

AFR
967
P557

PN-AAJ-519

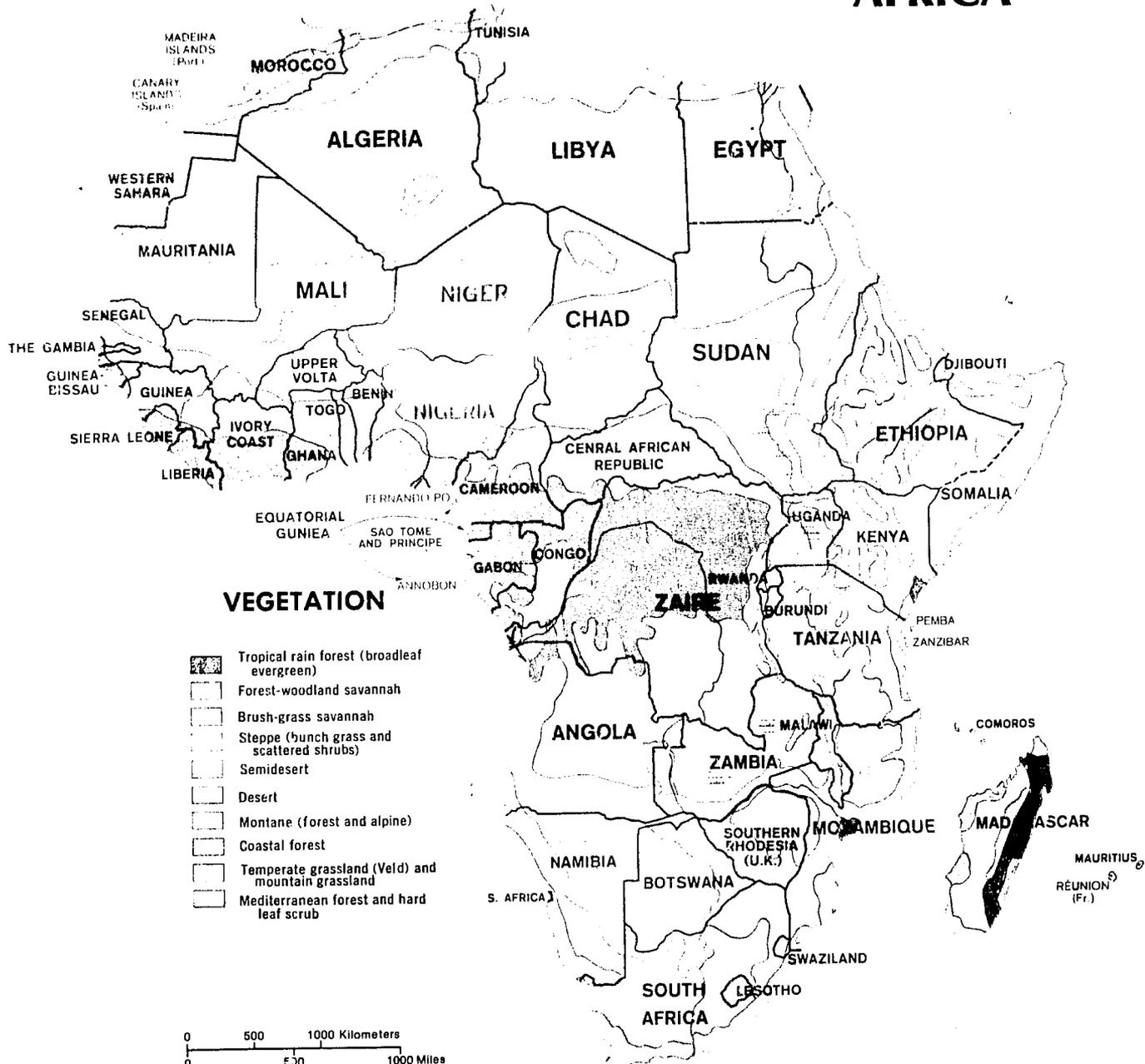
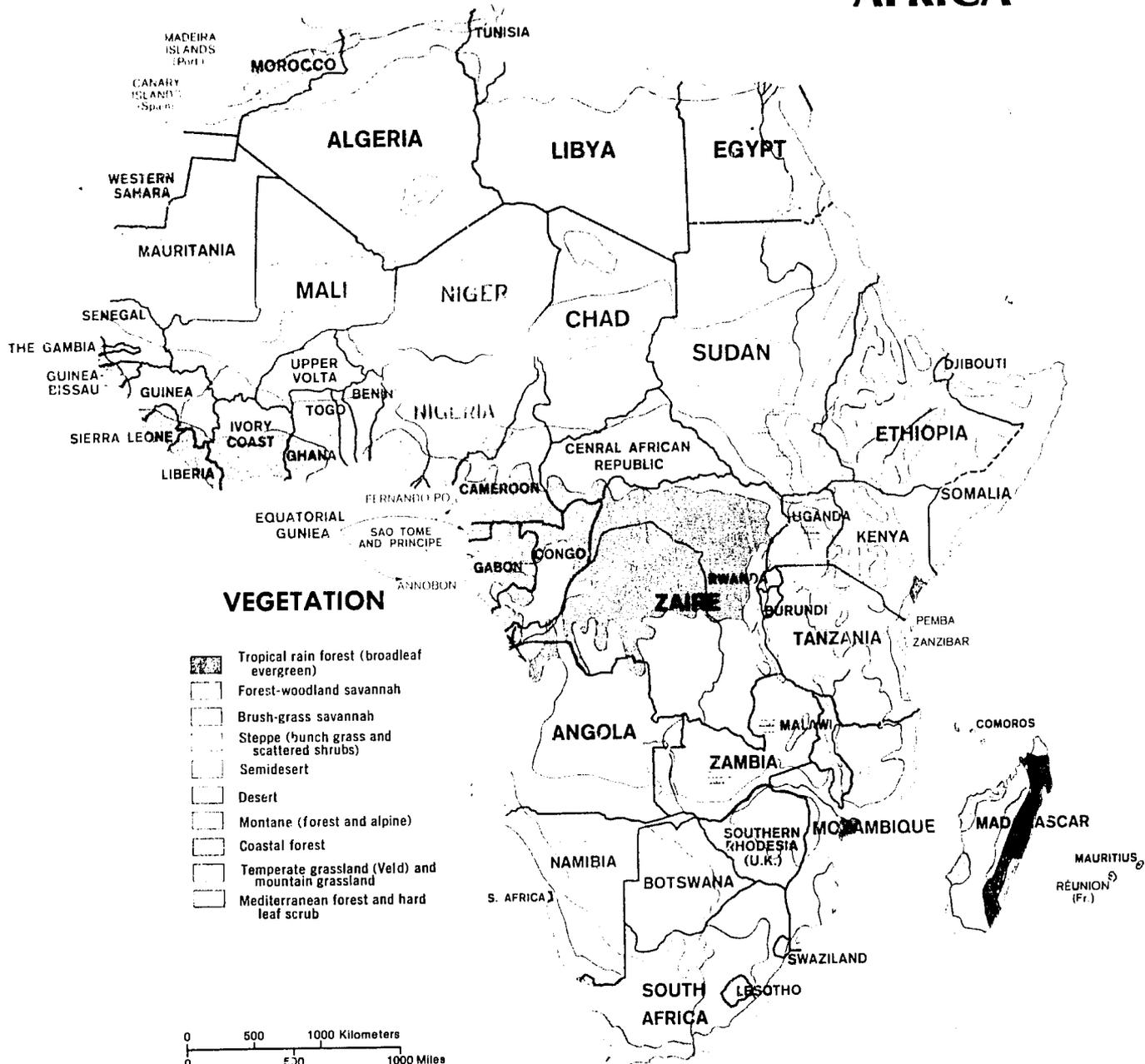
East Africa

A Regional Profile

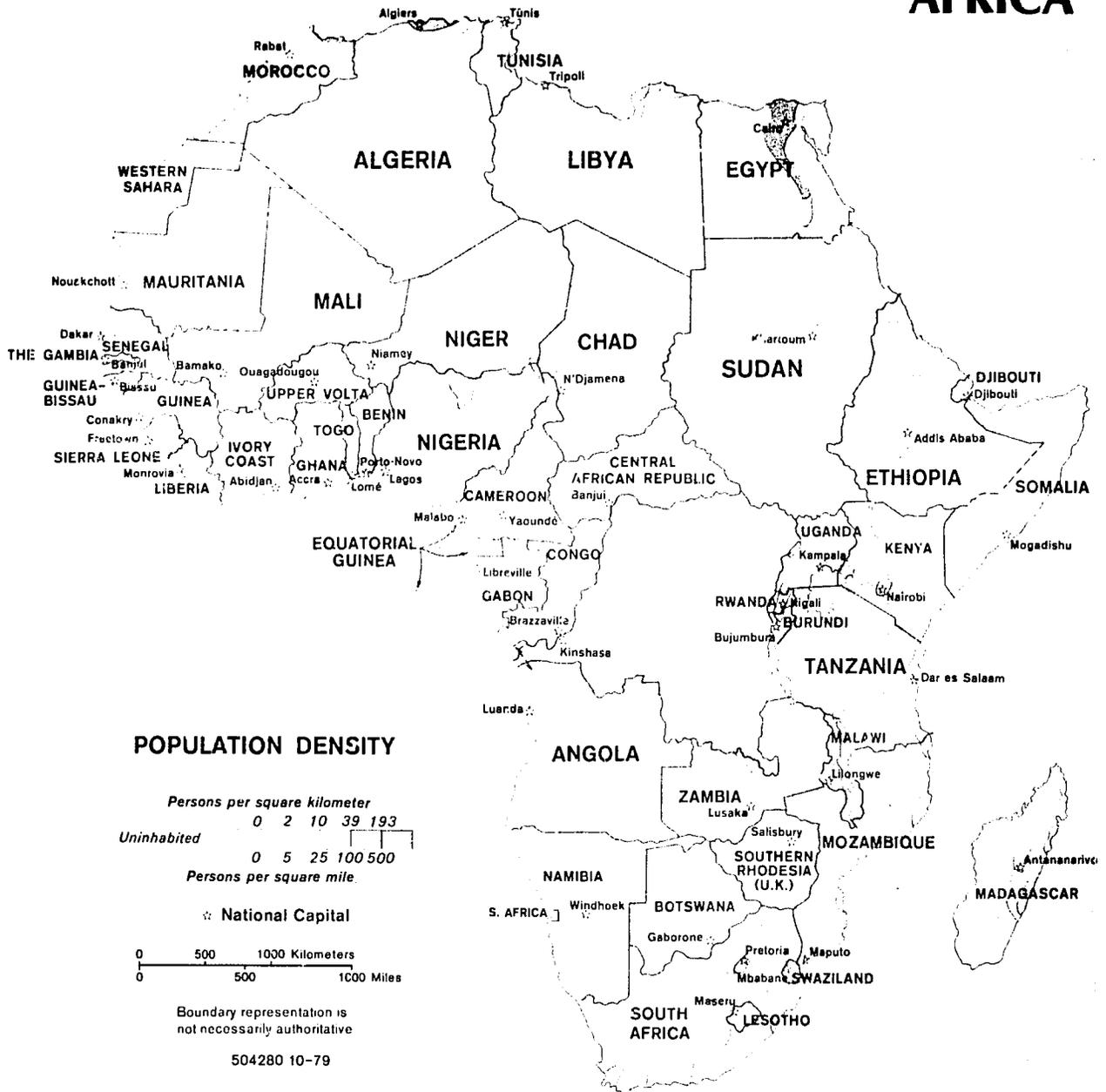
April 1981

Office of U.S. Foreign Disaster Assistance
Agency for International Development
Washington, D.C. 20523

AFRICA



AFRICA



EAST AFRICA: A REGIONAL PROFILE

prepared for

The Office of U. S. Foreign Disaster Assistance
Bureau for Private and Development Cooperation
Agency for International Development
Department of State
Washington, D. C. 20523

by

Thomas Philippi and Cecily Mango

of

Evaluation Technologies, Inc.
Arlington, Virginia
under contract AID/SOD/PDC-C-0283

The profile of the seven countries of East Africa is one in a series designed to provide baseline country data in support of the planning and relief operations of the Office of U. S. Foreign Disaster Assistance (OFDA). The content, scope, and sources differ from previous profiles in that an attempt has been made to assess each country's vulnerability to natural disasters and how well they are prepared to deal with the consequences should a disaster strike. A special emphasis has therefore been placed on the relationship between environmental problems and development issues, and how each can be affected or even profoundly altered by the threat of a disaster. In addition, topics such as nutrition, food storage capacity, and logistics have been highlighted because they are frequently of interest to international relief organizations.

If the information provided can also be useful to others in the disaster assistance and development communities, so much the better. Every effort is made to obtain current, reliable data; unfortunately it is not possible to issue updates as fast as changes would warrant. A cautionary note, therefore, to the reader: statistics are indicators at best, and if names and numbers matter, the bibliography will point to a current source.

We invite your comments and corrections. Address these and other queries to OFDA, AID, as given above.

April 1981

OFDA COUNTRY PROFILES: APRIL 1981

AFRICA

Cape Verde
Chad
Djibouti
East Africa Regional Profile
Ethiopia
Mali
Mauritania
Niger
Sahel Transportation Survey
Senegal
Somalia
Uganda
Upper Volta
Zaire

ASIA

Bangladesh
Burma
India
Indonesia
Malaysia
Nepal
Pakistan
Philippines

CARIBBEAN

CARICOM Regional Profile
Dominican Republic
Haiti

LATIN AMERICA

Bolivia
Chile
Ecuador
El Salvador
Guatemala
Honduras
Nicaragua
Peru

NEAR EAST

Turkey

SOUTH PACIFIC

Fiji
Tonga
Western Samoa

INDIAN OCEAN

Island Countries of the
Indian Ocean

CONTENTS

List of profiles.....	i
Preface.....	ii
DJIBOUTI.....	1-26
1. Environment.....	1-3
Landforms.....	1
Vegetation.....	1
Temperatures.....	2
Precipitation.....	2
Waterways.....	2
2. Disaster Vulnerability.....	4-6
Floods.....	4
Drought.....	4
Refugees.....	5
Seismicity.....	5
3. Human Ecology.....	7-8
General population.....	7
Ethnic groups.....	7
4. Nutrition.....	9-12
Overview.....	9
Staple foods.....	9
Food programs.....	10
Acceptable alternatives.....	12
5. Health, Sanitation, and Housing.....	13-15
Overall health status.....	13
Vital statistics.....	13
Health services and facilities.....	14
Health personnel.....	14
Sanitation.....	15
Rural housing.....	15
Urban housing.....	15
6. Disaster Preparedness.....	16-18
Host disaster plan.....	16
Host contacts.....	16
US mission plan.....	16
US contacts.....	17

Food supplies.....	17
Storage facilities.....	17
Transportation.....	18
Voluntary agencies.....	18
7. Agroecconomy.....	19-20
Overview of agriculture.....	19
Livestock raising.....	19
Current status.....	20
8. Industrial Economy.....	21-22
Overview of economy.....	21
Imports.....	21
Exports.....	22
9. Transportation and Logistics.....	23-25
Road network.....	23
Distances.....	23
Railroad.....	23
Ports.....	24
Airports.....	24
Airlines.....	25
Air distances.....	25
10. Energy and Communications.....	26
Electric power.....	26
Radio network.....	26
Telephone system.....	26
Television.....	26
ETHIOPIA.....	27-89
1. Environment.....	27-34
Physical geography.....	27
Soils.....	28
Climate.....	29
Precipitation.....	29
Vegetation.....	33
Land use.....	33
Major waterways.....	33
Highlands.....	34
2. Disaster Vulnerability.....	35-38
Civil strife/refugees.....	35
Drought/famine.....	35
Infestation/pests.....	37

3.	Human Ecology.....	39-45
	Population overview.....	39
	Urban areas.....	39
	Ethnic and sociocultural groups.....	43
4.	Nutrition.....	46-50
	Nutritional status.....	46
	Diet.....	46
	Food and drink.....	47
	Food programs.....	48
	Emergency food assistance.....	49
5.	Health, Sanitation, and Housing.....	51-64
	Vital statistics.....	51
	Diseases.....	51
	Health services and facilities.....	52
	Health personnel.....	61
	Folk medicine.....	62
	Refrigeration/medical supplies.....	62
	Housing.....	63
6.	Disaster Preparedness.....	65-67
	Host disaster plan.....	65
	Storage.....	65
	US plan.....	65
	Red cross.....	65
	Voluntary agencies.....	66
	International organizations.....	66
7.	Agroeconomy.....	67-76
	Overview of agriculture.....	67
	Livestock.....	68
	Drought.....	69
	Foodgrain deficit.....	69
	Recent trends.....	70
	Production/area planted.....	71
	Harvest dates.....	71
	Agricultural exports.....	72
	Imports.....	73
	Storage.....	74
8.	Industrial Economy.....	77-81
	Economic overview.....	77
	Production.....	78
	Recent trends.....	79
	Imports.....	79
	Exports.....	81

9. Transportation and Logistics.....	82-87
Road network.....	82
Transport agencies.....	83
Distances.....	84
Railroads.....	84
Ports and shipping.....	85
Civil aviation.....	87
10. Energy and Communications.....	88-89
Electric power.....	88
Radio network and telecommunications.....	88
Telephone network.....	88
Television.....	89
 KENYA.....	 90-133
1. Environment.....	90-93
Geographic regions.....	90
Precipitation.....	91
Temperatures.....	91
Waterways.....	92
Land use.....	92
Environmental problems.....	93
2. Disaster Vulnerability.....	94-97
Drought/food shortage.....	94
Floods.....	95
Infestations/pests.....	95
3. Human Ecology.....	97-101
Population overview.....	97
Population distribution and density.....	98
Urban/rural growth rates.....	99
Migration.....	99
Ethnic groups.....	100
Refugees.....	101
4. Nutrition.....	102-105
Nutritional status.....	102
Diet.....	102
Food programs.....	103
Famine relief.....	105

5. Health, Sanitation, and Housing.....	106-112
Overview of health.....	106
Diseases.....	107
Vital statistics.....	107
Health services and facilities.....	107
Health personnel.....	109
Medical supplies and cold chain.....	110
Water supply.....	110
Housing.....	111
6. Disaster Preparedness.....	113-115
Kenya National Plan.....	113
Storage.....	113
US Contact.....	113
International Organizations.....	113
Voluntary Agencies.....	114
7. Agroecconomy.....	116-121
Overview of agriculture.....	116
Food crops.....	116
Production.....	117
Land use.....	118
Planting and harvesting dates.....	118
Exports.....	119
Food imports and outlook.....	120
8. Industrial Economy.....	122-125
Economic overview.....	122
Industrial production.....	123
Imports.....	124
Exports.....	124
9. Transportation and Logistics.....	126-130
Road network.....	126
Railways.....	127
Ports.....	128
Airports.....	129
Airlines.....	129
Air distances.....	130
10. Energy and Communications.....	131-133
Electric power.....	131
Petroleum.....	132
Other energy sources.....	132
Telecommunications.....	132
Radio network.....	133
Television.....	133

SOMALIA.....	134-176
1. Environment.....	134-138
Landforms.....	134
Precipitation.....	135
Temperature.....	135
Vegetation.....	136
Land use.....	137
Rivers.....	137
2. Disaster Vulnerability.....	139-142
Refugees.....	139
Drought.....	140
Environmental deterioration.....	140
Infestations.....	141
Seismicity.....	141
Disaster history.....	142
3. Human Ecology.....	143-144
General population statistics.....	143
Regional distribution.....	143
Ethnic groups.....	143
Settlement patterns.....	144
4. Nutrition.....	145-148
Nutrition overview.....	145
Regional dietary preferences.....	145
Staple foods.....	145
Meals.....	146
Acceptable substitutes.....	147
Food supply.....	147
Food programs.....	147
5. Health, Sanitation, and Housing.....	149-154
Vital statistics.....	149
Diseases.....	149
Health services and facilities.....	150
Health personnel.....	151
Water supply.....	152
Sanitation.....	153
Housing.....	153
6. Disaster Preparedness.....	155-159
Somali national plan.....	155
US Contact.....	155
Refugee camps.....	155

Refugee food situation.....	156
Water and sanitation.....	156
Health needs.....	156
Storage capacity.....	157
Transportation.....	157
US voluntary agencies.....	158
7. Agroecconomy.....	160-166
Overview of agriculture.....	160
Rainfed agriculture.....	160
Irrigation.....	161
Crop production.....	161
Crop dates.....	162
Current status.....	163
Livestock.....	163
Veterinary services.....	164
Fishing.....	165
Agricultural exports.....	165
Agricultural imports.....	166
8. Industrial Economy.....	167-168
Overview of industrial economy.....	167
Imports.....	167
9. Transportation and Logistics.....	169-173
Road network.....	169
Surface miles.....	170
Railroad network.....	170
Ports.....	170
Shipping lines.....	172
Airports.....	172
Air carriers.....	173
Air distances.....	173
10. Energy and Communications.....	174-176
Electric power.....	174
Petroleum.....	174
Domestic fuel supplies.....	175
Telecommunications.....	175
Radio.....	176
Television.....	176
SUDAN.....	177-216
1. Environment.....	177-180
Overview of environment.....	177

Plains.....	177
Northern desert.....	177
Mountains.....	178
Rivers.....	178
Precipitation.....	179
Temperatures.....	179
2. Disaster Vulnerability.....	181-184
Overview of vulnerability.....	181
Deforestation/desertification.....	181
Floods.....	182
Water hyacinth.....	182
Infestations.....	183
Disaster history.....	184
3. Human Ecology.....	185-189
Population overview.....	185
Urban areas.....	185
Ethnic groups.....	185
Settlement patterns.....	187
Migration.....	187
Emigration.....	188
Refugees.....	188
4. Nutrition.....	190-193
Nutritional status.....	190
Diet by region.....	190
Staple foods.....	191
Taboos.....	191
Food programs.....	192
5. Health, Sanitation, and Housing.....	194-200
Vital statistics.....	194
Diseases.....	194
Health facilities.....	195
Refrigeration.....	195
Health personnel.....	196
Water supply.....	196
Cultural preferences in housing.....	197
Rural housing.....	197
Urban housing.....	198
Building materials.....	199
6. Disaster Preparedness.....	201-203
Host plan.....	201
US mission plan.....	201
Donor community.....	201

Voluntary agencies.....	202
7. Agroecconomy.....	204-208
Overview of agriculture.....	204
Constraints and potential.....	204
Irrigation.....	204
Crop production.....	206
Harvesting dates.....	207
Livestock.....	208
Agricultural exports.....	208
8. Industrial Economy.....	209-210
Overview of industrial economy.....	209
Current status.....	209
Industrial production.....	209
Imports.....	210
9. Transportation and Logistics.....	211-213
Road network.....	211
Railway network.....	211
Ports.....	212
Inland waterways.....	212
Airports.....	213
Airlines.....	213
10. Energy and Communications.....	214-216
Overview of energy resources.....	214
Electricity.....	214
Petroleum.....	216
Radio network.....	216
Television.....	216
TANZANIA.....	217-272
1. Environment.....	217-220
Plateau regions.....	217
Mountains.....	217
Lakeshore region.....	218
Coastline and Islands.....	218
Waterways.....	218
Precipitation.....	219
Temperatures.....	219
Land use and soils.....	220
2. Disaster Vulnerability.....	221-226
Vulnerability overview.....	221

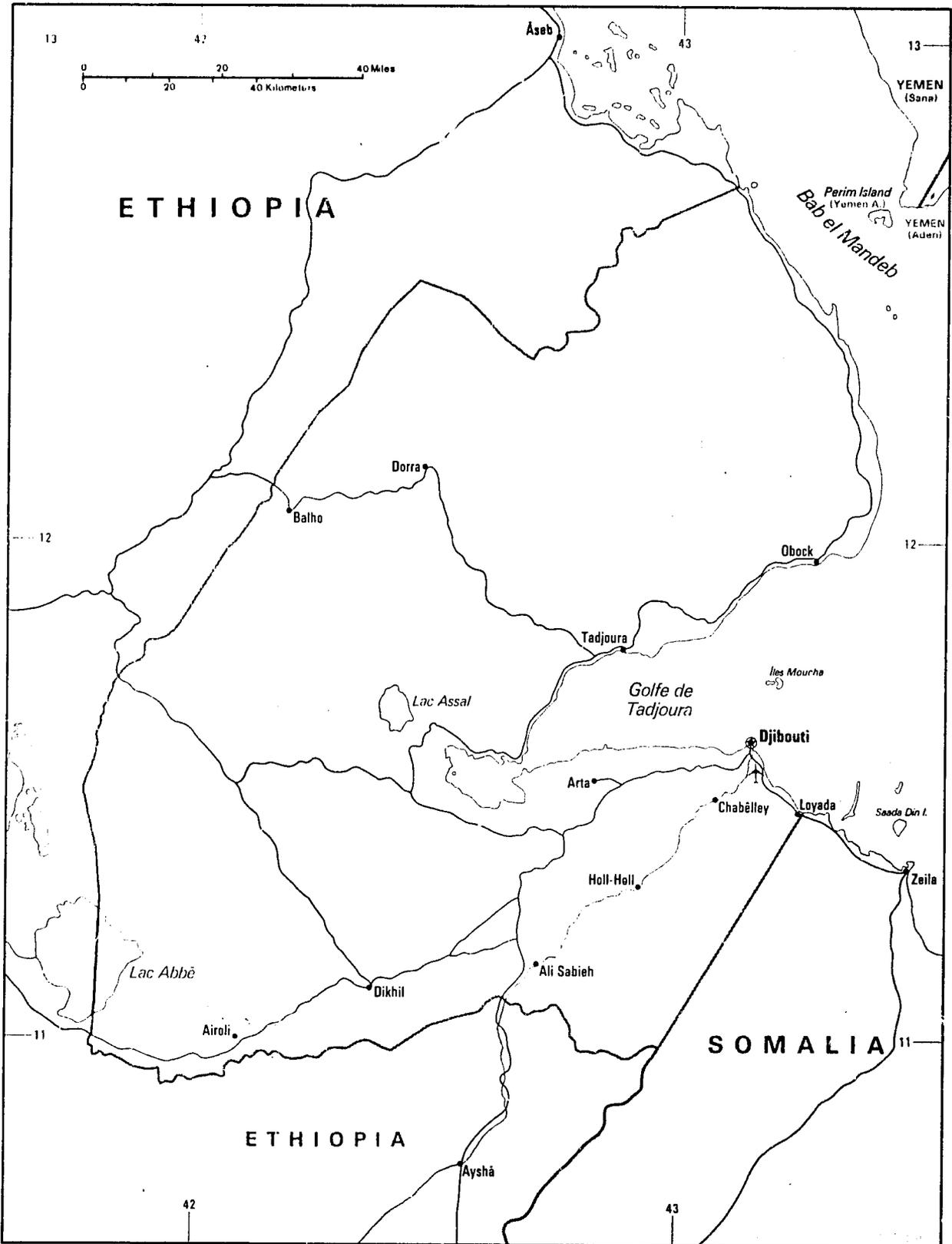
Infestation/pests.....	223
Civil strife/refugees.....	224
Drought.....	225
Floods.....	226
3. Human Ecology.....	227-232
General population statistics.....	227
Density patterns.....	230
Urbanization.....	231
Resettlement.....	231
Ethnic groups.....	232
4. Nutrition.....	233-238
Nutrition overview - mainland.....	233
Nutritional status of Zanzibar.....	235
Diet.....	235
Food programs.....	236
5. Health, Sanitation, and Housing.....	239-247
Vital statistics.....	239
Health overview.....	240
Health care structure.....	241
Health facilities.....	242
Medical supplies.....	243
Health personnel.....	243
Water supply.....	245
Sanitation.....	246
Housing.....	247
6. Disaster Preparedness.....	248-251
Tanzanian national plan.....	248
Tanzania red cross.....	248
US contact.....	248
Voluntary agencies.....	248
7. Agroecconomy.....	252-262
Overview of agriculture.....	252
Current status.....	252
Crops.....	252
Crop dates.....	254
Food chain.....	256
Storage facilities.....	257
Livestock.....	258
Fishing.....	259
Agricultural exports.....	259
Agricultural imports.....	260

8. Industrial Economy.....	263-264
Economic overview.....	263
Imports.....	263
Exports.....	264
9. Transportation and Logistics.....	265-270
Transportation overview.....	265
Road network.....	265
Railways.....	266
Ports.....	266
Shipping.....	269
Inland waterways.....	269
Airports.....	269
Air distances.....	270
10. Power and Communications.....	271-272
Electric power.....	271
Radio.....	271
Telecommunications.....	272
Television.....	272
UGANDA.....	273-315
1. Environment.....	273-279
Overview of environment.....	273
Range and land resources.....	273
Rainfall.....	275
Temperatures.....	276
Waterways.....	277
Mountains.....	278
Land use.....	279
2. Disaster Vulnerability.....	280-282
Economic situation/civil strife.....	280
Drought.....	280
Refugees.....	281
Infestations.....	281
Disaster history.....	282
3. Human Ecology.....	283-284
Population overview.....	283
Distribution of population.....	283
Ethnic and sociocultural groups.....	283
Refugees.....	284

4.	Nutrition.....	285-289
	Diet summary.....	285
	Food preferences by region.....	285
	Nutritional deficiencies.....	287
	Current status.....	287
	Feeding programs.....	288
	US assistance.....	288
5.	Health, Sanitation, and Housing.....	290-293
	Health overview.....	290
	Diseases.....	290
	Folk medicine.....	291
	Vital statistics.....	291
	Health services and facilities.....	291
	Health personnel.....	291
	Housing types and institutions.....	292
6.	Disaster Preparedness.....	294
	Ugandan national plan.....	294
	US contact.....	294
	International organizations.....	294
7.	Agroeconomy.....	295-300
	Agricultural sector summary.....	295
	Coffee.....	295
	Production zones.....	296
	Principal crops.....	297
	Harvest dates.....	298
	Agricultural exports.....	299
	Agricultural imports.....	299
8.	Industrial Economy.....	301-304
	Economic overview.....	301
	Balance of payments.....	302
	Industry.....	302
	Imports.....	303
9.	Transportation and Logistics.....	305-309
	Road network.....	305
	Motor vehicles.....	305
	Surface distances.....	306
	Railways.....	307
	Ports.....	307
	Airports.....	307
	Airlines and air distances.....	308
10.	Energy and Communications.....	310-315

Electric power.....	310
Telecommunications.....	311
Radio network.....	313
Television.....	314
Bibliography.....	316-322

Djibouti



502715 9-77 (542150)
Mercator Projection
Scale 1 1,300,000

Railroad
— Road
Airport

1. Environment

1.1 Landforms

The Republic of Djibouti (ROD) is a small country of about 23,000 sq. km. The hinterland extends only an average of 90 km. beyond and parallel to the coastline which is about 800 km. in length. The landscape may be described as desolate, the terrain volcanic, and its morphology extremely irregular. Volcanic eruptions have produced reliefs which vary from tabular (basalt mountains rising to 1,780 m.) to craggy peaks in the north-east. 89% of Djibouti is barren desert, 10% is pastureland, and less than 1% is cultivated.

1.2 Vegetation

Desert: low lying thorn scrub, some grasses after rain; scattered mimosa, acacia, gum arabic, and small euphorbias.

Valleys: mimosa, acacia, tamarind, euphorbia, and castor-oil plants grow near streams. Some doum and date palms are found in the valley of Gobaad and in the low region north of Ganle.

Mountains: euphorbia, dracaena, jujube, palm, bow-tree, and ficus.

The best grasses are found at higher altitudes where precipitation is greater such as on the southeastern slopes of Mt. Mabilia and in the Gouda range where a succession of vegetation zones are found. The Dal forest, composed of juniper, ficus, and jujube trees (with grass undergrowth) is in the latter range. A plateau region north of Gouda provides grazing after rain fills the wadis. The same is true of Mussali Mt. on the Ethiopian border which affords pasturage only after rains. Grasses are good on the Dakka and Grammare plateaus which reach 1,175 meters and receive an annual average of 200 mm. of rain. On these plateaus the colonial government increased the number of water holes and built dams to increase catchment areas. In the Arta Mountain region, shrubs abound but there is little grass. Some plains areas, such as Hanle and the Gobaad, yield vegetation but tend to be overgrazed. Others are highly saline, making grazing impossible.

Agriculture is possible in the ROD only with irrigation. (See Agroceonomy, section 7.)

1.3 Temperatures

The climate of the ROD is one of the hottest in the world, with the hinterland being somewhat drier than the port region. There are two main seasons dominated by the prevailing winds. From late summer to the end of March, sea winds (the Karma and the Sougoum) bring moisture and rain from the Indian Ocean as well as the year's most comfortable temperatures. Continental winds influence the weather patterns for the remainder of the year. The most extreme heat is experienced during the summer months when, for a period of about 50 days, the sand-laden Khamsin blows from the northwest.

Temperature ranges in Djibouti are as follows: mean daily maximum is 28.7°C. In January to 40.4°C In July (may reach as high as 43.4°C); mean daily minimum is 22.5°C in January to 30.5° in July. Humidity tends to increase with lower temperatures; the relative humidity varies from 43% in July to 80% or higher in January.

1.4 Precipitation

The ROD's scant rainfall is erratic and varies with altitude. Rain falls in the coastal region about 26 days of the year, mostly in March and November, with an annual average of less than 5 inches. Loyada, on the coast east of Djibouti, has the lowest yearly total (86 mm). In mountainous regions, rainfall amounts to an average of 508 mm., often occurring in severe, sudden storms. Sudden, excessive rainfall has at times resulted in disastrous flooding in the port of Djibouti. (See Floods, section 2.1.) Periodic droughts also occur with serious effects on the diet and health of the population. (See Drought, section 2.2.)

<u>Location</u>	<u>Annual Rainfall</u>
Djibouti	130.5 mm. average
Loyada	86 mm. average
Randa (on Mt. Gouda)	227 mm. average
Asseyla (As-Eyla)	256 mm. average
Mt. Mabila	150 - 300 mm. range
Hanle Plain	150 mm. maximum

1.5 Waterways

There are no permanent surface waterways in the ROD; few rivers have water throughout their length even after heavy rains. Three sandy streams,

the Sadal, Adaleyi, and Iboli, are in the Mt. Mabila region, north of Tadjoura. There are a few subterranean rivers, the most important being the Ambouli, which is a source of water for the city of Djibouti.

2. Disaster Vulnerability

2.1 Floods

The rainy season in Djibouti lasts from October to March with short rains in October and November. Normally, the annual rainfall is between 5.1 and 8.1 inches. Sudden heavy rains and abnormally high tides cause serious flooding in coastal areas on the average of once every six or seven years.

Djibouti City, where half the total population lives (est. 150,000), is often inundated by heavy rains due to the virtual absence of storm drains. After the floods in October 1977 and February 1978, which together damaged over 25,000 buildings and an undetermined number of roads, bridges, and electric and telephone wiring, the Government of the Republic of Djibouti (GROD) began discussions with a United Nations team with a view to preventing future flooding by leveling off and filling in flood-prone areas.

2.2 Drought

Since the vast majority of Djibouti's food is imported, periods of drought directly affect the nomadic population (45% of total population) who graze their livestock on the limited areas of pastureland (10% of total land area). However, when the nomads move into towns in search of food, they strain the already limited public services and increase the need for imported food. The failure of rain for two consecutive years resulted in an emergency in the early summer of 1980. Many nomads lost from 50% to 100% of their livestock and became entirely dependent on external aid. Some 20,000 nomads (60% of whom are women and children) are sheltered in temporary camps and are receiving short-term aid from the GROD and international donors. The nomads are being encouraged to return to their land to avoid long-term dependence on external relief.

One major issue in the most recent drought has been the lack of accessible water. Where there is an underground source, the local population has no tools, equipment, or technicians to release the water. The GROD has provided some relief through tanker trucks which distribute water into open drums left by the side of the road, but nomads often have to walk for miles to reach the supply. This measure is also able to help only limited numbers of people. A long-term solution to this problem would involve training local manpower in the use and maintenance of suitable drilling and pumping machinery.

2.3 Refugees

As a neutral country, Djibouti has been a haven for refugees fleeing from the fighting in Ethiopia. An estimated 50,000 (UNHCR figure) refugees are now in Djibouti placing a great burden on the country's fragile environment and economy. Although the GROD has set up relief camps and has been providing some basic supplies, large amounts of food, medicine, and general relief goods are needed from international donors. This situation is likely to continue because Djibouti does not have adequate natural or public resources required to absorb large numbers of people.

People have been fleeing to Djibouti since 1975, and they basically constitute three groups: those of rural origin who have fled the Ogaden and are now concentrated in refugee camps at Dikhil and Ali-Sabieh; refugees from Eritrea now in camps in and around Djibouti City; and an unknown number of unregistered urban refugees living in the capital. The refugees, most of whom are women and children (an estimated 85% of total camp populations) are entirely dependent on imported food for survival. (See Food Programs, section 4.3 and Disaster Preparedness, section 6.)

2.4 Seismicity

Djibouti is in the Red Sea earthquake zone which includes the Somali coast. Two earthquakes occurred in the early 1960's: one in January 1960 caused moderate damage to buildings in Djibouti City and was also felt in Tadjourah and Ali-Sabieh; the other in March 1961 caused slight damage in Djibouti City.

January 4, 1960; Time: 06:16:30.9
Epicenter: 11.6°N - 42.8°E

Major earthquake preceded and followed by numerous shocks, felt strongly on the French Somali Coast, at Arta (11°31'N, 42°50'E); walls were cracked, several native huts of shingles reported to have collapsed; cliffs reported to have broken away in neighborhood of Arta; the shock likewise felt at Djibouti, Tadjourah, and Ali-Sabieh. Series of shocks began on 31 December 1959; the meteorological service at Djibouti recorded 35 shocks during January 1960; most of these were also recorded by the observatory at Addis Ababa.

March 11, 1961; Time: 08:41:03.6
Epicenter: 11.7°N - 43.0°E

French Somali Coast; intensity VI-VII at Djibouti City (slight damage); felt also at Tadjourah, Ali-Sabieh and Dikhil; several aftershocks.

2.5 Disaster HistorySummary Disaster History

<u>Disaster</u>	<u>Strike Date</u>	<u>Location</u>	<u>No. Killed</u>	<u>No. Affected</u>
Flood	10/24/77	Djibouti City	0	85,000
Flood	2/00/77	Djibouti City	0	100,000
Train Wreck	11/08/79	near Holl-Holl	60	82
Drought	:280-81	Nationwide	n.a.	130,000

Source: Disaster History on file at OFDA in Washington, D.C. Covers 1965 to present.

3. Human Ecology

3.1 General Population

Statistical data concerning population numbers must be considered approximate at best. Fluctuations occur in large part because of the nomadic habits of many of the ROD's people and because of extensive migration. In their search for water and pasture, nomadic tribes show little respect for national boundaries and may cross frontiers of countries where related tribes live. From its earliest years, Djibouti has also attracted foreigners because of apparent port and railroad employment opportunities. The greatest number of immigrants have been impoverished Somalis from several different tribes who have entered the country across the southern border. The lack of natural obstacles on that frontier has made it almost impossible to control the movement of people across it.

The most recent World Bank estimate puts the total population at 310,000 (1978). Approximately 50% of the population lives in urban areas, of which Djibouti City accounts for 90%. Other urban areas are Obock, Tadjourah, Ambouli, Ali-Sableh, and Dikhil. The rest of the population consists of nomadic tribes scattered throughout the country wherever sufficient vegetation permits herds to graze. Population density per sq. km.: 9.8; average annual growth rate: 2.3% (1976-78).

3.2 Ethnic Groups

Two major ethnic groups, both Hamitic, inhabit the ROD. Issas and related Somali tribes are the numerical majority, representing 50% of the population, while the Afars (Danakil), with ethnic ties to tribes in Ethiopia, make up approximately 40%.

In the tribal hierarchy, Afars come under one of three sultanates: Rohayto, Aoussa, and Tadjourana, with only the latter being wholly in the ROD. The two major Afar groups, the Adoyamara (the "white people" or commoners) and the Assayamara (the "red people" or nobles) have generally intermingled and both have a strong sense of Afar solidarity. The several tribes are subdivided into numerous factions (made up of a number of related families), with authority based on a rigid hierarchy which assigns to each chieftancy an accepted place in society based on seniority and numbers. The Afars inhabit about three-quarters of the republic in northern and western areas.

The Issas of the Dir Somali clan are divided into three main groups: the Abgals, Dalois, and Wardigs, who are further divided into subtribes. The supreme chief of the Issas, the Ougaz, is chosen from the latter group, which lives mostly outside the ROD. The Dalois are considered superior to the Abgals because of genealogical seniority, but this seems to have little effect on their mutual relationship. While there is no rigid hierarchy in Issa society, there is a pariah caste, called by the generic term sab, whose dialect differs from pure Somali and whose occupations are the most menial (blacksmiths, hunters, and potters). Strongly adhering to tradition, the Issas feel closely related to other Somalis within and outside the ROD.

The Issas are concentrated in the southwest and in the southeastern section which borders on Somalia, and which includes the capital city of Djibouti. Alien Somali tribes represented in the ROD are the Issas, Darods, and Gadaboursis.

Both major ethnic groups are nomadic, but some urbanization has occurred, especially among the Issas. Arabs (the majority originally from Yemen), mostly urban dwellers, make up about 6% of the population, but have had a disproportionate political influence in the past because of their wealth. Afars and Issas have resented the Arabs' power but, because of a common religion, they have great respect for Arab culture. Europeans (the majority of whom are French, including over 4,000 members of the military still in the ROD) comprise about 4% of the population.

3.3 Refugees

See Refugees, section 2.3; Food Programs, section 4.3; and Disaster Preparedness, section 6.

4. Nutrition

4.1 Overview

Subsistence nutrition is generally the norm in Djibouti. Iron and vitamin deficiencies are common, especially in children and women of child-bearing age. The cost of food is high and consumption of khat (an expensive non-nutritive stimulant), which dulls the appetite, is thought to be a significant factor in malnutrition. Nomads' food supply is precarious, dependent upon sufficient rainfall to promote growth of vegetation. Periods of drought seriously limit indigenous food production. (See Drought, section 2.2.)

The diet of nomads in the hinterland consists of milk, durra, ghee, and sheep's tail. Occasionally goat, sheep or camel meat, dates, cereals, and corn are eaten. The sedentary poor, including sedentary cultivators and those on the fringes of the cities (possibly the most malnourished group) subsist on corn, durra, and beans which they may grow, and purchased sugar, vegetable oils or ghee. All food available in urban areas is imported.

The widespread consumption of khat has long been recognized as a serious threat to good nutrition, health, and individual productivity. Khat leaves, which must be used fresh, are imported from Ethiopia, largely by air freight. Cathine, the active ingredient, acts as a stimulant and appetite depressant. High levels of consumption may result in motor and physical disorders, as well as insufficient nutrient intake due to reduced appetite.

4.2 Staple Foods

Starches: durra (sorghum durra), a type of millet, is a staple of the nomads' diet; eaten in porridge or pancake form. Rice, corn, beans also eaten.

Meat: goat, mutton or camel eaten on rare occasions by nomads. Pork is not eaten.

Milk: from goats, sheep, cattle, and camels. A staple in the diet of the nomads, it is drunk in large quantities when pasturage is good. May be used soured.

Fat: ghee and sheep's tail used by nomads. Vegetable oil may be used by sedentary population.

Fish: eaten only by coastal groups and by urban population. Islamic prohibition against consumption of shellfish.

Vegetables: corn, red pepper, green vegetables, tomatoes, and onions consumed by town dwellers.

Fruit: dates when available; melons are grown in Ambouli gardens.

Beverages: milk, tea, coffee.

4.3 Food Programs

P.L. 480, Title II

P.L. 480, Title II food assistance is directed toward alleviating nutritional deficiencies of the most vulnerable groups in Djibouti—mothers, children, refugees, and the unemployed. The Title II program, operated by Catholic Relief Services (CRS) and assisted by the Djibouti National Office for Refugees (ONARS), is divided into four separate programs: Mother-child health, school-feeding, Food-for-Work, and refugee and welfare recipients. CRS also ensures that adequate storage facilities exist for the food and that transportation is available for its distribution. Commodities provided are rice, vegetable oil, milk powder, and soy-fortified sorghum grits.

P.L. 480, Title II Recipients, FY 1981

MCH - mother	10,000
MCH - child	15,000
School-feeding	4,500
Food-for-Work: workers	2,000
Food-for-Work: dependents	6,000
Refugees and welfare	20,000
Total	57,500

Source: USAID, Annual Budget Submission FY 82, Djibouti.

Mother-child health program:

Malnutrition among preschool children is widespread and the World Health Organization (WHO) estimates that the infant mortality rate is 50%, largely due to a chronic lack of food in the country. The population for ages 0 to 4 years was estimated by WHO (April 1979 report) at 45,480 of which 30,915 are in Djibouti City.

The FY 1980 program started with 4 centers in Djibouti; however only 8% of the eligible children could be admitted to the program. The proposed plan for FY 1981 calls for the expansion of the program in Djibouti District and the opening of 14 new centers in Ali-Sabieh, Dikhil, Tadjourah, Tadjourah, and Obock districts. Distribution will be carried out at health centers in each district. The centers have been selected by CRS and ONARS on the basis of need, storage capacity, the availability of trained personnel, and proximity to transport facilities.

School-feeding program:

An estimated 18,000 children are enrolled in Djibouti's primary schools for the 1980/81 school year (14,000 in Djibouti City and 4,000 in rural schools). The CRS-sponsored Title II food is distributed to 22 schools in the 5 districts. The total number of recipients is 4,500.

Food-for-Work program:

Multi-donor food-for-work programs were begun in the refugee camps at Dikhil and Ali-Sabieh in April 1979. Refugees are building their own housing units (traditionally called toukoul) under the supervision of French peace corps volunteers (l'Association Francaise les Volonteers). Local material (rock) is being utilized along with roofing, wood, and cement furnished by the UNHCR. All labor is done free. Upon completion of a unit workers receive P.L. 480 II rations. Each unit contains 4 rooms (7m. x 8m.) and accommodates 4 families. At Dikhil 8 units have been completed and at Ali-Sabieh 60 units. UNHCR plans call for 1,125 units.

Another Food-for-Work activity is a pilot gardening project at Mouloud where some 100 refugee families are settled. To date 15 ha. of land have been cultivated (sorghum, tomatoes, melons). Workers maintain the plots, dig irrigation ditches, and build their housing. Plans call for extending the cultivated land by 10 ha.

Refugees:

Title II food distributions are limited to official refugee sites sanctioned by the GROD and the UNHCR (refugee camps in Ali-Sabieh, Dikhil, and Djibouti City). ONARS maintains district warehouses with capacities of 100 MT each. Donor food and supplies are transported by truck from Djibouti City to these warehouses and then to the refugee camps on a monthly basis. (See also Refugees, section 2.3 and Disaster Preparedness, section 6.)

CRS retains control and final say over the distribution of the Title II foods that it sponsors in Djibouti. Although local agencies like ONARS and the Ministry of Health handle CRS-sponsored commodities at the various

points in the delivery and distribution process, the ultimate responsibility for the control of these commodities remains with CRS. For additional information on refugee-related assistance see Disaster Preparedness, section 6.

4.4 Acceptable Alternatives

All foods distributed by CRS through the P.L. 480, Title II program (rice, soy-fortified sorghum grits, vegetable oil, and non-fat dried milk) have been distributed by other donors and have been well received by both the refugee and national populations.

5. Health, Sanitation, and Housing

5.1 Overall Health Status

Tuberculosis is widespread and the most serious public health problem in the ROD. Pulmonary tuberculosis predominates. Chronic malnutrition and unsanitary living conditions contribute to the high morbidity and mortality rates of TB and other diseases. Control is difficult because of constant introduction of the disease by people crossing the borders from Ethiopia and Somalia.

Enteric diseases are endemic, with bacillary dysentery the most common. Childhood diseases (whooping cough, chicken pox, measles, and mumps) are common communicable infections. The incidence of venereal disease is high with gonococcal infections predominating. Skin and eye disorders are widespread. A severe conjunctivitis frequently results from trauma to the eye caused by the sandy winds of the summer monsoons. Heat and aridity, as well as vitamin deficiency and hypoproteinemia, appear to play a role in the cause of another eye condition, Bietta's disease, which is a common degenerative pathology of the cornea frequently seen in Djibouti.

Malaria is not endemic, probably because of a well executed program of mosquito control. However, cases are frequently seen in new arrivals from Ethiopia and Somalia. Filariasis and dengue fever, which have been observed in the ROD, appear not to constitute a significant health problem. A polio vaccination campaign carried out by the GROD with vaccine purchased from the Pasteur Institute in France depends on continued funding.

Other reported diseases include: leprosy, meningococcal infections, infectious hepatitis, tetanus, scarlet fever, and typhoid.

5.2 Vital Statistics (1976)

Birth rate/1000 population	48-49 *
Death rate/1000 population	20-27 *
Infant mortality/1000 live births	n.a.
Life expectancy	n.a.

* Projected estimates

Source: U.S. Bureau of the Census. World Population, 1977.

5.3 Health Services and Facilities

Djibouti has one general government-supported hospital (Peltier) in Djibouti City. Lacking equipment and sometimes drugs, it provides free treatment for the poor and unemployed. The European civilian population receives private health care while many working Djiboutis are covered by an organization called SMI which is similar to a health care organization.

Medical facilities have been concentrated in the city of Djibouti but in 1962 the government attempted to further decentralize services by establishing clinics in areas more easily accessible to the rural population. In addition to the clinics already in the hinterland cercles (i.e., Obock, Tadjourna, Ali-Sabieh, and Dikhil), medical posts or first-aid stations were set up in Yoboki, As Eyla, Hall-Hall, Dorra, and Randa.

A para-medical team working in the border station of Guelele, examines and vaccinates new arrivals from the war zones in Ethiopia. A border patrol and male nurses in outlying dispensaries handle the task of surveillance of possible smallpox cases in people coming into the ROD. However, remote districts in the north are not well covered.

5.4 Health Personnel

Estimates of the number of physicians range from 35 to 52. Most are French trained; a few are Djiboutis trained in other countries. Physician estimates include military doctors and those in private practice as well as doctors in public health service, including a Director of Public Health.

Distribution by type of medical personnel (1975):

Physicians:	52
Dentists:	6
Dental Technicians:	3
Pharmacists:	6
Pharmaceutical Assistants:	6
Veterinarians:	2
Veterinary Assistants:	20
Midwives:	4
Traditional Birth Attendants:	19
Nurses:	137
Assistant Nurses:	102
Nursing Auxiliaries:	193
Physiotherapists:	1
Medical Laboratory Technicians:	7

Medical Laboratory Assistants:	11
Medical Radiological Technicians:	3
X-Ray Assistant Technicians:	5
Auxiliary Sanitarians:	91
Other Health Auxiliaries:	287

5.5 Sanitation

There is no central sewage collection and treatment facility. Some modern houses have cesspools, but they must be periodically pumped out and there is no way to safely dispose of the contents (i.e., there are no provisions for sewage decontamination or conversion into fertilizer); other houses have shallow latrines. Contamination of water supplies in all areas of the ROD is a constant threat, although the water supply in the city of Djibouti is treated by chlorination and presently appears to be safe for consumption.

5.6 Rural Housing

Nomads (both Afars and Issas) live in portable "bee-hive" huts. They can be easily built and dismantled, and consist typically of an armature of boughs over which palm-leaf mats or skins are stretched. The matting is bound to the frame with thick cord which is also used to bind it to a camel pack when being transported.

A more permanent form of housing is found among the Afars in the high regions of the Gouda and Mabilia mountains. There the dabou, made of large stones held together with earth and covered with mats and rubble thrown over thorn scrub, serves as a dwelling for tribesmen who live a sedentary existence part of the year.

5.7 Urban Housing

Housing of the urban poor is extremely inadequate. One and two room shanties provide housing in the native quarter of Djibouti known as the Magala. The section has expanded rapidly along with population growth of the city. Projects of the colonial government provided some improved dwellings, but they fell far short of meeting housing needs. Refugees who have recently settled in Djibouti are housed in makeshift shacks constructed of burlap, cardboard, and scrap lumber, adding to the already serious overcrowding and poor sanitary conditions.

6. Disaster Preparedness

6.1 Host Disaster Plan

As a result of the refugee situation, the GROD has established the National Office for Refugee Assistance (ONARS) to plan and implement emergency assistance and related rehabilitation and development programs. A special officer for refugee affairs has been appointed by the government and refugee needs appear to receive a high priority, both in the capital and in the field. However, the country can not sustain such support operations without continued external assistance. ONARS receives less than \$100,000 annually from the GROD for administration support and this amount falls far short of the total financial needs of the organization. Port congestion and inadequate handling facilities have also slowed some relief activities. In case of floods, the national army, the police, and most civil servants are mobilized to assist in relief activities.

6.2 Host Contacts

Office National d'Assistance aux Refugies et aux Sinistres (ONARS)
Ali Malow, Director
B.P. 55, Djibouti
Administers refugee camps; provides warehousing and transportation for relief supplies.

Ministere de la Sante Publique et des Affaires Sociales
B.P. 296, Djibouti
Administers health centers where food assistance is distributed.

Ministere de l'Education Nationale
B.P. 16, Djibouti
Administers primary schools where food assistance is distributed.

6.3 US Mission Plan

There is no Mission Plan. At present, the Ambassador makes the determination that a disaster situation exists and exercises his disaster relief authority in expenditure of funds allotted for emergencies.

USAID is involved in two projects in Djibouti that are related to disaster preparedness. One is the installation of a Growth Surveillance System for measuring both food deficiencies and the impact of food aid, particularly in the most vulnerable group: mothers and children. The other is a remote sensing program which will be able to evaluate the natural resource base and aid in decisions on future agriculture and livestock development.

6.4 US Contact

US Embassy, Villa Plateau du Serpent Blvd.
Marechal Joffre; B.P. 85
Tel: 35-38-49, 35-39-95, 35-29-16/17
Telex: 5873DJ AMEMB
Workweek: Sunday-Thursday 0600-1300
MDRO: E. Amundson, Acting AID Affairs Officer

6.5 Food Supplies

The following kinds of food have been made available by the USG, International agencies, and the GROD in recent emergency situations (care of refugees): Durra, rice, soy-fortified sorghum grits, vegetable oil, sugar, tea, tomato paste, dried skimmed milk, wheat, canned fish, and canned meat.

Much of the donor food assistance to Djibouti is sporadic and often provided depending upon availability rather than to meet a precise need. Exceptions are routine supplies of CARITAS and Red Cross foods for orphanages, UNHCR supplemental rations to refugees, and a recent WFP provision of 65 MT of grain to alleviate food deficits for nomads as a result of the prolonged drought.

6.6 Storage Facilities

ONARS stores food commodities donated by the UNHCR, WFP, and CRS in a single warehousing unit in the capital city's industrial zone. In May 1980 CRS rented an additional warehouse for separate storage of all Title II foods. The repair or construction of small storage facilities at distribution centers is planned.

6.7 Transportation

Transport in the city and in some rural areas (of the southern interior) can be carried out by transit agencies, although this type of operation has proved slow, costly, and sometimes unreliable for food donors in the past. The Djibouti-Addis railroad can be used to ship foods to Ali-Sabieh and Dikhil; but this also is a very time consuming operation. CRS has provided logistical support to ONARS in the form of medium-weight trucks for the purpose of transporting CRS-sponsored foods to both rural and urban areas.

6.8 Voluntary Agencies

Catholic Relief Services (CRS), under contract to the USG, manages the Title II, P.L. 480 commodity assistance in conjunction with ONARS. CRS is also in charge of USG-funded refugee relief. (See Food Programs, section 4.3.)

Laurence J. Bourassa, Program Director
Catholic Relief Services - USCC
B.P. 1975, Djibouti

Support Staff:

Tahirou Diao
Francoise Diao
Hussein Ali Ahmed
Mehta Vimalkumar
Kadra Mahmoud
Ibrahim Ghaleb

Program Assistant
Food/Nutrition Supervisor
Administrative Aid
Accountant
Secretary
Driver/Messenger

7. Agroecconomy

7.1 Overview of Agriculture

Djibouti has few natural or human resources. The aridity and sterility of the soil (about 90% of total area is desert) and the nomad's aversion to farming result in little cultivation. Production is limited to dates, some green vegetables, tomatoes, and fruits grown at oases and sold in the city of Djibouti to supplement imported foodstuffs. Cultivation is limited to the relatively cool months between November and May. Approximately 95% of the country's food needs are imported, including all its food grains and most of its animal protein. Due to the almost total dependence on food imports, Djibouti often becomes the victim of regional, natural, and man-made disasters. Disruption of the food supply chain in surrounding countries (Ethiopia and Somalia) exerts pressure on the Djibouti populace. Traditionally, the majority of the country's food was imported by rail from Ethiopia; however, the fighting in Eritrea and the Ogaden has severely limited this source and the GROD has been forced to seek other suppliers, mainly Kenya and France.

7.2 Livestock Raising

The nomadic pastoralists, who are not animal breeders in the Western sense, are herders of livestock. Living largely outside the cash economy, they regard their animals as the main source of wealth and food. Their principal food, milk, as well as butter and occasionally meat, is obtained from their herds. Water and pastureland govern the nomads' choice of encampment. Treks are dictated by custom; migration time is determined by abundance of rainfall.

Since cattle require good grasses, they are found only in the best grazing areas, such as the Gobaad Plain and the mountain ranges of Gouda and Mabilia. Camels, goats, and sheep are found throughout non-desert areas wherever drought-resistant plants provide grazing.

The Animal Husbandry Service provides meat inspection services and programs to vaccinate and protect animals against parasites. The inaccessibility of herds has hampered efforts of the too few veterinarians.

Estimates of numbers of animals as of 1977: 18,000 cattle; 98,000 sheep; 585,000 goats; 3,000 asses; 25,000 camels.

7.3 Current Status (1981)

The effects of the drought of the last two years and of the conflict in Ethiopia will continue to be felt in 1981. An estimated 152,000 people, including 22,000 located in ad hoc camps, require emergency food assistance. In 1981, approximately 45,000 people will be in relief camps. Total emergency food requirements for 1981 are estimated at 9,750 tons of rice, 11,580 tons of sorghum/durra, 1,687 tons of edible oil, 2,796 tons of sugar, 2,931 tons of milk, 428 tons of sardines, 332 tons of tomato paste, 418 tons of dates, 105 tons of tea, 60 tons of salt, and 600 tons of infant food.

Total cereal import requirements (including above emergency needs) for 1981 are estimated at 60,000 tons, an increase of about 10,000 tons from 1980. Aid pledged so far totals 1,000 tons.

Estimated Import Requirements in 1981, (as of mid-November, 1980)
(thousand tons)

<u>Cereal & Sources of supplies</u>	<u>Total Requirements</u>	<u>Commercial Purchases</u>	<u>Food Aid Allocated, Committed, or Shipped</u>
<u>Wheat</u>			
Germany, F.R.	30.0	0.0	1.0
<u>Rice</u>	20.0	0.0	0.0
<u>Coarse Grains</u>	10.0	0.0	0.0
<u>Total</u>	60.0	0.0	1.0

8. Industrial Economy

8.1 Overview of Economy

Djibouti is one of the poorest countries in the world. With scarce natural resources, few industries, and little potential for agriculture, the economy is based almost entirely on the port of Djibouti and the railway line linking the port with Addis Ababa. This has made the ROD particularly vulnerable because the basis for its prosperity can be so easily affected by external circumstances. The closing of the Suez Canal from 1967 to 1975 caused a drastic reduction in port activity from which it has never fully recovered. Growing competition in recent years from other Red Sea ports-- Massawa, Assab, Aden, and Jeddah--has resulted in lower volumes of trade and less use of fuel facilities in Djibouti.

The ROD has virtually no industry. Aside from shiprepair and rail and vehicle workshops, the only facilities are a Coca-Cola and a Pepsi-Cola bottling plant, two abattoirs and meat processing plants, and a liquid oxygen plant. Reserves of geothermal energy were discovered in 1975 at a depth of 1,137 meters near Djibouti, but efforts to exploit them were later abandoned. The economy is thus based almost entirely on services, primarily connected with trade and with secondary labor markets in administration, construction, the military, health, and education.

Migration of indigenous, unskilled nomads to Djibouti in search of temporary employment as well as a large influx of foreign laborers (mostly Somalis) has created a high urban unemployment rate (possibly 50%) in a city where employment opportunities generally depend on the amount of port activity.

Livestock raising, fishing, and some agriculture are the main occupations of the rural population and constitute the traditional economic sector. There is some fishing in waters off Obock and Tadjourah, and a greater amount off Djibouti where a market exists among townspeople and passing ships. Despite small scale and rudimentary methods of operation, the present fishing industry has potential for expansion given better equipment and increased manpower.

8.2 Imports

About 60% of Ethiopia's imports come through the port of Djibouti, including manufactured goods and fuel. In the ROD almost all domestically used goods must be imported. These consist of iron, steel and metal work,

motorcars, trucks and spare parts, petroleum products, flour, timber, coal, sugar, cotton textiles, and cement. Major suppliers include France, Ethiopia, the UK, Japan, and Kenya.

With imports consistently and significantly exceeding exports, the country runs a permanent trade deficit. The unfavorable balance of trade has been offset only partially by invisible earnings such as harbor dues, transit taxes, and railway profits.

8.3 Exports

40% of Ethiopia's exports are handled by the port of Djibouti and include coffee, hides, wax, oilseeds, vegetables, and fruit. Indigenous exports are limited mainly to ship supplies and skins and hides. France is the principal export destination.

9. Transportation and Logistics

9.1 Road Network

The road network, approximately 1,650 km. in total length, consists of about 90 km. of paved roads with the remainder being pistes (tracks), 800 km. of which can be used only by trucks and jeeps during the dry season. The streets of Djibouti, including an extension to Ambouli and the airport, and the 40 km. road from the capital to the Arta hill section are paved. The road leading from Djibouti to the southern frontier at Loyada has a crushed stone surface.

A system of improved roads in the south connects Djibouti with Ali-Sabieh and Dikhil. At Dikhil the road divides; one branch leads to As-Eyla and the other to Garbes and Yoboki. Recent construction beyond Yokobi has extended the track to connect with the Addis Ababa-Assab highway in Ethiopia. In the north, a track goes from Tadjoura inland to Dorra, and a recently constructed section of coastal road north of Obock completes the connection between Assab and Djibouti, by way of Maulhoule, Obock, and Tadjourah. The distance between Djibouti and Tadjourah by this route is approximately 300 km. (It is 40 km. by ferry across the Gulf of Tadjourah.)

Roads are costly to construct and maintain because of damage from tornadoes and rainfall. Regardless of classification, they should be attempted with caution, as even "improved" roads may be barely passable.

9.2 Distances *

Djibouti to:	Arta	40 km.
	Lake Assab	100 km.
	Tadjoura	300 km.
	Zella (in Somalia)	65 km.

* These figures are approximations.

9.3 Railroad

There is only one railroad which is part of the line connecting Djibouti with the Ethiopian capital of Addis Ababa. The railway has a total length of 784 km. of which only about 100 km. lie in the ROD. It is a single track line of 1 meter gauge. The last station in the ROD is at Ali-Sabieh, about 89 km. from Djibouti.

The railway carries passengers as well as freight, and provides service several times weekly.

9.4 Ports

Djibouti, the only port in the ROD, has two important kinds of trade: transit trade with Ethiopia and a transshipment, victualing, and bunkering trade.

Most of Ethiopia's foreign trade (an estimated 60% of imports and 40% of exports) passes through the port of Djibouti. After the 1952 federation of Eritrea with Ethiopia, an alternate route opened up for Ethiopia's trade via highway and truck to the port of Assab. Despite this competition, Djibouti has maintained an attitude of cooperation with Ethiopia and thus has kept a consistently large share of the latter's transit trade.

Not wishing to be entirely dependent on an uncertain Ethiopian transit trade, authorities began expansion of other port activities. Djibouti also serves as a storage and distribution center in the transshipment of merchandise to other ports. Handling goods in transit, including Ethiopian trade, represents about one-fourth of the port's traffic. Greatest expansion has been in the victualing and bunkering trade for ships making Djibouti a port of call. Petroleum products amount to about 1.2 million tons annually, while there is a small trade in water and ice.

The harbor consists of a roadstead outer harbor and an inner harbor. The inner harbor is well protected; the roadstead is partially protected by reefs and the configuration of the land. There are no restrictions on imports into Djibouti because the country was established as a free zone in 1949. Port dues are charged for loading and discharging services and for the use of the port's installations. It employs about 450 people in addition to 2,000 dockers; its annual handling capacity is in excess of 2 million metric tons.

9.5 Airports

The ROD has one international airport in Djibouti and six smaller airfields. Only Djibouti/Ambouli Airport, which is located 5 km. south of the city, is capable of handling all equipment in use by the six international airlines serving the country and by the national airline, Air Djibouti. There are also a few landing strips which can be used by military planes in an emergency.

9.6 Airlines

Air Djibouti B.P. 505, rue Marchand; internal flights to six major centers (including: Obock, Ali-Sabieh, Dikhil, Tadjoura and Randa) and services to Ethiopia, the Yemen Arab Republic, the People's Democratic Republic of Yemen, Somalia, Saudi Arabia, and Egypt.

Djibouti is served by the following foreign airlines: Air France, Air Madagascar, Democratic Yemen Airlines, Ethiopian Airlines, Somali Airlines and Yemen Airways Corporation.

9.7 Air Distances

From Djibouti (Ambouli) to:	Statute <u>Miles</u>
Cairo	1489
Houston (via Cairo, Rome, NYC)	8519
Miami (via Cairo, Athens, Madrid)	8067
New Orleans (via Cairo, Rome, NYC)	8269
New York (via Cairo, Rome)	7098
Rome (via Cairo)	2818

10. Energy and Communications

10.1 Electric Power

A thermo-electric power plant built in Djibouti in 1954 was taken over by Electricite de Djibouti in 1960. Another station is reported to be in operation now. Small generating plants were installed at Arta, Tadjourah, and Dikhil in the early 1960's. Geothermal reserves may hold potential as an indigenous source of power which the country has lacked, having been entirely dependent on imported fuel oil. In 1977, the ROD had a 23,500 kW capacity. Production was 55 million kWh (310 kWh per capita).

10.2 Radio Network

There is one AM station; no FM. An estimated 30,000 radio sets were in use in 1977. Nomad groups are reported to possess transistor radio receiving sets.

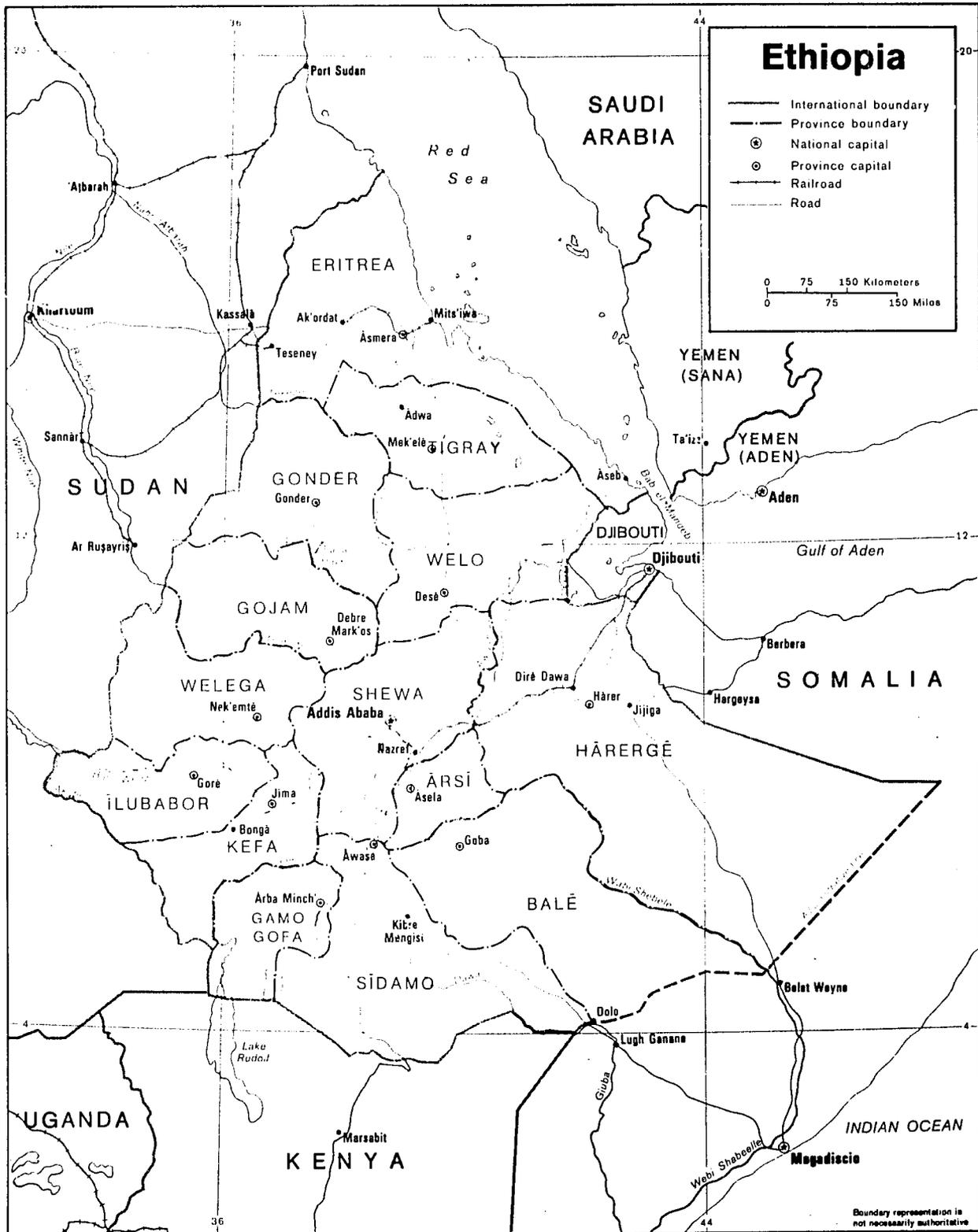
Radiodiffusion - Television de Djibouti (RTD): B.P. 97 Djibouti. Daily broadcasts of 17 hours of radio in French, Afar, Somali, and Arabic reach East Africa and the Arabian peninsula.

10.3 Telephone System

There are an estimated 3,600 telephones in use, a Telex, and a telegraph system (International Telephone and Telegraph is described as generally reliable). In addition there are several (5 in 1975) major transmitters in use for ships at sea.

10.4 Television

There is one television station in Djibouti City which broadcasts five hours a day. There are an estimated 10,000 TV sets.



1. Environment

1.1 Physical Geography

With a total area of 1.2 million sq. km. (472,000 sq. mi.), Ethiopia occupies a major portion of Africa's easternmost landmass known as the Horn of Africa. From its northern apex at 18° north latitude to its southern border at 3°30' north latitude, Ethiopia measures 900 miles; the east-west axis between 33° and 48° east longitude is approximately the same distance.

Three distinct geographical regions can be distinguished:

- (1) Ethiopian Plateau - a highland mass comprising most of the country which forms the most extensive upland area of the entire African continent. Elevations in the north are commonly 2,400-2,700 m., but rise to 4,300-4,600 m. in higher peaks; elevations in the south are lower. The plateau has 2 distinct sub-regions: the rugged High plateau bisected by the Great Rift Valley, and the more level Somali plateau.
 - (a) North of Addis Ababa, the High plateau is known as the Central or Amhara plateau; it embraces 6 of 14 provinces and 3 of the most populated districts of Eritrea. The High plateau inclines toward the west and northwest, then descends near the Sudan border. Its physiography varies from deep chasms to high mountains, including the Chercher, Aranna and Chelalo ranges. South of Addis Ababa the plateau is also rugged but of a lower elevation; most Ethiopian coffee is grown in this region. East and west sections of the High plateau are mirror images, separated by the Great Rift Valley; both are fertile areas with patches of forests and both are densely populated.
 - (b) Somali plateau begins in the southeast of the Ahmar and Mendebo mountain ranges. The plateau is flat, arid, rocky, and sparsely populated, inhabited mostly by nomadic Somali.
- (2) Great Rift Valley - the most extensive fault on the earth's surface, extending from the Jordan Valley to the Zambezi River in Mozambique, a total of 50° latitude. In Ethiopia, the Rift Valley is bordered by the Danakil Depression in the north. To the south the Rift becomes a deep trench slicing the Central plateau from north to south; averages 40-60 km in width. North of Addis Ababa, the western wall of the Valley turns north, running parallel to the west coast of Arabia, leaving a wide

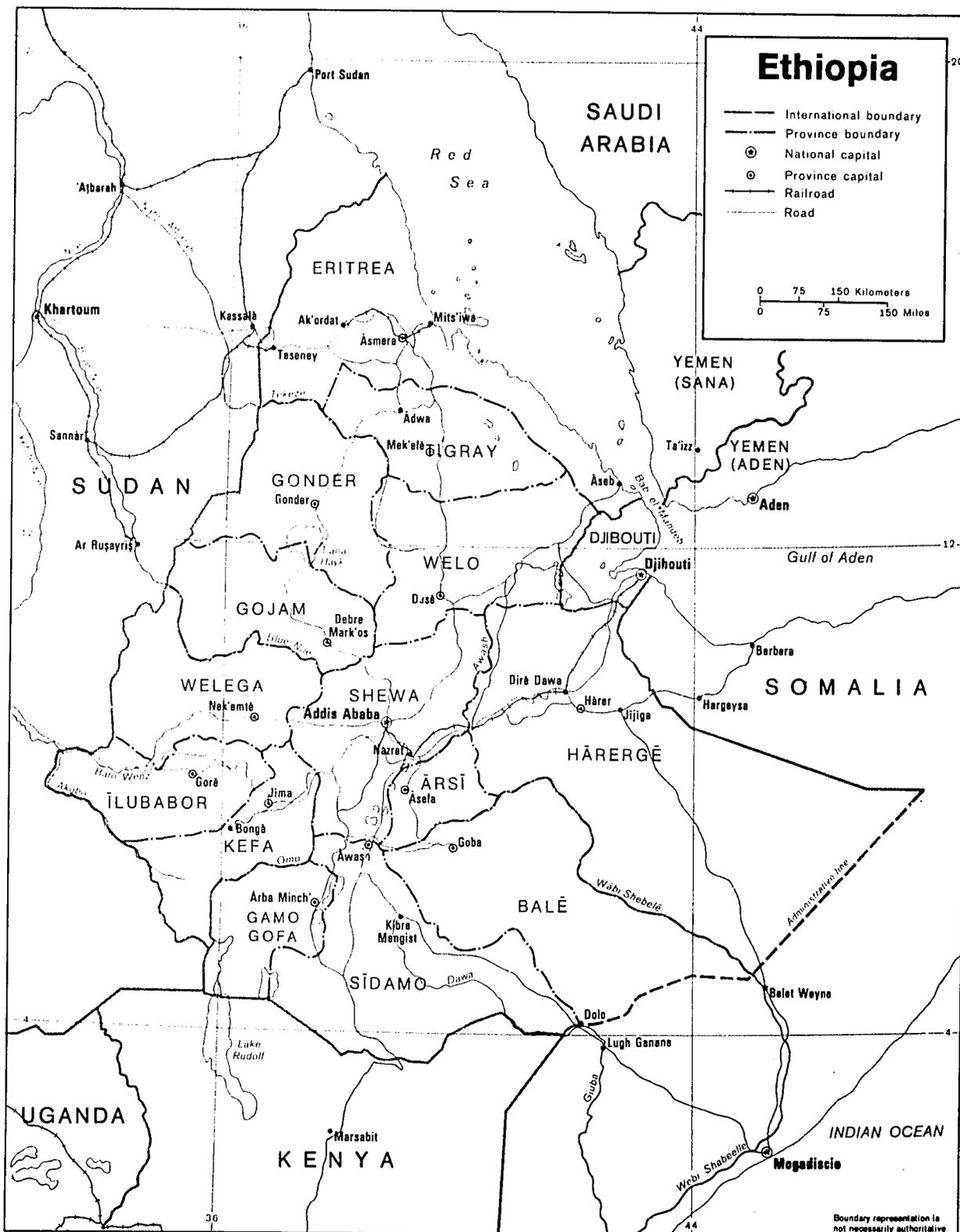
plain between the escarpment and the Red Sea coast. The latter gradually narrows until, north of Massawa, the foothills of the escarpment are almost on the coastline. The eastern wall of the Valley turns east in the latitude of Addis Ababa, forming an escarpment looking north over the Danakil Plains; the escarpment is abrupt, commanding an extensive view of the lowlands 1,000 m. below. The southern half of the Valley is dotted by large salt and fresh water lakes. The valley floor at its southern border is 600 m. above sea level; near Addis Ababa 1,800 m. above sea level.

- (3) Lowlands - rugged terrain surrounding the highland mass. In the north, the Great Rift Valley broadens into the saline Danakil Plains, the land of the semi-nomadic Afar. Within the Plains is the Danakil Depression, 116 m. below sea level in places and said to be the hottest place on earth. East of the Depression, the Red Sea Mountains parallel the coast; elevations rise to 2,040 m. in the south. North of the Depression, the Danakil Alps border a 16-24 km. wide hot, arid, treeless coastal strip. In the west of Ethiopia are small, diverse segments of the Sudan Plains. Some segments are tropical lowlands, politically part of Ethiopia, but inhabited by people related to the Sudanese.

1.2 Soils

Decomposition of volcanic rocks over most of the High plateau has produced reddish brown clay soils and black cotton soils; although deficient in phosphorous, good crops are still grown on these soils. However, in densely populated areas, soil erosion has been severe; extremely serious in Tigre and Eritrea provinces. Heavy seasonal rainfall and denuding of natural forest cover are other causes of soil erosion. It is estimated that one billion tons of topsoil (60,000 hectares one foot deep) wash away annually.

For Ethiopian farmers, the most common distinctions to be drawn in their environment are not simply between fertile and infertile areas, but between agricultural highlands and agricultural lowlands. Differences in altitude mean differences in both precipitation and temperature. Above the height of approximately 2,400 m., barley and wheat are the common crops. At an intermediate level, down to some 1,700 m., the preferred crop of teff (*eragrostis*) is grown, a very small grain millet which is only eaten in Ethiopia. At this altitude sorghum and maize are also important crops, and these become paramount in the lowest agricultural areas, down to some 1,500 m., where teff will not grow well. These areas might be described as "marginal" in that their increased exploitation by farmers has been



due to land hunger, and the soils are less fertile and the rain less trustworthy than at higher altitudes. But population is far denser than in the rangelands. (See Agroecology, section 7.)

1.3 Climate

Variations in elevation and vegetation combine to form 3 generally distinct environmental zones: cool, temperate and hot (dega, welna dega, and kollo to Ethiopians):

- (1) Cool zone - in central parts of western and eastern sections of high plateau; also in a small area around Harar. Terrain is generally above 2,400 m. with temperatures ranging from 16°C to 0°C; hottest months March-May. Above 3,000 m. hail frequently damages crops; frost not unusual. At lower elevations, stock raising, and cereal farming are practiced, although the cool zone is essentially mountain grassland.
- (2) Temperate zone - most densely populated and agriculturally productive; covers most of high plateau between 1,500-2,400 m. Temperatures range from 27°C to 16°C with greatest variations between November and January. Nights are cool with a light frost common.
- (3) Hot zone - occupies most areas below 1,500 m.: Danakil Depression, lowlands of Eritrea province, eastern Ogaden, tropical valleys of Blue Nile and Takaże rivers, and belt along Sudan-Kenya border. Climate is torrid; 27°C is the zonal average with temperatures soaring to 49°C along the arid Red Sea Coast, and 38°C in the Ogaden.

Ethiopia is extremely vulnerable to drought, especially in the low-lying pastoral areas and along the eastern escarpment where there is a widespread dependence upon the spring (Belg) rains. Cultivation in areas of marginal rainfall increases vulnerability to drought. (See Precipitation, section 1.4 and Drought Famine, section 2.2.)

1.4 Precipitation

As with climatic zones, Ethiopia has three general rainfall patterns: Belg or short rains from February-May, Kiremt or heavy rains from June-September, and Bega or scarce, dry-season rains from October-January.

All three are the result of the fringe effect from mainly monsoonal winds from southern Asia. During Kiremt and Belg rains, Indian Ocean winds prevail; winds from the northeast across the Arabian desert prevail in the dry season. The rainy season is regarded as "winter", the dry season as "summer." Belg rains are often followed by six weeks of dry, hot weather before the onset of Kiremt; the latter is frequently accompanied by violent electrical storms and brings 80% of the rains to the northwest region of Central Plateau. Rains in the southwest are more evenly distributed and abundant. Humidity and precipitation decrease from south to north: rains are heaviest in the southwest near Gore in Illubabor province, scant in the Great Rift Valley, less frequent on the eastern part of the Somali Plateau, and negligible over the Danakil Depression. Cool zone: 1,270-1,780 mm. rain per yr. Temperate zone: 500-1,520 mm. rain per yr. Hot zone: average of less than 500 mm. rain per yr.

Disturbances in the Belg rain pattern were a major cause of the calamitous drought between 1973-75. Meteorological conditions which contributed to the drought still persist and are likely to continue. The following provinces are classified according to their dependence on Belg rains*. Dependence is defined as Belg rain production that contributes more than 15% of total food supply. Least dependent: Eritrea, Tigre, Wolega, Illubabor, Kefa, Gojam, Begemdir. Moderate (mixed) dependence: Sidamo, Hararghe, Wollo. Heavy dependence: Shoa, Bale, Gemu Goffa, Arussi. Rainfall data for Ethiopia are neither reliable enough nor representative enough to allow a close comparison of long-term means by region. But it is sufficient to observe that the highlands usually receive 500 mm. to over 1,000 mm. more annual rainfall than the rangelands, and yet the distance between these two zones can be as little as 30 km.

* Note: In many pastoral areas, Belg rains provide most of year's precipitation; pastoralists are heavily dependent on Belg rains for pasture growth.

Normal Monthly Rainfall in Ethiopia (millimeters)
(24 Synoptic Stations)

<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>O</u>	<u>N</u>	<u>D</u>	<u>To- tal</u>	<u>Alt- tude (m)</u>	<u>No. of Years</u>
<u>South-West</u>														
Gore														
38	51	111	161	252	360	367	354	365	193	130	54	2,435	2,000	21
Neqempte														
11	22	54	86	232	391	379	371	253	194	131	15	2,139	2,000	6

Normal Monthly Rainfall in Ethiopia (millimeters)
(24 Synoptic Stations)

<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>O</u>	<u>N</u>	<u>D</u>	<u>To- tal</u>	<u>Alti- tude (m)</u>	<u>No. of Years</u>
<u>Jimma</u>														
33	54	73	147	151	230	226	214	188	86	52	30	1,484	1,750	19
<u>Awasa</u>														
15	67	61	97	118	101	143	141	104	97	30	9	945	1,750	8
<u>Average</u>														
24	49	77	123	188	271	279	270	227	142	86	27	1,751		
<u>North and Northwest</u>														
<u>Bahr Dar</u>														
3	1	8	24	86	177	465	436	207	93	37	3	1,543	1,800	13
<u>Debre Markos</u>														
19	21	53	74	80	168	318	314	211	77	28	18	1,380	2,500	20
<u>Gondar</u>														
3	7	22	39	80	154	338	314	128	57	29	13	1,185	2,000	20
<u>Adi Ugri</u>														
0	6	9	25	29	42	180	193	47	10	18	3	562	2,000	14
<u>Asmara</u>														
1	2	11	28	41	38	166	142	23	8	22	4	487	2,300	30
<u>Agordat</u>														
0	0	0	6	10	28	116	125	37	6	3	0	332	630	22
<u>Average</u>														
4	6	17	33	54	101	264	254	109	42	23	7	915		
<u>Escarpment-Rift</u>														
<u>Addis Ababa</u>														
17	32	73	95	76	116	261	282	177	37	8	11	1,186	2,400	30
<u>Kombolcha</u>														
28	38	77	94	49	28	279	254	119	31	22	19	1,041	1,900	21
<u>Debre Zeit</u>														
8	27	36	67	38	80	223	235	118	20	7	5	860	1,850	23
<u>Awash</u>														
25	48	58	46	27	35	113	160	48	13	15	5	591	900	15
<u>Meqele</u>														
4	4	23	44	16	30	212	212	34	2	7	2	590	2,000	14

Normal Monthly Rainfall in Ethiopia (millimeters)
(24 Synoptic Stations)

<u>J</u>	<u>F</u>	<u>M</u>	<u>A</u>	<u>M</u>	<u>J</u>	<u>J</u>	<u>A</u>	<u>S</u>	<u>O</u>	<u>N</u>	<u>D</u>	<u>To- tal</u>	<u>Altitude (m)</u>	<u>No. of Years</u>
<u>Dire Dawa</u>														
10	28	50	68	40	19	89	140	62	9	25	6	545	1,150	13
Average														
15	30	53	69	41	51	196	214	93	19	14	8	802		
<u>Southern Highlands</u>														
<u>Goba</u>														
19	40	58	139	99	65	88	125	121	106	75	21	955	2,700	12
<u>Jigjiga</u>														
13	34	43	105	82	61	83	132	94	54	20	10	732	1,650	22
Average														
16	37	50	122	91	63	85	128	108	80	47	16	844		
<u>South- East, Ogaden</u>														
<u>Negele</u>														
6	9	50	193	130	10	7	8	23	158	47	14	654	1,500	12
<u>Gode</u>														
0	10	29	120	97	1	0	0	7	103	85	7	459	600	7
<u>Qebridehar</u>														
2	7	21	127	64	3	1	1	12	132	67	3	440	550	16
Average														
3	9	33	147	97	5	3	3	14	131	66	8	518		
<u>Red Sea</u>														
<u>Ghinda</u>														
89	108	80	40	24	10	76	55	20	32	50	100	685	860	18
<u>Massawa</u>														
34	20	11	7	4	0	8	11	2	21	24	39	181	5	30
<u>Assab</u>														
8	3	2	1	0	0	12	7	5	1	0	9	49	5	23
Average														
44	44	31	16	9	3	32	25	9	18	25	49	305		

1.5 Vegetation

The natural vegetation of the plateaux and highlands above 1,800 m. is coniferous forest, but these forests have now largely disappeared and are found today only in the more inaccessible regions, e.g. in the Bale highlands and on the slopes of Mt. Jiba, to the west of Addis Ababa. In the lower elevations of the southwest higher rainfall and temperatures have produced extensive broad-leafed rain forests with a variety of species including abundant karraro. Although there has been a steady encroachment by shifting cultivators, these forested areas in Illubabor and Keffa Administrative regions are relatively remote and have not yet been subjected to extensive commercial exploitation. Above the tree line on the plateaux are wide expanses of mountain grassland. The highlands are the site of settled agriculture in which approximately 4 million farmers produce a variety of grain crops. Unfortunately, the growth of population and the depletion of resources in forest cover and soil has led to the practice of farming in areas which are very marginal and unreliable in rainfall, particularly along the eastern escarpment. This has exacerbated the drought and famine conditions which have developed in the period since 1973. In the lowlands, depending on rainfall conditions, there is a range of dry-zone vegetation, from limited areas of desert through thorn scrub to acacia savannah.

1.6 Land Use

65% of Ethiopia's total land area (790,000 sq. km.) is classified as agricultural land: 140,000 sq. km. cropped or fallow, 650,000 sq. km. permanent pasture. Less than 10% of total land area is under crops; excellent agricultural potential at most elevations in highland area. Estimated use of remaining land area: 18% barren desert or swamps, 10% rivers and/or lakes, 7% forests.

1.7 Major Waterways

Large, widely spaced rivers flow between steep banks of clay and rock. The major river is the Blue Nile averaging 150 m. wide and 1.1 m. deep. Many rivers are between 60-150 m. wide and 1.8 m. deep; high water periods are between late July to late September in north, and early June to November in south. For the remainder of the year, major rivers are usually less than 75 m. wide and between 1.1 m. and 1.8 m. deep. The Wabi Shebele, Gamale-Dorya, and Dawa rivers have two periods of maximum flow: early May to mid-June and late August to late November. Most rivers have sand or gravel bottoms; some have stretches of boulders and rapids.

<u>River</u>	<u>Length (Km.)</u>
Abai	800
Wabi Shebele	1,000
Gamale	480
Awash	1,200
Omo	760
Tekele	608
Mereb	440
Baro	277
Angereb	220

Lakes are of importance only to a small percentage of the population, but they have a major economic/tourism potential. The largest is Lake Tana, 3,165 sq. km., in the center of the Amhara Plateau at 1,800 m. altitude; water level minimum in May/June, maximum in September.

1.8 Highlands

The Highlands consist mainly of severely dissected plains, precipitous hills, and mountains extending almost continuously over the western and southern parts of the country. From the Sudan border in the north, a belt of hills and mountains extends 640 km. southward; elevations range between 365 m. and 2,430 m. In the south, hills and mountains are discontinuous, trend southwest to northeast, and are generally between 400 m. and 3,350 m. above sea level. The highest peak in the south is 4,290 m. in the Mendebo Mountains. Hill and mountain regions are scattered throughout the rest of the country with elevations averaging between 304 m. and 3,000 m.; the highest peak in the country is 4,602 m. in the Rasdajan system in the northern exterior.

2. Disaster Vulnerability

2.1 Civil Strife/Refugees

The Eritrean and Ogaden conflicts have created virtually all of the Ethiopian refugees and displaced people. Eritrean resistance to annexation by Ethiopia dates from 1962 as the first Eritrean refugees fled into the Sudan. A renewed offensive by Ethiopia in 1978 caused new displacement for thousands, bringing the total number of refugees from Ethiopia to Sudan to 390,000 by March of 1980. On the other hand, fighting in the vast Ogaden area between Somalia and Ethiopia began in 1977. Within the Bale and Sidamo regions of the Ogaden, nearly one million persons have been affected by the fighting, most of whom have fled to Somalia.

Drought, famine locust plagues, and political disorders have affected about one-third of the population in several northern provinces. Many of these people required some degree of emergency assistance in 1978 and 1979.

2.2 Drought/Famine

Most of Ethiopia is subject to periodic drought except the five western provinces of Gojjam, Wollega, Illubabor, Keffa, and Gema Gofa. The number of droughts documented in the last 200 years indicates that seven major droughts per century can be expected; less complete figures suggest that approximately two of these will be extremely destructive.

The following list indicates major droughts in this century:

<u>Date</u>	<u>Description</u>
1913-14	Widespread drought across northern Africa; great starvation in Tigre
1921	Complete failure of rains October 1920 to May 1921
1932-34	Drought in southern Ethiopia
1953	Drought in Tigre and Wollo
1957-59	More than 100,000 people in Tigre and Wollo reported to have died as a result of drought and locust infestation

-
- 1965 As a result of drought there was a grain shortfall of 400,000 to 900,000 tons below usual total grain production of about 6 million tons; an estimated 2,000 died; 1.5 million were in need of food aid
- 1969 Severe drought in Eritrea; 1.7 million people affected
- 1971-74 Worst drought of century in West Africa also affected Ethiopia; toll taken by two years of poor rains (1971-72) plus deforestation and unwise land use practices became apparent when rains failed completely in 1973; Wollo and Tigre especially hard hit; at least 100,000 died, even though massive international aid significantly reduced mortality rates
- 1978-79 Drought, especially in Wollo and Tigre, compounded by locust infestation and an outbreak of ergotism; 2-3 million affected

For a number of years now, below average rainfall has caused what amounts to an on-going drought in many of Ethiopia's outlying provinces, particularly in the northeast in the low-lying pastoral areas and along the eastern escarpment where there is widespread dependence on spring (Belg) rains. The early cessation of rains in March and April of 1979 and their late onset in 1980 have once again affected vulnerable subsistence farming and tribal populations dependent on nomadic animal husbandry. This most recent drought extends along a broad crescent starting in the northern region of Tigre and sweeping down to Wollo, Harar, Sidamo, and Bale provinces. Over 50% of the 600,000 cattle in the drought area have died. The Government of Ethiopia estimates that as of July 1980 as many as five million people are in need of emergency relief and that a shortfall of approximately 230,000 metric tons of food can be expected given the latest forecasts of food grain production. Official figures have been called into question although the seriousness of the drought has not. To clarify the urgency of the present drought situation in Ethiopia (and East Africa generally), a Multi-Donor Mission (MDM) led by the United Nations Disaster Relief Organization (UNDRO) visited Ethiopia at the end of May 1980. The MDM concluded that only 70% of the five million people considered at risk could be reached given the limits imposed by organizational and logistical considerations, and security restrictions in Eritrea and the Ogaden. As a result, the MDM has recommended that a major international appeal be launched primarily for food and transportation assistance.

While the recent droughts have had a disastrous impact on large numbers of people, their impact on national foodgrain production has not

been substantial, since they have not generally affected the major grain exporting regions (Gojam, Southern Gonder, Southern and Central Shewa and Arussi). See also Drought, section 7.3.

2.3 Infestation/Pests

Locusts - Desert locusts are always present in their hopper form in northern Somalia, northern Ethiopia, and coastal Sudan, one of their favored breeding areas. When rainfall is favorable the locusts multiply rapidly and form massive, destructive swarms that may then ride prevailing winds thousands of miles to the east, south, and west.

Plagues of the desert locust have been reported in Ethiopia since antiquity. Ethiopia has suffered heavily from all four of this century's major desert locust plagues, with scarcely a break between the plagues of the 40's and 50's. In 1958 locusts hit the provinces of Eritrea and Tigre particularly hard, bringing near famine conditions. In the following year swarms (which ultimately combined to form a single swarm covering some 400 sq. miles) are estimated to have consumed enough food in six weeks to have fed a million people for a year.

International efforts to keep track of and to understand the desert locust were begun by the Anti-Locust Research Center of London in the 1920's. The survey organization in eastern Africa established by the ALRC was succeeded in 1954 by the Desert Locust Control Organization (DLCO/EA) under FAO auspices. When favorable conditions for locust breeding again occurred in 1967, DLCO/EA battled swarms for two years in Ethiopia, the Sudan, and Somalia both on the ground and from the air. Although there was considerable damage locally, disaster was avoided, and it was estimated that crops worth more than \$30 million were saved. The success of anti-locust efforts in the Horn of Africa also prevented the escape of all but a few swarms to other areas.

In 1977 favorable rainfall in both the Arabian peninsula and the Horn of Africa raised the threat of renewed locust plagues after a ten year recession. The situation was initially considered extremely serious because breeding and feeding conditions for the locusts were ideal and because political conditions made it impossible to carry out control operations in both the Eritrea and Ogaden regions. Ethiopia appealed to the international community for assistance, and substantial aid was made available to DLCO/EA through the FAO.

1978 saw the first resurgence in 10 years of desert locust activity, largely because of the inaccessibility of the breeding areas in the Ogaden region during the emergency and the coincidental occurrence of unusually

favorable breeding conditions. The outbreak was successfully controlled throughout most of Ethiopia during the main 1978-79 harvest season, and locust damage has consequently been of only limited importance so far, but the danger of further outbreaks persists while the breeding areas remain inaccessible.

2.4 Disaster History

Summary Disaster History

<u>Disaster</u>	<u>Strike Date</u>	<u>Location</u>	<u>No. Killed</u>	<u>No. Affected</u>
Drought	10/00/65	Nationwide	0	260,000
Flood	5/07/68	Vicinity of Kelafo	1	16,000
Earthquake	3/29/69	NE, Sardo	24	
Drought	69	Hamasion Division	0	0
Drought	74	Tigre, Wollo, N Shoa	100,000	45
Drought	4/05/75	Kangra	0	0
Flood	4/00/76	Gode, Kelafo, Mustahil	0	30,000
Drought	6/00/77	W Wollo Province	0	300,000
Civil Strife	6/00/77	Ogaden Region	0	133,291
Drought	3/00/78	Wollo-Tigre	n.a.	700,000
Civil Strife	78	Ogaden	n.a.	650,000
Civil Strife	78	Bale-Sidamo	n.a.	n.a.
Drought	0/00/78	W. Wollo-Tigre	n.a.	2,000,000
Food Shortages/ Locust	11/00/78	Wollo-Tigre	n.a.	n.a.
Drought	5/00/80	Wollo-Tigre	n.a.	47,000

Source: Disaster History on file at OFDA in Washington, D.C. Covers 1965 to present.

3. Human Ecology

3.1 Population Overview

In the absence of a national census, the 1980 population of Ethiopia was estimated to be 33 million by the World Bank; 90% live in rural areas. The average annual growth rate between 1970-1978 was 2.5%; urban growth rate over 7%. The age structure of the Ethiopian population is typical of other developing countries: a large proportion of children and young adults, and a small proportion of middle-aged and elderly; 70% of population is under 29 years of age.

Generally speaking, the distribution of population reflects the pattern of relief. The highlands, having a plentiful rainfall, are the home of settled agriculture. Land above 2,000 m. is free of the malarial mosquito, a factor contributing to the non-occupation of lowlands which are suitable for farming. 10% of the population lives below the 1,000 m. contour, 20% between 1,000 and 1,800 m., and 70% above the 1,800 m. contour line. Nearly all the major settlements are in the highlands. The notable exceptions are special cases such as the two ports (Massawa and Assab), border posts (e.g. Tessenei and Moyale), the river port of Gambela and the railway creations, Dire Dawa and Nazaret. All the provincial capitals were located in the highlands but, with the gradual eradication of malaria and the improvement of medical services, there is some movement towards lower elevations. Thus, in Illubabor, the capital has moved from Gore to Matu, in Sidamo it has moved from Yirgalem to Awasa, and in Gemu-Goffa from Chenchä to Arba Minch.

3.2 Urban Areas

Ethiopia's urban population is defined as those living in towns with 2,000 or more inhabitants. In 1974, there were 183 such towns, with a combined population estimated at 3,020,700 or 10.9% of the country's total. The urban proportion was more than 20% in the Administrative Regions of Eritrea and Shoa, but only about 4% in Bale and Illubabor. The population of the country's capital, Addis Ababa, was 1,046,260, followed by Asmara (285,860) and Dire Dawa (72,860). There were also four towns with between 40,000 and 60,000 inhabitants each. The growth rates in these larger urban settlements are high.

Ethiopia: Area, Rural and Urban Population and Density
by Province, 1975
(In thousands)

	Population (In thousands)			Area (sq.km.)	Density
	Rural	Urban	Total		
Arussi	890.9	63.2	954.1	23,000	41
Bale	734.1	33.4	767.5	124,600	6
Begemder (Gondor)	1,685.1	112.3	1,797.4	74,200	24
Eritrea	1,617.3	507.4	2,124.7	117,600	18
Gemu Goffa	833.3	42.6	875.9	39,500	22
Gojam	1,668.7	115.3	1,784.0	61,800	29
Hararge	2,520.8	214.7	2,735.5	259,700	11
Illubabor	650.5	30.7	681.2	47,400	14
Kaffa	1,323.5	90.2	1,413.7	54,600	26
Shoa	4,110.3	1,455.1	5,565.4	85,400	65
Sidamo	2,295.5	161.6	2,457.1	117,300	21
Tigre	1,727.3	164.7	1,892.0	65,900	29
Wollega	1,700.6	67.3	1,767.9	71,200	25
Wollo	2,148.2	137.5	2,285.7	79,400	29
Total	23,906.3	3,195.8	27,102.1	1,222,100	22

Population by Provinces/Towns
(1974 estimates)

Arussi

Assela	22,100	Bokoji	2,770
Dera	2,710	Gubessa	3,150

Huruta	5,860	Kofele	3,690
Robi	4,890	Sire (Felege Berhan)	4,410
Ticho	3,330	Tinsae Berhan	6,660
<u>Bale</u>			
Adaba	3,800	Dodola	4,110
Ginir	5,840	Goba	15,650
Robi	2,720		
<u>Begemdir</u>			
Addis Zemen	6,720	Azezo	12,960
Dabat	6,550	Debark	6,710
Debre Tabor	10,600	Gondar	43,040
Istie	3,310	Kola Diba	6,010
Nefas Mewcha	2,820	Setit	4,530
Wereta	4,810		
<u>Eritrea</u>			
Adi Keyeh	6,280	Adi Kwala	9,400
Adi Ugri	15,920	Agordat	21,160
Assab	20,060	Asmara	285,860
Debarwa	3,080	Dekemhare	13,070
Dekeshehay	3,590	Emba Derho	6,510
Ginda	5,980	Himbirti	4,540
Hirgigo	4,220	Keren	27,370
Massawa	23,880	Quazen	4,770
Senafe	4,000	Teseney	11,020
Tsaeda Kristian	4,050	Tsezega	4,870
<u>Gemu Goffa</u>			
Arba Minch	8,790	Bake	10,400
Bulki	2,650	Chencha	2,650
Felege Neway	3,680	Gidole	6,990
Jinka	4,530		
<u>Gojam</u>			
Adet	3,560	Bahr Dar	29,490
Bure	7,440	Debre Markos	33,730
Dangla	5,960	Dejen	4,700
Dembecha	3,290	Elyas	4,410
Fenote Selam	6,690	Mertole Mariam	3,730
Motta	3,800		

Hararghe

Alem Maya	6,320	Asbe Teferi	12,690
Bedeno	3,440	Bedesa	4,880
Deder	5,330	Dire Dawa	72,860
Dodola	4,050	Fugnan Bira	7,360
Gelemso	5,110	Girawa	3,400
Gota	4,850	Harar	53,560
Hirna	5,770	Jijiga	9,730
Melka Rafu	4,440		

Illubabor

Buno Bedele	3,190	Debele	3,100
Gambella	2,590	Gore	10,410
Mattu	7,820	Tobba	3,270

Kefa

Agaro	16,870	Bonga	7,000
Jimma	52,420	Mizan Teferi	4,630
Sintu (Limu Genet)	3,930	Waka	3,500

Shoa

Addis Ababa	1,046,260	Addis Alem	6,660
Akaki	23,120	Alaba Kulto	5,820
Alem Gena	3,820	Ankober	2,500
Bako	5,220	Butajira	8,060
Debre Berhan	20,740	Debre Sina	5,350
Debre Zeit	34,420	Enware	3,380
Fiche	14,830	Gebre Guracha	4,450
Gedo	4,730	Gefersa	3,960
Genet (Holeta)	8,130	Ghinchi	4,710
Ghion (Wolisso)	15,310	Guder	4,040
Hagere Hiwet (Ambo)	12,790	Hosana	10,280
Karakore	3,870	Meki	4,550
Mojo	6,360	Nazret	50,550
Negele	5,400	Robi	5,550
Sebeta	4,670	Shashemane	16,070
Sheboka	3,130	Sheno	2,860
Tulu Bolo	3,250	Welenchiti	5,760
Welencomi	3,530	Welkite	4,880

Sidamo

Agere Mariam	5,590	Agere Selam	5,400
Aleta Wondo	10,510	Awassa (Tabor)	19,550
Bule	2,590	Dilla	17,320
Hidilola	2,930	Kibre Mengist	10,140
Leku	5,940	Moyalle	5,260
Negele	10,660	Odo Shakiso	3,380
Sodo	14,890	Wenago	3,680
Wendo	6,600	Yabello	4,540

Tigre

Abi Addi	7,710	Adi Abbo	7,790
Adi Grat	11,600	Adi Shaho	3,230
Adi Sheno	3,320	Adwa	20,450
Axum	15,910	Chercher	3,360
Hauzen	3,520	Inda Baguna	3,430
Inda Selassie	9,870	Inticho	2,780
Korbete	2,710	Maychew	9,440
Mekele	34,290	Quiha	3,290
Seleklaka	4,700	Wukro	7,610

Wolega

Arjo	3,740	Dembi Dollo	9,340
Enago	3,240	Ghimbi	10,180
Lekemt	21,260	Mendi	3,470
Nejo	4,650	Shambu	5,610
Sire	2,580		

Wollo

Alamata	6,660	Bati	9,570
Dessie	54,910	Hauk	4,030
Kobo	9,490	Kombolcha	6,410
Korem	6,410	Sekota	13,620
Wuchale	3,600	Woldiya	11,810
Wereilu	4,150		

3.3 Ethnic and Sociocultural Groups

Although the former Imperial Government deliberately obscured ethnic diversity by emphasizing "national unity", Ethiopia nonetheless is characterized by substantial ethnic, linguistic, and cultural heterogeneity.

However, in the absence of reliable data, group population estimates are still highly controversial.

For the past 100 years, the Amhara have been culturally and politically dominant although they comprise only 30% of the population. Nearly all government employees are Amhara; they appear to dominate the present junta. The largest single group is the Oromo, known as Galla (a name they resent) outside Ethiopia, representing 40% of the population. Other groups include Tigre, Afar, Somali, Saho, and Agew. The following 9 categories are taken from Bender's The Ethiopian Nilo-Saharan and, by his own admission, are no less arbitrary than all other classification schemes.

1) North Eritrean

A dozen small tribes in the triangular tip of Ethiopia (Red Sea and Sudan border as sides, with base running through Keren); most are Muslim nomadic pastoralists. Largest tribe is Beni Amer (90,000); North Eritrean total population 150,000. Most speak Bedawie, often use Tigre as second language.

2) The Agew

Dispersed throughout Eritrea, Begemdir, Wollo, and Gojam provinces; speak central Cushitic dialects. Most are plow cultivators; total population 170,000. Sub-groups include Falasha, Kilmait, and Awl.

3) Amhara-Tigrean

Historical bearers of Ethiopian Orthodox Christianity. Tigreans speak Tigrinya; concentrated in both Tigre province and south-central Eritrea; considerable resentment against Amharas. Latter concentrated in western Wollo, north Shoa, Gojam, Begemdir, and Hararghe provinces*. Total population 7 million; sub-groups who converted to Islam known collectively as Jabarti.

4) Core Islamic

Live on eastern flank of greater Ethiopia; in chronic state of tension with Amharas. Afar, Saho, and Somali nomadic pastoralists; speak East Cushitic and live in desert lowlands of Eritrea, Tigre, Wollo, and Hararghe provinces. Sub-groups include Argobba and Harari. Total population 1.4 million.

5) Oromo

Most widely dispersed of all ethnic groups; spread through-

out 10 provinces but concentrated in Shoa, Arussi, Sidamo, and Wellega. Nearly all speak mutually intelligible dialects of one East Cushitic language: Gallinya. Total population 10 million; major sub-groups include Arssi, Raya, Boran, Guji, and Wollo.

6) Lacustrine Group

Live in and around Great Rift Valley chain of lakes from southern Shoa south through Gemu Goffa and western Sidamo. Sub-groups: Gurage in Shoa, Sidamo in Shoa and Sidamo, and Konso in Gemu Goffa. Last two speak East Cushitic languages. Total population 2.8 million.

7) Omotic

Live in a small region surrounding Omo River in Keffa and Gemu Goffa provinces. Hoe cultivators growing tuberous plants, cereal grains. Total population 1.4 million.

8) Sudanic

Live in enclaves along entire length of Sudan border; speak languages belonging to four branches of Nilo-Saharan family. Primarily sedentary, practicing hoe cultivation of grains; Nuer only sub-group of pastoralists. Total population 360,000.

9) Caste Groups

Consist of despised endogamous peoples scattered throughout country. Attached to various host groups providing special economic or ritual services. No total population estimate available. In some cases, caste groups physically distinct from host; former often more Negroid.

* Note - Resentment in wake of land reform program against Amharas, who traditionally constitute local nobility/ large landowners. Reports of violence against them frequent and widespread. Also Oromo-Amhara ethnic rivalry exacerbated in recent years with formation of various opposition groups.

3.4 Refugees

See section 2.1, Civil Strife/ Refugees

4. Nutrition

4.1 Nutritional Status

Despite a lack of current data, Protein-Energy Malnutrition (PEM) is considered widespread, especially among infants, children, and lactating mothers; PEM is also a major factor for hospital admittance in many provinces. All of the following are considered common in the average Ethiopian's diet: deficiency of vitamin A, especially in the highland areas; primarily iron-related anemia; hypovitaminosis C in the dry season affects 30% of the population; deficiency of vitamin B2 (riboflavin). In addition, iodine deficiencies make goiter endemic, especially in Shoa province, while rickets is common in Muslim groups and towns. For the past seven to ten years several areas have been affected by chronic food shortages and famine associated with drought, particularly Wollo, Tigre, and the Ogaden. (See Disaster Vulnerability, section 2.2.)

Calorie intake as % of requirements - 72.0 (1977)
Per capita protein intake (grams/day) - 56.0 (1977)

4.2 Diet

Ethiopia can be divided into four staple food areas:

- 1) cultivated highland areas: teff, barley, wheat and millet (prepared as "injera");
- 2) cultivated mid-and lowland areas: corn, sorghum, teff (as "injera", porridge or bread);
- 3) cultivated central and southern part of the country; ensete (false banana);
- 4) nomadic area (approximately 4 million people): milk, meat, (sometimes blood) and cereals.

The most important basic food is injera bread; made mostly with teff (a cereal grain high in iron), but a combination of wheat, oats, and sorghum is also used. Teff is stone-ground into a flour and then mixed with water into a batter; the latter is seeded with yeast and fermented one or two days. The dough is shaped into a pancake and cooked in a large, slightly concave iron griddle over an open fire; not turned during cooking but steamed 6 to 8 minutes.

The most common accompaniment to injera is wot (wat) or allicha, a stew or thick soup resembling curry; eaten with or on injera. Wat is made with either peas, chickpeas, lentils or potatoes, and is often heavily

seasoned or even hot; ingredients depend upon availability of pulses, fasting requirements, and regional preferences. Ingredients commonly added to wat: ground red pepper, garlic, butter or oil, onions, occasionally meat. Meat eaten by 20% of population more than once a week, 16% once a month, the rest never. Chicken is a festival dish but eggs are seldom eaten.

The nomadic diet is based on milk, while the non-nomadic population drinks milk less than once a week. Small amounts of vegetables, even less fruit, are also part of the overall Ethiopian diet. Sugar is used in beverages by 50% of population once a week.

Injera and wot are usually eaten at noon and evening meals. Breakfast is normally light: black coffee, small amount of injera, possibly roasted whole-grain barley kernels. Raw meat is eaten by some during festivals. Abish (fenugreek) is widely used as baby food; made into soup and given to infants with injera; a protein supplement to teff and other cereals.

4.3 Food and Drink

- Cereals:** most food crops on cultivated lands are cereals. Teff is the preferred grain. Other cereals include barley, sorghum, maize, wheat. Kollo is prepared from grain and roasted like coffee; eaten for breakfast and between meals. Maize traditionally consumed as whole seed, or as split maize, or made into flour to prepare other dishes (injera). Barley dagusa (type of millet) used for brewing talla, a local beer.
- Pulses:** lentils, chick peas, field peas, beans, peanuts; next in importance to cereals. Used primarily in making wot; sometimes ground before cooking, or eaten roasted.
- Vegetables:** most Ethiopians eat few vegetables with the exception of some onions, garlic, dried red peppers, gommen (a kale-like plant) potatoes, pumpkins, and tomatoes.
- Fruits:** seldom eaten; citrus, bananas, avocados, grapes, custard apples, pineapples, plums, figs, peaches, strawberries available.
- Meat:** eaten occasionally; urban consumption higher than rural. Coptic and Moslem dietary laws prohibit consumption of pork; affects most of population. Chicken favorite animal protein source. Beef, mutton, and goat also eaten.

-
- Dairy:** eggs rarely eaten, almost never in rural areas. Goat, camel or cow's milk has major role in diet of nomadic tribes. Milk production per animal so low, total consumption of dairy products well below expectations for such traditionally large national herds. Estimated butter consumption is 1 oz/day; vegetable oil eaten in place of butter on fasting days. Soft cheese also made in many homes.
- Fish:** consumption limited to immediate lake and river areas; small amounts shipped by rail from Red Sea to Addis Ababa and Asmara.
- Other Foods:** principal oilseeds are "neug", safflower, sesame, and peanuts. Honey produced in many areas; used to make fermented beverage called "tedj". Condiments: cinnamon, black pepper, ginger, cloves, and a spice "berbere" prepared from red pepper; used in most dishes.
- Beverages:** bottled beer found throughout Ethiopia; large scale production of talla, tedj and araki (a distilled liquor). Chat, though not a food, chewed for its stimulant effect; also has Vitamin C and betacarotene. Coffee very popular; consumed heaped with sugar.

4.4 Food Programs

P.L. 480 Title II:

At present, the only private voluntary agency handling a Title II program in Ethiopia is the Catholic Relief Service (CRS). CRS activities are split between a MCH program in Addis Ababa and a MCH program which includes related beneficiaries in the drought stricken areas of Wollo. The MCH program in Eritrea administrative region has been suspended since December 1977 due to the inability of CRS to monitor the program.

During FY 81, CRS plans to switch from CSM to non-fat dry milk. CRS is proposing to change to non-fat dry milk based on its high nutritive content and is proposing that the same ration used for CSM be continued. The recipient ration for the MCH program for FY 80 and FY 81 is as follows:

<u>Commodity</u>	<u>Grams/Month</u>	<u>Grams/Day</u>	<u>Calories/Day</u>
NFDM	2,140	71	258
SFSG	1,360	45	162
VegOil	<u>450</u>	<u>15</u>	<u>133</u>
Total	3,950	131	553

In addition to the MCH program, CRS plans to continue its other child feeding program for 500 recipients using 3 kilos/month of non-fat dry milk, 3 kilos/month of SFSG and .45 kilos/month of oil. This provides approximately 850 calories/day.

Maternal and Child Health (MCH)
Addis & Wollo

<u># of Recipients by Commodity ('000)</u>	<u>Name of Commodity</u>	<u>Kgs ('000)</u>	<u>(\$'000)</u>
135	NFDM	4,160	1,468
135	SFSG	2,644	537
135	Oil	<u>875</u>	<u>718</u>
	TOTAL	7,679	2,723

Source: USAID, Annual Budget Submission, FY 1981, Ethiopia.

4.5 Emergency Food Assistance

Since 1974, Ethiopia has had emergency food needs. While the size of these needs rises and falls, there seems to be no reason to believe that the cycle will cease within the next few years. The known problems of drought, crop failure, locusts, and internal/external strife almost assure that emergency food assistance will be needed in Ethiopia indefinitely. What cannot be predicted is the magnitude of the assistance. (See Disaster Vulnerability, section 2.)

Emergency food assistance estimates for Ethiopia in 1980 vary according to harvest predictions. FAO estimates shortfall in foodgrain needs will be 249,000 MT while UNDR0 assessment team estimates 151,000 MT; the latter figure represents maximum tonnage Ethiopia can absorb and distribute from outside sources. Food commitments from other donors as follows (as of July 1980):

USG - 24,950 MT wheat, 17,790 ICSM
Australia - 6,000 MT wheat (donated), 60,000 MT wheat (commercial import)
Canada - 20,000 MT wheat
Italy - 3,000 MT wheat
WFP - 45,600 MT wheat
Mennonites - 500 MT wheat
EEC - 50,000 MT wheat, 2,000 MT skimmed milk, 1,000 MT vegetable oil
Sweden - \$1 million non-specified food aid
E.Germany - \$2.6 million non-specified food aid

5. Health, Sanitation, and Housing

5.1 Vital Statistics

Crude birth rate/1000	49 (1978)
Crude death rate/1000	25 (1978)
Infant mortality/1000 live births	181 (1972)
Child (1-4) death rate/1000	37 (1978)
Life expectancy in years	39 (1978)

5.2 Diseases

Despite an absence of comprehensive morbidity and mortality data, it seems that the most common diseases in Ethiopia are infectious, particularly gastro-intestinal and respiratory; 50-80% of all diseases seen in the population are communicable. Malaria, parasitic skin disease and helminthiasis are especially prevalent.

Specific diseases and their patterns of endemicity can be summarized as follows:

Malaria - measured by epidemic potential and economic burden, malaria is the most serious disease problem. One-half of the population lives in malaria-prevalent areas; endemic from sea level to 1,530 m., especially in Ogaden area and lowlands bordering Sudan. Several million are infected (some estimate 60% of population); seasonal outbreaks along Blue Nile, Jila, and Baro Rivers; peak incidence in Oct. and Nov. Affected areas: Eritrea, Begemdir, Wollega, Illubabor, and Gemu Gofa.

Tuberculosis - second most serious health problem; 30-40% of population infected. Incidence varies by province; 3% for eastern regions, 5% for Ogaden area; also prevalent in Hararghe and Kefa provinces, and in Addis Ababa. Crowded, windowless housing and poor hygiene are its main causes.

Venereal Disease - extremely high incidence (75%) among adult population; rural and urban incidences equal. 150,000 to 200,000 new syphilis cases every year.

Leprosy - estimated prevalence of 10-15% per 1,000; total of 200,000 infected. Irregularly distributed; concentrated in central provinces at elevations over 1,800 m.; common in Hararghe and Gojam provinces.

Schistosomiasis - endemic in several regions but data are scarce. Areas of high prevalence include northern lowlands, Begemdir province, northern highlands, and western borderlands. Spreading in Shoa, Gondar, Hararge, and Eritrea. Intestinal form more prevalent but foci of predominant vesical in Awash and Wabe Shebelle Valleys. However, cases reported in all areas except Gemu Goffa and Illubabor provinces.

Trachoma - average active rate among adults 20%. High prevalence in Gondar area in Begemdir province (90%), and in Dese in Wollo province (60%).

Smallpox - decreasing in incidence since 1960's but in 1971, 55% of all the world's cases were in Ethiopia; incidence ranged from 55 per 1,000 inhabitants in Arussi province to 459 per 1,000 inhabitants in Illubabor province. Continued reductions through 1976 with 915 cases reported; outbreaks mainly among Somali nomads roaming drought-affected Ogaden. No cases as of 1978.

Typhus - incidence peaks in November, although data especially scarce; reported mainly in highlands.

Relapsing Fever - one of few countries where relapsing fever is endemic; of 5,000 cases reported in 1969, 90% in Ethiopia; 40% mortality rate if untreated. Endemic in all provinces especially at higher elevations. Louse-borne form in High Plateau, Eritrea province; tick-borne form in lowlands.

Sleeping Sickness - foci along Gillo, Akobo and Baro rivers, areas in Gambella Awraja, Illubabor Administrative Region, and nearby areas of Kaffa; a potential threat in valleys of Blue Nile, Didessa, Omo and Gojeb rivers wherever tsetse flies occur.

Yellow Fever - major outbreak (30,000 deaths) in 1962, but none since. Typical yellow fever areas are near by banana (ensete) plantations.

Others: parasitic infections including cholera, typhoid, paratyphoid, amoebiasis, respiratory diseases widespread among all age groups; rabies believed widely prevalent.

5.3 Health Services and Facilities

The Dergue is the principal provider of health care via the Ministry of Health (MOH). Recent emphasis placed on prevention and environmental services; 1/4 of budget goes to malaria eradication. Each province has

a Provincial Health Dept. headed by a Health Officer; service is decentralized with health centers in larger towns and health posts in the smallest villages. Health centers are inadequate due to the chronic shortage of facilities and equipment. In an effort to reduce the flow of poor patients to Addis Ababa's St. Paul's Hospital (previously the only provider of free health care), MOH announced in January 1977 that free medical care was available to all needy people in all hospitals and clinics.

At the moment, only 8 to 15% of the total population has access to any sort of health service. There are 84 hospitals with 8,623 beds (one bed per 3,200 people), over 50% of which are concentrated in Addis Ababa, Asmara and Harar. 106 health centers are staffed by 1 or 2 laboratory technicians, some health assistants, and unskilled staff. In theory, these health centers are each expected to provide preventive and curative outpatient care to a population of 25,000 to 50,000. 1,010 health stations are staffed by 1-2 health assistants provide minimal care (first aid) to a population of 3,000 to 5,000.

Present 5-Year Plan calls for construction of 500 new health stations, 50 health centers, and 5 rural hospitals (70 beds each) by 1978. (Prince Makonnen Duke of Harar Memorial Hospital with 500 beds not included; not yet operational.) Health stations are equipped only for examination and are limited to dispensing and treatment; 450 in place by 1975, 350 new ones built in 1976.

Health Facilities, 1972

<u>Administrative Region</u>	<u>Hospitals</u>	<u>Beds</u>	<u>Clinics</u>	<u>Health Centers</u>
Arussi	3	130	27	4
Bale	1	23	14	2
Begemdir	2	217	33	10
Eritrea	17	2,240	117	5
Gemu Goffa	2	73	21	4
Gojam	3	232	37	7
Hararghe	10	855	55	8
Illubabor	2	70	15	6
Kefa	3	227	24	6
Shoa	12	533	81	12
Addis Ababa	13	2,664	60	--
Sidamo	5	417	47	5
Tigre	4	243	41	7
Wolega	4	285	37	6
Wollo	4	206	40	11
Total	85	8,415	649	93

Hospitals

<u>Province</u>	<u>Capital</u>	<u>Hospitals</u>	<u>Support Agency</u>	<u>Beds</u>	<u>Rate Per 10,000</u>			
Addis Ababa	Addis Ababa	Menelik II Hospital	MPH	400	41.8			
		Ras Desta Hospital	MPH	74				
		Princess Tsehai Memorial Hospital	MPH	150				
		Ethio-Swedish Pediatric Hospital	MPH	45				
		Princess Zenebe Work Hospital	MPH	250				
		Infectious Diseases Hospital	MPH	40				
		Emanuel Hospital	MPH	262				
		Tuberculosis Hospital, St. Peter	MPH	125				
		St. Paul's Hospital	HSIF	400				
		Haile Selassie I Hospital	HSIF	200				
		Gandi Memorial Hospital	HSIF	60				
		Army Hospital	MD	148				
		Bodyguard Hospital	MD	150				
		Police Hospital	MI	100				
		Dejazmach Balcha Hospital	USSR	100				
		Empress Zeweditu Hospital	7th Day Adv.	207				
		Omedela Clinic	Private	7				
				<u>2,718</u>				
		Arussi	Asela	Asela (Under Construction)		SM	60	0.6
				Bekoje			<u>10</u> 70	
Bale	Goba	Goba (Planned)		(70)	(4.3)			
Begemdir	Gondar	Gondar (Planned)		250	2.1			
		Debre Tabor (Planned)		<u>237</u> 487				

<u>Province</u>	<u>Capital</u>	<u>Hospitals</u>	<u>Support Agency</u>	<u>Beds</u>	<u>Rate Per 10,000</u>
Eritrea	Asmara	Asmara			
		Itegue Mennen Hospital		1,116	1.54
		Haile Selassie I Ophthalmic Centre		120	
		Mental Hospital		154	
		Prison Infirmary		63	
		Mitsiwa			
		Haile Selassie I Hospital		395	
		Assab			
		Civil Hospital		60	
		Keren			
		Civil Hospital		110	
		Agordat			
		Civil Hospital		106	
		Tesenev			
		Civil Hospital		52	
		Barentu			
		Civil Hospital		28	
Udi Ugr					
Civil Hospital		155			
Adi Kayih					
Civil Hospital		85			
Dekemhare					
Infirmary		6			
				<u>2,450</u>	15.4
Gemu Goffa	Arba Minch	Chenche (Under Construction)		60	
		Gidole (Under Construction)	NM	50	
				<u>110</u>	1.3
Gojam	Debre Markos	Debre Markos	MPH	50	
		Bahir Dar	MPH	120	
		Finote Selam (Not yet in operation)	MPH	45	
				<u>215</u>	1.4
Hararghe	Harar	Harar			
		Makonnen Haile Selassie Hospital	MPH	186	

<u>Province</u>	<u>Capital</u>	<u>Hospitals</u>	<u>Support Agency</u>	<u>Beds</u>	<u>Rate Per 10,000</u>
		Teferi Makonnen TB Hospital	MPH	110	
		Ras Makonnen Hospital	HSIF	106	
		Army Hospital	MD	30	
		Bisidimo Leprosarium	DAHW	120	
		Dire Dawa Halle Selassie I Hospital	MPH	180	
		Franco-Ethiopian Railway Hospi- tal	RC	50	
		Jigjiga General Hospital	MPH	75	
		Asbe Teferi Leul Sale Selassie			
		Kebri Dehar General Hospital	MPH	60	
		Kelafo General Hospital	MPH	75	
		Mission Hospital	SIM	30	
		Degeh Bur General Hospital	MPH	75	
		Deder Mission Hospital	MM	25	
		Erer Gota Health Center Hospital	MPH	40	
				<u>1,262</u>	3.7
Illubabor	Gore	Gore	R	40	
		Metu	R	60	
				<u>100</u>	1.5
Kefa	Jimma	Jimma	R	200	2.9
Shoa	Addis Ababa	Debre Birhan General Hospital	MPH	80	
		Debre Zeyt General Hospital	MPH	50	
		Agere Hiywet Door Of Life	BM	40	

<u>Province</u>	<u>Capital</u>	<u>Hospitals</u>	<u>Support Agency</u>	<u>Beds</u>	<u>Rate Per 10,000</u>
		Nazaret			
		Haile Mariam Mamo Memorial Hospital	MM	80	
		Lemo			
		Mission Hospital	SIM	30	
		Shashemene			
		Mission Hospital	SIM	100	
		Wonji			
		General Hospital	SE	480	1.4
Sidamo	Yirga Alem	Yirga Alem, Negele, Soda Diala	M	300	
		Adola	MINB	60	
Tigre	Mekele	Mekele	R	80	
		Adigrat	R	35	
		Adwa	R	80	
		Selekleka (Under Construction)	M	--	
				195	0.8
Wolega	Nekempte	Nekempte	MIN	120	
		Gimb	M	60	
		Aira	M	50	
		Demi Dolo	M	50	
				280	2.0
Wollo	Dese	Dese		120	
		Dese	M	40	
		Woldeya	M	40	
		Chefa (Farm)		15	
				215	1.7
		Total		8,882	3.7

* Prince Makonnen Duke of Harar Memorial Hospital with 500 beds not included. Not yet operational.

Key

BM.....Baptist Mission
 DAHW.....German Leprosy Relief Association
 HSIF.....Haile Selassie I Foundation
 M.....Missions
 MD.....Ministry of Defense
 MI.....Ministry of Interior
 MINB.....Ministry of Mines and State Domain
 MM.....Mennonite Mission
 MPH.....Ministry of Public Health
 R.....Government
 RC.....Railway Company
 SE.....Sugar Estate
 SIM.....Sudan Interior Mission
 SM.....Swedish Mission
 USSR.....Soviet Union
 7th Day Adv.....7th Day Adventist Mission

Other Health Facilities

<u>Province</u>	<u>Special Facilities</u>	<u>Health Centers</u>	<u>Support Agency</u>	<u>Health Station</u>	<u>School Health Services</u>
Arussi	Beloje 10 Tibela SM (Leprosy Village)	Asela Tinsa Ticho	R+M	15	7
Bale		Ginir	R+M	10	3
Begemdir		Adi-Arkay Aykel Setit Gondar Dabat Gorgora Adis Zemen Koladuba	R FM	18 1	6

<u>Province</u>	<u>Special Facilities</u>	<u>Health Centers</u>	<u>Support Agency</u>	<u>Health Station</u>	<u>School Health Services</u>
Eritrea		Adi-Kwale Dekemhare Barentu Nakfa Tensenev			
Gemu Goffa		Arba Minch Bulki Chencha Jinka	R M	6 4	
Gojam		Debre Markos Finote Selam Bahir Dar Dangla Halle Selassie Ber	R M L	13 2 8	7
Hararghe		Kelafo Degeh Bur Ayshia Dire Dawa Ejersa Goro Erer-Gota	R M	42 8	8
Illubabor		Metu Gambela Buno Bedele Gore Tepi	R RL AM	LL 1 1	4
Kefa		Agaro Maji Bonga Waka Jima Mizan Teferi	R M	12 7	6
Shoa		Debre Sine Mulo Glyon Feche Hosaina	M	39 18	26

<u>Province</u>	<u>Special Facilities</u>	<u>Health Centers</u>	<u>Support Agency</u>	<u>Health Station</u>	<u>School Health Services</u>
		Mehal Meda Kara Kore Debre Zeyt Ziway			
Sidamo		Awasa Kibre Merigist Moyale Yirga Alem Sodo	R M M	17 19	6
Tigre		Mekele Aksum Inda Silase Ably Adi Maychew Wikro Adigrat	MPH M	15 2	6
Wolega		Asosa Shembo Gidami Nekempte Dembi Dolo Gimbi	MIN N	7 13	12
Wollo	Dese (Leprosarium) 150/beds	Dese Asayata Lalibela Sekota Were Jiu Alamata Hayk Tenta	R M	15 15	13

Key

AM...American Mission
FM...Falsha Mission
L....Leprosy Station
M....Missions

MINB...Ministry of Mines and State Domains
MPH....Ministry of Public Health
NM.....Norwegian Mission
R.....Government

Note: Felege Helwat Hospital opened in 1977 on shores of Lake Tana.

5.4 Health Personnel

Health officers, community nurses, sanitarians, and dressers bear the brunt of medical services delivery. Most physicians are foreigners working in urban areas. Provincial health services are organized around a community health team of middle-level personnel: health officer, community nurse, and sanitarian. Training aims to increase the role of the community health teams while providing for eventual replacement of foreign physicians with Ethiopians. Personnel shortages, especially MD's, will be a fact for decades; there is also a need for retraining and upgrading personnel.

Health Personnel by Province

	MD's	HO's	RX's	SA's	Nurses		Dressers		
					R	C	E	A	P
Arussi	7	6	-	8	22	11	57	54	38
Bale	1	6	-	6	9	4	24	19	5
Begemdir	14	15	-	14	19	18	60	78	28
Eritrea	69	12	23	25	144	14	251	133	175
Gemu Goffa	2	6	-	7	8	10	38	29	6
Gojam	13	13	-	16	16	18	48	79	13
Hararghe	28	19	-	17	45	13	85	122	66
Illubabor	9	11	-	10	11	11	52	25	20
Kefa	9	13	-	10	25	11	78	67	46
Shoa	19	26	-	24	61	32	258	129	62
Addis Ababa	167	29	87	50	416	67	316	321	334
Sidamo	9	9	-	12	39	14	139	91	73
Tigre	9	17	1	16	23	20	50	91	36
Wolega	10	14	-	11	38	12	112	67	42
Wollo	8	17	1	15	16	15	40	88	39
Total	374	213	112	241	892	270	1628	1393	983

HO...Health Officers; R...Registered; A...Advanced; RX...Pharmacists; C...Community; P...Practical; SA...Sanitarians; and E...Elementary

Health Facilities and Manpower
Before and After 1974

	<u>Before 1974</u>	<u>Since 1974</u>	1/
<u>Health facilities</u>			
Hospitals	84	86	2/
Health Centers	93	108	
Health Stations	460	933	3/

<u>Medical Personnel</u>		
Physicians	374 4/	430
Nurses	1162	1687
Health Assistants	4711	7478

Based on crude estimates before 1974, the number of people covered by each health facility is the following:

Rural hospital	100,000
Health centers	20,000
Health station	5,000

- 1/ All health facilities since 1974 were built in rural areas.
- 2/ The two new regional hospitals have 1,000-bed capacities.
- 3/ 200 health stations were built by the Development Through Cooperation Campaign.
- 4/ 104 are Ethiopians.

Source: Social Service Dept., Ministry of Planning.

5.5 Folk Medicine

Uvulectomies, gum cutting, and extraction of infant's back teeth to treat diarrhea are still common practices. Most popular folk medicine is butter; infants are often given rancid butter (older the better) through the mouth or nose; it is often applied to the umbilical cord wound causing fatal tetanus neonatorum. Another popular beliefs is that sunlight is harmful to babies (contributes to high incidence of rickets--30% of infants in 1960.)

5.6 Refrigeration/Medical Supplies

Cold storage facilities at Bole Airport and Addis Ababa are limited. Cold storage facilities at Black Lion Hospital, P.O. Box 56575, Addis Ababa (phone 15 12 11). In most provincial hospitals and some health centers cold storage facilities are available. No cold chain operational.

For importation, storage, distribution of medicaments: C.M.S. (Central Medical Stores), P.O. Box 976 Addis Ababa (phone: 11 12 49). Private channels authorized to a limited extent for some non-government organizations. Directions in English. (It should be noted that, in 1978,

all drugs had to be air-freighted into the country.) There are still some private pharmacies in towns and drug-vendors in the rural areas. Most of the important pharmaceutical companies are represented. There is a national drug factory, EPHARM, P.O. Box 2457, Addis Ababa (phone: 44 82 20), which mainly re-packs already prepared drugs.

5.7 Housing

The most common rural housing is a circular, conical-roofed tukul. Walls are made of strong, upright poles set close together. Other poles are split into strips and bound horizontally to the vertical ones at 1 meter intervals; latticed frame. In grain-growing areas, durra stalks are used instead of split poles. Walls are covered with clay-straw plaster (chicka). In bamboo-growing areas, walls made of bamboo strips woven into patterns; conical roofs are covered with thatched grass, some of corrugated iron. Both circular and conical-shaped roofs provide good resistance against wind and rain. Most tukuls: earthen floors (some cow dung), single entrance, no chimney, windows rare. The fireplace is made with 3-5 stones; sometimes an oil drum is placed in the center; smoke seeps out or escapes from a small hole. Tukuls mostly multi-purpose: living, kitchen, storage, stable (livestock separated by partition with stable floor lower than rest of house). Family beds are elevated clay platforms against walls; animal skins are used for bedding. Most families (especially farmers) live in compounds surrounded by strong fences made of branches and sticks, preferably thorny. Animals are sometimes penned in a kraal, a fenced area within the compound.

Nomads live in collapsible, portable huts. Afar huts are called ar-- acacia branches bent into a dome-shaped framework 1.5-1.8 m. high, covered with grass mats. Cooking and animal storage is outside the hut. Somali huts are partitioned into two sections by hide or branch curtains; the man lives in the section nearest the door, the wife in the other. A thornscrub enclosure marks an extended family settlement.

Urban tukul construction is varied: traditional, stone walls, or wattle walls; two-thirds are made of chicka with corrugated iron roofs. Statistics from former government survey in late 1960's indicated that 50-79% of the urban population live in one room houses, 55% of urban residents have access to piped water, and 60% of urban residents are without access to sanitary facilities; openpit latrines or nearby fields are used. A significant shortage of urban housing exists while improvements to existing stock are badly needed. An estimated 61,000 new units are needed each year, 16,000 of which would be in Addis Ababa; new building activity only meeting 10-15% of deficit.

In the wake of the Dergue land reform program, ownership of urban houses is restricted to one per family, extra houses have been nationalized and rents standardized by location and land area. Urban dwellers associations (kebeles) have been established as counterparts to peasant associations: 1,500 total in 600 towns, 290 in Addis Ababa. Duties: implement land reform provisions, collect rents, maintain houses, schools, clinics and roads. Also charged with establishing market centers, and cooperative shops.

6. Disaster Preparedness

6.1 Host Disaster Plan

Relief and Rehabilitation Commission (RRC) established in 1974. Details of Commission hierarchy and staffing not available. RRC responsible for coordination and direction of all disaster relief operations.

Food and Nutrition Surveillance (Early Warning System), a branch of RRC is responsible for maintaining food supplies, monitoring shortages and other conditions relating to food distribution/availability.

Shimelis Adugna, Chief Commissioner, Relief and Rehabilitation Commission. Address: P.O. Box 5686, Addis Ababa. Tel: 15 30 11. Cable: REHAB.

Akiliu Mewaae
Ethiopian Food and Nutrition Surveillance System
Old Planning Commission Office. Room 30

6.2 US Plan

Although a US Mission Plan was prepared in 1975, reduction of US personnel and continued political and military difficulties in Ethiopia render the plan inoperable for the foreseeable future.

U.S. Embassy
Entoto St: P.O. Box 1014, Addis Ababa
Tel 110666/117/129

Mission Disaster Relief Officer: Owen W. Roberts, Charge d'Affairs
Alternate: Marie Murray, Economics/Commercial Officer

6.3 Red Cross

No disaster plan, but was active in 1973-74 drought relief. Ethiopian Red Cross Society operates clinics in Gimbe, Amba Mariam, Ajbar, Aesm, Gazo Belay, Estarph, Kon, Tsehay, and Mewsha. Clinics planned for Kul Mesk, Chew Kutir, Kola Midir, Ayna.

Address: Ethiopian Red Cross Society
Ras Desta Dامتew Avenue
P.O. Box 195
Addis Ababa. Cable: Ethiocross
Tel: 444591

6.4 Voluntary Agencies *

Catholic Relief Services: Off Africa Avenue (Bole Rd.), Opposite Showa Bakery Bldg., Addis Ababa.

Church World Service: Christian Relief and Development Association, P.O. Box 5674, Addis Ababa.

Consolata Society For Foreign Missions: P.O. Box 18, Shashemane, Ethiopia. Tel. 166; P.O. Box 5581, Addis Ababa. Tel. 15 00 93.

Eastern Mennonite Board of Missions and Charities: Ethiopia Mennonite Church, P.O. Box 1165, Addis Ababa.

Lutheran World Relief: Evangelical Church MeKane Yesus, P.O. Box 2087, Addis Ababa.

Mennonite Central Committee: Box 18, Nazareth, Ethiopia.
Tel. 11 23 48

Sudan Interior Mission: P.O. Box 127, Addis Ababa. Tel. 11 23 48

World Vision Relief Organization: Box 3330, Addis Ababa.

*Note - for a complete listing of voluntary agencies active in Ethiopia see the TAICH Country Report for Ethiopia, October 1979.

6.5 International Organizations

International Livestock Center for Africa
P.O. Box 5689, Addis Ababa
Dr. Pratt, Director General
Collects weather and food supply data.

UNDP
Regional Telecomm. Bldg., Churchill Rd.
Addis-Ababa; Cable: UNDEVPRO; Tel: 448-075;
Telex: 976-21039

World Food Program
Old Economic Commission for Africa Bldg., Room 743
Martin Mock, Deputy Representative

7. Agroeconomy

7.1 Overview of Agriculture

Since World War II, Ethiopia has moved from being a net exporter of cereals, to self-sufficiency, to having cereal deficits, with the latter increasing since the early 1970's. Traditional constraints to growth of agricultural sector include primitive cultivation techniques (multiple plowing usually required with ox-drawn plows), poor seed selection, minimal integration of livestock and tillage agriculture, few inputs, lack of capital investment, and an inadequate transportation system. Exceptions are limited to commercial farming and in lowlands, large-scale irrigated state farms scattered in the highlands. In addition, severe soil erosion affects much of the country, especially the northern Highlands.

Slightly less than 90% of the total labor force is employed in agriculture. About 85% of holdings are 2 hectares (ha.) or less in size. Livestock are important in the farming system, especially in the central highland areas, and the country has the largest national cattle herd in Africa (about 27 million head, or one animal per capita). Agriculture accounts for about half of the GDP and agricultural exports comprise over 90% of total exports. Of the country's total area of 120 million ha. some 78 million ha. (65%) is classed as agricultural, of which 13 million ha. is cropped at one time or another, and 65 million ha. is permanent pasture. Although much of this land is too arid for rainfed cropping, large areas of available land are known to be suitable for crop development, although underdeveloped infrastructure and health problems (mainly tsetse fly and malaria) limit their use.

The total area under the major crops (mainly cereals and pulses) in 1977-78 has been estimated by the Ministry of Agriculture and Settlement (MOAS) to have been 5.5 million ha. On this area the leading crops were teff, 1.5 million ha. (28%), barley, 0.9 million ha. (16%), wheat, 0.5 million ha. (9%), maize, 0.9 million ha. (16%), and sorghum, 0.7 million ha. (13%). Some 98% of production was from smallholdings, with 1.5% from state farms and 0.8% from cooperative farms. Coffee is probably the single

most important non-food crop in the economy; in the crop year 1977-78, 190,000 tons were produced, of which 72,000 tons were exported. Secondary crops include sugar, cotton, oats, sesame, sisal, and flax.

Creation of a new marketing infrastructure through the land reform program is the main thrust of the Dergue effort to improve performance of the agricultural sector. Large commercial farms have been replaced by state farms marketing their own output through public channels under the direction of the Agricultural Marketing Corporation (AMC). Marketing costs, however, remain high: bad roads, double transport, numerous title transfers in the marketing chain, high storage losses, and lack of reliable grading are all causes. The AMC is the main instrument for implementing Dergue marketing/price policies in grain trade; responsible for distribution of fertilizers, seeds, pesticides, and implements. A crop information Unit has also been formed to act as an advance warning system and crop forecaster. (See Nutrition, section 4.)

Although there is a lack of current and reliable data, agricultural production appears to have been roughly maintained since the land reform in 1975. Indeed the estimates of the MOAS show a rise in production following the revolution with a fall back to 1974-75 levels in 1977-78. A further trend is that production of teff (the preferred grain in urban areas) has been maintained while the production of higher yielding grains such as wheat, maize, and sorghum has fallen. Even so, teff was especially scarce in urban areas just prior to the 1977 and '78 main harvests, due to both increased rural consumption and stockpiling, and some diversion to meet security needs. Reasons for this teff production trend include: teff is strongly preferred by consumers; producers treat it as a cash crop; it is an easier grain to store during periods of uncertainty; its price prospects have appeared favorable; and teff straw is also used as a reinforcing agent in rural construction.

7.2 Livestock

With about 27 million cattle, 24 million sheep, 18 million goats, and large numbers of camels, poultry and other stock, Ethiopia has one of the largest livestock populations in Africa. Roughly 20-25% of agricultural output is contributed by livestock; hides and skins, meat products, and live animals have all been important exports at various times. Livestock also provide a major source of draught power and transportation, and are estimated to provide about 10% of protein intake in the rural areas. For the nomadic population, numbering about 2 million in the south and east, livestock represent a mainstay. Official data probably understate the value and importance of livestock, especially through underrecording

exports (which could exceed Br. 20 million per year, compared with a recorded value of Br. 61 million for hides and skins, live animals, and canned and frozen meat in 1977-78).

The 1974-75 drought in the south apparently had a significant effect on livestock numbers and reduced subsequent offtake. The security situation in the main nomadic areas, the Ogaden, and the south also reduced supplies. Exports of live animals and canned meat have fallen to practically nil, in part reflecting government restrictions aimed at increasing domestic supply and reducing prices, and partly deteriorating international prices for canned meat. Exports of hides and skins however, have, been increasing, reflecting favorable international prices. (See Agricultural Exports, section 7.8.)

7.3 Drought

The major droughts of 1973-74 in the north and 1974-75 in the eastern and southern lowlands were followed by two adequate seasons (1975-76 and 1976-77). The emergency situation in the Ogaden during 1977-78, however, uprooted some of the settled, grain-producing population. The Belg (short rains) in early 1978 in Western Wollo, Tigre, and Eastern Gonder were inadequate and were followed by excessive main rains causing the spread of ergot (a fungus disease of grain poisonous to humans) and the premature germination of grains before harvesting. Despite port congestion and other logistic difficulties, the Government, with donor support, provided relief assistance to about 1.5 million people.

One feature of the 1978 emergency is that in contrast with the 1973-74 and 1974-75 occurrences, the government, through the Relief and Rehabilitation Commission, took prompt steps to deal with the problem. However, despite the advances made in establishing an early warning system for drought outbreaks, hard data are not available on the total area and population affected. For example, estimates made in late 1978 by Ethiopian and international agencies of the population at risk from serious drought during the first half of 1979 varied from slightly less than 1 1/2 million to over 4 1/2 million people. (See Drought/Famine, section 2.2.)

7.4 Foodgrain Deficit

With foodgrain production having fallen in 1978 as population rose by about 2.5% per annum, (cereal exports ceased after 1975-76) a foodgrain deficit has emerged. Firm estimates of the size of this deficit and its likely trend are not available. An estimated 400,000-500,000 tons of cer-

eals were needed in the Ethiopian year September 11, 1978 to September 10, 1979. This compares with 200,000 tons of commercial and relief imports the previous year. Port capacity and internal distribution capacity (transport and storage) were formerly serious constraints, but are now considered less crucial. While this deficit at first sight may appear to be of alarming size, it is important to place it in perspective. This deficit represents only about 10% of 1977-78 foodgrain production (including pulses).

Current situation: The cereal import deficit for 1980 is not yet fully covered and it is now unlikely that it will be met before the new harvest which has already begun in some areas. The unfilled gap is estimated at about 59,000 tons, or 15% of total yearly requirements. Against the 1980 UNDR0 appeal for emergency assistance of 151,000 tons of cereals and 31,950 tons of other foods, 92,000 tons of cereals and 23,250 tons of other foods have been pledged so far. The amounts pledged include a new FAO/WFP emergency food assistance of 10,000 tons of wheat approved on November 24, 1980.

Food supply outlook for 1981: A preliminary official forecast of the 1980 main season cereal and pulse production now being harvested, indicates poor to very poor output in Hararghe, Bale, Sidamo, Gamo Gofa regions, in the south, and in Wollo and Tigre regions in the northeast. The sorghum crop is also very poor in the Shewa region. Good or satisfactory performance is forecast for Gojjam, Gonder, Shewa (excluding sorghum), and Wellega. It appears that most regions where production was reduced by drought in the 1979-80 season are again expecting poor crops this year. The Government anticipates serious food shortages in several of the affected regions. In the Ogaden, the continuation of military activities is likely to increase further the number of displaced people in need of assistance.

7.5 Recent Trends

The dominant trends have been a shift in the structure of production away from export crops towards food crops, and within food crop production, towards teff. Marketed grain production has also declined. One factor accounting for these shifts has been the increase in food consumption following land reform. A second has been the conversion of formerly commercial farms producing oilseeds and pulses for export into state or co-operative farms which were faced with start-up difficulties, and have concentrated on food production. Third, logistic and transport problems have hampered the marketing of produce and the provision of consumer goods in surplus-producing rural areas.

The area of the state farms under cultivation and production has been increasing over the past four years. Though only accounting for some 2% of agricultural output, they have a significant share of marketed output, probably 20-25%, and have absorbed a large share of monetary investment in the sector. However, they face substantial problems and have been affected by labor unrest. Though yields per hectare are probably higher than in peasant agriculture, the overmanning and heavy mechanization evident in 1978 probably indicates that total factor productivity has been lower.

7.6 Production/Area Planted *

<u>Crop</u>	<u>1975/76</u>	<u>1976/77</u>	<u>1977/78</u>
Foodgrains	4,584	4,364	4,675
Teff	1,721	1,550	1,488
Barley	601	746	903
Wheat	500	507	464
Maize	728	680	896
Sorghum	718	707	706
Millet	316	174	218
Pulses	662	690	644
Horse Beans	259	266	279
Chick Peas	198	174	156
Haricot Beans	42	44	16
Field Peas	107	139	128
Lentils	56	67	65
Total	5,246	5,054	5,319

* In thousand hectares
Source: Ethiopian Government

Note: Largest maize growing areas by percentage are Shoa and Wolega provinces but it is grown nearly everywhere between elevations of 1500-2200m. Eritrea, Wollo, and Tigre provinces are usually food deficit areas.

7.7 Harvest Dates

<u>Crop</u>	<u>Jan</u>	<u>Feb</u>	<u>Ma</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
Barley	*	*	*						*	*	H	H
Maize	H	*								*	*	H

<u>Crop</u>	<u>Jan</u>	<u>Feb</u>	<u>Ma</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
Millet	H	*								*	*	H
Sorghum	H	*	*					*	*	*	*	H
Teff									H	H	H	H
Wheat	H	*	*	*	*					*	*	H
Chick Peas	*	H	H	*							*	*
Lentils	*	*								*	H	H
Coffee	H	H									H	H
Cotton	H											H

H= Main Harvest

*= Period of Harvest

7.8 Agricultural Exports

Value of Exports of Major Commodities (in millions of Birr)

<u>Fiscal years</u>	<u>1976-77</u>	<u>1977-78</u>	<u>July-December</u>	
<u>Ethiopian Fiscal years</u>	<u>1969</u>	<u>1970</u>	<u>1977</u>	<u>1978</u> 1/
Coffee	408.9	514.5	216.1	203.9
Pulses	48.6	30.4	21.0	7.9
Oilseeds	26.9	11.9	5.2	5.5
Sugar	13.7 2/	-	-	-
Hides & skins	52.3	58.0	26.8	35.1
Raw cotton	6.8	2.4	1.0	-
Petroleum products 3/	22.0	3.8	1.0	-
Other exports	27.8	18.5	13.6	13.8
Re-exports	5.0	1.2	0.1	0.1
Total Export f.o.b. 4/	642.8	652.2	292.0	271.0

1/ Preliminary

2/ Mainly molasses.

3/ Petroleum products replaced by data from the Assab Oil Refinery.

4/ Excludes non-monetary gold.

Source: Customs Office.

The value of exports grew at about 6% between 1972-73 and 1977-78. However, most of this increase is due to higher prices, principally for coffee but to a lesser extent also for pulses, fruits and vegetables, live

animals, and oilseed cake. Coffee export volumes have fluctuated. Declines in 1974-75 and 1976-77 (the year when prices peaked) reflect marketing and transportation difficulties, regional disturbances, and possibly some disincentive effects arising from the increase in the coffee export surtax. In 1977-78 priority was given to coffee exports; as a result, coffee exports recovered and the crop accounted for 76% of the value of exports in 1977-78, compared with 44% in 1972-73. Setit Humera, a major oilseed producing area, has been the scene of recent unrest causing disruptions in production and marketing. As a reaction to uncertainty, small farmers seem to have favored subsistence crops (especially food-grains) over cash crops (oilseeds and pulses) in the past few years. Among the other major exports, only hides and skins show increasing or stable export values. In addition, disturbances in Sidamo, Hararge, and Bale, major stock raising areas, reduced the availability of live animals for export (an activity also prohibited for some time). Sugar exports declined because of higher domestic consumption. Exports of fruits and vegetables declined in 1977-78 because of the interruption of traffic on the Addis Ababa-Djibouti Railway.

7.9 Imports

The cereal import requirement for 1981 is tentatively estimated by FAO at 400,000 tons, the same as for 1980. Food aid allocated so far to Ethiopia totals about 17,000 tons.

Estimated Import Requirements in 1981
('000 tons)
(Known position as of mid-November)

<u>Cereal & sources of supplies</u>	<u>Total 1/ requirements</u>	<u>Commercial purchases</u>	<u>Food Aid allocated, committed, or shipped</u>
<u>Wheat</u>			
Australia	350.0	0.0	11.5
<u>Coarse Grains</u>			
USA (Title II FY81 Req. Alloc.)	50.0	0.0	5.8
<u>All Cereals</u>	400.0	0.0	17.3

1/ Requirements are for current consumption.

7.10 Storage

Storage capacity of all State Farms is grossly insufficient; for estimated 80,000 MT grain production in 1975-76, only 25,000 MT of storage space was available. Major new project now underway to increase storage capacity to 350,000 MT at 20 locations including the following additional target increases: Dessie (10,000 MT), Makele (10,000 MT), Dire Dawa (10,000 MT), Shashamene (5,000 MT), Addis Ababa (15,000 MT). Agricultural Marketing Corporation is now constructing an additional 25,000 MT of storage facilities of its own: 20,000 MT in Addis Ababa, and 5,000 MT in Debre Zeit.

Storage Capacity (MT)
Agricultural Marketing Corporation

	<u>Owned</u>	<u>Rented</u>	<u>State Farms</u>	Private (Incl. AMC Rented) <u>Storage</u>
Arussi	-	-	8,000	-
Bale	-	-	-	-
Begemdir	300	1,000	-	-
Eritrea	1,000	6,000	-	145,000
Gemu Gofa	-	-	3,600(cotton)	-
Gojam	3,000	-	-	-
Hararghe	-	-	1,050	3,500
Keffa	-	1,000	-	3,000
Illubabor	1,000	100	-	-
Shoa	25,200	37,500	5,000	360,000
Sidamo	-	-	10,000	-
Tigre	-	-	-	1,000

	<u>Owned</u>	<u>Rented</u>	<u>State Farms</u>	Private (Incl. AMC Rented) <u>Storage</u>
Wolega	1,000	-	-	-
Wollo	<u>1,500</u>	<u>-</u>	<u>5,000</u> (repair)	<u>20,000</u>
	33,000 ^{1/}	45,600	32,650 ^{2/}	532,500 ^{3/}

1/ of which silos 29,00 MT

2/ of which for grain 25,000 MT

3/ of which AMC rented storage 45,000 MT

Source: EGC, Eurbanks, MOA, and Mission Estimates, January 21, 1977

Major Grain Mills
(1975)

(a)

<u>Nationalized Name</u>	<u>Location</u>	<u>Maximum Processing Capacity (MT p.a.)</u>	<u>Storage Capacity (in MT)</u>
(Ministry of Commerce, Industry & Tourism)			
Kali Food Products	Addis Ababa	15,000	10,000
A. Mihos & Co.	Addis Ababa	21,600	2,000
Adowa Flour Mills (EGC)	Akaki	12,480	
National Flour Mill & Debre Zeit Flour Mills	Addis Ababa	30,000	2,800
A. Mihos Flour Mills	Dire Dawa	9,000	2,000

<u>Nationalized Name</u>	<u>Location</u>	<u>Maximum Processing Capacity (MT p.a.)</u>	<u>Storage Capacity (in MT)</u>
Red Sea Flour Mills	Asmara	<u>14,300</u>	<u>500</u> (rented)
	Sub-Total	102,380	17,300
<u>(b) Private</u>			
Astron Brothers	Addis Ababa	28,800	N.A.
Holeta Flour Mills	Holeta	2,160	N.A.
Abate Flour Mills	Addis Ababa	5,475	N.A.
Akaki Flour Mills	Akaki	6,500	N.A.
Nazareth Flour Mills	Nazareth	14,400	N.A.
Machinazion Eritrea	Asmara	1,820	N.A.
	Sub-Total	59,155	
	Total (a & b)	161,535	17,300

8. Industrial Economy

8.1 Economic Overview

Since 1974 radical and far-reaching changes have taken place in the structure of Ethiopian society, most of which have generated a climate of political uncertainty and upheaval. In addition, fiscal goals have been disrupted by longstanding regional conflicts which have diverted valuable resources at the expense of economic development. By mid-1978 serious economic problems (some inherited) had emerged or intensified, such as food shortages, economic stagnation, inflation, declining exports, and fiscal difficulties.

From 1973-74 to 1977-78, the GDP grew at less than 0.5% per annum in real terms. Security problems, the uncertainties, dislocations, and resistance which followed the government reforms, and the ensuing difficulties in internal marketing and distribution were some of the causes. The emergency situation in Eritrea and the Ogaden caused the destruction of facilities, the dislocation of transport and communications, and the diversion of economic resources. Although agricultural production has been maintained, the structure of production has shifted away from export crops toward food crops; marketed production has probably declined. In the industrial sector, factory closings in Eritrea (which formerly accounted for about 1/3 of industrial production) have caused a fall in output. However, production outside the Eritrea region has been maintained. Production has also been constrained by shortages of agricultural raw materials, transport difficulties, spare parts shortages, machinery breakdowns, high managerial turnover, and labor disputes. Construction activity also declined. Inflation has been rampant, with consumer prices rising at an average rate of 20% per annum through the three years ending mid-1978.

These difficulties have also affected Ethiopia's external transactions. Export earnings from coffee have been maintained, partly because of higher prices in 1976-77, and partly because of increased export volumes. However, other exports have declined, with the result that coffee now accounts for 75% of the total value of exports. On the other hand imports have grown rapidly, at about 21% per annum in value terms since 1973-74. However, much of this growth is attributable to drought relief and other unspecified items, probably including military imports. The resulting deterioration in the resource balance was financed up to and including 1976-77 by external assistance, either in the form of transfers or of net inflows of public capital. In 1977-78, the capital inflow was reduced, and the deficit was financed largely by heavy recourse to the foreign exchange reserves, which were drawn down from the equivalent of one year's supply of imports to about five months.

Consequently, the Dergue introduced its first National Revolution Development Campaign (the "Zemeteba") in September 1978 to revive the economy and address pressing economic problems. The objectives of the Zemeteba were to: 1) reduce current food shortages by intensifying efforts by the organizations dealing with the peasant sector, and by doubling state farm area; 2) help drought-affected highland areas by strengthening afforestation, rehabilitation, and resettlement programs; 3) eliminate current shortages of consumer items and certain construction materials; 4) improve the efficiency of government agencies and businesses and 5) increase foreign exchange availability by promoting exports. Preliminary indications are that actual performance fell somewhat short of the targets; however, the Government believes that this performance has, on the whole, been satisfactory.

Gross National Products in FY 1976-77

	<u>US\$ Mln.</u>	<u>%</u>
GNP at Market Prices	3,294.7	100.0
Gross Domestic Investment	292.7	8.9
Gross Domestic Savings	186.4	5.7
Resource Balance	106.3	-3.2
Export of Goods and NFS	403.9	12.3
Import of Goods and NFS	510.2	15.5

8.2 Production

Gross Value of Manufacturing Production at
(Current Prices, million Birr)

<u>Year ended September 10 1/ Ethiopian Calendar years</u>	<u>1974 1966</u>	<u>1975 1967</u>	<u>1976 1968</u>
Foodstuffs	165.4	177.1	203.8
Beverages	88.0	89.1	103.6
Tobacco	29.3	32.6	49.6
Textiles	275.1	287.2	287.7
Leather and shoes	37.0	29.8	40.3
Wood and products	21.3	20.2	22.0
Paper and products	19.6	14.4	15.8
Printing and publishing	14.5	15.7	18.0

Year ended September 10 1/ <u>Ethiopian Calendar years</u>	1974 <u>1966</u>	1975 <u>1967</u>	1976 <u>1968</u>
Chemicals and petroleum	165.3	169.9	200.0
Non-metallic minerals	25.5	20.0	24.0
Basic metal industries	35.8	34.8	28.5
Metal products, machinery, etc.	<u>13.9</u>	<u>11.7</u>	<u>17.5</u>
Total	890.6	902.7	1,010.8

1/ Some data collected on basis of fiscal year ended July 7 and other on Gregorian calendar year ended December 31.

Source: Central Statistical Office, based on Annual Industrial Surveys.

8.3 Recent Trends

The most important general economic trends in Ethiopia have been summarized by the World Bank in a Memorandum dated April 1980. They are:

- relative stagnation in output growth (but no major falls) and a decrease in the amount of marketed grain, especially in Addis Ababa, which has contributed to more rapidly rising prices;
- a steady decline in export volumes, partly offset by high coffee prices during 1976-77 and delayed in its effects on import capacity by an initially high foreign exchange reserve level;
- an increase in Government development spending (halted however, by the war in 1977-77), but a fall in private investment; the emergence of substantial deficit financing by the Government and public sector enterprises mostly because of emergency needs;
- a possible increase in modern sector employment; a shift in real income from the urban to the rural sector; and greater equality in intra-urban income distribution, especially among those in modern sector employment. However, urban poverty remains serious.

8.4 Imports

The value of imports has grown rapidly (at about 21% per year since 1973-74), or by 8% per year at 1976 prices. However, if "unrecorded" imports (which represent drought relief and other unspecified items) are

eliminated, imports at 1976 prices grew just over 1% per year, with most of this growth occurring in 1974-75 and again in 1976-77, the year before the emergency situation occurred. All categories of imports rose (in value terms) by similar amounts over the period since 1973-74, except for raw materials and semi-finished goods, which fell after 1975-76.

Major trade partners include Italy, Federal Republic of Germany, United Kingdom, United States, and Japan.

Value of Imports by Major Commodity Groups
(in millions of Birr)

Fiscal years	1975-76	1976-77	1977-78
<u>Ethiopian Fiscal years</u>	<u>1968</u>	<u>1969</u>	<u>1970</u> 1/
Food and live animals	24.2	33.9	45.3
Petroleum & petroleum products 2/	106.6	137.2	157.9
Chemicals	79.3	65.6	63.0
Medical & pharmaceutical products	21.7	23.5	50.8
Textiles	43.3	70.3	81.7
Clothing	13.5	21.3	63.6
Metal and metal manufactures	37.7	42.3	48.3
Machinery including aircraft	114.9	90.0	102.0
Electrical materials	36.1	38.0	55.0
Road motor vehicles	80.7	110.5	127.9
Other imports	51.9	99.6	128.7
Unrecorded imports	33.7	131.5	120.0
Total imports, c.i.f.	<u>689.4</u>	<u>910.3</u>	<u>1,095.0</u>
of which freight & insurance	(113.5)	(148.7)	(151.1)
imports, f.o.b.	(575.9)	(761.6)	(943.9)

1/ Includes Br. 178 million which was recorded in the customs statistics during the second half of 1978, but paid for during 1977-78. This amount has been allocated to individual commodity group according to their relative value weight.

2/ Fuel imports adjusted to correct petroleum imports in customs data (upward Br. 17.5 million in 1972-73, Br. 29.5 million in 1973-74 and Br. 19.7 million in 1974-75 and downward by Br. 2.4 million in 1975-76) with data from the Assab Oil Refinery.

Source: World Bank, Economic Memorandum on Ethiopia, 1980.

8.5 Exports

See Agricultural Exports, section 7.8.

9. Transportation and Logistics

9.1 Road Network

Mountainous topography and long distances between population centers are major and expensive constraints to developing a transportation system in Ethiopia. Consequently, many parts of the country remain isolated and dependent on pack animals or human carriers for transport. Road density is almost the lowest in Eastern Africa (about 19 km. per 1000 sq. km. or 0.9 km. per 1,000 population). Cultivable land (especially in the southwest) remains largely unused because of lack of roads and about three quarters of the farms are more than a half-day's walk from an all-weather road.

Despite the low road density, road transport is the dominant modern transport mode, accounting for over 90% of both freight and passenger movements. In 1980, the road network consisted of about 9,400 km. of main, all-weather roads and approximately 31,000 km. of rural roads, mostly dry-weather tracks. With few interconnecting links, the main network extends radially from Addis Ababa, but large areas of the west, southwest, and east still lack an all-weather link to the capital. Although the primary and secondary parts of the main road network still require considerable upgrading and extension, the more urgent need is development and improvement of the lower-class roads ("feeder roads") and rural roads to complement past investment in primary and secondary roads.

All weather roads as of April 1976:

North & South - Addis to Assab (via Dese), Addis Assab (via Nazareth, Awash), Addis to Massawa (via Dese), Addis to Asmara (via Debre Markos, Gonder), Addis to Bonga, Addis to Hosaina, Addis to Gidole (via Shashamane), Addis to Yabelo (via Shashamane), Addis to Nazareth and Addis to Asela (via Nazareth), Jigjiga to Degeh Bur, Dire Dawa to Dewele (Djibouti border).

East - West - Addis to Gimbi (via Lokemti), Addis to Jigjiga (via Nazareth and Harar), Addis to Dire Dawa (via Nazareth), Tessenet to Massawa (via Keren), Shashamane to Goba.

All Weather Roads by Maintenance District 1973/74
(in km.)

<u>Gravel</u>	<u>Asphalt</u>	<u>Total</u>	
1,001	993	2,084	Alømgena
397	565	962	Combolcha
846	180	1,026	Shashamane
572	241	973	Dire Dawa
535	15	578	Gondar
365	--	365	Debre Mardos
525	173	698	Jimma
333	566	899	Asmara
<u>555</u>	<u>37</u>	<u>592</u>	Adigrat
5,127	2,770	8,177	Total

9.2 Transport Agencies

National Transport Corporation (NATRACOR) is main Dergue agency for coordinating road transport. All formerly private truckers have now been made associate members of NATRACOR. Maximum and minimum freight rates established by autonomous Road Transport Authority. Shortage of skilled local personnel is a constraint, though an active training program is being pursued. There is also a considerable backlog of maintenance work needed on rural roads (over 3,000 km. require maintenance).

While the recent increase of trucking operations on the Assab road has undoubtedly increased transport capacity, there is some doubt about whether this level of activity can be sustained. Newly purchased trucks (1,000) are not being properly maintained, and are being badly damaged by inexperienced drivers. Also, many trucks have been diverted from elsewhere in the country to the Assab route as a temporary palliative. Thus, transport is likely to continue to be a constraint to both domestic and foreign trade, though to a lesser extent than in 1977-78. The restoration of overland access to Asmara, and Government's plans to increase production and distribution of consumer goods (many of which come from Asmara) to increase incentives for marketing agricultural production, will also add to the demand for road transport. Even if the government succeeds in achieving self-sufficiency in grain in the medium term, this will not reduce the overall road transport task because of the need to redistribute the domestic harvest within the country.

The reduced military activity in Eritrea and the Ogaden is expected to release a considerable number of trucks for civilian use (a figure of 1,000 trucks has been mentioned). Also, an Emergency Transport Unit, under UNDP auspices, will shortly commence operations with a fleet of 160 trucks specifically designated to transport grain imports. However, additional trucking capacity will still be required, and the collapse of private investment in trucking and spare parts distribution poses a problem.

9.3 Surface Distances

	<u>In Kilometers</u>										
	Ad	Am	As	Ds	Go	Ha	Jg	Jm	Ma	Na	Te
Addis	-	1076	861	397	748	523	628	335	1166	99	1432
Asmara	1076	-	1189	679	529	1599	1704	1411	115	1175	356
Assab	861	1189	-	510	1469	1384	1489	1196	1279	960	1545
Dessie	397	679	510	-	959	920	1025	732	769	496	1035
Gondar	748	529	1469	959	-	1271	1375	1083	644	847	885
Harrar	523	1599	1384	920	1271	-	105	858	1689	424	1955
Jigjiga	628	1704	1489	1025	1376	105	-	963	1794	529	2060
Jimma	335	1411	1196	732	1083	858	963	-	1501	434	1767
Massawa	1166	115	1279	769	644	1689	1794	1501	-	1265	471
Nazareth	99	1175	960	496	847	424	529	434	1265	-	1531
Tessenei	1432	356	1545	1035	885	1955	2060	1767	471	1531	-

Ad: Addis
Am: Asmara
As: Assab
Ds: Dessie

Go: Gondar
Ha: Harrar
Jg: Jigjiga
Jm: Jimma

Ma: Massawa
Na: Nazareth
Te: Tessenei

9.4 Railroads

Since the closure early in 1976 of the 506 km. Northern Ethiopian Railway connecting Massawa to Asmara and Akordat, Ethiopia's only railway is the Franco-Ethiopian Railway linking Addis Ababa with Djibouti, a distance of 782 km., 100 km. of which are in the Republic of Djibouti. The Railway is owned 50% by the Ethiopian Government, 27% by the Djibouti Government, and 23% by private French shareholders. Day-to-day operations of the Railway are managed largely by Ethiopians, with technical services located in Djibouti.

Although subject to considerable year-to-year fluctuations, freight traffic was growing rapidly until the recent disruptions. Imports and exports account for up to 80% of total freight traffic by weight, and about 90% by ton km.

Because of guerilla activities, operations declined drastically in 1976-77, and virtually ceased altogether from June 1977 to July 1978, seriously affecting supplies of grain, fertilizer, and building materials. Since re-opening, operations between Djibouti and Dire Dawa (about 300 km.) have been limited to daylight hours. In the December quarter of 1978, the Railway carried 40,000 tons of Ethiopian imports, about 2/3's of the December quarter figures prior to the disturbances. Ethiopian export traffic for the December 1978 quarter was 10,000 tons, less than 25% of the level prevailing before the disturbances. The Railway continues to suffer from sabotage, but damage has been limited to a few structures and items of rolling stock, and the Railway has been able to continue its track relaying program. There is still about 510 km. of the original 20 and 25 kg/meter rail, which restricts axle loads to 12.5 metric tons, and the railway is replacing this with 30kg/meter rail at the rate of 40-50 km. per year. However, the more immediate problem is poor locomotive and wagon availability, due primarily to an inadequate parts inventory (in the case of locomotives) and poor maintenance facilities (in the case of wagons). Six new 1200 hp locomotives and 50 wagons were procured in 1978 with Ethiopian Government funds, but half the locomotive fleet is still over 20 years old, and 60% of the wagon fleet is over 40 years old.

9.5 Ports and Shipping

Ethiopia is served by three ports: Massawa and Assab in Eritrea Province, and Djibouti in the Republic of Djibouti. Massawa serves the northern part of the country and Assab was developed as a major port in the 1950's to serve the central and southern parts. Assab's importance increased when a refinery was established in 1967; since then the port has dominated the trade in petroleum products, which accounts for over half its tonnage. Dry cargo, however, was distributed approximately equally between the ports until the disturbances of recent years caused most trade to be routed through Assab.

Massawa

Massawa is a natural port with six berths for ocean-going vessels with a total length of 900 m. However, in practice only two berths are suited to accept modern cargo ships; four other berths are now considerably less than the design depth of 9 m. due to lack of dredging for many years.

Covered storage and open stacking space are inadequate. The wharves and buildings are about 35 years old and the quay cranes about 30 years old, but almost all facilities are in worse condition than if they had been efficiently maintained. None of the cranes still in working order can lift more than five tons, and there is very little other handling equipment, almost all cargo being handled manually. In spite of the poor condition of facilities, capacity at Massawa is basically adequate; improvements are required principally to increase the efficiency of the port.

Assab

Assab is a man-made harbor with six deep draft general cargo berths, berths for four coastal ships, plus buoy berths for the oil refinery and the salt works. Most of the cargo through the port, with the exception of petroleum and salt products, is break-bulk. As with Massawa, the main deficiencies have been ill-maintained port equipment, undue reliance on manual cargo handling, and insufficient stacking and storage space. These deficiencies were revealed when dry cargo trade through the port more than doubled between 1974-75 and 1976-77 following disruptions to trade through Massawa and Djibouti. By late 1977 congestion at Assab was severe, primarily because of lack of equipment (especially to discharge grain and fertilizer in bulk). Government has since made substantial progress in removing these deficiencies. Forty forklifts and four mobile cranes have been procured and much discharged cargo is now immediately taken outside the wharf area to await loading for long distance truck haulage. Other improvements are underway. Dutch-financed bulk evacuators were expected to become operational around the middle of 1979, further improving grain unloading operations. The Marine Transport Authority is procuring eighteen quay cranes, which will be operational by the end of 1980. As there is only one such crane at the moment, this will dramatically improve port handling. Existing warehouse capacity is presently being doubled, and the open storage area increased.

Djibouti

Djibouti has seven general cargo berths and 3 petroleum berths. Operations follow a similar pattern to those at Massawa and Assab. While its relative importance as an import port declined following completion of the new road to Assab in late 1973, exports through Djibouti (mainly coffee, dried vegetables, sugar and cereals) almost doubled in the three years to 1974-75, and the port's share of Ethiopia's dry cargo trade remained stable through 1975-76. However, Ethiopian trade through Djibouti fell in 1976-77 following disruptions to rail sources, and fell to negligible levels in 1977-78 due to the virtual cessation of rail operations in that year. A road linking the port to the Addis Ababa-Assab road was

completed in late 1976, but road transport proved difficult with a round trip taking twice the time required for a round trip to Assab, and Ethiopia has virtually abandoned this alternative. (Difficulties include Djibouti limiting the number of trucks to 30 per day (in both directions), not allowing trucks to cross the border after 4 p.m., problems with border formalities, and lack of accommodation for drivers at the port.)

With the resumption of rail operations in July 1978, trade through the port has gradually built up again, but is well below 1976 levels. The national Ethiopian Shipping Line concentrates its operations on the Red Sea-Northern Europe route, carrying about 30% of Ethiopia's dry cargo trade on that route, or about 1/7 of the country's total dry cargo trade.

9.6 Civil Aviation

Ethiopia has developed a reasonably extensive system of airports and airfields which partly compensates for the lack of roads in many areas. Forty-three airports are nominally served by scheduled domestic services, though services have been curtailed since 1976 because of emergency conditions. In addition, there are 26 airstrips occasionally used for charter flights. Only four airports--Addis Ababa, Asmara, Dire Dawa, and Jimma--have paved runways, and jets can be accommodated only at Addis Ababa and Asmara airports, both of which have recently been improved. Most of the other airports are less than 1,500 m. long, unpaved, not equipped with night landing facilities, and have to be closed during part of the rainy season; several have been badly damaged during the hostilities of the past few years.

Ethiopian Airlines provides all scheduled domestic services and accounts for over half of international passenger movements. The Airline is procuring (with commercial credit) two new Boeing 727s at a cost of around US\$ 40 million to replace some obsolete aircraft on international services, and hopes to buy another four 727-200s by 1984 to add to its existing fleet of five Boeing 720Bs. The Airline is also considering new aircraft to replace its aging DC3s on the domestic routes; in contrast to earlier plans, the intention now is to buy short take off and land (STOL) aircraft, which will significantly reduce the required upgrading of domestic airports.

The following airlines serve Ethiopia: Air Djibouti, Air France, Air India, Alitalia (Italy), British Airways, CAAC (People's Republic of China), Cameroon Airways, EgyptAir, Kenya Airways, and Lufthansa (Federal Republic of Germany) serve Addis Ababa. Saudi Arabian and Yemen Airways serve Asmara only.

10. Energy and Communications

10.1 Electric Power

In 1977, 297,000 kW of installed capacity with 500 million kWh produced; 20 kWh per capita. Hydroelectric generating facilities in Aba Samuel, Addis Ababa, Awash I (Koka), Awash II (Nazreth II), Awash III, Bahar Dar, Debre Birhan, Debre Markos, Dembidollo, Derso, Ghion, Hagere Hiwot, Himma. Thermal generating facilities in 43 locations. Total production 1973-74 in ('000) kWh: 413,196; hydro - 282,935; thermal 130,261. Ethiopia has great power potential.

10.2 Radio Network and Telecommunications

Telecommunications Services of Ethiopia (TSE): P.O.B. 1047, Addis Ababa; autonomous, state-owned; responsible for all public, national, international telecommunications services in the country, and for transmission components of the national radio broadcasting system.

Radio Ethiopia: P.O.B. 1020, Addis Ababa; broadcasts in Amharic, Afar, Arabic, English, French, Galigniya, Oromoligna, Tigre, Tigrinya, and Somali. From Addis, 50% of broadcasts in Amharic, 16% in English. From Asmara studio, broadcasts in Tigre and Tigrinya; from Harar studio, in Oromo. Total listening audience 20 million.

Radio Voice of Revolutionary Ethiopia: P.O.B. 654, Addis Ababa; medium-wave local services; short-wave services in thirteen languages to Asia, the Middle East, Africa, and Madagascar; Amharic, English, and French most important broadcast languages. Station nationalized in 1977; formerly called Radio Voice of the Gospel.

10.3 Telephone Network

<u>Telephone System</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
Exchange capacity lines	63,630	67,470	68,455	70,210
% automatic	82	81	81	81
Main lines in service	39,062	43,986	48,188	50,670
Telephones in service	54,483	60,788	65,685	68,879
Waiters			2,100	
Public coinbox telephones	328	421	509	517
Local + LD calls (millions)	82.1	102.2	126.0	160.1
National out-calls (thousands)	36.4	48.7	54.5	66.3

<u>Telex System</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
Exchange capacity lines	334	334	334	543
Subscribers	220	261	277	277
Inland messages (thousands)	33.5	39.0	36.1	27.5
National out messages (thousands)	49.3	71.8	81.3	81.2

<u>Telegraph System</u>				
Telegraph offices	13	13	13	13
Inland messages (thousands)	108.3	115.2	109.6	131.7
National out messages (thousands)	116.0	122.9	111.8	86.2

10.4 Television

Ethiopian Television Service: P.O.B. 5544, Addis Ababa; television services were inaugurated in 1964; government-owned.

There are an estimated 25,000 sets in Ethiopia. A microwave link has been established between Addis Ababa and Asmara and there are plans for program transmissions from the capital to Dessie and Asmara.

1. Environment

1.1 Geographic Regions

The Lake Victoria Basin - Covering the southwest corner of Kenya, this basin extends eastward from the lake to the Mau Escarpment. Most of this area is composed of a level plateau (1,800-2,400 m. above sea level) bisected by the Kavirondo Gulf which penetrates inland from the shore of the lake about 80 km. Fertile soils and good drainage allow intensive cultivation of cotton, sugarcane, and foodcrops.

The central Rift Valley and highlands - The part of the Rift Valley that runs through Kenya is divided into two sections: the Mau Escarpment to the west and the Aberdare Range in the east. The Mau Escarpment extends from the Tanzania border more than 320 km. northward to the Cherangany Hills. Most of the important plateau areas of the western highlands (Trans-Nzoia, Uasin Gishu, Nandi, and Kericho) range in elevation from 3,600 m. to 4,200 m. above sea level; Mt. Elgon on the Ugandan border rises to 4,321 m. The eastern highlands of the Aberdare Range stretch from the Ngong Hills near Nairobi north to the Kaikopia plateau. Mt. Kenya, the country's highest mountain (5,199 m.), is part of this range. The valley between these two highlands is from 48-128 km. wide. The valley floor is about 610 m. at the Tanzanian border, rises to over 4,270 m. at Lake Naivasha, and then drops to 915 m. in the north around Lake Rudolph. A chain of shallow lakes separated by inactive or extinct volcanoes dots the valley floor. The terrain of the highlands varies from grassy plains to evergreen forests to barren mountains. Kenya's most fertile soils, consisting of dark brown loams, are found in the highlands.

The eastern plateau - The eastern plateau consists of the vast Nyika plain which slopes from the eastern highlands down to the coastal plain. The surface of the plain is broken by outcroppings of hills, including the Talta, Kasigau, Mach, and Kitul Hills. Vegetation is limited to thorn scrub and the entire region suffers from periodic drought. Human settlements are concentrated in the isolated hill areas, where the climate is less severe and where some grazing is possible.

Desert and semi-desert areas - To the north and northeast of the Nyika plain the land becomes increasingly arid. Most of northern Kenya and a small area around Lake Magadi in the southern Rift Valley can be described as semi-desert. The limited and erratic rainfall supports little more than stunted shrubs and bush. However, only the area on the east coast of Lake Rudolph is totally barren.

The Coast - The coastline runs for 536 km. along the Indian Ocean and is marked by bays, river inlets, and numerous offshore islands. In the

south the coastal plain is only 3-16 km. wide, limited on the west by a series of low hills. In the north the plain broadens into the 160 km. wide Tana Lowlands that extend across the Somali border. Vegetation varies; dense bush alternates with areas of forest and open glades. Coconut palms and mangrove thickets are found along the edge of the coast and in estuaries and lagoons, respectively.

1.2 Precipitation

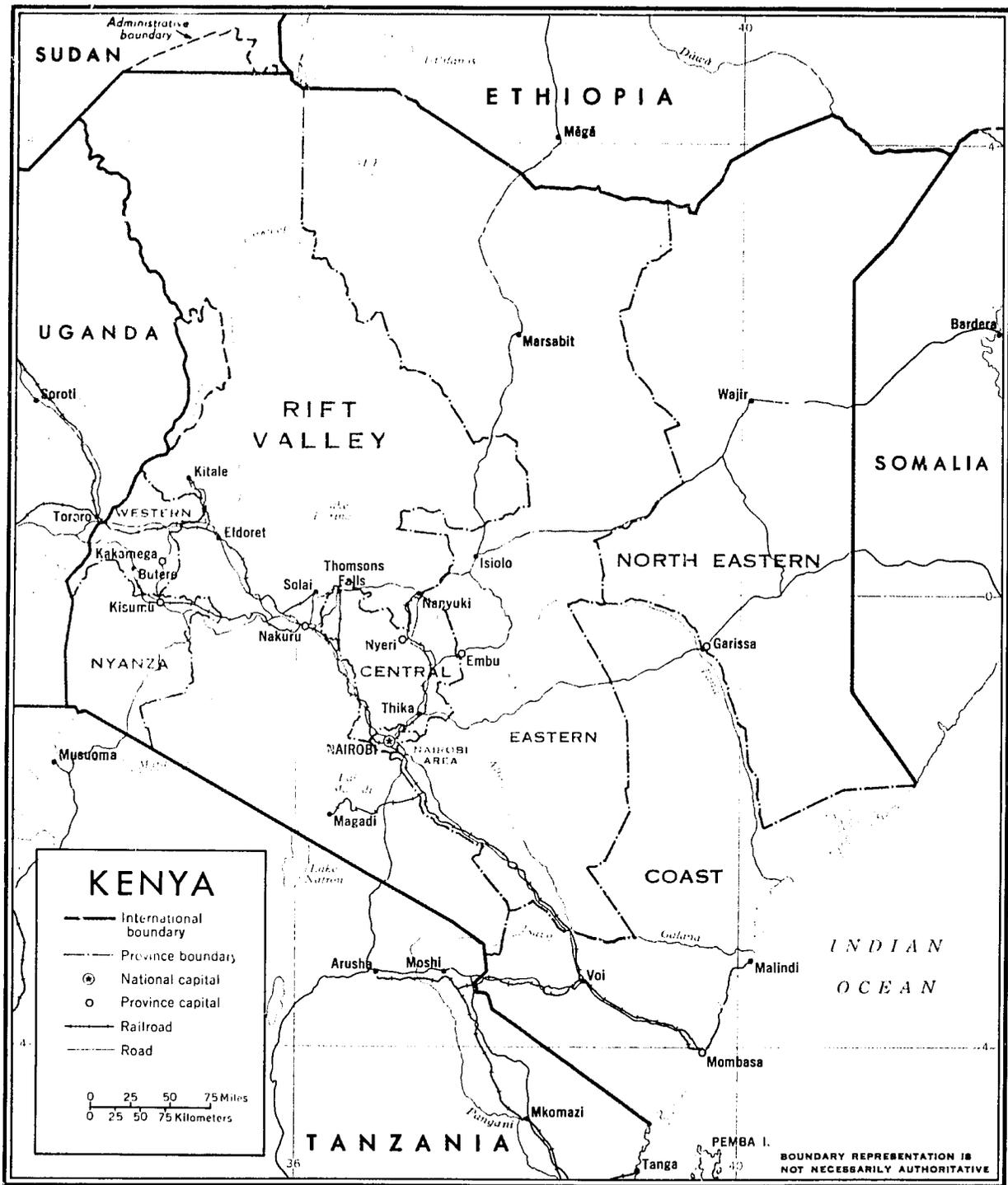
Seasons in Kenya are controlled by pressure systems of the western Indian Ocean and nearby landmasses. From December to March, NE winds blow to the north of the Equator, while to the south SE winds prevail. This period is relatively dry, although rainfall may occur locally. The rainy season lasts from late March to May, with the air stream coming from the east both to the north and south of the Equator. June through August are months of little rainfall and generally stable weather conditions. A transition period, October-December, brings more rain, particularly in the eastern highlands.

Local variations in rainfall occur according to changes in elevation and physical geography. Only 15% of Kenya's land area receives reliable and adequate rainfall for cultivation. These areas are the region around Lake Victoria, the highlands, and the coast. In the highlands rain is greatest on the eastern and southern slopes.

<u>Location</u>	<u>Annual Rainfall (mm.)</u>
Lake Victoria Basin	1,016 - 1,778
Highlands	508 - 1,524
Western (Mar-Sep)	1,143
Eastern (Mar-May; Oct-Dec)	889 - 1,524
Eastern Plateau	500 - 750
Arid regions	less than 500
Coast	1,000 - 1,500

1.3 Temperatures

Altitude is the main determinant of the temperatures in Kenya. In the Lake Victoria Basin, annual mean maximum temperatures range from 22° to 34° C and the mean minimum from 10° to 18° C. Temperatures in the higher elevations of the Rift Valley vary from 16° to 27° C, while the highland ranges often experience frost and mist with mean temperatures from 13° to



Base 75586 2 70

16° C. Mt. Kenya at an elevation of 5,200 m. is snow-capped year-round and supports small glaciers. On the eastern plateau annual mean maximum temperatures range from 18° to 22° C and mean minimums from 10° C to less than 6° C. Over the arid regions maximum mean temperatures are over 26° C and the minimum mean over 14° C. The coast has a mean annual temperature of more than 27° C.

1.4 Waterways

Kenya is drained by a network of small rivers and streams that are generally shallow and have seasonal variations in volume. The two most important rivers, the Tana and the Galana, rise in the eastern highlands and flow southeast into the Indian Ocean. Neither is navigable above its lower reaches, but the Tana River is being developed for irrigation and as a source of hydroelectric power. (See also Electric Power, section 10.1.) Most of the rivers that rise in the western highlands (the Nazoia, Yala, Mara, and Nyando) drain into Lake Victoria. Smaller rivers in the north and east are no more than intermittent streams or marshes.

Kenya has approximately 7,000 sq. km. of surface water within its borders and another 63,000 sq. km. when her share of Lake Victoria is added. The largest inland body of water is Lake Rudolph; others include lakes Baringo, Naivasha, Hannington, and Nakuru. In the past some of these lakes have provided good yields of fish but, due to problems such as overfishing and siltation, recent yields have been disappointing.

1.5 Land Use

Areas of good soils and adequate rainfall make up only about 15-17% of the total land area. Another 8-10% is marginal land where some agriculture is practiced but where drought is a continual problem. The remaining 75% of the land is arid or semi-arid and is inhabited only by nomadic pastoralists. This dry region extends from the Ethiopian border far into southeastern Kenya.

Of the arable land, approximately 12% is of high fertility and most is already under intensive cultivation; an additional 5% is land of medium potential. Only a small portion of the remaining land is suitable for dry-land farming or moderately intensive ranching. The scarcity of agricultural land has serious implications for both the growth of the agricultural sector and for population distribution. A high rate of growth among the

sedentary population is quickly decreasing the amount of farm land available for each family and is forcing people into more marginal lands. Here they become increasingly susceptible to drought and possible famine.

1.6 Environmental Problems

Soil erosion is a major environmental problem in Kenya. Soil loss rates are large both in areas of high agricultural productivity and in semi-arid regions. Although erosion has been most visible in the arid regions where gullies and eroded hillsides have marred the landscape, the problem has begun to have a negative impact in areas of intense cultivation. Factors that have contributed to increased environmental deterioration include overgrazing, intense cultivation of relatively poor soils, and deforestation (for the purpose of collecting wood needed for fuel and home construction). Since little replanting has taken place, some areas have been denuded of vegetation which in turn increases soil erosion. Silting is another environmental problem that is threatening hydroelectric, irrigation, and flood control projects on the Tana River. Kenyan and foreign donors are currently investigating methods of restoring the country's resource base while at the same time increasing productivity.

2. Disaster Vulnerability

2.1 Droughts/Food Shortages

Droughts in Kenya can be grouped according to their severity as follows:

National (or major) droughts - These directly affect production of more than 10-15% of the population. On the average, they last two or more growing seasons, generally occur across ecological zones, and often involve heavy livestock losses. Such droughts seem to occur about once a decade.

Regional droughts - These directly affect production of less than 10% of the population. They usually last one or two growing seasons; occurrence varies according to the kinds of crops, density of livestock, etc. On average two or three such regional droughts can be expected each decade. If stocking densities are low enough, nomadic pastoralists seem well adapted to getting through a single season's failure of rains by increasing the range of movement of their herds.

Local droughts - These probably occur every year somewhere in Kenya, especially in the marginal agricultural zones of the eastern plateau, which are the areas most susceptible to drought-induced famine.

In 1965 the March-May rains failed and a dry belt extended from Kitui through Samburu to Turkana, including the districts of Dwale Hinterland, Lama, Tana, Samburu, Marsabit, Tharaka, and Yandara. About 260,000 people were affected, and heavy stock losses were reported.

There was widespread failure of rain during the 1970 planting seasons. Livestock losses were particularly heavy in the Samburu region. Drought was again reported in 1973-74, and once again in 1979-80 which resulted in severe stock losses in the Turkana region. The food supply situation as of August 1980 was characterized as difficult, although the arrival of commercial maize imports and food aid was easing the situation. In the lowlands (central, eastern, and coastal regions) the outlook is poor; although the 1980/81 crop will be larger than in 1979/80, it will be insufficient for domestic needs.

Kenya - US Assistance

<u>FY</u>	<u>Type</u>	<u>Location</u>	<u>US Assistance</u>
1961-63	Drought & Flood	Ukambani; Masailand; Tana River lowlands	Food assistance valued at \$9.9 million

<u>Kenya - US Assistance</u>			
<u>FY</u>	<u>Type</u>	<u>Location</u>	<u>US Assistance</u>
1964	Flood	Central & Western regions	Food assistance valued at \$50,000
1966	Drought	Kitui thru Samburu to Turkana	Food assistance valued at \$3.4 million
1968	Drought	Central & Western regions	Food assistance valued at \$60,000
1971	Drought	Countrywide	Food assistance valued at \$350,000
1980	Drought	Turkana	Food & supplies valued at \$50,000

2.2 Floods

In late 1960 and 1961 there was severe drought, but it was followed in late 1961 and early 1962 by some of the heaviest, most widespread and continuous rainfalls on record. The areas most severely affected by the drought and subsequent floods were Machakos and Kitui in Ukambani; Kajardo and Narok in Masailand (including heavy stock losses); and the Tana River lowlands. In addition to major crop losses, flood damage to roads was also severe. At the height of the flooding, food relief had to be dropped from planes and helicopters to isolated areas.

2.3 Infestations/Pests

Desert Locusts - In plague years prevailing winds may carry desert locusts south into Kenya from Ethiopia and Somalia in September; they move north again when the winds change in February. Kenya has been affected by all four of this century's major desert locust plagues. A particularly notable invasion took place in 1928, when intensive breeding occurred. In January 1954 a swarm of locusts four miles long and ten miles wide invaded Nairobi's suburbs, the first penetration so far south in Kenya in modern times. As a result of control efforts by DLCO/EA, Kenya was not affected by the potential plagues of 1967-69 and 1978-79.

Migratory Locusts - Migratory locusts entered Kenya in 1930. They did the worst damage in 1931, when a substantial part of the maize crop was destroyed and milk yields dropped by 60% because of the destruction of pastures.

Red Locusts - Red locusts from the south also appeared in Kenya in 1930, part of a plague that overran practically all of Africa south of the Sahara.

3. Human Ecology

3.1 Population Overview

The population of Kenya in August 1979 was about 15,322,000. This makes Kenya the sixth most populous country in sub-Saharan Africa and tenth in the African continent. The 1969-79 intercensal population growth rate estimated at 3.4% per year is one of the highest in the world. Current demographic trends do not indicate any slowing down of population growth. In fact, the 1980 population growth may be approaching the rate of 4.0% per year. The main causes of this accelerated rate are the advances in public health and in an overall improvement in the standard of living. These have caused a decline in the death rate, especially of children, while the birth rate has remained constant.

Kenya's population forms "islands" of densely populated regions separated by extensive areas of sparsely inhabited land. The population is concentrated primarily in three distinct regions. Outside these three regions and excepting the administrative and trading centers, the rural landscape is dotted with isolated homesteads. The concentration of settlements is heaviest in the wetter areas, with settlements elsewhere being fewer, more distant from each other, and located primarily near water sources. In the arid areas, except for the transitory settlements of pastoral people, the land is very sparsely settled.

Kenya Population Change in Major Cities and Towns
1969-1979

	<u>1969</u>	<u>1979</u>	<u>% Increase</u>
Kenya	10,943,000	15,320,000	44%
Nairobi	509,000	835,000	64
Mombassa	247,000	342,000	38
Kisumu	32,000	150,000	369
Nakuru	47,000	93,000	98
Eldoret	18,000	50,000	178
Thika	18,000	41,000	128
Nyeri	10,000	36,000	260
Kericho	10,000	30,000	300
Kitale	12,000	28,000	133

	<u>Provinces</u>		
	<u>1969</u>	<u>1979</u>	<u>% Increase</u>
Central Province	1,676,000	2,348,000	40
Coast Province	944,000	1,339,000	42
Eastern Province	1,907,000	2,717,000	43
North Eastern Province	246,000	373,000	52
Nyanza Province	2,122,000	2,634,000	24
Rift Valley Province	2,210,000	3,240,000	47
Western Province	1,328,000	1,836,000	38

Source: Adapted from Kenya Statistical Abstract, 1978 and recent reports on 1979 census.

3.2 Population Distribution and Density

Kenya is divided into 8 provinces and 41 districts. The largest province is Rift Valley, with 30% of the country's total area and 20% of its population. The smallest in area is Nairobi, and the smallest with respect to population is North-Eastern Province. For the country as a whole in 1969, the average density was 19 persons per sq. km. The pattern of regional population distribution is primarily a function of the natural resource endowment of the land, mainly rainfall and soil fertility.

There are three major population concentrations: one in the west, near Lake Victoria, another in the central area, adjacent to Nairobi, and a third in the east, on the Indian Ocean coast. All districts with population densities above 100 per sq. km. are located in one of these high density areas. The lacustrine population in western Kenya coincides with agriculturally high-potential lands. District densities here are all above 100 persons per sq. km., e.g. 307 in Kisii, 222 in Kakamega, and 193 in Kisumu. In general, the density tends to increase from about 100 persons per sq. km. close to the lake shore, to well over 500 persons in parts of Kakamega and Kisii districts. This high density area merges eastwards into the western Rift highlands, where average densities range between 50 and 200 persons per sq. km.

The second main population concentration extends from the city of Nairobi northeastward to the Nyambeni Hills in Meru District; densities of 400 to 600 persons per sq. km. are found in southern Kiambu; and densities of 200 to 400 persons per sq. km. are characteristic of the Embu and Meru areas.

A third population concentration extends from the area west of the Tana River delta southward to the Tanzanian border, with average densities of from 50 to more than 500 persons per sq. km.

3.3 Urban/Rural Growth Rates

Although 90% of Kenya's population is classified as rural, growth rates in urban areas appear to be high; some estimate as high as twice the national growth average. Approximately 1.1 million people, or about 10% of the population in 1969, inhabited 48 towns. In 1974, the urban population had increased by some 45% to approximately 1.6 million, almost 13% of the total population. A continuation of this urban growth rate of 7.3% would double the urban population every ten years. However, this high urban growth rate is not uniform throughout the country. In Western Province, one of the most densely peopled and fastest growing provinces, less than 1% live in towns of more than 2,000. North-Eastern Province has not a single town with as many as 2,000 inhabitants. The largest number of towns with more than 2,000 inhabitants, the largest urban population, and the highest proportion of urban population are found in Rift Valley Province.

3.4 Migration

External migration has been negligible, but internal migration has played some role in population distribution. Available census data show that in recent years Rift Valley, Coast, and Nairobi Provinces have had sizeable gains in net lifetime migration through internal migration, while Eastern, Central, and Western provinces have had sizeable losses. In 1969, 40% of all lifetime migrants was rural-rural, and only about 33% was rural-urban.

Since two-thirds of male immigrants leave their wives in the country, about one-quarter of all urban wages are remitted to the rural areas. As increasing numbers of landless families join these migrants to take up urban residence, they impose a severe stress on health, water, and housing facilities. (See Section 5, Health, Sanitation, and Housing.)

Province	Population Growth	Natural Increase	Net Migration	Net Migration as % of	
	1962-69 (000's)	1962-69 (000's)	1962-69 (000's)	Natural Increase	Net Growth
Nairobi	164	101	+63	+62	+38

<u>Province</u>	<u>Population Growth</u>	<u>Natural Increase</u>	<u>Net Migration</u>	<u>Net Migration as % of</u>	
	<u>1962-69</u>	<u>1962-69</u>	<u>1962-69</u>	<u>Natural Increase</u>	<u>Net Growth</u>
Central	335	439	-104	-24	-31
Coastal	200	164	+35	+21	+17
Eastern	361	447	-86	-19	-24
North Eastern	24	24	-	-	-
Nyanza	480	458	+22	+5	+5
Rift Valley	433	370	+64	+17	+15
Western	309	303	+6	+2	+2
Kenya	<u>2,306</u>	<u>2,306</u>	-	-	-

Source: Data from the 1969 Kenya Population Census

3.5 Ethnic Groups

Kenya's modern population results from three different cultural influences: a pastoral influence which came with groups who arrived from the north; a settled agricultural, Bantu-speaking influence which came with groups originating to the south; and an Arabic (Swahili) influence which came with groups entering the area along the east coast. These early influences have been heavily altered by British colonial occupation which ended only in 1963 and by the independent Kenyan nationalism which has grown steadily both before and since that date.

Most of the principal tribal groups in Kenya have experienced a high growth rate. The most numerous tribe is the Kikuyu, numbering about 2.2 million and living mostly in Central and Rift Valley Provinces, whose implied average annual growth rate is 4.2%, much above the national average. High growth rates are also reported among the other major tribes. The Luo, 87% of whom live in Nyanza province, increased by 32.5% between 1962 and 1969; and the Luhya, 89% of whom live in Western Province, increased by 33.8%. The growth rate was very low among the Masai, 97% of whom live in Rift Valley Province, and among the Ogaden and Somalis, who live in the North-Eastern Province: the Masai increased by only 0.5%, and the Ogaden and Somalis actually declined in numbers by 25.9%.

Population Growth by Principal Tribal Groups, Kenya 1962-69 1/

<u>Tribes</u>	<u>1962</u>	<u>1969</u>	<u>% Change</u>
1. Kikuyu	1,642,065	2,201,632	34.1

Population Growth by Principal Tribal Groups, Kenya
1962-69 1/

<u>Tribes</u>	<u>1962</u>	<u>1969</u>	<u>% Change</u>
2. Luo	1,148,335	1,521,595	32.5
3. Luhya	1,086,409	1,453,302	33.8
4. Kamba	933,219	1,197,712	28.3
5. Kisii	538,343	701,679	30.3
6. Meru	439,921	554,256	26.0
7. Mijikenda	414,887	520,520	25.5
8. Kipsigis	314,771	471,459	37.9
9. Nandi	170,085	261,969	54.0
10. Turkana	181,387	203,177	12.0
11. Masai	154,079	154,906	0.5
12. Tugen	109,691	130,249	18.7
13. Embu	95,647	117,969	23.3
14. Elgeyo	100,871	110,908	10.0
15. Talta	83,613	108,684	30.0

1/ Kenyan tribes with population of 100,000 or above

Source: Data from Kenya population census 1969.

3.6 Refugees

Although Kenya's refugee population is not large, its predominantly urban and professional character has made it difficult and expensive to absorb. About 5,000 of the 6,000 refugees recently living in Kenya were Ugandans who fled the repression of the former Amin government. The other 1,000 refugees are from Ethiopia and other African countries. The Ugandan refugee population has undergone substantial change during the past few months. Many of the Amin-era refugees returned to Uganda following his overthrow but a roughly equal number fled to Kenya. Some of the most notorious of Amin's henchmen who fled were returned following extradition procedures and in August 1979, following a spate of robberies in Nairobi, several hundred Ugandans were summarily deported. The Kenyan government has since given its assurance that refugees will not be summarily returned.

4. Nutrition

4.1 Nutritional Status

The National Nutrition Survey conducted by the Central Bureau of Statistics in February-March 1977 found about one-third of rural Kenyan children in the one to four year age group to have mild to moderate Protein Energy Malnutrition (PEM). Another major problem identified was widespread anemia among women, especially pregnant women. Ongoing programs to combat these and related problems include: 1) various Ministry of Health programs, such as the MCH/Family Planning program and training of nutrition field workers at the Karen College of Nutrition; 2) the Ministry of Housing and Social Services' Family Life Training Centers; 3) numerous non-Government efforts such as P.L. 480 Title II, MCH, and pre-school feeding programs; and 4) missionary-operated MCH programs. In addition, a Food and Nutrition Planning Unit (FNPU) has been established in the Ministry of Economic Planning and Development to coordinate all nutrition-related programs.

4.2 Diet

Maize dominates the diet of both rural and urban dwellers in Kenya (except pastoralists); very little protein is derived from animal sources while fats and oils are rarely consumed.

While corn is eaten everywhere, it is eaten in conjunction with or alternately with sorghum in almost all areas except Central Province and the higher elevations of Eastern Province. Rice and wheat are in increased demand, especially in the urban areas, but their consumption is limited because of income level and geographic/ethnic background. Corn is used whole, boiled with beans, potatoes, onions, and green leaves in a popular Kikuyu dish known as Irilo. Corn is usually pounded before cooking, to crack the outer layer. The grain may also be eaten on the cob and roasted, especially when fresh. Corn flour is used with water to make a cream (uji), which may be drunk at breakfast, often with the addition of milk. In Nyanza it is eaten with vegetables and, when available, with meat and fish. Other cereals, especially sorghum, are cooked whole and frequently used with sour milk. The mixture is often allowed to ferment and becomes a kind of beer.

The usual roots and tubers are available, but manioc is common only in Nyanza, where it is either eaten alone or dried and made into flour and mixed with sorghum. The combined ingredients are ground and made into a thick paste called ugali. In the Central Province, European potatoes

are popular and the Government supports this promotion because of their yield and protein content. It seems that they are more popular in the cooler areas of the province. Potatoes are mashed with plantains and mixed with greens and legumes; meat is added occasionally.

Legumes are universal, eaten mixed with the ingredients described above, or ground into flour and made into a sauce to eat with ugali. Legumes are often the most important source of protein in the diet.

Meat is eaten only occasionally and is usually served in conjunction with some special feast or celebration. Roasted or stewed goat is the meat most commonly eaten. Fish is generally eaten only by people living along the shore of Lake Victoria and on the coast; it may be fried, stewed, or eaten dried and smoked.

Green leafy vegetables find a place in stews, but they are cooked for a long time which may be detrimental to their vitamin content. Fruits, except bananas, are eaten as snacks. Tea and coffee (wherever cultivated) are drunk, but beer is a favorite, made from sugarcane or from millet. Milk is used in uji or in tea, but is usually left to sour. As elsewhere in Africa, the main meal is in the evening. Quite often food for several days is cooked at one time, then stored. Morning and midday meals are customary, consisting of leftovers of the previous night's dinner. Breakfast is usually uji or tea. However, quite a substantial minority seems to skip either breakfast or the midday meal.

4.3 Food Programs: P.L. 480 *

The 1982 proposed Title I program is for 109,000 MT of wheat and yellow corn for a total value of \$15.0 million. The 1981 program is for 142,500 MT of wheat and yellow corn valued at \$18.0 million. The differences in both quantities and mix are due to the Mission's analysis of Kenya's food production in early 1980 resulting in the conclusion that Kenya's food problems are more serious than those attributable to the vagaries of climate. The decision to eliminate vegoli from Title I for 1980 through 1983 reflects the Mission's concern that its P.L. 480 program avoid interventions that may prove disruptive to Kenya's agricultural production sector.

The 1982 Title II proposed program includes 9,451 MT of commodities (NFDM, bulgar, rice, and vegoli) for a total C&F value of \$6.2 million. The program targets 149,500 recipients. The 1981 program proposal for 9,200 MT of commodities is similar to that programmed in 1982. It appears likely, however, that in the absence of accelerated increases in production, Kenya will require food assistance for the next decade.

In recent years, major Title II activities have been handled through Catholic Relief Services (CRS), Maternal and Child Health (MCH), pre-school children feeding (PSCF), and food for work (FFW) activities. One of the major constraints on Title II activities has been the high cost of inland transportation; this has adversely impacted on the program costs in the northern three-fifths of Kenya where food need is the greatest. During FY 1981 further expansion of MCH and FFW will be needed in Northern Kenya the area hardest hit by drought and famine. (See Agroecology, section

*Please note - data on P.L. 480 programs change frequently. For up-to-date information, see the most recent USAID Annual Budget Submission.

P.L. 480 Title I/III Supply and Distribution
('000 Metric Ton)

<u>Stock Situation</u>	<u>FY 1980</u>	<u>Estimated FY 1981</u>
<u>Commodity - Wheat</u>		
Beginning Stocks	30.1	27.0
Production	135.0	160.0
Imports	99.0	190.0
Concessional	(81.0)	(60.0)
Non-Concessional	(18.0)	(130.0)
Consumption	237.0 ^{1/}	290.0 ^{2/}
Ending Stocks	27.0	80.0
<u>Commodity - Maize</u>		
Beginning Stocks	49.9	50.0
Production	150.0	400.0
Imports	250.0	200.0
Concessional	(20.0)	(100.0)
Non-Concessional	(229.0)	(100.0)
Consumption	400.0	400.0
Ending Stocks	49.9	250.0 ^{3/}
<u>Commodity - Rice</u>		
Beginning Stocks	-	-
Production	23.0	28.0
Imports	34.0	36.0
Concessional	(10.0)	(10.0)
Non-Concessional	(24.0)	(24.0)
Consumption	57.0	60.0 ^{4/}
Ending Stocks	- 9	-

- 1/ Rationed up to February 1980.
- 2/ Assuming no rationing.
- 3/ Of which 100.0 MT is for strategic reserve.
- 4/ Assumes increased imports and unrestricted market.

Source: USAID, Annual Budget Submission, FY 1982.

4.4 Famine Relief

The normal "short rains" (October-November) did not materialize in Kenya's two-rainfall areas in 1979, causing severe shortfalls of food grains, reduced milk production, and heavy losses of livestock (cattle, sheep, and goats). The most severely affected areas were, in general, the nomadic pastoralist areas of northern Kenya. CRS, at the request of the GOK, and various missionary societies in Turkana (perhaps the worst of the famine stricken areas) provided 109 MT of bulgar wheat to northern Turkana to supplement GOK famine relief efforts. Despite the advent of the "long rains," famine conditions in Turkana will prevail for at least another six to nine months (through 1980). An estimated 35% of the people in northern Turkana have lost all or most of the livestock which is their exclusive or primary source of sustenance and new crops will not mature until late 1980. CRS plans further assistance to the people of Turkana during August, September, and October 1980 by using food commodities not scheduled or committed for other programs.

5. Health, Sanitation, and Housing5.1 Overview of Health

Information on the health status of Kenyans is limited. Until 1973, the reporting system collected weekly information on communicable diseases, and monthly or annual information on non-communicable diseases. A new information system on vital and health statistics has been in the process of development since 1974. This system, which covers all government, municipal, mission, and private health institutions (excluding only private practice clinics), was field tested during 1975 and 1976 in three areas: Kitui (Eastern Province) and Kwale (Coast Province) districts, and Mombasa Municipality all of which contain about 7% of the total population. During 1977, the system was extended to the remaining districts of Coast and Eastern provinces, and it will eventually cover the rest of the country.

1975 Outpatient Data from Old and New
Information Systems

	<u>Old System *</u> <u>Entire Country</u>	<u>New System</u> <u>3 Districts w/ 7%</u> <u>of Population</u>
Acute poliomyelitis	165	198
Infectious hepatitis	743	1,545
Kala-azar	110	1,074
Leprosy	276	722
Tetanus	544	144
Tuberculosis	4,676	1,464
Malaria (clinical)	355,682	316,829
Diarrheal diseases	17,969	143,163
Chickenpox	6,740	10,120
Measles	20,201	15,494
Meningitis	228	150
Mumps	4,084	5,590
Bilharzia (schistosomiasis)	8,904	20,752
Whooping-cough	6,442	9,070
Pneumonia	33,872	24,372

* Old system did not cover health centers, dispensaries, or non-government institutions.

Source: Social Perspectives, Vol. 1, No. 2 (August 1976)

5.2 Diseases

Malaria: hyperendemic below 2,000 m. (below 2,500 m. in Rift Valley) primarily in western and coastal areas. Main transmission periods are from April-June and from Nov.-Dec. except North Eastern, Nyanza, Western, and coastal provinces where it is year round. The risk is minimal in the Nairobi area, and in the Central and Rift Valley provinces.

Cholera: endemic in the western provinces since 1974, although fatality rates in recent outbreaks have been low.

Schistosomiasis: foci in plains around Kisumu, along the lakeshores, and in all irrigation projects. Control measures exist but they have been largely ineffective.

Leprosy: concentrated in the west and along the coast; foci also in central provinces.

Trachoma: occurs along the southern border areas, mainly in nomadic tribes.

Other Diseases: entero-parasitic diseases (ascariidiasis, giardiasis) especially prevalent in children. Scabies, measles, and whooping cough are important causes of death in malnourished children under 5 years of age. Poliomyelitis, tuberculosis, brucellosis, venereal diseases, snake bites, and hemorrhagic conjunctivitis are also problems.

5.3 Vital Statistics

Infant mortality /1000 live births:	126 (1978)
Crude birth rate /1000 population:	51 (1978)
Crude death rate /1000 population:	14 (1978)
Life expectancy at birth, years:	53 (1978)
Percentage of population w/ access to safe water:	17 (1975)

5.4 Health Services and Facilities

Government medical services have a three-tiered structure with national, provincial, and district levels. All curative and preventive

services are integrated at the provincial level with a medical officer (MO) seconded by a health inspector (HI), together acting as the managing team. Basic specialist services, X-ray facilities, and general laboratory facilities are available at provincial hospitals (300 beds). District level services are under a district medical officer (DMO) (also called Medical Officer of Health) and a district health inspector (DHI) with one or more junior medical officers; X-ray, and limited laboratory facilities are generally available at district hospitals (120 beds). At divisional (rural) level, facilities include approximately 165 health centers (each with a few beds), and 400 dispensaries with medical assistants or senior enrolled nurses in charge. Additionally, there are health inspectors responsible for preventive medicine. Less than 50% of health facilities are provided with piped water, while 70% of all water supplies are untreated. Less than 15% of all facilities have electricity, and over 60% of institutions lack proper facilities for water and waste disposal. Efforts are being made to integrate burgeoning tuberculosis activities, and well developed leprosy services. Non-governmental services (missions) throughout the country are reported to be excellent. Private hospitals and nursing homes are found in major towns; in smaller towns, general practitioners and specialists. Traditional healers play an important role, particularly in rural areas.

There are 36 rural health units in the Central province, 21 in the Coast province, 43 in Eastern, 52 in Nyanza, 64 in Rift Valley, and 25 in the Western province for a total of 241 rural health units in 36 districts.

Health Institutions and Hospitals, Beds & Cots by Province

	Health Institutions			Hospital Beds & Cots	
	<u>Hospitals</u>	<u>Health Centers</u>	<u>Health Sub-Centers & Dispensaries</u>	<u>No. of Beds & Cots</u>	<u>No. per 100,000 Population</u>
Nairobi	26	2	113	3,919	479
Central	45	31	158	3,758	168
Coast	23	18	129	2,420	188
Eastern	27	20	201	3,177	127
North-Eastern	3	3	16	313	115
Nyanza	33	30	144	4,065	137
Rift Valley	50	66	311	4,679	160
Western	<u>18</u>	<u>31</u>	<u>31</u>	<u>2,377</u>	<u>127</u>
Total	225	201	1,103	24,708	106

Source: World Bank, Kenya Economic Survey, 1979.

Percentage Distance From Health Centers, by Province

<u>Health Center</u>	<u>Central Prov.</u>	<u>Coast Prov.</u>	<u>Eastern Prov.</u>	<u>Nyanza Prov.</u>	<u>Rift Valley Prov.</u>	<u>Western Prov.</u>	<u>Total</u>
Under 1.0 mi.	3.97	4.36	3.30	2.14	8.52	6.68	4.10
1-1.9 mi.	13.87	16.13	11.03	13.76	9.63	7.00	11.83
2-3.9 mi.	43.47	23.31	16.20	42.25	23.73	37.32	33.46
4-7.9 mi.	30.04	20.28	30.06	30.37	39.47	23.69	29.15
over 8 mi.	8.65	35.92	39.41	11.48	18.66	25.31	21.46
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: World Bank, Kenya Economic Survey, 1979.

5.5 Health Personnel

The rural health system has been built around the use of paramedical rather than physician manpower; and rural health training centers have been developed to provide practical training for the clinical officers, community nurses, and health assistants who will staff the Rural Health Units.

In 1978 there was one physician for every 25,000 people (the figure in the United States was one for every 553); one clinical officer for every 13,800; one registered nurse for every 11,200; and one enrolled nurse for every 3,500. On the other hand, it has been estimated that Kenya has one traditional medical practitioner for every 250-400 people, and that 80% of births are supervised by a traditional nurse-midwife. Clearly these traditional practitioners are important resources. Moreover, it is not at all sure that the health needs of the population can be satisfied exclusively through a system of health centers with the current mix of health manpower.

Registered Medical Personnel, 1976-78

per 100,000 population

Doctors	9.50
Dentists	0.84
Clinical Officers (Gov't)	9.46
Pharmacists	1.59
Registered Nurses	41.14
Enrolled Nurses	51.26

Source: World Bank, Kenya Economic Survey, 1979.

5.6 Medical Supplies and Cold Chain

The Central Medical Store (Government) in Nairobi is in charge of distribution to all government as well as to non-profit services. A list of available drugs is published by the Store. Drugs in hospitals are often out of stock. Bulk imports by wholesale companies are available from travelling representatives. Private chemists are located in all major towns (Nairobi, Mombasa, Kitale, Nakuru). Private chemists and wholesalers are well stocked.

Good cold storage facilities are found in Nairobi. Provincial and district hospitals have moderate facilities. Some health centers and dispensaries have refrigerators. Refrigerated transport should be arranged in advance and is very limited.

5.7 Water Supply

Water problems are of two kinds. In the urban areas, about one-third of the population lacks adequate piped water and sewage disposal. In rural areas, about one-fourth of the population lives more than two miles from the nearest dry season water source. This imposes a heavy burden on women and children who daily must spend hours carrying water. In the Coast Province, almost five percent of the population lives beyond eight miles from the nearest dry season water supply. At present, 74% of rural households surveyed have a water source within one km., with a low of 41% in Coast Province and a high of 88% in Central and Western provinces. These figures do not necessarily describe access to safe water.

Distance to Water Supplies by Province 1975-78

Wet Season Drinking Water	Central Prov.	Coast Prov.	Eastern Prov.	Nyanza Prov.	Rift Valley Prov.	Western Prov.	Total
Under 1.0 mi.	88.47	66.84	85.26	83.53	90.05	91.07	85.94
1-1.9 mi.	10.98	23.35	10.80	14.89	9.90	8.70	12.08
2-3.9 mi.	0.55	9.36	2.62	1.58	0.05	0.00	1.60
4-7.9 mi.	0.00	0.44	1.18	0.00	0.00	0.23	0.34
over 8 mi.	0.00	0.00	0.14	0.00	0.00	0.00	0.03
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Wet Season Drinking Water	Central Prov.	Coast Prov.	Eastern Prov.	Nyanza Prov.	Rift Valley Prov.	Western Prov.	Total
Under 1.0 mi.	83.06	43.33	60.80	69.48	69.86	86.52	72.15
1-1.9 mi.	14.96	22.36	18.83	26.00	25.44	13.00	19.41
2-3.9 mi.	1.98	19.06	9.32	4.52	4.28	0.25	5.03
4-7.9 mi.	0.00	10.89	9.36	0.00	0.42	0.23	2.81
over 8 mi.	0.00	4.36	1.69	0.00	0.00	0.00	0.61
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Rural Survey Statistics and Kenya Statistical Abstract, 1978.

5.8 Housing

Lack of adequate housing for low income groups, especially in urban areas, remains a major problem. Surveys show that about 35% of all urban households exist in squatter settlements and slums which are characterized by: overcrowding; unauthorized construction of unplanned dwellings built of substandard materials; and lack of suitable water facilities and sewerage, increasing the danger of epidemic diseases and fires.

The government has identified lack of suitable land for housing, slowness in land acquisition, lack of physical development planning, lack of adequate water supply, and cumbersome approving procedures from local authorities as major hinderances to solving the housing problem.

Rural Housing Percentage Distribution of Main Dwelling Units by Number of Rooms and Province

	Central	Coast	Eastern	Nyanza	Rift Valley	Western	Total
One room	13.98	13.20	25.91	23.02	28.59	29.69	23.30
Two rooms	30.40	31.97	39.11	39.29	44.23	33.66	37.36
Three rooms	27.37	25.89	17.61	20.36	14.69	13.74	19.44
Four rooms	17.66	14.85	7.99	9.24	7.09	16.28	11.49
Five rooms	5.43	5.38	4.05	2.96	3.05	3.78	3.69
Six rooms	5.17	8.70	5.33	5.14	3.35	2.84	4.71
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Avg. # of Rooms per dwelling unit	2.91	3.02	2.46	2.50	2.23	2.42	2.54

	<u>Central</u>	<u>Coast</u>	<u>Eastern</u>	<u>Nyanza</u>	<u>Rift Valley</u>	<u>Western</u>	<u>Total</u>
Mean household size	6.95	8.04	6.74	6.58	7.51	7.44	6.97
Avg. # of people per room	2.39	2.66	2.74	2.63	3.37	3.07	2.74

Source: World Bank, Kenya Economic Survey, 1979.

6. Disaster Preparedness

6.1 Kenya National Plan

Kenya has no national disaster plan. Within the GOK data on regional conditions are received via a chain of information extending from local to regional levels. Relief committees do exist at the district level but information on their functions is not available. Requests for relief assistance are made to the President's Office where allocations are made for emergencies. The GOK is distributing some maize in the Turkana region; however, the government does not generally publicize problems.

6.2 Storage

There are adequate storage facilities available in Kenya for quarterly imports of CRS Title II commodities. There are 20 major inland warehouses as listed:

Gatanga, Isiolo, Karatina, Kiganjo, Kisii, Kisumu, Kitui, Lodwar, Longonot, Machakos, Marsabit, Meru, Mombasa, Nairobi, Nakuru, Naro moru, Ngong, North Kinangop, Ol Kalau, and Voi.

In addition to these central storage points, unlimited storage facilities can be utilized in Mombasa through CRS's clearing agents, Kenya Bonded Warehouse.

6.3 US Contact

U.S. Embassy
Cotts House, Wabera St., Nairobi
P.O. Box 30137; APO NY 09675
Tel. 334141
MDRO: Jack Slattery, Health/Nutrition Officer

6.4 International Organizations

DLCO/EA - Nairobi
Teshale Abebe, Officer in Charge

UNDP
Mr. C.P. Metcalf, Deputy Resident Rep.

World Food Program
Allen Jones

6.5 Voluntary Agencies *

CARE
Contact: Daniel Roth
P.O. Box 43864, Nairobi
Tel. 334300, 334311

Catholic Relief Services
Contact: John G. Mathews
Waiyaki Way & David Osloni Rd., Nairobi
Tel. 62171

CRS maintains a warehouse in Kitale which is the last outpost for supplies headed for Turkana.

Church World Service
Contact: National Christian Council of Kenya
P.O. Box 45009, Nairobi

Eastern Mennonite Board
Contact: Joseph C. Shenk
P.O. Box 47596, Nairobi
Tel. 28023

Food for the Hungry, Inc.
Contact: Richard Dukes
P.O. Box 14978, Nairobi
Tel. 60689, 61916

Lutheran World Relief
Contact: John C. Kamau
P.O. Box 45009, Nairobi

Mill Hill Missionaries
Contact: Rev. James Cowan, M.A.
P.O. Box 795, Kisumu

The Pathfinder Fund
Contact: Marasha Marasha
P.O. Box 48147, Nairobi
Tel. 334023

The Salvation Army

Contact: Joshua Ngugi
Box 40575, Government Rd., Nairobi
Tel. 27541

Seventh-day Adventists

Contact: D.M. Pettibone
P.O. Box 2276, Nairobi

World Vision Relief

Contact: MacMillan Kriru
P.O. Box 30646, Nairobi
Tel. 331017

- * Please note - for a detailed listing of voluntary agencies active in Kenya see the TAICH Country Report for Kenya, July 1980.

7. Agroecconomy

7.1 Overview of Agriculture

Kenya's economy is dominated by agriculture, although its share of GDP has declined slightly in recent years. In 1975 it accounted for 29% of the total GDP compared with 38% in 1954. More than half of the agricultural output is subsistence production.

The majority of Kenyans live in rural areas and depend on some type of agricultural activity for a living. Unfortunately, approximately 46 million of Kenya's 57 million ha. (80%) are unsuitable for agriculture or intensive animal husbandry use, although much of the 80% could be commercially utilized as range lands. Of the 20% arable land, much is already under cultivation. In the market sector a distinction is made between output from large and small farms. The large farms correspond mainly to what is left of European farming together with the plantations and estates, and the small farms correspond to African smallholdings.

Unlike many other less developed countries in Africa, Kenya produces a wide variety of cash crops which help to make its economy less vulnerable to fluctuations in export prices. Agricultural output, however, is greatly dependent upon the weather since there is as yet little irrigated production. The principal crops, in order of importance, are coffee, tea, maize, wheat, sugar, sisal, and pyrethrum which together accounted for 89% of the KSh 4,168 million output of crops in 1976. Except for maize, wheat, and some sugar, marketed crops are mainly for export. Livestock and dairy production are important activities, both for domestic consumption and export. In 1976 the value of output of livestock products was KSh 758 million, of which 60% was accounted for by meat and 32% by dairy products. Kenya's leading export crop is coffee. Most of the output is high grade arabica. A Coffee Marketing Board controls coffee production and handles much of its marketing.

7.2 Food Crops

Maize: Maize dominates smallholder production as well as the diet of both urban and rural dwellers throughout Kenya. 40% of cultivated land in Kenya is under maize production.

Maize is grown in six of Kenya's seven provinces (North Eastern Province is the exception). It is harvested throughout the year in some part

of the country with the exception of the long rainy season from April to June. Yields vary greatly in the higher areas of Nyanza and Western Provinces, averaging around four tons per hectare compared to less than one ton per hectare in the lower parts of Eastern Province (1975). Generally speaking, the further west in the country, the more reliable the rainfall which is an important reason why the western part the Kenya plays a major role as a maize growing area. The Rift Valley produces 45% of the total maize crop followed by Nyanza and Western provinces combining for 26% of maize produced in Kenya.

Maize is also an important source of supplemental income for rural smallholders. Despite the widespread cultivation of maize and other food crops, the poor smallholders are not considered self-sufficient in food production. It is estimated that only 42% of the total food consumption (55% being maize) is home grown. The remainder is purchased or bartered in the market place.

Wheat: Wheat provides approximately 5% of both the average Kenyan's calorie intake and total protein consumption. Although domestic demand for wheat is increasing at an annual rate of 8%, wheat production remains sluggish. One reason for the former is the growing popularity of bread as a convenience food, especially among low-income urban dwellers. However, people in rural areas consume more bread and wheat flour than do urban dwellers (about 70% of the bread and 65% of the wheat flour). Furthermore, wheat shortages affect rural areas first because production and transportation costs combine with political factors to ensure that urban areas are first in line during shortages.

7.3 Production

World market price fluctuations significantly affect the value of Kenya's farm produce. Agriculture's contribution to GNP rose substantially in 1977, but declined by 4.2% in 1978 when tea and coffee prices fell.

The volume of marketed coffee fell from the peak level of 97,000 tons in 1977 to 84,000 tons in 1978, but its value fell much more, from KSh 3,860 million to KSh 2,300 million.

Maize production has decreased nationally. Estimated total maize production for 1980 is 1.8 million MT compared to 1.3 million MT in 1979 and compared with about 2.2 million MT in 1976. This takes into account almost 16% inpost-harvest losses, a significant factor during periods of shortages. Maize accounts for almost 20% of all agricultural production and

48% of the value of food crop production in Kenya. Moreover, it provides 25% of agricultural employment and 77% of food crop employment. Nearly all small-holders grow either local or hybrid maize.

In contrast to a rapidly increasing demand for bread, national wheat production has fallen from a gross production level of 241,200 MT in 1967 to 135,000 MT in 1979. Land under wheat cultivation fell from 167,000 ha. in 1968 to 103,000 ha. in 1979. Yields per hectare have also declined over the past decade. Wheat is mainly grown on large scale farms accounting for over 70% of wheat acreage. Since independence, many large farms were subdivided into smallholdings with production shifting from commercial crops (such as wheat) to subsistence crops, including maize and pulses, and minor cash crops.

7.4 Land Use

The official definition of arable land classifies the quality of agricultural potential in terms of rainfall. Only 19% of the arable land thus classified falls into the high and medium potential categories (generally about 612.5 mm. annual rainfall). The remaining low potential land (below 612.5 mm.) is only marginally suitable for crop production and amounts to 81% of the arable land, distributed unevenly throughout the nation. While pressure on the land was alleviated during the years following independence by opening up large estates previously owned by Europeans to settlement by Kenyan smallholders, much of the high-potential land is now densely settled. Because of traditional ethnic landholding patterns some higher potential land is not fully utilized. With population growing at more than 3.5% per annum, pressure on land is mounting which in turn increases subdivision and landlessness in high-potential areas, and in settlement in semi-arid areas ill-suited to farming. The latter also poses a serious threat of environmental degradation.

7.5 Planting and Harvesting Dates

<u>Commodity</u>	<u>Planting season</u>	<u>Harvesting season</u>
Coffee (Arabica)	Mainly rainy season ²	October - March
Tea	Mainly rainy season ²	Throughout year
Barley	April - May	November - March
Corn:		
Long rains crop	April - May	October - February
Short rains crop	October - November	June

<u>Commodity</u>	<u>Planting season</u>	<u>Harvesting season</u>
Millet	April - May	October - February
Oats	April - May	November - January
Rice	April - May	December
Sorghum	April - June	October - February
Wheat	May - August	November - January
Cotton:		
Coast Province	May - June	September
Lake areas & Nyanza Prov.	May - September	November
Sisal	Throughout year	Throughout year
Bananas	Throughout year	Throughout year
Citrus	Throughout year	Throughout year
Mangoes	Throughout year	Throughout year
Castor beans	April - May	September - October
Groundnuts	May - September	December - February
Sunflower seed	May - September	December - February
Pyrethrum	Throughout year	Throughout year
Wattle:		
Mainly in Central Prov.	Throughout year	Throughout year
Sugarcane	April - May ³	May - December
Tobacco (two crops)	March - April	July - August
	September - October	January - February
Beans and peas	Throughout year	Throughout year
Manioc	May - June	January - February
Potatoes:		
Irish	April - June, October	Throughout year
Sweet	April - May	October - November

- 1 In all Provinces there are two crop-growing seasons: short rains, October - December; long rains, April - June.
- 2 Tea harvesting after 3 years from seed or cuttings.
- 3 Harvested from 12 to 18 months after planting.

Source: US Dept. of Agriculture, Planting and Harvesting Seasons for Africa and West Asia.

7.6 Exports

Over the past few years, the value of Kenyan exports has varied substantially. They increased from about KSh 4,600 million in 1974 to 9,800 million in 1977 after which they fell to KSh 7,400 million in 1978, rising only slowly to KSh 7,800 million in 1979. While there were minor changes in the quantity of exports, virtually all of the variation is due to price changes. The price of coffee increased more than four-fold between 1975

and 1977 while tea prices more than doubled during the same period. Accordingly, earnings from coffee and tea alone were greater in 1977 than all exports combined in 1975. However, in 1978, both tea and coffee prices fell, causing most of the decline in export earnings.

Exports: Changes in Value, Quantity and Price
(1978-1979)*

	1978	Value KSh '000		Change	% Change	
		1979			Value	Quan.
Coffee, unroasted	124,669.3	110,573.2	-14,096.1	-11.3	-9.6	
Tea	63,187.1	62,845.0	-342.1	-0.5	10.7	
Petroleum products	60,316.2	68,044.8	7,828.6	13.0	-16.0	
Meat and products	2,721.3	2,689.4	-31.9	-1.2	-12.8	
Pyrethrum	4,082.7	5,502.7	1,420.0	34.8	49.6	
Hides & skins, undressed	9,825.	13,770.4	2,945.5	40.2	20.1	
Soda Ash	3,684.3	5,556.5	1,872.2	50.8	34.4	
Fluorspar	2,556.8	1,983.8	-583.0	-22.7	-42.3	
Cement	9,008.2	8,346.7	-661.5	-7.3	-16.4	
Beans, peas, etc.	2,141.6	1,491.7	-649.9	-30.3	34.1	
Cashew nuts, raw	n.a.	56.6	56.6	n.a.	n.a.	
Cotton, raw	1,389.0	924.7	-464.3	-33.4	-10.6	
Pineapples, canned	9,583.1	9,316.0	-267.1	-2.8	-2.5	
All other items	67,731.6	83,888.0	16,156.4	23.9	n.a.	
Total	365,889.2	380,748.5	14,799.3	4.2	n.a.	

* Excluding re-exports

Source: World Bank, Kenya Economic Survey, 1979.

7.7 Food Imports and Outlook

Food supply outlook for 1981 (January/December): There are reports of famine in the arid and semi-arid areas in Northern Kenya. The difficult food supply situation experienced all over the country in 1980 is expected to continue in 1981. Recent information confirms that the 1980 maize crop (for consumption in 1981) was again below average (although better than in 1979) owing to persistent dry weather in the western portion of the country where most of the crop is harvested. The wheat crop just harvested has recovered from the poor 1979 level. Cereal import requirements for 1981 are estimated by the Government at 480,000 tons, only slightly below imports in 1980. Of the total requirements, 350,000 tons are in the form of maize, 15,000 tons rice, and 115,000 tons wheat. Despite the good wheat

crop this year, large wheat imports are needed reflecting a sharp anticipated increase in consumption. So far, about 60,000 tons of cereal are known to have been pledged as aid by the US and by WFP. There is no information on commercial imports made so far for arrival in 1981. (See Nutrition, section 4.)

Estimated Import Requirements in '000 MT
(Jan/Dec 1981)

<u>Cereal & Sources of Supplies</u>	<u>Total Requirements</u>	<u>Commercial Purchases</u>	<u>Allocated, Committed, or Shipped</u>	<u>Total 2 + 3</u>
Wheat:	115.0	0.0	48.7	48.7
USA (Title I, FY'81 Alloc.)		0.0	39.0	39.0
USA (Title II, FY'81 Req.)		0.0	3.4	3.4
WFP (No. 1230 Exp.)		0.0	6.3	6.3
Rice:	15.0	0.0	12.2	12.2
USA (Title I, FY '81 Alloc.)		0.0	10.0	10.0
USA (Title II, FY '81 Req.)		0.0	2.2	2.2
Coarse Grains	350.0	0.0	0.0	0.0
All Cereals	480.0	0.0	60.9	60.9

Source: AID Annual Budget Submission, FY 82.

8. Industrial Economy

8.1 Economic Overview

During the first ten years of its independence, Kenya's economy grew at a remarkable rate. Total GDP from 1964-73 increased 6.6% annually while both agriculture and manufacturing grew 4.7% and 8.4% respectively. Despite this rapid growth, however, Kenya today remains a poor, predominantly rural country dependent upon agriculture. In 1978 average per capita income was US\$320; agriculture accounted for one-third of GDP (1975-77) and 60% of export earnings. Continued economic growth as favorable as that in the post independence years is hindered by three basic problems: extremely fast population growth, an overly protected industrialization scheme, and slow growth of and lack of export diversification. (See Human Ecology, section 3. and Agroecology, section 7.)

Kenya's pattern of industrialization and its effects on export growth has been especially problematic. In general, recent industrialization has taken place behind a wall of heavy protection afforded by tariffs, quotas, and licensing while rapid growth of industry in the past was largely based on investments in fairly simple, import-substitution industries by multinational companies. This pattern of industrialization has had some unfavorable side effects. First, the industrial sector has become increasingly dependent on imported raw materials, components, and spare parts. Declines in exports or deteriorating terms of trade which force reductions of imports, therefore, have heavy repercussions on industrial production and employment. Second, the high levels of protection result in an "anti-export" bias by making it more profitable to produce for the domestic market than to export. Finally, the structure of production is relatively capital intensive and is not sufficiently based on use of domestic resources, including labor.

Although value added in the manufacturing sector grew at an annual rate of 10.5% between 1972 and 1978, manufacturing remains a relatively small part of Kenya's economy: 13% of GDP and 13% of modern sector employment in 1977. Among the most rapidly expanding sub-sectors between 1972-77 were: canned vegetables and fruit, leather and footwear, plastics, paper and paper products, metal products and, more recently, clothing, transport equipment, and electrical machinery. Meanwhile, meat, dairy goods, furniture, and nonelectrical machinery declined, and basic industrial chemical production stagnated. More moderate growth was registered by tobacco, textiles, grain milling, and miscellaneous foods.

Manufacturing in Kenya is regionally concentrated in six urban centers, Nairobi (50% of industrial output in 1972) being the most important, followed by Mombasa (19%). Four smaller industrial centers -- Kisumu,

Nakuru, Thika, and Eldoret -- accounted together for 13% of 1972 output. Kenyan industrial production in 1976 was highly concentrated in 420 firms and establishments, which contributed 86% of output and 89% of value added in that year. The small-scale industry sector (defined as firms with below 50 employees) consisted of some 3,340 "registered" firms in 1975. Most were very small "workshops" with an average of six employees, although there are also a few "modern" plants employing generally more than 20 persons, using imported equipment, with semi-automated production processes, and producing goods approaching international quality standards.

8.2 Industrial Production

Manufacturing Sector Structure of Production

<u>Industry</u>	<u>Percentage share in Total (projection)</u>		
	<u>1968</u>	<u>1978</u>	<u>1983</u>
Manufacture of food, beverages & tobacco	29.6	34.5	37.1
Manufacture of textiles, wearing apparel & leather industries	12.4	10.4	10.2
Manufacture of wood & wood products, including furniture	6.1	5.7	5.0
Manufacture of paper & paper products printing & publishing	7.6	4.6	4.6
Manufacture of chemicals & chemical products, petroleum, coal, rubber & plastic products	15.4	18.0	17.6
Manufacture of non-metallic mineral products, except products of petroleum and coal	5.9	7.0	6.2
Manufacture of basic metal industries, fabricated metal products, machinery & equipment	22.7	18.8	18.4
Other manufacturing industries	0.2	1.0	0.9
Total	100.0	100.0	100.0

Source: Kenya Development Plan, 1979-83.

8.3 ImportsPrincipal Commodities (KL '000)*

<u>Imports</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
Crude petroleum	67,027	86,822	93,470
Motor vehicles & chassis	27,169	22,961	23,620
Agricultural machinery & tractors	5,668	6,519	7,097
Industrial machinery (incl. electrical)	61,442	61,129	69,886
Iron and steel	23,442	15,563	28,172
Cotton fabrics	2,296	1,382	971
Synthetic fiber fabrics	8,760	5,976	3,301
Paper and paper products	19,941	11,130	7,599
Pharmaceutical products	7,423	7,595	6,734
Fertilizers	13,359	11,228	5,225

*One KL=20 KSh

Principal imports suppliers are the EEC, UK, US, Japan and, Tanzania.

8.4 Exports

As a result of the anti-export bias, exports have grown slowly and there has been a lack of diversification. From 1964 to 1972 the volume of exports expanded at an average annual rate of 4.6%. Between 1972 and 1974 export volume increased by an additional 11% but it has not risen above the 1974 level since then. To some extent this reflects the fact that Kenya's exports have been adversely affected by the collapse of the EAC and that there have been production problems in agriculture and industry.

Among Kenya's major manufactured exports, the volume of such primary and processed agricultural products as canned pineapples, canned beef, wattle extract, and cement has expanded rapidly. However, exports of more highly processed goods such as paint, clothing, and shoes have declined with the loss of neighboring markets, particularly in Uganda and Tanzania. (See Exports under Agroecconomy, section 7.)

Principal Trading Partners
(KL '000)*

	<u>1974</u>	<u>Exports</u> <u>1975</u>	<u>1976</u>
East African Community			
Tanzania	25,949	28,540	33,442
Uganda	39,676	32,910	33,162
Western Europe			
United Kingdom	18,700	22,691	36,072
Other EEC	46,204	38,303	82,813
Other	11,637	11,287	21,012
Eastern Europe	2,968	2,301	3,301
USA	8,028	8,409	18,378
Other Africa	30,258	33,578	41,245
Japan	5,364	6,333	4,551

* One KL=20 KSh

9. Transportation and Logistics

9.1 Road Network

The road network is unevenly distributed throughout the country with the heaviest concentration of roads in southern Kenya running from Mombasa on the coast, through Nairobi, to the Ugandan border. The classified road network consists of approximately 50,600 km.; of this, 4,300 km. are bitumen, 15,900 km. are gravel, and 30,400 km. are earth. The network consists of 10% international and national trunk roads, 16% primary, 68% secondary and minor, and 6% special purpose roads (such as agricultural, tourists, and settlement roads). The classification of the network reflects the projected economic role of the roads rather than their present function; many classified as trunk or primary are low-standard earth or gravel road having low traffic volumes and serving as feeder roads. About one-third of the paved roads are in poor condition and many of the earth and gravel roads have also not been maintained adequately. However, most urban areas are adequately served and paved; two-lane highways link most major centers. Reconstruction to make the road from Nairobi to Addis Ababa all-weather was completed in 1976 and there are plans to construct a major highway between Kitale and Juba, Sudan. The GOK has also announced the construction of 14,000 km. of rural access roads by 1982.

The Ministry of Works is responsible for administration, construction, and maintenance of the classified highway system. Over 7,000 km. of roads have been constructed since 1970 and, with the assistance of the World Bank, Kenya has developed a road construction and maintenance program to improve road transport in the 1980's.

Road Network by Classification and Road Type, 1977 (Km)

	<u>Bitumen</u>	<u>Gravel</u>	<u>Earth</u>	<u>Total</u>
International Trunk	1,674	1,152	n.a.	2,826
National Trunk	710	1,172	521	2,403
Primary	1,135	4,271	2,474	7,880
Secondary	341	3,617	6,206	10,164
Minor	87	2,867	21,171	24,125
Special Purpose 1/	<u>384</u>	<u>2,789</u>	<u>n.a.</u>	<u>3,173</u>
Total	4,331	15,868	30,372	50,571

1/ Includes Government access, township, municipality, settlement, strategic tourist, sugar, tea, wheat, and Special Rural Development roads.

Source: World Bank: Kenya Highway Sector Project, 1979.

Vehicle Fleet, 1973-76 1/

<u>Year</u>	Passenger Cars, Utilities <u>Pick-ups</u>	Trucks & <u>Trailers</u>	<u>Buses</u>	Motor- <u>cycles</u>	Other 2/ <u>Vehicles</u>	<u>Total</u>
1973	116,945	15,302	3,523	8,966	9,486	164,222
1974	130,939	27,635	4,196	10,332	10,986	184,086
1975	142,025	29,476	4,605	11,312	12,294	199,712
1976	152,998	31,504	5,017	12,608	13,607	215,734

% of total
registra-
tion (1976)

71% 14% 2% 6% 6%

1/ Vehicles for which licenses are renewed, plus those registered for the first time. Includes all Government vehicles except military vehicles.

2/ Includes road construction vehicles, farm tractors, and three-wheelers.

Source: World Bank, Kenya Highway Sector Project, 1979.

9.2 Railways

The rail network covers about 2,100 km., comprising one main line extending 1,095 km. from the port of Mombasa via Nairobi to the Uganda border, where it links up with the Ugandan Railway, and 1,000 km. of branch lines. The network is managed by Kenya Railways (KR) established in early 1977 following the breakup of the East African Railways Corporation.

Most long-distance bulk cargo between Mombasa and the Ugandan border is transported by rail, although since the late sixties an increasing proportion has gone by road. Railway stock has been declining in recent years and Kenya Railways is in the process of acquiring new rolling stock from the US, the UK, and Sweden.

Branch Lines

Voi to Kahe (on the Tanga-Arusha line in Tanzania)

Konza to Magadi via Kajiado

Nairobi to Nanyuki via Sagana

Nakuru to Butere via Molo, Chemelil, and Kisumu

Leseru to Kitale

9.3 Ports

Mombasa, Kenya's principal port, handles most of the country's imports and exports as well as transit traffic for Uganda, Rwanda, Burundi, and parts of eastern Zaire. The port's capacity is estimated at about 3 million tons per year. There are also two smaller ports: one on Lamu Island and the other at Malindi, 96 km. northeast of Mombasa. The port at Malindi has an open harbor with anchorage for ships of any size, but it is exposed to monsoons.

Mombasa

The port has two harbors: Kilindini Harbor on the southwest side of Mombasa Island and, on the east side of the Island, Mombasa Old Port which is entered between Ras Serani and Mackenzie Point about 0.8 km. north-northeast. The entrance channel to the Old Port has a minimum depth of 11.89 m. This harbor is only used by dhows, small coasting vessels, and bulk-cement carrying vessels of limited size.

Kilindini is a fine sheltered harbor and it affords anchorage to all classes of vessels in depths of from 12.8 to 27.5 m., or vessels may secure to buoys or to the quay in depths of from 8.5 to 10.5 m. The anchorages provide sufficient accommodation for 12 vessels at single anchor to which vessels are directed under the guidance of a pilot. The holding ground is good, bottom mud. Mooring buoys are situated on the western side of Kilindini Harbor for four vessels up to 213.35 m. in length; draft is unlimited. Four mooring berths S.E. of Ras Kilindini are used for small vessels.

The entrance from the sea is by an approach channel dredged to a maximum depth of 12.19 m. on a transit of 327° (Mackenzie Leads) 3 km. from Ras Serani lighthouse, thence indirectly to the harbor between Ras Mwa Kisenge on the mainland and Ras Mzimili on the south end of Mombasa Island about 1.1 km. to the S.W. of Ras Serani lighthouse.

Deep water quays have depths at L.W.O.S.T. of 10 m. The 18 berths are numbered from 1 to 18. There are two tanker berths giving facilities for bulk handling of black and white oils. In addition there is a lighterage and coaster wharf with two 3-ton quay cranes (fixed) for handling of packaged oil, as well as two other general cargo lighterage wharves, total length 411.4 m. The deep water general cargo berths are served by electric level luffing portal cranes with lifting capacities ranging from 3-7 tons and are equipped with 10 transit sheds, 3 of which are double storeyed, with a total floor area of 75,580 sq. m. Attached to one of these sheds is a 15-chamber cold store with a capacity of 2,867 cu. m. The lighterage wharves provide nine handling points and are served by fixed electric quay cranes and six transit sheds having a total floor area of 16,250 sq. m.

Other storage premises include two sheds with a floor area of 9,208 sq. m., a customs warehouse with 1,115 sq. m. floor area and a coal stacking area. There is a floating crane of 60 tons capacity.

Deepwater berths 16, 17, and 18 are now complete. The berths have ancillary transit sheds and stacking areas and have been designed for easy conversion to container berths. Also completed is a new cold store, capacity 1,233 cu. m.

Construction of new depot outside port area. Dredging of entrance and extension to bulk handling wharf at Mbaraki underway.

Working hours on weekdays; two shifts - 07.00-15.00 and 15.00-23.00; Saturday, two shifts - 07.00-12.30 and 12.30-18.00 hrs. Sundays and public holidays constitute overtime.

9.4 Airports

Nairobi is one of the major aviation centers in Africa. Construction of a new international airport complex in Nairobi was completed in March 1978. International air transport services are provided to Nairobi by over 20 airlines on a scheduled basis, and by about 15 on a non-scheduled basis. Mombasa has its own international airport. Domestic services are provided to 4 other smaller airports (Malindi, Kisumu, and two smaller Nairobi airports) and several game parks. Air transport is of major importance to the tourist industry since the majority of tourists travel to Kenya by air, and many are transported within Kenya by chartered aircraft. Air transport is also important for Kenya's rapidly expanding export of perishable horticultural and farm products which go principally to Europe. These exports increased from 1,476 tons in 1968 to 25,077 tons in 1977.

9.5 Airlines

African Cargo Airways Ltd.: P.O.B. 46020, Nairobi; air-cargo subsidiary of African Safari Airways; operates throughout Africa, Europe, and the Gulf area; fleet of one Britannia 300F.

African Safari Airways: P.O.B. 46020, Nairobi; international tour flights; fleet of one DC-8-50F.

Kenya Airways Ltd.: P.O.B. 19002, Nairobi; services to London, Frankfurt, Cairo, Copenhagen, Athens, Rome, and Zurich; also to the Middle East, Ethiopia, Nigeria, India, Mauritius and Seychelles, and Zambia; internal

services are operated from Nairobi to Mombasa, Malindi, Kisumu, and Mumias; four Boeing 707, one DC-9-30, three Fokker F-27-200, and two Boeing 720B.

The following international airlines run regular services to and from Kenya: Aeroflot, Air France, Air India, Air Madagascar, Air Malawi, Alitalia, British Airways, British Caledonia, EgyptAir, El Al, Ethiopian Air Lines, KLM, Lufthansa, Olympic, Pan African Airlines (Nigeria), Sabena, SAS, Sudan Airways, Swissair, TWA, and Zambia Airways.

9.6 Air Distances

Nairobi to:	<u>Statute Miles</u>
Arusha, Tanzania	146
Dar es Salaam	415
Juba, Sudan	564
Khartoum	1,205
Kilimanjaro	146
Kisumu	151
Malindi	256
Mombasa	246
New York	7,349
Paris	4,033
Rome	3,343
San Francisco	9,598
Seychelles	1,304
Zanzibar	374

10. Energy and Communications

10.1 Electric Power

Hydroelectric power is the main indigenous energy source in Kenya. The hydroelectric potential of the country is estimated at 6,000 MW (30,000 GWh per annum); however, half of this is located on small rivers which would be uneconomical to develop. The remaining 3,000 MW is on the Tana River, but only about 800 MW would be cost-effective to develop. At the present about 300 MW have been developed through the construction of three power stations (Kindaruma, Gitaru, and Kamburo) about 112 km. east of Nairobi. Electricity is supplied by 3 companies: The East African Power and Lighting Company, Ltd. (EAP&L), The Kenya Power Company, Ltd. (KPC), and The Tana River Development Company, Ltd. (TRD). EAP&L coordinates all power development, manages and staffs the other two companies, and is the sole distributor of power in Kenya.

Power is limited to the central and southwestern sections of the country and along the southeast coast. There are several isolated diesel installations in the north and east but only 6% of the total population has access to electricity resulting in an average consumption of about 90 kWh per capita (1978). Industry is the primary user of electrical energy in Kenya. Supply: 240 volts, 50 cycles AC, triple phase; 415 volts, volts, triple phase are available if heavy power is required.

Most of the electricity sold by EAP&L is distributed through an interconnected system covering five major areas of Kenya: Nairobi, Mount Kenya, Coast, Rift, and Western Districts. Power is supplied to some of the large centers in outlying areas by isolated diesel stations. There are also numerous small privately operated generators, mostly isolated and used for standby purposes. The three largest hydroelectric power stations (Kindaruma - 44 MW, Gitaru - 145 MW, and Kamburu - 94 MW) are owned by TRDC, and the 98 MW Kipevu steam station located at Mombasa is owned by EAP&L. Two smaller hydroelectric developments, Tana (10.4 MW) and Wainjili (7.4 MW) are owned by KPC. The remaining four very small hydroelectric installations (3.3 MW in total) together with eight diesel-electric stations, the Nairobi South, and the gas turbine plant, are owned by EAP&L. All of these generating stations are interconnected by means of 132 kV and 33 kV transmission and subtransmission lines. This system is linked to Uganda by a 132 kV double-circuit transmission line for the transfer of 30 MW bulk power. EAP&L also operates four isolated diesel-electric power stations with a total of 2.2 MW in the northern and eastern parts of the country.

10.2 Petroleum

The main source of primary energy is imported oil and petroleum products. During the period of 1973-78 imported fuels accounted for 80% of Kenya's total energy consumption. Except for small amounts of specialty oils and greases, most of the imported crude is processed at a refinery in Mombasa. Between 1973-78, an average of about 2.7 million tons of crude oil per annum was refined; of this total about 1.5 million tons per annum were used domestically while the remainder was exported to neighboring countries. During 1973-78, the net value of oil imports averaged about 17% of the total value of Kenya's merchandise imports.

10.3 Other Energy Sources

Geothermal power has the greatest potential as a new source of electric power. Although geothermal exploration has been underway for some time, its development has only recently become cost effective. The most promising site is at Olkaria in the Rift Valley near Lake Naruasha about 100 km. from Nairobi. Two other potential sites at Lake Hannington and Eburu have not been explored.

No oil or gas reserves have been found in Kenya, despite continuous searching. There are also no known coal reserves. In rural areas, firewood and charcoal are used extensively while bagasse is used as a source of fuel by the sugar industry.

10.4 Telecommunications

In December 1977, the Kenya Posts and Telecommunications Corporation (KPTC) was created as an autonomous GOK-owned entity under the Ministry of Power and Communications. KPTC is responsible for maintenance and operation of local and national telecommunications services, international telegraph and telex services, and operation of international telephone services. In addition, it handles all domestic and international postal services. Kenya External Telecommunications Company (KENEXTEL), the other operating telecommunications organization, is a state-owned company, responsible for operation of the international automatic telephone exchange and the earth satellite station.

Average telephone density is about 1.0 telephones per 100 population (1977). Telephone service is concentrated in the Nairobi area where density is 10.8 telephones per 100 population. Telephone density in the rest of the country is approximately 0.4 per 100 population. All ten prin-

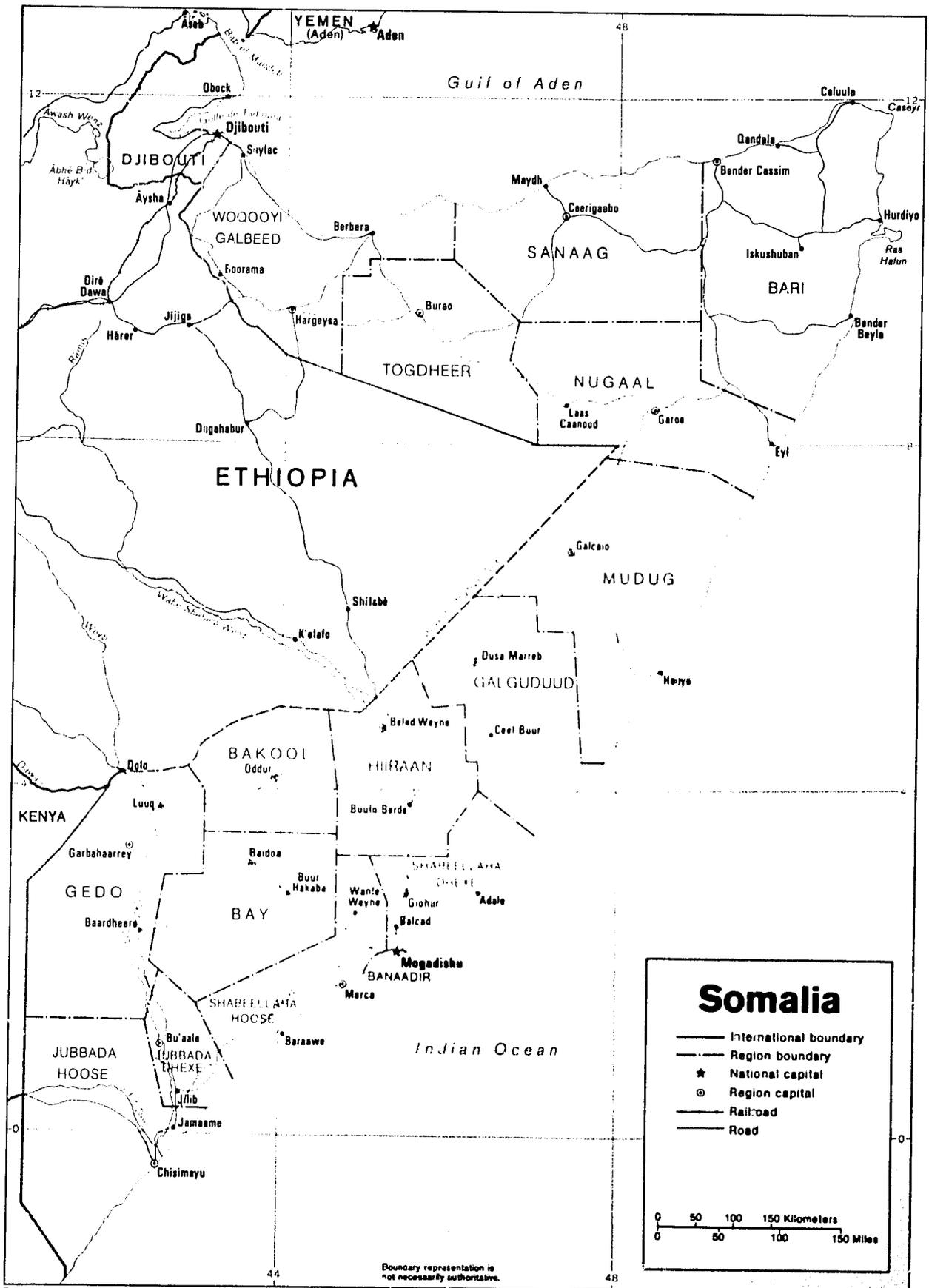
cipal towns (those with populations exceeding 19,000), 73 of the 86 urban centers (district administrative headquarters with populations of more than 2,000), 62 of the 150 urban centers, 31 of 420 market centers, and 18 of 1,018 local centers have local and/or long distance telephone facilities. Telegraph service is generally available except at local centers.

10.5 Radio Network

The Ministry of Information and Broadcasting is responsible for Voice of Kenya, the national broadcasting service. Voice of Kenya (P.O.B. 30456, Nairobi) operates three services: a national service in Kiswahili; a general service in English; and vernacular programs in Hindustani, Kikuyu, Kikamba, Kimeru, Kismasai, Somali, Borana, Luluyia, Kalenjin, Kisi', Kurra, Rendile, Teso, Turkana, and Luo. There were 525,000 radio receivers in 1977.

10.6 Television

Evening television service is provided by Voice of Kenya Television. There is one station that broadcasts in English and Swahili. There were 60,000 TV receivers in 1977.



Boundary representation is not necessarily authoritative.

1. Environment

1.1 Landforms

The 3,000 km. coastline is characterized by level sand, mud or salt flatplain, sometimes backed by dunes, except from Hargeisa to Cape Guardafui where the northern highlands form the shore. Coral reefs 3-16 km. offshore parallel much of the coast necessitating ships to anchor offshore at most ports. (See Ports, section 9.5)

The northern coastal plain, the Guban (literally "burnt land"), varies in width from about 55 km. in the west to as little as 2-3 km. in the east. Broad, shallow watercourses that are dry except in the rainy season traverse the plain. Most of the year this semi-arid, scrub-covered area is hot and dry. However, when the rains arrive vegetation is quickly renewed and for a short time provides some grazing for nomad livestock.

Away from the coast the plain rises to form rugged mountain ranges that extend from the northwestern border with Ethiopia east to Cape Guardafui. Elevations of these mountains average between 1,800-2,100 m. Somalia's highest point, Surud Ad, which rises to over 2,400 m. is located near the town of Erigavo.

To the south, the mountains descend in ridges, broken by dry watercourses and isolated valleys collectively known as the Ogo. This region merges into an elevated plateau which gradually slopes toward the Indian Ocean. The eastern section of the central plateau is particularly arid and during the drought of 1974-75 it was a major disaster area. The western portion receives more rain and can support some dryland farming. This is also an area of permanent wells which provides a base for the nomads during the dry season.

The western plateau slopes southward and merges into the broad undulating plain known as the Haud. This area provides some of the best pasturage for livestock, despite the lack of rainfall for much of the year. In addition, natural depressions flood during the rains to become seasonal lakes. The Haud extends for over 160 km. into the Ogaden region of Ethiopia.

Southwestern Somalia is dominated by the country's only two permanent rivers: the Juba and Shebelle. Favorable rainfall and soil conditions make this entire region a fertile agricultural area and the location of most of the sedentary population. (See Agroecology, section 7.)

1.2 Precipitation

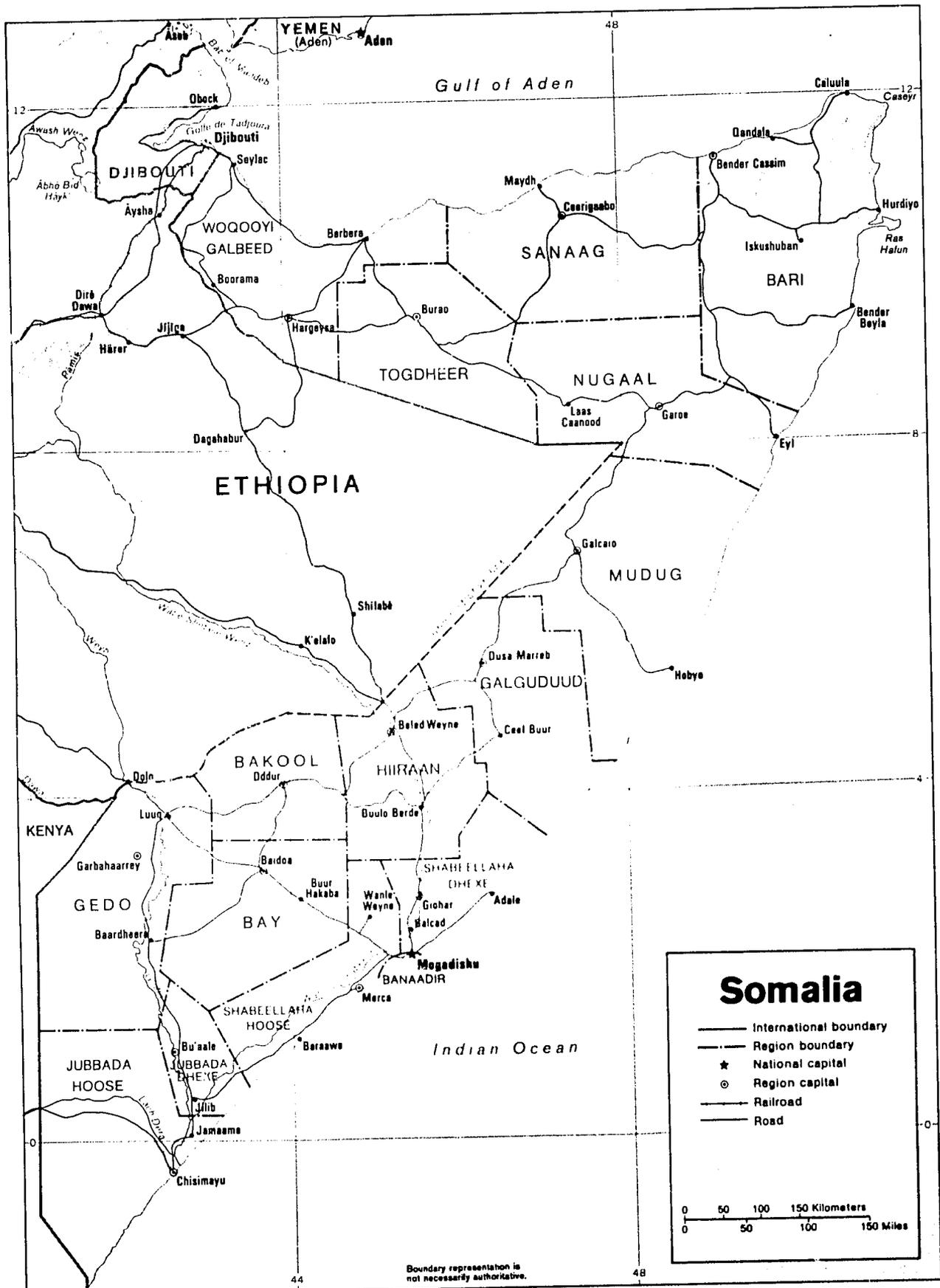
Rainfall is the major factor influencing much of Somali life. The time of arrival and the sufficiency of rainfall are major determinants of whether grazing land will be adequate to support livestock and the nomadic population. There are four seasons, two wet and two dry. These are determined by the flow of monsoon winds, from the northeast during December-March and from the southwest during June-September. Since the main flow of monsoon air parallels the coast, most rain falls during transitional periods, April to June and October to December, when winds are variable.

<u>Season</u>	<u>Months</u>	<u>Comments</u>
Jilal	Jan-Apr	Hot, dry, dusty winds from NE monsoon. Harshes time of year for nomadic groups.
Gu	Apr-Jun	Transitional period which brings the country's heaviest rains.
Hagaa	Jun-Sep	Longest season; SW monsoon brings dry winds. Showers occur along coastal areas.
Dayr (der)	Oct-Dec	Short Intermittent rains

Most of the country receives less than 500 mm. of rain annually. Except in the higher elevations which may receive over 508 mm. of rainfall, most of northern Somalia receives only 50-152 mm. annually. The southwest receives an average of 330-500 mm., and some coastal areas more than 508 mm. Rainfall comes in showers or localized rains and is characterized by extreme variability that must be taken into account when developing rain-fed agricultural schemes. (See Rainfed Agriculture, section 7.2.)

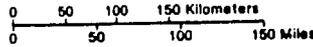
1.3 Temperature

Mean daily maximum temperatures range from 29°C to 41°C. Mean daily minimum temperatures usually vary from 15°C to 29°C. Temperatures are lower at the higher elevations and along the Indian Ocean coast. In the north, especially the northwestern highlands, winters are cool with



Somalia

- International boundary
- - - Region boundary
- ★ National capital
- ⊙ Region capital
- Railroad
- Road



Boundary representation is not necessarily authoritative.

occasional frosts and frequent fog. The summer mean daily maximum is generally about 29°C, but temperatures as high as 49°C have been recorded in the coastal plain along the Gulf of Aden.

The south has an equatorial climate with less extreme temperature variation than northern regions. Temperatures range from about 18°C to 41°C; February-April are the hottest months. Coastal temperatures are usually 2-3°C cooler than those inland.

Temperatures are generally warm to hot year-round, except in the northern highlands. Precipitation is limited and variable, usually falling as short heavy showers or thunderstorms, but humidity may be high, especially in coastal areas. Blown dust and/or haze may restrict visibility in lowland areas.

		<u>Temperatures</u> (Centigrade)				
<u>Station</u>		<u>Jan</u>	<u>Apr</u>	<u>Jul</u>	<u>Oct</u>	<u>Extreme</u>
Berbera	max	29	32	42	33	47
	min	20	25	31	24	15
Mogadishu	max	30	32	28	30	36
	min	23	26	23	24	15

1.4 Vegetation

Except in a few areas where irrigation or sufficient and reliable rainfall permits crop production, most of Somalia is suitable only for livestock grazing.

Northeast and north central - Some scattered scrub trees, acacia, and coarse grass. Semi-desert vegetation.

Northern highlands - As elevations and rainfall increase, vegetation becomes denser. Vegetation includes: aloe, mimosa, small groves of cedar, juniper, wild fig, and gob (cherry-apple) trees; aromatic bushes from which myrrh and frankincense are derived are also found here. The area encompassing Hargeisa is covered by woodland, and in some places, extensive grassland. Sorghum and maize have been grown here since the 1930's and it is the only region outside southwestern Somalia that has a significant number of sedentary cultivators. (See Agroecology, section 7.)

The Haud - This semi-arid region is covered with scattered trees, mainly acacias, and grasses. Scattered scrub and grass clumps are also found along the Indian Ocean coast. However, overgrazing, particularly in the area between Mogadishu and Kisimayo has resulted in the destruction of protective vegetation and the gradual movement inland of coastal sand dunes.

Juba and Shabelle river valleys - Somalia's major agricultural zone. Relatively well watered, this area supports a rich pasturage. However, the semi-arid climate and a high evaporation rate have had adverse effects on the soil. Soils along the Shebelle River have inadequate water-holding capacity, and soils along both rivers tend to be saline because of the alkaline river water. (See Irrigation, section 7.3.)

1.5 Land Use

About 8 million hectares (ha.) or 13% of the land area are estimated as potentially suitable for crop production, but only about 0.7 million ha. or 1% of the total land area are currently being cultivated. Of the cultivated land, about 540,000 ha. are rainfed with the rest under irrigation. (See Agroecology, section 7.)

<u>Land Use</u>	<u>Area</u>	<u>% of Total</u>
Presently cultivated:		
Controlled irrigation	50	0.08
Flood irrigation	110	0.17
Rainfed farming	<u>540</u>	<u>0.85</u>
Total cultivated	<u>700</u>	<u>1.10</u>
Potentially cultivated:	<u>7,500</u>	<u>11.75</u>
Total cultivable	<u>8,200</u>	<u>12.85</u>
Rangeland	28,800	45.15
Unusable	<u>26,800</u>	<u>42.00</u>
Total land area	<u>63,800</u>	<u>100.00</u>

1.6 Rivers

Only two rivers, the Juba and the Shebelle, both of which rise in the Ethiopian highlands and flow southward across the Somali Plateau, are permanent. The Juba reaches the Indian Ocean at Kisimayo, while the

Shebelle turns SSW some 32 km. north of Mogadishu and flows parallel to the coast for about 322 km. until it meets the Juba south of Gollib. Much of the lower course of the Shebelle is intermittent; even in the spring rainy season it may not flow through to the Juba. The Shebelle floods March-May and August-November, reaching maximum depth of 1 to 2 m. in spring, falling to a minimum December-February. The Juba rises in April, reaches maximum depth (over 2 m.) in September or October, recedes somewhat in November, rises again in December, then falls to a minimum of 1 m. in March. Neither river is used much by commercial shipping. The Juba is navigable between Jumbo, at its mouth, and Serenli, 555 km. upstream, during highwater period.

Tugs, dry watercourses which fill briefly during and after rain storms, are numerous in the northern mountains, the Daror and Nogal valleys, and on the Shebelle-Juba plateau, but infrequent in desert areas.

2. Disaster Vulnerability

2.1 Refugees

There are currently more refugees in Somalia than in any other single country in the world. As of February 1981, there were approximately 1.2 million refugees in Somalia making up over one-fourth of the total population. Of these 1.2 million, about 800,000 were in 33 refugee camps set up by the Government of Somalia (GOS), while another 400,000 were living in the countryside with friends or relatives. Refugees began to arrive in Somalia in 1977 from the war zones in Ethiopia. By 1979 the numbers increased sharply with 25,000 arriving each month. Most of the refugees are women (30%) and children (32% 6 years or under; 29% aged 7-15); only 9% are men and most of these are either elderly, ill or handicapped. Almost all new arrivals suffer from malnutrition and disease, often the result of having traveled long distances without adequate food and water. Approximately 15% of the refugees are classed as severe malnutrition cases needing therapeutic supplemental feeding. Inadequate food supplies are the biggest problem facing the GOS and international donors. Not only is there a critical shortage of food for the refugees, but Somalia has also been struggling with a serious drought which threatens the survival of the indigenous population. (See Drought, section 2.2.)

In addition to the general shortage of food, transportation of available supplies is erratic and unreliable. It generally takes six days to move food from Mogadishu warehouses to the camps in the south and west. Only one bridge crosses the Juba River and it may take up to 20 hours for the 250 mile trip between Mogadishu and the camps in Gedo. During the rainy season deliveries are further hindered by mud on unpaved roads. (See also Transportation and Logistics, section 9.) The situation is so severe that many refugees are receiving only 850 calories a day instead of the normal refugee ration of 1,060 to 1,330 calories per day (MDR prescribed by the United Nations is 2,200 calories). Each family in the camps cooks their own meals, but food often comes in such odd combinations (rice or flour, oil, and powdered milk) that few dishes that are familiar can be made. There is no way to predict how long Somalia will receive international aid. Of the food needed to supply the camps through June 1981, about 75% has already been pledged, but international aid is not always consistent and there have been droughts in many of the donor nations (the US, China, India, Russia) which may restrict future aid. (See Refugee Food Situation, section 6.3.)

There is also the worry that if the war in Ethiopia intensifies, so will the flood of refugees. The UN estimates that 2.5 million ethnic Somalis still live in the Ogaden. The prospects for the refugees in Somalia are bleak. There is little chance that they will return to the

Ogaden soon and little chance that they will be settled in Somalia. The GOS policy is not to encourage permanent settlement because Somalia has such limited industrial and agricultural potential. Camps in the Lower Shebelle region south of Mogadishu still have refugees from the drought that devastated the Horn in 1975. (See Disaster Preparedness, section 6.)

2.2 Drought

Drought is a way of life for the nomads of Somalia. It is expected that about two years in five will be drought years and that one of those will be severe drought. In the north there were severe droughts with heavy loss of stock in 1950, 1955, 1964, and 1969. Every region of the country, even the eastern river valleys, was affected by the drought of 1973-74, which was an extension of the Sahel drought. At least 19,000 people died and there were enormous livestock losses. Some 1.2 million people (of a total population of 3 million) were given food relief.

Recent droughts have been aggravated by the practice of overstocking which forces herders onto marginal grazing lands and leaves them more vulnerable to drought. Although most nomads have been able to rebuild their herds after each drought, some have lost all their stock and been forced to migrate to towns where they swell the ranks of the unemployed. The most recent drought began in Djibouti, but soon spread across Ethiopia and Somalia. Two-thirds of Somalia is now suffering from drought and preliminary indications show that because of late and irregular rainfall (severely deficient in north), the crop to be harvested in September and October 1980 will be below normal in the north and average in the south. The total maize and sorghum crop for 1980 is not expected to exceed the poor 1979 crop. Some of the refugees now living among the rural population may be forced by the drought to seek food and shelter in the camps. (See also Disaster Preparedness, section 6 and Agroecology, section 7.)

2.3 Environmental Deterioration

Together with water resources, grazing land constitutes the most critical factor affecting human activity in Somalia. Although some 60% of the population lives by nomadic grazing, about 40% of the country is of little economic value because of insufficient rainfall. Low rainfall means fodder growth is inadequate and of poor quality. Land is so overgrazed and eroded, especially around water sources, that some is already beyond reclamation. Since no range management system has been implemented, no fodder crops are grown to supplement the grassland, leaving little but brittle thorn bushes.

The concentration of refugees with their livestock in rural areas has also caused water shortages and overgrazing which could result in permanent damage to the environment. Large numbers of refugees and drought-affected nomads who camp along the rivers have created excessive demands on limited resources, especially on the limited supply of firewood.

2.4 Infestations

Northern Somalia is part of the desert locust breeding zone which runs along the coasts of the Red Sea and the Gulf of Aden. Somalia has suffered heavily from all four of this century's major desert locust plagues, with scarcely a break between the plagues of the 40's and 50's. There was also significant damage during the plague of 1967-69, although control measures taken by the Desert Locust Control Organization (DLCO/EA) of which Somalia is a member, prevented its spread. In spite of political difficulties which prevented DLCO/EA teams from entering the Eritrean or Ogaden regions of Ethiopia after the outbreak of a new plague in 1978, DLCO/EA was able to control the swarms after they left those areas. Swarms attacked grazing areas in northern Somalia but did not reach the croplands. It was estimated that only 5 percent of Somalia's crops were lost to locusts in 1978.

A large number of Quelea birds migrated to Somalia in 1980 and destroyed an unspecified amount of sorghum and rice at its milk stage. DLCO/EA instituted spraying operations against 214 ha. of roosting sites with good results reported. A serious armyworm infestation was also reported in northwestern Somalia. The general office of DLCO/EA supplied transportation and exhaust sprayers to the Somali national unit to assist them in ground control work.

Tsetse flies are located in well watered areas. The proximity of agricultural settlements to fly-infected areas is a key factor in prohibiting cultivators from being major owners of grazing animals. The GOS has started a vegetation clearance program along rivers to eliminate tsetse habitats.

2.5 Seismicity

Somalia is in the earthquake zone which runs along the Red Sea coast. Although frequent tremors are felt, Somalia rarely experiences severe earthquake damage. The most recent earthquake was on May 3, 1980 in northwestern Somalia. Hargeisa, the country's second largest city, was shaken but no damage or casualties were reported.

2.6 Disaster HistorySummary Disaster History

<u>Disaster Type</u>	<u>Strike Date</u>	<u>Location</u>	<u>No. Killed</u>	<u>No. Affected</u>
Drought	12/00/64	Nationwide, Galcliao	0	3,000,000
Drought	69	E Burao, N Mudugh	0	400,000
Drought	6/00/74	NW to Central Areas	19,000	230,000
Civil Strife	77	Nationwide	0	35,000
Flood	11/00/77	Shabelle, Juba Rivers	n.a.	40,000
Flood	77	Shabelle, Juba Rivers	n.a.	40,000
Refugees	80	Border areas	n.a.	1,500,000
Drought	80	North to Central	n.a.	n.a.

Source: Disaster History on file at OFDA in Washington, D.C. Covers 1965 to present.

3. Human Ecology

3.1 General Population Statistics

World Bank estimates (mid-1978) place the Somali population at 3.7 million (not including refugees). (See Refugees, section 2.1.) Annual growth rates: 2.3% (1970-78); urban 5.1% (1970-80). Age Structure: 45% aged 0-14, 53% aged 15-64, 2% over 64 years (1974-77). Population densities vary with the season as well as with location. The largest concentrations of people are in the south (in Mogadishu and the Juba and Shebelle river valleys) and in the Hargeisa area on the northwest plateau. In arid regions of northeast and central Somalia, densities average less than 1.3 persons per sq. km. Urban population accounts for 30% of the total population (1980 World Bank estimate), of which 34% is in Mogadishu. About 100,000 Somalis have migrated to work in oil-exporting states in recent years (See Overview of Industrial Economy, section 8.1.)

3.2 Regional Distribution

Population by Region (1975 census)

Wogooyi Galbeed	440,000	Shabeellaha Dhexe	237,000
Togdheer	258,000	Banaadir	371,000
Sanaag	146,000	Shabeellaha Hoose	398,000
Bari	155,000	Jubbada Hoose	246,000
Juba	85,000	Gedo	212,000
Mudug	215,000	Bay	302,000
Galguduud	182,000	Bakool	100,000
Hiraan	147,000		

Source: World Bank, Somalia Economic Memorandum, 1979.

3.3 Ethnic Groups

Ethnic Somalis constitute the vast majority of the population (over 95%). Historically, cultural divisions arose between pastoral nomads, collectively termed Samaal (until recent drought about 75% of population) and sedentary cultivators and herdsman, the Saab (20% of population). Traditionally, nomadism is the most desirable lifestyle. Lineage groups

and the clans comprising them are the basic social units in both groups, but social stratification is more marked in Saab clans. Low caste groups, probably descended from aboriginal inhabitants of the area, follow specialized occupations (hunters, smiths, barbers, circumcisers) and are culturally and socially isolated from Somali clans, their patrons. Non-Somali riverine peoples, known as Habasho, are culturally and physically distinct from Somalis: interior groups are farmers, while coastal peoples are sailors, fishermen, and traders. Small numbers of Yemeni Arabs, Pakistanis, and Italians are involved in the commercial and modern agricultural sectors.

Because Somali are unified by language, religion, and culture, the concept of pan-Somalism, that all Somali peoples (in Kenya, Ethiopia, and Djibouti as well as Somalia) should be one nation, has had considerable impact on relations with neighboring states. Present borders with Ethiopia and Kenya were established by Great Britain in the late 19th century but the oral tradition which claims areas of both countries as Somali territory persists, and is important to the nomads who cross borders in their seasonal transhumance.

3.4 Settlement Patterns

Over two-thirds of the population is nomadic or semi-nomadic and involved in annual migrations related to the seasons. These movements result in periodic changes in settlement patterns particularly in northern Somalia. During the dry season the nomads concentrate in villages or small encampments near permanent wells or other reliable water sources. When the rains begin, they scatter with their herds, moving frequently until animal forage and water give out.

Except for a small area around Hargeisa, most of the sedentary population is located in the south along the Juba and Shebelle rivers. Although some nomads and semi-nomads (pastoralists who farm part-time) are found in this area, the prevailing settlement pattern is fixed agricultural villages and settlements. In the 1970's this pattern has been reinforced because many nomads from the drought-stricken north and northeast were resettled into sedentary agricultural occupations in the southwest.

The location of most cities and towns appears to have been determined by trading factors. The coastal cities were established as trade centers by Arab and Persian immigrants between the 8th and 10th centuries A.D. Inland towns generally mark caravan crossing points or locations where water is available year-round.

4. Nutrition

4.1 Nutrition Overview

Somalia's natural resources are limited and, despite efforts to develop agriculture and livestock breeding, food production is insufficient. Frequent shortages are caused by drought, flood, crop disease, or periodic locust infestation. Consequently the diet of most Somalis is inadequate, unbalanced, or both. A marked drop in the population's food intake also occurs during the dry season when local supplies are scarce. This is particularly true among nomads whose total caloric intake during such times barely amounts to 50% of daily requirements. (The daily minimum requirement (MDR) established by the U.N. is 2,200 calories.)

Per capita supply of calories	79.0% of MDR
Per capita supply of proteins	55.1 grams per day

Nutritional deficiencies and malnourishment are found throughout the country. Protein-energy malnutrition (PEM) is the major cause of death among infants and children except in nomadic areas where milk and meat are dietary staples. Also common is iron-deficiency anemia, vitamin-A deficiency (in all areas except along the SW border), and goiter (prevalent in the north).

Within families, deficiencies are not evenly spread. Because men have the first claim on available food, malnutrition in women and children is often greater. Another cause of nutrition-related deaths, particularly among children, is the consumption of unboiled water and milk. This practice leads to dysentery, diarrhea, and a weakened state which makes a child susceptible to other diseases.

4.2 Regional Dietary Preferences

Nomads' basic diet is milk (men may drink 8-10 quarts daily during rainy season), supplemented by cereals, mostly durra (sorghum), especially during the dry season. Meat is not eaten regularly, perhaps once or twice a month, because animals are killed only if unfit. Sugar, rice, dates, tea, coffee, and butter are obtained by barter.

Sedentary villagers subsist on locally cultivated maize or sorghum, beans, and small quantities of fruits and vegetables. Animal products are rarely available. Fish is consumed only by the coastal population, although the government is promoting fish as a good source of protein.

The urban population depends on markets selling domestic and imported foods, and the adequacy of their diet is closely correlated with income and educational levels. Imported rice is the main staple. Urban diets are generally lacking in vitamins and calcium, and are too high in fat and sugar.

4.3 Staple Foods

Grains: durra and other sorghums, maize, rice, wheat flour, pasta

Fish: fresh and dried fish sometimes eaten by villagers, never by nomads

Meat: camel, beef, mutton, goat

Fowl: chicken and wild fowl are eaten by villagers but not by nomads

Dairy: milk, sweet and curds, (camel, sheep, goat, cow), ghee (clarified butter from cow's or goat's milk)

Fats: sesame oil (preferred), peanut oil, butter (clarified)

Fruits: bananas, dates, citrus (oranges, grapefruits, lemons), watermelons, mangoes, guavas, papayas

Vegetables: potato and tomato products (both imported); onions, cabbage, tomatoes, cowpeas, mung beans, spinach

Beverages: milk, coffee, tea

Children's diet: milk, cereal gruels, fruit if available. Children may be breast-fed for as long as 5 years.

4.4 Meals

Nomads: Breakfast of tea, camel milk, dates. Dinner of meat (if available), rice, sorghum or pasta, camel milk, dates. Camel milk may also be drunk at any time of the day or night.

Villagers: Breakfast of tea, porridge of maize or sorghum flour, bananas, bread. Main meal of rice, pasta or cornmeal mush with sauce of meat and/or vegetables. Fruits also eaten.

Nomads cook outside their huts or tents; villagers use a separate kitchen building. Both groups use a meerscham cooker set on stoves over an open fire. Wood is the usual fuel, although charcoal is preferred. Clay and aluminum pots are the usual cooking vessels. Hands are used for eating, knives and spoons (wood or metal) for preparing and distributing food.

4.5 Acceptable Substitutes

Wheat flour, supplemented by milk powder, is an acceptable substitute for the normal staple food complex of sorghum, maize flour, milk, and butter.

4.6 Food Supply

Since 1969, the GOS has intervened in the food distribution system in an attempt to promote greater equality in distribution, and to control retail prices. Domestic outputs of sorghum, maize, and rice are purchased by the GOS Agricultural Development Corporation (ADC) at controlled prices and are then resold to local governments, which in turn, sell to private retailers. Reasonable markups are set by the Government to cover transportation and processing costs. Food imports can only be undertaken by Ente Nazionale Commercio (ENC), a Government agency, which imports all food for which local production is inadequate or nonexistent, mostly tea, sugar, rice, wheat, and edible oil. It then sells at GOS-fixed prices in the same manner as the ADC.

While the Government sets retail prices for the private sector, there is no formal system of rationing or public sector retail food outlets. When goods are in short supply, buyers are limited in the quantities they may purchase at any one time. In general the system works well. Transportation is handled by private truckers under contract to the GOS.

4.7 Food Programs

The P.L. 480, Title II program in Somalia provides food to refugees who have no means of producing or purchasing agricultural products. The U.S. contribution is part of a multi-donor effort to assist the victims of the Ogaden conflict and is approximately 60% of the total assistance going to them. Some food assistance is also provided to native Somali drought

victims, who have been resettled in permanent agricultural and fishing communities, but who are not as yet self-sufficient in food production.

In addition to the U.S., other food donors include the WFP, UNHCR, EEC, and the West German and Dutch Governments. Meetings between these groups are held regularly to coordinate food requirements and pledges. (See Disaster Preparedness, section 6.) It is currently agreed that the United States will furnish corn and rice, two commodities widely grown in the U.S. but not in Europe. Other donors will furnish milk, meat, oil, wheat, sugar, and tea.

5. Health, Sanitation, and Housing

5.1 Vital Statistics (1978)

Crude birth rate	48 per 1000 population
Crude death rate	20 per 1000 population
Infant mortality	150-200 per 1000 live births (est.)
Life expectancy at birth	43 years
Annual growth rate	2.3%

Source: World Bank, World Development Reports, 1980.

5.2 Diseases

Pulmonary tuberculosis, malaria, and infectious and parasitic diseases constitute the country's major health problems. In addition schistosomiasis (bilharzia), tetanus, venereal disease, leprosy, heart disease, poliomyelitis (there is little or no vaccination), and a variety of skin and eye diseases are common.

Ecological, economic, and social conditions favor a high and increasing incidence of tuberculosis. The disease is widespread among the mobile segment of the population. Tuberculosis also spreads easily among people who sleep in close proximity within the transportable huts of the nomads or in the poorly constructed, poorly ventilated houses of most sedentary people.

The World Health Organization (WHO) began a major tuberculosis control scheme in 1964, directed from a tuberculosis center in Mogadishu. The project is aimed at preventing and controlling the disease by mass vaccination and sputum examination. Control measures have been carried out in urban centers but have been difficult to implement among the roughly two-thirds of the population who are nomadic or semi-nomadic.

Outbreaks of malaria occur in endemic and epidemic forms. During rainy seasons the entire Somali population is exposed. In the south malaria persists throughout the year. In the north the incidence of malaria is high from November through May. The larvae are transported in nomads' water skins, and the adult mosquitoes proliferate in the shallow basins of water that dot the landscape after the heavy semi-annual rains. The building of water storage tanks has extended the time and surface area (in contrast to narrow deep wells) in which the mosquitoes can breed.

The GOS, in cooperating with WHO and UNICEF, trains personnel and directs malaria eradication programs that have become part of the rural health services. These ongoing programs have considerably reduced the incidence of malaria.

Schistosomiasis has spread with the development of new and larger irrigation schemes in Somalia. The areas of highest incidence are the Juba and Shebelle river valleys. It is estimated that 80-90% of the workers on irrigated banana plantations have schistosomiasis.

Other common diseases include pneumonia, typhus, relapsing fever, boutonuse fever, dengue, filariasis, yellow fever, sandfly fever, kala-azar, meningitis, and yaws. In 1975 the leading causes of death for ages 1-4 were gastroenteritis, bronchopneumonia, anemia, and kwashiorkor. Many newborn babies die from tetanus infections contracted by the use of non-sterile implements used in cutting the umbilical cord. The last cholera outbreak was in 1977.

5.3 Health Services and Facilities

The National Health Plan calls for a 3-tiered structure of 16 regional offices, 84 district health offices (includes the 14 Mogadishu districts) and 165 dispensaries at the village level. However, the plan has never been implemented at the rural level.

Most health care expenditures have gone for construction of large urban hospitals. Local dispensaries have in many cases been closed because of a lack of staff and supplies. Imports of drugs are controlled by state monopoly (ASPIMA), but poor distribution policies often lead to shortages in rural areas. All doctors must work for the government but pharmacies are under private control.

Regional Health Offices (RHO) consist of a regional hospital (100 plus beds), one or more specialized hospitals, one or more health centers specializing in maternal and child care and/or environmental health, and outpatient services. The RHO supervises and provides referrals for its 3-5 district offices. RHO's are administered by medical specialists.

District Health Offices (DHO) are based in 20-50 bed hospitals equipped with a public health wing with functions analogous to regional health centers. DHO's should be, but are not always, headed by a medical officer; otherwise by a medical assistant.

Dispensaries provide only curative services. They are staffed by dressers with on-the-job training and traditional birth attendants.

Hospitals, Hospital Beds, Dispensaries, and Doctors
in Somalia by District, 1976

<u>Location</u>	<u>No. of Hospitals</u>	<u>No. of Beds</u>	<u>No. of Dispensaries</u>	<u>No. of Somali Doctors</u>
Bakol	2	68	4	1
Gedo	4	66	6	1
Bay	3	129	10	1
Lower Juba	5	700	4	2
Cent. Shebelle	5	88	10	3
Lower Shebelle	4	145	24	4
Hiran	3	231	10	2
Galgudud	4	34	6	1
Mudug	3	108	5	1
Nugal	4	108	2	2
Sanag	4	95	0	1
Bari	6	88	8	1
Togdheer	3	275	0	3
North West	7	748	0	10
Cent. Juba	1	150	0	3
Benadir	5	2,400	18	104
Total	63	5,433	108	140

Source: Berry, Eastern Africa Country Profiles: Somalia, 1980.

Note: As of July 1976, there were 43 maternal-child health centers with staff and equipment.

5.4 Health Personnel

Professional staff shortages are a major problem, even in Mogadishu where it is often difficult to fill vacant posts. In 1976 an estimated 140 qualified Somali physicians and 92 expatriate physicians were practicing in the country. Because of the dearth of physicians outside major towns, local pharmacists often serve as medical practitioners, dispensing drugs without a prescription, and giving injections.

There are also a variety of local healers who specialize in herbal medicine. Cauterization and bloodletting are used to treat headaches, pneumonia, tapeworm, and rheumatism. In 1977, there was 1 doctor per 15,000 people; 1 nurse per 2,900 people.

Health Personnel, 1973

	<u>Nurses</u>	<u>Sanitarians</u>	<u>Midwives</u>	<u>Lab techs</u>	<u>X-ray techs</u>	<u>Anesthetist assistants</u>
Banadir						
General Hospital	103	-	24	8	2	2
Forlanini Hospital	56	1	-	3	1	-
Martini Hospital	133	-	34	5	-	1
TB Center	-	1	-	-	3	-
Dispensaries	75	4	22	-	-	-
MGH Centers	18	-	-	-	-	-
Lower Shebelle	32	4	8	-	1	-
Central Shebelle	32	3	2	1	-	-
Lower Juba	47	2	11	2	1	1
Gedo	-	-	-	-	-	-
Bakol	8	-	1	-	-	-
Bay	24	1	6	1	1	-
Hiran	18	1	18	3	-	-
Galgudud	10	-	3	-	-	-
Mudug	11	-	5	1	1	-
Nugal	13	-	4	-	-	-
Sanag	7	1	2	-	-	-
Bari	18	1	8	-	1	-
Togdheer	47	3	6	2	-	1
Hargeisa	118	18	6	8	5	2
Total	770	40	160	34	16	7

5.5 Water Supply

Of the total population, 33% has access to safe water; 58% of the urban population (of which 87% is in Mogadishu); 20% of the rural population. In urban areas water is piped to house connections (15% of urban water supply) or to public standpipes. The remaining communities obtain water from dug and drilled wells and public standpipes usually at well sites. Many of the wells, are shallow, producing low yields and water of poor quality. Sanitary conditions surrounding the wells are poor due to the large numbers of people and animals concentrated in one place.

In rural areas and small towns, water is obtained from shallow dug wells or a variety of surface water sources, most of which are contaminated. The scattered nature of the rural population makes total coverage impossible if supplies are to be provided within walking distance of homes.

Public education to teach people how to treat contaminated water (mainly by boiling) would be the most cost-effective approach to providing safe water to the whole population.

5.6 Sanitation

The only public sewerage system is in a small area of Mogadishu. In large urban areas refuse is burned, but few small towns do so. A small number of urban houses have septic tanks or cesspools, but most lack even latrines. In settlement camps, latrines are provided but not widely used. According to the most recent World Bank estimates (1974-77), 47% of the total population had access to some form of sanitation facility, including 77% of the urban population and 35% of the rural.

5.7 Housing

Rural

Nomadic: Portable dwellings (agal) which can easily be set-up or dismantled and transported by camel are the most common form of shelter. Pliant branches or weeds are used to build the frame of these elongated hemispheres that measure 3-4 m. across and 2-3 m. high. Mats of rawhide or woven grass or sisal are used for walls, on the floor, and to cover the entrance. All household utensils and belongings must be easily transportable.

Village: Most houses (muudul) are a one-room cylindrical framework of posts and vines plastered with a mixture of mud, ashes, and dung. An 8 m. high center pole supports a conical thatch roof. Metal roofs are a sign of prosperity among settled cultivators. Household goods are generally more numerous and heavier than those of the nomads.

Note: For information on refugee housing see section 6.2.

Urban

Arish - A rectangular house with a two-sided, sloping, thatched roof. The arish, which is painted white or rose, is larger than the muudul measuring 9-18 m. x 22-45 m. Most arish in Mogadishu have metal roofs. Prosperous owners may build in wood or stone.

Municipalities control town planning and housing; however, the GOS must approve municipal plans before funding them. Housing development schemes in Mogadishu and Hargeisa, financed by the United Nations and other foreign donors, have helped reduce the housing shortage resulting from rural-urban migration.

6. Disaster Preparedness

6.1 Somali National Plan

Somalia has no national plan to cover all types of disasters. However, since September 1979 when the GOS declared a state of emergency, there has been a government program to deal with the refugees. At the central government level there is a National Refugee Commission under the direction of a coordinator from the Ministry of Local Government and Rural Development. Administration at the regional or operational level is conducted by commissioners, supported by a staff which parallels the services represented at the national level (health, education, agriculture, finance).

Life in each refugee camp is organized in a hierarchical structure of committees. A representative is selected for every 10 households to sit on the village committees. There is a committee in each camp for food distribution, health, self-help, security, agricultural activities, and education. Overall responsibility lies with the camp commander who is assisted by members of the local refugee relief committee.

By and large the plan has worked well despite the overwhelming number of refugees. The most serious problems have been a shortage of food, supplies, and equipment, transportation foulups, and a dearth of trained personnel.

6.2 US Contact

U.S. Embassy
Corso Primo Loglio, Mogadishu
Tel 28011
MDRO: Charles P. Campbell, AID Director
Alternate: Nick Mariani, Program Officer

6.3 Refugee Camps

As of February 1981 there were an estimated 800,000 refugees living in 33 camps and another 400,000 (estimated) living in Somali towns and villages. Camp conditions are characterized by overcrowding, an absence of environmental sanitation, and poor personal hygiene. Health services are rudimentary or non-existent. Shelter in the camps is constructed by

the refugees from locally available materials such as brush thatched with grass. As a result, the dwellings are not waterproof and do not provide adequate shelter from the wind and cold. In some camps tarpaulin and plastic sheets have been distributed to make shelters more waterproof. The shortage of building materials is compounded by the demand for fuel, resulting in over-exploitation of local firewood resources. To meet cooking fuel needs, some voluntary agencies are experimenting with solar cookers.

6.4 Refugee Food Situation

The make-up of the camps (90% of the refugees are women and children) creates relatively high food requirements and makes it difficult to design programs to allow the refugees to become even partially self-sufficient. When international food assistance does not arrive on time, the GOS dips into its own central stores depriving Somali citizens. A number of items in the basic refugee diet--sugar, meat, and tea--are not normally available under international assistance. Some can be purchased locally but much must be imported.

Basic Daily Ration (grams)

Maize or sorghum	250	DSM	50
Rice	75	Meat	20
Wheat flour	75	Sugar	4
Oil	40	Tea (adults)	3

6.5 Water and Sanitation

In most camps refugees consume water directly from nearby rivers or from wells that are also used by livestock. Some tankers have been provided by the UNHCR to supply water in emergency situations. Although the refugees have been advised to boil water, the shortage of fuelwood in most camps makes this practice almost impossible. Health education is needed to ensure that pit latrines are used.

6.6 Health Needs

The meager national health services in areas where refugees are concentrated are unable to meet the needs of the indigenous population let

alone the refugees. Although the GOS Ministry of Health is not directly involved in providing for refugee health needs, it has provided some personnel through the Refugee Commission. Additional health care personnel is provided by other GOS agencies and various voluntary agencies. None of the camps has hospital or laboratory facilities, and there are severe shortages of drugs, vaccines, medical supplies and equipment.

6.7 Storage Capacity

With the large influx of food and relief supplies, storage capacity has been seriously overstretched. At the present, basic foods are distributed from producing centers and ports to GOS stores at regional and district levels (See Food Supply, section 4.6). However, GOS stores in the regions of refugee concentrations do not have the capacity to handle both normal food requirements and the amounts needed to supply the refugees. Distribution from the GOS stores to the camps is done by truck. Refugees are given their food in bulk (to last from several days to several weeks) because there are no storage facilities at the camps.

6.8 Transportation

Internal transportation problems have caused major disruptions and irregularities in the delivery of food to the camps. Initially, the responsibility for transportation was divided between several GOS agencies resulting in confusion and bureaucratic delay. Food transportation, now centralized in the National Refugee Commission, is done by GOS vehicles and those of private trucking firms. However, many of the private contractors are reluctant to provide transport because poor road conditions cause excessive vehicle damage and very heavy repair and maintenance costs. There has also been a lack of funds for the GOS to pay private truckers.

Another issue has been the shortage of fuel. Somalia, which had been totally dependent on Iraqi oil, suddenly found itself without a supplier because of the Iran-Iraq war. The UNHCR was able to purchase 1.2 million liters of diesel truck fuel and thus temporarily resolve the crisis. However, unless a long-term solution is found, fuel shortages will continue to plague relief efforts.

Port congestion remains a problem because the internal transport network continues to have too few trucks in operation to move goods inland from the port. (See Transportation and Logistics, section 9.)

6.9 Voluntary Agencies (As of Nov. 1980)

Africare - Assisting the National Refugee Commission of Somalia with a team of advisors. An initial \$614,796 USG grant funded the program in FY 1980. Donated \$3,000 to the GOS for its Refugee Health Office.

American Friends Service Committee - Plans short-term emergency program for Somalia.

American Red Cross - Delegate is assigned to work with the Somali Red Crescent.

Baptist World Alliance - Donated \$40,000 to the Mennonite Central Committee for its program in Somalia.

Food for the Hungry International - Building 3 supplemental feeding centers in refugee camps at Kuryole for 6,000 children and 1,000 mothers, and starting a self-help project in raising poultry. Expects to ship 400 MT of food by end of 1980. 3 FHI personnel in Somalia; another 2 persons will arrive in early 1981.

Inter-Church Response for the Horn of Africa - A consortium of CRS, CWS & LWR, ICRHA is providing both immediate relief aid and planning longer term projects for refugees and nationals in Somalia. CWS will focus on water resource development and health care delivery, CRS on food and nutrition, and LWR on agricultural development (with the Mennonite Central Committee), solar energy, and other appropriate technologies.

International Christian Aid (Field Contact: Jack Maxon) - Operates programs in Horseed Camp in medical care, supplementary feeding for children, sponsorship of 500 children, and primary health care. Runs a mobile clinic. Field personnel includes 1 doctor, 5 nurses, 1 lab technician, 1 mechanic, 1 electrician/radio-technician, 6 administrative and general workers. Airlifted relief supplies to Mogadishu in June 1980.

Lutheran World Relief - In addition to a \$250,000 cash contribution to ICRHA, donated 100,000 quilts.

Mennonite Central Committee - Donated 517 MT of vegetable oil and milk powder, clothing, school kits, and household items. Current staff includes a water development expert, 1 administrator, and 3 persons working in agriculture and women's development programs.

Operation California - Has 90,000 lbs. of supplies available. Presently seeking means to transport the goods to Somalia.

OXFAM - America (Field Contact: Stephen Green, Hotel Croce del Sud, Mogadishu, Telex - 745). Over \$50,000 raised for projects in Somalia in 1980.

Save the Children Federation - Contributed \$10,000 for operations in Somalia's Borama camp.

Seventh-day Adventist World Service - Anticipates sending a medical team to Somalia.

US Committee for Somali Refugee Relief - Sent medicine to Somalia's National Refugee Commission and UNHCR.

World Concern/Crista International (Field Contact: Don Gilkison, P.O. Box 44400, Nairobi) - An 11-member medical team will arrive in Somalia in January 1981. A health education program is planned for the Gedo region.

World Relief Corporation (Field Contact: Bob Bowman, Box 41951, Nairobi) - Supports a medical team in Somalia in cooperation with TEAR Fund of Holland.

World Vision International (Field Contact: Gen. Joshua Hamidu, World Vision Africa, P.O. Box 58378, Nairobi, Tel. 331-019). Opening a program office in Somalia. Lead agency at Las Dhure camp; providing supplemental food and health care. During 1980 shipped 59 MT of drugs and 3 water purification units. The WVI team includes 2 doctors, 10 nurses, 2 logistics coordinators, 1 mechanic, pharmacist, engineer, nutritionist. Staff will increase to 24 by the end of December 1980.

Other international agencies involved in refugee relief assistance include UNHCR (Otto Hagenbuchle and Tom Barns, Dep. Reps in Mogadishu), the League of Red Cross Societies, and the World Food Program (John Wood, Sr. Coordinator).

7. Agroecconomy

7.1 Overview of Agriculture

The future of Somali agriculture depends to a large extent on the use of improved cultivation and range management practices. Land suitable for cultivation or for more productive grazing is limited in relation to total land area but, with good management, it could supply the country's food requirements as well as increase export earnings. Prior to the colonial period, indigenous agriculture was limited to subsistence farming: dryland cultivation of durra in the northwest and flood plain production of maize, sorghum, and vegetables between the Juba and Shebelle rivers. Europeans established plantations on the Juba-Shebelle plain, producing bananas, sugar, and citrus on irrigated land. Since independence, most plantations have been converted to state-owned farms and cooperatives, but the dearth of technical and managerial skills and the scarcity of equipment have not permitted a complete changeover. Government and foreign aid projects aim at diversifying crops to provide additional exports as well as an improved diet for Somalis. Such projects include substituting domestic crops for costly food imports, increasing acreage of irrigated land, and expanding dryland production using bunding (trapping rainwater behind earthen embankments).

7.2 Rainfed Agriculture

Rainfed agriculture is practiced in areas having an annual rainfall of at least 400 mm. (a total of about 550,000 ha.). Most rainfed cultivation is found in the south, although it is also practiced in some northern areas, particularly the plateau region surrounding Hargaisa. Maize and sorghum are the main grains produced by rainfed farming and in normal years Somalia is almost self-sufficient. However, rainfall in Somalia is unreliable and approximately one year in every four harvests falls short. (See also Precipitation, section 1.2.) To protect themselves in drought years, farmers store grain in underground pits. Although losses due to rodents and rotting are high, the system generally ensures enough grain for farmers during drought periods. However, no grain is available for sale to nomads and other non-growers. (See also Drought, section 2.2.)

In an effort to limit the effect of vagaries in rainfall and to increase production, numerous experimental methods have been implemented to advance rainfed farming techniques. Considerable success has been attained in the north by using bunding to grow fast-maturing strains of sorghum and maize. An IBRD project in the northwest proposes to double the area of bunding, repair existing bunds, and introduce extension services to farmers.

7.3 Irrigation

There are approximately 118,000 ha. of uncontrolled flood irrigation and 50,000 ha. of controlled irrigation. Of the controlled, 34,000 ha. are on the Shebelle and 14,000 ha. are on the Juba. Of the land potentially suitable for controlled irrigation, 160,000 ha. are on the Juba and 80,000 ha. are on the Shebelle. The greater potential of the Juba is due to a water flow three times that of the Shebelle; however, a shortage of good land along the Juba restricts optimum use of the available water. (See Vegetation, section 1.4.)

Major crops grown on irrigated land are bananas (major export crop), sugar, citrus and other fruits, and some vegetables. Other crops grown in limited quantities include maize, sesame, rice, cotton, and groundnuts.

Since the 1973-75 drought, the GOS has been attempting to expand irrigation and thereby reduce the impact of future droughts. To date this program has had only limited success. Constraints include: limited natural resources (for example, much Somali surface and ground water is so heavily mineralized that high solar evaporation rates concentrate salts in the soil to the detriment of plant growth); inadequate technical information; and a shortage of skilled manpower which in turn means deficiencies in planning and project preparation.

7.4 Crop Production

The three principal crops are sorghum, maize, and sesame, accounting for 90% of the cultivated area, of which 55% is sorghum, grown mostly on rainfed farms. Bananas, sugarcane, fruits, and vegetables, and small amounts of groundnuts, cotton, and pulses are grown under irrigation. State farms growing maize, rice, and other irrigated crops are gaining in importance. Cereal consumption in Somalia is about 350,000 tons per year, of which approximately 15-30% has to be imported. Production has not kept pace with population increases, thus increasing future reliance on imports.

	<u>Principal Crops</u> (metric tons)	
	<u>1976</u>	<u>1977</u>
Maize	120,000	120,000
Sorghum	120,000	120,000
Sugarcane	350,000	400,000

Principal Crops
(metric tons)

Sweet potatoes	3,000	3,000
Cassava	29,000	30,000
Dry beans	5,000	5,000
Grapefruit	6,000	6,000
Bananas	150,000	150,000
Groundnuts	10,000	10,000
Cottonseed	3,000	2,000
Cotton (lint)	3,000	2,000
Sesame seed	22,000	22,000
Coconuts	1,000	1,000

Source: Europa, Africa South of the Sahara, 1980.

7.5 Crop Dates

<u>Commodity</u>	<u>Planting season</u>	<u>Harvesting season</u>
Cereals & grains:		
Corn (Gu) 1/ (Der) 2/	Mid-April Mid-October	July February
Millet & sorghum (Gu) (Der)	April Mid-October/Mid November	July February/Mid-February
Rice	May-June	August-September
Fibers:		
Cotton (Gu) (Der)	April September	Mid-August-October February/Mid-February
Fruits:		
Bananas	n.a.	Throughout year
Dates	n.a.	Mid-June/Mid-July
Grapefruit	n.a.	May-June
Lemons	n.a.	Throughout year
Oilseeds:		
Peanuts (Gu) (Der)	April October	August February
Sesame (Gu) (Der)	April October	August February
Sugarcane	July-September	Throughout year
Tobacco (Gu) (Der)	March-April September	September-October February-March
Vegetables:		
Beans, dry (Gu) (Der)	April November	August February

<u>Commodity</u>	<u>Planting Season</u>	<u>Harvesting season</u>
Cassava (manioc)	April	Throughout year
Onions	April-October	June-December
Tomatoes	April-October	June-December

- 1/ "Gu" season, April-June; season for planting and sowing of most crops.
 2/ "Der" season, September-November.

7.6 Current Status (1980)

The food situation remains extremely difficult and transportation of supplies to refugee camps had to be curtailed in early October owing to fuel shortages. The grain needs of camp refugees are met until the end of March 1981; edible oil needs are met until January 1981; DSM pledges are insufficient. Cereals needs up to July 1981 for registered refugees are estimated at 132,000 tons of which 104,000 tons are pledged. Total cereal deficit for 1981, including the needs of refugees in the camps, is tentatively put at 400,000 tons.

The domestic cereal crop (gu-main) just harvested was poor in north and central Somalia and below average in the south, and is not expected to exceed the poor 1979 crop. Dry weather during most of October is likely to have adversely affected the second season (der) crop, to be harvested in February 1981.

7.7 Livestock

Nomadic or semi-nomadic pastoralists make up 60% of the population. Traditionally, livestock is regarded as a source of social status, wealth, and daily sustenance. More recently, livestock has become a source of cash income and a last resort against famine during drought. Livestock production constitutes the largest single contribution to the GDP and it provides the bulk of Somalia's exports.

<u>Livestock</u> <u>(FAO estimates, '000 head)</u>		
	<u>1976</u>	<u>1977</u>
Cattle	2,600	2,654
Sheep	7,000	7,212

Livestock
(FAO estimates, '000 head)

Goats	8,000	8,212
Pigs	8	8
Asses	22	22
Mules	21	21
Camels	2,000	2,000
Chickens	2,500	2,576

Source: Europa, Africa South of the Sahara, 1980.

The low milk and meat yields from livestock result from the use of small, unimproved breeds and from the poor grazing and water supply available. Traditional husbandry practices are oriented toward survival rather than productivity. In dry seasons watering is kept to a minimum and animals receive little care at birth or when sick. Birthrates are low, death rates high, and animals are often underweight and vulnerable to drought and disease.

Nomadic pastoralists - the migration of camel nomads are dictated by the availability and distribution of water and grazing. These people raise not only camels that need to be watered infrequently but also sheep, goats, and cattle that need water every few days; thus, camels are herded separately. The family camp, always set up near a well, takes care of the sheep, goats, and cattle while the unmarried men and boys take the camels on their annual migration.

Cattle raisers - found mainly in central and southern Somalia. Since cattle cannot be without water for more than 2 or 3 days, grazing areas generally ring villages at a distance of a 3 to 4 hours' walk. Cattle owners, in contrast to camel herders, are not self-sufficient. During the dry season they must either barter with farmers for grain or cultivate some of their own land.

7.8 Veterinary Services

The regional office of the Ministry of Livestock, Forestry, and Range (MLFR) is responsible with providing veterinary services, maintaining rangelands, and promoting forestry development and conservation. MLFR comprises the relatively autonomous National Range Agency (NRA), the Livestock Development Agency (LDA), the Veterinary Service, the Department of Animal Production, and the Institute of Animal Health. The regional office of the NRA is responsible for management of range reserves, forest clearing, fodder production, and the management of water points within the rangelands,

but has neither the qualified staff nor the facilities to assume those responsibilities. The main function of the regional Department of Veterinary Services is vaccination against rinderpest with some treatment for ectoparasites, trypanosomiasis, and other diseases, and distribution of drugs to pastoralists.

7.9 Fishing

About 90,000 Somalis (less than 2% of total population) make their living by fishing. Somalia has abundant coastal resources but the fishing industry has remained undeveloped to date. Constraints to development include: long distances between coastal areas and population centers; lack of modern technology and equipment (especially after the departure of Soviet technical aid in 1977); and a cultural aversion to eating fish.

7.10 Agricultural Exports

Livestock and livestock products (meat and meat products, hides and skins) account for about 75% of Somalia's total merchandise exports. Somalia has long exported modest numbers of animals to the Gulf states but, with the growth in oil income, the meat market there has grown immensely. The other major export is bananas. Output has not recovered from the 1974-75 drought which destroyed 1,000-1,500 ha. of plantation land. Heavy rains in November and December 1977 wiped out an additional 1,000 ha. The banana sector suffers from low productivity, in part because of their low price.

Recipients of Somali exports are Saudi Arabia, Italy, China, and other Arab countries.

Merchandise Exports (Average 1974-76)

	<u>US\$ Million</u>	<u>%</u>
Livestock	46.9	60.3
Bananas	13.2	16.9
Meat & meat products	6.5	8.4
Hides & skins	4.8	6.2
Fish & fish products	2.2	2.9
Others	<u>4.2</u>	<u>5.3</u>
Total	<u>77.8</u>	<u>100.0</u>

7.1: Agricultural Imports

The 1974-75 drought required large imports of maize, sorghum, rice, and sugar averaging about 20% of the total import bill. On the whole, the structure of imports has remained relatively stable (excluding refugee assistance) with food items accounting for 15-30% of total imports. The most notable change has come in the rise in sugar imports due to declining domestic production and increased consumption. (See also Imports, section 8.2 and Food Programs, section 4.7.)

Estimated import requirements in 1981 (as of November 1980)
(thousand tons)

<u>Cereal & Sources of Supplies</u>	<u>Total Requirements</u>	<u>Commercial Purchases</u>	<u>Food Aid Allocated, Committed, or Shipped</u>
<u>Wheat</u>	150.0	0.0	
USA (Title I FY'81 Alloc.)			18.0
<u>Rice</u>	75.0	0.0	
USA (Title I FY'81 Alloc.)			10.0
<u>Coarse Grains</u>	175.0	0.0	
USA (Title I FY'81 Alloc.)			25.0
USA (Title II FY'81 Emer.)			15.0
<u>All Cereals</u>	400.0	0.0	68.0

Source: FAO, Africa Food Emergency, Dec. 1980.

8. Industrial Economy

8.1 Overview of Industrial Economy

Somalia is one of the poorest and least developed nations in the world. GNP is estimated at about So.Sh. 8,200 million in 1978, (World Bank). This gives a GNP per capita income of about \$325 in 1978 at the official exchange rate (So.Sh. 6.295 = US\$1.00), but if a more realistic exchange rate is used, (So.Sh. 9.00 = US\$1.00) it gives a per capita income of about \$225 (World Bank). As much as 70% of the population lives at the subsistence level, when the arid climate permits subsistence.

Exploitable natural resources are limited to grazing land and, in the south, to irrigable farmland between the two perennial rivers. Known mineral resources include iron ore (low grade), uranium and other radioactive minerals, sepiolite, gypsum, anhydrite, tin, and piezoquartz, but exploitation is not feasible at present. Exploration for oil and natural gas is underway, but no significant finds have resulted. Commercial fishing is under development and tourism (game park) is being investigated.

GOS development efforts have been aimed at improving living conditions and strengthening national control over its resources. Public ownership and management has expanded through nationalization, although the Government has stated that there is room for private initiative. The small monetary sector is hindered by the small domestic market, poor infrastructure, and a shortage of capital and entrepreneurial experience. Food processing (sugar, grain milling, milk, and fish processing), textiles, and cement are the most important industries. Most factories are located in the Mogadishu area where power, transport, and markets are readily available.

A major economic problem is the migration of about 100,000 Somalis to work in oil-exporting states, thus draining the country of craftsmen, technicians, and professionals. The potential for remittances is great both in direct remittances and through their use as foreign exchange to finance imports which are then sold domestically for shillings (a system known as "franco valuta"). However, the GOS needs to find a way to control the flow of people and money (either through incentives to retain workers or taxation of foreign-earned income). Otherwise, Somalia is essentially spending scarce resources to train people for export.

8.2 Imports

Excluding the massive amount of aid that has poured into Somalia for refugee relief, imports have remained relatively stable throughout the

1970's. Foodstuffs account for 1/3 of the total, other consumer goods 1/4, and fuel and lubricants 1/4. Due to weak exports, import capacity is limited. In 1977 merchandise imports (f.o.b.) totaled US \$175.1 million in contrast to merchandise exports of US \$71.3 million. Major suppliers are Italy, China, West Germany, and Arab countries.

Imports by Commodities, 1974-76
(So. Sh. million)

	1974		1975		1976	
	value	percent	value	percent	value	percent
Cereals & cereal products	71.2	7.9	161.0	16.5	134.1	13.7
Fruits & vegetables	12.9	1.4	18.8	1.9	5.0	0.5
Sugar & sugar products	61.3	6.8	4.4	0.5	1.4	0.1
Coffee, tea & cocoa	13.6	1.5	12.3	1.3	22.3	2.3
Beverages & tobacco	7.6	0.8	18.4	1.9	22.9	2.3
Animal & vegetable oils & fats	12.9	1.4	29.5	3.0	41.4	4.2
Non-edible animal, vegetable & crude materials	20.4	2.3	16.2	1.7	29.5	3.0
Petroleum & related products	60.6	6.7	59.4	6.1	66.5	6.8
Medical & pharmaceutical products	24.2	2.7	25.3	2.6	27.9	2.9
Chemical & rubber products	59.0	6.6	56.9	5.8	74.6	7.6
Paper & paper products	49.2	5.5	46.2	4.7	27.2	2.8
Wood, lumber & cork	20.4	2.3	13.5	1.4	17.4	1.8
Textiles	95.4	10.6	29.4	3.0	33.9	3.5
Clothing	20.4	2.3	7.8	0.8	11.3	1.2
Metals (base)	71.9	8.0	25.5	2.6	33.7	3.4
Metal & mineral mfgs.	66.6	7.4	83.2	8.5	77.7	7.9
Electrical machinery	37.8	4.2	36.2	3.7	31.9	3.3
Non-electrical machinery	87.8	9.8	152.1	15.6	93.9	9.6
Miscellaneous manufactured articles	23.5	2.6	39.7	4.1	54.5	5.6
Transportation equipment	68.1	7.6	120.4	12.3	150.2	15.4
Other	13.6	1.5	17.5	1.8	20.7	2.1
Total	898.4	100.0	973.7	100.0	978.0	100.0

Source: World Bank, Somalia Economic Memorandum, 1979.

9. Transportation and Logistics

9.1 Road Network

The road network constitutes the principal means of transportation, but a lack of all-weather roads and poor connections between the north and south limits its present utility. Though no supporting data are available, camels and donkeys provide an important transport element: the former carry nomads and their household goods, while the latter haul small loads within cities and between villages. The heaviest concentrations of motor vehicles are found in Mogadishu and Hargeisa. In the countryside most vehicles are used to move export crops, products, and livestock. This last function is particularly important to the export economy because the weight loss incurred by trekking cattle to markets is avoided. The GOS places a high priority on transport development to further the unification of the country and to facilitate food distribution as well as to develop the fishing and mining industries. Most recent construction has concentrated on upgrading existing tracks to all-weather paved roads. The poor quality of present tracks in the north makes livestock transport by truck almost impossible.

In 1975, of 17,700 km. of roads, 1,400 were paved, 1,000 were gravel, and 15,300 were earthen. Roads classified as primary: 5,900 km.; secondary: 2,500 km.; feeder: 2,300 km. A major road running from the Kenyan border through Kisimayo and Mogadishu to the international border in the northwest is being completed. A 649 mile segment linking Belet Uen with Burao, constructed with Chinese aid, was completed in 1976. Work on the Burao-Berbera road and the extension of the Hargeisa-Borama road to Loyada on the Djibouti border are in progress in the north. Southern projects include upgrading the Daldoa-Dinsor road and extending it to Gelib; extending the road from Kisimayo to Liboye, and improving the Galuen-Gelib road to a paved standard.

Most vehicles are based and used in the Mogadishu and Hargeisa areas. No vehicles are manufactured in country; imports, mostly from Italy, are limited in number and subjected to high tariffs by the GOS. The Ministry of Transport's regional offices allocate specific freight transport jobs to private truck operators on a first-come-first-served basis. Public transport operators must be registered but are not restricted as to routes. No large fleets exist and few operators have more than one vehicle. Freight and passenger rates, set by the Ministry of Transport, are held as low as possible.

9.2 Surface Miles

<u>From</u>	<u>To</u>	<u>Km</u>
Afgol	Baydhaba	217
	Shalambot	64
Belet Uen	Jowhar	217
Berbera	Hargaisa	157
Burao	Belet Uen	1,044
	Berbera	140
	Galclao	653
Gellb	Dinsor	340
	Gauluen	270
	Kisimayo	112
Kisimayo	Liboya	210

9.3 Railroad Network

Somalia has no rail system.

9.4 Ports

Although there are 27 harbors on the Somali coast, four of them, Berbera, Kisimayo, Mogadishu, and Merca, handle over 95% of overseas trade. Only three harbors, Berbera, Kisimayo, and Hordio, are naturally sheltered. Berbera serves the northern regions, handling 90% of livestock exports, Kisimayo handles meat and banana exports, while Hordio has no economic hinterland. Mogadishu and Merca are lighterage ports; the former handles most imports, the latter banana exports.

Berbera

The harbor is formed by a low sandy spit. Navigable width of entrance about 0.8 km. with fairway depth 16.4 to 18.3 m., reducing gradually to approximately 11 m. on the northern side at 555 m. off the pier. Anchorage in 9 to 18.3 m.

The berthage line of the new port provides handling of cargo carriers with deadweight up to 12,000 tons (having shipload of 10,000 tons, length equal to 160 m., width 20 m., draft when loaded 8.8 m.). The length of berthage (320 m.) allows for handling of two such freighters simultaneous-

ly. The depth at the berthing line is 9.80 m. The berths are equipped with bollards rated at 75 ton tractive effort each, with fenders made of rubber tubes; telephone communication available.

Storage: The port has a covered warehouse (5,760 sq. m.), and an open storing ground (15,000 sq. m.)

Cranes: There are two electric portal cranes (each with hoisting capacity of 5 tons), installed at the berthage. Mobile cranes and forklift trucks are in use.

Kisimayo

The port is situated in a sheltered bay about 384 km. south of Mogadishu. A strong breakwater protects the 'L' shaped artificial harbor. Ships can anchor in the basin of the new port with minimum depth of 8.53 m. Entrance through channel, 100.6 m. wide. Three channel buoys on port side, five on starboard, 400 to 500 m. apart. No operations can be effected to ships anchoring on open roadstead. Lighterage craft consist of four pontoons, capacity 300 tons each. The four pontoons can be beached to discharge all self moving items (tractors, cars, lorries, etc.).

All ships can berth alongside in the new port. Port basin delimited by concrete piles, draft at minimum low tide 8.53 m. Pier 'L' shaped, one 340 m. length and the other 280 m. Four berths for medium-size ocean-going vessels. One large transit shed and open storage available. The port has suffered severe deterioration in recent years and at least one of the four berths is no longer usable.

Cranes: Cranes up to 25 tons available. Development: Bunkering facilities, Marine Radio Station, second tug, and radar reflector buoys.

Merca

Ships anchor offshore in the Indian Ocean about 400 m. from the pier. The wooden pier is 200 m. long and 12 m. wide and is used for berthing lighters loading and discharging ships. There is no deep water harbor. Weightbridges scale available for heavy items. Storage: Two banana sheds and two warehouses available. Cranes: Only ships' derricks are used to load and discharge ships. No portal cranes available on the pier, but a number of mobile cranes are used to handle cargo in the pier and stacking area. No floating cranes available.

Mogadishu

Open roadstead with good holding ground in 12.19 to 13.71 m. of water, 0.8 km. offshore. Any length of vessel may anchor with a draft up to

9.45 m. at single anchor and 5-6 chain lengths. During the S.W. monsoon (May to August), the swell is heavy with strong current.

Five piers used by lighters, lengths from 102 to 1,058 m., nine transit sheds, and one 10,988 sq. m. government warehouse are available. There is also a large open storage area. Ship's derricks are used for loading and discharging. A small number of mobile cranes on the piers, but no floating cranes. There is a New Port area, depth 11 m., with five berths: three for general and bagged cargo, one for livestock, and one for bunkering. Three transit sheds and a large open storage area available. Water supplied by pipeline at berths.

9.5 Shipping Lines

- Brocklebank Line: Monthly service Oct. to April from United Kingdom to Berbera; agents A. Besse and Co. (Somalia) Ltd., Berbera.
- Cian Line: Regular calls at Berbera Oct. to April; agents A. Besse and Co. (Somalia) Ltd., Berbera.
- Lloyd Triestino: Regular passenger and cargo service to Italy; agents Agenzia Marittima, Mogadishu.
- National Shipping Line: 4 ships, mainly for international trade in livestock and bananas; joint venture of governments of Somalia (51%) and Libya.

Other lines call irregularly at Somali ports. Somali "dhows" sail between East Africa, Aden, and Arabia. Coastal shipping has been minimal due to lack of interregional trade; development of commercial fishing industry is expected to stimulate growth.

9.6 Airports

There are three major airports of international standard: Mogadishu, Kismayo, and Hargeisa. Eleven smaller airports/airfields are regularly served by domestic air transport. Regional airports: Baldoa, Berbera, Burao, Erigavo; local airstrips: Alula, Bosaso, Dayaha, Eyl, Galkayo, Iskushuban, Obbya. These small airstrips provide the only quick access to many areas of the country. There are also 28 usable airfields suitable for landing small aircraft.

Domestic air passenger transport has increased slightly since 1970, while domestic air freight has declined; both international passenger traffic and freight tonnage have increased considerably. Information on storage facilities is not presently available.

9.7 Air Carriers

Somali Airlines: Piazza della Solidarieta Africana, P.O.B. 726, Mogadishu. Owned 51% by GOS, 49% by Alitalia. Operates internal passenger and cargo services and international services to Abu Dhabi, Cairo, Jeddah, Muscat, Nairobi, and Rome. Fleet: 1 Boeing 720B, 2 Viscount 700, 2 Fokker F27, 3 DC-3, 2 Cessna 206, 1 Cessna 180.

The following foreign airlines serve Somalia: Alitalia, Democratic Yemen Airlines, and Kenya Airways.

9.8 Air Distances

<u>From</u>	<u>To</u>	<u>Statute Miles</u>
Mogadishu	Addis Ababa	657
	Asmara	1,015
	Djibouti	676
	Jeddah	1,407
	Mombasa	577
	Nairobi	624
	New York (JFK)	7,611
	Paris	4,101
	Rome	3,415
	Kismayo	Dar es Salaam
Mogadishu		246
Hargesa	Entebbe	1,036
	Khartoum	884
	London (Heathrow)	3,830
	Mogadishu	523
	Nairobi	893
Erigavo	New York (JFK)	7,182
	Hargesa	237
	Mogadishu	612
Berbera	Hargesa	90
	Mogadishu	581

10. Energy and Communications

10.1 Electric Power

Most electricity is produced by industry for its own use; even in Mogadishu, 98% of the population has no access to electricity. The national government, autonomous agencies, and municipalities are also producers. As of 1976, capacity was 18,000 kW and production 45 million kWh or 15 kWh per capita. Most power plants are fueled by imported oil. Supply: 220 volts, 50 cycles AC.

10.2 Petroleum

Petroleum demand is satisfied entirely through imports. Petroleum products were obtained from the USSR until 1976 and since then from Arab oil-exporting countries. Since late 1978 a 250,000-ton refinery at Mogadishu owned jointly with Iraq, has been processing crude from that country and now meets most domestic requirements except for motor and aviation gasolines and gas oil. Final consumption of petroleum products grew by nearly 16% p.a. during the 1971-79 period. Gas oil represents 50% of petroleum products, followed by gasoline and fuel oil (about 20% each). Kerosene, jet fuel and, to a minor extent, liquified petroleum gas account for the remainder. The transport sector is the largest user of petroleum products, consuming about 60% and petroleum refining an estimated 12%. Fuel consumption by industry probably amounts to not much more than 6% of total demand, which is about equal to the consumption by the residential, commercial, and government sectors combined.

<u>Volume</u>	<u>Imports of Petroleum Products</u>			
	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
<u>'000 of tons</u>	106.8	172.3	149.9	312.2
Motor gasoline	23.7	31.2	29.3	73.4
Gas oil 53/57	66.0	109.0	92.8	170.7
Kerosene	7.1	9.0	5.4	13.6
Jet fuel	8.6	21.3	19.9	52.5
Aviation gas	1.4	1.8	2.5	2.0
<u>'000 of barrels</u> ^{1/}	876	1,413	1,229	2,560

<u>Value</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
<u>Total in '000</u> <u>of US\$</u>	10,985	19,148	18,452	38,661
<u>Unit price in US\$</u> <u>per barrel</u>	12.55	13.55	15.01	15.10

1/ One metric ton is equivalent to about 8.20 US barrels.

Source: World Bank, Somalia Economic Memorandum, 1979.

10.3 Domestic Fuel Supplies

Most of the population use wood or charcoal as fuel. Given the generally low rainfall, wood supplies are limited. In the southern part of the country, where land is being cleared for cultivation and population densities are high, fuel supply has become a major problem. Wood is also trucked in from great distances to Mogadishu. Besides contributing to fuel shortages, uncontrolled land stripping also causes environmental deterioration, particularly soil erosion.

10.4 Telecommunications

By western standards telephone service is poor, telegraph service fair; however, a telecommunications project funded by the EEC is underway. At present, Mogadishu has an automatic exchange system, while other urban centers have manual exchanges. High frequency systems link major urban areas with the capital. These systems will be retained for connections with Baydhaba, Belet Uen, Galcayo, Bosaso, Burao, Hargeisa, and Berbera, but will be replaced by "modern sophisticated systems," presumably microwave, in Jowhar, Balad, and the southern centers of Afgol, Coriolel, Merca, Genale, Gelib, Kisimayo, and Jamana. Modern exchanges are scheduled for Hargeisa and Kisimayo. Existing high frequency international connections via relay stations in Nairobi and Rome are to be replaced by direct microwave connections. Telephones total 6,000 (one per 500 persons); most are located in Mogadishu (over 3,000), Hargeisa, and Kisimayo.

10.5 Radio

Radio is the primary means of communication in Somalia and the GOS considers it an important aid in extending social programs to the rural population. Since May 1976, the Somali broadcasting service has cooperated with the national adult educational center to air education programs. Recent installation of two 75 kW transmitters (two 50 kW, one 10 kW, and two 5 kW transmitters were already in use) has ensured countrywide reception. Regional adult education centers, to be located in Baydoha, Galcayo, Qoryoley, Gardo, Kisimayo, Jowhar, and Burao, will serve as distribution and maintenance centers for radio receiving sets in rural areas. Some 1,200 radio receiving sets and 800 radio recording sets will be distributed to adult learning groups affiliated with regional centers. As of July 1977, there were 68,000 radio receivers in the country, or one for every 44 people.

Radio Mogadishu, is the main government service; broadcasts in Somali, English, Italian, Arabic, Swahili, Amharic, Galla, and Affar.

Radio Hargeisa, northern region government station, broadcasts in Somali and relays Somali and Amharic transmission from Radio Mogadishu.

Home service broadcast in Somali from Ethiopia, Kenya, and Djibouti are audible throughout much of the country, as well as Somali-language programs from BBC, USSR, Italy, and Egypt. Foreign language programs in Kishwahili (VOA), English (BBC, USSR, PRC, and VOA), and Italian (Italy and PRC) are available in at least part of Somalia for periods of 1-18 hours daily.

10.6 Television

One television station; at present no further information concerning reception or number of receivers.

10-1-50

10-1-50

Received of the
Hospital for
the year ending
the 31st day of
December 1949

the sum of
Five hundred
and no/100
dollars

for
the year ending
the 31st day of
December 1949

and for the
year ending
the 31st day of
December 1948

10-1-50

One hundred
and no/100

1. Environment

1.1 Overview of Environment

Most of Sudan is a sparsely populated plain, with plateaus or mountains near the borders in the west, southeast, and along the Red Sea. Semi-arid savanna, a mixture of short grasses, scattered brush, and short trees, is the prevalent vegetation type. However, there are sharp contrasts between the south and north associated with the availability of water. The southern provinces of Equatoria, Bahr al Ghazal, and Upper Nile receive 762 to 1,270 mm. of rain during the six to nine month rainy season and produce lush vegetation. Permanent swamps in these areas cover about 80,000 sq. km. and there is excess water most of the year. In contrast, most of northern Sudan is barren desert with broad areas devoid of either vegetation or people. Narrow belts of cropland, generally no more than a few miles wide, run along the Upper Nile, the White Nile, the Blue Nile, and the Atbarah rivers.

1.2 Plains

The countryside of Sudan, excluding the mountains and the Nile valley, has little contrast in terrain. The monotony of the plain, which extends 800-965 km. from east to west and more than 1,600 km. north-south, is broken only by low rolling hills and massive sand dunes. Soils are composed mainly of clay, much of which is impermeable and difficult to cultivate, or sand which contains little clay or humus. The limited rainfall passes quickly through the loose sand; on flat land, shallow surface layers of clay become waterlogged. On sloping land, rainwater may run off, resulting in minimal absorption. Rainfed agriculture is common in the central plains. Natural savanna vegetation is removed and crops are quickly planted as soon as the soil has been softened by the rains. After a few years soils are exhausted and the farmer clears and plants in a different area. Much of the original savanna has been degraded by shifting cultivation and overgrazing, leaving only thornbush and other shrubs.

1.3 Northern Desert

The northern quarter of Sudan is almost entirely desert: the Libyan Desert in the northwest and the Nubian Desert in the northeast. Only on narrow strips of land along the Nile riverbanks is any cultivation possible. The area from Atbarah to Wadi Halfa often has no rain for years at a time. The land west of the Nile supports only a few nomads who, with their

animals, cover vast areas of barren land in search of grazing fodder. Water is available only in scattered oases. See also Desertification, section 2.2.

1.4 Mountains

Red Sea Hills - this area supports only seminomadic herders, who also cultivate hardy varieties of millet in the wetter valleys.

Jabal Marrah - forms part of the watershed between the Nile River and Lake Chad drainage basins. The range is volcanic in origin, and its valleys are relatively fertile. Although cultivation is generally dependent on seasonal rains, some valleys and hillside terraces are irrigated with water from small perennial mountain streams.

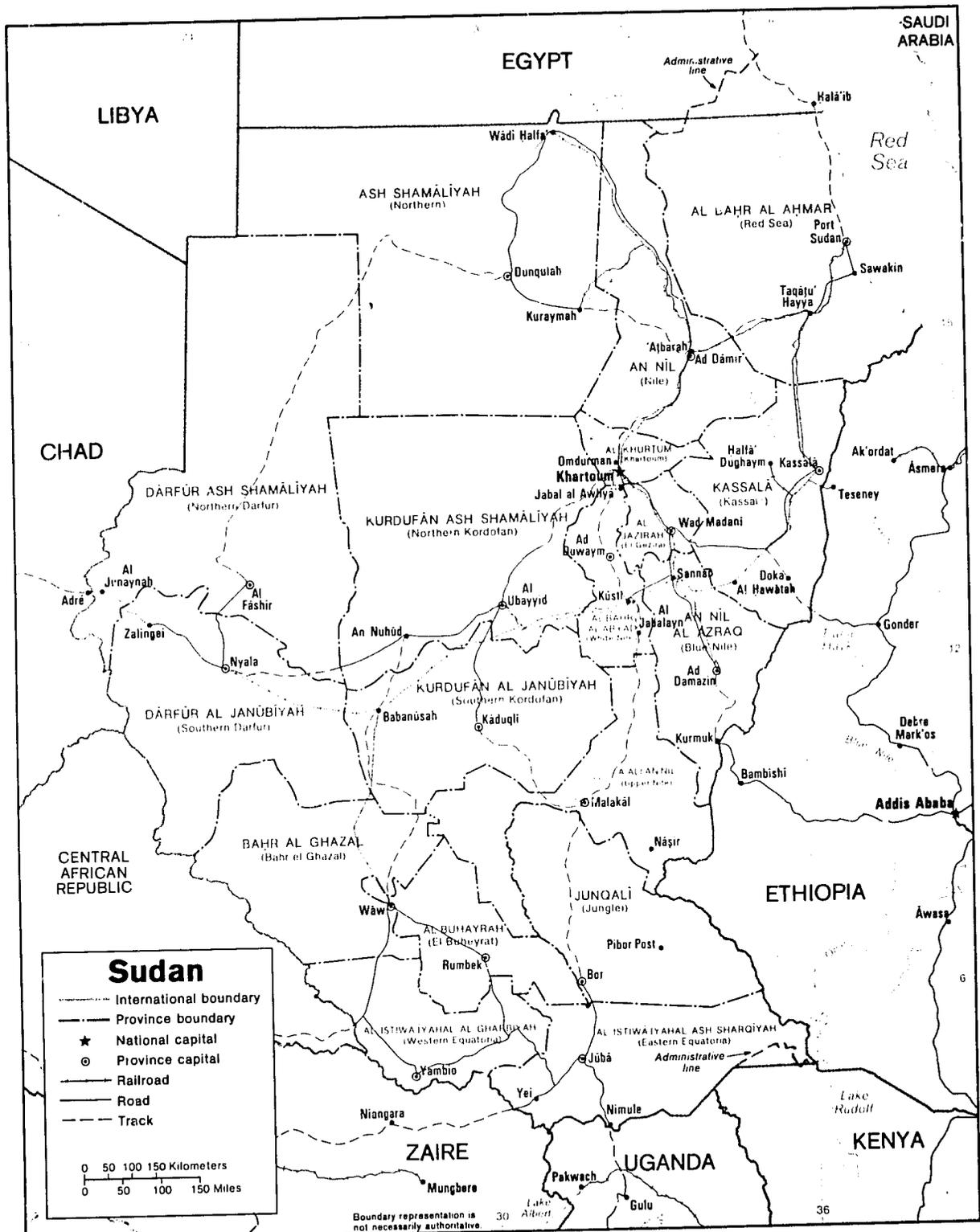
Jibal an Nubah - covered in many areas by savanna-like vegetation. Some slopes were once cultivated and then abandoned by subsistence farmers. There are numerous wells in the valleys and a few mountain streams flow all year.

Immatong and Dongotona mountains and the lower Didinga Hills - considerable variety of terrain and vegetation with many areas covered by rain forest.

1.5 Rivers

The most distant source of the Nile River, the White Nile (known as Bahr al Jabal in southern Sudan) loses much of its water to evaporation before it reaches the main Nile. A large volume is carried into the Sudd, a region of swamps and floating vegetation in south-central Sudan, where losses to evaporation are especially heavy. Partially for this reason, the annual input from the White Nile into the upper Nile at Khartoum is only one-fifth of that from the Blue Nile. However, much of the White Nile water arrives during the months when the Blue Nile contribution is very low.

The Blue Nile rises in the Ethiopian highlands, where summer rains draining into the fast-flowing river cause seasonal flooding on the lower reaches of the Blue Nile and on the upper Nile. During the flood season the Blue Nile and its two major tributaries, the Dindar and the Rahad, contribute 70% of the water of the upper Nile. During the low water stage the Blue Nile and other eastern tributaries contribute only 20% of the total flow.



Base 504566 8-80 (544712)

All perennial streams of significant size are part of the Nile system. There are also numerous wadis, or intermittent streams, which drain into the Nile during the rainy season and stand empty during the rest of the year. Some of these intermittent streams provide large amounts of water to agricultural areas. For example, the Qash and Barakah rivers, which flow into Kassala Province from northern Ethiopia during July-September, provide water for irrigation schemes in northern Kassala and the Tawkar delta.

1.6 Precipitation

Most of the country has a tropical continental climate. Dry air masses from the northern deserts blow over Sudan most of the year while humid air masses from the equatorial regions prevail in southern Sudan during the spring and summer (April-July), and push as far north as Khartoum during late summer. Rainstorms develop along the front between these huge air masses. In southern Sudan annual rainfall is over 1,270 mm., reducing to between 381 and 762 mm. in the central plains. The storms are much weaker by the time they reach Khartoum, where rainfall usually varies between 127 and 254 mm. per annum. The area above 15° north latitude receives only scattered showers each year, and in northern border areas there is often no rain at all.

For the human and animal population, the length of the dry season is more important than the length of the wet season or the total seasonal rainfall. Since the evaporation rate is high throughout the year, most surface water disappears before the dry season is well advanced (except in southern swamp areas). The soil becomes dry and hard, and streambeds stand empty. The need for drinking water becomes the dominant problem until the next rainy season. Villagers may carry water for several miles when nearby supplies are exhausted, but the family or village usually moves when the round trip is 17 km. or more. Various storage methods used are tanks, dams, hollow trees, hollows in natural rock or clay formations, and artificial basins (hafirs), which are usually constructed in areas of impermeable clay. See also Water Supply, section 5.6.

1.7 Temperature

Mean temperature and daily maximums are high throughout the year. The northern desert is relatively pleasant during the winter months, when winds from the north bring cool, dry air. However, by April or May the sun and desert wind are increasingly hot throughout the northern and central areas. Temperatures in the Khartoum-Omdurman area are typical of those in north

and central Sudan. January, the coolest month, has mean minimums of about 15°C and mean maximums of about 32°C. Maximums for the rest of the year range from 40°C in December, to 48°C in June. In the south temperatures are only slightly lower, held down by more frequent cloud cover and rainstorms, but the humidity is higher. In the central and northern areas, temperatures at night drop noticeably. Mean minimums range from 15°C to 27°C in most areas of the country throughout the year. Nighttime temperatures are somewhat lower during the winter in the northern desert and absolute minimums as low as 1°C have been recorded at Wadi Halfa.

2. Disaster Vulnerability

2.1 Overview of Vulnerability

Though affected by a recent influx of refugees from the war in Ethiopia and the famine and civil strife in Uganda, Sudan is not subject to either the frequency or intensity of natural disasters as are its East African neighbors. (See Refugees, section 3.7.)

Its two main geographical features are its vastness and the Nile River, the country's main water source. Because of the immense distances and the undeveloped state of the transportation system, the problem of moving goods and people has been a major obstacle to development and effective relief activities in times of disaster. This problem is compounded by the annual rainy season, which often lasts up to eight months (June-January). The virtual absence of all-weather roads in the countryside means that small towns and settlements are cut off from one another due to the impossibility of moving vehicles through the mud. Even rail services are curtailed because of frequent washouts along the old-fashioned, narrow gauge tracks. As one moves farther south, where rainfall is heaviest, communications come to a stop; plains turn into swamps, and swamps and rivers into immense lakes. In past years, transportation shutdowns have resulted in thousands of tons of food, medicine, and general relief supplies piling up in Port Sudan. The lack of fuel for all types of transport has also been a major hindrance in relief activities. (See Transportation and Logistics, section 9.)

2.2 Deforestation/Desertification

Environmental deterioration caused by poor agricultural practices is common in Sudan. Substantial agricultural land is being lost and desertification is moving south at a rate of 5-6 km. per year. Sheet and gully erosion are widespread, and approximately 240,000 hectares (ha.) in northern Sudan are affected by salinity problems. About 1.2 million ha. of land are cleared annually; 800,000 ha. for mechanized crop production and 400,000 ha. for traditional agricultural and forest products. Current rainfed mechanized agricultural techniques generally require land abandonment after 5 years, while only within forest reserves (0.5% of total land area) are good forest practices observed. Overgrazing is common and 500,000 to 800,000 sq. km. are burned each year, removing about 300 million tons of foliage; nomadic tribes annually uproot millions of acacia trees for firewood. Such pervasive deforestation has caused substantial erosion and reduced water retention capability along many water courses in central Sudan. (See Agroecology, section 7.)

The environmental problem receiving the most attention from Sudan's National Research Council's Committee for the Environment is desertification. The problem has been under study for several years, and a Program of Desert Encroachment Control and Rehabilitation (D.E.C.A.R.P.) was prepared in 1976 by a team of specialists from the Ministry of Agriculture's General Administration for Natural Resources and from the National Council for Research working in collaboration with the United Nations Environment Program and the Food and Agriculture Organization.

Desert encroachment has also become a matter of concern for urban planners in the Sudan. For example, in planning the expansion of the city of El Obeid, the planners decided to protect the city from desert encroachment on the west and north sides by creating a reforested green belt on these two sides and directing further urban growth to the east and south of the existing city.

2.3 Floods

Floods are an annual and generally welcome event which provide water for drinking and irrigation. However, every 3 or 4 years major flooding occurs that causes structural and agricultural damage. In 1975 extensive flooding in central and eastern Sudan inundated more than 66 million ha., destroying approximately 7,000 homes and leaving 100,000 people homeless. In 1978 flood waters caused severe damage in Gezira, White Nile, Northern Nile, and Kassala provinces. Some 200 villages were badly damaged and up to 80 were totally destroyed. There was heavy water damage to the Gezira Scheme irrigation system and an undetermined quantity of crops and livestock were lost. The total dollar value of the damage was estimated at \$25 million by the Government of Sudan.

2.4 Water Hyacinth

The unchecked outbreak of water hyacinth in the Nile has been called "one of the environmental disasters of the century." The water hyacinth is a South American plant, first seen in the Upper Nile region in 1958. By 1962, the plant had succeeded in infesting the whole stretch of the White Nile from Juba to the Jebel Aulia Dam as well as other rivers and lakes. In the period of April to October, vast amounts of water hyacinth plants drift north toward the Jebel Aulia Dam where they accumulate, completely covering the water surface. During this period wind and water current action compress them into a thick carpet that people can walk on.

The accumulation of water hyacinth on the Nile has caused a water loss of up to 7 billion cubic meters per year, or one-tenth the normal yield of the river. Besides reducing the water supply, water hyacinth blocks irrigation pump inlets and canals, hydroelectric power plants, and water supply channels for settlements. Difficulties in water transport such as damage to boats, delays in service, and increased fuel consumption have been reported. Fishing along the river banks has become difficult or impossible since many side channels are completely choked up. Water hyacinth also provides good breeding sites for mosquitos (causing an increased incidence of malaria) and freshwater snails, which are intermediate hosts for the parasite that causes schistosomiasis.

The Sudanese government has launched a control program to limit the spread of the plant at a cost of US \$2.5 million per year. However, researchers have expressed concern over the limitations and dangers of using herbicides. Efforts made in South America by a team of entomologists to select insects that live on and destroy water hyacinth are being investigated.

2.5 Infestations

Migratory Locusts - In 1930 migratory locusts appeared in the Sudan for the first time since 1899. Between 1930 and 1940 they returned every year and caused heavy damage to crops. In 1968, migratory locusts appeared in the eastern Sudan, where they ate 1,214 ha. of sugarcane.

Red Locusts - Sudan is on the very northern edge of the red locust's range. The only record of the red locust having penetrated into Sudan was in 1937 when a swarm appeared and travelled north as far as 17° N, near Atbarah.

Desert Locusts - The coastal region of the Sudan is part of the desert locust breeding zone along the Red Sea and the Gulf of Aden. Kassala Province in particular has been hard hit by all four of this century's major desert locust plagues. There was significant desert locust damage in the Sudan in 1967, but the plague did not last beyond 1969, largely due to control efforts by the Desert Locust Control Organization/East Africa (DLCO/EA). DLCO/EA was also responsible for controlling the plague of 1978-79, when desert locusts in Sudan were restricted to the coastal area, and no major damage was reported.

Tsetse Flies - Tsetse flies are endemic in southern Sudan. A government control problem exists, but most people living in this area have adapted by not keeping cattle.

During the summer of 1980 a serious Quelea bird infestation was reported by the Sudan Ministry of Agriculture. DLCO/EA assisted in a spraying operation in the southern, central, and eastern parts of the country.

2.6 Disaster History

Summary Disaster History

<u>Strike Date</u>	<u>Disaster Type</u>	<u>Location</u>	<u># Killed</u>	<u># Victims</u>
2/27/65	Train Wreck	Port Sudan	124	124
4/00/65	Meningitis	Khartoum Prov	0	2,300
3/00/66	Cholera	Nationwide	0	0
73	Civil Strife	South	0	680,000
9/07/75	Flood	Gash River	0	145,000
9/00/76	Ebola Fever	W. Eq. Prov	150	299
7/00/78	Flood	Gezira Prov	34	500,000
80	Refugees	Kassala Prov	n.a.	450,000

Source: Disaster History on file at OFDA in Washington, D.C. Covers 1965 to present.

3. Human Ecology

3.1 Population Overview

As of mid-1978, the population was estimated to be 17.4 million by the World Bank. Average annual growth rate: 2.6% (1974-77). Age structure: 45% aged 0-14, 52% aged 15-64, and 3% over 65 years. The total population is small in relation to the size of the country, which has an average density of seven person per sq. km. (Average density per sq. km. of agricultural land is 54.) However, distribution is very uneven with over 50% of the people concentrated in 15% of the land area. The area of highest density centers on the confluence of the Nile, extending south-east to the Ethiopian border and southwest to the Nuba Mountains and the farms around Al Ubayyrd. There are other localized areas of moderate density, especially along the smaller rivers of the Nile system. The rest of the population is spread across the Sudanese plains. Two areas almost completely uninhabited are the northwestern desert and the Dindar game reserve near the Ethiopian border.

3.2 Urban Areas

The three largest urban centers are Khartoum, Khartoum North, and Omdurman, comprise 31% of the total urban population. Total urban population is estimated at 25% (1980) and growing at an annual rate of about 6.8% (1970-1980). In both large and small towns much of the population is still directly or indirectly dependent upon agriculture for their livelihood.

3.3 Ethnic Groups

The population of the Sudan can be divided into two groups based on physical as well as cultural characteristics. The people of the north, of Arabic or Arabized Nubian extraction, constitute slightly over 50% of the total population. They include sedentary farmers in the Nile River basin (about 20% of the population), transhumant farmer/herders in the central plains (20%), and nomadic herders in the north and west (15%). In terms of language, culture, and religion they share a common Arabic heritage, but in other respects they exhibit great diversity.

The people of the south are of Negroid, largely Nilotic extraction. They are divided into a large number of small tribes with a long history of inter-tribal warfare as well as conflict with the Arabs of the north. Pop-

ulation figures for these groups are uncertain, but it can be estimated that the Dinka account for about 20% of the national population, the Nuer for 10%, the Shilluk for 5%, and assorted other groups (Aniak, Acholi, Azande, Bor, Jo Luo, Langa, and others) for approximately 10% remaining. It is difficult to estimate the numbers of smaller tribes actually in the Sudan because all of them migrate freely across international borders. Most of these groups speak Nilotic languages, with the Dinka and Nuer forming a distinct language group and the Shilluk, Aniak, and others belonging to the Luo language group.

<u>Ethnic Group</u>	<u>Principal Location (by province)</u>
Northern Region	
Arabs	Blue Nile, Northern, Khartoum, Kordofan, Darfur
Nubians	Northern
Beja	Kassala
Nuba	Kordofan
Fur	Darfur
Zaghawa	Darfur
Dargung peoples	Blue Nile
West Africans	Kassala
Other	Blue Nile, Various
Southern Region	
Dinka	Bahr el Ghazal
Nuer	Upper Nile
Shilluk	Upper Nile
Bari ²	Equatoria
Lotuko ²	Equatoria
Toposa ²	Equatoria
Didinga	Equatoria
Azande	Equatoria
Muru ²	Equatoria
Bongo ² and Baka	Bahr el Ghazal, Equatoria
Ndogo ²	Bahr el Ghazal
Other	Various

1/ Africans originating in countries west of Sudan

2/ And related peoples

3.4 Settlement Patterns

Five major patterns of settlement have been identified: large urban centers; small towns; rural sedentary groups (mostly members of cohesive village groups); rural nomads; and rural dwellers in separate homesteads or clusters lacking cohesive village organization. The last group, with its near absence of community structure or central authority, is prevalent in the wooded southern and southwestern provinces.

The main factor determining settlement patterns has been the limitations imposed by the availability of water. Sedentary agriculture remains the lifestyle for the majority of the population, but millions of primarily sedentary farmers move seasonally with their livestock or as the soil becomes depleted. It has been estimated that over 40% of the population moves either seasonally or at regular intervals.

For pastoralists these moves are dictated by responses to the availability of water and pasture. During the dry season, from January to June, they settle near permanent wells or perennial streams. After a short southward movement to meet the early rains they travel north following the rains. Each group has its customary routes and stopping places within its tribal territory and is careful not to interfere with the routes of others. When nomads are in the central area of the country they often live among the sedentary farmers, sharing their water and pastures. Cereals, mostly millet and sorghum, and vegetables are bartered for hides, dried meat, and the use of animals for transport.

People in the southern provinces move twice a year over short distances from small villages on high ground to cattle camps near permanent swamps and streams and back again. The village is their permanent home and they stay there during the wet season (May-December) cultivating two crops and keeping their cattle on nearby pastures. Starting in December and continuing into March the water and pasture on the higher ground becomes so scarce that the cattle are moved to lower areas. The entire population moves with the cattle and stays in the lowlands until the end of the dry season.

3.5 Migration

The search for jobs is only part of a broad pattern of migration to the northeastern provinces where major irrigation schemes are located. The movement from the arid western and central areas and from farther west, in central and western Africa, has been going on for centuries. Migrants came for religious reasons (the confluence of the Nile and the old city of Omdurman were on the route to Mecca), economic reasons, or both.

Other forms of migration, generally involving only moderate distances, are an integral part of Sudanese life. People move to seek better economic conditions, when water runs out, and to practice shifting cultivation. Migration also may result from marriage because in many Sudanese groups, custom requires young people to marry outside their village or ethnic group. Millions of nomadic or seasonally nomadic families move from place to place with their herds in search of water and grazing fodder. Over half of all native-born Sudanese live in a locality other than the one in which they were born. Also many borders in the south and west cut through ethnic territories. Most borders are open and have little meaning to nearby settlers who continue to make seasonal migrations to trade or intermarry across national boundaries.

3.6 Emigration

Permanent emigration from Sudan has occurred only on a limited scale. Small numbers of Sudanese emigrate to Egypt or Libya, in most cases to find employment. During the 1960's the civil conflict caused more than 250,000 southern Sudanese to flee over the border, mostly into Uganda. After the peace treaty in 1972 most of these people returned to Sudan. Since then no major movement of people out of the country has occurred.

3.7 Refugees

The most immediate issue in Sudan at the present is the estimated 450,000 refugees who have sought a haven there. Refugees have been entering Sudan since the mid-1960's from Zaire, Ethiopia, Uganda, and Chad. In coordination with the United Nations High Commission for Refugees (UNHCR) and World Food Program (WFP), the Government of Sudan (GOS) has consistently accepted refugees on a humanitarian basis and has attempted to assist in settling them away from the borders. Such efforts on the part of the GOS have often been at the expense of applying the same financial and human resources to address the needs of its own citizens. The strain on Sudanese resources (food, housing, medicine, transportation, education, etc.) has been pushed even further in the past year with another large influx of refugees fleeing from the most recent fighting in Ethiopia. To avoid greater social and economic tensions between refugees and local populations, the GOS has adopted a new policy aimed at integrating the refugees into the country's long-range development plans. The GOS now believes that refugee resettlement must be done in concert with general economic development and must emphasize production-oriented activities.

If this program is successful, the energy and resources currently being expended on the refugees might be available to address some of the environmental and development-related problems, which in the meantime hinder self-sufficiency for all of Sudan.

Refugees in the urban areas, particularly Khartoum, Kassala, and Port Sudan, live in crowded squatters' huts. These single-room huts, with no access to water or sanitation facilities, often hold as many as 4 families. The GOS solution is to move the refugees into organized settlements outside the towns. Understanding that many refugees who came from an urban background do not want to live in rural areas, the GOS hopes to provide vocational training so they can get urban jobs later.

The GOS has set up several successful refugee resettlement villages where each family is given a small plot of land to farm. However, at the present most refugees in Sudan live in poor conditions. Temporary shelters (tents, tarpaulins, plastic sheeting) are common and many people must walk several miles for firewood and water. Generally, these relief camps have no storage facilities, so each family receives a 2-week supply of food, soap, and cooking oil at a time. However, the GOS is making progress in alleviating these conditions.

4. Nutrition

4.1 Nutritional Status

Malnutrition predominates in the eastern districts of Kassala and Red Sea provinces, and in the western districts of Darjur Province. Anemia is endemic among women of child bearing age, children, and chronically ill patients with malaria or schistosomiasis. The fatality rate of malnutrition ranges between 10 and 18% with the highest percentage occurring in children 0-4 years of age.

The diet of most Sudanese is neither balanced nor of sufficient quantity. Isolation and lack of transport limits the exchange of foodstuffs in many areas; most regional groups subsist on local supplies of a few staples. Storage facilities are inadequate (much grain is lost to rodents) and severe food shortages sometimes mark the end of the dry season, when grain is scarce and animals give little milk. Under these circumstances, disasters such as floods or locust invasions often cause short periods of localized famine.

Per capita supply of calories - 88.0% of the minimum requirement of 2,200 established by the U.N.

Protein (grams per day) - 65.1

Animal and pulse protein - 23.1 grams per day

Source: World Bank, Sudan Social Indicators Data Sheet, 1980.

4.2 Diet by Region

Northern and western nomads - food derived mainly from their animals and supplemented by grain. Because nomads rarely slaughter their cattle, nearly 50% of their protein intake is from milk and clarified butter. This diet is high in protein and fat and low in vitamins, minerals, and carbohydrates.

Southern pastoralists - diet is similar to nomads' except that during the dry season they get most of their protein from fish. Fish are speared or netted from the bottom of swamps and streams that are drying out. The fish is either eaten fresh or dried in the sun. Toward the end of the dry season before the new harvest the people eat wild fruits, vegetable roots, and seeds collected by the children.

Sedentary cultivators in the central plains - the usual diet is sorghum and millet. Most people have little surplus grain to trade for animal products; thus their diet is high in carbohydrates and low in protein.

Southwest Azande - unable to raise cattle due to the prevalence of the tsetse fly, they live on sorghum and millet, and in poor crop seasons, on the drought-resistant cassava. They supplement this diet with groundnuts, some fish, and various kinds of rodents and insects.

Most of the people do not understand the need for a balanced diet and dietary deficiencies are aggravated by social customs. Men usually eat first and women and children often do not get enough protein and other nutrients. Women frequently are forbidden to eat meat, milk, and eggs during pregnancy and lactation. Many children are kept on breast-milk alone until one year of age and then weaned abruptly to the family diet. Other children are sent to grandmothers who feed them on sugar water or custard powder and water without a supplement of body-building foods.

4.3 Staple Foods

Cereals - sorghum, wheat, millet, rice, maize

Roots and tubers - cassava, yam, sweet potatoes, white potatoes,

Pulse crops - broad beans, chick peas, fule masri, lubia, sweet peas

Oils - groundnut oil, sesame oil, cotton seed oil

Vegetables - okra, eggplant, onion, green pepper, tomatoes, squash

Fruits - citrus fruits, mangoes, bananas, dates, guava, melon

Meat/fish/fowl - beef, mutton, camel, goat, fish, chicken

Dairy - milk, eggs, clarified butter

4.4 Taboos

There are many food taboos, generally varying by ethnic group. For example, some groups believe milk causes worms in children and eggs retard speech development. Other groups think fish and milk cause food poisoning and skin diseases. Moslems do not eat pork or non-ritually slaughtered meat.

4.5 Food Programs

P.L. 480, Title I/III:

The P.L. 480 Title I/III program will provide Sudan with approximately \$100 million over a five-year period, FY 1979-1983. The program provides the Government of Sudan (GOS) with resources for further development in the areas of agriculture, transport, health, and rural planning. The purpose is to encourage GOS efforts to meet the country's food grain requirements (particularly wheat), increase food production, and stabilize pricing policies. Currency that would otherwise have been spent on wheat imports can be invested in export earnings or import substitution projects.

P.L. 480, Title II:

The P.L. 480, Title II program has been in operation under the auspices of the Catholic Relief Services (CRS) since 1977. Recipient levels expanded from an initial 15,000 children to 30,000 in 1979. In FY 1981 CRS will expand this to a total of 80,000 in four provinces: Khartoum (40,000), Kassala (16,000), Red Sea (16,000), and Gezira and the town of Wadi Halfa (8,000). For the first time 30,000 mothers will be added to the 50,000 children as recipients.

At the present, the only commodities distributed are non-fat dry milk (NFDM) and vegetable oil. Because of their long shelf-life and minimal infestation problems, these commodities are the only ones distributed due to significant transport problems. CRS plans to add bulgar for 16,000 recipients in the Red Sea Province in FY 1981 and, depending upon improved railway service, for the other 64,000 recipients. The transportation constraint is the biggest obstacle to the planned expansion of the Title II Program since storage facilities are adequate for the increased amount of commodities. The three commodity ration will provide per recipient per day 727.5 calories and 31.5 grams of protein. (The current ration provides 536.5 calories and 24.5 grams of protein.)

Upon arrival at Port Sudan and after the goods are cleared by Sudan Customs, they are stored in a Sea Ports Corporation warehouse until a Sudan Rail car is available to transport them inland. A GOS cargo agent maintains records of all commodity movements and is in charge of clearing and forwarding the goods. Ships experience little delay in unloading their goods at Port Sudan (due largely to greatly expanded storage areas); however, because of Sudan's poor inland transport system, goods continue to pile up. It has been estimated that often up to 3 1/2 million tons have been delayed at the port awaiting inland transport. Due to broken locomotives and a lack of spare parts, Sudan Railways generally operates at 40%

of capacity. But since Sudan Railways is a state-controlled business and is much cheaper than truck transport, all Ministry of Health goods must go by rail.

P.L. 480, Title II commodities are distributed at government health centers through a pre-school program administered jointly by CRS and the GOS Ministry of Health. CRS provides the commodities, a basic nutrition curriculum, and supervisory consultation; the Ministry pays for clearing and inland transport of food and provides storage facilities, government health centers, and health personnel. Each center has a staff consisting of a doctor and/or medical assistant; a health visitor (specializing in maternal/child health), a nutrition educator, a clerk, nurses, and other support staff. The center is equipped with standard medicines, vaccines, weight scales, a small laboratory, consulting rooms, and other supplies. Most centers have space for food storage and group lectures.

World Food Program (WFP) is the only other consistent supplier of food assistance to Sudan. UNICEF has made occasional donations but does not expect to provide any food aid after 1979. CRS maintains close contact with both WFP and UNICEF to ensure that there is no duplication.

P.L. 480 Title II, FY 1981

(to be provided by CRS to 80,000 maternal and child recipients)

<u>Commodity</u>	<u>KGS</u>	<u>\$'000</u>
NFDM	1,920	678
Salad oil	960	789
Bulgar	1,920	367
Total	4,800	1,834

5. Health, Sanitation and Housing5.1 Vital Statistics

Crude birth rate /1,000	45 (1978)
Crude death rate /1,000	18 (1978)
Infant mortality/1,000 live births	132 (1975)
Child (1-4) death rate/1,000	31 (1978)
Life expectancy in years	46 (1978)
Growth Rate	2.6% (1974-77)

5.2 Diseases

Diseases resulting from poor environmental sanitation and malnutrition account for the majority of illnesses. Communicable endemic and epidemic diseases are also common. Some agricultural and socio-economic developments in Sudan have aggravated several health problems, particularly water-borne diseases.

Malaria - endemic with sporadic epidemic outbreaks. It had been seasonal in incidence but, with the development of large irrigation schemes, malaria has become a year-round problem. Control programs have been in existence for over 20 years with little effect. Occurs in all areas except the northwest and far west.

Schistosomiasis - highest incidence reported in the provinces of Khartoum, Blue Nile, and Darjur, with Blue Nile being the most severely affected due to its huge irrigation schemes.

Enteric diseases - major problem among children (63% of all cases). This disease is primarily related to poor sanitation and contaminated water.

Onchocerciasis (River Blindness) - water-borne disease occurring primarily in southern Sudan. An estimated 160,000 (1976) are presently affected, including approximately 18% of young males aged 15-24. Unless the present trend is halted, a projected 200,000 persons will be infected by 1984.

Trypanosomiasis (Sleeping Sickness) - major parasitic disease affecting southern Sudan; actual magnitude in humans unknown.

Other diseases - TB (BCG vaccine in use), cerebro-spinal meningitis (5% incidence rate), measles, polio, pertusis, and diphtheria.

5.3 Health Facilities

The Ministry of Health (MOH) is responsible for the planning and implementation of health programs. With the assistance of WHO, the MOH has developed a national health plan detailing priorities, including a new health service program for the rural population. The new plan, which includes improved distribution of drugs and supplies, training of health and management personnel, and a transport and communication system should be fully operational in 1984.

As of 1976, existing health facilities were as follows:

Hospitals	133
Hospital beds	15,670
Health centers	144
Dispensaries	634
Dressing stations (to be upgraded to rural health care units)	1,505
Blood banks	22
Specialty hospitals	38
School health units	11
Nursing schools	54
Village mid-wife schools	18
Health visitor schools	3
Medical assistant schools	5
Public health laboratories	4
Public health offices	225
Endemic disease units	3
Population per hospital bed	960 (urban-260; rural-2,580)

In southern Sudan, 3 provincial hospitals have extensive facilities including X-ray, surgery, laboratory, and blood bank; 21 hospitals have limited facilities. There is a regional laboratory in Juba. Northern Sudan has about 105 hospitals, 159 health centers, 580 dispensaries, and 1,380 dressing stations. All types of specialized facilities are found in Khartoum. Gezira and Kassala Provinces have special programs for schistosomiasis and malaria.

5.4 Refrigeration

All provincial hospitals have cold storage facilities. District hospitals, rural hospitals, some health centers, and a few dispensaries have kerosene refrigerators. Provincial hospitals can get drugs by plane from Khartoum. Ice boxes and thermos flasks for in-province delivery are generally in short supply.

5.5 Health Personnel

There is a shortage of health personnel of all types. Included in the national health plan is a program for massive training of para-medical workers. As in most developing countries, the preponderance of physicians in Sudan are in the major urban areas.

Private practice is allowed for all Sudanese doctors. They may either open private clinics in their free time or resign from government service and practice privately full-time. Traditional healers are popular in southern rural areas and among Moslem tribes in western Sudan.

Physicians	1,287
Dentists	54
Medical Assistants	1,645
Medical Technicians	514
Pharmacists	307
Health Visitors	23
Health Statisticians	50
Dental Technicians	27
Social Workers	4
Nutritionists	19
Senior Public Health Inspectors	62
Public Health Inspectors	151
Public Health Officers	271
Sanitary Overseers	11,120
Nurses	4,438
Village Mid-wives	unknown
Population per Nurse	1,260
Population per Physician	9,760

Source: USAID, Health Sector Report - Sudan, Nov. 1976.

5.6 Water Supply

Thousands of wells have been drilled in recent years to provide rural populations with a water supply. While these wells provide many advantages -- such as safe water, reduced disease, irrigation -- they also contribute to greater soil erosion, degradation of vegetation, and possibly overpopulation. In many cases microdeserts have been created by poor well management. In the west where there are fewer wells, baobab or tebedi trees, whose hollowed trunks hold up to 4,500 liters of water, are sometimes used as storage tanks.

In the central plains a large number of reservoirs (hafirs) have been created to collect surface water during the rainy season. A reservoir of 15,000 cubic meter capacity can meet the minimum water requirement for about 2,500 people.

In urban areas water is piped to individual houses (middle to upper income) or to central standpipes (lower income) intended to serve 15-100 households. Problems of blockage, pressure lapses, and inadequate maintenance are common. Only Khartoum and Khartoum North have a central sewerage system (service to less than 30% of the population). Most households use septic tanks, pit latrines or, for the lower income groups, bucket latrines.

5.7 Cultural Preferences in Housing

In both urban and rural areas, people of Arabic extraction build their houses within a high-walled compound. Portions of the compound wall are then used to construct living quarters facing one or two interior courtyards. A sharp distinction is made between men's quarters and women's quarters.

Among the African groups of the south, cultural preferences with regard to shelter are quite different. Houses are typically framed with thorn tree branches and thatched with millet stalks to allow for the free passage of air and smoke. A homestead consists of two or more round, mud-walled huts with conical roofs of layered thatch, surrounded by a brush fence. Village homesteads are often grouped around a central cattle yard (kraal), which also contains a shelter, sometimes used as a public meeting place.

In swampy areas, homes are sometimes built on piles. The dry season shelters for transhumant farmers are "beehives" of sticks, grass, and mud, which do not survive the first rains. Wet season shelters are thick earthen roofs with tanned hides hung over the rafters to form walls. Even "permanent" homes require extensive annual repairs and are rebuilt about every five years.

5.8 Rural Housing

Over 13 million people, or 75% of Sudan's population, are estimated to be living in rural areas. Of these, 4.4 million people live in permanent houses made with local materials such as mud, timber, and straw, and another 8.6 million people are either nomads with portable light-weight shel-

ters or seasonal migrants living in houses built for temporary occupancy. Because of the differing and sometimes ambiguous definitions of "household", the average occupancy per house may vary from 5-10 people.

Housing density is very low in a typical rural village settlement. Cattle herdsman cluster a number of huts around fenced areas where they keep their cattle. Farming communities have a tendency to build shelters at the edge of their farmland, where cattle areas and huts are placed side by side.

The design and materials used for rural housing vary from area to area depending upon local raw material availability. In the northern and western parts of the country, the rural shelters are made mostly with mud and have thatched or straw roofs and walls plastered with manure. In the southern region, the circular one-room house, called a toukal, has mud or straw walls and a conical, layered straw roof. This type of unit requires constant maintenance and creates a fire hazard.

Proximity to a water supply, whether from a river, spring, or man-made well, is the most important factor in choosing a site for permanent settlement. Sanitary waste does not present a significant problem in rural areas, due to low residential densities. In general, rural housing meets the basic needs of rural residents and improvement of housing and services is given low priority compared to housing in the major urban areas.

5.9 Urban Housing

According to the 1973 Census, the "average household" in urban areas had 5.4 persons living in 2 rooms. Forty-three percent of dwelling units had only one room, and 40% of those households with 5-6 members lived in only one room.

Only a small portion of urban houses were built of "permanent materials"; 4.7% of homes had walls of brick or stone, and 12.7% of homes had roofs of zinc sheets or concrete. Walls of mud were used in 47.4% of homes. However, the combination of mud walls and baladi roofs was by far the predominant housing type throughout urban areas of Sudan; 30.9% of homes were of this type. In addition to the traditional building materials, the most commonly used building materials for housing construction are bricks, cement, lime, lumber, and reinforced steel bars.

5.10 Building Materials

Cement is produced in Sudan by two state-owned plants which produce annually 130,000 to 170,000 tons of good quality cement. Sun-dried and soft burnt bricks are produced on the banks of the White and Blue Nile and other rivers across the country. The main difference between sun-dried and soft burnt red bricks is that the latter are water-resistant and therefore last longer. Steel bars for concrete work are produced locally from imported steel.

Urban Building Materials, 1973

<u>Wall Material</u>	<u>Roof Material</u>					<u>Total</u>
	<u>Baladi</u>	<u>Wood</u>	<u>Zinc Sheet*</u>	<u>Concrete</u>	<u>Other</u>	
Grass	.4		.1		18.0	18.5
Brick	4.6	4.7	6.5	1.4	1.4	18.6
Mud	30.9	2.6	1.8		12.1	47.4
Stones	.1	.2	.8	.5	.5	2.1
Wood	.1	4.1	.1		.2	4.4
Muddy Brick	2.0	.2	.3		.4	2.9
Other	.3	.3	.9	.3	4.2	6.1
Total	38.4	12.1	10.5	2.2	36.8	100.0

* Permanent material

Source: USAID, Sudan Shelter Sector Assessment, 1978.

Housing Characteristics From 1973 Census

	<u>Sudan Urban</u>	<u>Khartoum 3 Cities</u>	<u>Port Sudan</u>	<u>Ei Obeld</u>	<u>Juba</u>
Total number of dwelling units	471,490	132,726	29,143	15,783	9,836
Average number of rooms	2.0	2.2	1.7	2.3	1.6
Percent with only one room	43	39	55	38	66

SUDAN

5. Health, Sanitation, and Housing

	<u>Sudan Urban</u>	<u>Khartoum 3 Cities</u>	<u>Port Sudan</u>	<u>EI Obe'd</u>	<u>Juba</u>
Persons per household	5.4	5.9	4.5	5.6	5.4
Persons per room	2.7	2.7	2.7	2.4	3.4

Source: USAID, Sudan Shelter Sector Assessment, 1978.

6. Disaster Preparedness

6.1 Host Plan

Sudan has no national disaster plan. In the case of an emergency, a national relief committee is formed from members of the military government. Operational decisions, made by the central committee, are transmitted to provincial commissioners and down through the administrative hierarchy to the village chiefs. Data on the disaster and victims are collected through the same hierarchy but in reverse order. Because of the long-term duration of the refugee problem a permanent Commissioner of Refugees has been established within the Ministry of Interior.

6.2 US Mission Plan

Assistance provided by the United States is usually channeled through one of the major voluntary agencies active in Sudan, one of the United Nation's agencies, or through one of the GROD ministries.

U.S. Embassy
Gamhouria Ave.; P.O. Box 699, Khartoum
Tel. 74611, 74700; Telex 619 AMEMB KM
MDRO: Arthur W. Mudge, Aid Director
Alternate: Jack Faircloth, Management Officer

6.3 Donor Community

The donor community consists of about 60 members, including 25 bilateral and multilateral donors who provide the largest amounts of assistance. The World Bank is the largest Western donor with an annual program of about \$70 million. The European Economic Community, the Federal Republic of Germany, the Netherlands, Great Britain and the United States are other large donors. Most of the christian voluntary agencies work in the south where there is a large christian population. In general more donors are active in the south than in the north. Donor coordination is accomplished on an ad hoc basis since the Sudanese do not bring donors together to discuss matters of mutual interest.

6.4 Voluntary Agencies

ACROSS (African Committee for Rehabilitation of Southern Sudan)

Contact: P.O. Box 21033, Nairobi, Kenya

P.O. Box 164, Juba

African Inland Mission

Contact: P.O. Box 57909, Nairobi

Catholic Relief Services

Contact: James McLaughlin, Director

Raymond A. Riddick, Project Officer

Mohamed El Hassan, Shipping Manager

Ihsan Mustafa, MOH Liaison Officer

Aziza El Mahi, Liaison Officer

Nur Pharmacy Bldg., 2nd Floor, Hurria St., Khartoum

Church World Service

Contact: Sudan Council of Churches, P.O. Box 469, Khartoum

Eastern Mennonite Board of Missions and Charities

Contact: Sudan Council of Churches, Box 469, Khartoum

Family Planning International Assistance

Contact: Dr. Mohamed Isbahim

Dept. of Pediatrics and Child Health, Faculty of Medicine,

University of Khartoum, P.O. Box 102, Khartoum

The Ford Foundation

Contact: John Bruce

P.O. Box 1794, Khartoum

Foster Parents Plan

Contact: Donald Martin, Director

P.O. Box 346, Wad Medani

International Medical and Research Foundation

Contact: Dr. Sam Singh Bhachu

c/o Primary Health Care Program, Juba

International Voluntary Services, Inc.

Contact: Michael Bohn, Field Director

P.O. Box 1926, Khartoum

Tel: 81/335

Lutheran World Ministries

Contact: Bram Voets, Director
P.O. Box 126, Malakal, Upper Nile Province
Tel: Malakal 214

Map International

Contact: ACROSS, P.O. Box 21033, Nairobi

Mennonite Central Committee

Contact: Keith Gingrich
ACROSS, P.O. 164, Juba

Mill Hill Missionaries

Contact: Rev. R. Pikkemaat, Acting Superior
P.O. Box 27, Malakal, Upper Nile Province

Sons of the Sacred Heart

Contact: Rev. O. Sina, Provincial Superior
Verona Fathers, P.O. Box 114, Khartoum
Tel: 72564

Sudan Interior Mission

Contact: F.M. Dye Jr., Area Director
P.O. Box 220, Khartoum
Tel: 79664

Missionary Sisters of Verona

Contact: Sr. Pia Clementina Baldessari, Regional Superior
Sisters House, P.O. Box 53, Khartoum
Tel: 71595

World Vision Relief Organization

Contact: Dr. Bryant L. Myers, Associate Director
AGIP House, 2nd Floor, Haile Selassie Ave. & Harambee Lane,
Nairobi
Tel: 331-152 and 331-019

7. Agroecconomy

7.1 Overview of Agriculture

The agriculture sector dominates the Sudanese economy. It is the source of virtually all exports, contributes about 40% of the GDP, and is the main source of employment for nearly two-thirds of the labor force. Production consists mainly of cotton, cereals, oilseeds, gum arabic, and livestock.

Of a total land area of just under 600 million feddans (1 fedden = .42 hectares), some 200 million are classified as agricultural land, 220 million as forest, and about 180 million as uncultivable land. Recent agricultural developments have been largely concentrated in the central plain, where the bulk of irrigation development has taken place. Of the 17 million feddans officially estimated as currently under cultivation, some 4 million feddans are under irrigation, and about 5.5 million feddans are under mechanized farming. Most of the remaining area is rangeland, heavily used by the large livestock population in nomadic or sedentary livestock farming systems.

7.2 Constraints and Potential

With its underutilized land and natural resources, and a potentially large market for its products in neighboring Arab countries, Sudan is in a good position to expand agricultural production and accelerate its development and progress toward self-sufficiency. However, a variety of constraints must be dealt with if the country's full potential is to be realized: 1) lack of water and poor land conservation practices; 2) poor incentives and a weak marketing effort; 3) insufficient maintenance of machinery and equipment; and 4) the scarcity of managerial and administrative talent.

7.3 Irrigation

There are three types of irrigation schemes in Sudan: a) large schemes (over 200,000 feddans), managed by government-related bodies and cultivated by tenants; the Gezira-Managil scheme, with over 2 million feddans, is the largest of this type; b) medium scale schemes, which are mainly nationalized pump schemes along the Blue and White Niles; c) small scale schemes, mainly along the Nile north of Khartoum and belonging entirely to the private sector. The main irrigation schemes, Gezira, New

Halfa, and pump schemes on the White and Blue Niles, are all cotton producers, as is the new Rahad scheme. In the irrigated areas, all land preparation is mechanized and planting is from mid-July to mid-August. The harvest takes place over a two to three month period depending on variety, time of planting, irrigation efficiency, and climate. In late November the first pickings start.

Existing Irrigation Schemes

<u>Irrigation method</u>	<u>Schemes</u>	<u>Net commanded area (feddans)</u>	<u>% of Total</u>	<u>Source of water</u>
Gravity	Gezira	1,114,000	26.5	Blue Nile
	Managil	946,000	22.5	Blue Nile
	Rahad (stage 1)	150,000	3.6	Blue Nile
	New Halfa	<u>390,000</u>	<u>9.2</u>	Atbarah
	Sub-total	2,600,000	61.8	
Pump	Kenana	40,000	1.0	White Nile
	Hagar Asalaya	18,000	0.4	White Nile
	Abu Na'ama	30,000	0.7	Blue Nile
	Es Suki	85,000	2.0	Blue Nile
	NW Sennar	49,000	1.2	Blue Nile
	Hurga-Nurel Din	22,000	0.5	Blue Nile
	Guneld	85,000	2.0	Blue Nile
	Nationalized schemes	435,000	10.3	White Nile
	(805,000 f)	270,000	6.4	Blue Nile
	100,000 1/		2.3	Main Nile
	Private schemes 2/	63,000	1.5	Blue Nile
Private schemes	<u>235,000</u>	<u>5.6</u>	Main Nile	
Sub-total	1,432,000	34.0		
Flush	Gash delta	50,000	1.2	Gash R.
	Tokar delta	<u>60,000</u>	<u>1.4</u>	Baraka R.
	Sub-total	110,000	2.6	
Basin	North. Prov. Sch.	50,000	1.2	Main Nile

<u>Irrigation method</u>	<u>Schemes</u>	<u>Net commanded area (feddans)</u>	<u>% of Total</u>	<u>Source of water</u>
Tubewell	Sag el Na'am	3,000	0.1	Groundwater
	Private schemes	<u>15,000</u>	<u>0.3</u>	Groundwater
	Sub-total	18,000	0.4	
Grand Total		4,165,000		

- 1/ 35,000 f. were already Government schemes.
- 2/ Uncertain, estimate given (+ or - 5%).
- 3/ Estimate (+ or - 20%).

7.4 Crop Production

Cotton - Sudan produces three types of cotton. The most important variety is long staple cotton, which accounted for about 70% of total cotton acreage up to 1974/75, followed by medium staple cotton with about 18%, and short staple with some 12%. Total cotton acreage until the 1974-75 season remained largely unchanged at about 1.2 million feddans. In recent years, the area devoted to cotton has fallen to about 1 million feddans and cotton output has declined. From 1970/71 to 1974/75, output fluctuated between 1-1.2 million bales but output fell almost 50% in 1975/76 and has not fully recovered since.

Groundnuts - Although most groundnuts are grown under rainfed conditions, 25% of production is now under irrigation on some 500,000 feddans. The optimal growing period is approximately 17 weeks of irrigation followed by three or four weeks of drying out. In the irrigated areas, planting should start in mid-June, enabling the harvest to be completed by the end of December.

Wheat - traditionally grown along the main Nile in Northern and Nile provinces under the basin flooding system, and more recently on pump irrigation schemes. With the drive for self-sufficiency in food production, wheat has become a major crop in the Gezira and New Halfa schemes and on some of the White Nile pump schemes. The planting season starts between mid-October to mid-November. The best sowing date is as soon as possible after the winter wind has arrived in the hope of maturing the crop before the return of summer. In general yields are low and over the past 10 years have varied from 400 to 650 kg/f.

Sorghum - only 9% (500,000 feddans) out of a total of 6 million feddans is grown under irrigation. Since sorghum is a major staple, most farmers prefer to grow some for subsistence needs rather than buy it with cash. Under irrigation planting starts in June/July. Irrigation yields about 430 kg/f.

Beans - grown in Nile, Northern, and Khartoum provinces; an important foodstuff and valuable protein source.

Rice - grown under rainfed and flood conditions in the south; recently introduced into the Gezira under irrigation to offset imports.

7.5 Harvesting Dates

<u>Crops</u>	<u>Harvest Period</u>	<u>Bulk of Harvest</u>
Wheat	Feb - Apr	Mar - Apr
Barley	Feb - Apr	Jan - Feb
Maize	Feb - Apr	Sep - Oct
Millet	Oct - Dec	Oct - Nov
Sorghum	Oct - Dec	Dec - Jan
Potatoes	Oct - Dec	Apr - May
Cassava	Whole year round	Apr - May
Onions	Whole year round	Apr - May
Dry beans	Jan - Mar	Jan - Mar
Broad beans	Jan - Mar	Jan - Mar
Chick-peas	Jan - Mar	Jan - Mar
Lentils	Mar - Apr	Mar - Apr
Lupins	Mar - Apr	Jan - Feb
Oranges	Mar - Apr	Nov - Mar
Lemons	Whole year round	Nov - Mar
Dates	Jul - Nov	Jul - Aug
Bananas	Whole year round	Jul - Aug
Mangoes	Whole year round	Apr - Aug
Groundnuts	Whole year round	Nov - Dec
Sesame Seeds	Oct - Dec	Oct - Dec
Cotton	Oct - Dec	Jan-Apr 1/ & Nov-Dec 2/

1/ Irrigated

2/ Rainfed

7.6 Livestock

Livestock are one of Sudan's most plentiful and most neglected resources. In general livestock are kept for their numbers rather than their productivity and selection. The GOS maintains a veterinary program of inoculation, but breeding, grazing management, and veterinary supervision are still at a rudimentary stage. In the north the chief grazing animal is the camel; in the central plains and southern areas cattle predominate. The major ecological regions of the country differ so radically that livestock breeds from one zone may not be able to survive in another. There are two principal indigenous types of cattle: the northern or Arab variety and the southern or Nilotic breed. Nilotic cattle seldom survive for more than one generation away from the flood plain, and the Arab cattle will die if left in the flood region. There are also various types of sheep, but all are kept for meat rather than wool.

	Livestock (<u>'000 head, year ending September</u>)	
	<u>1976</u> (FAO estimates)	<u>1977</u>
Cattle	15,300	15,892
Sheep	15,300	15,248
Goats	10,600	11,592
Pigs	7	8
Horses	20	20
Asses	670	675
Camels	2,800	2,813
Chickens	23,000	24,000

Source: Europa, Africa South of the Sahara, 1980.

7.7 Agricultural Exports

Cotton is still the dominant cash and export crop, accounting for about 56% of all exports. It is followed by sesame (9%), groundnuts, and gum arabic (each 8%). Other exports include livestock, hides and skins, castor beans, horticultural produce, and Kerkadeh (a derivative of a flower grown by farmers in the savanna belt and used as a beverage). In some years of surplus, quantities of sorghum have also been exported. Recent crop diversification has concentrated on import substitution and considerable expansion has taken place in wheat and sugar output.

8. Industrial Economy

8.1 Overview of Industrial Economy

Sudan's modern sector is limited to the mechanized irrigation schemes in Al Jazirah and the Quah and Tawkar deltas, and some light industry in the Three Towns region of Khartoum, Khartoum North, and Omdurman. Tertiary activity in organized commerce, government, and services is also concentrated in the Three Towns area. Apart from the processing of agricultural commodities such as cotton, oil seeds, and sugar, the small manufacturing sector is limited to the production of consumer goods and building materials. Nationalization measures of 1970/71 transferred a significant proportion of industry, commerce, and finance to the public sector, which already included all of the modern irrigation facilities, the railways, and virtually all power and water supplies. Although some industrial enterprises have been returned to the private sector, about 50% of the GDP is generated within the public sector. As of 1978, the distribution of GDP was: 43% from agriculture, 12% from industry, 6% from manufacturing, and 45% from services. Between 1970-78 GDP grew 2.7% per year.

8.2 Current Status

The most serious economic problem facing Sudan is the precarious situation of the balance of payments. Within two years (1973-75) the current account deficit increased from US \$65 million to US \$640 million and has not changed much since. According to a 1980 World Bank report, gross official reserves have fallen from the equivalent of two months worth of imports in 1974 to only a few days worth of imports, while debt service obligations have accumulated to over \$1.2 billion (Sept 1979). The crisis is the consequence of inadequate management policies compounded by external factors such as the sharply higher cost of petroleum imports and a steep rate of international inflation (World Bank). For example, while import prices rose about 88% between 1973-78, there was no corresponding rise in Sudan's export prices.

8.3 Industrial Production

	<u>Selected Industrial Products</u>		
	<u>Unit</u>	<u>1975</u>	<u>1976</u>
Cement	'000 tons	171.2	163.3

	<u>Unit</u>	<u>1975</u>	<u>1976</u>
Wheat flour	'000 tons	225.9	251
Sugar	'000 metric tons	139	140
Soap	'000 tons	39.4	47.1
Wine	'000 liters	4,809.4	4,709.7
Beer	'000 liters	9,987.4	8,401.6
Cigarettes	million	680	690
Canned fruit & vegetables	million tins	14.2	n.a.
Shoes	million pairs	13.2	12
Woven cotton fabrics	million sq. meters	103	n.a.
Motor spirit	'000 metric tons	114	120
Naphtha	'000 metric tons	40	11
Jet fuels	'000 metric tons	47	50
Kerosene	'000 metric tons	36	37
Distillate fuel oils	'000 metric tons	447	325
Residual fuel oils	'000 metric tons	463	577
Liquified petro oils	'000 metric tons	3	4

Source: Europa, Africa South of the Sahara, 1980.

8.4 Imports

Principal industrial commodities: transport equipment, machinery, textiles, petroleum products, iron and steel, metal manufactures, pharmaceuticals, fertilizers, sacks and jute, tires, and footwear.

Principal import suppliers: UK, Japan, USA, West Germany, India, Italy, and Kuwait.

9. Transportation and Logistics

9.1 Road Network

Sudan's transport system is railway oriented with roads serving as feeders to the railways. River transport on parts of the Nile system supplements the railways. The highway network is in an early stage of development and road density is very low in relation to other African countries. The network totals 18,500 kms. of roads and tracks, composed of less than 2% bituminous-paved roads, 13% gravel-surfaced roads, and 85% earth tracks. Most paved roads are near the capital and most gravel roads are in the six southern provinces. The four western provinces have no asphalt roads, except within the confines of the provincial capitals, and only 200-300 kms. of gravel roads.

Roads have not been properly maintained nor has road construction and improvement kept pace with agricultural expansion. Consequently, the present condition of the road network is a bottleneck for economic development of the country. Unimproved roads or tracks in areas of clay soils are usually firm during the dry months but become muddy and impassable with the first rains. Conversely, roads and trails across sandy regions can become impassable when the sand is completely dry. In the southwest, heavy flooding often prevents travel; motor traffic on roads in the Upper Nile Province is limited to the drier months of January-May. There are several good gravel roads in Equatoria and Bahr el Ghazal provinces which are passable all year round, but in these districts most of the minor roads become impassable after rain.

The road joining Juba and Khartoum is open from mid-November to mid-April. The new tarmac road linking the capital with Port Sudan is now complete, substantially easing the transport problem on that route. Rehabilitation of communications in southern Sudan is a major priority as the civil war completely destroyed 1,600 km. of roads and 70 bridges. In 1977 construction of a 960 km. road linking Juba and Wau was begun with assistance from the Federal Republic of Germany. The Wad-Medani to Gedaref highway, financed by a loan from the People's Republic of China, was completed in March 1977.

9.2 Railway Network

Sudan depends primarily on railways for transport. Despite improvements, however, rail facilities are far from adequate. The length of the railway network is 4,781 km. and the average density of railways for the whole country is only 1.9 km. per 1,000 sq. km. The main line runs from

Wadi Halfa on the Egyptian border to El Obeid via Khartoum. Lines from Atbarah and Sennar connect with Port Sudan on the coast. There are lines from Sennar to Damazine on the Blue Nile (227 km) and from Aradeiba to Nyala in the southwestern province of Darfur (689 km), with a 445 km branch line from Babanousa to Wau. Sudan Railways Corporation: P.O.B. 1812, Khartoum; P.O.B. 65, Atbarah.

There is a tremendous shortage of locomotives. Currently the national fleet of rail cars numbers 400. The World Bank and Saudi Arabia are providing funds for 20 new cars.

9.3 Ports

Port Sudan, on the Red Sea, 788 km. from Khartoum, is Sudan's only major seaport. After the reopening of the Suez Canal in June 1975, work began on installing new equipment at Port Sudan and enlarging its capacity. The port authority is Sea Ports Corporation, P.O.B. 2534 Khartoum. Tel: 79343, 79114, Cables: Mawani-Khartoum, Telex: 464 MAWANI. The harbor has a good entrance 278 m. wide protected from all directions. Depth at entrance decreasing rapidly from 73.2 to 25.6 m. In addition to the quay berths there are four anchorages in the inner harbor with ample water and reasonable holding ground where vessels may load and discharge by means of pontoons (but not between July 1 and August 31). Floating equipment includes powerful tugs, light tugs, cargo pontoons, coal lighters, water barge, and a powerful firefloat. Sixteen tanker terminal berths available. Fuel, diesel and gas oil ex barge from Shell Co. of the Sudan, Ltd. Ship repairs and towage available. Ample warehousing is available.

Suakin, a small port, 50 km. south of Port Sudan, is being developed by the GOS as an adjunct to Port Sudan, whose capacity will thereby double.

9.4 Inland Waterways

River transport is mainly used between Kosti and Juba (1,435 km.) and between Dongola and Kareima (187 km.); the trip between Rosti and Juba takes 12 days. Both these routes are navigable all year round. The total length of river navigation routes is about 4,068 km. of which 1,723 km. are open all year and the rest are seasonal. River transport between Wadi Halfa and Shellal is under development at the present time.

River Transport Corporation: P.O.B. 284, North Khartoum; operates steamers on 2,500 km. of the Nile.

River Navigation Corporation: Khartoum; jointly owned by the Egyptian and Sudanese Governments; operates services between Aswan and Wadi Halfa.

9.5 Airports

The International Airport is at Khartoum. Other large airports are located at Port Sudan, Kassala, Juba, Geneina, Malakal, Ar Rusayris, Al Fashir, El Obeid, and Wau.

9.6 Airlines

The government-owned Sudan Airways operates internal and international services. It connects Khartoum with twenty important Sudanese towns as well as with Europe, the Middle East, and Africa. Fleet: 2 Boeing 737, 2 Boeing 707, 5 Fokker F-27.

Sudan is also served by the following foreign airlines: Aeroflot, Air France, Alitalia, British Airways, Egypt Air, Ethiopian Airlines, Interflug, Libyan Arab Airlines, Lufthansa, MEA (Lebanon), SAS, Saudi Arabian Airlines, Swissair, and Yemen Airways.

10. Energy and Communications

10.1 Overview of Energy Resources

Although preliminary investigations indicate that Sudan might have some fossil fuel resources (hydrocarbons), imported oil and hydroelectricity are the main sources of commercial energy. Imported oil covers about 80% of the country's commercial energy needs with the balance met by hydroelectric generation, which supplies about 70% of the country's electric energy requirements. Non-commercial sources of energy are firewood and vegetable wastes (charcoal, sugarcane bagasse, and stalks from cotton fields). Bagasse is used in sugar factories and charcoal in households (especially in rural areas) as a source of heat. Sudan has no known geothermal resources. The use of commercial energy by sectors is as follows: transport about 40%, agriculture 25%, industry 20%, households 10%, and government and municipal sectors 5%. About 10% of the total petroleum consumption is used as fuel for generation of electricity. The demand for commercial energy has increased about 6% annually during the period of 1973-77.

10.2 Electricity

Although a very low proportion of the population, about 8%, has access to electricity, this represents one of the highest in East Africa. However, small towns remain without electricity and rural electrification is limited to the developed irrigated areas located in Blue Nile and Khartoum provinces. The per capita consumption of electricity, about 50 kWh per year, is among the lowest in the world. The Public Electricity and Water Corporation (PEWC) is the main producer and sole distributor of electricity, generating about 90% of the total electricity produced in the country. Supply: 220 volts, 50 cycles, AC.

Periodic power failures have plagued Sudan, particularly the Khartoum metropolitan area. Sedimentation and debris problems at the Roseires Hydroelectric Power Dam on the Blue Nile are especially troublesome between July and September. The Ministry of Irrigation and the Ministry of Agriculture (in a joint effort) have instituted remedial measures, but a long-term solution remains to be found.

Installed Plant Capacity - August 1978

<u>Blue Nile Grid</u>	<u># of Units</u>	<u>Type</u>
Burri	8	Diesel

<u>Blue Nile Grid</u>	<u># of Units</u>	<u>Type</u>
Burri	4	Steam
Kilo X	1	Gas Turb.
Roseires	3	Hydro
Sennar	2	Hydro
Wad Medani	8	Diesel
Damazin	2	Diesel
<u>Blue Nile Isolated Stations</u>		
El Doulem	3	Diesel
El Geteina	3	Diesel
El Gourashi	6	Diesel
<u>Eastern</u>		
Kassala	10	Diesel
Khasm el Girba *	1	Diesel
	5	Hydro
<u>Northern</u>		
Atbarah	9	Diesel
Dongola	4	Diesel
Shendi	7	Diesel
<u>Southern</u>		
Juba	8	Diesel
Malakal	5	Diesel
Wau	8	Diesel
<u>Red Sea</u> Port Sudan	9	Diesel
<u>Darfur</u> El Fashir	8	Diesel
Nyala	6	Diesel
<u>Kordofan</u> El Obeld	12	Diesel
Um Ruaba	5	Diesel

* 6.6 MW Kaplan turbine operates only from June to October; 6.0 MW Pump turbine operates only from October to February; and 4.5 MW diesel units operates October to June.

10.3 Petroleum

Petroleum products are processed at the Port Sudan refinery from imported crude oil. The refinery capacity for processing various petroleum products is about 1.3 million tons per year. About 35% of the gas/oil and 44% of the kerosene consumed in Sudan are imported, mainly from Kuwait.

A pipeline/refinery project is currently being developed by the GOS and several foreign companies (Chevron, Bechtel) as a result of newly discovered oil reserves.

10.4 Radio Network

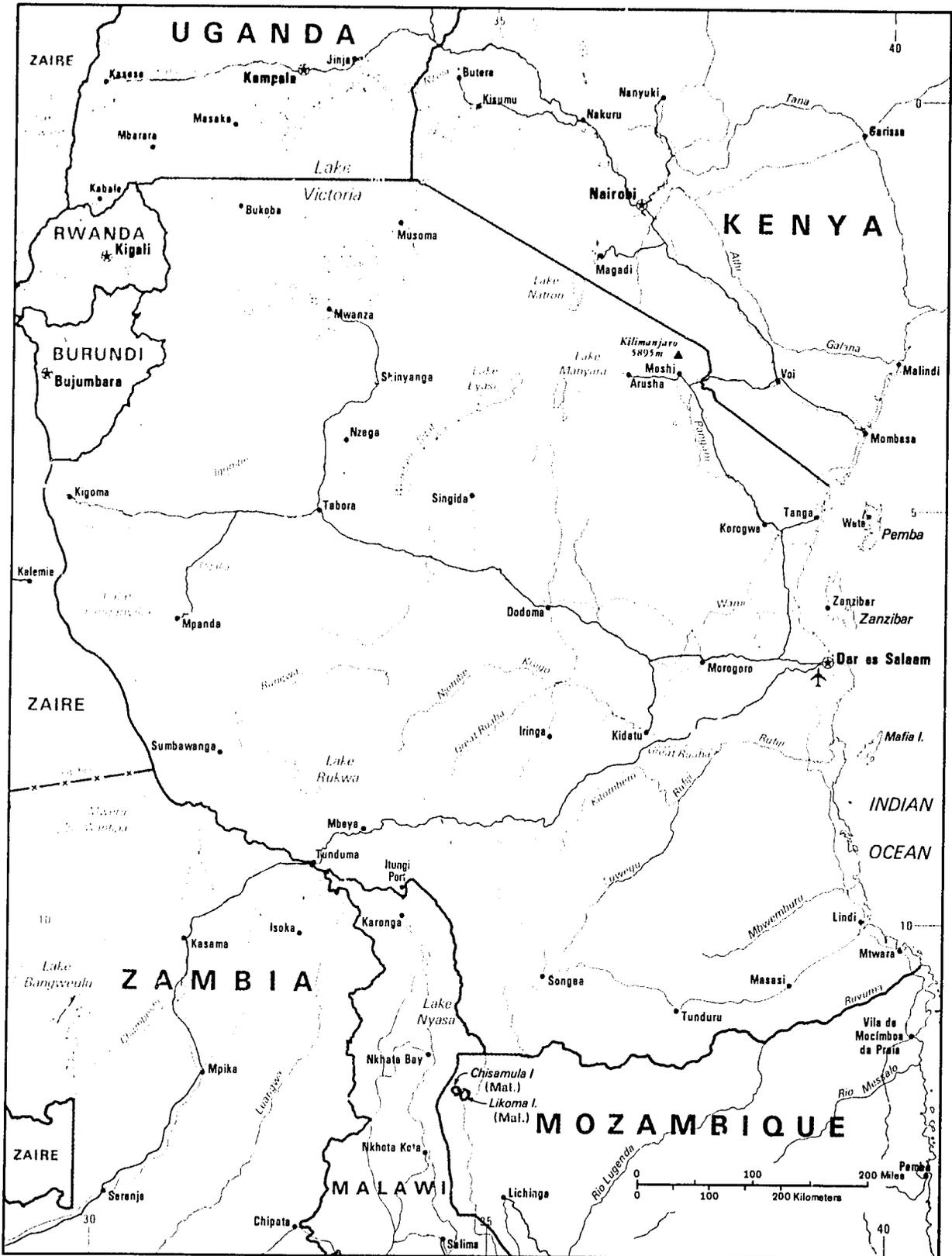
Sudan Broadcasting Service: P.O.B. 572 Omdurman; a government-controlled radio station which broadcasts daily in Amharic, Arabic, English, Somali, and Tigrinya. There were an estimated 1,135,000 radio receivers in 1978.

In November 1974 an earth satellite station, operated on 36 channels, was opened at Umm Haraz giving Sudan improved telecommunication links. A nationwide satellite network is being established with 14 earth stations in the provinces.

10.5 Television

Sudan Television Service: P.O.B. 1094, Omdurman. Broadcasts 35 hours per week. There were 95,000 television sets in 1978. A microwave network to extend television transmission was begun in 1975. There is a second station at Gezira and further stations are planned at Atbarah and Port Sudan.

Tanzania



502745 9-77 (541831)
 Mercator Projection
 Scale 1:7,800,000
 Boundary representation is
 not necessarily authoritative

- Railroad
- Road
- ✈ Airport

1. environment

1.1 Plateau Regions

There are two major plateaus: the Central Plateau and the Eastern Plateau. The Central Plateau, an arid plain marked by granitic outcrops, lies between two branches of the Rift Valley. Elevation varies from 900 to 1,800 m. The Eastern Plateau consists of a series of lower plateaus descending gradually to the coastal lowlands. The northern part of the plateau is known as the Masai Steppe, a semi-arid plain of about 70,000 sq. km. dotted with dry bush and grasses. South of the Uluguru Mts., the plateau broadens to form a rough triangle, the base of which stretches from Lake Nyasa to the coast. The terrain is uneven, characterized by isolated outcroppings of hills.

1.2 Mountains

In the north, along the border with Kenya, a range of mountains extends from Tanga inland as far as Lake Manyara. This range includes the Usambara and Pare mountains (2,300 m.) and further north, Mount Kilimanjaro and Mount Meru. Mt. Kilimanjaro consists of two peaks: Kibo, the higher peak, is almost 5,900 m. while Mt. Meru rises to 4,560 m. Both peaks receive abundant rainfall on the southern slopes, and tropical rainforest conditions prevail at the lower elevations.

The second mountain zone runs from Lake Natron southward in a series of isolated mountains and mountain chains. Interspersed between the mountains are numerous lakes and craters. Between Lake Natron and Lake Manyara are the Winter Highlands, a volcanic region containing Mt. Loolmalassin and the Ngorongoro Crater (100 km. across) in which large numbers of wildlife are found. West of the crater lies Olduvai Gorge, where paleontological explorations have led to the theory that the earliest forms of man may have originated in East Africa.

The Southern Highlands are the third major mountainous region. They stretch southwest in a line running from the Nguru Mts., located mid-way between Dar es Salaam and Dodoma, to the ranges surrounding the northern tip of Lake Nyasa.

1.3 Lakeshore Region

The northern portion of the Central Plateau gradually slopes downward to form the large shallow depression containing Lake Victoria, which lies at an elevation of about 1,180 meters. The gradual slope of the land permits agricultural development not possible along the steep embankments of Lakes Tanganyika and Nyasa. The area is densely populated and the people have close cultural ties with those living along the Ugandan and Kenyan portions of the Lake Victoria basin.

1.4 Coastline and Islands

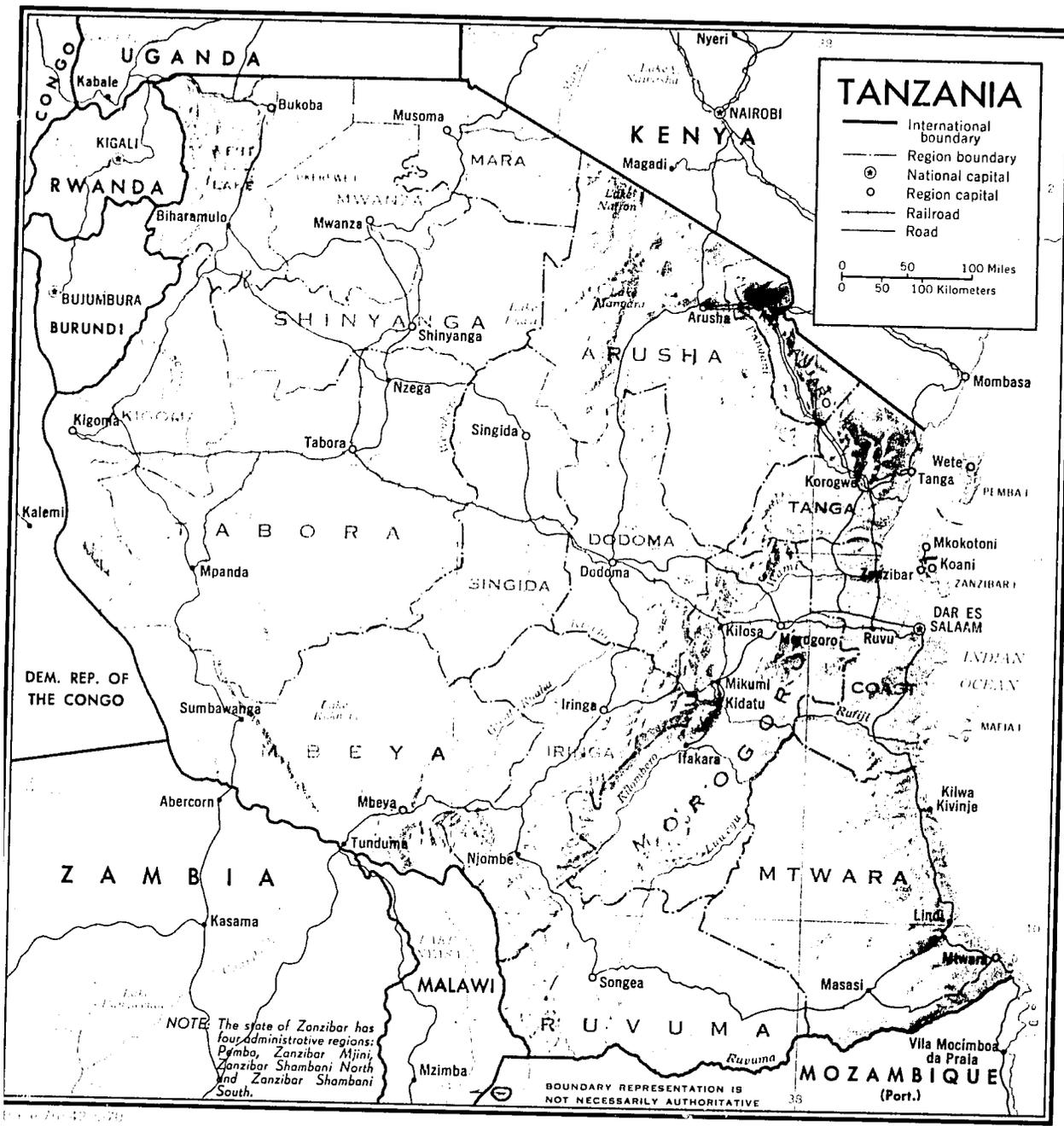
The 800 km. coastal belt is narrow in the north and south (16-60 km. wide) and broader in the center near the lowlands of the Rufiji River valley. The coast is difficult to approach because of coral reefs and shifting sandbars at the mouths of rivers.

The islands are primarily coral. The largest island, referred to both as Zanzibar and Unguja, is separated from the mainland by a channel 35 km. wide. The island is about 80 km. long and 40 km. wide with a total area of 1,657 sq. km. Zanzibar rises from a flat plain in the east to a more hilly area in the west. Pemba, north of Zanzibar, is 67 km. long and 22 km. wide with a total area of 984 sq. km. Its topography is dotted with small steep hills and valleys. Mafia, 43 km. long and 14 km. wide, is situated about halfway down the mainline coast.

1.5 Waterways

The country's rivers drain into four major basins. Five important rivers and a number of minor ones in the eastern third of Tanzania enter the Indian Ocean directly. Streams around Lake Nyasa empty into the lake and reach the Indian Ocean via the Zambezi River. A number of short rivers drain into Lake Victoria and ultimately, via the Nile River, into the Mediterranean Sea. Several rivers in western Tanzania, the longest of which is the Malagarasi, drain into Lake Tanganyika and, via the Congo River, into the Atlantic Ocean. Streams in the north and southwest empty into interior basins.

Many of Tanzania's rivers are shallow or marshy with only seasonal flows. A few, particularly those draining into the Indian Ocean, offer potential for irrigation and hydroelectric power. The Rufiji River and its tributaries, draining nearly a quarter of the mainland's territory, offer the greatest potential.



Tanzania's lakes provide transportation, are a source of food and livelihood, and offer abundant water supplies for irrigation. The largest lake in Tanzania and in Africa is Lake Victoria. Lake Tanganyika, the world's second deepest lake, has a rugged coastline and a few poor harbors. Lake Nyasa also has poor harbors. Lake Rukwa to the east of Lake Tanganyika is small and shallow, and tends to be brackish. A series of small lakes in the northern part of the country all have salty water. Lake Natron is commercially exploited for salt and soda.

1.6 Precipitation

The availability of water is a major factor in Tanzania's development because agricultural practices and production are largely determined by the distribution and seasonal fluctuations in rainfall. In most parts of the country rainfall is insufficient and unreliable; often unseasonable floods alternate with droughts.

In the southern part of the country rains may begin as early as October or November and end in March. In the north, however, the heavy rains begin in March and end in May or June. There is also a good deal of local variation and a few places, especially in the northern highlands, occasionally benefit from a short rainy period in November or December.

Altitude also plays a large role in determining rainfall patterns, with the higher elevations receiving more precipitation. Although only about half of the country receives more than 750 mm. annually, there are great variations: from more than 2,540 mm. just northwest of Lake Nyasa to less than 500 mm. in parts of the Central Plateau and the Masai Steppe.

1.7 Temperatures

Tanzania has a tropical equatorial climate determined by the country's position just south of the equator and by the airstreams coming from the Indian Ocean and southern Asia. However, temperatures are moderated by altitude, resulting in a somewhat cooler climate in the higher elevations, where average temperatures drop to 13-16°C during the winter months (June-Sept.) and rise to only 19-22°C during the summer (Nov.-April). Monthly temperatures in Dar es Salaam range from a June average of 24°C to a January average of 28°C. A similar hot and humid tropical climate is found on Zanzibar and Pemba. At Mwanza the June average is 20°C and the January average is 23°C.

1.8 Land Use and Soils

About 9% of the total land area on the mainland is under cultivation, 10% is fallow or in temporary use as pastureland, and an additional 25% is potentially suitable for agriculture. Factors that have limited development include poor soils, unreliable and inadequate rainfall, and the prevalence of the tsetse fly.

The Mt. Kilimanjaro area has rich volcanic soils and adequate rainfall creating Tanzania's most fertile area. Coffee, bananas, vegetables, and grains are grown here. The rest of the northeastern region has poor soils and is more suitable to livestock raising.

Good soils are also found around Lake Victoria, in the southern highlands, and in the Mbeya-Iringa area. Most of the major cash crops are grown in these areas.

The Central plateau region has poor soils and unreliable rainfall making this area suitable only for subsistence cultivation.

In the coastal zone soils vary from low to high fertility permitting a variety of crops to be grown in selected areas. Good alluvial soils are also found in the larger river valleys. Problems of flooding, drainage, and salinity exist, but these soils offer excellent potential for development.

See also Agroecology, section 7.

<u>Land Use, 1976</u> ('000 hectares)	
Arable land	5,200
Land under permanent crops	1,090
Permanent meadows and pastures	44,720
Forests and woodland	31,074
Other land	6,520
Inland water	5,905
Total area	94,509

Source: Europa, Africa South of the Sahara, 1980.

2. Disaster Vulnerability

2.1 Overview of Disaster Vulnerability

Although Tanzania's history of natural disasters includes the most common types affecting other East African countries, their most pressing problem historically has been the widely dispersed rural population. Some outstanding features of rural distribution patterns include densely populated areas separated from each other by zones of sparse population, low population density in the middle of the country, and the predominance of scattered individual homesteads rather than nucleated villages in rural areas. As a result of these patterns, considerable effort by the Government of Tanzania (GOT) has been made to bring people into planned and permanent villages, totaling more than 6,000 to date. However, since most Tanzanians live on the periphery of the country (leaving the middle relatively unpopulated) transport and communications systems have been enormously difficult to develop. Some roads connecting Dar es Salaam with other population centers become almost impassable during the rainy season. The most reliable transport then becomes the railway line, inland waterways in the case of the lake areas, and coastal shipping in the case of southern Tanzania (Lindi, Mtwara, and Ruvuma regions). Distribution of food supplies has been problematic; some areas receive more food supplies than they can use while other areas experience critical shortages of the same supplies. (See Human Ecology, Section 3 and Transportation and Logistics, section 9.)

Environmental Problems by Region

<u>Location</u>	<u>Problem (s)</u>
<u>Arusha</u>	
Arusha	Land use conflict
Masai	Bush pigs, tsetse,
Mbulu	East Coast Fever
<u>Coast</u>	
Bagamoyo	Schistosomiasis, malaria, bush pigs, birds
Kisarawe	Industrial pollution (sisal), bush pigs, birds
Mafia	East Coast Fever, bush pigs
Mzizima	Birds, land use conflict, bush pigs, birds
Rufiji	Flood hazard

<u>Dodoma</u>	
Dodoma	Soil erosion, flood/drought hazard, bush pigs, tsetse, birds
Konoda	Flood hazard
Mpwapwa	Bush pigs, birds
<u>Iringa</u>	
Iringa	Birds, malaria, soil erosion, East Coast Fever
Mufindi	Soil erosion, deforestation,
Njombe	East Coast Fever, birds
<u>Kigoma</u>	
Kasulu	Tsetse, birds, malaria
Kibondo	Trypanosomiasis, tsetse, birds
Kigoma	Trypanosomiasis, flood hazard
<u>Kilimanjaro</u>	
Kilimanjaro	Land use conflict
Pare	Industrial pollution (sisal)
<u>Mara</u>	
Musoma	Tsetse, Black Quarter Fever, schistosomiasis, malaria
North Mara	East Coast Fever
<u>Mbeya</u>	
Chunya	Tsetse, trypanosomiasis
Mbeya	Tsetse, trypanosomiasis, soil erosion, deforestation
Mbozi	East Coast Fever
Rungwe	Soil erosion
Sumbawanga	East Coast Fever
<u>Morogoro</u>	
Kilosa	Tsetse, bush pigs, birds, flood/drought, pollution
Morogoro	Tsetse, bush pigs, birds
Ulanga	Malaria, trypanosomiasis
<u>Mtwara</u>	
Kitwa	Tsetse, bush pigs, birds malaria, trypanosomiasis
Lindi	Bush pigs, birds
Masasi	Malaria, bush pigs, birds
Mtwara	Malaria, tsetse, bush pigs, birds
Nachingwea	Bush pigs, birds
Nwala	Isolation

<u>Mwanza</u>	
Geita	East Coast Fever, tsetse, malaria, trypanosomiasis, floods, birds
Kwimba	Malaria, floods, East Coast Fever, Black Quarter Fever, birds
Mwanza	Malaria
Ukerewe	Floods
<u>West Lake</u>	
Biharamulo	Tsetse, East Coast Fever, bush pigs
Bukoba	East Coast Fever, bush pigs
Karagwe	East Coast Fever, bush pigs, trypanosomiasis
Ngara	East Coast Fever, bush pigs
<u>Pemba</u>	Malaria, schistosomiasis, land use conflict, low soil fertility
<u>Zanzibar</u>	Malaria, low soil fertility

Source: Clark University, Environmental Context of Development In Tanzania, 1977.

2.2 Infestation/Pests

Migratory Locusts -Historically migratory locusts have caused severe damage in Tanzania. In this century migratory locusts were responsible for acute crop shortages in parts of the Usambara Mountains in 1927, 1933, and 1944. They returned again in 1948 but, thanks to control efforts, have not appeared since.

Red Locusts - The red locust infests most of southern Africa, including Tanzania. Between 1930 and 1944 a red locust plague caused heavy damage to grain crops in Tanzania. In 1950-51 a massive four-month hand spraying campaign in the Rukwa area was successful in destroying swarms of red locust hoppers and thus saving some 3 million sq. miles from potential famine. Discovery of the locust's three primary breeding grounds - near Lake Rukwa in southwest Tanzania, along the Malagarasi River and its tributaries in west-central Tanzania, and a third in Zambia - has facilitated control efforts, which have been in the hands of the International Red Locust Control Service since 1949. The need for continued vigilance was demonstrated by reports that swarms of red locusts had again invaded two areas of the Rukwa region in 1978.

Desert Locusts - In plague years prevailing winds may carry desert locusts south to Tanzania from Ethiopia and Somalia in September; they (or their progeny) then move north again when the winds change in February.

Northern Tanzania in particular has been affected by all four of this century's major desert locust plagues. As a result of control efforts by the East African Desert Locust Control Organization (DLCO/EA) Tanzania was not affected by the potential plagues of 1967-69 and 1978-79.

Armyworm - Tanzania is particularly vulnerable to infestations of armyworms. Serious outbreaks have occurred in 1980; Tanzania's DLCO/EA unit is attempting to control the present outbreak.

Quelea-quelea - another destructive pest that Tanzania is troubled with is the Quelea-quelea bird, although crop damage is considerably below that in Kenya and Somalia.

Tsetse fly - Infestations of tsetse fly are a serious problem in Tanzania, occurring in over 60% of the mainland (especially prevalent in the northeast) and over 25% of the island of Zanzibar. Risk of infection severely limits the use of potentially productive range and cropland, which in turn reduces production capacity for a rapidly growing population; it also limits agricultural surplus for export and badly needed foreign exchange. Cattle production has stagnated at about 10 million head; per capita availability of milk and meat is declining. The Government of Tanzania (GOT) has purchased spraying and clearing equipment, and provided personnel in support of a USAID project to control tsetse fly on Zanzibar. The GOT is now planning mainland control programs.

2.3 Civil Strife/Refugees

Tanzania's relations with Uganda, strained by accusations of invasion plans and threats of armed intervention in the mid-1970's, worsened in October 1978 when Ugandan troops invaded northwest Tanzania. The invasion annexed the Kagera Salient (comprising some 1840 sq. km.) and displaced about 40,000 Tanzanians in the West Lake region. Under pressure from the Organization of African Unity, Ugandan troops withdrew but, to date, only half of the displaced Tanzanians have been resettled.

As far as refugees are concerned, Tanzania has within its borders about 170,000 people: 135,000 from Burundi, 25,000 from Rwanda, and 6,000 to 8,000 from Uganda, most of the latter located in the West Lake region.

2.4 Drought

Drought has occurred in Tanzania about every 5 or 6 years, but there is evidence that this pattern is shortening to every 3 to 4 years. The central plateau (roughly Dodoma, Mpwapwa, and Manyoni districts) is the area of Tanzania most subject to drought and therefore famine. In this dry region good harvests are the exception rather than the rule. During the German and British administrations shortages of food from drought and other causes necessitated famine relief at approximately 3 to 5 year intervals. The following list of acute food shortages in the central region in this century gives an indication of the scope of the problem.

<u>Date</u>	<u>Description</u>
1910	drought; few human fatalities
1916-18	food and animals taken by troops; drought in 1918; thousands of men, impressed as porters, died
1919-20	influenza epidemic; continued drought; substantial famine relief; at least 30,000 deaths
1920-21	aftermath of preceding shortages
1925-26	severe drought; many deaths
1929-30	poor distribution of rains; severe shortages; food imported
1932	locust infestation; few human fatalities
1934-35	failure of rains; severe shortages; relief operations in Dodoma, Manyoni, and Singida districts
1937	drought and rinderpest; moderate food shortages; no human deaths reported
1942-44	drought and weaver birds destroyed crops; large-scale food aid by governments; 16,000 employed on food-for-work programs; 36 deaths reported
1946-47	drought; large stock losses; famine relief food imported after local reserves exhausted
1949-50	long drought; 1949 harvest one third of average; stock losses high; large-scale food aid; local shortages continued into 1951

<u>Date</u>	<u>Description</u>
1953-55	weaver birds in 1952 followed by drought and armyworms; grain harvest reduced by 75%; famine relief to 10,000 people; livestock mortality rate 60%
1961-63	by late 1961 400,000 people on famine rations because of drought; then heavy rains reduced harvests and wiped out replanting; 600,000 people received emergency food in 1962
1965-67	drought; severe food shortages
1968-69	extreme drought; severe famine
1973-75	extreme drought; severe food shortages

Although the central region has been most severely affected, food shortages in other areas are not unknown. Shortages ranging from local to generally severe are reported in 30 to 40% of the years in other areas.

2.5 Floods

Although drought is the major cause of food shortages in Tanzania, the exception to this is the Rufiji River valley where floods are common. This district has experienced at least partial crop failure in about one third of the years since the mid-30's. Prior to that there was heavy flood damage only about once in 12-15 years. Since then floods have become much more common, probably because of accelerated clearing for cultivation and the destruction of natural plant cover in upper basins.

<u>Date</u>	<u>Description</u>
3/00/68	Rufiji River Valley; 40 killed; 57,000 affected
5/00/74	Ulanga District; 25 killed; 50,000 affected
1979-80	localized floods/seasonal rainfall shortages; major food shortages.

3. Human Ecology3.1 General Population Statistics

Tanzania's 1978 census places the national population at 17,500,000 which indicates a current growth rate of 3.3% per year (World Bank 1978 estimate is 16.9 million; growth rate 3.0%). Of the total population 9.2% is urban; 8.5% urban growth rate. While there is still a net migration from rural areas into cities or into the fertile agricultural areas where living standards are generally higher, many people are beginning to respond to the overcrowding by moving back to the countryside. Population density: 17 per sq. km. of total land area; 32 per sq. km. of agricultural land. Age structure: 46% aged 0-14, 51% 15-64, and 3% aged 65 years and over. Average family size is 7 and several areas of the country are overpopulated in terms of the carrying capacity of the land and employment opportunities.

Regional Population, 1978 Census

Iringa Region	922,801	Mwanza Region	1,443,418
Iringa Rural	290,101	Ukerewe	138,729
Mufundi	173,824	Magu	258,780
Njombe	326,084	Mwanza	169,660
Ludewa	75,610	Kwimba	325,380
Iringa Urban	57,182	Sengerema	243,636
		Geita	307,233
Mara Region	723,295	Rukwa Region	451,897
Tarime	252,513	Mpanda	146,322
Serengeti	207,675	Sumbawanga Rural	247,773
Musoma Rural	43,980	Sumbawanga Urban	57,802
Musoma Urban	219,127		
Kigoma Region	648,950	West Lake Region	1,009,379
Kibondo	139,991	Karagwe	185,013
Kasulu	255,651	Bukoba Rural	256,354
Kigoma Rural	194,520	Muleba	217,493
Kigoma Urban	58,788	Biharamulo	165,580
Singida Region	614,030	Ngara	107,917
Iramba	242,003	Bukoba Urban	77,022
Singida Rural	213,732	Dodoma Region	917,921
Manyoni	102,403	Kondoa	275,082
Singida Urban	55,892	Dodoma Rural	276,737
		Dodoma Urban	158,577
		Mpwapwa	261,525

Shinyanga Region	1,323,482	Coast Region	516,949
Bariadi	296,935	Bagamoyo	136,059
Maswa	303,967	Kisrawe	222,455
Shinyanga Rural	362,177	Rufiji	135,334
Kahama	291,657	Mafia	23,101
Shinyanga Urban	68,746		
Mbeya Region	1,080,241	Mtwara Region	771,726
Chunya	89,119	Mtwara Rural	144,354
Mbeya Rural	256,472	Newala	307,385
Kyela	114,553	Masasi	271,447
Rungwe	235,314	Mtwara Urban	48,510
Ibeje	71,228		
Mbozi	235,444	Ruvuma Region	564,113
Mbeya Urban	78,111	Tunduru	135,548
Lindi Region	527,902	Songea Rural	183,095
Kilwa	114,032	Mbinga	196,167
Lindi Rural	245,089	Songea Urban	49,303
Natchingwea	102,067		
Liwale	39,406	Arusha Region	928,478
Lindi Urban	27,308	Monduli	118,756
Morogoro Region	939,190	Arumeru	238,020
Kilosa	274,478	Arusha	86,845
Morogoro Rural	344,081	Kileto	59,790
Kilombero	133,007	Banang	231,292
Mahenge	113,510	Mbulu	193,775
Morogoro Urban	74,114		
Tabora Region	818,049	Kilimanjaro Region	902,394
Nzega	225,027	Rombo	157,739
Igunga	189,486	Pare	208,164
Tabora Rural	187,063	Moshi Rural	311,951
Urambo	149,081	Hai	172,317
Tabora Urban	67,392	Moshi Urban	52,223
Tanga Region	1,039,592		
Lushoto	286,069	Dar es Salaam Region	851,522
Korogwe	191,115	Kinandoni	364,706
Muheza	199,674	Ilala	228,235
Tanga	143,878	Temeke	258,581
Pangani	33,340		
Handeni	184,516		

The population of Zanzibar, according to an unpublished government census conducted in 1978, was 270,736 with 135,834 males and 135,902 females; for Pemba, the population figure was 204,919, with 101,362 males and 103,557 females.

The overall population density for Zanzibar is 163 persons/sq. km., and for Pemba 208 persons/sq. km., or an average population density of 180 persons/sq. km., for both islands.

The age distribution of the population is presented for Zanzibar and Pemba:

	<u>Zanzibar</u>	<u>Pemba</u>
less than 15 years	46%	53%
15-45 years	38%	34%
greater than 45 years	16%	13%

With half the population under 15 years of age, the islands have high economic dependency levels. An examination of population distribution by district shows 41% of the population of Zanzibar residing in one district—the "Town." On Pemba, only 16% of the population is urban, with total population much more equally divided among the four districts.

Zanzibar Population, by District - 1978

<u>District</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>% of Total</u>
Northern (a) 27 Villages	23,441	24,684	48,125	18
Northern (b) 23 Villages	14,880	14,063	28,943	10
Central 36 Villages	15,540	14,197	29,737	11
Western 22 Villages	16,769	14,767	31,536	12
Town 18 Villages	53,890	56,614	110,504	41

<u>District</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>% of Total</u>
Southern 17 Villages	10,669	11,274	21,943	8
Total	135,189	135,189	270,788	100

Source: USAID, Tanzania Health Sector Strategy, 1980.

Pemba Population, by District - 1978

<u>District</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>% of Total</u>
Chake Chake 12 Villages	23,320	23,878	47,198	23
Mkoani 16 Villages	25,388	26,171	51,559	25
Konde 9 Villages	23,482	23,829	47,311	23
Wete 15 Villages	29,172	23,679	58,581	29
Total	101,362	103,557	204,919	100

Source: USAID, Tanzania Health Sector Strategy, 1980.

3.2 Density Patterns

The pattern of population distribution is closely related to the soil, climate (rainfall), and the occurrence of the tsetse fly which is found in 60% of the country. Population is densest on the periphery of the country: high densities occur in the northeastern highlands (especially on the fertile lower slopes of Mt. Kilimanjaro), the coastal areas from Tanga south to Dar es Salaam, areas adjacent to Lake Victoria, and the area around Mbeya, northwest of Lake Nyasa. Some of these regions are overpopulated with up to 250 persons per sq. km. All of these areas receive a minimum of 750 mm. of rainfall annually. When sufficient and dependable rainfall is combined with fertile soil as in the volcanic highlands of the Eastern Rift Valley, heavy concentrations of people can be supported, particularly when terracing and water control measures are practiced.

Rainfall determines settlement patterns in the southern parts of Sukumaland, the Makonde Plateau, and the Southern Highlands. Although these areas often receive abundant rainfall it is unreliable, resulting in erratic agricultural production and thus lower population densities. Some form of cultivation (usually subsistence cultivation of sorghum and millet) can be practiced in areas receiving as little as 450 mm. of rainfall; however, these areas are sparsely settled. Regions receiving between 200-450 mm. are used for grazing except where the tsetse fly occurs. Large areas of the Eastern Plateau and over two-thirds of the Central Plateau are covered with woodland that provides a breeding place for the fly. Areas receiving less than 200 mm. of rainfall are usually uninhabited.

Both Zanzibar and Pemba have high population densities. Pemba has a fairly evenly distributed population but in Zanzibar there are heavy concentrations in the north and in Zanzibar Town, and less dense settlement in the central and southern regions.

3.3 Urbanization

Tanzania is still one of the least urbanized African countries despite an urban growth rate of 8.3% (1970-80). Currently about 12% of the mainland population is urban; on the island of Zanzibar 27% of the population is urban. Dar es Salaam, the seat of government and the leading commercial and financial center, accounts for about 50% of the total urban population.

In 1974 it was announced that the capital would be moved to Dodoma, 480 km. to the west of Dar es Salaam. The move is taking place in installments and is to be finished by 1990.

Other major urban areas:

- Tanga - second largest city; port
- Mtwara - port and trade center
- Moshi - headquarters of the coffee industry
- Arusha - terminus of Tanga railroad, adjacent to tourist attractions
- Tabora - trade center for agricultural produce
- Ujiji - fishing center
- Mwanza - transportation center handling trade with Kenya and Uganda.

3.4 Resettlement

Beginning in 1970, the GOT launched a wide-ranging villagization program to resettle the country's rural population. The purpose was to

provide social services to a previously scattered population. This, it was hoped, would encourage self-reliance and a community approach to rural development in cooperative (Ujamaa) villages. The rapid manner in which the scheme was implemented and the disruption of traditional agriculture have caused major social and economic problems for the country, though there are great hopes for its long-term success. There are now about 7,700 registered villages, containing over 75% of the rural population. The village is intended to be the country's primary social, economic, and political unit.

3.5 Ethnic Groups

There are approximately 120 identifiable ethnic groups (or tribes), each of which differs in varying degrees in social organization, language, and culture from the others. None of the groups is large enough to be dominant. The largest, the Sukuma, constitutes 13% of the population, while the next largest groups are each under 5%. About 95% of the population is considered Bantu or Bantu speaking. The most important Bantu language, and the national tongue, is Swahili.

Major Ethnic Groups:

Sukuma - live just south of Lake Victoria. Most practice mixed agriculture (subsistence cropping and cotton cultivation) and cattle herding.

Makonde (4.0%) - isolated on the Makonde Plateau in the southeast. Known as wood craftsmen.

Chaga (3.7%) - found on the southern slope of Mt. Kilimanjaro. Involved in cash cropping (chiefly coffee), and trade.

Haya (3.5%) - live along the west coast of Lake Victoria. Cultivators of coffee and tea.

Nyamwezi (3.4%) - live along the west coast of Lake Victoria. Cultivators of coffee and tea.

4. Nutrition

4.1 Nutrition Overview -- Mainland

Tanzania is essentially self-sufficient with respect to food production except in times of drought which occur every five or six years. According to the Ministry of Agriculture, the amount of foodstuffs produced in the country has improved substantially since 1972. Nationwide, both the total available calories and grams of protein per capita per day have increased. However, in nine regions a decrease in daily per capita calories was noted between 1974/75 and 1976/77, and in seven regions there was a decline in protein consumption. Regions where decreases in both calories and protein availability were noted were Coast, Mtwara, Ruvuma, Iringa, Singida, and Mara.

A parastatal organization, the Tanzania Food and Nutrition Center (TENC), has been established to coordinate nutrition-related activities. Its professional staff, numbering about 30, deals with issues such as food science and technology, nutrition planning, agricultural economics, and food processing and marketing. The Center presents a joint bi-weekly program with the Ministry of Agriculture on Radio Tanzania. It publishes a quarterly food and nutrition journal (Lishe), a food preservation manual, a weaning manual, and health education texts.

Two Nutritional Planning courses, covering four regions, have been given to agriculture and planning officers. Nutrition education seminars are also offered to home economics teachers. Because of limited resources, these educational programs have been aimed at district leaders and teachers rather than villagers. However, food storage, weaning foods, and saltiodization seminars have been directed towards villagers as well as extension workers and politicians.

Regional Food Balance Sheets - Calories (KCAL/Capita/Day) 1974/75 1976/77

	1974/75			1976/77		
	<u>Veg.</u>	<u>Animal</u>	<u>Total</u>	<u>Veg.</u>	<u>Animal</u>	<u>Total</u>
Iringa	1,743	51	1,794	1,277	56	1,333
Mara	2,525	165	2,690	2,280	147	2,427
Kigoma	4,059	248	4,307	4,508	189	4,698
Singida	1,541	156	1,697	1,468	163	1,631
Shinyanga	1,535	152	1,687	2,736	131	2,867
Mbeya	1,911	87	1,998	3,026	95	3,120
Mwanza	2,504	122	2,626	2,566	140	2,706
Rukwa	2,613	197	2,810	5,394	205	5,599

	1974/75			1976/77		
	<u>Veg.</u>	<u>Animal</u>	<u>Total</u>	<u>Veg.</u>	<u>Animal</u>	<u>Total</u>
West Lake	2,135	41	2,176	2,655	48	2,703
Dodoma	1,357	136	1,493	1,340	128	1,468
Coast	1,902	106	2,008	785	82	867
Mtwara	2,327	8	2,335	1,877	8	1,885
Lindi	1,631	36	1,667	3,107	60	3,167
Morogoro*	1,982	29	2,011	2,145	21	2,166
Tabora	3,341	142	3,483	3,463	140	3,603
Tanga	3,193	49	3,242	2,948	49	2,997
Ruvuma	4,747	167	4,914	4,466	159	4,625
Arusha	2,218	274	2,491	3,533	285	3,818
Kilimanjaro	2,055	42	2,097	2,184	82	2,286
Dar es Salaam	1,902	106	2,008	785	82	867
Tanzania			2,368			3,030

* Sugar not Included In Morogoro

Source: USAID, Tanzania Health Sector Strategy, 1980

Regional Food Balance Sheets - Protein (gram/capita/day) 1974/75, 1976/77

	1974/75			1976/77		
	<u>Veg.</u>	<u>Animal</u>	<u>Total</u>	<u>Veg.</u>	<u>Animal</u>	<u>Total</u>
Iringa	39.76	4.01	43.8	31.86	4.41	36.3
Mara	28.80	15.12	43.92	27.66	12.80	40.5
Kigoma	64.07	31.42	95.49	92.95	23.64	116.5
Singida	41.34	9.26	50.60	38.01	12.20	50.2
Shinyanga	41.08	11.77	52.85	70.81	10.70	81.5
Mbeya	48.90	7.81	56.71	76.81	7.63	84.4
Mwanza	35.93	11.31	47.24	43.74	13.01	50.1
Rukwa	82.44	25.41	107.80	168.47	26.15	194.62
West Lake	36.74	4.17	40.90	49.43	4.65	54.01
Dodoma	55.29	10.46	55.56	36.18	36.32	72.50
Coast	39.78	9.12	48.9	17.09	7.10	24.14
Mtwara	57.12	0.82	57.9	45.06	0.90	46.0
Lindi	32.72	4.42	37.1	69.32	7.54	76.9
Morogoro	46.26	2.16	48.4	56.35	1.56	57.9
Tabora	68.57	11.25	79.82	90.46	10.65	101.1
Tanga	64.06	4.28	68.3	64.94	4.29	69.2
Ruvuma	110.17	21.28	132.0	103.16	20.28	123.4
Arusha	94.10	20.24	114.34	128.55	20.44	149.0

	1974/75			1976/77		
	<u>Veg.</u>	<u>Animal</u>	<u>Total</u>	<u>Veg.</u>	<u>Animal</u>	<u>Total</u>
Kilimanjaro	18.23	5.69	23.92	27.80	6.50	34.3
Dar es Salaam	39.78	9.12	48.9	17.09	7.05	24.14
Tanzania			63.0			72.4

Source: USAID, Tanzania Health Sector Strategy, 1980.

4.2 Nutritional Status of Zanzibar

Little reliable nutritional data on Zanzibar exist. Most deficiencies result from food scarcity due to poverty, erroneous food-related beliefs, and poor food distribution within the community and the family. Protein-energy deficiencies are most common among children. Weaning marasmus and kwashiorkor have been reported in both urban and rural areas. Anemia is commonly seen both in children and pregnant women. Many of the anemias are thought to be due to high levels of hookworm, bilharzia, and other helminthic infections, as well as to general protein-intake deficiency. Other nutrition-related problems include dental caries, caused by the action of acids released from the bananas and coconuts dominant in the Zanzibari diet, and constipation and related gastrointestinal disorders.

Shortages of various foodstuffs, particularly rice and flour which Zanzibar must import, are common. Local fishermen often take their protein-rich catches to the mainland, where they can command higher prices than are possible in the Islands. Small-scale poultry and dairy production efforts in the Islands do not meet the needs for protein-rich foods.

Within the Ministry of Health and Social Welfare, most nutrition activities are integrated with maternal and child health (MCH) services. Nutrition education for mothers is the responsibility of MCH aides. For the public in general, it is carried out by the Health Education Unit. The frequency of these educational efforts is intermittent.

4.3 Diet

Diet varies throughout Tanzania, and is governed by the prevailing soil, geographic, and climatic conditions. Millet, sorghum, maize, plantains, and manioc provide the basic carbohydrates. Meat in very small quantities, fish, pulses, and milk provide the protein. Dietary deficiencies vary from region to region and from year to year depending on crop

production and the occurrence of disasters. Food distribution is often a major problem because of poor road conditions, especially during the rainy season.

Coastal regions - main staples are manioc, with maize and dried fish added. Other important foods are rice, legumes, sorghum, and sesame. A few cattle are kept by pastoralists in the northeast but they are not available elsewhere because of the tsetse fly. It is possible to obtain meat in stores but it is very expensive. The regional custom is two meals a day with the larger one in the evening. Leftovers from supper are eaten cold for breakfast. Beverages include coffee and beer; water is rarely boiled. Fruit is eaten for snacks. Taboos: pork, eggs, chicken, catfish.

Most of the time for food preparation is spent pounding grain. Corn is pounded to remove the husk, soaked, then pounded again into flour while still wet, then dried in the sun. Rice is dried, pounded, cooked or sometimes treated in the same way corn is. Then it is used to make ugali (a stiff mixture of cereal flour and water with bread-like consistency), ugi (a thin gruel of cornflour and water or milk), and similar dishes. Cooking is done on a fireplace made of three stones, with wood for fuel. In the fields, men and women eat manioc and madafu (unripened coconut water). The men eat together and get the largest share; then the women eat and then the children. Food shortages occur mostly from November to February.

Central regions - maize, millet, and manioc are the staples. Maize forms the basis of the ugali while groundnuts, kidney beans, okra, cowpeas, and other pulses are used in the sauce. Tomatoes, onions, and peppers are used as condiments; curry is a favorite spice. Fruits are eaten as a snack when available. Meat resources are scarce. Dried fish is eaten whole, providing calcium from the bones. Milk is consumed often, especially at breakfast, and is accompanied by wheat cake or bread. Maize and beans cooked together (makande) are eaten during work. Tea is preferred to coffee; beer is consumed only by non-Muslims. Taboos: pork, eggs, antelope, and zebra meat; ants, bambara nuts, and cowpeas are forbidden to pregnant women.

4.4 Food Programs

USAID's food assistance program in Tanzania is designed to overcome recurrent food shortages, to provide emergency food relief, and to counteract nutritional deficiencies. The effort was begun in 1973 with a Title II project and, during the periods of 1974-78 and 1980-81, included a Title I program. A three-year Title III program is being designed for start-up in FY 1982. For sources of other imported foods, see Agricultural Imports, section 7.

Title I

To assist Tanzania's efforts to overcome the effects of the 1974-75 drought, a P.L. 480, Title I program was begun in FY 1975. The \$34.4 million in Title I supplies provided a total of 65,947 tons of maize and 37,607 tons of rice. The maize provided under Title I for 1976 and 1977 represented 59% and 78% respectively, of the total maize imports into Tanzania for those years. By the Fall of 1978, weather conditions had improved substantially to enable farmers to grow sufficient food grains to meet the country's needs, and the Title I program was discontinued. However, drought and acute foreign exchange problems during 1979/80 resulted in the re-introduction of a Title I program in FY's 1980 and 1981.

Title II

Proposed P.L. 480, Title II resources for FY 1981-85 will furnish continuing nutrition assistance to a variety of recipients through Catholic Relief Services (CRS), primarily in child feeding activities. These include: support for maternal and child health activities, day-care centers, food-for-work, and institutional programs. The level of commodity support provided in this category will decrease gradually in line with the Tanzanian Government's policy of reducing dependence on external food aid. Commodities presently provided are non-fat dried milk, bulgur (soy fortified), corn-soy meal, and vegetable oil.

The GOT policy of self-reliance has a direct bearing on foreign assistance food programs. Briefly stated, the maternal and child supplemental feeding programs, as a part of the rural public health program, are to be fully supported by the government by mid 1980's. The GOT has established a Strategic Grain Reserve which has as its goal the capability to respond immediately to extraordinary food requirements. In FY 1979, the U.S. pledged a total of 50,000 metric tons of maize as part of a multi-donor effort to establish this food reserve. Actual delivery of the US contribution will depend on the construction of adequate storage facilities and the determination that shortages of food are occurring.

Total Title I/Title II/Title III Volume (in millions of dollars)

<u>FY</u>	<u>Title I</u>	<u>Title II</u>	<u>Title III</u>	<u>Total P.L. 480 Volume</u>
1975	16.0	7.6	-	23.6
1976	4.3	19.6	-	23.9

<u>Total Title I/Title II/Title III Volume (in millions of dollars)</u>				
1977	7.6	10.3	-	17.9
1978	6.5	4.3	-	10.8
1979	-	4.9	-	4.9
1980	7.5	5.8	-	13.3
1981	7.5	5.7	-	13.2
1982	-	1.7	7.5	9.2
1983	-	1.7	10.0	10.7
1984	-	1.7	15.0	16.7
1985	-	1.7	15.0	16.7
	<u>\$ 49.4</u>	<u>\$ 65.0</u>	<u>\$ 47.5</u>	<u>\$ 94.9</u>

Source: USAID, Annual Budget Submission FY 1981, Tanzania, 1979.

5. Health, Sanitation, and Housing5.1 Vital Statistics

Birth rate/1000 population (1979)	46
Death rate/1000 population (1978)	16
Infant mortality/1000 live births (1973)	125
Annual growth rate (%) (1969-79)	2.9
Life expectancy in years (1978)	50.5

Source: USAID FY 1982 Congressional Presentation, Annex 1.

Demographic Estimates for Tanzania by Region, 1973

	Life Expectancy at Birth (Years)	Infant Mortal- ity Rate (/1000)	Crude Birth Rate (/1000)	Crude Death Rate (/1000)
Iringa	43	178	51	20
Mara	51	130	49	16
Kigoma	38	215	46	25
Singida	41	196	43	28
Shinyanga	48	145	40	16
Mbeya	46	162	47	18
Mwanza	48	145	44	16
Rukwa	n.a.	n.a.	n.a.	n.a.
West Lake	48	145	47	19
Dodoma	48	145	47	17
Coast	41	196	46	25
Mtwara	48	145	44	17
Lindi	48	145	39	17
Morogoro	43	178	46	20
Tabora	48	145	40	17
Tanga	48	145	50	17
Ruvuma	48	145	45	16
Arusha	51	130	46	15
Kilimanjaro	51	139	48	16
Dar es Salaam	56	88	n.a.	n.a.
Tanzania (avg.)	47	152	45.6	17.7

Source: USAID, Tanzania Health Sector Strategy, 1980.

5.2 Health Overview

The major causes of morbidity and mortality are diseases associated with poor sanitation, poor nutrition, and lack of health education. About one-third of childhood deaths have malnutrition as a contributing cause. Approximately 16% of reported deaths in children under five years old are from diseases for which immunization is available. Parasitic diseases are prevalent throughout the country.

- Malaria** - the most widespread tropical disease in Tanzania. The disease is endemic throughout the country, but most severe in lowland areas near Lake Victoria and the coast. Control programs (chemosuppression, spraying, larval control) are on-going. Malaria is the most serious health problem in Zanzibar. Although a control program exists, the number and severity of cases appears to be increasing.
- Measles** - between 1969 and 1977 measles was the second most common cause of death on the mainland (primarily among children aged 4 months to 6 years). Complications from measles are often fatal to undernourished children.
- Gastroenteritis and diarrhea** - among the most common causes of death. Consumption of contaminated food, poor sanitation, and malnutrition are contributing factors to these diseases.
- Schistosomiasis (Bilharzia)** - approximately 20% of Tanzanians are infected with schistosomes. Urinary schistosomiasis is the most common form with prevalence exceeding 70% near Lake Victoria. It is also found in central Tanzania, along the sea coast, and on Zanzibar and Pemba. A control program (molluscicide application and chemotherapy) exists on the mainland; no control programs on the islands.
- Trypanosomiasis** - only 40% of Tanzania is tsetse-free. Trypanosomiasis is particularly prevalent in the northwestern part of the country. A tsetse fly control program exists.
- Onchocerciasis** - in 1978-79 an estimated 500,000 Tanzanians were afflicted with "River Blindness." Of these about 25,000 suffered total loss of vision. Prevalence rates in Tanga may be as high as 40%; in Morogoro 35%; and in Ruvuma 20%. Mbeya and Kigoma also have high rates. Control consists of entomological and epidemiological surveying.

-
- Filariaasis - particularly high incidence rate on Zanzibar; no control program.
- Cholera - 17,000 Tanzanians were treated for cholera during an outbreak between Oct. 1977 and June 1979; more than 1,500 deaths were reported during the epidemic. Although the disease was widespread, the causes of transmission varied from area to area. In controlling the epidemic, teams of health workers administered treatment (antibiotics) and instituted preventive measures such as the building of latrines, restricting travel, and restricting participation in burial ceremonies.

Other major causes of morbidity in Tanzania include tetanus (high rate in infants), tuberculosis, leprosy (estimated 150,000 persons infected in 1978-79), trachoma, rabies, typhoid fever, hepatitis, ankylostomiasis, ascariasis, and cancer.

5.3 Health Care Structure

Tanzania's health policy is carried out through an integrated national health service using facilities and personnel made available by the GOT, local authorities, and voluntary agencies. The Ministry of Health has overall responsibility for planning and coordinating health activities while much of the implementation responsibility lies in regional and district directorates.

Each registered village in Tanzania has a village development committee which charts the needs of the village and identifies which projects can be carried out with the resources of the village and which will require external assistance. A Divisional Committee, comprised of representatives from a group of villages, verifies the needs, priorities, and goals of each village. The District Planning Committee coordinates all divisional plans, assesses the feasibility of projects and the availability of resources and manpower, and draws up a final district plan. The Regional Planning Committee evaluates district plans and formulates the regional plan.

The health care infrastructure in Zanzibar is similar to the mainland's. The Ministry of Health and Social Welfare, comprised of three operational divisions, Preventive Services, Curative Services, and Planning and Administration, is responsible for the delivery of health care, free of charge, to all island citizens.

5.4 Health Facilities

The GOT has established a hierarchy of primary health care facilities. The smallest health care unit at the village level is the Village Health Post (VHP). This post is the basis for village health campaigns and is equipped to provide first-aid treatment for minor ailments. The VHP is usually staffed by a volunteer who has had some first-aid training.

The Rural Dispensary serves as a center for out-patient treatment, Maternal-Child Health (MCH) services, and organization of health campaigns. Ideally, rural dispensaries would provide services for a population of about 6,000 (a ward) and be staffed by one rural medical aide, one MCH aide or village midwife, and one health assistant. Urban dispensaries provide similar services in urban centers.

The Rural Health Center is a referral unit for 4-5 rural dispensaries and is organized to provide preventive and curative medical care. The center consists of outpatient clinics for the treatment of common diseases and injuries, initial treatment of more serious cases, and 20-30 beds for uncomplicated deliveries and short-stay in-patient care. Urban Health Centers have similar functions; however they generally have more staff because of the need to serve larger numbers of people.

Government hospitals are classified according to jurisdiction. There are district, regional, and consulting hospitals each with increasing specialization of staff and equipment.

Regional Distribution of Health Facilities, 1978

<u>Region</u>	<u>Dispensaries</u>		<u>Health Centers</u>		<u>Hospitals</u>		
	<u>Disp's</u>	<u>Pop/Disp (000's)</u>	<u>RHC's</u>	<u>Pop/RHC (000's)</u>	<u>Hospitals</u>	<u>Beds</u>	<u>Pop/Bed</u>
Iringa	161	5.7	11	83	-	1,383	667
Mara	109	6.6	10	72	4	658	1,099
Kigoma	87	7.4	7	93	5	540	1,202
Singida	84	7.3	6	102	5	728	843
Shinyanga	154	8.6	14	95	6	923	1,434
Mbeya	136	7.9	12	90	11	1,320	818
Mwanza	188	7.7	19	76	9	1,490	969
Rukwa	72	7.0	6	75	3	290	1,558
West Lake	121	8.3	8	126	11	1,636	617
Dodoma	148	6.6	14	69	7	1,795	542

	<u>Disp's</u>	<u>Pop/Disp</u> <u>(000's)</u>	<u>RHC's</u>	<u>Pop/RHC</u> <u>(000's)</u>	<u>Hospitals</u>	<u>Beds</u>	<u>Pop/Bed</u>
Coast	100	5.2	5	103	6	447	1,156
Mtwara	96	8.0	7	110	6	1,056	731
Lindi	98	5.4	7	75	-	717	736
Morogoro	181	5.2	10	94	10	1,440	652
Tabora	111	7.4	8	102	7	1,135	721
Tanga	214	4.9	12	87	11	1,549	670
Ruvuma	94	6.0	9	63	7	1,214	465
Arusha	142	6.5	11	84	9	960	957
Kilimanjaro	145	6.2	11	82	13		727
Dar es Salaam	106	8.0	8	106	5	959	888
Tanzania	2,547	6.7	184	92	151	21,482	791

Source: USAID, Tanzania Health Sector Strategy, 1980.

The Island's primary health care network consists of 63 health centers, including 34 on Zanzibar and 29 on Pemba, or one center for every 7,551 citizens. Their location is generally within a 8-10 km. distance of most residential areas.

The highest level of curative services is provided by 4 hospitals: the V.I. Lenin Hospital in Zanzibar Town, and 3 on Pemba at Wete, Chake Chake, and Mkoani. Most of Zanzibar's physicians are based at these hospitals. The V.I. Lenin Hospital has 10 wards with a total of 363 beds. It is staffed by 397 Zanzibaris (including 11 physicians) and a 6-member Chinese medical team.

5.5 Medical Supplies

The Central Medical Store and the National Pharmaceutical Company are responsible for the import and distribution of drugs and medical supplies. Private hospitals are authorized to import medical supplies. Private pharmacies operate in cities but not in rural areas. A list of drugs in common use is available. Directions should be in Swahili and English.

5.6 Health Personnel

Despite GOT efforts to distribute health staff in areas of greatest need, more prosperous regions and urban areas tend to attract more

personnel. Health workers undergo frequent compulsory job transfers, creating problems in continuity of experience and delivery of service. There is also a lack of continuing education for health workers, especially in remote rural areas.

Health Personnel

	<u>1976</u>	<u>1978</u>	<u>1980 (est.)</u>
Medical Doctors (Total)	683*	772	830
% Tanzanians	52.1	55.0	n.a.
Assistant Medical Officers	193	250	300
Medical Assistants	770	1,176	1,200
Rural Medical Aides	1,049	1,736	2,800
Nurse/Midwives "A"	1,100	1,300	540
Nurse/Midwives "B"	3,720	4,900	5,025
Health Auxiliaries	455	545	800
MCH Aides/Village Midwives	960	1,900	2,700

* 34 Cuban and 60 Chinese doctors are excluded

Source: USAID, Tanzania Health Sector Strategy, 1980.

Population Per Primary Health Care Staff*

<u>Region</u>	<u>Population/1 staff</u>
Iringa	1,835
Mara	2,395
Kigoma	2,412
Singida	2,067
Shinyanga	3,646
Mbeya	1,696
Mwanza	1,886
Rukwa	1,844
West Lake	2146**
Dodoma	1936
Coast	3615
Mtwara	2052
Lindi	2137
Morogoro	1692
Tabora	1925

<u>Region</u>	<u>Population/1 staff</u>
Tanga	2377
Ruvuma	1576
Arusha	1495
Kilimanjaro	1051
Dar es Salaam	791

* Medical Officers, Assistant Medical Officers, Medical Assistants, Rural Medical Aides, Nurse-Midwives, MCH Aides, Village Midwives, Health Officers

** Bukoba District not included

Source: USAID, Tanzania Health Sector Strategy, 1980.

At the village level most health services are delivered by traditional healers and traditional birth attendants. The GOT has established a traditional medicine Research Unit at the University of Dar es Salaam to explore ways of integrating traditional and modern medicine.

5.7 Water Supply

An estimated 3 million people are served by rural water schemes, and 6 million have access to clean water supply systems. (88% of the urban population and 36% of the rural population has access to safe water.) In 1976, 21.6% of households reported tap water as the source of supply; 56.2% reported lakes, rivers, streams, or rainwater.

Water supply in Zanzibar Town and in the towns on Pemba is the responsibility of the Ministry of Water and Electricity. In the urban areas an estimated 75% of dwellings have piped water, with the remaining people dependent on standpipes. A limited piped water supply in the rural areas is concentrated largely in villages near the main roads where piping systems have been easy to install.

Regional Water Supply

	Proportion of Population Served by Water Supply, 1973/74	Proportion of Households Reporting Water Source, 1976	
		River, Lake Stream & Rain	Tap
Iringa	8%	59.1%	8.9%

	Proportion of Population Served by Water Supply, 1973/74	Proportion of Households Reporting Water Source, 1976	
	% Households	River, Lake Stream & Rain	Tap
Mara	10	29.7	25.2
Kigoma	20	61.6	14.5
Singida	17	13.1	.1
Shinyanga	.6	54.6	4.1
Mbeya	10	44.3	26.3
Mwanza	10	26.0	5.0
Rukwa	n.a.	54.9	6.6
West Lake	25	52.2	7.5
Dodoma	38	14.7	20.1
Coast	12	22.0	23.2
Mtwara	15	30.9	19.7
Lindi	18	41.9	19.4
Morogoro	15	45.0	26.5
Tabora	35	6.7	12.1
Tanga	17	43.2	27.7
Ruvuma	19	7.3	11.8
Arusha	28	17.9	68.7
Kilimanjaro	30	60.1	24.6
Dar es Salaam	12	10.3	82.9

Source: USAID, Tanzania Health Sector Strategy, 1980.

5.8 Sanitation

Efforts have been made to provide facilities for excreta disposal in rural villages and urban areas. The Ministry of Lands, Housing and Urban Development and the World Bank are planning sewage disposal schemes in five urban centers which will provide water-borne sewerage in commercial and upper socio-economic areas, and pit latrines in poorer areas. The Ministry of Health is in the process of establishing a Rural Sanitary Unit. Pilot schemes testing different latrine models in rural villages have begun. (17% of the total population has access to some form of excreta disposal; 88% of the urban population and 14% of the rural.)

Sanitation on the offshore islands is confined mainly to Zanzibar Town and to the three towns on Pemba. Most sanitation workers are engaged in solid waste disposal activities. The two trucks available for solid waste disposal in Zanzibar Town carry refuse to a landfill area 5 km. from the town. There is no incineration or sea dumping of waste material. The

majority of the island's population depends on septic tanks and pit latrines. Given Zanzibar's high water table, these areas easily become breeding places for disease vectors.

5.9 Housing

Housing conditions for many Tanzanians are crowded and unsanitary. In 1976, 33% of Tanzanians were living in households with seven or more members, and 29% of these households had only one or two rooms. Houses in rural areas are commonly built of mud or clay and poles with dirt floors and thatched roofs. Wealthier families build houses of bricks with corrugated iron roofs and concrete floors.

6. Disaster Preparedness

6.1 Tanzanian National Plan

Tanzania has no national disaster plan. Instead, the GOT budgets contingency funds for emergencies with supplemental appropriations made as needed. The national Milling Corporation (NMC) is responsible for the strategic grain reserve program. Warehouses are currently under construction at Dodoma (5,000 MT capacity) and Dar es Salaam (10,000 MT), with plans for one in Arusha (20,000). Other organizations that collect and monitor data on the food supply system are the Crop Security Program, the Marketing Development Bureau (both within the Ministry of Agriculture), and FAO. However, data collection is not coordinated, lacks sophisticated methods, and is often done in a haphazard manner.

6.2 Tanzania Red Cross

The Tanzania Red Cross (Sister Mary MacKeje, Secretary General) operates 20 branches throughout the country. The society deals primarily with food relief; drought assistance is handled by the GOT. Attempts have been made to promote disaster preparedness at the regional and village levels.

6.3 US Contact

U.S. Embassy
National Bank of Commerce Bldg.
City Dr.; P.O. Box 9123, Dar es Salaam
Tel 68894/67983
USAID Mission Director: Jim Williams
MDRO: Peter Shirk, FFP Officer

6.4 Voluntary Agencies

Africa Inland Mission
Contact: Rev. Russell Baker, Jr., Field Secretary
P.O. Box 1414, Mwanza

Missionary Sisters of Our Lady of Africa
Contact: P.O. Box 185, Tabora

African-American Institute

Contact: John Mbelwa, Program Representative
P.O. Box 9121, Dar es Salaam

Agricultural Missions Foundation, Ltd.

Contact: Douglas M. Knapp
Baptist Agricultural Project
P.O. Box 172, Tukuyu

American Lutheran Church

Contact: Rev. Sebastian Kolowa, Bishop
Evangelical Lutheran Church in Tanzania
P.O. Box 3033, Arusha

American ORT Federation, Inc.

Contact: Richard Peterson
ORT, P.O. Box 9204, Dar es Salaam

Catholic Relief Services

Contact: Robert Dugas
CRS-USCC, A.M.I. Building, 2nd floor
Independence Ave/Mkwepu St., Dar es Salaam
CRS runs 300 MCH centers; monitors nutritional status
of children.

Church of God, Inc.

Contact: Rev. Roy Hoops
P.O. Box 41, Kondoa

Church World Service

Contact: Stanford A. Shawn
Christian Council of Tanzania
P.O. Box 2537, Dar es Salaam

Consolata Fathers

Contact: Fr. Adalbert Galassi
P.O. Box 4885, Dar es Salaam, Tel. 67-333
Fr. Igino Lumetti, Superior
P.O. Box 503, Iringa, Tel. 2289

Eastern Mennonite Board of Missions and Charities

Contact: Rev. Zedekiah M. Kisare, Bishop
Tanzania Mennonite Church
Private Bag, Musoma

Helper Project International

Contact: Steve Wood
Kitulo Ranch, Box 1114, Mbeya

Holy Ghost Fathers

Contact: Father Christopher Promis, C.S.Sp.
P.O. Box 867, Arusha

Lutheran Church in America

Contact: P.O. Box 3033, Arusha

Lutheran World Relief, Inc.

Contact: Egli Nilssen, Administrator
Tanganyika Christian Refugees Service
P.O. Box 3955, Dar es Salaam

Maryknoll Fathers

Contact: Rev. William F. Daley, M.M.
P.O. Box 578, Musoma

Maryknoll Sisters

Contact: P.O. Box 122, Soni

Mennonite Economic Development Associates, Inc.

Contact: David Leinbach
Box 7, Musoma

Moravian Church

Contact: Rev. Joseph Kalindiya
P.O. Box 29, Tabora

Rev. T. Msinjili

P.O. Box 377, Mbeya

Rev. Stephen Mvakasyuka

P.O. Box 32, Tukuyu

Operation Bootstrap

Contact: David Simonson
Box 556, Arusha

White Fathers

Contact: P.O. Box 1472, Mwanza

World Division Relief Organization
Contact: Dr. Bryant L. Myers
P.O. Box 58378 Nairobi, Kenya
Tel. 331-019, 332-152

YWCA
Contact: P.O. Box 2086, Dar es Salaam
Tel. 22439

7. Agroeconomy

7.1 Overview of Agriculture

Agriculture is the dominant economic activity, accounting for approximately 50% of the GDP and between 75-80% of total exports. Over 90% of the population is engaged in agriculture, the majority as subsistence farmers and a few as salaried workers. The recent performance of the agricultural sector has been somewhat sluggish. Over the period 1967-77, the average annual rate of growth of agricultural production was about 2.7%, less than the estimated population growth. As a result, Tanzania became increasingly dependent on imports of maize, rice, and wheat.

A notable feature of the agricultural sector has been the government's efforts to change the traditional structure of the rural population by its attempted socialist transformation of the economy. Although most of the rural population was living in villages by 1977, information on the extent of communal farming is vague. Many cultivators appear to be carrying on as before and few villages are functional agricultural cooperatives. Large-scale agriculture is confined to a small number of private estates and state farms producing cash crops: sisal, coffee, tea, sugar, wheat, rice, and livestock. Most food crops continue to be produced by individual families on private plots or farms that are legally part of a village but whose harvest belongs to the cultivator.

7.2 Current Status

Recent reports confirm that as a result of late and erratic rains the 1980 crop just harvested was poor. Maize was most affected but wheat and rice production was also below average. Domestic procurement of maize by the National Milling Cooperation from June to the end of October amounted to 73,000 tons. Total maize purchases for the 1980/81 season are estimated at 95,000 tons. Domestic purchases of wheat and rice (13,000 and 25,000 tons respectively), are also lower than anticipated. In 1979/80, purchases amounted to 160,000 tons for maize, 26,000 tons for wheat, and 31,000 tons for rice.

7.3 Crops

The major subsistence crops include maize, millet, sorghum, wheat, rice, cassava, potatoes, plantains, bananas, and beans. Maize, millet,

and sorghum are grown throughout much of the country, with heavier production of maize in areas of better rainfall. Wheat farming is more heavily concentrated in the northeast while rice is cultivated chiefly in the well-watered valleys of Mbeya, Rukwa, and Morogoro regions, along the coast, and in some areas near Lake Victoria. A large rice growing project of 3,200 hectares has been developed by technicians from the People's Republic of China at Mbarali, in the Mtwara Region. Handed over to the Tanzanian Government in September 1977, the area will be operated as a state farm and is expected to produce about 12,000 tons of milled rice a year.

Cassava, the principal edible root crop, is widely grown and easy to cultivate. It is not as popular in the diet as grains but it can be stored in the ground for as long as 12-18 months, and is relied on as a food source during times of drought or during other crop failures. Bananas constitute a major staple along the coast and in the heavier rainfall areas of the northeast as well as in the region west of Lake Victoria.

Principal Crops
('000 metric tons)

	<u>1975</u>	<u>1976</u>	<u>1977</u>
Wheat	46	58	71
Rice (paddy)	150	172	194
Maize	825	897	968
Millet	160	130*	150*
Sorghum	280	260	240*
Potatoes	79	84*	88*
Sweet potatoes*	320	330	335
Cassava (Manioc)*	3,800	3,900	4,000
Dry beans	134	146	153*
Chick-peas	9	5	7*
Groundnuts (in shell)	46	74	74*
Castor beans	3	3	1
Sunflower seed	9*	6	7*
Sesame seed	10*	6	7*
Cottonseed	87	132	113**
Coconuts*	300	307	314
Copra*	27	27	27
Onions (dry)	30	37	40*
Other vegetables	843	876	898
Sugar cane*	1,276	1,213	1,297
Citrus fruits*	32	33	35
Mangoes*	168	170	174
Pineapples*	45	45	46
Bananas*	750	770	790

	<u>1975</u>	<u>1976</u>	<u>1977</u>
Plantains*	750	770	790
Other fruit*	195	201	206
Cashew nuts	121.7	80.0	110.0
Coffee (green)	52	55	59
Tea	14	14*	15*
Tobacco (leaves)	27	27	27**
Sisal	162	150	150
Cotton (lint)	45	65	59**

* FAO estimate.

** Unofficial estimate.

Source: Europa, Africa South of the Sahara, 1980.

7.4 Crop Dates

<u>Crop</u>	<u>Planting</u>	<u>Harvesting</u>
Beverages:		
Coffee		
Arabica:		
Mainly Moshi and Meru	March - May	November - February
Southern Highlands	March - May	November - February
Robusta:		
West Lake Province and Lake Province	Throughout year <u>1/</u>	Throughout year
Tea:		
Southern Highlands	December - March <u>2/</u>	Throughout year
Tanga Province	January - April	Throughout year
Cereals and Grains:		
Corn:		
Northern Province	Throughout year (mainly March - June)	Throughout dry season (peak July-August)
Southern Highlands	September - February	May - January
Millet	Variable (mainly February - March)	July - October
Sorghum	Variable (mainly February - March)	July - October
Wheat (mainly Mt. Kilimanjaro northern & western slopes)	April & September	July - November

<u>Crop</u>	<u>Planting</u>	<u>Harvesting</u>
Rice: Mainly Rufiji Delta, Lake Province, Tukuyu & Pangani <u>3/</u>	Variable	August - September, February - March
Fibers:		
Cotton: Lake Province (main area)	December - January (varies with locality)	July - December
Eastern Province Sisal (plantations)	February - April Throughout year	August - December Throughout year
Fruits and nuts:		
Bananas and plantains	Throughout year	Throughout year
Cashew nuts (coastal areas Eastern, Southern and Tanga)	December - March	October - January
Papaya (papain)	Throughout year	Throughout year
Oilseeds:		
Castorbeans	December - January	Throughout year
Coconuts (coastal and islands)	Throughout year	Throughout year
Peanuts:		
Lake & Western Province	November - January	July - August
Southern & Central	November - March	June - September
Sesame seed	March - April	May - August
Soybeans (Southern Province)	January	June - July
Sunflower seed: Mainly Eastern and Western Province	December - January	July - October
Miscellaneous crops:		
Chillies <u>2/</u>	Throughout year	Throughout year
Pyrethrum: Northern & Southern Highlands	Throughout year	Throughout year
Sugarcane: Northern Province and Lake Province (mainly plantation) <u>4/</u>	January - April	August - April

<u>Crop</u>	<u>Planting</u>	<u>Harvesting</u>
Tobacco:		
Mainly flue-cured:		
Southern Highlands Province	December - January (transplant)	May - July
Western Province	December - January (transplant)	May - July
Other types	December - January (transplant)	May - July
Vegetables:		
Beans and peas ^{5/}	Throughout year	Mainly May - August
Cassava (manioc)	Throughout year	Throughout year
Potatoes:		
Irish: Northern & Southern Highlands	March - June	July - November
Sweet	March - June	July - November

^{1/} Peak season June - December. ^{2/} With the rains. ^{3/} Sown as early as possible after start of wet season. ^{4/} Year round, partially with irrigation. ^{5/} Including seed beans for export.

Note: There are two rainy seasons. In some years times of planting (and therefore of harvesting) will be earlier or later than the times stated, depending on whether the rains are early or late.

7.5 Food Chain

The National Milling Cooperation (NMC) is the official entity responsible for the procurement, transportation, storage, and distribution of most food crops. During the 1974-75 drought, NMC also became involved in distributing large quantities of imported grain on an emergency basis. Outside headquarters NMC operates through 24 branch offices, one in each of the 20 regions and 4 others in Dar es Salaam. Crops are purchased from farmers by the Village Council on behalf of NMC, and held until NMC can procure them.

The quantity of crops marketed officially in any year depends on the levels of production, the size of the surplus available for marketing, and the official prices fixed by the GOT relative to the prices in the informal market, including those in neighboring countries. Of the total quantities marketed, roughly 50-70% of the maize and about 50% of the paddy rice and

wheat pass through informal markets. Purchases of other food crops, including sorghum, bulrush millet, finger millet, and cassava, have only recently become official. These have traditionally served as subsistence, drought-resistant crops in semi-arid areas. Recently, NMC has procured 400,000-500,000 metric tons of crops each year.

Problems with the present system include: insufficient operating funds; a lack of weighing facilities, quality control capability, pest control, and adequate storage capacity; and problems of communication and transportation.

7.6 Storage Facilities

Much of existing storage, including silos and godowns, both owned and hired by NMC, are in poor condition. Many have inadequate or no access roads, are in dilapidated condition, and lack adequate drainage, ventilation, and fire prevention equipment. Even with proper handling, storage under such conditions involves substantial losses from dampness and insects. Estimates of crop storage losses vary widely (between 5 and 55% loss per annum) depending on the crop, geographical location, condition of purchase, and storage conditions. Storage capacity is insufficient to meet present requirements. Although on a country-wide basis storage appears adequate, a regional analysis shows a shortage in some areas and a surplus capacity in others.

Estimated Seasonal Storage Capacity by Region, 1982/83 1/
(without further investment)
('000 MT)

	Bag Stores Available by <u>1982/83 3/</u>	Silos <u>Owned</u>	Stores Requiring <u>Replacement</u>	Net Available <u>by 1982/83</u>
Dar-es-				
Salaam/Coast	68.5	15.4	0.6	83.3
Morogoro	21.7	-	-	21.7
Tanga	9.4	-	-	9.4
Mtwara/Lindi	7.0	-	7.0	-
Arusha	34.6	26.1	0.5	60.2
Kilimanjaro	16.8	-	-	16.8
Dodoma	14.7	-	-	14.7
Singida	5.0	-	-	5.0
Tabora	7.8	-	0.6	7.2
Kigoma	3.8	-	-	3.8

	Bag Stores Available by <u>1982/83</u> <u>3/</u>	Silos Owned	Stores Requiring Replacement	Net Available by <u>1982/83</u>
Rukwa	16.1	-	-	16.1
Mwanza	10.2	-	0.5	9.7
Mara	6.7	-	-	4.0
Shinyanga	4.4	-	0.4	3.1
West Lake	3.1	-	-	4.0
Iringa	20.3	12.1	0.5	31.9
Mbeya	12.4	-	2.0	10.4
Ruvuma	7.0	-	-	7.0
Total	269.5	53.6	12.1	311.0 <u>2/</u>

- 1/ Figures reflect normal storage capacity. Needs are estimated up to 1982/83 because the investment proposed under a World Bank project would meet needs up to this year; a second phase with additional investment would follow.
- 2/ In addition to this total, NMC stored about 250,000 MT in the open in 1978/79.
- 3/ Includes bag stores hired, which in Dar-es-Salaam, Morogoro, Arusha, and Kilimanjaro account for 40-60% of the storage, and storage under construction as of 1979.

Source: World Bank, Tanzania Grain Storage and Milling Project, 1980.

7.7 Livestock

Cattle raising, either as a subsistence or commercial activity, can be carried on successfully only in the 40% of the country not infested by the tsetse fly. The tsetse-free areas are found across the northern part of the country, in a north-south zone extending through Dodoma Region and the Southern Highlands, and in part of the southwest around Mbeya. Large cattle concentrations occur in a region south of Lake Victoria inhabited by the Sukuma, who raise cattle as a subsidiary activity to farming. Large numbers are also raised by the pastoral Masai in Arusha and Kilimanjaro regions, and by the Gogo in Dodoma Region. Experts consider livestock development potential to be great. However, extensive efforts to train the rural population in herd management, nutrition, disease control measures, and marketing values will be required.

	<u>Livestock</u>		
	('000 head, year ending September)		
	<u>1975</u>	<u>1976</u>	<u>1977</u>
Cattle	13,882	14,362	14,817
Sheep	2,900	2,950	3,000
Goats	4,600	4,700	4,700
Pigs	24	24	25
Asses	160	160	160
Chickens	19,000	19,300	20,700
Ducks	2,300	2,350	2,400

Source: Europa, Africa South of the Sahara, 1980.

7.8 Fishing

Tanzania's freshwater and marine fisheries potential was only partially exploited in the late 1970's by some 40,000 traditional and 3,000 commercial fishermen. The greatest potential for expansion is offered by Lake Tanganyika whose waters, according to United Nations fishery experts, held an estimated stock of roughly 2.5 million tons from which close to 750,000 tons might be safely harvested annually. This total compared with a catch in the 1970's of about 50,000 tons a year. Increased production is also possible on lakes Victoria, Nyasa, Rukwa, and Kitangiri. About 75% of the total fish production is from fresh water sources, with the remaining 25% coming from the Indian Ocean.

7.9 Agricultural Exports

Agricultural exports have failed to keep pace with the growth of the rest of the economy due to the poor growth rate of agricultural cash crops. While agricultural output has increased impressively in recent years (by an average of 7%), most of this growth has been in the subsistence sector. Except for tobacco and tea, exports of agricultural cash crops (coffee, cotton, and cashew nuts) have either decreased or stagnated since 1973. The failure of agricultural export growth has led to increasing dependency on foreign loans and grants to pay for imports. Depending on year to year variations in maize production surpluses, Tanzania will probably continue to export maize some years and import it in others.

	<u>Exports</u>	
	(million shillings)	
	<u>1974</u>	<u>1975</u>
Coffee beans	375	483
Raw cotton	473	297
Sisal	463	302
Cloves	88	321
Cashew nuts	196	177
Tobacco	88	82
Residual fuel oils	77	77
Cordage, rope and twine of sisal	145	88
Pepper and pimento (Incl. chillies)	69	81
Tea	69	81
Total	2,430	2,369

Source: Europa, Africa South of the Sahara, 1980.

7.10 Agricultural Imports

In spite of increased official purchases of rice and wheat, Tanzania is a net importer of these products and will probably continue to rely on imports to satisfy at least half of the domestic demand. During years of bad weather, Tanzania has imported large quantities of maize, although it has also been able to export some in good years. Over the period 1967-77 the average annual growth rate of production was about 2.7%, less than the population growth (over 3.0%). This slow growth was exacerbated by the drought which resulted in the need for large imports of food grains. Since 1976, agricultural production has recovered from the effects of the drought, increasing in real terms at an average of about 7%. At the same time there has been a shift in emphasis away from export crops toward food crop production. Nevertheless, increasing demand for food crops has meant continued dependence on rice and wheat imports. The principal suppliers of these commodities are the US, the Peoples' Republic of China, Japan, Canada and Australia.

Import requirements of maize, wheat, and rice in 1980/81 are estimated at 380,400 tons against 120,000 tons imported in 1979/80. The deficit is particularly large this season because normally self-sufficient rural areas are in the market for food and because of the need to maintain stocks at pipeline levels. Since June 1980, the Government has purchased on a commercial basis 188,000 tons of maize, and food aid totalling 197,000 tons of

cereals has been received or pledged. Of this total of 385,000 tons, only about 200,000 tons have been delivered. There still appears to be a gap of about 130,000 tons of cereals to be covered before May 1981.

Estimated Grain Import Requirements in 1980/81
(thousand tons)

<u>Cereal and Sources of Supplies</u>	<u>Total 1/ Requirements</u>	<u>Commercial Purchases</u>	<u>Food Aid Allocated, Committed, or Shipped</u>
<u>Wheat</u>	70.0	0.0	52.2
Australia			20.0
Canada			9.7
France			5.0
EEC (1980 Program)			5.0
Germany F.R.			4.5
Spain			2.0
Austria			6.0
<u>Rice</u>	85.0	0.0	56.7
EEC (1980 Program)		0.0	5.0
Italy		0.0	2.5
Japan		0.0	25.0
USA (Commodity Exch.)		0.0	14.2
USA (Title I FY'81 All.)		0.0	10.0
<u>Coarse Grains</u>	360.0	188.0	88.3
EEC		0.0	10.0
Japan		0.0	3.9
Netherlands		0.0	8.0
USA		188.0 ^{2/}	0.0

<u>Cereal and Sources of Supplies</u>	<u>Total 1/ Requirements</u>	<u>Commercial Purchases</u>	<u>Food Aid Allocated, Committed, or Shipped</u>
USA (Title I FY'80)		0.0	19.4
USA (Title II FY'80)		0.0	21.0
USA (Title I FY'81)		0.0	25.0
WFP		0.0	1.0
<u>All Cereals</u>	<u>515.0</u>	<u>188.0</u>	<u>197.2</u>

* As of mid-November, 1980

1/ Includes some quantities needed to maintain stocks at pipeline levels.

2/ Includes 17,000 tons of maize (part of the March 1980 purchase of 50,000 tons) arrived in June 1980, and 171,00 tons of maize contracted for in July.

Source: FAO, African Food Emergency, Dec. 1980.

8. Industrial Economy

8.1 Economic Overview

Tanzania's industrial sector has undergone a rapid expansion since independence in 1961 involving diversification in output and a major shift in ownership from private to public hands. The share of manufacturing in GDP rose from just under 4% in 1961 to 10% in 1970, and has remained around this level ever since. The manufacture of consumer goods accounted for 50% of output and 69% of employment in 1976. Intermediate goods such as saw-milling and plywood, leather, aluminum re-rolling, chemicals and plastics, and some capital goods such as vehicle assembly, have added to the diversified nature of the industrial sector.

There is extensive state intervention in economic activity (banking, insurance, transportation, wholesale trade) and detailed government investment planning. Two main goals of the GOT's present development strategy are structural transformation of the economic sector and self-reliance, with an emphasis on the use of domestic resources for domestic needs. Priority will be given to industries which cater to the basic needs of the population (food, shelter, health) and to the development of heavy industries such as iron and steel.

During the first two years of the Third Five Year Plan (1976-1981), the average growth rates were 5.9% for industry and 5.3% for the overall economy. Poor performance in exports, due to poor cash crop output, led to increasing dependency on foreign loans and grants to pay for imports. However, by 1978 after a program of economic controls was instituted, food production had increased and the GOT was able to lift import restrictions and begin importing the spare parts and raw materials needed by all major sectors of the economy. Unfortunately, the price of coffee, Tanzania's main export, began to fall at the same time that imports were liberalized. Also, in October 1978 war broke out with Uganda and the resulting imports of military equipment put an increasing strain on the balance of payments and the domestic budget. By 1979 the overall balance of payments deficit was approximately US \$200 million and arrears on import payments were estimated at about US \$200 million. In an effort to deal with this deficit, the GOT was forced to reimpose import restrictions and devalue the Tanzanian shilling by 10% in January 1979.

8.2 Imports

The bulk of imports, with the exception of the massive importation of foodgrains during 1974-75, consist of manufactured and semi-manufactured

products. However the proportion of different types of imported commodities has varied over the years, reflecting changes in emphasis of domestic policy. In 1962, consumer goods accounted for 48% of imports, intermediate goods 14%, transport equipment 9%, and machinery and other equipment 29%. By 1977, these proportions had changed to 19%, 45%, 11%, and 25% respectively. Principal suppliers are Great Britain, the U.S., China, and West Germany. (See also Agricultural Imports, section 7.10.)

Principal import commodities: crude petroleum, machinery, railway rolling stock, metals and metal manufactures, iron and steel, medical and pharmaceutical products, motor cars, other transport equipment, paper and paperboard.

8.3 Exports

The only exports other than agricultural products are small amounts of residual fuel oils and diamonds. Major export destinations are Great Britain, West Germany, Singapore, and the US. (See Agricultural Exports, section 7.9.)

9. Transportation and Logistics

9.1 Transportation Overview

Before the dissolution of the East African Community, Tanzania's transportation services were owned and administered jointly by the EAC. Since 1977 the GOT has given priority to developing the domestic transportation sector. Established immediately were the Air Tanzania Corporation, the Tanzania Harbors Authority, and the Tanzania Railways Corporation. Railways, airways, inland water, and sea transport are all in the public sector; only road transport is controlled by the private sector.

9.2 Road Network

The road network consists of some 33,500 km. of roads, of which 2,600 km. are hard-surfaced and 1,100 km. are engineered gravel roads; the remainder are earth tracks impassable in the rainy season. Rural roads are in especially poor condition. During the wet season many roads turn into mud; the most reliable means of moving goods and people is by rail or water. Zanzibar has 619 km. of road, of which 442 km. are bitumen surfaced; Pemba has 363 km., 130 km. of which are bitumen surfaced.

A major road improvement and construction program completed in 1972 was the upgrading and asphaltting of a highway running from Dar es Salaam to the Zambian border near Mbeya. Known as the TanZam Highway, the project was undertaken by Tanzania primarily to provide Zambia with a reliable route for its exports and imports. The current Five-Year Plan (1977-81) calls for upgrading and extending the primary road system, which includes 6,000 km. of trunk roads and about 1,200 km. of other main roads. This system interconnects the regional capitals and also the Tanzanian system with those of other countries.

The trucking industry was privately operated until 1973, when the GOT became involved in public transport as part of its increased participation in economic activities. Since then private trucking operations have declined with the withdrawal of services from isolated regions and greater concentration on more profitable long-distance hauling. GOT services have proved less efficient than private ones and these, together with a lack of spare parts and the deterioration of the truck fleet because of poor road conditions, have caused important constraints on economic activity, particularly on crop movement.

9.3 Railways

The rail network built during colonial times is designed to meet the needs of an economy geared to the production and export of raw agricultural products. Since 1977 the rail system has been run by a national company, the Tanzania Railways Corporation (TRC). The most recent addition to the network, running from Dar es Salaam to the Zambian border, began operations in late 1975. This line is operated by the Tanzania-Zambia Railway Authority (TAZARA), owned jointly by the governments of the two countries. Although the tracks of both systems run into Dar es Salaam, rolling stock is not interchangeable, TAZARA having 1,067 m. track, while the TRC system has 1 m. track.

<u>Lines</u>	<u>Kilometers</u>
Tanga - Moshi	350
Moshi - Arusha	85
Dar es Salaam - Kigoma	1,254
Mnyusi - Ruvuma	188
Kilosa - Kidafu	109
Tabora - Mwanza	380
Kaliwa - Mpanda	211
Dar es Salaam - New Kapiri Mposhi, Zambia	1,860

An extension of the Tanga-Moshi-Arusha line to Musoma on Lake Victoria has been proposed to give Uganda greater access to the sea.

9.4 Ports

The principal port, Dar es Salaam, was greatly congested in 1977, and foreign shipping lines were imposing surcharges because of delays in cargo handling. Increased Tanzanian economic activity was partly responsible for the congestion, but the chief cause was the large volume of Zambian imports and exports occasioned by the opening of the new railway in 1975. The problem was further compounded by increasing imports and exports for Zaire, which began using the railroad in 1976.

The two other ports, Tanga and Mtwara, handle much smaller tonnages than Dar es Salaam. Mtwara has deepwater berthing facilities, and about 70% of the country's cashew nut exports pass through the port. Tanga lacks deepwater berthing; cargo movement requires lighterage.

Dar es Salaam

The entrance channel is about 2 km. in length from its outer entrance between the edges of the banks fronting North and South reefs, to the harbor entrance S. of West Ferry point; its width varies from about 277 m. to about 92.5 m. at its narrowest part between East and West Ferry points. Minimum depth is 7.31 m. at L.W.O.S.T., minimum width 128 m. In Inner Harbor, port operations are unaffected by the weather.

Accommodation - Anchorages in basin and creek:

	Depth m.	Max. length of vessel m.
A, stem mooring	9.1	183
B, moored	7.6	152
C, moored	7.6	183
D, single anchor	7.3	183
E, moored, buoys and anchor	7.3	153
F, buoys	7.3	168
G, buoys	9.1	168
H, buoys	9.1	168
K, moored, buoys and anchor	9.1	183

Eleven deep water berths, total length approx. 2,000 m.; dredged depth 10 m. Lighterage quays, total length 588 m., 167 forklift trucks, 56 tractors, pallets, 3 berthing and 8 towing tugs, 41 lighters, 2 pilot boats, 10 labor launches, pontoons, etc.

Storage: Two main quay transit sheds, 11,706 sq. m. and 16,898 sq. m. respectively; two transit sheds at the back of the port totalling 16,695 sq. m.; passenger sheds, baggage halls, customs warehouse and transit depots, etc. Stacking grounds of 93,000 sq. m. at the main port and 20,539 sq. m. at Ubungo.

Cranes: 30 electric level luffing cranes of 3/20 tons capacity; 33 mobile cranes of 4/30 tons capacity; one (unreliable) 60-ton capacity floating crane.

Mtwara

Depth at entrance, 20 m. Single anchorage with 27.4 m. and 304.8 m. swinging room. Ample room for additional anchorage in depths of from 12.8 to 25.6 m. Weather: Monsoon conditions.

Deepwater, 380.4 m. quay with 9.75 m. depth alongside at M.L.W.S. Any size ship may use the port which is well sheltered and has an area of over 10.3 sq. km. Tankers now discharge oil while alongside.

Storage: Three transit sheds with total floor area 7,450 sq. m. and open stacking grounds of 4,646 sq. m.

Cranes: Mobile cranes with capacities of 4 to 6 tons, forklift and platform trucks.

Pemba Island

All cargo must be routed via Zanzibar. All vessels passing within 19.2 km. of Pemba Island should give 48 hours notice either to the agents in Zanzibar, or to the Commissioner of Police, Zanzibar, whose address is P.O. Box 237, Zanzibar.

Tanga

Tanga Port, a natural harbor, is the coastal terminus of the railway between Tanga and Arusha through Moshi, Momba, and Korogwe.

Sheltered water of varying depth. The Inner Harbor provides six anchorages, maximum draft 8.23 m., length 182.9 m. Outer Harbor - six anchorages, maximum draft 16.76 m., length 213.4 m. Least depth 13.71 m. at L.W.O.S.T. Entry by the ship channel, a gap in the outer reefs about 9.6 km. from Ras Kasone. Vessels can enter and leave the port by day or night.

A multi-purpose jetty on the east side of Ras Kasone is in operation in conjunction with the fertilizer factory. Designed for vessels up to 30,000 tons d.w. but larger vessels can be accommodated. 14.63 m. of water at L.W.S. Two lighterage wharves (depth alongside 2.44 to 3.05 m.) with a total length of 381 m. and nine handling points, serving road and rail.

Storage: Transit sheds total floor area, 22,120 sq. m.

Cranes: Two 7-ton electric cranes with hoppers. There are two 3-ton, six 5-ton, one 20-ton electric cranes plus mobile cranes.

Zanzibar

Harbor affords good anchorage in all weather to all vessels; approaches well lighted and marked. South entrance L.W. 11 m., North entrance, L.W. 12.8 m. N.T., rise 3.05 m.; S.T. 4.57 m. Five cranes, largest up to 3 tons. Vessels loaded and discharged by lighters. Wharf for coasting vessels and lighters only.

9.5 Shipping

Tanzania Harbors Corporation: P.O.B. 9184, Dar es Salaam. Harbors: Dar es Salaam (eight deep-water berths, one oil jetty for super oil tankers up to 100,000 m.t.), Mtwara (two deep-water berths), Tanga (lighterage).

National Shipping Agency (NASACO): State-owned shipping company with which all foreign shipping lines have had to deal exclusively since February 1974.

Tanzania Coastal Shipping Line Ltd.: P.O.B. 9461, Dar es Salaam; regular services to the Arabian Gulf, Madagascar, Mauritius, and Seychelles; also charter services.

The following shipping lines are among those serving East African ports: British India Line, Canadian City Lines, Christensen Canadian Lines, Clan Line, Cie. Maritime Belge, Deutsche Ost Africa Linie, East Africa National Shipping Line, Farrel Lines, Harrison Line, Indian African Line, Koninklijke Nedlloyd N.V., Lloyd Triestino, Lykes Lines, Maritime Co. of Tanzania Ltd., Mitsui OSK Lines, Moore-McCormack, Nedlloyd Line, Nippon Yusen Kaisha Line, Oriental Africa Line, Osaka Shosen Kaisha, Scandinavian East Africa Line, Southern Lines, Sovereign Marine Lines, Svedel Lines, Serdish East Africa Line, Union Castle Line.

9.6 Inland Waterways

Lake marine services operate on lakes Tanganyika and Victoria. Steamers connect with Kenya, Uganda, Zaire, Burundi and Zambia. A joint shipping company was formed with Burundi in 1976, to operate services on Lake Tanganyika.

9.7 Airports

Tanzania has two international airports, at Dar es Salaam (13 km. from the city) and Kilimanjaro. There are also about 50 other government - designated airfields, many of which are little more than landing strips. Air Tanzania Corporation operates a 19-point domestic network and international services to Burundi, Mozambique, Rwanda, Zambia, Madagascar, Mauritius, Seychelles, and the Comoros. Fleet: 2 Boeing 737, 5 Fokker F27-600, 4 Twin Otters. Zanair is operated by the Zanzibar Government. Domestic airports: Tanga, Moshi, Dodoma, Lindi, Mtwara, Nachingwea, Songea, Iringa,

Njombe, Mbeya, Tabora, Kigoma, Mwanza, Bukoba, Musoma. There are also airports on the Islands of Zanzibar, Pemba (Wete), and Mafia.

Tanzania is served by the following foreign airlines:

Aeroflot (U.S.S.R), Air Comores, Air India, Air Zaire, Air France, Air Madagascar, Alitalia, British Airways, DETA (Mozambique), Ethiopian Airlines, KLM (Netherlands), Lufthansa (Federal Republic of Germany), Pacific Alaska Airlines, SAS (Sweden), Sabena (Belgium), Swissair, and Zambia Airways.

Domestic airports: Tanga, Moshi, Dodoma, Lindi, Mtwara, Nachingwea, Songea, Iringa, Njombe, Mbeya, Tabora, Kigoma, Mwanza, Bukoba, Musoma. There are also airports on the islands of Zanzibar, Pemba (Wete), and Mafia.

9.8 Air Distances

Dar es Salaam to:	Statute Miles
Djibouti	1,301
Dodoma	242
Entebbe	670
Khartoum	1,617
London	4,651
Mafia Is.	77
Mbeya	418
Mogadishu	747
Mombasa	198
Moshi	275
Mtwara	249
Mwanza	530
Nairobi	415
New York	7,723
Pemba Is.	120
Rome	3,767
Seychelles	1,131
Tabora	455
Tanga	123
Zanzibar	46

10. Power and Communications

10.1 Electric Power

The major sources of hydroelectric power are the river systems flowing into the Indian Ocean. Smaller rivers in the Lake Victoria and Lake Tanganyika areas, the Pangani River in the northeast, and the Great Ruaha River in Morogoro Region have also been tapped to some extent. The unexploited coal deposits in the southwestern part of the country offer possible potential for thermal power generation.

The Tanzania Electric Supply Company (TANESCO) generates, transmits, and distributes power on the mainland. Installed generating capacity is 151,000 kW of hydroelectric power and 100,000 kW of thermal power (diesel and steam); 15,000 kW are gas-turbine generated. Fuel for the non-hydro units is imported oil. The expansion of the Kidato facility on the Great Ruaha River, financed by the World Bank, the Swedish International Development Agency, and West Germany, will increase TANESCO's installed hydroelectric capacity to over 250,000 kW (scheduled completion, 1980).

Almost all power sold is distributed through an interconnected system running from Dar es Salaam westward through Morogoro to Kilosa and north to Tanga, Moshi, and Arusha. This follows generally the distribution of urban population and major industrial facilities. Separate generating units are being established in other population centers (15 installed by 1977). About 70% of electric power sales is to industry, 12% to commercial establishments, 18% to homes. Electricity supply: 230 volts AC.

10.2 Radio

Radio Tanzania: P.O.B. 9191, Dar es Salaam. Broadcasts internally in Swahili; externally in English, Afrikaans, and in African languages of Mozambique, Zimbabwe, South Africa, and Namibia.

Radio Tanzania Zanzibar: P.O.B. 1178, Zanzibar. Broadcasts in Swahili on three wavelengths.

There were an estimated 310,000 radio sets in use in 1977 (19 sets per 1000 population).

10.3 Telecommunications

Tanzania has local dial and long distance telephone services. By radio telephone and cable, there are international connections to the US, UK, and other parts of the world. Service is adequate in Dar es Salaam, Arusha, and Moshi but poor between cities. In rural areas communication is haphazard, especially during the rainy season when phone, telegraph, and mail services are often disrupted. There are 75,000 telephones; 0.4 per 100 population. One Indian Ocean satellite station is in operation.

10.4 Television

Television Zanzibar: P.O.B. 314, Zanzibar. Color service operating only in Zanzibar. There were 8,840 television sets in Zanzibar in 1978.

There is no television service on the mainland.

1. Environment

1.1 Overview of Environment

Uganda is a landlocked country on the eastern African plateau whose capital, Kampala, is 1,400 km. by rail to the nearest Indian Ocean port. Of a total land area of 241,139 sq. km., 17% or 35,454 sq. km. is open water and swamps, made up primarily of Lakes Victoria, Albert, and Edward.

84% of Uganda's land area (excluding open water) forms a plateau between 900 m. and 1,500 m. in altitude, with a gentle downslope to the center to form Lake Kyoga. The western arm of the east African rift system accounts for the 9% of the land area at less than 900 m. and this includes the lowlands flanking the rift lakes (Edward and Albert) and the course of the Albert Nile at little more than 620 m. Mountains of over 2,100 m. occupy 2% of the land area and these lands are above the limit of cultivation. The highest point is Mount Stanley, 5,109 m., in the Ruwenzori group on the border with Zaire, but larger areas of highland are included in the Uganda portion of the volcanic mass of Mount Elgon, near the Kenyan border. The remaining 5% of the land area lies at an altitude of 1,500-2,100 m. in the eastern and western extremities which form the shoulders of their respective rift valley systems and in the foothills of the mountains already mentioned. At this altitude the country is free of malaria and contains some of the most heavily populated regions.

1.2 Range and Land Resources

Range and Land Resources (in sq. km.)

A. Mountain Grasslands	2,066
a. Mt. Elgon	692
b. Kigezi Highlands	945
c. Ruwenzori Mts.	429
B. Elephant Grass	13,913
a. Fertile Crescent	7,353
b. Toro - Bunyoro	6,560
C. Moist Hyparrhenia	11,161
a. Bukedi Plains	2,921
b. Central Uganda Ridge	6,680
c. Ankole - Kigezi Uplands	1,560

D. Dry Hyparrhenia	27,731
a. West Teso	4,997
b. North Buganda	7,886
c. North Acholi	6,324
d. West Nile - Madi	8,524
E. Themeda Triandra	
a. Ankole/Masaka Grassland	6,877
F. Loudetia Kagerensis	493
G. Setaria Ingrassata)	
H. Chrysopogon Steppe)	Karamoja 12,216
I. Bushland & Thicket)	

- A. Mountain Grassland - elevations over 1,680 m. occur in 3 subzones: Mt. Elgon in Bugisu and Sebei Districts; the Kigezi Highlands in SW Uganda; and the Ruwenzori Mts. in Toro District. They contain less than 3% of total land area or about 54,390 sq. m. Lands at lower elevations get adequate rainfall, and lands suitable for cultivation support high population densities. Livestock raising is limited.
- B. Elephant Grass - zone has 2 subzones: the Fertile Crescent north and west of Lake Victoria and the Toro - Bunyoro subzone. The Zone occurs at elevations between 900 and 1,680 m. Rainfall in excess of 1,140 mm. makes it one of the largest areas of fertile, well drained land in Africa. Deciduous and evergreen forest predominate. Covers about 36,260 sq. km. or 19% of total area. Principally a cash crop zone, with little natural grazing.
- C. Moist Hyparrhenia Zone - occurs between elevations of 1,035-1,680 m. on generally fertile, well drained soils under semi-deciduous forests or Savannah woodland. Covers 29,000 sq. km. or 15% of total area. Both annual and perennial crops grown. Divided into 3 subzones: the Bukedi Plain west of Mt. Elgon, the Central Ridge in Lango, Teso, and Acholi Districts, and the Ankole Uplands in western Ankole District.
- D. Dry Hyparrhenia - between elevations of 610-1,525 m. on soils of poor to moderate fertility; rainfall of 760-890 mm. Orchard savanna predominates. Rainfall is seasonal, limiting cultivation to annual crops. Covers 71,740 sq. km. or 37% of land area. 4 subregions: West Teso, North Buganda, North Acholi, and West Nile/Madi.
- E. Ankole/Masaka Grasslands - occur between 1,220-1,830 m. in Ankole & Maska Districts; rainfall 760-1,420 mm. Characterized by Themeda triandra. Covers 18,130 sq. km. or 9.4% of total land area. Good natural grasslands but shallow soils on hill slopes. Seasonally flooded valley bottoms severely limit crop production, but provide extensive grazing areas.

- F. *Loudetia Kagerensis* - smallest zone; area of seasonal swamp forest in southern Masaka and the Sese Islands. Low agronomic potential.
- G. Karamoja - entire district of Karamoja 31,590 sq. km. or 17.5% of area. 3 resource zones - *Setaria Ingrassata*, *Chrysopogon* Steppe and Bushland & Thicket. Unpredictable rainfall. Severe overpopulation in relation to land resources.

1.3 Rainfall

Mean annual rainfall varies from 510 mm. in parts of Karamoja to 2,160 mm. in the Sese Islands. More than 1,520 mm. falls on Mt. Elgon, west Kigezi, Ruwenzori, and on the high ground in Bunyoro; also around Gulu and on the northwestern shore of Lake Victoria. More than 1,140 mm. falls along a 225-mile arc around Lake Victoria from Tororo to Rakai, and along a straight belt of similar length striking northwest from Tororo to Gulu. This amount also falls in the West Nile Highlands, west Ankole, and along the belt of high ground from Ruwenzori to Bunyoro. Rainfall is deficient in Karamoja, along the floor of the Western Rift Valley, and along a salient extending from Tanzania through Ankole to Lake Kyoga. In the salient there is an area of low irregular rainfall near the middle course of the Katonga River. But total amounts of rain are less significant agriculturally than the length of the dry season. For much of the center and west there is only one month with less than 50 mm. of rainfall. This zone is characterized by permanent cropping of bananas for food, and coffee and tea for cash crops. To the south the dry season increases to three months (June to August); in the north it increases to four months (December to March) and in the northeast the dry season is even longer. Where the dry season is marked, as in the north and east, annual cropping of finger millet provides the staple food and cotton the main cash crop. In the driest parts pastoralism predominates, possibly with a little sorghum cultivation. (See Agroecology, section 7.)

Annual Mean Rainfall in millimeters

Entebbe	1623.8	Mbarara	905.6
Tororo	1463.7	Fort Portal	1487.0
Jinja	1320.2	Masindi	1302.3
Kabale	99.48	Gulu	1553.6

Lake Victoria Climatic Zone

March - May
June - July
October - November
December - March

- a strip of land 48-80 km. wide around the shores of Lake Victoria.
- Principal rainy season
- Relatively dry
- Rainy season
- Relatively dry

Ankole, Southern Uganda Zone

April - May
 June - July
 September - November
 December - February

- Includes western parts of Busoga, most of East and West Mengo, Mubende and Masaka Districts and all except western-most part of Ankole.
- Rainy season
- Dry season
- Rainy season
- Dry season but often broken

Western Uganda Zone

April - May
 June - July
 September - October
 December - February

- a strip 48-64 km. wide on the western border, West Nile, Toro-Bunyoro, Lake Albert, Lake George and N.E. Lake Edward areas.
- Rainy season
- Dry season
- Rainy season
- Dry season

1.4 Temperatures

Temperatures
 (centigrades per year)

	<u>Mean</u> <u>Max</u>	<u>Mean</u> <u>Min</u>
Arua 1,280 m.	28.3	17.2
Butiaba 621 m	29.3	22.0
Entebbe 1,146 m.	25.9	17.1
Gulu 1,106 m.	29.3	17.1
Holma 1,158 m.	28.5	16.7
Jinja 1,170 m.	28.3	17.3
Kabale 1,871 m.	23.2	10.1
Kampala 1,312 m.	26.7	17.3
Kawanda 1,196 m.	27.3	15.9
Kitgum 937 m.	31.8	17.3

	<u>Mean Max</u>	<u>Mean Min</u>
Mosaka 1,313 m.	25.7	15.9
Mbale 1,220 m.	29.3	16.2
Mbarara 1,443 m.	26.3	14.6
Moroto 1,524 m.	29.2	15.8
Mubende 1,553 m.	25.3	16.0
Serere 1,139 m.	30.0	18.0
Tororo 1,226 m.	28.8	16.3

1.5 Waterways

Papyrus swamps cover about 54,000 sq. km. The fringes of these swamps are commonly used for vegetable growing. Much swampland has been reclaimed.

The 460 km. Victoria Nile runs from Lake Victoria at Jinja over Owen Falls north into Lake Kyoga. It leaves Kyoga in a westward direction, and changes to a northerly course at its junction with the Kafu River which runs into it from the west. After the Karuma Falls the river follows a westward course over Murchison Falls into Lake Albert. From Lake Albert it flows as the Albert Nile, in a northerly direction, leaving Uganda at Nimule on the Sudan border.

The other rivers are the Aswa-Morota, Dopeth-Okok, Kafu, Kagera, Katonga, Mayanja-Kato, Mpologoma-Malaba, and Pager. Many of these are sluggish and swampy.

Lakes Albert, Edward, and George are troughs in the western rift valley system, while Lakes Victoria, Kyoga and Kwanja are shallow basins on the plateau. Lake Salisbury to the northeast provides an outlet for the waters north of Mt. Elgon into the Nile system. All the lakes are relatively shallow; however, they do support a fishing industry.

Uganda is well supplied with water compared to most countries in Africa as 15% of the total surface area is open water. Besides the large

lakes on the boundaries, branches of Lake Kyoga fork through the center of the country and the Nile traverses from south to north.

Lakes

	<u>Area (sq. km.)</u>	<u>Maximum depth (meters)</u>
Victoria	68,687	82
Albert	5,335	51
Edward	2,202	117
Kyoga	2,047	7
Bisina	308	7
George	246	5
Bunyoni	46	39
Kachira	42	4
Nakivali	35	3-4
Kijanebalola	35	5
Nabugabo	32	4-5
Mutanda	22	50

1.6 Mountains

In the extreme southeast are the Mufumbiro volcanoes, of which only the northern slope is in Uganda. The Mufumbiro Range includes Mt. Sabinto (3,647 m.), the meeting point of Uganda, Rwanda and Zaire. The most spectacular mountains are the Ruwenzoris, sometimes called the "mountains of the moon," along the western border. The range is about 80 km. long and rises to heights of more than 4,270 m.; the highest is Mt. Margherita at 5,112 m.

Along the eastern border with Kenya is a range of volcanic centers and hills; Mt. Elgon at 4,325 m. is the highest. West of the border mountains are a number of smaller mountain masses including the Labwar Hills, ranging from 1,800-2,500 m. On the northern border are the southern outlines of the Imatong Mountains of the Sudan, all about 1,830 m.

Principal Mountains

Mt. Debasien	3,070 meters
Mt. Elgon	4,325 "
Mt. Margherita	5,105 "
Mt. Moroto	3,085 "

Principal Mountains

Mt. Morungole	2,750	"
Mt. Muhavura	4,130	"
Mt. Zulia	2,150	"

1.7 Land UseLand Use
('000 hectares)

Arable land	3,900	*
Under permanent crops	1,351	
Permanent meadows & pastures	5,000	
Forest land	2,759	
Other land	6,961	
Total land area	19,971	
Inland water	3,633	
Total area	23,604	

* FAO estimates

Source: Europa, Africa South of the Sahara, 1980.

2. Disaster Vulnerability

2.1 Economic Situation/Civil Strife

Severe shortfalls in domestic agricultural production and scarcity of imports during and after the last years of the Amin regime have resulted in a serious deterioration in economic and social conditions. The breakdown of law and order has continued, with widespread smuggling and corruption still prevalent. Large numbers of weapons were diverted during the war of liberation and are now used by criminals. In addition, the undisciplined and largely unpaid Ugandan Army continues to pillage the resources of the local population. A critical food shortage in large areas of the country has developed after four years of insufficient rain and two years of civil conflict. Stores are empty, people queue for essential commodities, industrial and agricultural production is at a standstill, and the transportation system is in shambles. There are shortages of vital drugs and medicines, and diseases which had been largely eliminated (such as cholera) have appeared again.

2.2 Drought

The most distressed areas in Uganda are Karamoja and West Nile Provinces. Drought and raiders have decimated about 60% of the cattle herds in Karamoja, which were the main source of the inhabitants' livelihood, and as many as 275,000 people face starvation if emergency funding programs are not continued. The main problem is a lack of transportation, particularly trucks, spare parts, and petroleum to move supplies to the destitute. UNICEF is now attempting to provide needed vehicles and spare parts. At least 20,000 people in Karamoja are alleged to have died from malnutrition since January 1980, and the Karamoja are now menaced by the Turkana, who have crossed into Karamoja from even more drought-affected regions in northwestern Kenya. According to the Food and Agriculture Organization, emergency food aid already received would fully cover the needs of the affected Karamojans until the end of August 1981 if the transportation problem were solved. Prospects for the new harvest in northern and eastern Uganda are unknown. However, a multi-donor effort has recently provided almost 300 tons of seeds, agricultural implements and technical assistance in anticipation of the spring rains in 1981. In southern, western, and central areas, crop prospects are good provided normal weather prevails through August, 1981. Nevertheless, a large deficit of food is anticipated for 1981.

The other major problem is the West Nile area in northwestern Uganda where remnants of Idi Amin's army invaded in October, 1979. The Ugandan

and Tanzanian troops sent to repel the invaders created such havoc that some 250,000 Ugandans fled to Sudan and Zaire. Around 175,000 have now returned to West Nile but their houses and crops have been looted. Furthermore, the area faces a severe drought that affects close to one million Ugandans.

2.3 Refugees

Within Uganda are about 118,000 refugees, mostly from Rwanda and Zaire, who had been settled in the western and southern regions for a number of years. During the civil conflict about 25,000 of these refugees were uprooted and their settlements destroyed. The United Nations High Commission for Refugees issued a special appeal to help these refugees, in addition to helping the returning exiles and an estimated 265,000 internally displaced persons. The UNHCR is capable of handling the earlier refugees, but considerable help will be needed for those returning to the West Nile area.

2.4 Infestations

Desert Locusts - The most severe invasion in this century was in 1929, when desert locust swarms appeared in almost all districts of Uganda and damage to cotton, millet, cassava, and sweet potato crops was reported. As a result of control efforts by the Desert Locust Control Organization (DLCO/EA), of which Uganda is a member, the country was not affected by the plagues of 1967-69 and 1978-79.

Red Locusts - Swarms of Red Locusts invaded Uganda from the south each year between 1933 and 1937 as part of a larger plague. Damage to crops was severe in Toro and Mubene, but was largely confined to the southwest. Discovery of this locust's primary breeding grounds in swamps in Zambia and Tanzania has facilitated control efforts, and damage has been minimal in recent decades.

Migratory Locusts - There were heavy infestations by migratory locusts in Uganda between 1930 and 1934, with severe damage to millets and sorghum. An effort was made to limit their impact by planting crops not attacked by this locust, especially sweet potatoes, beans, and groundnuts. Discovery of the migratory locust's breeding area in West Africa has facilitated control efforts.

2.5 Disaster HistorySummary Disaster History

<u>Disaster</u>	<u>Strike Date</u>	<u>Location</u>	<u>No. Killed</u>	<u>No. Affected</u>
Bubonic Plague	35	n.a.	2,000	n.a.
Earthquake	3/20/66	Bwamba County	104	50,000
Civil Strife	1978-79	Nationwide	n.a.	400,000
Drought	1980-81	Karamoja Province	n.a.	500,000

Source: Disaster History on file at OFDA in Washington, D.C. Covers 1965 to present.

3. Human Ecology

3.1 Population Overview

The population of Uganda is predominantly rural as only 8% of the population live in towns of over 1,000 people; densities are highest in agricultural areas, particularly south of Lake Kyoga.

The population at the last census in 1969 was 9,548,847 and showed a 3.8% per annum increase since 1959; mid-1979 estimate is 13.2 million. 45% of the population is under 15 years of age and only 3% is over 64 years. Average density is estimated at 49 people per sq. km.

3.2 Distribution of Population

The urban population, although growing twice as fast as the population as a whole, was only about 835,000 in 1972, and much of it in small towns and trading centers. Population of Kampala, the capital, was 331,000 in 1970; Jinja, an industrial center, had 100,000 and Mbale 23,500.

Population by Province (1976)

<u>Province</u>	<u>Population</u>	<u>Province</u>	<u>Population</u>
West Mengo	513,798	Karamoja	284,067
East Mengo	851,583	Jinja	52,509
Masaka	640,596	Mbale	23,544
Mubende	330,700	Kizezi	647,988
Kampala	330,700	Ankole	861,145
Teso	570,628	Toro	571,514
Bngisu	397,889	Bunyoro	351,903
Bukedi	527,090	West Nile	573,762
Busoga	896,875	Madi	89,978
Sebel	64,464	Acholi	463,844
		Lango	504,315

3.3 Ethnic and Sociocultural Groups

Black Africans make up more than 98% of the population. The approximately 40 tribes can be grouped as follows:

Bantu - comprise 65% of the population and inhabit the southern half of country; primarily farmers.

Baganda - dominant Bantu group (16% of population); brought under central government control in 1967.

Nilotes - live in north-central and northeast regions; stockraising is major occupation; finger millet and sorghum are main crops.

Sudanese - inhabit the West Nile District in the northwest; high rainfall permits growing of cassava, finger millet, and maize.

Note: There is a sharp distinction between the semi-nomadic, warrior tribes of the Nilotic in the north and the predominantly sedentary Christian Bantu people in the south, giving the impression of 2 separate nations within Uganda.

Asian immigrants from the Indian subcontinent numbered about 74,300 in 1969; however, in 1972 all but a few hundred Asians were expelled (less than 500 remained by 1975).

English is the official language but Swahili is the language of trade and the army. Luganda is most widely spoken Bantu language. Communication is often a problem as each tribe speaks its own language, which is generally unintelligible to neighboring tribes. Broad dialect differences also exist.

3.4 Refugees

Within Uganda are about 118,000 refugees, mostly from Rwanda and Zaire, who had been settled in the western and southern regions for a number of years. During the civil conflict about 25,000 of these refugees were uprooted and their settlements destroyed. The United Nations High Commission for Refugees issued a special appeal to help these refugees, in addition to helping the returning exiles and an estimated 265,000 internally displaced persons.

4. Nutrition

4.1 Diet Summary

Although the country generally has adequate food sources for a balanced diet, lack of information about nutrition is a major problem. Staple foods are bananas, millet, sweet potatoes, maize, and cassava. Other foods include groundnuts, sorghum, beans, peas, and a variety of green vegetables and fruits. Rice and wheat are grown on a limited scale. Millet and sorghum are important as they are highly insect resistant and can be stored for a long time; they are also the primary ingredients in the brewing of beer which is important in the diet.

Calorie supply, per capita of required (FAO) - 91%
Protein supply, grams per day per capita - 61%

4.2 Food Preferences by Region

Busoga District

The main crops grown in this area are cotton, coffee, plantains, finger millet (*Eleusine coracana*), sweet potatoes, manioc, groundnuts, corn, mixed beans, and peas. Cattle are common in the north, but are kept more for social prestige than for food. Fish from Lakes Kyoga and Victoria are abundant. Food taboos in the district include eggs, poultry, mutton, pork, and certain kinds of fish, and apply only to females over 6 years of age. No specific taboos are reported relating to pregnancy or lactation.

In addition, a marked seasonal incidence of malnutrition occurs during the first three months of the year when only starchy staples are available. Protein-rich foods, such as millet and groundnuts, are harvested in May and are in very short supply toward the end of the year.

Bukedi District

Food crops are primarily finger millet (in the north), manioc, groundnuts, sorghum, plantains (in the south), corn, sweet potatoes, and beans. The main cash crop is cotton. Bukedi has considerable fishery resources. Food taboos are not widely observed in Bukedi. Malnutrition increases in January and February when food is in short supply and the population eats only manioc, plantains, and sweet potatoes.

Ankole District

The tsetse fly is common in the east part of Ankole. In the center and southwest some cultivation is possible, but most of the land in this area is used only for grazing. Plantains, sorghum, sweet potatoes, mixed beans, manioc, finger millet, groundnuts, corn, and peas are the main food crops.

Only one-third of the total fish catch is consumed because of a strong taboo among the Banyankole tribe. The rest is exported to other parts of Uganda. Women and girls over the age of 6 are forbidden to eat eggs, chicken, mutton, and pork or to drink goat's milk.

The Hima also have many taboos. Milk is not mixed with other foods in the same dish or even in the stomach. Several hours must intervene between drinking milk and eating anything else. Sometimes a purgative is recommended between the two intakes.

The incidence of malnutrition is highest during April and May, possibly because at that time of the year mothers are engaged in intensive field work, and neglect their children. This period also coincides with the time when the most nutritious foods, such as sorghum, are in short supply, and the fare consists of sweet potatoes, plantains, and manioc.

Kigezi District

There are no cash crops in Kigezi, therefore, most of the population lives on a purely subsistence basis. The main food crops are sorghum, sweet potatoes, plantains, beans, peas, millet, and corn. The Kiga drink cow's milk but not goat's milk. Lake fishing is practiced, but only 10% of the catch is consumed locally. Food taboos are widespread in the area; few men and no women eat fish.

Karamoja District

The people of the Karamoja District are a Nilo-Hamitic group. Sorghum forms the basis of their diet, supplemented by cucumbers, beans, corn, and occasionally finger millet. Millet, however, is dependent upon rainfall, which is often absent in this region. Sedentary agriculture is the way of life for about 80% of the people in the area; the other 20% are cattlemen leading a nomadic existence. The nomads live mainly on milk and on blood from the jugular veins of their cattle. Dairy cows, goats, and sheep provide milk for women and children at the permanent settlements.

Babies are breast-fed and receive some butter or ghee soon after birth. Breast-feeding continues through next the pregnancy. At 1 month of age, infants are given fresh or sour milk, sorghum beer, and thick

gruel. After 6 months, sorghum porridge, meat, and beer are given more often and after a year, sorghum bread, meat, and beer. After 2 years of age, children eat the same food as adults. Blood and meat are considered famine foods among the sedentary population, expressing once again the concept that cattle are not to be used for food.

Buganda District

The Baganda people rely mainly on plantains, which they call matoko, meaning "food"; this has an emotional value as the word also means "goodness." Because plantains can be harvested year-round, the Buganda people do not store food. There are two main meals daily, generally around 2:00 p.m. and 9:00 p.m. Matoke (mashed plantains) is eaten at both meals, generally accompanied by one or more sauces made with pulses, meat or fish. Food is cooked wrapped in banana leaves and is often pressed into a soft hot mush dipped into the sauce. Plantains are also made into beer (pombe). Special taboos during pregnancy include salt, sugarcane, onions, sweet plantains, white ants, mutton, eggs, chicken, and fish (which is never eaten by women and girls anyway). Certain types of clay are eaten by pregnant women, a practice extremely common in Africa.

4.3 Nutritional Deficiencies

Malnutrition is the major cause of mortality among children, particularly in matoke eating regions. Diseases resulting from nutritional deficiencies include kwashiorkor, marasmus, beri-beri, and pellagra. Iron and riboflavin deficiencies are not uncommon; goiter is found in mountainous western regions; vitamin C deficiency is related to a high incidence of respiratory disease.

Since the most important aspect of malnutrition in Uganda is protein malnutrition, it seems probable that the cause of this deficiency is the extensive use of plantains and manioc as staple foods. Uganda produces two high-protein foods: eleusine millet, called wimbe, and sesame, called sim-sim, both of which contain good quality protein and have high levels of calcium. Yet the use of cornmeal, a low-protein food, is spreading in towns, in institutions, and among the labor force.

4.4 Current Status

The present food situation in northern Uganda is serious. Severe child malnutrition in the Karamoja area is widespread and there have been reports of starvation in Gulu, Lira, Arua, Soroti, and Moroti. Inadequate

rainfall during two successive rain seasons and continued lack of rainfall, especially in northern regions, has drastically curtailed the production of grain planted in December 1979 and January 1980; increased cassava and other root crop plantings have occurred as a hedge against the drought. The June 1980 harvest of corn, sorghum, and millet was minimal with only partial recovery expected by the December/January 1981 harvest.

The Government of Uganda requested an emergency food distribution of 70,000 MT of cornmeal and vegetable oil (administered by CARE) to 200,000 families. In recent months, the program has been disrupted by armed highjackings of food convoy trucks by both military and civilian groups. In October 1980 CARE suspended all trucking operations except for the distribution of food already in its warehouses. The U.N. estimates that approximately 4 million people face food shortages in northern Uganda. Of these, half a million are chronically short of food. (See also Drought, section 2.2.)

4.5 Feeding Programs

Ongoing donor feeding programs are as follows (as of May 1980):

CARE fed approximately 34,000 recipient families in 14 northern districts exclusive of Karamoja from February to May 1980; CARE's current emergency supplemental ration is 35 kg. of cornmeal and 3 kg. of vegetable oil per family per month.

UNHCR, acting as distribution agent for WFP, is implementing an emergency program primarily in Karamoja for approximately 250,000 recipients with the focus on displaced persons and returning Ugandans. Title II is providing approximately 400 MT of vegetable oil and 435 MT of NFDN for this program which totals 1,094 MT. Another WFP program, which is an extension of efforts during Amin period, will assist Uganda in meeting food needs.

4.6 US Assistance

The following is a partial breakdown of US assistance to Uganda during FY 1980:

<u>Source</u>	<u>Purpose</u>	<u>Amount</u>
OFDA	Grant to CARE for transportation of food	208,000
	Medical supplies	423,500

<u>Source</u>	<u>Purpose</u>	<u>Amount</u>
	Three separate grants	31,790
	Medical supplies	10,000
OFDA	Grant to UN for airlift of maize from Ethiopia	138,000
495-F	Grants to UNHCR (support of an appeal)	2,500,000
	Grant to CARE for transportation of food	360,000
P.L. 480 Title II	Cornmeal, corn oil, and milk distributed by CARE and WFP (total 31,796 MT) plus freight	13,953,000
State	Grant to UNHCR	1,000,000
	TOTAL	18,624,290

5. Health, Sanitation, and Housing

5.1 Health Overview

A report on medical services by the Ministry of Agriculture in February 1977 disclosed that many hospitals and health services were operating under "appalling conditions". Some were without doctors or drugs; others lacked transport; most hospitals had no mortuaries. At the present time there is a serious shortage of trained personnel and very little foreign exchange allocated to purchase essential drugs. Preventive medicine has been almost totally neglected and the only treatment for lepers is that provided by private agencies. Health services, declining since 1971, were particularly affected by the departure of foreign personnel in 1972. What treatment there is, in government hospitals and dispensaries, is free.

After the Tanzanian invasion that ousted Idi Amin, looting occurred in Kampala, Masaka, and Mbarara: beds, blankets, sheets, and medicine were taken; offices were stripped of furniture and telephones; files and records were destroyed. Although most hospitals were not bombed, the looters blew the safes open and caused structural damage to buildings. All the hospitals which were looted had their stores extensively damaged.

5.2 Diseases

As a result of the declining standard in health services, diseases which were once under control have become more prevalent. Whereas in 1970 malaria was the number one disease, this is now second to measles. Skin diseases, respiratory diseases, rabies, sleeping sickness, and infectious diseases have steadily increased and death rates have risen.

Major diseases include:

Malaria - formerly the most widespread disease occurring everywhere except at elevations above 4,000 ft. and in a few major towns. All four species of human malaria are found although *Anopheles gambiae* is the most common.

Parasitic diseases - most serious is bilharzia (schistosomiasis) which is transmitted by infected water snails. Also common are hookworm, roundworm, and filariasis.

Other prevalent diseases include sleeping sickness (trypanosomiasis), leprosy, yaws, venereal disease, whooping cough, and tuberculosis;

louse-borne typhus in Southern Province (Ankole). Vaccination programs exist for smallpox, poliomyelitis, DPT, measles, and cholera. No smallpox since 1972.

5.3 Folk Medicine

Although modern medical techniques have generally been accepted, there is still substantial reliance on native doctors and ancient remedies which include magic, sacrifices, incense burning, and herbal cures.

5.4 Vital Statistics (1979)

Birth rate	45 per 1000 population
Death rate	14 per 1000 population
Infant mortality	136 per 1000 live births
Growth rate	3.0%
Life expectancy at birth	50 years

5.5 Health Services and Facilities

Health services have suffered during the last eight years because of foreign exchange difficulties and the exodus of skilled and experienced doctors. Detailed information on the status of health services and facilities is not currently available.

The health services in Uganda are provided through the following facilities: (as of 1979)

Government	46 hospitals	8,112 beds
Missionary	26 hospitals	3,215 beds
Industry	3 hospitals	284 beds
Private	1 hospital	30 beds

In addition there are 102 government health centers, 59 dispensaries, and 270 health units run by local authorities.

5.6 Health Personnel

In 1970, according to Ministry of Health Information, there were about

1,650 doctors in Uganda. By the middle of June, 1979, this figure was reduced to 620, with the major depletion of doctors having taken place in missionary rather than government hospitals. There are now some 191 key vacancies in the Ministry of Health and at Mulago Hospital in Kampala. A concerted effort will have to be made to encourage the Ugandan doctors now working outside the country (estimated to number 124) to return home.

Health Personnel in 1975:

1 doctor per 27,000 inhabitants
 588 medical assistance
 1,975 midwives
 2,432 nurses
 28 pharmacists (1974)
 19 dentists (1974)

As of 1977, the Ministry of Health started training personnel in 20 health categories. The Faculty of Medicine, Makerere University has increased its annual intake to over 100 students. Two training institutions provide an average annual output of 60 medical assistants.

5.6 Housing Types and Institutions

Rural - The settlement pattern consists of scattered homesteads, each composed of a small house(s) surrounded by cultivated fields. Compact villages are not common; found only among some northern Nilotic tribes. Construction materials consist of wattle and daub, thatching, grass, and reeds. Tin roofing, cement, bricks, and tiles are increasingly common. Building styles vary with ethnic groups.

Urban - Sun-baked mud bricks, cement blocks, and fired bricks have been encouraged by the government as building materials. Rapid urbanization has outstripped government efforts at low-cost housing.

Although a comprehensive survey has not yet been carried out on the damage caused by the war, reports indicate that Mbarara and Masaka, suffered the most serious structural damage with many buildings completely razed. However, damage caused by the civil upheaval merely aggravated an already deteriorating housing situation. Government-sponsored housing has remained at a virtual standstill for the last eight years. A lack of capital and inadequate supplies of building materials, construction equipment, tools, and spare parts have made it difficult for the private sector to provide

adequate housing especially for people in low income groups. Ever-rising building costs (the government-controlled price for a bag of cement is Shs. 100, but the magendo price is Shs. 500) discourages private initiative and makes it impossible for individuals to acquire mortgages from financial institutions under the existing terms.

6. Disaster Preparedness

6.1 Ugandan National Plan

Ministry of Rehabilitation
Martin Orech, Permanent Secretary

The National Relief and Rehabilitation Committee (within the Ministry of Rehabilitation), representatives from the Ministry of Agriculture, and representatives from the donor community have bi-weekly meetings to discuss the current situation in Uganda. The data gathering system is poor and official data are generally unreliable or in very raw form.

6.2 US Contact

The U.S. Embassy is currently located at the offices of the British High Commission.
MDRO: Craig Buck, Acting Mission Director

6.3 International Organizations

International Committee of the Red Cross - Peter Spoerri, Chief Delegate
League of Red Cross Societies - M.S.E. Navcler, Chief Delegate
World Food Program - Francisco Strippoli, Deputy Representative

7. Agroeconomy

7.1 Agricultural Sector Summary

Agriculture is the most important sector of the economy accounting for 50% of GDP and employing almost 90% of the labor force. Year-round production, due to good climate and rich soils, makes Uganda generally self-supporting in basic foods. Although figures are not available, crops such as bananas, plantains, maize, millet, cassava, sorghum, potatoes, sim-sim, groundnuts, beans, and peas (all of which form the staple food in various regions of the country) showed an increasing trend throughout the 1970's. However, cash crops were devastated under the Amin regime. Coffee production declined from 251,000 tons in 1969 to 120,000 tons in 1978; cotton from 76,000 tons in 1970 to 15,000 tons in 1978. By 1978, sugar production was almost nonexistent. Agricultural recovery has been limited due to the effects of recent and severe drought, as well as by disruptions from war. The shortage of basic foods has reached crisis proportions. (See Nutrition, section 4 and Drought, section 2.2.)

The major cumulative effects of mismanagement by the Amin regime on the agricultural sector can be summarized as follows:

- the drastic decline in recorded production of the major agricultural export crops between 1970 and 1978;
- a particularly marked decline in productive capacity of the capital-intensive estate sub-sector;
- the overwhelming, and increasing, dependence upon coffee for Uganda's foreign exchange earnings;
- the smuggling of large quantities of primary produce, especially coffee, across Uganda's international borders;
- the switch of agricultural resources from cash crops into food crops, especially in areas with access to urban markets;
- increased poverty in some of the remoter districts.

7.2 Coffee

Coffee dominates the present economy of Uganda and has done so since the early 1960's. Coffee's contribution to foreign exchange earnings had risen from around 50% to 93% in 1977. The coffee industry is the largest single employer when the production, processing, and transport sectors are

put together. The coffee export tax dominates government revenues, contributing over 60% of the national revenue budget in 1977 (Shs.2,000 m.).

According to estimates made by the Ministry of Agriculture, robusta coffee occupied an area of nearly 200,000 ha. in 1977 (detailed area estimates are unreliable given the absence of an agricultural census since 1963-64). The fertile, high rainfall areas of Buganda Region account for most of the production, with some smaller outlying areas in Busoga and Western Region producing smaller amounts. The greater part of the Eastern and Northern regions are unsuitable for coffee production.

Robusta coffee is produced almost entirely in the small-holder or informal rural sector of the economy, large-scale production having declined over recent years to less than 2% of the total. Coffee is often grown interplanted with another perennial crop such as bananas and sometimes with annual crops such as beans or sweet potatoes.

7.3 Production Zones

Production Components by Agro-Ecological Zone

<u>Agro-ecological zones</u>	<u>Major cash-earning activities</u>	<u>Food activities w/ good cash-earning potential</u>	<u>Subsistence food activities</u>	<u>Location by admin. district</u>
High effective rainfall, high altitudes	Arabica coffee, Tea, Pyrethrum, Temperate fruits	European potatoes, Temperate vegetables, Dairy cattle, Bananas	Sweet potatoes, Wheat, Peas	S. Kigezi W. Ankole Upper Ruwenzori Toro Bugisu Sebei
High effective rainfall, middle altitudes	Robusta coffee, Tea, Spice crops, Cocoa	Bananas, Field & Soya beans, Dairy Cattle, Maize	Sweet potatoes	Masaka Mubende C.&S. Bunyoro E.&W. Mengo W. Busoga

<u>Agro-ecological zones</u>	<u>Major cash-earning activities</u>	<u>Food activities w/ good cash-earning potential</u>	<u>Subsistence food activities</u>	<u>Location by admin. district</u>
Medium rainfall, middle altitudes	Cotton, Tobacco, Cashew, Groundnuts, Maize, Sunflower	Sorghum, Sim-Sim, Field beans, Beef & Dairy cattle	Finger millet, Cassava, Cow-peas, Goats	N. Kigezi lower Ruwenzori W.&E. Bunyoro N. Buganda Acholi, Lango, Teso, Bukedi, E. Busoga
Lower rainfall, middle altitudes	Beef Cattle	Sorghum, Goats	Cassava, Pigeon peas	Karamoja N.E. Teso
Areas w/high isolation, middle altitudes	Sugar, Rice Tropical fruits, High value vegetables	Dairy cattle, Poultry, Pigs		Central & northern areas

7.4 Principal Crops

Production of Principal Crops (thousand metric tons)

<u>Cash Crops *</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1/</u>
Coffee	137.1	155.9	121.3	120.0	
Robusta	(123.1)	(151.6)	(119.0)	(114.5)	
Arabica	(14.0)	(4.3)	(2.3)	(5.5)	
Cotton	24.1	13.8	20.2	14.8	
Tobacco	3.7	3.1	3.1	2.4	
Tea	18.4	15.4	15.2	10.8	
Sugar (raw)	23.9	18.5	11.4	7.8	

<u>Food Crops</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	1/
Plantains (matoke)	8,138	8,531	8,855	9,194	
Cassava	2,838	2,993	2,928	2,865	
Maize	674	566	594	622	
Sorghum	390	344	351	355	
Beans	337	253	291	297	
Groundnuts	177	193	187	188	
Finger millet	567	578	561	543	
Sweet potatoes	2,002	1,659	1,689	1,720	

1/ Estimates.

* The principal export crop producer prices have been raised in an effort to improve the incentive to produce and market through official channels. The increases, which were announced in July 1979, were for: robusta coffee, tea, greenleaf, and seed cotton.

Source: Commonwealth Secretariat, Rehabilitation of the Economy of Uganda, 1979.

7.5 Harvest Dates

<u>Crop</u>	<u>Harvesting</u>
Maize:	
Main crop	Jul-Sep
Second crop	Jan-Feb
Rice:	
First crop	Jan-Feb
Second crop	Jun-Jul
Third crop	Sep-Nov
Sorghum:	
First crop	Dec-Jan
Second crop	Jul-Aug
Millet (finger and bullrush)	Jun-Aug
Onions	Jul-Sep
Dry peas	Jun-Aug
Pigeon peas	Oct-Dec
Soybeans	Jul-Aug
Groundnuts	Jul-Aug & Nov-Dec
Cotton	Nov-Mar
Linseed	Feb-Apr
Sunflower seed	Aug-Oct
Tobacco	Jun-Nov
Flax	Mar-May

Year-round harvesting: potatoes, sweet potatoes, cassava, chillies, dry beans, bananas, sesame seed, castor beans, coffee, team sisal

7.6 Agricultural Exports

	<u>Major Export Commodities</u>			
	(value in million shillings; volume in metric tons)			
	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Coffee				
Value	1,398.1	2,487.0	4,536.3	2,419.4
Volume	176.6	153.1	135.3	113.4
Cotton				
Value	210.9	182.0	131.2	153.3
Volume	25.4	19.3	9.9	11.8
Tea				
Value	120.8	89.2	98.0	63.8
Volume	16.9	11.7	8.8	8.7
Copper				
Value	69.5	59.2	23.0	-
Volume	7.8	6.4	2.2	-
Unmanufact'd tobacco				
Value	15.9	15.9	25.1	8.3
Volume	1.3	1.1	1.5	-
Value of merchandise exports, f.o.b. 1/	1,902.2	2,919.0	4,831.0	2,655.8

1/ Includes re-exports

Source: Commonwealth Secretariat, Rehabilitation of the Economy of Uganda, 1979.

7.7 Agricultural Imports

Food supply for 1981 (January-December): A multi-agency mission (led by UNDR0) which visited Uganda in the first half of October has reported that the critical food situation in the Karamoja and in other regions will continue in 1981. The recent harvest in the north (first season, the major crop in this part of the country) was poor and it has been estimated that it would cover no more than two months consumption. Production in other areas has been poor because of drought and a lack of seed and agricultural

implements. The mission estimated that the total harvest in 1980 was 25% below normal.

The mission indicates that people in Karamoja will require assistance until the new harvest in 1981. The number of people affected was estimated at 125,000 for November, 160,000 for December, and 250,000 from January to August 1981. Food stocks already in the country and firm pledges made by various donors cover the need of Karamoja only until the end of 1980. Food aid needs for the period January to August 1981 were estimated by the mission at 2,250 tons of cereals, 3,375 tons of protein foods, 2,025 tons of DSM, 2,025 tons of oil, 1,350 tons of sugar, and 203 tons of salt.

Apart from Karamoja, a large number of people are expected to require emergency assistance in north-eastern areas where food distribution is handled by CARE. Provisional estimates made by CARE indicate that if harvests are poor, people requiring assistance would increase from the current 340,000 to 691,000 in January-March 1981, to 1,010,000 in April-June 1981 and decline slightly to 805,000 in July-August 1981. The UNDR0 mission has recommended that the Relief and Resettlement Committee re-examine the situation in north and north-eastern Uganda before the end of 1980.

The total cereal deficit for the country as a whole in 1981 is tentatively estimated by FAO at 200,000 tons against estimated imports in 1980 of 130,000 tons. In addition, a substantial quantity of pulses will be needed. Cereal aid pledged so far totals 13,500 tons.

See also Drought, section 2.2 and Nutrition, section 4.4, 4.5, and 4.6.

8. Industrial Economy

8.1 Economic Overview

After visiting Uganda in 1979, one economic mission team concluded that "the Government of the National Liberation Movement inherited a country in ruins." Uganda, which in 1970 had one of the highest per capita incomes in eastern Africa, experienced a decline in real GDP estimated at about 1% per annum on average from the early 1970's through 1978. With population growth averaging more than 3% per annum, per capita GNP fell by about 25%. The decline was particularly severe in the modern sector, with the output of monetary agriculture, manufacturing, mining, and construction all having fallen. Only subsistence agriculture achieved some growth, as farmers turned away from the production of export cash crops (principally coffee, tea, cotton, and tobacco) towards essential food crops.

In October 1979, the new Government outlined an economic and social policy which declared the central objectives of the Government to be rapid economic growth, improved income distribution, equitable spread of development across the entire country, and improved social services. Economic recovery has been divided into two phases. The priorities in the first phase (which it was hoped could be accomplished within six months) are to restore essential services and stimulate the production and sale, through official channels of, export cash crops: coffee, cotton, tea and tobacco. The second phase (expected to cover an additional 18 months) calls for the initiation of a medium-term investment program directed at rehabilitating the key productive sectors and social infrastructure to the levels which prevailed in 1970.

A major obstacle to rehabilitation is the present divergence among official, black market, and international prices. Black market (magendo) prices for basic consumer items generally range from three to five times the official or controlled retail price, which is in turn usually related to but higher than the border price of the item, reckoned at the official exchange rate. Furthermore, while reliable data are lacking, it is apparent that the majority of transactions take place at black market rather than at official prices. Correspondingly, the black market rate for the Uganda shilling has fluctuated between eight and twelve times the official rate in recent months. In this situation, the profit opportunities are great for those who are able to buy locally produced goods at official prices, or who obtain foreign exchange licenses at the official exchange rate but sell the imported goods at the black market price. Thus, both the price control system and the foreign exchange allocation system are being subjected to enormous pressures.

Gross National Product in 1978 (estimates)

	<u>US \$Million</u>	<u>%</u>
GNP at market prices	3,260	100.0
Gross fixed investment	156	4.8
Gross national saving	139	4.3
Current account balance	- 131	-4.0
Export of goods and NFS	332	10.2
Import of goods and NFS	458	14.0

8.2 Balance of Payments

With the exception of the coffee price boom in 1976-1977, the balance of payments situation was characterized by trade deficits, low levels of grant and loan assistance, chronic overall deficits, and the accumulation of substantial payments arrears. The situation did not improve markedly in 1979. Export revenues, over 95% of which are derived from coffee, are expected to be slightly above the depressed 1978 level, but well below the level of 1977. Imports, however, are expected to fall below the 1978 level even in nominal terms, reflecting the fact that the expansion of imports called for in the first phase of reconstruction had not yet really begun.

8.3 Industry

Most of Uganda's industries are agro-processing plants (cotton ginneries, textile plants, sugar, cigarette, and fertilizer factories). Due largely to the decline in agriculture, overall industrial performance has plummeted. Blanket production fell from 1,164,000 units in 1970 to 175,000 (1978); edible oil down from 6,100 tons (1974/75) to 1,500 tons (1977/78); match production down 49,000 cartons (1970) to 8,000 cartons (1978); paper from 1,603 tons (1972) to 1,350 tons (1978). Steel production in the town of Jinja declined from 18,250 tons in 1970 to 12,000 tons in 1972, 7,500 tons in 1975 and an estimated 6,000 tons in 1979. Worst hit was the production of superphosphate (fertilizer compound) which fell from 25,000 tons in 1970 to zero by 1978. There are three sugar plants with installed capacity of 195,000, but total production in 1977 was only 6.4% of capacity.

Production of Selected Manufactured Goods

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1/</u>
Beverages (Waragi) ('000 liters)	359	543	526	408	
Beer (million liters)	39	23	22	..	
Cigarettes (billions)	2	2	2	..	
Pipe tobacco (tons)	108	115	98	..	
Cotton and rayon fabrics (million sq. meters)	34	39	36	25	
Blankets ('000 pieces)	309	619	663	595	
Soap ('000 tons)	4	3	1	1	
Matches, small size ('000 cartons) <u>2/</u>	25	13	10	4	
Matches, large size ('000 cartons) <u>3/</u>	6	4	-	1	
Superphosphates ('000 tons)	4	2	1	-	
Steel ingots ('000 tons)	8	8	9	3	
Corrugated iron sheets ('000 tons)	1	1	2	2	
Cement ('000 tons)	98	88	71	50	
Paints (million liters)	1	-	1	1	
Blister Copper ('000 tons)	8	5	2	2	

1/ Preliminary

2/ Cartons of 10 gross small-size matchboxes

3/ Cartons of 200 large-size matchboxes

Source: Commonwealth Secretariat, Rehabilitation of the Economy of Uganda, 1979.

8.4 Imports

Principal trading partners are Kenya, Tanzania, United Kingdom, Fed. Rep. of Germany, and Japan.

<u>Commodities</u>	<u>Imports</u> ('000 shillings)		
	<u>1975</u> *	<u>1976</u> *	<u>1977</u>
Paper and paper products	36,271	22,542	22,414
Cotton fabrics	12,512	3,167	248
Iron and steel	44,227	18,105	n.a.
Other metals and metal products	7,546	3,730	n.a.
Machinery, incl. agricul- tural machinery	210,610	222,488	213,735

<u>Commodities</u>	<u>1975</u> *	<u>1976</u> *	<u>1977</u>
Transport equipment	208,601	111,172	174,091
All other articles	439,296	398,456	n.a.
Total	946,553	779,660	1,567,300

* Net Imports

Source: Commonwealth Secretariat, Rehabilitation of the Economy of Uganda, 1979.

See also Agricultural Imports, section 7.7.

9. Transportation and Logistics

9.1 Road Network

Uganda's road network has been decimated by both years of neglect and by looting of maintenance equipment during the recent war. Lack of routine maintenance has caused a rapid degeneration of many paved roads: sizeable potholes, shoulder erosion, and pavement deformation. Since Uganda's economy depends heavily on transportation by road of its agricultural produce, such neglect has had especially severe consequences.

The Ministry of Works is responsible for the approximately 7,000 km. of major, all-weather trunk roads, 2,000 km. of which are two-lane bituminized highway. District governments are responsible for maintaining some 20,000 km. of secondary roads, virtually all of which are unpaved.

A 1977 study identified the following sections of road as needing reconstruction on a priority basis because of their frequent use in transporting essential goods:

Kampala to Masaka: 100 km.
 Lyantonde to Mbarara: 64 km.
 Mbarara to Ntungamo: 78 km.
 Katunguru to Fort Portal: 115 km.

9.2 Motor Vehicles

Registered Motor Vehicles*

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
Heavy commercial vehicles	7,337	7,492	9,720	9,777
Goods vehicles	6,380	6,570	7,569	7,738
Buses	1,307	1,386	1,545	1,566
Passenger cars	26,579	27,043	28,015	28,393
Motorcycles and scooters	6,910	7,203	7,491	7,528

* Excluding government-owned vehicles.

Source: Uganda Computer Services, Kampala.

9.4 Railways

On August 26, 1977 Uganda Railways was formed following the break-up of the East African Railways Corporation (EARC) in July 1977. With this separation has come a continuing set of problems for Ugandan Railways: it must rely on heavy-duty Kenyan engines for the main-line haul from Kenya to Kampala; all major servicing must be done in Nairobi, at prices and standards with which Uganda is unhappy; and the number of former EARC wagons in Uganda, which run between the two countries, is generally both less than the number required by Uganda and considerably less than the number Uganda believes it should have as a result of the division agreed upon in 1977. These problems, combined with the rapid deterioration of the Ugandan economy under the military regime, resulted in traffic levels before the liberation war that were only a fraction of earlier levels. Railway service between Kenya and Uganda came to almost a complete stop in 1977 leading Uganda to seek alternate routes to the sea.

Development of an alternative route from Lake Victoria (by ferry from Jinja to Mwanza) to Dar-es-Salaam by rail has been under consideration for many years. Full-scale expansion of Tanzanian ports capacity and rail lines in Uganda is prohibitively expensive, although renewed friendship between both countries keeps the idea alive. Dry dock facilities to assemble four wagon ferries at Port Bell, Uganda is now under construction. New ferry service is scheduled to begin in 1981.

9.5 Ports

Uganda depends on cooperative agreements with Kenya and Tanzania for access to the sea. Direct rail line links Uganda with Kilindini harbor in Mombasa, Kenya. Since break-up of EAC other, more expensive means of access to the Red Sea and Atlantic have been explored. See Kenya Ports, section 9.4 and Tanzania Ports, section 9.3 for details.

9.6 Airports

International airport at Entebbe. Others include:

<u>Airfields</u>				
<u>Town</u>	<u>Elevation meters</u>	<u>Dimensions meters</u>	<u>Position</u>	<u>Direction</u>
Arua	1,204	1,707x30	0303 N, 3055 E 2 mi. N of Arua	18/36

<u>Town</u>	<u>Elevation meters</u>	<u>Dimensions meters</u>	<u>Position</u>	<u>Direction</u>
Gulu	1,070	3,110x30	0248 N, 3216 E 1.8 mi. NW of Gulu	17/35
Jinja	1,170	1,332x30	0027 N, 3312 E 2 mi. NNW of Jinja	13/31
Kasese	560	1,570x30	0011 N, 3006 E 1 mi. NE of Kasese	01/19
Lira	1,091	846x45	0215 N, 3255 E 0.5 mi. NNE of Lira	10/28
Masindi	1,173	2,010x30	0145 N, 2145 E 5 mi. NNE of Masindi	01/19
Mbarara	1,402	1,371x30	0033 S, 3036 E 5 mi. NW of Mbarara	11/29
Moroto	1,280	1,496x30	0231 N, 3435 E 5 mi. WSW of Moroto	14/32
Soroti	1,132	1,732x30	0143 N, 3337 E 1 mi. NE of Soroti	05/23
Tororo	1,170	1,707x30	0041 N, 3410 E 1 mi. SW of Tororo	18/36
Murchison Falls	721	1,585x30	0220 N, 3130 E 8.5 mi NNW of Paraa Lodge	07/25

9.7 Airlines and Air Distances

Aeroflot, Air Zaire, Alitalia, British Airways, British Caledonian, Ethiopian Airlines, Lufthansa, Sabena, SAS, Sudan Airways.

Africa

International

Kampala to:	<u>Statute Miles</u>	Kampala to:	<u>Statute Miles</u>
Mwanza, Tanzania	178	New York	7063

<u>Africa</u>		<u>International</u>	
Kampala to:	<u>Statute Miles</u>	Kampala to:	<u>Statute Miles</u>
Nairobi, Kenya	324	Nice	3391
N'Dola, Zambia	938	Paris	3810
Salisbury, Zimbabwe	1245	Rome	3145
Soroti, Uganda	141	Vienna	3456
Stanleyville, Congo	504	Zurich	3579
Tabora, Tanzania	355		
Tananarive, Malagasy Rep.	1653		
Tanga, Tanzania	578		
Tripoli, Libya	2585		
Zanzibar, Tanzania	636		

10. Energy and Communications

10.1 Electric Power

The present state of the electric power sector in Uganda can be summarized as follows:

- a single source of electricity for all practical purposes - the 150 MW capacity Owen Falls hydro station;
- a per capita consumption of 45 kWh - one of the lowest in the world;
- a 50 year agreement (till 2008) to supply 30 MW per year to Kenya;
- a consumption ratio of about 60:40 between Uganda and Kenya with the corresponding revenue ratio being 90:10.
- within the Ugandan market, a steep fall in consumption by industry - from 72% in 1969 to 48% in 1978.

The picture since 1978 is not reassuring. In June 1979, for example, only five machines (of 10 installed) were found to be working at the Owen Falls station, each giving an output of 9-10 MW. The load fluctuation in previous weeks had been between 25 and 70 KW.

The present level of power generation in Uganda is in the region of 90 to 100 MW. Fortunately, there has been no material damage to the power project and its associated sub-station at Jinja during the recent fighting.

Power Generating Capacity Installed in Uganda (MW)

Owen Falls Hydro-electric Station	150
Mabale Hydro-electric Station	1
Diesel stations at Arua, Koboko, Adjumani and Moyo	<u>3</u>
Total:	154

Power Consumed by Different Market Segments

	<u>Unit</u>	<u>1971</u>	<u>1973</u>	<u>1975</u>	<u>1977</u>	<u>1978</u>
Total units generated	mkwh	816	793	727	688	630

	<u>Unit</u>	<u>1971</u>	<u>1973</u>	<u>1975</u>	<u>1977</u>	<u>1978</u>
Transmission losses	mkwh %	73	52	84	84	80
Units available	mkwh	744	701	643	604	550
Total supplied to Kenya	mkwh %	293 39.4	302 43.1	261 40.6	272 45.1	217 39.5
Total consumed by Uganda	mkwh %	451 60.6	399 56.9	382 59.4	332 54.9	333 60.5
Consumed by domestic sector	mkwh %	83 18.4	70 17.5	82 21.5	88 26.5	98 29.4
Consumed by commercial sector	mkwh %	81 18	76 19	77 20.1	69 20.8	74 22.2
Consumed by industrial sector	mkwh %	287 63.6	253 63.5	223 58.4	175 52.7	161 48.4

Source: Commonwealth Secretariat, Rehabilitation of the Economy of Uganda, 1979.

10.2 Telecommunications

The system is based on open wire lines and low capacity radio relay links. An Atlantic Ocean satellite communications station opened at Arua in 1977.

Uganda Posts and Telecommunications Corporation (UPT) falls under the Ministry of Power and Communications and is responsible for the postal service, telephone and telex (including telegraphy), external (international) telecommunications, and radio frequency allocation and registration. As of 1978, there were 46,000 telephones in Uganda.

War Damage:

Extensive damage was done to subscriber installations generally, and those at Masaka and Mbarara in particular - their exchanges and buildings were completely destroyed. Several junction routes, such as Kampala/Entebbe and Kampala/Bombo, suffered far-reaching damage; this also applied to the major radio link stations in southwest Uganda.

The problem is further compounded by the major damage to the maintenance workshop, including tools, equipment and stores, and the looting of practically the whole fleet of vehicles. Although war damage was extensive, the far-reaching effects of years of neglect, disrepair, and obsolescence cannot be ignored.

1979 War Damage to Uganda Posts and Telecommunications

<u>Item</u>	<u>Location</u>	<u>Extent of Damage</u>
Subscriber Installation	Overall	70%
	Masaka	100%
	Mbarara	100%
Kampala network (excl. U/G cable)	Kampala	60% (?)
Exchange and their buildings	Masaka	100%
	Mbarara	100%
	Lira	100%
	Mityana	100%
	Mpigi	100%
	Kyotera	100%
	Kalisizo	100%
Nabusanke	100%	
Maintenance workshop (inc. tools, equipment, and stores)	All	60% (?)
Radio link stations	Sabwe (Mpigi)	60%
	Masaka	60%
	Mbarara	60%
Records (accounts, post offices, and savings banks)	Overall	40% (?)
Junction cable and major o/h route	Overall	60%
	Kampala/Entebbe	80%
	Kampala/Bombo	80%
Vehicle fleet	Overall	80%

Source: Commonwealth Secretariat, Rehabilitation of the Economy of Uganda, 1979.

10.3 Radio Network

In Uganda radio broadcasting is carried out by Radio Uganda which is part of the Ministry of Information and National Guidance. The latest official audience survey report published in 1972 indicates that there were an estimated 1.1 million sets in homes, for which the average number of listeners per set was estimated at 4.3.

All programs at the moment originate at Kampala. They are then fed to two short wave (SW) transmitters in Kampala (popularly called the "red" and "blue" channels) and beamed out to cover as much of Uganda as possible. The blue channel has been used primarily for Bantu languages and the red one for non-Bantu languages. A total of 18 languages are broadcasted.

To complement the two SW transmitters in Kampala there are also five medium wave (MW) stations at Arua, Mawagga, Bobi, Kabale, and Butaba. In addition, Radio Uganda operates an external broadcast service from Soroti. These programs are also received in many parts of Uganda.

War damage has been extensive, most of it in the form of looted tools and equipment, vehicles and furniture, and fittings. However, three of the nine link stations were totally destroyed; no reports for Arua and Bobi transmitting stations. In addition to the actual war damage there has been a gradual but steady deterioration in the standard of maintenance of the equipment and an insufficiency of spare parts.

1979 War Damage to Radio Uganda

<u>Facility</u>	<u>Location</u>	<u>Extent of Damage</u>
Studios	Broadcasting House	10%
	Nakasero News Studios	10%
Workshops	Kampala	Looted
Outside broadcasting & mobile recording unit	Broadcasting House	unknown
Transmitting stations	Kabira Road (50+10 KW)	10%
	Bugolobi (SW + MW)	10%
	Mawagga (2x50 KW, MW)	Looting of tools, measuring equipment, furniture, vehicles
	Kabale (2x50 KW, MW)	"
	Soroti (2x250 KW, SW)	"
	Butebo (2x50 KW, MW)	"

<u>Facility</u>	<u>Location</u>	<u>Extent of Damage</u>
	Bobl (2x50 KW, MW)	No report, but is off the air
	Arua (Gilgil)	"
	Mbale	Long off the air
Link stations	Magejo	Totally destroyed
	Mbarara	"
	Dokolo	"
	Nakisajja	Equipment & tools looted
	Kisunji	No damage
	Omoru	No report
	Rwagazu	"
	Soroti & Butebo	Looted
Teleprinter network (news)	Gulu	No report
	Fort Portal	"
	Jinja	"
	Mbale	"
Naguru Central Receiving and monitoring station	Naguru	No report

Source: Commonwealth Secretariat, Rehabilitation of the Economy of Uganda, 1979.

10.4 Television

Uganda started black and white TV service in 1965 operating at vhf with 625 lines. It falls directly under the Ministry of Information and National Guidance. There is only one program channel that is fed to several transmitters around the country.

A color service (System PAL/B) was started in July 1975. It was estimated in August 1977 that there were 800,000 black and white sets, and 1,000 color sets with an estimated average number of eight viewers per set.

Live programs from other countries may be received and retransmitted either via the earth station in Kenya and then by microwave to Kampala or via the Arua earth satellite station, and by domestic satellite to Koiolo.

War damage has been in the form of looting of tools, spare parts, measuring equipment, vehicles, and furniture and fittings. In addition, however, Mbarara transmitting station was totally destroyed as was the brand new equipment (yet un-commissioned) at Masaka.

Bibliography

- American Council of Voluntary Agencies for Foreign Service, Inc. Emergency In East Africa, Situation Report No. 1. November 26, 1980.
- _____. Technical Assistance Information Clearing House (TAICH). Ethiopia, October 1979. New York: TAICH, Oct. 1979.
- _____. TAICH Country Report: Kenya, New York: TAICH, July 1980.
- _____. TAICH Country Report: Sudan, New York: TAICH, October 1979.
- _____. Development Assistance Programs of U.S. Non-Profit Organizations. Tanzania. New York: TAICH, October 1979.
- Baxter, P. T. W. Ethiopia's Unacknowledged Problem: The Oromo. African Affairs, Vol. 77, No. 308. London: Oxford University Press, July 1978.
- Bechtold, Peter K. Politics in the Sudan. Parliamentary and Military Rule in an Emerging African Nation. New York: Praeger Publishers, 1976.
- Berry L., et. al. Eastern Africa Country Profiles. Country Profile #5, Djibouti. Worcester, MA: Clark University, 1980.
- _____. Country Profile #3, Kenya. Worcester, MA: Clark University, 1980.
- _____. Country Profile #4, The Republic of Somalia. Worcester, MA: Clark University, 1980.
- _____. The Environmental Context of Development in Tanzania: A Map of Environmental Pressure Points. Worcester, MA: Clark University, February 1977.
- Bliatout, Thowpaov, et al. Comparative Public Health Systems Monograph #3: Health in Ethiopia. Honolulu: University of Hawaii, May 1974.
- Burns, Robert E. The Current Controversy Over Low-Cost Road Construction In Developing Countries. Addis Ababa: June 1975.
- Central Statistical Office. Retail Price Index for Addis Ababa. Information P, No. 125. Addis Ababa: PMAC, February 6, 1978.
- _____. Transportation and Communications Statistics. Bulletin #13. Addis Ababa: PMAC, September 1976.

-
- Chi-Bonnardel, Regine Van. The Atlas of Africa. New York: Free Press, 1973.
- Clark, Edward G., et. al. An Assessment of the Refugee Situation in Southern, Central and Eastern Africa. Washington, D.C.: Robert R. Nathan Associates, Inc., November 1977.
- Cohen, John M., et al. Revolution and Land Reform in Ethiopia: Peasant Associations, Local Government and Rural Development. Ithaca, New York: Cornell University, January 1976.
- Collier's Encyclopedia with Bibliography and Index. Vol. 22. New York: Macmillan Educational Corp., 1978.
- Commonwealth Secretariat. The Rehabilitation of the Economy of Uganda. Volume Two. London: Commonwealth Secretariat, June 1979.
- Edwards, Thomas W., M.D. Report on Health and Nutrition in the Republic of Djibouti, December 1977.
- Encyclopedia Britannica. 1978 Book of the Year. Chicago: Encyclopedia Britannica, Inc., 1978.
- Espenshade, Edward B., Jr. Goode's World Atlas, 14th. Ed. Chicago: Rand McNally & Co, 1974.
- Ethiopian Nutrition Institute. Production and Utilization of Maize in Ethiopia. Addis Ababa: December 1975.
- Europa Publications. Africa South of the Sahara. London: Europa, 1980.
- Food and Agriculture Organization of the U.N. Food Balance Sheets. Rome: FAO, 1971.
- _____. Foodcrops and Shortages. Rome: FAO, November 1980.
- Hance, William A. The Geography of Modern Africa. 2nd ed. New York: Columbia University Press, 1975.
- Hendrix, J. Walter. Ethiopia Trip Report: Ergotism (unpublished summary; log). Washington, D. C.: AID, August 10, 1978.
- Henn, Albert E. Tanzania Health Sector Strategy. Dar es Salaam: USAID/Tanzania, February 1980.
- Herrick, Allison B., et. al. Area Handbook for Uganda. Washington, D.C.: GPO, 1969.

-
- Hoben, Allen. Social Soundness Analysis of Agrarian Reform in Ethiopia. Washington, D. C.: USAID-Ethiopia, February 1976.
- Hussein, Abdul Mejid, Ed. REHAB: Drought and Famine in Ethiopia. London: International African Institute, 1976.
- International Air Transport Association. Air Distances Manual. Montreal: IATA, April 1980.
- International Agricultural Development Service. Agricultural Development Indicators: A Statistical Handbook. New York: International Agricultural Development Service, 1978.
- Kaplan, Irving, et al. Area Handbook for Ethiopia. Washington, D.C.: GPO, 1971.
- _____. Area Handbook for Somalia. Washington, D.C.: GPO, 1977.
- _____. Tanzania: A Country Study, Washington, D.C.: GPO, January 1978.
- League of Red Cross Societies. Basic Facts on Sudan. Geneva: LICROSS, 1978.
- Legume, Colin, ed. Africa Contemporary Record. Annual Survey and Documents 1976-77, London: Rex Collings, 1977.
- _____. Annual Survey and Documents 1977-78. New York: Africana Publishing Co., 1979.
- Levine, Donald Nathan. Greater Ethiopia: The Evaluation of a Multi-Ethnic Society. Chicago: University of Chicago Press, 1974.
- Lewis, I.M. Peoples of the Horn of Africa. London: International Africa Institute, 1955.
- LICROSS/Volags Steering Committee. When Disaster Strikes and Help is Needed: A Guide to National Preparedness in Disaster Prone Areas. Geneva: LICROSS, 1976.
- _____. Ethiopia: Drought/Plague of Locusts. Relief Bureau. Circular No. 705. ROP 7806 (a). Geneva: LICROSS, June 26, 1978.
- May, Jacques M. and McLellan, Donna L. The Ecology of Malnutrition in Eastern Africa and Four Countries of Western Africa. Studies in Medical Geography. Volume 9. New York: Hafner, 1970.

-
- Ministry of Public Health. Health Facilities and Personnel: Ethiopia. Addis Ababa: MOH, September 1972.
- National Academy of Sciences. Aquatic Weed Management: Some Prospects for the Sudan and the Nile Basin. Report of a Workshop held 24-29 November 1975, Khartoum, Sudan.
- Nelson, Harold D, et. al. Area Handbook for the Democratic Republic of Sudan. Washington, D.C.: GPO, 1973.
- Population Reference Bureau, Inc. 1979 World Population Data Sheet. Washington, D.C.: Population Reference Bureau, Inc., 1979.
- Ports of the World. London: Benn Brothers, Ltd., 1980.
- Rake, Alan, ed. New African Yearbook 1978. London: International Communications, 1978.
- Rothe, J.P. The Seismicity of the Earth, 1953-1965. Earth Sciences 1. Paris: UNESCO, 1969.
- Shepherd, Jack. The Politics of Starvation. Washington, D. C.: Carnegie Endowment for International Peace, January 11, 1976.
- Synge, Richard, ed. Africa Guide 1978. New York: Rand McNally and Co., 1977.
- System Secretariat. The Belg Rains: Ethiopia. Food and Nutrition Surveillance, February 12, 1975.
- Thompson, Virginia and Adloff, Richard. Djibouti and the Horn of Africa. Stanford, California: Stanford University Press, 1968.
- Ugandan Government. Ministry of Planning and Economic Development. The Republic of Uganda 1971 Statistical Abstract. Entebbe: Statistics Division, 1971.
- United Nations. National Report: Somalia, Provisional Report for Habitat. Vancouver: U.N., April 1975.
- _____. Report of the Mission to Somalia. January 1980.
- _____. World Crop Harvest Calendar. New York: UN Food and Agriculture Organization, 1959.
- United Nations Economic Commission for Africa. Report of a Workshop for Trainers of Rural Women Leaders. Khartoum: ECA, 1977.

-
- US Agency for International Development. Annual Budget Submission, FY 1981, Djibouti. Washington, D.C.: USAID, May 1979.
- _____. Annual Budget Submission, FY 1982, Djibouti. Washington, D.C.: USAID, June 1980.
- _____. Annual Budget Submission, FY 1981, Ethiopia. Washington, D.C.: State Dept., June 1979.
- _____. Annual Budget Submission FY 1982, Kenya. Washington, D.C.: USAID, June 1980.
- _____. Annual Budget Submission FY 1981, Somalia. Washington, D.C.: USAID, May 1979.
- _____. Annual Budget Submission FY 1981, Sudan. Washington, D.C.: USAID, January 1979.
- _____. Annual Budget Submission FY 1981, Tanzania. Washington, D.C.: USAID, May 1979.
- _____. Country Development Strategy Statement FY 1981, Somalia. Washington, D.C.: USAID, January 1979.
- _____. Health Sector Report - Sudan. Washington, D.C.: USAID, November 1976.
- _____. Inventory and Rehabilitation Report, Non-ERA Highway Equipment for Ethiopian Roads Authority. Washington, D.C.: AID, November 1976.
- _____. Office of Foreign Disaster Assistance. Djibouti: A Country Profile. Washington, D.C.: OFDA, Jan 1979.
- _____. Office of Foreign Disaster Assistance. Somalia: A Country Profile. Washington, D.C.: OFDA, January 1980.
- _____. Office of Foreign Disaster Assistance. Summary Reports. Djibouti Floods I & II. Washington, D.C.: OFDA, July 1979.
- _____. Office of Housing. Sudan Shelter Sector Assessment. Washington, D.C.: USAID, November 1978.
- US Central Intelligence Agency. National Basic Intelligence Factbook. Washington, D.C.: GPO, January 1979.

-
- US Department of Agriculture. Foreign Agricultural Service. Planting and Harvesting Seasons in Africa and West Asia. Washington, D.C.: FAS, July 1960.
- US Department of Commerce. Environmental Science Services Administration. Climates of the World. Washington, D.C.: GPO, 1972.
- US Department of Health, Education and Welfare. Synchrisis: The Dynamics of Health. Ethiopia VIII. Washington, D.C.: GPO, April 1974.
- US Department of State. The Global 2000 Report to the President. Volume Two, The Technical Report. Washington, D.C.: State, 1980.
- World Bank. Economic Memorandum on Ethiopia. Washington, D.C.: IBRD, April 1980.
- _____. Ethiopia. Appraisal of the Grain Storage and Marketing Project. Washington, D.C.: IBRD, May 1977.
- _____. Ethiopia: Grain Storage and Marketing Project. Washington, D.C.: IBRD, March 1978.
- _____. Kenya: First Telecommunications Project. Staff Appraisal Report. Washington, D.C.: IBRD, March 5, 1979.
- _____. Kenya: Highway Sector Project. Staff Appraisal Report. Washington, D.C.: IBRD, March 26, 1979.
- _____. Kenya: Olkaria Geothermal Power Project. Staff Appraisal Report. Washington, D.C.: IBRD, December 20, 1979.
- _____. Kenya: Staff Appraisal Report of a Fourth IBRD Loan to the Industrial Development Bank. Washington, D.C.: IBRD, February 20, 1980.
- _____. Petroleum Exploration Promotion Project. Washington, D.C.: IBRD, May 1980.
- _____. Somalia Bay Region Agricultural Development Project. Washington, D.C.: IBRD, November 1979.
- _____. Somalia Country Economic Memorandum. Washington, D.C.: IBRD, January 1979.

- _____. Proposed Development Credit for an Agricultural Rehabilitation Program. Washington, D.C.: IBRD, March 1980.
- _____. The Sudan Public Electricity and Water Corporation Power III Project Staff Appraisal Report. Washington, D.C.: IBRD, March 1980.
- _____. Staff Appraisal Report of a Bank Loan Tanzania Investment Bank (TIB). Washington, D.C.: IBRD, June 1979.
- _____. Tanzania Rural Development Bank Project. Washington, D.C.: IBRD, February 1980.
- _____. Tanzania Grain Storage and Milling Project. Washington, D.C.: IBRD, April 1980.
- _____. World Development Report. Washington, D.C.: World Bank, August 1980.
- World Health Organization. Official Records of the World Health Organization. No. 236 Proposed Budget for the Financial Years 1978 and 1979. Geneva: WHO, 1976.
- Ya'Ersa, Meremer. Results of Experiments In Animal Production. Addis Ababa: Institute of Agricultural Research, July 1976.