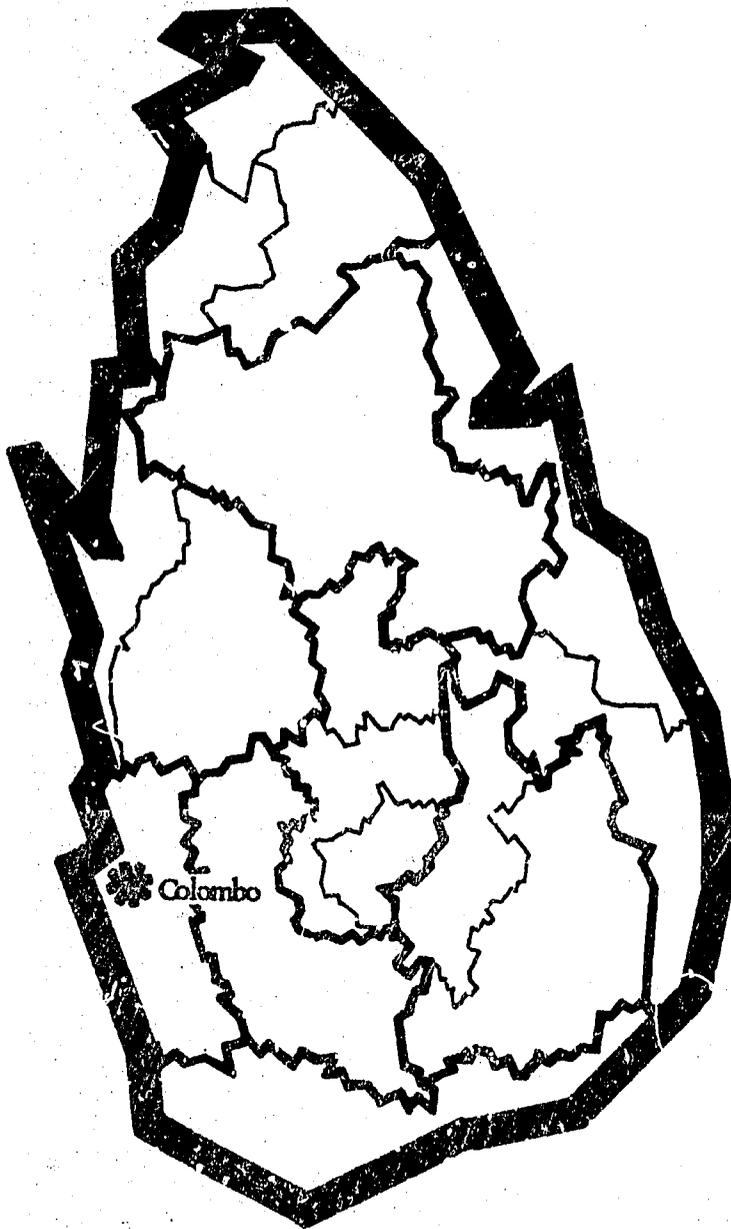


PN-AAJ-748

ISN 31992-

# Sri Lanka

## A Country Profile



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



**SRI LANKA: A COUNTRY PROFILE**

prepared for

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

by

**Evaluation Technologies, Inc.  
Arlington, Virginia  
under contract AID/SOD/PDC-C-2112**

The profile of Sri Lanka is part of 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). Content, scope, and sources have evolved over the course of the last several years; the relatively narrow focus is intentional. To avoid redundancy, some topics one might expect to find in a "country profile" are not covered here.

We hope that the information provided will also be useful to others in the disaster assistance and development communities. 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, A.I.D., as given above.

July 1983

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1. General Information1.1 Geographic Codes

AID Standard	383
AID Region	AID/ASIA
State Region	NEA/INS

1.2 Host Mission in U.S.

Embassy: 2148 Wyoming Avenue, N.W.  
Washington, D.C. 20008  
Tel: (202) 483-4025

For current information on the Sri Lanka  
Embassy staff in the United States,  
see the U.S. Department of State,  
Diplomatic List.

1.3 U.S. Mission in Sri Lanka

Embassy: 44 Galle Road  
Colombo 3  
Mailing address: P.O.B. 106  
Tel: 21271, 21520, 21532  
Telex: 0803-21305 amemb ce

For current information on the U.S.  
Embassy staff in Sri Lanka, see the  
U.S. Department of State, Key Officers of  
U.S. Foreign Service Posts.

1.4 Time Zones

EST+10 hrs. 30 min.  
GMT+5 hrs. 30 min.

1.5 Currency and Exchange Rate

Rupee (R, Rs), 100 cents = 1 Rupee  
Exchange rate: floating since late 1977,  
Rs 22.98 = U.S. \$1 (June 1983)

### 1.6 Travel and Visa Information

Passport is required but no visa is necessary for visits of less than three months. If stay extends beyond three months, apply for visa application at embassy - include 1 photograph and 42¢ fee. Businessmen should present a letter explaining the nature of their trip along with a visa application to embassy/consulate.

**Health Requirements:** No vaccinations are necessary; however, a certificate of inoculation against yellow fever is required of all visitors arriving from an infected area.

### 1.7 Calendar and Holidays

Tamil Thai Pongal Day	January*
Durutu Poya Day	January*
Navam Poya Day	February*
Independence Commemoration Day	February 4
Maha Sivarati Medin Poya Day	February*
Commonwealth Day	March (2nd Monday)
Good Friday	*
Sinhala and Tamil New Year	*
May Day	May 1
Wesak Full Moon Holiday	May*
National Heroes Day	May 22
Pason Poya Day	June*
Bank Holiday	June 30
Ramazan Festival Day	July, August*
Nikini Poya Day	August*
Binara Poya Day	September*
Hadji Festival Day	September*
Vap Poya Day	October*
Poya Day	November*
Deepavali	November*
Uandwap Poya Day	November*
Christmas	December 25
Milad-un-Nali, Birth of the Prophet	December*

\*The dates of these holidays vary. Poya Day is celebrated every full moon.

### 1.8 Treaties and Agreements

Agricultural Commodities  
Reciprocal pilot licenses for the operation  
of civil aircraft  
Economic and Technical Cooperation  
Investment Guarantees  
Telecommunications  
Defense

### 1.9 International Organization Memberships

Asian Development Bank, Colombo Plan, the Commonwealth, FAO, GATT (de facto), the Group of 77, International Atomic Energy Agency, ICAO, IMF, International Postal Union, ITU, UN, UNESCO, World Bank (IFC, IBRD, and IDA), WHO, WIPO, WMO, applying to ASEAN.

### 1.10 Government

**Official Name:** Democratic Socialist Republic of Sri Lanka

**Political Status:** Independent state within the British Commonwealth since February 4, 1948.

**Government Structure:** Presidential/Parliamentary system modelled after the French Fifth Republic.

The President is popularly elected and serves as head of state for no more than two six-year terms. He appoints the Prime Minister and cabinet ministers who must all be members of Parliament.

The unicameral parliament consists of 168 members (196 after the next election) elected through a system of modified proportional representation.

- Political Parties:** The two major parties are the Sri Lankan Freedom Party (SLFP) and the ruling United National Party (UNP).
- Regional Organization:** Sri Lanka's 24 districts are administered by an appointed Governor, a Katcheri or secretariat, and an elected Development Council. Local authorities consist of 10 municipal village councils, 76 town councils, 36 urban councils, and 510 village councils.

### 1.11 Ethnic and Sociocultural Groups

The Sinhalese are the ethnic majority comprising about 72% of the total population. The Kandyan Sinhalese inhabit rural and highland areas while the Low Country Sinhalese live mostly in coastal urban regions.

The Sri Lanka Tamils represent about 11% of the population, and are concentrated in the northern and eastern coastal regions. Relations between the Sinhalese and the Tamil minority have been tense for several decades. (See section 2.2, Hazard Analysis.)

The Indian Tamils are descendants of workers brought in by the British to work the tea plantations. They now represent about 9% of the population and live mostly in the south central highlands. A 1964 agreement with India has resulted in the repatriation of two thirds of the Indian Tamils while the previously disenfranchised remainder has been granted Sri Lankan citizenship. About one million Moors live in Sri Lanka, primarily along the coasts.

### 1.12 Languages

Sinhala is the official language. Both Sinhala and Tamil, a Dravidian language, are national languages. English, the common medium in government and business, is spoken by about 10% of the population.

### 1.13 Religions

Over 90% of the Sinhalese practice Buddhism in its Theravada (Hinayana) form. The rural Kandyan Sinhalese tend to be more traditional than the Low Country Sinhalese. Most of the Tamils are Hindu. There are also about one million Moslems and one million Christians, both Tamil and Sinhalese.

### 1.14 Geography

#### Location and Area:

Sri Lanka is a pear-shaped island (65,610 sq km) located about 80 km from the south-eastern end of India.

#### Topography:

Most of the land is a flat plain except for the south central region which is mountainous with peaks ranging from 2,100 to 2,400 m above sea level. The mountainous zone is surrounded by an intermediate zone of upland ridges and valleys.

#### Rivers:

The main rivers flow in a radial pattern from the south central highlands toward the coast. The longest rivers are: Mahaweli Ganga (465 km), Malevatu Oya (163 km), and Kala Oya (148 km).

There are twelve rivers 72-113 km long and nearly one hundred small rivers are seasonal streams. In the lowlands, many rivers impede land development and communications.

#### Climate:

Relatively uniform equatorial climate; generally warm and humid. A Dry Zone and a Wet Zone can be distinguished. The sparsely populated Dry Zone encompasses the central, southeast, and north central plains. The rainy season occurs from October to January; although rainfall is generous for an "arid" area, evaporation is rapid. Mean rainfall is 127 to 190 cm and ranges from 88.6 to 257.8 cm.

The Wet Zone covers the southwest plain and uplands where most of the population, industry, and agriculture are concentrated. Rainfall varies from 258-508 cm and is well distributed throughout the year.

Average temperatures at major cities are: Colombo (27° C), Watawali in the highlands (18° C), Trincomalee in the dry lowlands (28° C). There is little seasonal variation in temperature and at most locations the diurnal temperature variation does not exceed 4° C.

### 1.15 Population

#### Demographic Characteristics (1980):

Density/sq km	213
Urban population	27%
Percentage of total population in Colombo	22%
Population under age 15	36%
Population growth	1.78%

#### Population by Ethnic Groups (mid-1981):

Sinhalese	10,986,000
Sri Lanka Tamils	1,872,000
Moors	1,057,000
Indian Tamils	825,000
Total Population	14,850,000

Seventy-five percent of the population lives in the southwestern region.

Source: Registrar General's Office as cited in Europa Yearbook, 1982.

#### Population by Provinces and Districts:

<u>Province/District</u>	<u>Population (1981 census)</u>	<u>Density/sq km</u>
Western Province	3,915,001	1,070
Colombo	1,698,322	2,603
Gampaha	1,389,490	993
Kalutara	827,189	515

<u>Province/District</u>	<u>Population (1981 census)</u>	<u>Density/ sq km</u>
Central Province	2,005,956	359
Kandy	1,126,296	522
Matale	357,441	179
Nuwara - Eliya	522,219	363
Southern Province	1,882,912	342
Galle	814,579	487
Matara	644,231	517
Hamantota	424,102	164
Northern Province	1,111,468	128
Jaffna	831,112	401
Mannar	106,940	53
Vavuniya	95,904	36
Mullattiyu	77,512	39
Eastern Province	976,475	101
Batticaloa	330,899	134
Ampari	388,786	148
Trincomalee	256,790	57
Northern Province	1,706,099	220
Kurunegala	1,212,755	256
Puttalam	493,344	166
North Central Province	850,575	81
Anuradhapura	587,822	82
Polonnaruwa	262,753	77
Uva Province	922,636	110
Badulla	642,893	228
Moneragala	279,743	50
Sabaragamuwa Province	1,478,879	302
Ratnapura	796,468	246
Kegallo	682,411	410
Total	14,850,001	230

Source: Registrar General's Office as cited  
in Europa Yearbook, 1982.

Urban Areas:	
Colombo	586,000
Dehiwala-Mount Lavinia	174,000
Jaffna	118,000
Kandy	101,000
Galle	77,000

Source: Department of Census and Statistics  
as cited in Europa Yearbook, 1982.

1.16 Health

Vital Statistics: (1980)	Births/1,000 population	27.6
	Deaths/1,000 population	6.1
	Infant mortality/1,000 live births	44
	Life expectancy (years)	66

## Nutrition:

The incidence of malnutrition is low by South Asian standards, minimized in part by a government food stamp program.

Caloric intake (1977)	2,126 or 97% of requirements
Access to safe water (1977)	20%
Urban	45%
Rural	13%

## Major Diseases:

The major communicable diseases are malaria, respiratory tract infections including tuberculosis, diarrheal diseases, venereal diseases, and children's diseases (whooping cough, measles, diphtheria). There are also periodic outbreaks of typhoid, leprosy, and cholera.

In coastal areas, filariasis and infestation of the lymph nodes by worms has been common, but its incidence is declining. Goiter is endemic along the southwest coast.

Health Care  
Administration:

All health services are provided free of charge by the Ministry of Health. Each of the 24 administrative divisions is headed by a divisional health superintendent. A superintendent also heads the Colombo Group of Hospitals. These divisions are subdivided into 102 health areas managed by medical officers. The GSL plans to further decentralize medical services to the village level. Additionally, there are specialized campaigns against malaria, tuberculosis, venereal diseases, filariasis, and leprosy. The Ministry of Indigenous Medicine administers ayurveda medical services (traditional medicine). Private medical practice including drug production coexists alongside public services.

Health Facilities: (1980)	Type	Number	Beds
	Teaching and Provincial Hospitals (Colombo, Peradeniya, Galle and Jaffna)	12	10,687
	Specialized Hospitals	24	7,775
	Base Hospitals	20	5,644
	District Hospitals	109	11,622
	Peripheral Units	109	4,243
	Rural Hospitals	103	2,232
	Total	377	42,203

For a description of medical resources in Sri Lanka, see section 3.6.

### 1.17 Economy

#### Overview:

Sri Lanka is primarily an agricultural economy in which rice, tea, rubber, and coconuts are the major crops. Although the agricultural sector still represents almost 30% of all economic activity, manufacturing has increased its share of gross domestic product from 13.8% (1970-77) to 18% in 1981. Manufacturing activities include food and paper processing, flour milling, cement, and textiles. Services and construction represented 44% and 9% of 1981 GDP respectively. From 1978 to 1980, inflation averaged 22% annually with real income declining. During the same period, unemployment stood at 10-11%, 4-5% lower than it was in the early 1970s.

**Balance of Payments:** Sri Lanka's goods and services deficit averaged U.S. \$378.76 million (10-20% of GDP) from 1977 to 1981. In 1982, a U.S. \$1.2 billion deficit was expected with petroleum accounting for 27% of all imports. Expenditures related to drought relief in 1980 and 1982 have also imposed pressures on the balance of payments.

**Exports:** The major exports in 1981 were industrial goods with 34% of the total, tea (31%), rubber (14%), coconuts (6.9%), and gems (6.3%). Primary markets are the United Kingdom, the United States, Japan, China, and the Federal Republic of Germany.

**Imports:** The major imports in 1981 were petroleum, representing 27% of the total, machinery and equipment (10.9%), sugar (8%), textiles and clothing (6%), transportation equipment (6.3%), fertilizers (3.4%), rice (2.8%), chemicals (1.8%), and building materials (1.5%). Sri Lanka's main suppliers are India, Japan, Saudi Arabia, the United Kingdom, the United States, and Singapore.

### 1.18 Communications

**Radio Network:** The Sri Lanka Broadcasting Corporation transmits radio programs in English, Sinhala, and Tamil. In 1981, there were approximately 705,000 receivers. Radio stations are located in Ampari, Anuradhapura, Duyagano, Galle, Jaffna, Maho, Matara, Putalam, Seeduwa, Senkadagala, and Weeraketya.

**Television:** In April 1979, experimental television broadcasting began within an 80 km radius of Colombo. Eventually, transmissions should reach all areas of the country.

**Telephone and Telegraph:** Telephone service is generally poor. Long distance calls are particularly fault prone. A shortage of morse and phonogram circuits results in many telegrams being sent through the mail rather than electronically. In 1979, there were 53,600 telephones, providing service to 27% of the population. (See section 3.8, Communications Resources.)

### 1.19 Transportation

**Motor Roads:** Eighty percent of all passenger/freight traffic is by motor road. Most areas of the island

are accessible by automobile, including the hilly, forested areas of the south central region. Thirty-two percent of the 81,000 km of roads is paved.

**Railroads:**

The 1,477 km railroad network radiates from Colombo. Most trains are outmoded diesels. Crossing the south central area is especially time-consuming.

**Seaports and Waterways:**

Colombo, the major port, has one of the world's largest artificial harbors. It is equipped with container facilities and can accommodate vessels of up to 40,000 dwt. Galle is a secondary port on the southwest coast with berth depths ranging from 6.10 to 7.92 m. The port of Trincomalee, located on the northeast coast, has a large natural harbor and three quays.

For further port information, see Lloyd's Ports of the World or The Exporters Encyclopedia. Both publications are revised annually.

About 400 km of Sri Lanka's inland waterways are navigable, and over 100 km of canals are open to river traffic.

**Airports:**

Katunayake International Airport is located 34 km from Colombo. There are also airports at Jaffna in the north, and Trincomalee and Batticaloa on the east coast.

**Airlines:**

The following airlines serve Sri Lanka: Aeroflot Soviet Airlines, Air Lanka, British Airways, Indian Airlines, Garuda Indonesian Airlines, Gulf Air, Indian Airlines, KLM Royal Dutch Airlines, Korean Airlines (ROK), Kuwait Airways, Air Lanka, Pakistan International Airlines, Royal Nepal Airlines, Singapore Airlines, Swissair, Thai International Airways, and UTA.

For a more detailed discussion of transportation in Sri Lanka, see section 3.8, Transportation Resources.

## 2. Disaster Vulnerability

### 2.1 Overview of Physical Environment

Sri Lanka is located near the southeastern tip of the Indian subcontinent between the Laccadive Sea and the Bay of Bengal. A plain only slightly above sea level covers the entire northern half of the island and continues around the coast of the southern half. The Jaffna peninsula, a limestone plateau, protrudes from the northern tip of the island. The south central region is mountainous with peaks ranging from 2,000-2,500 m. It is surrounded by an intermediate zone (below 300 m) of upland ridges and valleys. Rainfall variations are determined by monsoons and the central highlands which divide the country into the Wet Zone (south-western quadrant) and the Dry Zone in the eastern and northern parts of the country. During the cyclone season (May to November) most of the island is exposed to intense rainfall.

Although there are over a hundred rivers in Sri Lanka, many of these are only small or seasonal streams. All rivers originate in the central highlands and extend outward like spokes on a wheel toward the coast. Over half of the twelve major rivers flow through the Wet Zone where the island's agriculture, industry, and population are concentrated.

Much of the 1,770 km coastline is characterized by shifting sand bars and lagoons which form at the lower reaches of rivers and exacerbate flooding. With the exception of cliffs near the northeastern port of Trincomalee, the coasts are low and open to storm surges.

Nearly 70% of the island is covered by forest and grasslands. Deforestation has become a serious problem affecting river discharge, enhancing erosion, and increasing drought potential.

### 2.2 Hazard Analysis

Flooding: Although the entire island is subject to flooding, the Wet Zone tends to be more flood-prone than other areas. During the southwest monsoon (May to September), heavy rains in the hills of the Wet Zone cause rivers to rise and overflow their banks downstream.

During July 1982, heavy rains in the Kandyan hills produced floods in five south central districts. The rising waters of the Kalu Ganga River triggered mudslides, particularly in Ratnapura, where mass evacuations were necessary.

The formation of sand bars along the southwest coast restricts river discharge into the sea, and thus exacerbates flooding. Thunderstorms, common during April and May, cause flash floods at lower elevations of the Wet Zone.



In the Dry Zone flooding is limited to the wet season (October to January) and is caused primarily by the soil's poor water retention capability. It is common for water tanks used for paddy irrigation to overflow and inundate adjacent livestock grazing areas.

Drought: Droughts occur every three to four years in Sri Lanka and are usually confined to the Dry Zone. The potential for drought is determined by the northeast monsoon season (October to January) which compensates for sparse rainfall the rest of the year. Although a number of hydroelectric projects and river diversion schemes have been initiated, water supplies are still largely determined by rainfall levels. (See section 3.7, Mitigation Efforts.) However, in some areas of the Dry Zone, particularly the Jaffna peninsula, the existence of groundwater has alleviated dependence on seasonal precipitation.

Cyclones: Although Sri Lanka is located along the north Indian cyclonic belt, it has been struck by cyclones only five times this century (1907, 1922, 1931, 1964, 1978). The frequency is low because cyclones forming in the South Bay of Bengal from approximately May to November tend to divert toward either India or Bangladesh. When cyclones do strike Sri Lanka, they generally approach from the southeast and traverse the island diagonally. While intensity is greatest along the east coast between Batticaloa and Trincomalee, the rest of the island is subject to heavy rainfall as the cyclone moves northwest. Storm surges or tidal bores accompany cyclones but their impact is minimized by the convex shape of the coastline, the diagonal path of cyclones, and the small differential between high and low tides.

The November 1978 cyclone struck the east coast of Sri Lanka just north of Batticaloa, and progressed in a north-westerly direction over Ponnaruwa and Anuradhapura. Although the most serious damage was confined to the east coast from just north of Trincomalee to the southern limit of Ampari district, all streams flowing west rose quickly and caused widespread flooding on the coastal flats of the Wet Zone from the Colombo area to Puttalam.

Civil Strife: Long standing rivalry exists between the Buddhist Sinhalese and the Hindu Tamil minority. Since independence in 1948, the Sinhalese have sought to modify the Tamil's disproportionately large representation in government. The Tamils, in turn, have objected to the GSL's promotion of Buddhism and the adoption of Sinhalese as the official language. A number of clashes, mostly in the Jaffna area, have occurred between the two groups often resulting in widespread violence and property damage. The Tamil Liberation Tigers, a separatist group seeking to create a Tamil state in the north, wages a sporadic guerrilla war against the government. The GSL has responded by promulgating anti-terrorist laws.

Epidemics: Malaria is endemic in the Dry Zone. The last malaria epidemic affected the Wet Zone in 1968. A US \$22 million eradication project is being managed by Sri Lankan nationals with U.S., British, and Dutch technical assistance. By late 1982, malathion spraying of vege-

tation was being gradually replaced by drug treatments. If the program is continued, the probability of recurring epidemics will be greatly reduced.

Other Risks: There are no active volcanoes on the island. Seismic activity is minimal and poses little or no threat to life and property.

### 2.3 Disaster History

<u>Disaster</u>	<u>Strike Date</u>	<u>Location</u>	<u>No. Killed</u>	<u>No. Affected</u>
Cyclone	12/22/64	East Coast	800	280,000
Flood	9/00/66	Southwest	23	252,347
Flood	10/18/67	Colombc Area	n.a.	95,000
Cyclone	11/00/67	North & East	24	375,000
Malaria				
Epidemic	67	Nationwide	2	200,000
Flood	12/25/69	Widespread	62	1,000,000
Civil Strife	4/05/71	Colombo & Vicinity	50	16,000
Drought	77	Drought	n.a.	250,000
Civil Strife	08/00/77	Jaffna	140	1,000,000
Cholera				
Epidemic	77		n.a.	728
Flood	05/00/78		10	1,000
Flood	11/00/78	Jaffna Penin.	n.a.	1,000
Cyclone	11/24/78	Eastern Coastline	740	1,000+
Drought	80	Central	n.a.	n.a.
Flood	12/07/81	North	7	20,000
Drought	82	Widespread	n.a.	2,000,000
Flood	05/00/82	South Central	20	100,000
Flood/Land-slides	12/12/82	South Central	34	30,000

Source: OFDA Disaster History on file in Washington, D.C. covers 1900 to the present.

### 2.4 Vulnerability of Infrastructure

Serious infrastructure damage appears to be limited to the effects of cyclones. Commercial structures, homes, schools, hospitals and telecommunications systems are all likely to be affected during a cyclone, particularly when located along cyclone paths in the northern and eastern portions of the country.

Roads and bridges have previously resisted the effects of intense wind and rainfall, but fallen trees and power lines can impede the transport of relief supplies along roads. Housing in rural areas has generally been subject to more damage than urban housing, although wattle and daub construction is common in both areas. In urban areas, rubber tires restrain roofs from blowing away in storms. Schools and hospitals tend to be structurally vulnerable to cyclones. As a result, medical supplies and equipment are frequently damaged during storms.

While Sri Lanka's major port at Colombo has rarely been affected by cyclones, the ports of Trincomalee and Batticaloa lie directly on traditional cyclonic paths. However, fishermen on the east coast generally take precautions to secure their vessels and gear in response to cyclone warnings.

### 2.5 Vulnerability of Agriculture

Crops and livestock have been seriously affected by cyclones in the past. The heavy rains associated with these tropical depressions inundate paddy fields and destroy immature tea and rubber plants. Livestock grazing areas are frequently saturated by overflowing water tanks. In addition, strong winds uproot coconut plants, the major cash crop along the east coast, and storm surges salinate paddy fields, rendering farmland temporarily unsuitable for cultivation.

Droughts and floods can have disastrous effects on rice production. Droughts result in the postponement of rice planting and; thereby, reduce crop production during both the yala\* and maha\* crop seasons. The more important maha rice crop (about 65% of annual production) depends on a prolonged monsoon season late in the year. This is particularly the case in the Dry Zone where most of the rain falls during the northeast monsoon. In the Wet Zone, a period of little precipitation is often followed by torrential rains and flash floods which inundate paddy fields and other crops. Crops are frequently destroyed because poor drainage systems do not allow adequate run-off. Over the long-term, insufficient rainfall can hinder the replenishment of tank water supplies and adversely affect the Dry Zone rice crop which depends on irrigation. However, hydroelectric projects and river diversion schemes in the Mahaweli basin have alleviated the effects of drought to some degree. (See also section 3.4, Mitigation Effects.)

	<u>Crop Calendar</u>			
	Planting		Harvesting	
	<u>Maha*</u>	<u>Yala*</u>	<u>Maha*</u>	<u>Yala*</u>
Wet Zone	early Aug./ early Oct.	March April	Feb. March	July/ early Sept.

	Planting		Harvesting	
	<u>Maha*</u>	<u>Yala*</u>	<u>Maha*</u>	<u>Yala*</u>
Dry Zone	Nov./ early Dec.	March	Feb./ early March	August
Jaffna Peninsula	early Oct.		Feb. March	Fallow Plowing

\* Maha - northeast monsoon; Yala - southwest monsoon

### 3. Disaster Preparedness

#### 3.1 Host Country Disaster Plan

Sri Lanka has no comprehensive plan for disaster preparedness and relief operations. Legislation to implement a national disaster plan has been proposed but never enacted because of budgetary constraints. Each time a disaster occurs, several ad hoc disaster coordinating committees are established. At the national level is the Parliamentary Coordinating Committee composed of the Prime Minister and heads from the following ministries: Defence, Home Affairs, Information, Social Services, Local Government, Housing and Construction, Fisheries, and Industry and Scientific Affairs. At the district level, the District Minister acts as the Chief Coordinating Officer in conjunction with a GSL agent. Additionally, a liaison from the Ministry of Defence, local members of parliament, and senior level administrators for all public services are involved in disaster relief coordination. There are also village-level coordinating committees.

In past disasters, the Department of Social Services has played the central role in disaster assistance operations. The Director of Social Services initiates relief measures and delegates authority for local coordination, financial accounting, and distribution of relief supplies to government agents in each district.

According to the Constitution of Sri Lanka, the GSL is empowered to allocate direct transfers not exceeding Rs 300 (U.S. \$6,186) in case of individual or widespread disaster. Up to Rs 500 (U.S. \$10,310) per person can be given to repair or rebuild damaged houses. Ex-gratia payments have also been provided to dependents of deceased disaster victims.

Despite the lack of a formal disaster plan, relief operations in response to flooding have been effective. Flood relief instructions issued by the Department of Social Services in 1956 still serve as a primary guide to flood relief measures. In the absence of district plans, this 12-page document provides instructions to village headmen in how to conduct evacuations and determine eligibility for relief assistance.

#### 3.2 The Sri Lanka Red Cross Society

The Sri Lanka Red Cross Society (SRC) performs a complementary role in disaster preparedness, relief, and rehabilitation operations. Local chapters, composed of volunteers trained in first aid, are organized throughout the country. The SRC initiates disaster awareness projects and maintains its own communications systems, motor vehicles, tents,

saws, and reserve food supplies. SRC activities have been formalized through a contract with the GSL.

Sri Lanka Red Cross Society  
National Headquarters  
106, Dharampala Mawatha  
Colombo, 7  
Telephone: 91095

Following a disaster simulation project in July 1978, the SRC developed a counter-disaster plan for the town of Kaduwela located near the Kelani river.

#### Counter-Disaster Plan Summary

- (1) The Flood Forecasting Commission in Colombo would advise the SRC headquarters of any flood warning issued by meteorologists. In turn, the SRC would inform its local chapter and alert all Red Cross volunteers who would warn the population.
- (2) The local Government agent would still be responsible for overall coordination following a disaster but the SRC would be involved in directing the population to relief centers, resettling the homeless, and providing food and first aid.
- (3) The SRC would maintain records of families, shelters, wells, and other assets in flood-prone areas.

### 3.3 Storm Warning Systems and Response

The National Meteorological Center in Colombo is responsible for issuing cyclone warnings. Six of the country's 21 meteorological stations are located on the cyclone-prone east coast. All stations have radio links with the center in Colombo. Sri Lanka now benefits from satellite imagery for the collection and analysis of weather data. A microwave link (terrestrial signals) to a number of northern and western districts has also been established with India.

The local stations are responsible for warning public officials who, in turn, transmit the message to the populace. Response to these warnings, however, has not always been automatic. Much of the population lacks faith in meteorologists' warnings, and is generally ignorant of precautionary measures. In fact, disaster-consciousness is probably limited to the southwestern region where there is recurrent flooding.

The 1978 cyclone experience exemplifies the failure to translate disaster warnings into precautionary and preparedness measures. The meteorologists' belated warnings and the public's limited access to radios

delayed awareness of the impending disaster. Schools were open the day of the storm, and public officials took almost no preparedness measures to reduce damage to dams, water tanks, and irrigation systems. Thus, residents inferred that storm destruction would be minimal. Furthermore, recollections of the last major cyclone, which struck Sri Lanka almost two decades earlier, were quite limited. Only fishermen responded to the meteorological centers' warnings by securing their vessels and gear.

Following the cyclone, however, officials at all levels of government recognized the warning system's deficiencies in eliciting a precautionary response from the affected population. Radar warning systems were subsequently installed at the east coast port of Trincomalee and recommendations to implement disaster preparedness measures were formulated.

#### 3.4 Host Resource Summary

The following description is based primarily on the preparedness analysis and lessons learned of the 1978 cyclone. Host resources information is limited by Sri Lanka's lack of any coordinated data collection and reporting system. All resource distribution is ad hoc and no central collection or dissemination point exists.

Legal authorization is required before relief supplies can be distributed. On some occasions, limited distribution within a given population center has caused resentment among non-recipients.

#### 3.5 Diet and Food Supplies

The staples of the Sri Lankan diet are rice and wheat (imported) which are prepared with curried meat, fish, and vegetables. Millet, sorghum, and maize are also consumed in rural areas although to a lesser extent. Yams, manioc, and sweet potatoes are used as supplements.

Religious restrictions prohibit Hindus from eating beef, and Moslems from consuming pork and shellfish. Consequently, many Sri Lankans are vegetarians.

The quantity of reserve food supplies is a function of harvest and local demand, rather than precautionary requirements for disaster situations. Rice stocks generally last three to six months but water damage can reduce reserves by half following floods and cyclones. Village cooperative stores maintain a one or two day supply of sugar, tea, rice, matches, and candles. In addition, reserves from other areas of the island have been provided when food reserves in the affected area become exhausted. In case of disaster, village and private food shops can provide short-term emergency foods such as manioc, sweet potatoes, bread-fruit, jack fruit, and coconuts.

Although foreign food donations have replenished food stocks, inappropriate foods such as cheese or packaged cereals have often been provided. The shortage of transport vehicles and road obstruction often delays food distribution from abroad. Bread was the most successful item provided after the 1978 cyclone as it is universally accepted and requires no preparation.

### 3.6 Medical Resources

There is a shortage of all categories of medical personnel especially in rural areas where 80% of the population lives. Despite ambitious training programs, development of the health sector has been hindered by a continuing exodus of doctors.

#### Health Personnel

Doctors - registered with GSL	3,441 (1979)
Nurses	6,673 (1979)
Pharmacists	1,123 (1974)
Ayurvedic practitioners	1,200 (1982)
Private physicians	1,000 (1982)
Private nurses	1,033 (1982)

One fifth of the district hospitals have laboratories. Most of the provincial hospitals have both laboratory and x-ray facilities. Effective diagnostic services are hampered by insufficient electromedical equipment and spare parts.

The provision of medical supplies has been reasonably effective in past disasters. However, road blockages and the lack of a well-equipped ambulance fleet have delayed transport of the injured to hospitals. Helicopters are often needed to rescue the injured, especially following floods.

Due to the structural vulnerability of hospitals, medical supplies and equipment are subject to damage in cyclones and floods. Emergency equipment not requiring electricity such as manual suction machines is lacking. Water and toilet facilities are also in short supply. (See section 1.14, Health.)

Pharmaceuticals and Storage: The State Pharmaceutical Corporation distributes drugs through civil medical stores and divisional drug stores. In 1974 there were 360 central dispensaries and 240 ayurvedic dispensaries. There are also private dispensaries in every major community.

The State Pharmaceutical Corporation  
Sri Barar Jayatilleke Mauvatha  
Colombo 1

Civil Medical Stores  
335 Deans Road  
Colombo 10

The General Hospital in Colombo and civil medical stores maintain cold storage facilities. In addition, the Medical Research Institute in Colombo has 8,000 cubic feet of storage capacity. In other areas, electric and kerosene refrigerators are available.

In the past, the Ministry of Health has specified to donors what drugs are needed. Foreign-donated supplies are usually not appropriate during the emergency phase of a disaster because of the delay imposed by packaging and shipping. The most useful medical supplies are: bandages/surgical dressings, plaster rolls, splints, surgical supplies, flavin (antiseptic), drugs to treat cuts and bruises, analgesics, tetanus vaccine, drugs to treat diarrhea and influenza including oral rehydration supplies and antibiotics.

### 3.7 Shelter

Sri Lankans prefer to remain in an undamaged portion of their home or to move in with family or friends rather than relocate to temporary shelters. When these options are not feasible, only women and children seek shelter while men stay home to protect their family's belongings.

Schools have not been reliable relocation structures because of their structural weakness in intense rain and wind. Following a number of tropical storms, Parents'/Teachers' Associations built temporary shelters made of coconut, wood, and cadjan.

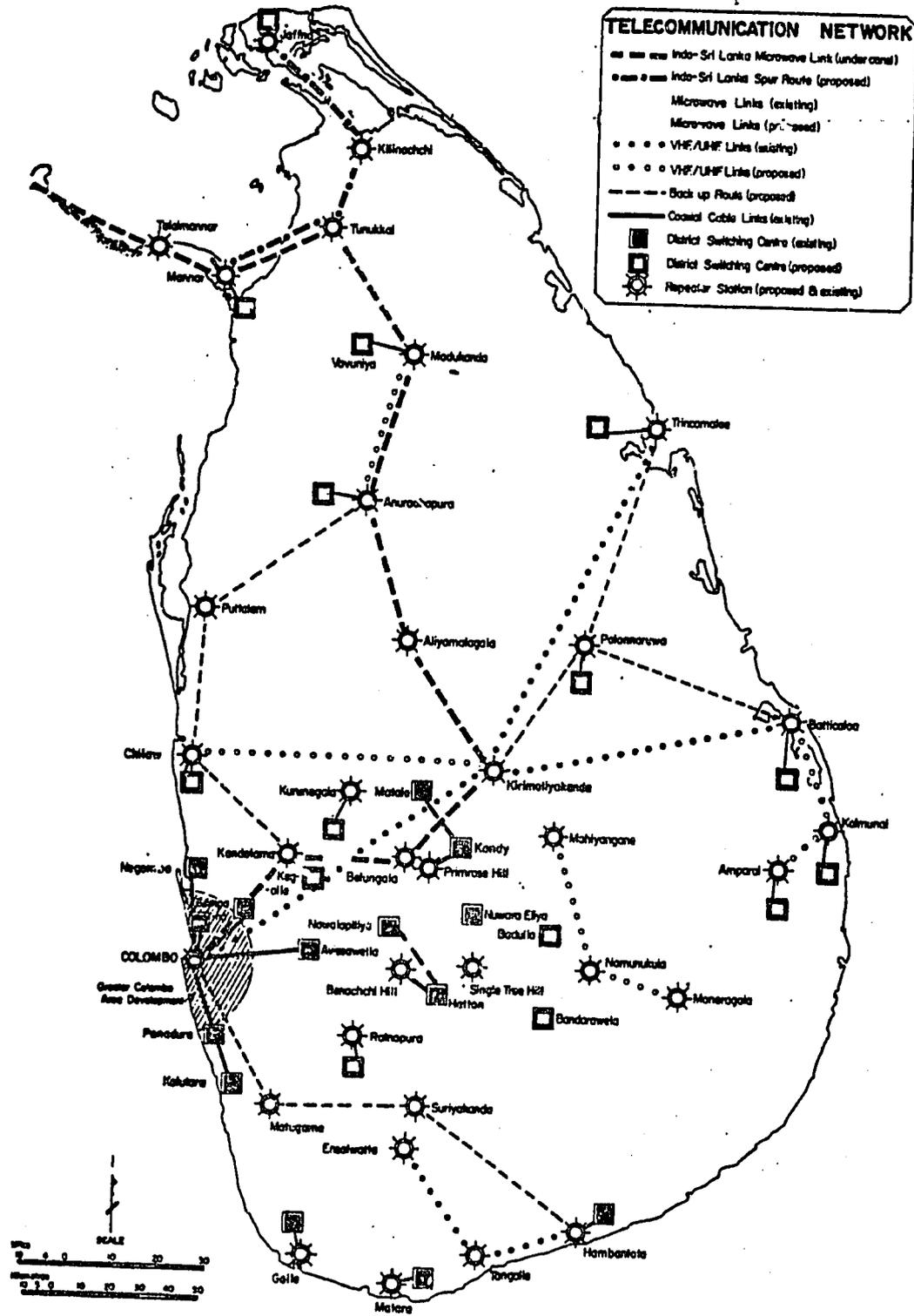
Cadjan, the preferred roofing material, is usually available for distribution outside the disaster-affected zone. Reinforced polyethylene, canvas, and tarpaulin are appropriate for public buildings, and for protecting food stocks and personal possessions. Tents can be used to store supplies; however, they are undesirable for human shelter because they tend to become very hot during the day and damp at night.

Clothing: Most local shops have adequate supplies of clothing and textiles. Clothing donated from abroad is usually inappropriate and reaches victims in the affected area too late.

### 3.8 Communications Resources

The lack of adequate communications equipment and systems seriously hampers relief operations, precluding rapid damage assessment and efficient resource mobilization. Following the 1978 cyclone, communication between Colombo and the battered east coast was entirely disrupted -- high winds knocked down telephone lines and telegraph poles. The first communications link with Colombo was conducted by wireless telegraph. Police car radios were subsequently used for local communication. Following the relief efforts, the United States donated 20 radio sets for future use. (See section 1.16, Communications and Figure 1 on p. 22.)

Figure 1



Source: World Bank

### 3.9 Transportation Resources

Sri Lanka has an extensive road network which connects nearly all parts of the island. Most of the 26,000 km of paved roads are located in the western lowland, the south central highlands, and the Jaffna peninsula. There is also a ferry service from Mannar Island, Northern Province to Pamban Island, India. The bus system is well developed and highly patronized. The Central Transit Board operates a fleet of 7,521 buses from 961 Northern Province depots (1981); P.O.B. 1435, 200 Kirula Rd., Colombo.

Sri Lanka's 1,395 km of railroads are operated by the Sri Lanka Government Railway, P.O.B. 355, Colombo 10. Equipment is outmoded and service is generally unreliable. The main line runs from Colombo to Talaimannar where there is a ferry to India. In addition to truck lines which branch across the Kandyan highlands to Matale and Bodulla, there are two central island links to the east coast ports of Batticaloa and Trincomalee, and a northward line to Jaffna. Another line runs along most of the western coast linking Palavi, Colombo and Galle. Freight services now operate between Nanuoya and Ragalla, Matara, and Tissamaharama.

There are three important seaports: Colombo, Galle, and Trincomalee. Colombo, the major seaport, can accommodate vessels of up to 40,000 dwt, 11 md in a 244 ha water area of which 121 ha is dredged to 10.97 m and over. There are mobile cranes, forklifts and a 300 m long terminal. Galle and Trincomalee are secondary ports. Galle has four jetties with cranes and four berths with depths ranging from 6.10 to 7.92 meters. Trincomalee has a large natural harbor with three quays. All ports are administered by the Sri Lanka Ports Authority, 19 Church Street, P.O.B. 595, Colombo, tel. 21201. For detailed information on approach, accommodations, storage facilities, crane capacity, and ship repairs, see Lloyds Ports of the World.

The Sri Lanka Shipping Corporation was formed in 1971. It now owns 8 major vessels with a total capacity of 116,000 tons; Sri Lanka Shipping Corporation, P.O.B. 1718 No. 6, Sir Baron Jayatilaka Mawatha, Colombo 1. Two other major shipping lines are Ceylon Shipping Lines, P.O.B. 891, Jayatilake Mawatha, Colombo, and Ceylon Ocean Lines, Ltd. P.O.B. 1276, 95 Wijerama Mawatha, Colombo 7.

Sri Lanka's major international airport is located 32.2 km from Colombo. There are nine other airports with permanent surface runways. The most important ones are Ratmalana, 17.5 km from Colombo, Gal Oya, Batticaloa, Jaffna, Kandy, Galle, and Trincomalee. Domestic air services are provided by Air Lanka, Helitours, Upali Air Services, and the Commercial Wing of the Sri Lankan Air Force. Air Lanka provides regular air service between Jaffna and Tiruchirapalli, India. Indian Airlines operates regular flights to Sri Lanka from Madras, Tiruchirapalli, and Tirandrum. Air Lanka, the national carrier, has the following equipment: 3 Lockheed Tristar

1011-1, 1 B-737, 2 B-707, 2 Tristars. Helitours, another domestic air carrier, has 2 DC-3, 7 Bell Jet Rangers, 2 Aerospatiale Dauphines, 3 Cessna Synasters, 2 Riley Herons, 1 Auro 748, 1 de Havilland Heron. (See section 1.17 Transportation.)

Air Lanka  
14, Sir Baron  
Jayatilfeke Mawatha  
Colombo 1  
Telephone: 21291  
Cable: LANA AIR

Commercial Wing  
Sir Chittampalan  
Garden Mawatha  
Colombo 2

Helitours  
Box 594  
Telephone: 31584

The Sri Lanka airforce maintains the following equipment: 3 MIG 17F, 1 MIG-15 VTI, 2 Jet Prouosts, 1 CV-440, 2 DC-3, 2 Riley's, 1 Heron, 3 C 337, 6 AB 206, 2 Bell 47G, 2 SA 365.

For more detailed information, see the latest issue of International Notams, International Flight Information Manual, and/or ICAO's Air Navigation Plan for the appropriate region.

COLOMBO/Katunayake  
Tel: 030 2861-5; Telex: 21657

#### Runway Characteristics

<u>Location</u> <u>Coordinates</u>	<u>Designation/</u> <u>Type</u>	<u>Class</u>	<u>Aircraft</u> <u>Capacity</u>	<u>Fuel/</u> <u>Octane</u>
07° 11' N	04/22	A	DC 8-62	Upon
79° 53' E	PAL		B 747	request

Remarks: alternate aerodromes - BOMBAY, COLOMBO/Ratmalana, TIRUCHIRAPALLI

Aids: ILS, NOB/L, LPP, LSA, VA(L), LRWY, LTE, LB, MDES, MCLM, MTHR, MTDZ, MSST, MFXD, MTWY

## COLOMBO/Ratmalana

<u>Location</u> <u>Coordinates</u>	<u>Runway Characteristics</u>			<u>Runway</u> <u>Length</u>	<u>Fuel/</u> <u>Octane</u>
	<u>Designation/</u> <u>Type</u>	<u>Class</u>	<u>Aircraft</u> <u>Capacity</u>		
06° 49' N 79° 53' E	04/22 INST	A	B 747 B 707-320C	2500 m	NA

Remarks: alternate aerodromes - COLOMBO/Katunayake

Aids: MDES, MCLM, MTHR, MPXD, MTWY VOR, LSA, LVA, (L), LRWY, LB

## JAFFNA/Kankasanturai

Tel: 802

<u>Location</u> <u>Coordinates</u>	<u>Runway Characteristics</u>			<u>Fuel/</u> <u>Octane</u>
	<u>Designation/</u> <u>Type</u>	<u>Class</u>	<u>Aircraft</u> <u>Capacity</u>	
09° 48' N 80° 04' E	05/23/NINST	A	AV 74	NA

Aids: NDB/L, MDES, MCLM, MTHR, MTDZ, MTWY

KeyAbbreviations

INSTR	Instrument Approach Runway
N-INSTR	Non-Instrument Runway
PA1	Precision Approach Runway Category I
PA2	Precision Approach Runway Category II
PA3	Precision Approach Runway Category III
RS	International Scheduled Air Transport, Regular Use
RNS	International Non-Scheduled Air Transport, Regular Use
RG	International General Aviation, Regular Use
AS	International Scheduled Air Transport, Alternate Use

Radio Aids

ILS	Instrument Landing System
DME	Distance Measuring Equipment
VOR	Very High Frequency Omni-Directional Radio Range
NDB/L	Non-Directional Beacon or Locator

Lighting Aids

PA	Precision Approach Lighting System
SA	Simple Approach Lighting System
VA	Visual Approach Slope Indicator System
AV	Abbreviated Visual Approach Slope Indicator System
RWY	Runway Edge, Threshold, and Runway End Lighting
CLL	Runway Center Line Lighting
TDZ	Runway Touchdown Zone Lighting
TE	Taxiway Edge Lighting
TC	Taxiway Center Line Lighting
STB	Stop Bars
B	Aerodrome or Identification Beacon

Marking Aids

DES	Runway Designation Marking
CLM	Runway Center Line Marking
THR	Runway Threshold Marking
TDZ	Runway Touchdown Marking
SST	Runway Sidestripe Marking
FXD	Fixed Distance Marking
TWY	Taxiway Center Line Marking
HLD	Taxiway Holding Position Marking

Runway Surface and Length

H	Hard Surface (numbers = ft. in hundreds)
S	Non-Hard Surface (numbers = ft. in hundreds)

Additional Lighting

L1	Portable Runway Lights (electrical)
L2	Boundary Lights
L3	Runway Flood Lights
L4	Low Intensity Runway Lights
L5	Low Intensity Approach Lights
L6	High Intensity Runway Lights
L7	High Intensity Approach Lights
L8	Sequenced Flashing Lights
L9	Visual Approach Slope Indicator (VASI)

Transport Vehicles: Specialized vehicles are in short supply. Following the 1978 cyclone, damage assessments of telecommunications equipment would have been expedited by access to additional motor vehicles and helicopters for aerial reconnaissance. There were also shortages of jeep-type vehicles to move supplies, and ambulances for the injured.

Tools: Tools to clear roads of fallen trees can be procured at most local stores. Localized shortages can usually be filled from other sources on the island.

### 3.10 U.S. Mission Disaster Plan

Although no formal U.S. Mission plan exists, the U.S. Ambassador is responsible for determining the existence of a disaster and notifying AID/OFDA, Washington. The USAID director, with support from the Mission Disaster Relief Officer (MDRO), would mobilize and direct disaster relief activities after a formal request for assistance has been made by the GOSL. During the 1978 cyclone, an MDRO was appointed to manage relief efforts. In addition, a Disaster Aerial Survey was conducted to assess the extent of damage and identify relief needs.

#### USAID Motor Vehicles - Colombo

- 2 Compact automobiles
- 1 Midsize automobile
- 4 Station wagons
- 3 Trucks (under 12,500 lbs)  
4x4

Source: Executive Office of Overseas Management Services, AID

### 3.11 International Organizations

United Nations  
204 Buller's Road  
P.O. Box 1505  
Colombo 7  
Tel: 82281, 85287, 55288  
Telex: 9541210

World Meteorological Organisation  
ESCAP Panel on Tropical Cyclones  
c/o India Meteorological Department  
55 Lodi Road  
New Delhi, India 110 0033.7

### 3.12 U.S. Voluntary Agencies

CARE, Inc.  
P.O. Box 1024  
Colombo  
Tel: 20894, 20895, 23397

CARE is involved in agricultural projects and nutrition education and health programs.

Catholic Medical Mission Board, Inc.  
10 West 17th Street  
New York, NY 10011  
Tel: (212) 242-7757  
CMMB provides medicaments in emergencies.

Catholic Relief Services  
The Catholic Center  
Social and Economic Development Centre  
133 Kynsey Road  
Colombo 8

CRS provides financial support for community development programs.

The Salvation Army  
120 West 14th Street  
New York, NY 10011  
Tel: (212) 243-8700

The Salvation Army is primarily involved in social welfare programs.

Seventh-day Adventist World Service, Inc.  
7 Alfred House Gardens  
P.O. Box 1253  
Colombo

Provides medical and community services.

World Rehabilitation Fund  
400 East 34th Street  
New York, NY 10016  
Tel: (212) 679-3200

Operates medical assistance programs.

World Vision Relief Organization  
32 Lauries Road  
Colombo 4  
Tel: 81447

World Vision provides relief and development assistance in the areas of sanitation, nutrition, and education in rural areas; also feeds displaced persons.

Young Men's Christian Association (YMCA)  
The National Council of the YMCA of Sri Lanka  
P.O. Box 381  
Colombo 1

The YMCA is involved in social welfare, food production and agriculture programs.

Sri Lanka Overseas Foundation  
P.O. Box 57015  
West End Station, N.W.  
Washington, DC 20037  
Tel: (202) 676-1144

Provides relief to flood victims.

### 3.13 Mitigation Efforts

Alleviating drought has been the major focus of Sri Lanka's mitigation efforts, although some measures to mitigate the effects of flooding and cyclones have been initiated.

In northern Sri Lanka, the GSL and numerous foreign governments and international organizations are participating in the Mahaweli development project. As part of this effort, the resources of the Mahaweli Ganga River and its tributaries are being harnessed for hydroelectric power generation. Many rivers are being diverted along neglected pre-colonial irrigation systems to reduce the Dry Zone vulnerability to rainfall fluctuations. Moreover, thousands of Sri Lankans have been relocated to this area to provide labor for increased rice paddy production, while also relieving population pressures in the Wet Zone.

In the hills of Sri Lanka, paddy fields have been terraced to mitigate the effects of flooding and subsequent erosion. Additionally, levees built in marshes and lagoons along the western coast restrict flood currents into large river channels. Such measures expedite discharge to the sea; thereby, preventing flood waters from entering the tributary basins. The placement of rock reinforcements around lagoons also restricts paddy flooding. In the Wet Zone, marsh reclamation has stemmed salt water penetration of paddy fields.

### 3.14 Disasters and the Development Process

The Government of Sri Lanka (GSL) is encouraging the settlement and cultivation of the Dry Zone to attain self-sufficiency in rice production. The Mahaweli Development Project aims to minimize the potential for

drought as the population grows and new lands are opened to farming. As part of the project, dams, reservoirs, and storage facilities are being established to support 360,000 hectares of agricultural land. Mitigating the Dry Zone's vulnerability to drought will have a direct bearing on Sri Lanka's overall development because of the dominant role of agriculture and related activities in the economy.

Unfortunately, apart from its beneficial aspects, the project presents a threat to forestry resources in the Dry Zone where 99% of Sri Lanka's natural forest cover is located. Because deforestation has been increasing, the GSL agreed to designate 77% of the Dry Zone's land as forest or wildlife preserve. This conservation measure represents a worthwhile decision to incorporate a disaster-related component into the development process.

Other disasters have a recurring impact on Sri Lanka's development. Each year floods in the hills and plains of the Wet Zone not only reduce paddy production but also damage terraces and irrigation tanks. Foreign exchange intended for capital-intensive imports to finance industrial development must be diverted to repair the infrastructure and pay for rice imports. Wheat, sugar, and milk are also imported regularly because of the impact of natural disasters on domestic production.

Cyclones potentially represent the greatest threat to the development process. Because these tropical depressions occur so seldom, however, improvements in the warning system would appear to be a more worthy priority than costly investments in cyclone-proof structures.

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