of	4,700 (36%)
	<u>frozen fish</u>	<u>3,895</u>	<u>fresh fish</u>	<u>4,000 (31%)</u>
	Total	7,000		13,000 (100%)

The average annual consumption of fish has apparently fluctuated around 5 kg per capita. Average fish consumption in the rest of Africa averages twice this level, indicating that consumption on Mozambique could be increased considerably.

h. Fishing Institutions

Since April 1976 the marine fishery is the responsibility of the Ministry of Industry and Commerce while the inland fisheries remain the responsibility of the Ministry of Agriculture.

The decree of 17 March 1976 established within the Ministry of Industry and Commerce a National Directorate of Fisheries (Direcao Nacional de Pescas) responsible for managing, administering, assisting and developing the marine fisheries at the various levels of research, production, processing and marketing.

Three technical services were established:

- (i) a fishery research service, which replaces the Biological Research Mission organized in 1968;
- (ii) an artisanal or people's fishery service, in charge of developing cooperatives, assisting and training the small-scale fishermen and supervising the granting of credit facilities;
- (iii) an industrial fishery service, in charge of managing the state fishery enterprises, developing the fishery infrastructure and marketing fishery products.

A planning unit is also attached to the Directorate of Fisheries with the role of analyzing fishery statistics and preparing an overall fishery development program.

The fishery research service comprises the 2,000 m² built-up area and about 120 staff of the ex-Biological Research Mission, whose budget averaged US\$ 300,000/year until 1974. Considerable bilateral and international assistance is required by the new Directorate of Fisheries.

The Ministry of Agriculture retains responsibility for the administration, management and development of the inland resources, for which the establishment, with international assistance, of a National Inland Fishery Center of Lake Cabora Bassa has been proposed.

i. General Conclusions on Fishery Potential

Although little scientific work has been done on the real extent and composition of the resources, preliminary studies indicate that the annual fishing potential of Mozambique may exceed 120,000 tons in the marine sector and 40,000 tons in the inland sector; of this less than 20 percent is actually exploited. From an economic point of view the fishery may be divided into two distinct industries, a modern and sophisticated marine fishery of more than 50 freezer trawlers exploiting the crustacean resources, potentially estimated at 20,000 tons/year, and a traditional small-scale fishery involving more than 25,000 full- and part-time fishermen of low productivity. Administratively, the inland and marine fishery sectors are the responsibility of two separate and understaffed authorities; no attention has so far been given to the traditional sector of the two fisheries.

Among the urgent reasons for developing fish production and increasing the productivity of the small-scale fishermen throughout the country are (a) the need to supply protein-rich food in adequate amounts to the population; (b) the need to reduce fish imports, which contribute to the trade deficit, and (c) the need to improve the very low living standards of the fishermen's communities. In the industrial sector, which has been affected by nationalization measures and the departure of expatriate staff, the role of the shrimp industry as foreign exchange earner makes it imperative to maintain and expand it.

By 1985 a national production of about 110,000 tons of fish and 15,000 tons of shrimp and lobsters will be needed to meet the local (estimated at 10 kg/caput) and export requirements.

Because of the low level of development of the traditional sector and the high amount of investment necessary, it is doubtful that these objectives will be achieved without massive government support to both sectors of the fishery. Immediate steps to upgrade the fishery are necessary, and the following are among the most urgent measures required:

- (i) the development of a new fishery on Lake Cabora Bassa and the expansion of the fishery on Lake Nyasa;
- (ii) the modernization of the traditional marine fishery through the introduction of better techniques and fishing craft, and assistance to fishermen through extension services and credit facilities;
- (iii) the training of skilled skippers and mechanics for the operation of the industrial fleet;
- (iv) the establishment of a nucleus of fishery officers and the carrying out of practical research programs;
- (v) nation-wide fish marketing studies and the implementation of measures likely to overcome fish transport and distribution problems, which constitute a major obstacle to fishery development;
- (vi) close cooperation between the various authorities and administrations which retain responsibility for the fishery.

Owing to the lack of local skill and financial resources, considerable foreign assistance will be necessary if these immediate objectives are to be achieved. Specific projects for urgent implementation have therefore been elaborated to this effect.

Development activities will also require investment capital, for which sources might be local private investors, and in particular the

fishermen themselves, assisted through credit facilities; international and bilateral banking organizations, or a fishery development fund financed by government grants and subsidies and possibly by a tax levied on the export of crustaceans.

An important task of the new fishery authorities will be to elaborate with international assistance a long-term fishery development plan, taking into account the requirements of the country in terms of food and socio-economic development, the existing constraints and limitations of the fishery and the potential national and external sources of financing and technical assistance.

A reasonable target for the next decade would be to double the present production of fish and shrimps so as to supply the population with about 6 kg fish/caput/year without importation, and to ensure fuller national exploitation of the coastal shrimp grounds. About two-thirds of the additional production of fish could come from the marine sector and one-third from the inland fishery.

5. Agroindustry

In 1972, there were about 1,600 industrial enterprises in Mozambique, of which 600 were agro-oriented. The agroindustry accounted for about 34% of the total industrial production (1972) and for about 50% of the total employment in the industrial sector. There is more information on this in the following table.

Table 24. The Industrial Sector in 1972

Sector	Factories	Gross Production Value '000 esc.	Workers Employed	Total Worktime per year in hr ('000)
Mining industry	126	218,378	6,328	10,987
Total processing industry	1,488	12,824,427	95,810	194,011
Agroindustry	599	4,481,263	50,171	102,099
Non-agro-industry	889	8,343,164	45,639	91,912
Total Industry	1,614	13,042,805	102,138	204,998

Source: Instituto Nacional de Estatística. "Estatísticas Industriais." Delagocao de Mozambique. 1972.

The main agroindustries in Mozambique are: cotton industry, sugar industry, cashew nut industry, rice industry, fertilizer industry, and saw-mill industry.

There were six sugar factories in the country in 1972. These industries employed over 6,000 workers that year and produced 325,000 tons of sugar. (105,000 was white sugar, 213,000 yellow sugar, and 7,000 refined sugar.)

In 1972, there were 22 cotton factories in Mozambique producing about 130,000 tons per year of textile mills and employing about 3,000 workers. The factories produced about 45,000 tons of cotton ginning and 84,000 tons of cotton wool.

In 1972, there were 17 rice factories. The rice industry represented about 2% of the total industrial production of Mozambique and it engaged some 800 workers. The total production is about 110,000 tons per year. The rice milling capacity has increased considerably with the starting of three new plants in 1972.

a. Agroindustrial Production

In the following table the agroindustry is presented in terms of number of factories, production and employment.

Table 25. The Agroindustrial Production, 1972

	Factories Number	Gross Production Value ('000 esc.)	Workers Total	Total Worktime per year in hr ('000)
<u>Food</u>				
Tinned meat	17	73,394	362	683
Milk industry	8	232,447	281	432
Tinned fruit and Vegetables	7	46,648	714	1,598
Animal oil prod.	9	497,557	1,922	4,049
Margarine	1	33,588	75	89
Cereals	359	49,568	1,069	1,189
Rice	17	300,340	806	1,528
Sugar	6	1,317,800	6,268	13,823
Cocoa and chocolate	7	21,020	242	395
Cashew nut	18	896,330	21,513	43,777
Tea	19	353,166	3,228	6,128
<u>Other</u>				
Animal food	5	88,087	189	319
Tobacco	6	396,780	803	1,362
Sisal	18	101,887	1,895	3,465
Hides	1	17,217	148	312
Forest industry	79	314,551	7,581	16,596
Cotton	22	740,833	3,075	6,352
Total	599	4,481,263	50,171	102,099

Source: Instituto Nacional de Estatística. "Estatísticas Industriais,"
Delagocao de Mozambique. 1972.

b. Agricultural inputs

Fertilizer production included 8,000 tons of nitrogenous fertilizers and 3,000 tons of phosphate in 1973.

Table 26. Fertilizer Production

Year	Nitrogenous (N)		Phosphate (P ₂ O ₅)		Potash	
	Production M.T.	Consumption M.T.	Production M.T.	Consumption M.T.	Production M.T.	Consumption M.T.
1961/65	-	3,600	-	750	-	600
1971	2,070	6,513	669	1,814	-	1,620
1972	9,400 ^a	7,200 ^a	2,800 ^a	4,000 ^a	-	2,700 ^a
1973	8,000 ^a	9,000 ^a	3,000 ^a	3,200 ^a	-	1,800 ^a

^aUnofficial figure.

Source: FAO Production Yearbook, 1974.

The use of fertilizer included 9,000 tons of nitrogenous fertilizers, and 3,200 tons of phosphate in the same year. In 1976, fertilizer production fell by 60 percent with employment down about 25 percent.

6. Concluding Comments on Export Potential and Agricultural Production

There is a certain agro-industrial base for production of inputs as well as for processing of agricultural products. The sector is, however, suffering from lack of technical knowledge, spare parts, etc. at the present time.

The scarcity of agricultural implements is a bottleneck in the production efforts. A development and manufacturing program with the aim to provide the rural sector with well adapted equipment and implements should therefore be given high priority.

The future supply of commodities will be determined in large part by the production goals set by the government. These goals will be set largely

in accordance with estimated domestic food requirements and export possibilities. For the state collective farms goals can simply be set by decree. Prices will be largely irrelevant as guidelines for decision making since the profit motive will be absent. Prices can be set to (1) channel the products into the appropriate consumption sector, (2) avoid black market or shortages, and (3) avoid illegal transfers across frontiers.

The production motive on aldeias comunais is as yet not clear. The emphasis will be on self-sufficiency, and the land will be worked collectively. Decisions on production will be made by administrators and committees. The role of prices in such a decision framework is not clear, and will probably emerge and evolve with time.

For at least the foreseeable future exports will come primarily from the state sector. The production capital exists for such activities and needs merely to be rehabilitated. Export levels comparable to pre-independence can, in general, be expected for rice, tea, cashews, sugar, and citrus in five years. In addition, such new products as shrimp and lobster will be added to the export list. Sisal production probably should not be revived because of uncertain world demand and competition from Brazil and the Phillipines. Copra is also likely to meet stiff international competition, as is cotton.

For at least the next five years the import of capital goods will be heavy, and the expected large deficits in balance of payments will require continued heavy financing.

The time frame of the long run supply-demand balance will depend on the development of the Cabora Bassa and Limpopo Valley projects. Upon full completion of these projects the irrigated area will increase several times over. While concrete feasibility studies of these developments are not yet

available, the ultimate production potential appears very large. Attention might well turn to producing oilseeds, corn and rice for the Asian markets. The demand for these products will probably continue to expand for some time, and Mozambique would seem to be located well with respect to these markets.

IV. PROPOSED AGRICULTURAL SECTOR STRATEGY

A. Policies

1. Supply

A policy of selectively reduced dependence on Rhodesian and South African imports would seem to be a reasonably sound general policy to pursue. Many imported foodstuffs and agricultural inputs can be produced domestically.

Given the rather long-term unemployment problem in Mozambique, resulting in the migration of a quarter of a million workers to mines in Rhodesia and South Africa, considerable attention should be given to the development of industries with high employment potential. Subsistence farming is a good high-employment industry. Bravo^{1/} has indicated that, if good input distribution and product collection systems are provided, a subsistence type of agriculture with a single cash crop such as cotton can provide a higher standard of living than migrant labor status.

Integration of the remote areas of Mozambique into a country-wide network of communication and social services is a most important policy. Portuguese colonial policy tended to fragment the country rather than integrate it. Reorientation of transport and communications networks is necessary if supply potential is to be realized.

The government strategy of rehabilitation of the commercial agricultural sector under the supervision of the State collectives is a necessary first step to increase domestic food availability, reinstate the export industries, and utilize existing processing capacity. The GOM is pursuing this policy vigorously. Infrastructure development in terms of the road system and

^{1/}Bravo, Nelson Saraiva, "A Cultura Algodoeira na Economia do Norte de Mocambique," junta de Investigações do Ultramar, No. 66, Lisbon, 1963.

irrigation development is urgent if this policy is to succeed. (The later conversion of these collective farms into cooperatives should offer no insurmountable obstacles). The development of the livestock sector is an important part of this strategy.

The internal marketing and distribution system will be a troublesome inadequacy for some time. While direct governmental intervention may be necessary for the short-run, the encouragement of private trader operations through appropriate price margins should be pursued where possible. This will involve coordination of geographical prices according to transport and handling costs. The sometimes-stated policy of "equal prices everywhere" will discourage efficient product distribution.

Consideration must be given to the cheapest source of pesticides and fertilizer. It may be cheaper to import urea rather than use the nitrogen production facilities available locally. Small scale production is often not economical. Continual imports of agricultural chemicals from South Africa or other world markets, may be desirable for the next several years.

A series of feasibility studies and resource inventories should be undertaken rapidly. Less is known about Mozambique's resources than most underdeveloped countries. The research that was accomplished by the Portuguese

before independence has largely become unavailable or obsolete, and the undertaking of development projects with inadequate research and planning could result in costly mistakes. Given the scarcity of trained indigenous personnel these studies should be undertaken by international consulting agencies. It appears that the policy of increasing agricultural production in the subsistence sector is being approached with a complex mixture of political, social, economic, and security motives. Widespread analfabetism compounds the problem. The effective program of the Instituta Algodoneira in the 1960's may be a useful concept to follow - namely the encouragement of the development of a key commodity such as cotton, through which appropriate distribution of inputs, technical assistance and methods of collection of product are firmly established. Once the framework for a key product is established it can serve as a vehicle through which additional social services can be provided.

Some progress has been made in the establishment of aldeias comunais, but with mixed results. Care must be taken to ensure that the necessary inputs are available before or at the time the communal villages are organized. This involves careful pre-planning on an individual unit basis. Administration and material requirements for such a program are large.

Little experience is available on how best to accomplish such a large scale re-structuring of land settlement and use patterns. It may be logical to start with areas proximate to existing commercial agriculture and village organization where some infrastructure is already in place. The development of aldeias comunais will undoubtedly be pursued with some experimentation and trial and error adjustment.

B. Programs

1. Supply

(a) There seems to be a shortage of tools and implements for small-scale production units. It would seem feasible to produce more of these items domestically in small-scale industrial plants.

(b) A training and education program, of course, is an urgent and vital aspect of Mozambique's needs. Many of the instructors must be recruited from outside Mozambique. Portuguese speaking technicians are scarce relative to technicians with other languages. Although Mozambique has been reluctant to solicit aid from Brazil because of ideological differences it would seem that relations between these two countries could be of substantial benefit to Mozambique. Mozambicans could attend Brazilian technical schools and Universities and Brazil could provide technicians to Mozambique.

2. Demand

(a) Improvement of diets through subsidized food stuffs in local government-owned stores would seem to be a appropriate short-term program. This would include possibilities such as canned milk and meat, sugar, beans, textiles, cereal grains, etc.

(b) The government might consider a national soft-drink fortified with ascorbic acid (manufactured from the cashew pear) for widespread distribution (possibly subsidized) to remedy the widespread deficiency in vitamin C.

V. INTERNATIONAL ASSISTANCE

A. Existing Aid Programs

Aid to Mozambique came first in the form of contributions of food, medical supplies and general soft-loans from a long list of countries. This emergency relief arose from a plea for help to the UN and the World community upon independence.

In a more intermediate step the Nordic Group, FAO, and UNDP of the UN initiated a series of specific 3-5 year projects designed to increase agricultural production. These projects were directed primarily to increased crop and livestock production and increased technical capacity of Mozambican technicians. The list of FAO-Nordic projects implemented or in an advanced stage of preparation are given in Table 27.

These projects were implemented upon request by the GOM and after visits by survey teams to determine background conditions and needs. By and large the projects were not guided by initial detailed feasibility studies, and coordination among projects is informal. The projects are financed primarily through FAO, by other donors, and by the Nordic Group.

In addition, the UNDP has a number of development projects. These are listed in Table 28.

Also there are several bi-lateral agreements between GOM and several countries, such as Italy (to provide health services), USSR (to develop plans for the Cabora Bassa irrigation scheme), and Bulgaria and USSR (irrigation of Limpopo Valley). Details of these agreements are not available.

Significant aid programs from other groups are listed in Table 29. A list of projects desired by the GOM but not yet funded are given in Table 30. As is obvious from the Tables, a wide variety of aid programs have been agreed on, and many of the projects are in various stages of implementation. The need, however, is massive. One of the big bottlenecks is lack of Ministry technicians to act as counterparts.

Table 27. FAO/NORDIC Agricultural Development Programme

Project symbol		Project title	Duration (months)	Responsibility for implementation and estimated cost (US\$ '000)	
Temporary	Previous			FAO	Bilateral (Nordic)
<u>1. Projects for immediate implementation (in 1976)</u>					
1/MOZ	1	CR- 1	Seed production	36	2 050
1/MOZ	2	CR- 3	Vegetable production	36	625
1/MOZ	3	CR- 4	Citrus rehabilitation	36	568
1/MOZ	4	LI- 2	Tsetse and animal trypanosomiasis control	36	400
1/MOZ	5	LI- 4	Livestock production stations	60	2 500
1/MOZ	6	LI- 5	Dairy production, Chimoio	36	652
1/MOZ	7	LI- 6	Beef production, Buzi	36	809
1/MOZ	8	LI- 7	Bush control	36	851
1/MOZ	9	LI- 8	Dairy production, Chokwe	24	543
1/MOZ	10	LI- 9	Beef production, Chimoio	36	1 990
1/MOZ	11	LI-10	Beef production, Mabalane	36	648
1/MOZ	12	LI-12	Beef production, Changanane	36	701
1/MOZ	13	LI-13	Strengthening of the Veterinary Research Institute	36	1 246
1/MOZ	14	FO- 1	Afforestation, Manica	60	1 200
1/MOZ	15	FO- 2	Firewood plantation, Maputo	60	3 500
1/MOZ	16	FI- 1	Inland fisheries	36	2 700
1/MOZ	17	IR- 2	Beira drainage	36	366
1/MOZ	18	IR- 3	Extension of Buzi irrigation scheme	36	555
1/MOZ	19	MI- 1	Support to DINECA: agricultural inputs and marketing	36	7 200
1/MOZ	20	ME- 1	Tools and small agricultural implements	36	2 510
1/MOZ	21	ME- 3	Agricultural spare parts	36	7 150
1/MOZ	22	TR- 1	National Agricultural Training Centre	46	1 903
1/MOZ	23	TR- 2	National Agricultural Machinery Training Centre, Tete	36	4 100
1/MOZ	24	TR- 3	Natural Resources Training Centre	36	545
1/MOZ	25	GE- 1	Project support (FAO Operations Office, Maputo)	36	600
Total				15 111	30 801

Table 27 Continued

Project symbol		Project title	Duration (months)	Cost US\$ '000	
Temporary	Previous				
<u>2. Reserve projects</u>					
2/MOZ	1	CR- 5	Banana plantation	24	200
2/MOZ	2	LI- 3	Wildlife survey and utilization	18	140
2/MOZ	3	LI-11	Beef feed-lot, Moamba	36	170
2/MOZ	4	FI- 2	Inland fisheries	12	327.2
2/MOZ	5	IR- 1	Limpopo Valley development	6	494
2/MOZ	6	MI- 2	Fertilizer demonstration	60	2 290
2/MOZ	7	TR- 4	Irrigation Training Centre, Limpopo	48	646.7
2/MOZ	8	GE- 3	Agricultural extension	36	1 700
2/MOZ	9	GE- 4	Accounting and management control unit	36	1 300
2/MOZ	10	GE- 5	Support unit, Chimoio	36	300
Total					7 367.9
<u>3. UNDP/FAO projects</u>					
MOZ/75/008	LI- 1	<u>1/</u>	Livestock production and health	48	2 252.6
MOZ/75/009	CR- 2	<u>1/</u>	Crop production and protection	48	2 646.0
MOZ/75/011	GE- 2	<u>1/</u>	Land and water use planning	42	1 112.2
MOZ/75/012		<u>2/</u>	Agricultural statistics		
MOZ/76/...	FO- 3	<u>3/</u>	Forestry and forest industries development	60	1 677.0
Total					7 687.8

1/ Ongoing projects.

2/ Approved project not yet operational.

3/ New project proposed for inclusion in the country programme.

Table 28. UNDP Mozambique: IPF commitments and estimates 1975-1979

Number	Title	Total	1975	1976	1977	1978	1979
75/004	Tete Water Supply	112 552	17 600	33 500	61 452	-	-
75/008	Emergency Livestock	2 214 391	10 391	323 900	653 700	637 200	589 200
75/009	Emergency Crop	2 845 661	28 861	133 800	657 800	1 062 500	962 700
75/010	Nutrition Adviser	6 343	6 343	-	-	-	-
75/011	Land Use Evaluation	1 153 437	10 537	38 700	241 700	434 500	428 000
75/012	Agricultural Statistics	112 643	6 343	14 100	52 600	39 600	-
75/013	Emergency Power Plant	207 010	-	161 600	45 410	-	-
75/015	Consultancies in Transport	123 623	99 808	23 815	-	-	-
75/016	Consultancies on Highways	112 000	-	112 000	-	-	-
75/021	Peri-urban Housing	1 213 380	2 000	378 400	832 980	-	-
75/024	Vaccination Campaign	451 700	-	147 150	304 550	-	-
75/025	Health Manpower	315 450	5 250	108 700	123 000	78 500	-
75/031	Primary Education	8 000	8 000	-	-	-	-
75/035	International School	3 000	-	3 000	-	-	-
76/002	FAO Mission	27 000	-	27 000	-	-	-
76/003	ITU Mission	23 700	-	23 700	-	-	-
76/004	Maritime Adviser	50 700	-	12 500	28 900	9 300	-
76/005	Vocational Training Mission	7 500	-	7 500	-	-	-
76/006	Electrical Technician Training	10 820	-	10 820	-	-	-
76/007	Forestry and Forest Industries Development (1980-82:676,100)	2 050 500	-	8 000	89 200	651 900	625 300
76/008	Vocational Training (Part I)	571 700	-	13 900	188 200	203 800	165 800
76/009	Vocational Training (Part II) (1980:600,000)	1 800 000	-	-	200 000	400 000	600 000
76/010	Fisheries Mission	10 300	-	10 300	-	-	-
	Grand total	13 431 410	195 133	1 592 385	3 479 492	3 517 300	3 371 000

Table 29. Bi-lateral Assistance Projects in Mozambique

Project number	Title	Source of assistance
3.2.2	Irrigation in Limpopo Valley	OAU/League of Arab States Bulgaria and USSR
3.2.3	Additional spillway gates at Massengin den	OAU/League of Arab States
3.2.9	Irrigation in Limpopo Valley	OAU/League of Arab States
3.2.17	Construction of Storage Centers	Netherlands
3.1.4	Study of deepening the Port of Baira	Commonwealth Fund
3.2.18	Rural Water Supplies	Netherlands
4.1.2	Educational Projects	Netherlands, Norway & Sweden

Table 30: Projects the Government intends to carry out for which assistance is not yet available

Project number	Title
2.2.1.	Activation of Chingdozi airport in Tete Province
2.2.12.	Emergency power-generating units (part)
2.2.13.	Construction of a substation at Manica
2.2.14.	Emergency plan for water supply to the city of Manica
2.2.9.	Microwave link with Zambia
2.2.10.	Telephone and telex link between Maputo and Beira
2.2.3.	Repairs on National Highway 1
2.2.4.	Widening of the Incoloane-Macia sections
2.2.6.	Construction of the Espungabara-Dombe-Chimoio Road
2.2.5.	Construction of the Angonia Road
2.2.7.	Strengthening of bridges over the Pungue, Mecumbuzi and Nhanzonia Rivers
3.2.4.	Feasibility study of Mapai Dam on the Limpopo River and preparation of a regional development plan
3.2.6.	Eight earth dams of the Montequiz area
3.2.7.	Introduction of agricultural implements and draft animals
3.2.8.	Restoration of the banana plantation in Incomati Valley
3.2.16.	Storehouses for the Aldeias Communais
3.1.7	Construction of a fishery port
3.1.1.	Improvements of the Moatize-Beira railroad line
3.1.2.	Increased traffic arising from the coal development in Moatize
3.1.6.	Improvements on the Nacala rail line
3.1.3.	Feasibility study of rail connexion to Zambia
3.1.10.	Litunde-Marrupa-Balama-Montepuez road
3.1.13.	Angoche-Momapo road (National Highway 236)
3.1.16.	Zambezi River bridge
3.2.30.	Centre-north-east highway
3.1.14.	Feeder-road programme
4.1.1.	Assisted self-help construction
3.1.8.	Pequenos Libombos Dam
3.2.27.	Reafforestation in Sofala Province (part)
4.1.2.	Educational projects (part)
3.2.13.	Provision of Tools and Agriculture Implements (part)

B. Future Aid Requirements and Possible U.S. Participation

Probably the largest single as yet unfulfilled need of Mozambique seems to be road construction and maintenance. Vast requirements in new road and bridge construction must be met if agricultural production is to be increased as hoped. This activity could be accomplished with a minimum of political and ideological difficulties and on a project-by-project approach. Additional feasibility study and planning would be desirable to ensure proper placement and quality of roads. Both main trunk lines and feeder road systems need to be developed.

A second major need is to develop the system of organization of the traditional agricultural sector. An adequate concept of community development consistent with the governmental ideology has apparently not yet been fully developed. Aldeias comunais are apparently being developed without sufficient prior planning as to resource needs, input supply system requirements and product collection systems. This is, of course, a very long run problem and the GOM effort will undergo considerable trial and error adjustment before success will be achieved. Unfortunately any U.S. role in this effort would likely experience some distrust and ideological conflict with the GOM, although it would seem that help with the technical aspects such as crop rotations, input requirements, introduction of new crops to increase nutrition levels, etc. could be approached in spite of the socio-political problems of communal organization.

In the health area, vast requirements will continue for some time in spite of considerable concentration of effort there by the GOM and several countries on a bilateral basis, as well as with the U.N. through UNICEF.

Considerable aid could be extended in the area of education, training and institutional development. This is a long run program of capacitation

in the areas of public administration, economic planning, University development and general effort to upgrade the quality and quantity of high-level technicians and administrators in public institutions. Agronomic and veterinary research units are vitally needed on a long term basis, given the complex nature of crop and animal production and the pests and plagues associated with a tropical agriculture. The U.S. has an impressive capacity in this regard combined with considerable experience all over the world.

Inventories of natural resources and the formation of guidelines for efficient management of such resources are vitally needed. Basic knowledge of forestry resources, wildlife, ground water availability, minerals, marine resources, etc. does not exist. Numerous development projects have been initiated on an emergency basis without adequate research and planning. Work on developing appraisals of resources should be initiated so future development schemes could be initiated on a more rational basis.

It appears that an adequate system of agricultural credit has not been developed. Work should be initiated toward developing credit institutions and a rational framework for supplying credit to the many different types of agricultural production and processing activities.

Mozambique does not have a system of national accounts. Economic planning cannot be accomplished adequately without national accounts.

Any program of technical or capital assistance should include an accompanying component of training. Trained manpower in Mozambique is incredibly scarce. Given the long time requirements involved in developing capable high-level administrators and technicians, the training component will be important for two decades.

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