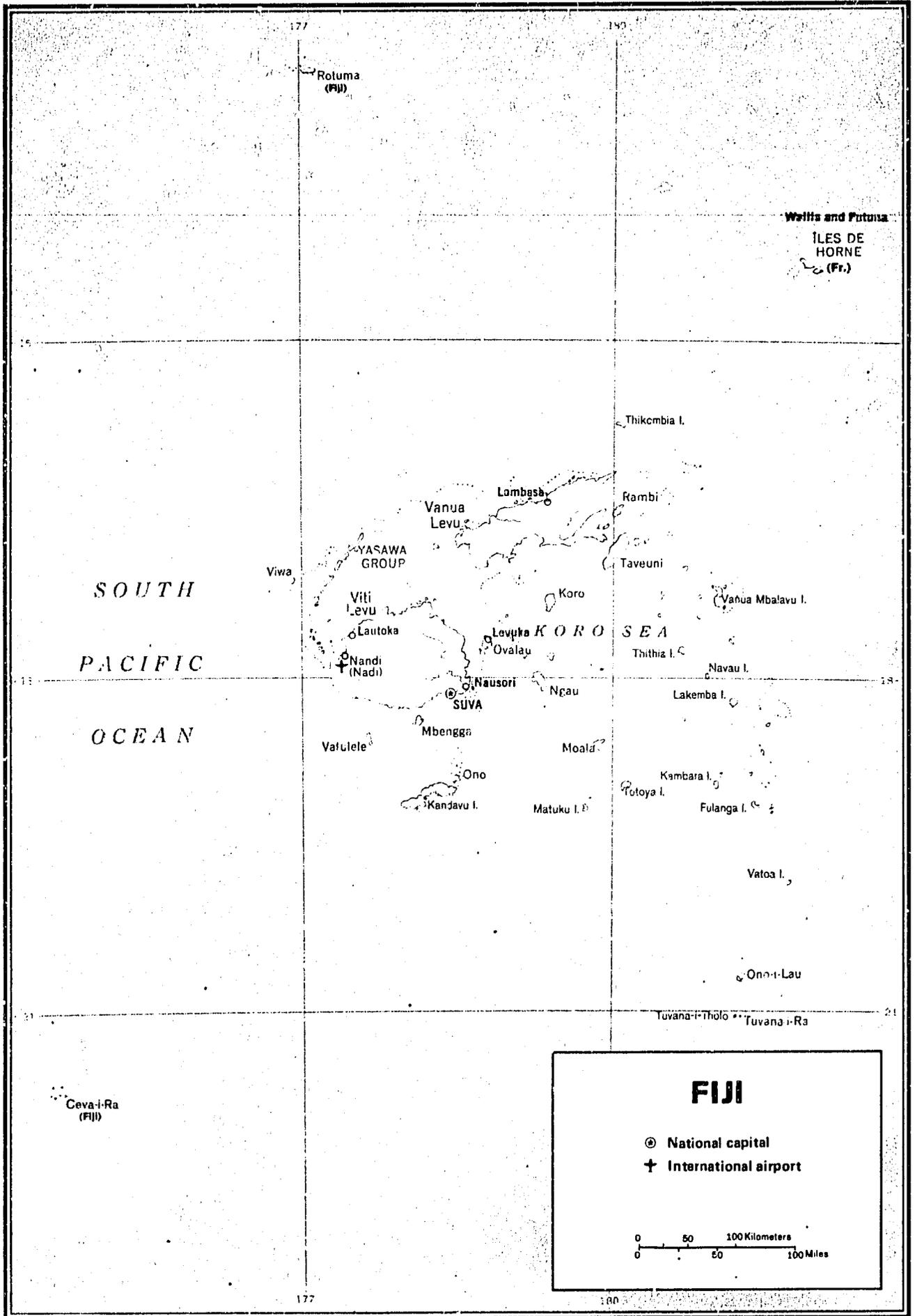


Fiji

A Country Profile



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



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Rotuma
(Fiji)

Wallis and Futuna
ILES DE
HORNE
(Fr.)

SOUTH
PACIFIC
OCEAN

Viwa

YASAWA
GROUP

Vanua
Levu

Lomvasa

Thikombia I.

Rambi

Taveuni

Koro

Vanua Mbalavu I.

Thithia I.

LOVUVA KORO
SEAS

Ovalau

Navau I.

Lautoka

Nausori

SUVA

Ngau

Lakemba I.

Vatulele

Mbengga

Moald

Ono

Kandavu I.

Matuku I.

Kambara I.

Totoya I.

Fulanga I.

Vatua I.

Ono-i-Lau

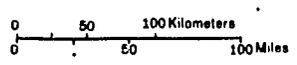
Tuvana-i-Tholo

Tuvana-i-Ra

Ceva-i-Ra
(Fiji)

FIJI

- ⊙ National capital
- ✚ International airport



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FIIJI: 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

Barbara Stein Naisoro

**Evaluation Technologies, Inc.
Arlington, Virginia
under contract AID/SOD/PDC-C-3345**

The country profile of Fiji 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 and the relatively narrow focus is intentional.

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.

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

October 1986

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1. General Information1.1 Geographic Codes

AID	882
FIPS	FJ
State region	EA

1.2 Host Mission to the U.S.

Embassy of Fiji
2233 Wisconsin Ave., N.W.
Suite 240
Washington, D.C. 20007
(202) 337-8320

1.3 U.S. Mission in Fiji

Embassy of the United States
31 Loftus Street
P.O. Box 218
Suva, Fiji
Tel: 314466, 314069, 311399, 311989
(Direct dial service is available from
the U.S. to Fiji)

The USAID Mission is at the same address.

1.4 Time Zones

EST + 17; GMT + 12

1.5 Currency

F\$0.74 = US \$1.00 (September 1986)

All figures in this profile are in US
dollars.

1.6 Travel and Visa Requirements

Passport and Visa: Visitors may obtain permits on arrival to stay for one month; these may be extended up to six months. Valid passports, onward or return air tickets, and adequate funds for the period of stay are required.

Visas are not required for citizens of the United States.

Health Requirements: Yellow fever and cholera vaccination certificate required of travelers over one year of age arriving from infected areas.

1.7 Holidays and Calendar

New Year's Day.....January 1st
 Good Friday.....variable
 Easter.....variable
 Queen's Birthday.....3rd Monday in June
 Bank Holiday.....1st Monday in August
 Fiji Day.....October (varies)
 Diwali.....November (varies)
 Prince Charles' Birthday..November (varies)
 Prophet Mohammed's
 Birthday.....November (varies)
 Christmas Day.....December 25th
 Boxing Day.....December 26th

1.8 Treaties and Agreements

Aviation
 Consuls
 Copyright
 Extradition
 Investment Guarantees
 Peace Corps
 Postal Matters
 Property
 Telecommunication
 Trademarks
 Visas

1.9 Memberships in International and Regional Organizations

ADB, Commonwealth, Colombo Plan, ESCAP, EEC (associate member), GATT, G-77, IBRD, IDA, IFC, ILO, IMF, INTELSAT, INTERPOL, International Civil Aviation Organization, International Fund for Agricultural Development, International Sugar Organization, International Telecommunication Union, Lome Convention, SPEC, South Pacific Air Transport Council, South Pacific Commission, South Pacific Forum, UN Mission, UNDP, Universal Postal Union, WHO, WMO, World Federation of Trade Unions, World Intellectual Property Organization

1.10 Ethnic Groups and Culture

The ethnic composition of Fiji's population according to official estimates for December 1984, was Fijians, 45 percent; Indians, 50 percent; part-Europeans, 2 percent; Chinese, 1 percent; Europeans and others, 2 percent. The term "Fijian" refers only to members of the indigenous community and "Indians" refers to those of Indian descent. Caucasians are commonly referred to as "Europeans."

The agent of Fijian culture is the community, usually, but not necessarily blood relations. Work is performed and obligations are fulfilled by groups, seldom by individuals. Of the physical symbols of interaction, two stand out as the most significant: 'yaqona' and 'tabua.' 'Yaqona' is the cultivated plant Piper methysticum and is the social drink of Fiji. It is presented as a sign of goodwill or hospitality and the order of drinking follows the social ranking of the individuals taking part. When an important request is being made, however, a presentation of yaqona may not be sufficient and it is the tabua - the polished tooth of the sperm whale - that changes hands.

Fijians share the islands with a variety of ethnic groups. In fact they are outnumbered by Indians, mostly descendants of laborers brought to work in the sugar plantations in the late 1800s. As in colonial times, the Indian population has continued to dominate the sugarcane industry and has become prominent in commerce as well. Europeans and part-Europeans are primarily the descendants of Australian and New Zealand settlers, many of whom took local spouses. They are now disproportionately employed in managerial, administrative, technical, and professional jobs. The Chinese first came to Fiji in the 1870s. Their numbers grew until the 1960s, when many emigrated to Canada.

1.11 Language

English is the official language and the common language among the various ethnic groups. Fijian and Hindustani are the other major languages. The majority of rural primary schools are under the control of single ethnic groups whereas in Suva almost one-half of the primary schools are multi-ethnic. Through the fourth grade the language of instruction is the official Bauan dialect in the Fijian classes, Hindi in the Hindu Indian classes, Urdu in the Muslim Indian classes, and English in the European and part-European classes. Thereafter, English, which is taught as a second language from the start in all schools, becomes the sole language of instruction.

1.12 Religion

According to the 1976 Census, 51 percent of the population classified themselves as Christian, 40 percent as Hindu, eight percent as Muslim, and one percent had no religion. Of the Christian community, 73 percent were Methodist; nearly all were Fijian. Of the Indians, some 80 percent identified themselves as Hindu.

1.13 History and Government

Early History:

Most authorities agree that people came into the South Pacific from the southeast via Indonesia as early as 800 A.D. In Fiji, the Melanesians and Polynesians mixed to form a highly developed society long before the arrival of Europeans. The first European discoveries of the Fiji group were accidental, occurring when the early navigators were on their way elsewhere. Major credit for the "discovery" of Fiji is given to Captain William Bligh who sailed through the group after the mutiny on the "Bounty" in 1789. During this period many Europeans jumped their ships and stayed in Fiji even though cannibalism and tribal warfare were rampant throughout the islands.

In the early nineteenth century the islet of Bau had become the center of power for the Western part of Fiji. In 1851 Ratu Seru Cakobau, high chief of Bau, decided to convert to Christianity which was rapidly gaining influence due to the efforts of Christian missionaries. Fearing both the growing power of another Christian prince, Ma'afu from Tonga, and a pressing American claim against him for property damages, Cakobau made the decision to cede the islands to Great Britain. In return, Britain would protect Cakobau and his people. On October 10, 1874, Fiji became a British colonial possession.

The Colonial Period 1874-1970:

A major development during the colonial era was the rapid immigration of indentured Indian laborers who came as part of the British plan to build a plantation economy based on sugarcane. Revenue from the sugar industry, monopolized by an Australian company, enabled the government to expand the new capital and port of Suva. The Fijians participated only marginally in this economic activity; however, the colonial government adopted the policy of maintaining special land and political rights for them. All land sales were prohibited and unalienated land remained the property of Fijian communities. After 1920, when the system of indenture was terminated, Indians became tenant farmers on land leased from

Fijians. Thereafter, a complex system of ownership developed characterized by three main types of landholding: freehold land, much of which was originally purchased from traditional chiefs; crown land, belonging to the government; and native land, held in perpetuity by native Fijians and amounting to 82.4 percent of all land in Fiji.

Independent Fiji

On October 10, 1970, Fiji became independent from Great Britain and accepted a democratic system of constitutional government based on the British Westminster model. Queen Elizabeth II, the titular head of state, is represented by a Governor-General who appoints the Cabinet Ministers.

The Parliament of Fiji consists of a House and a Senate. The country maintains a unique electoral system to ensure racial balance in the legislature; there must be 22 Fijians, 22 Indians, and eight "others." Voters register on one of three separate communal rolls representing Fijian, Indian, or General Elector (neither Indian or Fijian). They also register on an additional roll, called the National Roll. Each voter selects one candidate from his or her ethnic group, filling 12 Fijian, 12 Indian, and three General Elector communal seats. To choose the remaining seats, the National Roll allows each individual to vote for one candidate in each of the three ethnic categories .

The political balance of power so far hinges on a coalition between Fijians, Europeans and part-Europeans, Chinese, and some Indians (ruling Alliance Party), while the majority of Indians constitute the national opposition (National Federation Party). The latter is currently in disarray and its position is being threatened by the newly formed Labor Party.

Today Fiji enjoys a central position within the South Pacific region, and is highly urbanized and industrialized compared to its neighbors. Suva is not only larger than any other city in the island countries, but is also an entrepot port of regional importance, and the source of most of the

manufactured exports, other than processed primary products, which circulate within the region. The tourist industry is more highly developed in Fiji than elsewhere in the western Pacific, but the economy still depends mainly on agricultural exports - most notably sugar, and copra.

1.14 Economy

General Situation:

Like most other developing countries, Fiji has faced major challenges since 1979 in adjusting to a difficult international economic environment. These adjustments followed a period of positive economic performance from 1970 to 1978 with real GDP growing at 4.6 percent per annum. Beginning in 1979 Fiji's terms of trade declined as a result of the second oil price shock and the subsequent decline in non-oil commodity prices. Sugar was adversely affected by drought from 1981 to 1983 and tourist arrivals expanded only slightly between 1979 and 1983 mainly because of the worldwide recession. During this period real GDP per capita declined by two percent. In 1984, however, economic activity revived as sugar production and tourist arrivals recovered from the previous years' slump. Preliminary figures for Fiji's GDP at current market prices in 1984 totaled US \$1,125 million, of which agriculture, forestry and fishing represented 24.4 percent, government and other services 18.2 percent, distribution (including tourism) 15.9 percent, finance and insurance 13.3 percent, manufacturing 12 percent, transport and communication 11.6 percent, and remaining sectors 4.6%.

Balance of Payments:

In 1984, the balance of payments deficit was \$37 million. Fiji's current account deficit improved from a high of 13.6 percent of GDP in 1981 to three percent of GDP in 1984. However, this adjustment was achieved through a drastic reduction in public investment activity, the curtailment of associated capital goods imports, and

financing capital outflows rather than through increased savings or an improvement in export performance.

Exports: Total exports in 1984 were valued at \$244 million. The composition of Fiji's exports has changed little in the recent past. Sugar has retained its predominance, accounting for 57% of exports in 1984. The other major exports - gold, coconut and forestry products - accounted for 24% of total exports. Sugar has been reasonably well protected by trading agreements for many years and is mainly exported to the EEC countries.

Imports: Imports in 1984 amounted to \$424 million and were primarily composed of fuel, manufactured goods, machinery, and food. The major supplier is Australia followed by New Zealand and Japan.

External Debt: Fiji's external debt stood at \$316 million in 1984, or 37% of GDP. The debt burden increased rapidly between 1979 and 1984, as the debt service ratio rose from 5.2% (of exports of goods and services) in 1979 to 14% in 1984. This translates into a relatively high debt burden in relation to GDP. Nevertheless, Fiji presently enjoys a good international credit standing.

1.15 Population

The estimated population of Fiji in 1984 was 692,000 with a density of 37.9 persons per square km. Of the total population, 38 percent live in urban areas and 62 percent in rural areas. The following table shows the population by region in 1984.

Table 1Population in 1984

<u>Division</u>	<u>Capital</u>	<u>Population (1984 estimate)</u>
<u>Central</u>	Suva	
Naitasiri		86,000
Rewa		103,600
Serua-Namosi		18,100
Tailevu		44,800
<u>Eastern</u>	Levuka	
Kadavu		8,800
Lau		13,800
Lomaiviti		13,700
Rotuma		2,600
<u>Northern</u>	Labasa	
Macuata		69,300
Bua		12,800
Cakadrove		39,100
<u>Western</u>	Lautoka	
Ba		192,200
Nadroga-Navosa		53,200
Ra		28,100
<u>Total</u>		<u>686,000</u>

Source: Britannica, Book of the Year, 1986.

The populations of major cities and towns in 1982 were: Suva, 71,000; Lautoka, 26,000; Nadi, 9,000; Ba, 7,000; and Nausori, 6,000.

1.16 Health

Vital Statistics:	Births/1,000 population	30
	Deaths/1,000 population	5
	Infant mortality/1,000 live births	23
	Life expectancy at birth, years	65

Health expenditures in Fiji during 1984 amounted to \$31.2 million providing a net per capita health expenditure of \$45. In 1984 the doctor/medical assistant to

population ratio was 1:1521; the nurse to population ratio was 1:464; and the dentist/dental therapist to population ratio was 1:6397. The number of people covered by Fiji's health services in 1984 was close to 100 percent.

The delivery of health services in Fiji is the responsibility of the Ministry of Health and Social Welfare. Hospital fees are nominal and highly subsidized. Admission to general wards of all hospitals is approximately 50 cents a day. Children under the age of 15 are treated free of charge as are destitutes and the mentally ill. Overcrowding is a continuous problem in the divisional hospitals and staff carry a heavy workload. The majority of nurses are trained locally and will soon have a new nursing school complex to replace the Tamavua Nursing School. Doctors are trained overseas and at the Fiji School of Medicine. Other island countries in the region rely heavily on Fiji's facilities for health manpower training.

Emergency services are often made available by the private sector at minimal or no cost. These include ambulance services, flying squad services by helicopter or land plane, and use of commercial vessels.

1.17 Education

The quality and quantity of education in Fiji is very good in comparison to other Pacific islands. Tuition is free through class 8 and primary school enrollment is nearly one-hundred percent among the school age population. In 1984 there were 665 primary schools, 130 secondary schools, and 36 technical/vocational schools. In addition, the University of the South Pacific (USP) is headquartered in Suva and serves 11 island nations. It has over 2,000 students at its campuses in Fiji and Western Samoa, and a further 6,000 enrolled in

extension courses. USP has seven institutes involved in providing research, consultancy services, and training. They frequently run short courses on various topics with a total enrollment of about 1,400 per year.

1.18 Communications

Radio:

Under the name "Radio Fiji," the Fiji Broadcasting Commission (FBC) provides broadcasting services through two national networks of AM transmitters: Radio Fiji 1 broadcasts in English and Fijian, and Radio Fiji 2 in English and Hindustani. In addition Radio 3-FM in Suva carries English programs. The FBC is a statutory body and is jointly funded by an annual government grant and advertising revenue. Fiji's first independent commercial radio service, FM 96, began operating a 24-hour service in July 1984 and covers the Rewa Delta area, Navua, and as far as Pacific Harbor (Deuba).

Television:

In April 1986, the GOF signed a 12-year contract with an Australian television network to provide television service to the country beginning in September 1987. In recent years, video recorders have become increasingly popular; rental tapes are available at a variety of outlets.

Telephones:

Fiji had 51,296 telephones in 1984, or 13.4 per 1,000 people.

Press:

There is a wide range of newspapers including two English language dailies, the 'Fiji Times' and the 'Fiji Sun'. Others published by the Fiji Times and Herald Ltd. are the 'Sunday Times'; 'Shanti Dutt', a Hindi weekly; 'Nai Lalakai', a Fijian weekly; and 'Fiji Holiday', a monthly free newspaper targeted at the tourist industry.

See also Section 3.7, Communications.

1.19 Transportation**Roads:**

Fiji's major highway circles Viti Levu. The section between Suva and Lautoka along the southern coast is the Queens Road; the Kings Road links the towns along the northern coast. Regularly scheduled buses operate on the major islands. Carriers and taxis are also available in and around urban areas.

Road distances from Suva to the main centers in Viti Levu are:

Via Kings Road:

Suva to Nadi Airport	289 km
to Lautoka	265 km
to Ba	227 km
to Nausori	19 km

Via Queens Road:

Suva to Lautoka	221 km
to Sigatoka	127 km
to Nadi Town	183 km
to Nadi Airport	197 km

Rail:

The railroad system is used solely for transporting sugarcane from farming areas to the mills. There is no passenger service.

Air:

Nadi International Airport in the West and Nausori Airport (near Suva) are the two international airports in the country. Scheduled international flights are available to Vanuatu, Solomon Islands, Tonga, New Zealand, Australia, and Hawaii. In addition, small planes fly between Suva and island airstrips of the Fiji group.

Ports:

Fiji's three ports of entry are Suva, Lautoka, and Levuka. Suva handled 585,559 tons of cargo in 1984, mainly general cargo and bulk products while Lautoka handled 927,440 tons, mostly sugar, molasses, and petroleum products. Levuka serves as a base for Fiji's only fish canning industry. (For more information on transportation, see sections 3.8, 3.9, and 3.10.)

2. Disaster Vulnerability

2.1 Physical Environment

Geography

Fiji is composed of more than 300 islands with a land area of 18,272 square km. They are scattered over an ocean area of 1,290,000 square km, stretching 1,200 km from the northernmost to the southernmost islands and 650 km from the western to the eastern extremities. The islands are of volcanic origin except for most of the Lau group which consists of raised limestone structures and shares more characteristics with Tonga than with Fiji.

Eighty-seven percent of the land area is accounted for by the two major islands of Viti Levu (10,380 square km) and Vanua Levu (5,530 square km). Viti Levu has four kinds of terrain: plateau, mountain, upland, and coastal. The Nadrau Plateau (in which the Monasavu Hydroelectric plant is located) lies in the center of the island and has two mountain ranges running north and south to form the major divide. Other mountain ranges separate four upland areas that are heavily dissected by the island's numerous rivers and streams. Undulating coastal hills and lowland plains contain most of the population. Vanua Levu is characterized by a main mountain range that forms one plateau and two tablelands. The plains are generally lower and drier than those of Viti Levu and there are smaller but more numerous rivers. In general, the other islands are relatively rugged with most flat land located along coastlines in low narrow coastal plains. The largest of these are Kadavu and Taveuni; each are about 400 square km.

Climate

Fiji has a tropical climate controlled by southeast tradewinds. The temperature varies little throughout the year (from 23° C to 27° C); the hottest months are December to April when the humidity is highest. The wet or windward sides of the larger islands receive 2,800 to 3,500 millimeters of rainfall per year. The dry or leeward sides receive an average of 1,800 to 2,000 millimeters yearly. Fiji's rainfall is variable, often occurring in brief, localized, and heavy falls.

2.2 Cyclones

The most frequent and widespread destruction in Fiji is caused by tropical cyclones. In his study, Dealing with Disaster - Hurricane Response in Fiji, John Campbell cites a total of 121 tropical storms and hurricanes that were recorded in Fiji between 1880 and 1980. Although they are usually considerably smaller than hurricanes originating in the mid-latitudes, hurricanes forming in this area are characterized by very steep pressure gradients that create winds of tremendous velocity which

spiral towards a very low-pressure center. Other features are heavy rains, dangerous sea and coastal conditions, and unpredictability. The incidence of cyclones is 1.2 per season but this figure disguises variations from season to season. In fact, Campbell's data show that over the 100-year period, 34 seasons passed with no cyclonic activity. However, as many as four cyclonic events are known to have occurred in a single season (1955/56, 1964/65, 1984/85) but not all of these were severe.

Most cyclones in the Fiji area occur from December through April as indicated in Figure 1 on page 15. But the recognized season extends from October to May, taking account of the possibility of early and late events such as Cyclone Bebe which ravaged all four divisions in October 1972. As shown in Figure 2 on page 16, cyclones affecting Fiji tend to form in the seas north/northwest of the group and move in a southerly direction.

The most destructive aspect of cyclones are the accompanying high winds that cause severe damage to trees, crops, buildings, and other structures. In recent years, private homes in Fiji have suffered considerable wind damage, particularly to roofing, and water damage largely due to poor construction and lack of attention to hurricane-resistant techniques. The destruction of homes is frequently accompanied by loss of household effects which are swept away by floods, broken by collapsing structures, or ruined by salt water. Many households may lose everything, including cash crops, often a major source of income. Livestock losses are common, especially on Viti Levu where dairy farming takes place in the flood plains of the Rewa River and its tributaries. Stock deaths are caused by drowning, or slow starvation due to silting of pastures.

More importantly, tropical cyclones are life threatening. Serious injuries as well as deaths have occurred in Fiji from flying debris, electrocution, and collapsed buildings. Drownings by flood waters or ships lost at sea during storms have added to the death toll. Prolonged heavy rainfalls during cyclones have caused massive landslides, often resulting in loss of life.

The economic impact of cyclones is often very severe in Fiji. City dwellers may face a dramatic rise in prices for all root crops, especially yams and taro, following cyclones that cause extensive damage to areas supplying urban markets. Coconut trees and breadfruit often can survive the winds but may be unable to bear fruit for several years.

Damage to sugar, Fiji's most important export crop, can be severe, depending upon the age of the crop when the cyclone strikes. In general, damage to younger cane tends to be less extensive than that sustained by mature crops. Older, taller cane is likely to be flattened by winds making harvesting difficult and expensive. Damage to sugar factories and railway lines is frequently reported following cyclones in the sugar producing Western and Northern Divisions.

FIJI: INCIDENCE OF CYCLONES BY MONTH

1880/81 to 1985/86

NUMBER OF CYCLONES OR TROPICAL STORMS

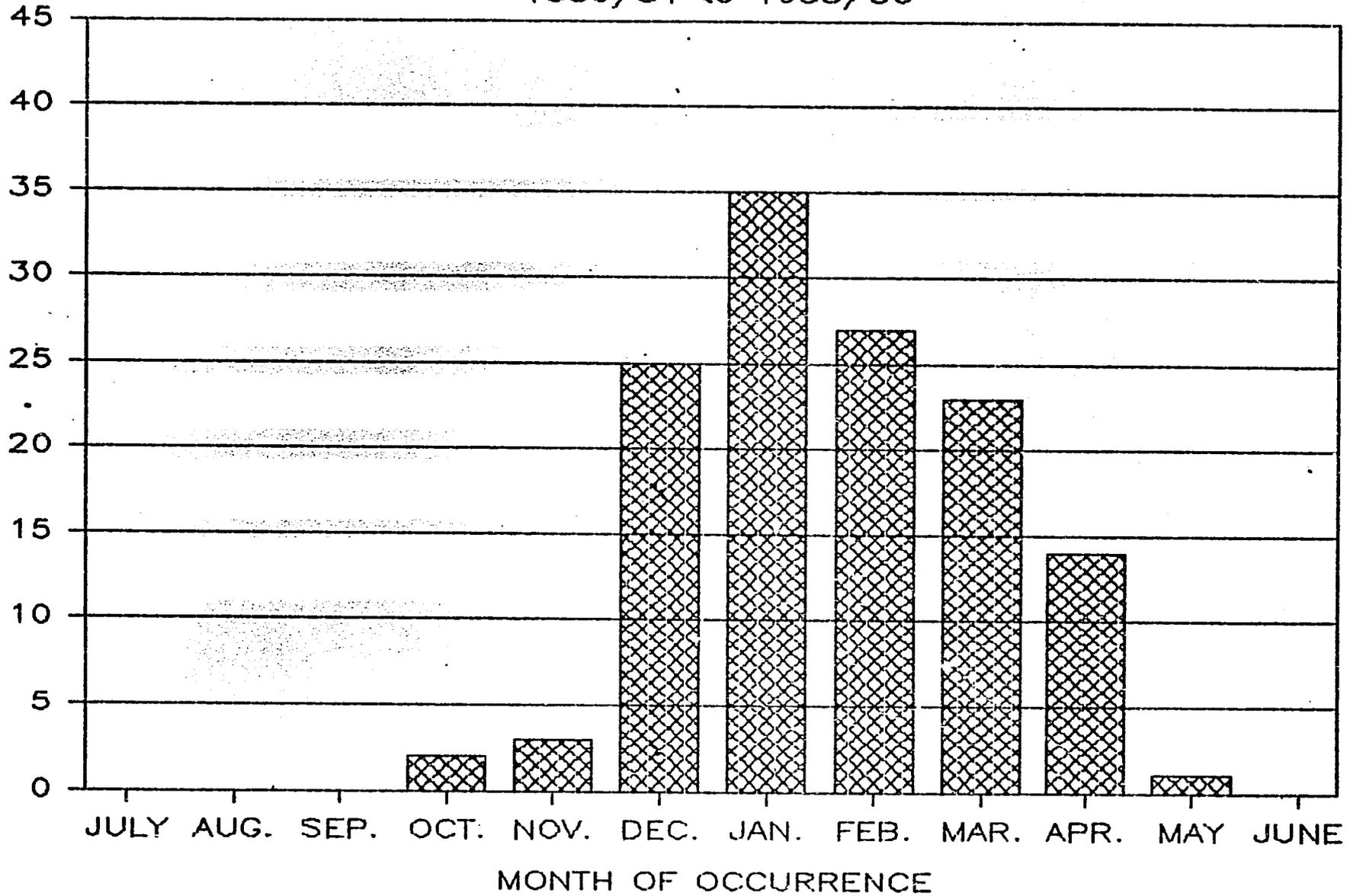
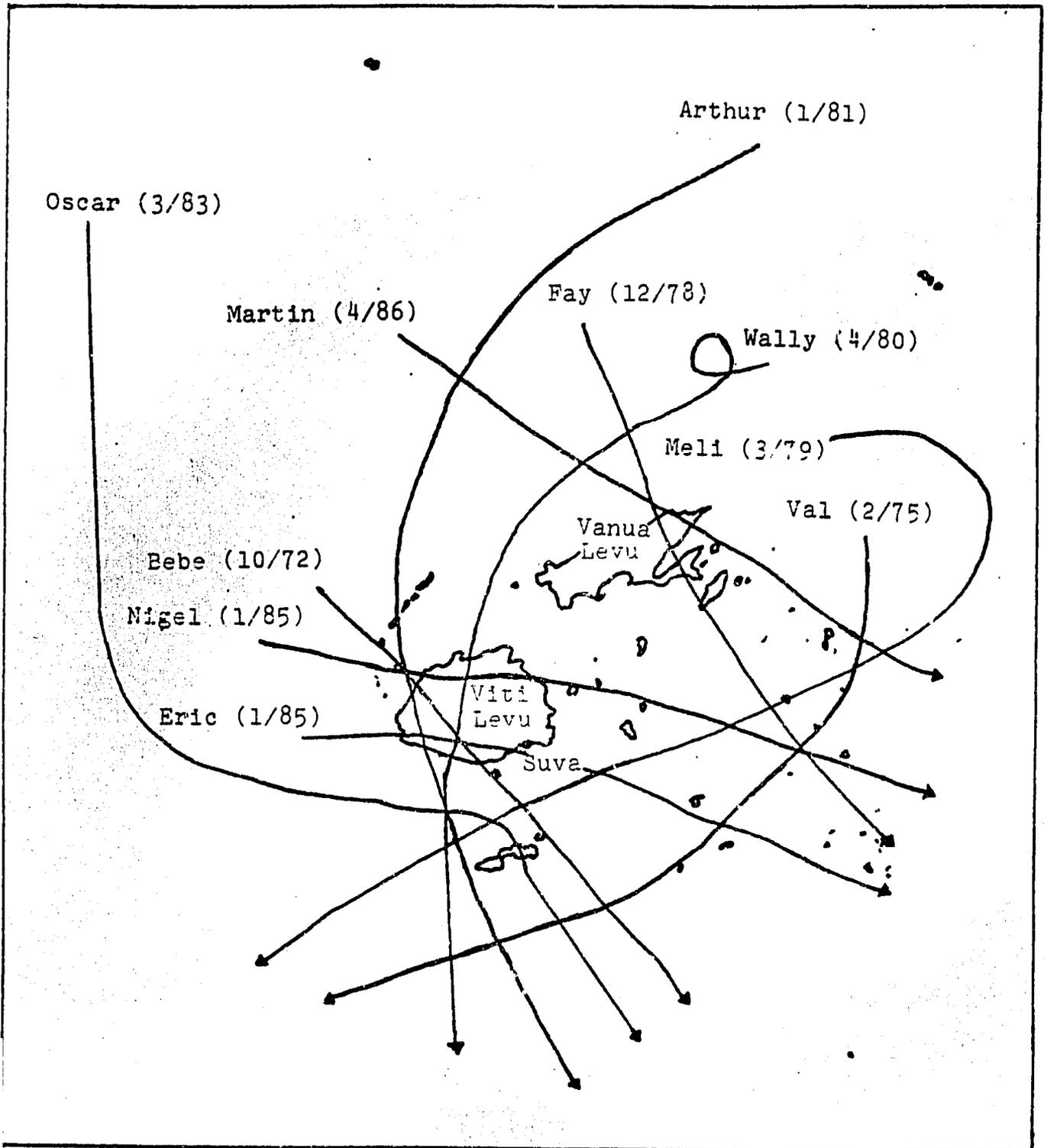


FIGURE 1

Source: Dealing With Disaster - Hurricane Response in Fiji; OFDA Disaster History.

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FIGURE 2 PATHS OF SELECTED TROPICAL CYCLONES,
1970 - 1986



Sources: INTERTECT, Improvement of Low Cost Housing in Fiji to Withstand Hurricanes and Earthquakes; J. Campbell, Dealing With Disasters - Hurricane Response in Fiji; PIDP, Cyclone "Eric" and "Nigel" Report; and Fiji Times, April 14, 1986.

Destruction to infrastructure in other sectors can be equally devastating. Tourism, Fiji's second most important industry, has suffered significantly after cyclones. Damage to hotels, road and airport closures, and adverse publicity in Australia and New Zealand (the major tourist markets) combine to reduce the inflow of visitors. Cyclone Oscar in March 1983 was particularly hard on the tourist trade although hotels were quick to recommission rooms closed by the storm. Even so, visitor arrivals during the first six months of 1983 dropped by more than 15%.

Food Rations

Historically, food rations have been distributed by the government following cyclones in Fiji. The trend was initiated during the colonial era and was well established by the time of independence. The successful operation of rationing programs has depended largely on the provision of food aid from overseas sources such as governments and international organizations. The GOF has assumed responsibility for procuring food items when donations have fallen short.

The two largest food relief programs ever mounted in Fiji were administered after Cyclone Bebe in October 1972 and after Eric/Nigel in January 1985. Following Bebe, more than 120,000 persons received rations in an extensive operation that covered virtually every extremity of the Fiji group. After Eric and Nigel, around 130,000 received rations. In this relief effort, distribution of food rations became a sensitive issue and was one of the most controversial activities of the emergency phase. There were some reports of hoarding and profiteering. Several people reportedly collected their monthly rations from different relief centers thereby getting more than their one-month entitlement. A concern among government officials and donors is the public's increasingly unrealistic expectations of central government assistance in the form of food and shelter following a disaster. The mentality of "free handouts" is well illustrated by the events of April 1986 when people lined up for food rations in Labasa even before Cyclone Martin struck.

In discussing Fiji's present system of rationing, many GOF officials emphasized the need to return to traditional strategies for coping with crop losses. Among the most important of these were the maintenance of a wide range of food resources, the application of food storage and preservation techniques, intra-community and inter-community cooperation, and sound settlement locations. In modern times, food rations have replaced these traditional disaster mitigation and relief systems, or such traditions have disappeared with modernization, making the possibility of post-cyclone famine a reality in Fiji.

2.3 Storm Surges

A storm surge is a temporary rise in the level of the sea that is not caused by tides. As Ram Krishna (Fiji's Director of Meteorology) explains in Tropical Cyclones, two main factors contribute to storm surges. First, very low pressure at the center of a cyclone causes the water level near the center to rise. The other factor is the accumulation in coastal areas of water dragged in by high winds circulating around the cyclone's center. Especially at high tide, the effects of storm surge can be as destructive as hurricane-force winds. Villages are washed away, coastal installations and vessels are destroyed, shorelines are eroded, and water supplies and soil become contaminated. Storm surge is known to have affected parts of Fiji in ten separate cyclonic events since 1972.

2.4 Flooding and Landslides

Tropical cyclones are almost always accompanied by torrential rains that cause flooding. A tropical storm may also produce continuous high intensity rainfall, sometimes lasting for several days. Landslides may be triggered and are a serious danger, particularly in areas where the natural terrain has been altered for road building or agricultural purposes. The most extensive landslides in recent memory followed Cyclone Wally in 1980. The Fiji Times reported that the road from Navua to Yarawa was blocked by 45 huge landslides in this disaster.

2.5 Earthquakes and Tsunamis

Fiji is the most densely populated and industrialized country of the small island nations in the Southwest Pacific. It is considered by experts to be the most vulnerable to earthquake damage of the various island groups. Approximately 70 percent of the world's intermediate and deep earthquakes occur in the region but they seldom cause damage on land surfaces. However, strong shallow earthquakes and swarms have been recorded in Fiji, underscoring the risk of significant future earthquakes. In addition to the direct effects of earthquake shaking, the secondary effects of earthquake-triggered landslides and tsunamis present a major hazard.

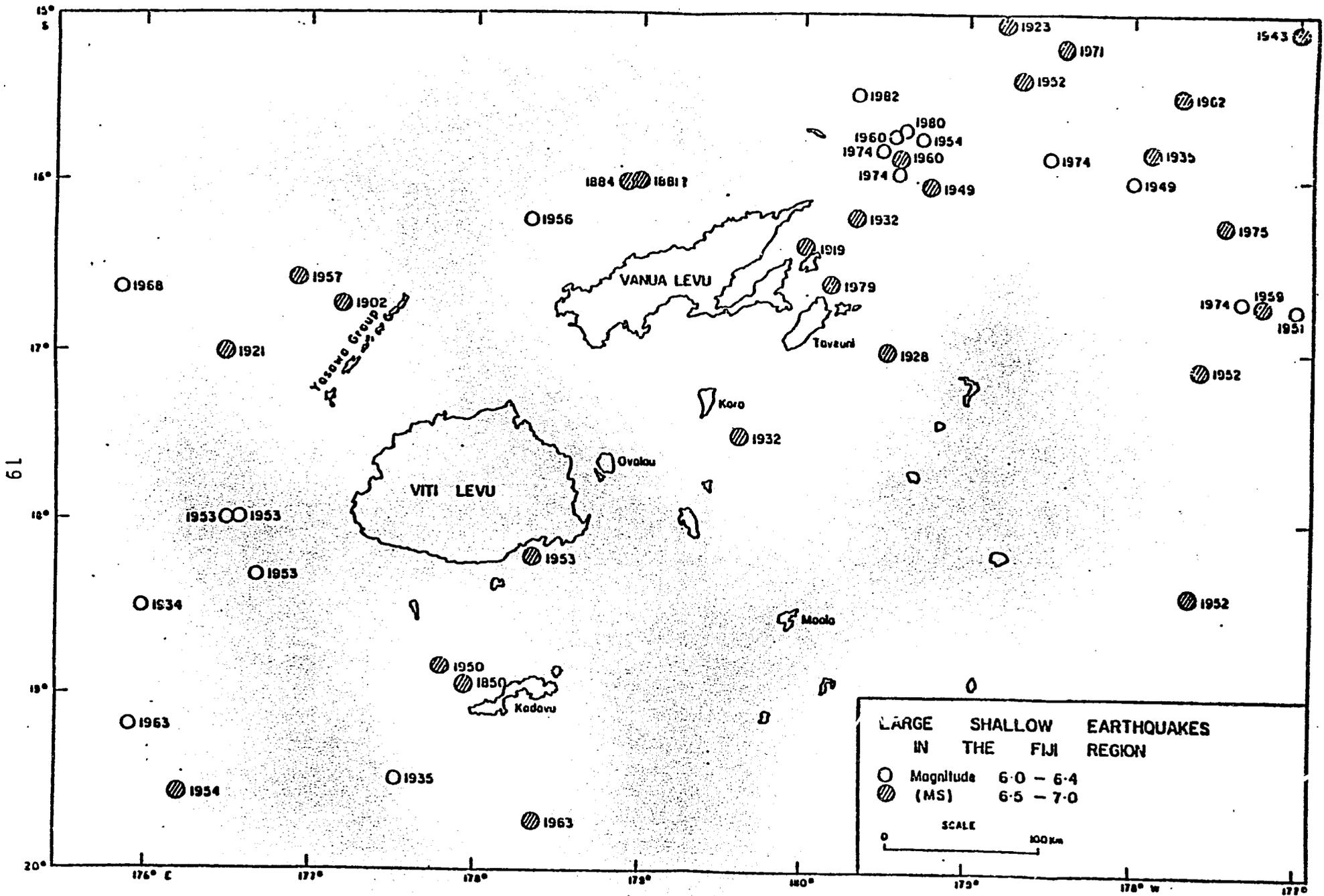


Figure 3. Historical seismicity in the Fiji region.

Source: Cornell University. Evaluation of Seismic Risk in the Tonga - Fiji - Vanuatu Region; Quarterly Progress Report to OFDA.

In 1978, the Office of U.S. Foreign Disaster Assistance began funding a team of Cornell University seismic experts to undertake an evaluation of seismic risk in the Tonga-Fiji-Vanuatu region. The program was carried out over a period of eight years through cooperative work with in-country agencies including the Fiji Mineral Resources Department. The researchers have identified several well developed seismic zones in and around Fiji. They are: a complex zone of strike-slip faulting between the northeastern Fiji Islands and the northern Tonga Trench; a narrow belt of strike-slip earthquakes north of Vanua Levu; and a belt of earthquakes west of Viti Levu. Within the Fiji Islands platform are further zones, including intense activity near southern Viti Levu; diffuse activity east of Viti Levu (near Ovalau, Koro, and Gao); a belt of earthquakes southwest of Viti Levu; swarm activity west of Kadavu; and nests of activity in the interior of Viti Levu. Figure 3 on page 19 shows historical seismicity in the Fiji region.

Suva is particularly vulnerable to earthquake and tsunami damage. The population of the metropolitan area is now close to 120,000 and most of the government, commercial, and industrial operations are concentrated there. Much of Suva's development, including port facilities multistory buildings, a major electric power plant, expansion of the port facilities, and completion of the 13-story Central Monetary Authority building has occurred on an area of filled land close to sea level. In 1953, this area was extensively damaged by an earthquake centered southwest of Suva measuring 6.8 on the Richter scale. Within minutes, the resultant tsunami swept over the reef surrounding the harbor and into the city.

In 1979 an area just north of Taveuni was struck by an earthquake measuring 6.9. More recently, in 1983 a swarm of over 85 earthquakes occurred near the island of Kadavu (south of Viti Levu) during July and August. The earthquakes caused minor damage to villages in western Kadavu. Landslides on Mt. Nabukelevu were triggered by the largest of these events which had magnitudes ranging from 1.1 to 5.1. In October of 1984 several earthquakes occurred near the Yasawa Islands (north of Viti Levu); the largest was widely felt throughout Fiji.

2.6 Drought and Famine

Prolonged severe droughts do not occur frequently in Fiji but nevertheless pose a considerable hazard. Certain areas of Fiji such as the limestone islands of the Lau Group are vulnerable to drought conditions that bring water shortages and devastation to crops. In the second half of 1977 when much of Fiji was affected by drought, the inhabitants of Southern Lau and other outer islands required rations. Late in the year, food was distributed for three months to 1,314 people.

It is droughts in combination with cyclones that produce the most disastrous consequences in Fiji. The greatest threat of such combined events is to Fiji's sugar crops, mainly grown in the dry zones of north-western Viti Levu and northern Vanua Levu. The most severe drought in recent years followed Cyclone Oscar in 1983 causing export losses of more than \$70 million.

Famine results from the destruction of food resources. In Fiji it is unlikely that post-cyclone famines have occurred, for traditional societies had many strategies for coping with such losses. In recent times food relief has served to offset any possibility of starvation that might exist.

2.7 Disaster History

Fiji has a history of disasters that have caused significant damage; the great majority have been either tropical storms or cyclones. The following is a selected list of some of the most devastating disasters although a few of those included were of lesser magnitude.

Table 2

Selected Major Disasters

<u>Type</u>	<u>Date</u>	<u>Location</u>	<u>No. Killed</u>	<u>No. Affected</u>
Cyclone	01/21/04	Central Fiji	n.a.	n.a.
Cyclone	03/24/10	Lau/Vitu Levu	n.a.	n.a.
Cyclone	01/28/12	Entire country	n.a.	n.a.
Cyclone	04/16/13	Lau	n.a.	n.a.
Cyclone	12/10/29	Entire country	n.a.	n.a.
Cyclone	02/16/31	Labasa/Lautoka	200	n.a.
Cyclone	02/19/41	Viti Levu	2	n.a.
Cyclone	01/28/52	Viti Levu	23	n.a.
Earthquake	00/00/53	Suva area	n.a.	n.a.
Cyclone	01/07/58	Lau	0	n.a.
Flood	03/22/64	Viti Levu	1	8,000
Cyclone	02/07/65	Entire country	2	10,000
Cyclone	10/24/72	Entire country	3	120,000
Cyclone	04/03/73	Savusavu/Bua	0	1,150
Cyclone	12/09/73	Kadavu/S. Lau	59	5,000
Cyclone	01/30/75	Lau	0	23,000
Drought	00/00/77	Entire country	0	n.a.
Cyclone	01/04/78	Yasawa/Viti Levu	0	n.a.
Cyclone	03/27/79	Kadavu/Lau	53	20,600
Cyclone	03/24/80	South-central Viti Levu	18	28,000
Cyclone	01/15/81	Western Fiji	0	4,700

Table 2Selected Major Disasters

<u>Type</u>	<u>Date</u>	<u>Location</u>	<u>No. Killed</u>	<u>No. Affected</u>
Cyclone	03/01/83	Central-eastern Fiji	9	200,000
Cyclone	03/25/83	Lau	0	11,132
Drought	00/00/83	Western Division	0	31,000
Cyclone	01/18/85	Western Division	28	100,000
Cyclone	03/17/85	Viti Levu	1	20,000
Cyclone	03/05/85	Viti Levu	3	2,000
Floods	04/12/86	Central Division	17	8,174
Cyclone	04/12/86	Vanua Levu	2	15,000

Source: Office of U.S. Foreign Disaster Assistance, Disaster History; and Dealing with Disaster - Hurricane Response in Fiji.

3. Disaster Preparedness and Assistance

3.1 Host Government Disaster Organization

Fiji's disaster response system is characterized by the existence of two relief committees: the Emergency Services Committee (EMSEC), and the Prime Minister's Relief and Rehabilitation Committee (PMRRC). EMSEC is designed to provide immediate relief needs whereas the PMRRC functions as the longer term rehabilitation and reconstruction committee.

EMSEC

EMSEC is subordinate to Cabinet through the Ministry for Home Affairs and is responsible for the coordination, planning, and implementation of immediate relief measures at all levels of government. EMSEC is also responsible for the direction, control, and maintenance of essential supplies and services during the emergency phase of a disaster.

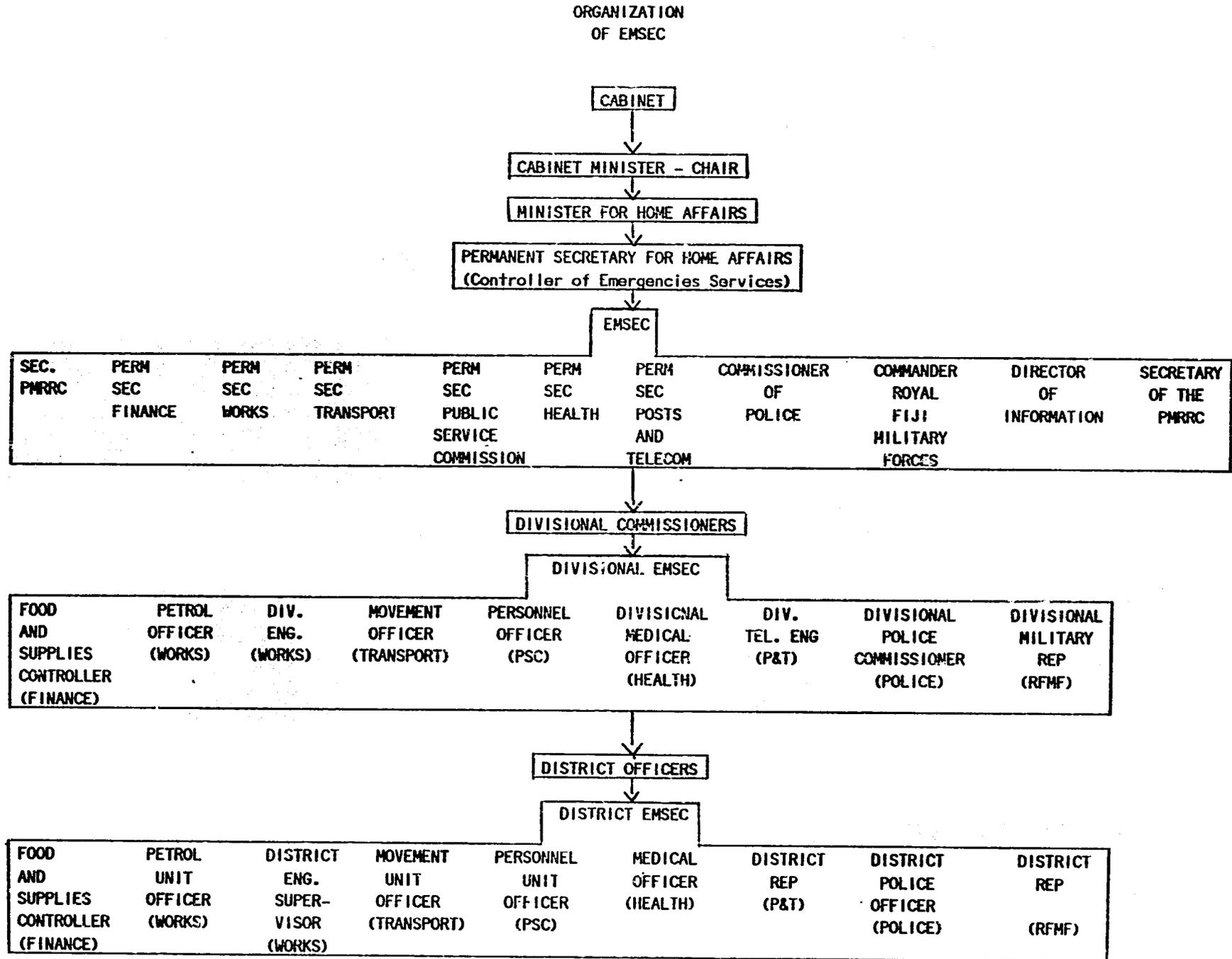
The membership of EMSEC is comprised of the Minister for Home Affairs (chair), the Permanent Secretary for Home Affairs (deputy chair and Controller of Emergency Services); the permanent secretaries for Finance, Transport, Works, Telecommunications, Health, Public Service Commission; the Commissioner of Police; the Commander of the Royal Fiji Military Forces; and the Director of Information. The senior assistant secretary for Home Affairs acts as secretary. The heads of welfare and Red Cross organizations are also members of the committee.

In each of the four administrative divisions the divisional commissioners chair mini-EMSECs comprised of divisional heads and chiefs of departments, and local heads of welfare and Red Cross organizations. Planning officers of the divisions serve as secretaries. An identical structure exists at the district level. (See Figure 4.)

PMRRC

This committee was created in 1972 and was first known as the PMHRC (Prime Minister's Hurricane Relief Committee). Until recently the membership was comprised of a group of private citizens acting under the chairmanship of the Prime Minister. The current membership is limited to high level civil servants. The Prime Minister no longer heads the PMRRC, leaving the chairmanship to the Minister of State for Rural Development.

Figure 4



Review of EMSEC

Following the four cyclones that affected Fiji during the 1984/85 cyclone season, the GOF decided to review its emergency response system. The East-West Center's Pacific Islands Development Program was consulted and it was decided that the review would be in two phases: the first would be a study of general emergency arrangements at the national level; and the second phase would focus on strengthening training and operations at the Divisional and District levels. The first phase was concluded in November of 1985 and a report was submitted to Cabinet. It contained several recommendations on future revisions of the national emergency system. One of the recommendations, to merge the EMSEC and the PMRRC, was expressed by Fiji nationals involved in disaster response. The merger would clarify organizational responsibilities and roles, especially in relation to the two stages of emergency and relief operations. It would also alleviate problems in the transition of authority from one committee to another. The review team also recommended that a permanent post be established for a disaster coordinator. However, the report was unacceptable to Cabinet and the recommendations were not implemented.

3.2 Warning System

Tropical Cyclones

The Fiji Meteorological Service is responsible for identifying tropical cyclones and providing the appropriate special weather bulletins for the Fiji group. The National Weather Forecasting Center at Nadi (NWFC) acts as the WMO-designated Tropical Cyclone Warning Center for the area from the equator to 25°S, and from 160°E to 140°W. Warnings are provided to Fiji and other island groups including Rotuma, Tonga, Niue, Western Samoa, American Samoa, Tokelau, Kiribati, Tuvalu, Wallis and Futuna, and Solomon Islands.

The primary means of distribution by the NWFC for all cyclone alerts and bulletins is through Radio Fiji; headquartered in Suva. But in past years Nadi has sometimes been severely affected by cyclones of hurricane intensity resulting in partial or full failure of communications between Nadi and Suva. In such an event, the Nadi/Suva telephone (and consequently the telex and AFTN link) may be lost, and the Nadi Communications Center will have to pass the domestic bulletins for Fiji via the HF radiotelephone to Radio Fiji in Suva. If the NWFC becomes totally ineffective, the Regional Meteorological Center in Wellington, New Zealand will be requested by telephone or other available means of communication (e.g., Air/Ground channels) to prepare and pass Fiji domestic bulletins to Suva.

Cyclones may also affect the Suva area, resulting in temporary failure of radio services. If such an event occurs, the Regional

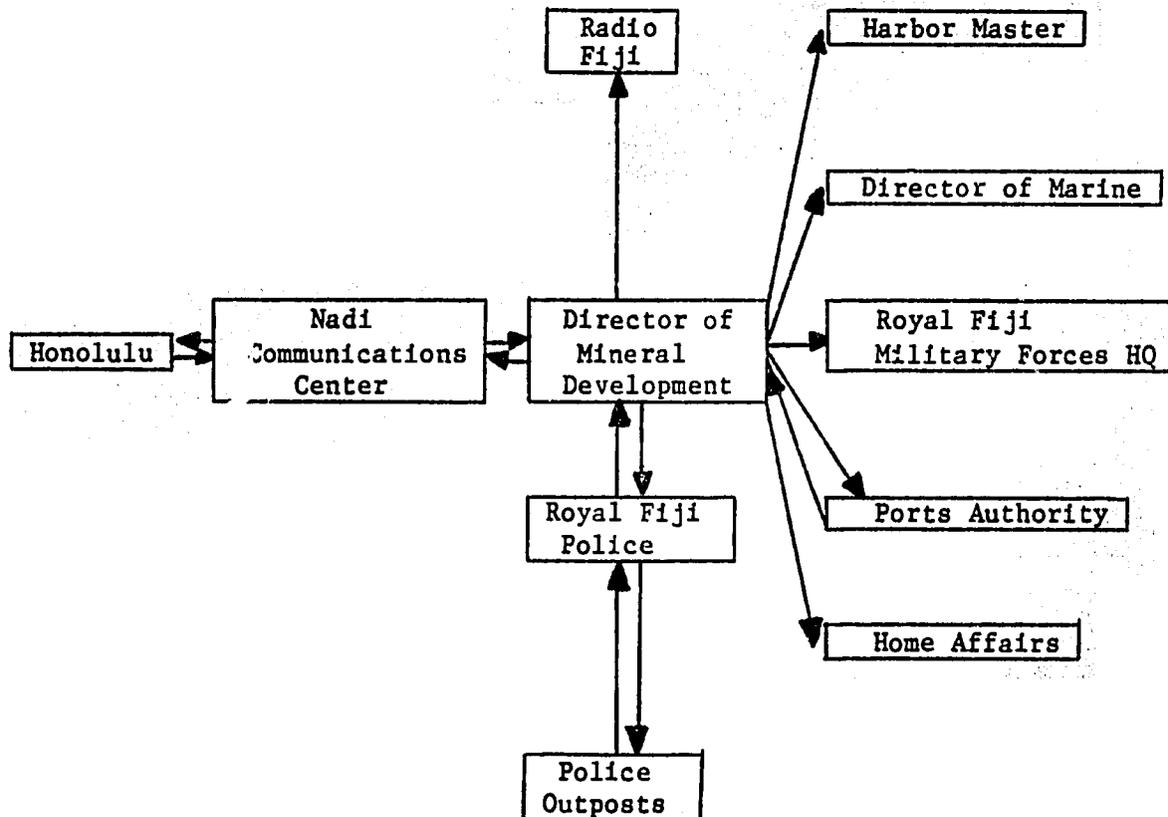
Meteorological Center in Wellington will arrange for Radio New Zealand to broadcast special bulletins to Fiji. From this description it is clear that Fiji's national broadcasting system plays a crucial role in the country's cyclone warning system. However, the viability of the system may be jeopardized by insufficient standby power facilities for the Fiji Broadcasting Commission.

Tsunamis

The international tsunami warning system is based in Honolulu, Hawaii. It provides Fiji and other Pacific islands with warnings of tsunamis that are created by strong Pacific earthquakes. Unfortunately, earthquakes occurring near Fiji may generate tsunamis that arrive before a warning can be issued by Honolulu. In such cases, the Director of Mineral Development must issue a warning to the appropriate departments and Radio Fiji, as shown in Figure 5 below.

Figure 5

Fiji's National
Tsunami Warning System



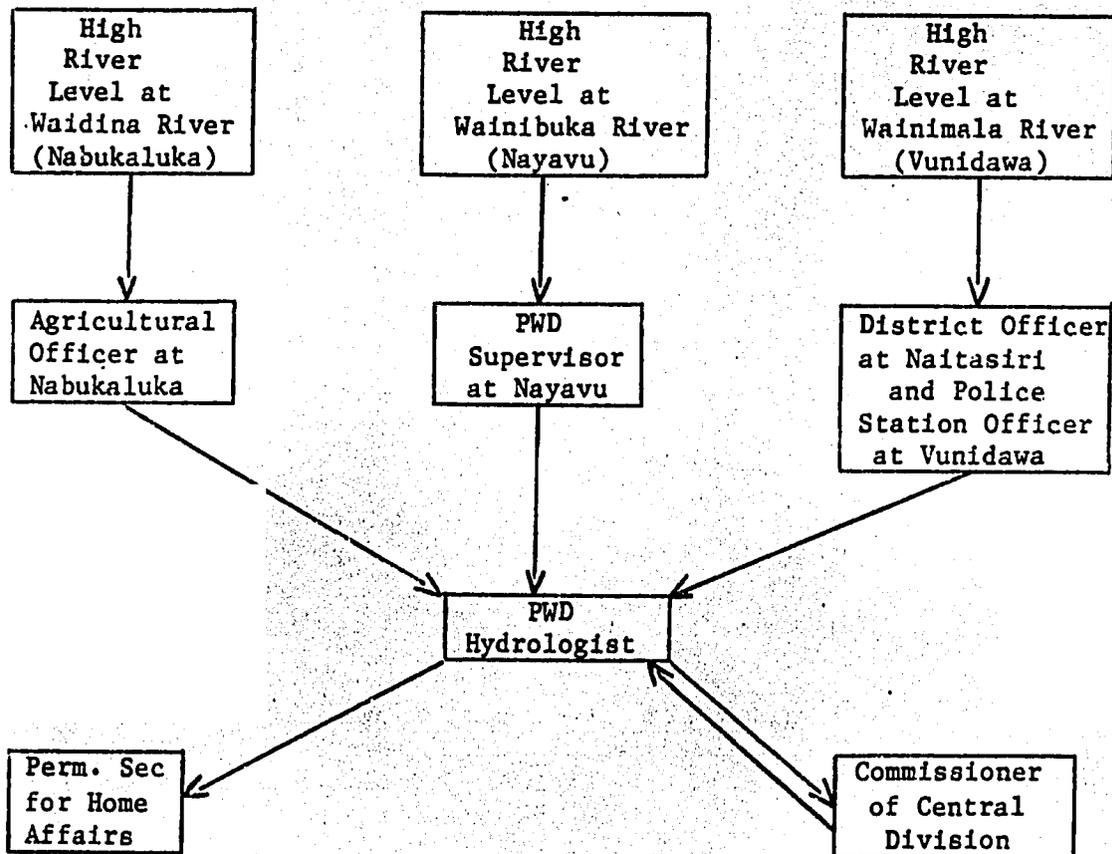
Source: EMSEC

Floods

Flood advisories for the Rewa and other rivers are prepared and issued by PWD hydrologists on the basis of hydrological information provided by the Hydrology Section of the Public Works Department. The diagram below shows the Flood Warning System for three of the Rewa River's tributaries that are prone to flooding.

Figure 6

Flood Warning System - Rewa River



Source: EMSEC

A problem with the flood warning system is the lack of access to meteorological information and advice available at the Nadi Weather Forecasting Center. The Government of Fiji is considering the provision of appropriate equipment to enable the communication of this information in the future. In September 1986 it announced plans for the installment of a computerized flood forecasting system for the Rewa River on Viti Levu.

Earthquakes

The Mineral Resources Department collects seismic data, but no precise techniques exist for predicting earthquakes at the present time. (See section 3.3, Mitigation Efforts).

Famine

Fiji is a member of the FAO Global Information and Early Warning System for Famine, headquartered in Rome.

3.3 Mitigation Efforts

Tropical Cyclones

Fiji's Ninth Development Plan indicates that progress is envisaged during the 1986-1990 period for improving the effectiveness of meteorological services, including cyclone warnings. The Government expects to establish a storm surge monitoring network at appropriate strategic coastal locations. Another project would replace Nadi International Airport's antiquated surveillance radar which is sited close to mountain ranges, preventing the identification of cyclones approaching from those directions. The replacement of Nadi Airport's windfinding radar is also under consideration.

During the past several cyclone seasons, communications between the Nadi Weather Forecasting Center and Suva have been disrupted. Essential back-up facilities and alternative routing of telephone/telex circuits including a high frequency voice/telex provision are being investigated. Several other changes to improve Fiji's meteorological services are under consideration, including the feasibility of shifting the meteorological services headquarters to Suva.

Floods

At present no systematized flood forecasting or control programs exist in Fiji despite a growing need for such services. The Rewa River dredging and flood mitigation project has been implemented at the cost of \$7 million. The project is designed to alleviate a "one in ten year flood," but each year increasing silt loads come down the river to replace the dredged materials. Much of the silt is due to erosion caused by agricultural malpractice. In the Waibau-Sawani area for example, tenant farmers have cleared all available land of forest cover, even the steepest slopes, and replaced it with shallow-rooted crops such as taro and ginger. The shallow roots do not bind the soil and the root bulk is too small to act as a temporary reservoir for water. Thus, landslides

occur as the soil becomes waterlogged and too heavy to be supported on the slope. Entire crops are lost as a result. Moreover, the volume and rate at which water arrives in Fiji's rivers are dramatically affected. The water runs rapidly across the ground, eroding the soil surface and depositing it in the river.

Downstream the effects of this process can be devastating, as demonstrated by the floods of April 1986. During these floods, Suva's water supply faced unprecedented disruption as a result of siltation and debris blocking the pumps at the pumping stations. Regular floods and landslides in Fiji in recent years have underscored the need to develop more effective control measures. Locally based environmental experts believe that the Waibau-Sawani area landslides could be replicated in other deforested areas.

Earthquakes

Seismological observations have been carried out in Fiji since the early part of this century, supported at first by scientific organizations in New Zealand, and subsequently strengthened by Lamont Geological Observatory's Upper Mantle Project in the 1950s and 1960s. In late 1979 the eight-station USAID network was established to complement three permanent stations in Viti Levu. The network was expanded in 1981 by the installation of a five-station telemetered network supported by Japan. With the installation of additional stations in 1983 and 1984, the network now encompasses eighteen stations (see Figure 7 on page 31).

The Mineral Resources Department also operates a network of strong motion accelerographs. Fiji acquired the initial six instruments of this network through USAID and the remainder were purchased directly by the Fiji government. Records obtained from this network are expected to provide the basis for predicting ground accelerations, and thus contribute to the development of building codes tailored to Fiji's seismic vulnerability.

3.4 Health

Medical services are available at three divisional hospitals in Suva, Lautoka, and Labasa. In addition, there are 15 sub-divisional hospitals, four area hospitals, three special hospitals, 46 health centers, and 94 nursing stations. Supplements to the government health services include two government subsidized private hospitals, 93 private doctors, 14 dentists, and 27 pharmacists. The locations of Fiji's hospitals and health centers are shown in Figure 8 on page 32.

In 1984, the number of hospital beds available in the country was 1,801. Below is a breakdown of the number of beds per hospital.

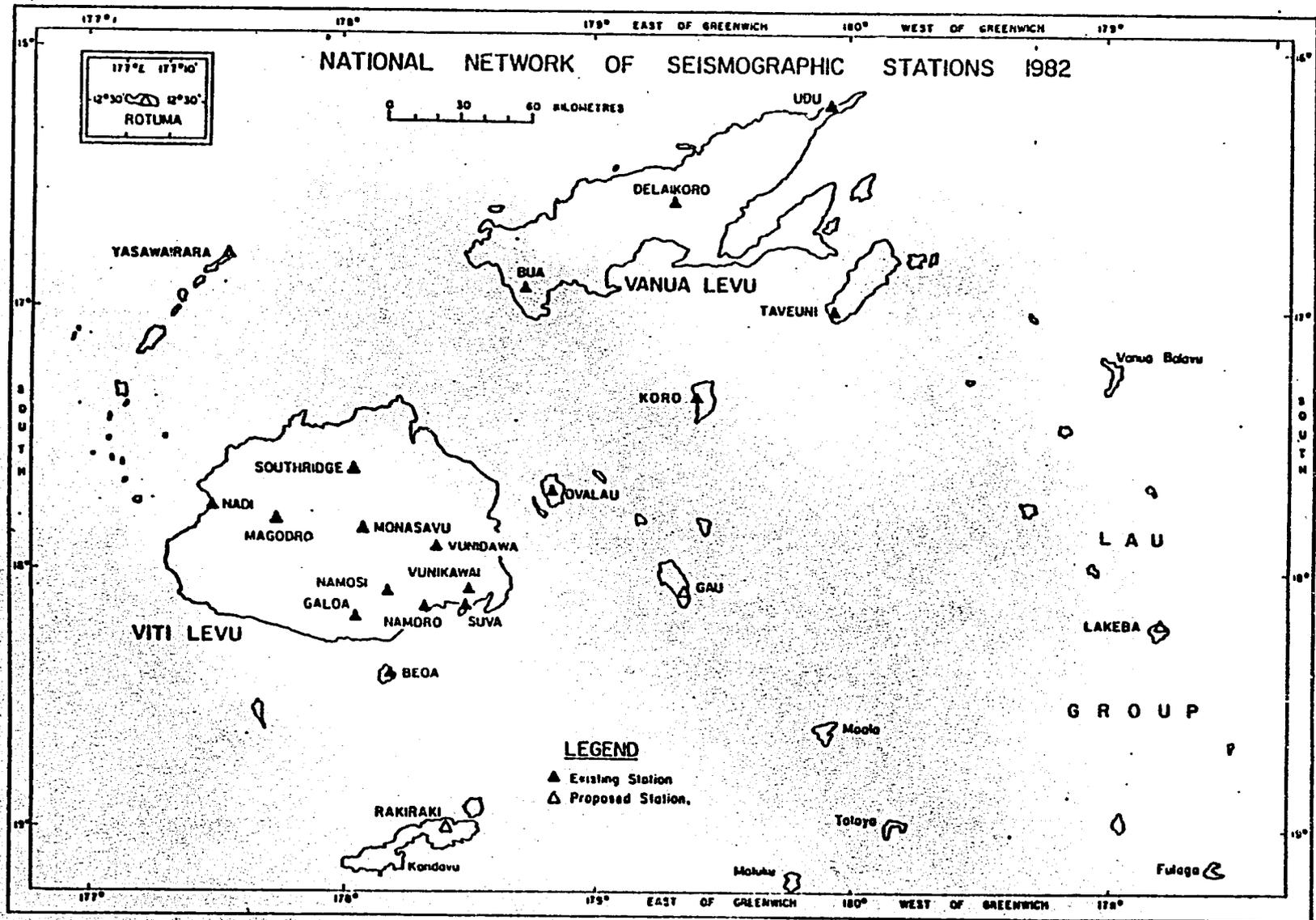
Table 3

HOSPITAL BEDS IN FIJI, 1984

<u>DIVISIONAL HOSPITALS:</u>							<u>NUMBER OF BEDS</u>
Colonial War Memorial	..	..	..	..	..	..	376
Lautoka	..	..	..	..	..	..	324
Labasa	..	..	..	..	..	..	129
Levuka	..	..	..	..	..	..	40
							<u>869</u>
<u>SUBDIVISIONAL HOSPITALS:</u>							
Sigatoka	..	..	..	..	..	..	56
Savusavu	..	..	..	..	..	..	56
Taveuni	..	..	..	..	..	..	51
Nadi	..	..	..	..	..	..	51
Vunisea	..	..	..	..	..	..	31
Ra	..	..	..	..	..	..	18
Nabouwalu	..	..	..	..	..	..	15
Lakeba	..	..	..	..	..	..	12
Lomaloma	..	..	..	..	..	..	12
Vunidawa	..	..	..	..	..	..	12
Nausori Maternity Unit	..	..	..	..	..	..	15
Tavua Maternity Unit	..	..	..	..	..	..	15
Korovou Maternity Unit	..	..	..	..	..	..	10
Navua Maternity Unit	..	..	..	..	..	..	10
							<u>364</u>
<u>AREA HOSPITALS:</u>							
Na'ilaga	..	..	..	..	..	..	20
Wainibokasi	..	..	..	..	..	..	12
Matuku	..	..	..	..	..	..	8
Rotuma	..	..	..	..	..	..	20
							<u>60</u>
<u>SUBSIDISED HOSPITALS:</u>							
Ba Methodist Mission	..	..	..	..	..	..	51
Ra Catholic Maternity	..	..	..	..	..	..	7
							<u>58</u>
<u>SPECIAL HOSPITALS:</u>							
Tamavua	..	..	..	..	..	..	180
St. Giles'	..	..	..	..	..	..	190
P.J. Twomey Memorial	..	..	..	..	..	..	80
							<u>450</u>
<u>TOTAL:</u>							<u>1,801</u>

Source: Ministry of Health and Social Welfare, Annual Report, 1984, pp. 23-24.

FIGURE 7



Source: Cornell University, Quarterly Progress Report to OFDA, January 21, 1985

Network of seismic stations in Fiji, established through the assistance of U.S. A.I.D. and Japanese aid programs.

Fiji has operated under a National Bulk Drug Purchase Scheme since 1981. Medicines are regularly purchased from Australia and New Zealand so that a six month supply of all major drugs is maintained at the Government Pharmacy in Suva. Cold storage facilities are adequate in urban areas. In rural areas each nursing station is provided with a kerosene-burning refrigerator for the storage of vaccines.

The major cause of death in Fiji is circulatory disease followed by neoplasms and infective and parasitic diseases. A marked increase has occurred in noncommunicable diseases such as cancer, diabetes, hypertension, heart disease, and stroke. Influenza remains the main notifiable disease with 71,200 cases reported in 1984. An alarming trend has been the steady increase in reported cases of sexually transmitted diseases.

Severe injury from flying debris and drownings are the most common causes of death in cyclones or flooding disasters. Dengue fever often becomes a serious concern after these types of disasters because pools of standing water offer ideal breeding grounds for mosquitos. Dengue fever and Ross River fever are endemic in Fiji.

The Ministry of Health's Vector Control Unit is responsible for biological control of the mosquito vector and for virological studies. The Unit maintains countrywide monitoring of mosquitos including the identification of problem areas and advice on source reduction by environmental control. Breeding grounds most favored are discarded tires, coconut shells, empty cans, bottles, and flower containers. A different mosquito family carries filariasis and breeds in crab holes. From time to time campaigns are waged to reduce the mosquito population but the local community tends to be apathetic about destroying potential breeding grounds. The Vector Control Unit also controls other vectors such as flies, cockroaches, fleas, and bed bugs.

3.5 Water Supply

Approximately 75% of Fiji's population has clean, piped water in the form of individual metered connections in urban areas or rudimentary water main networks in villages. The remaining 25% rely on untreated and unmetered water or rainwater.

Urban Water Supplies

Urban water supplies are carefully supervised; tap water is potable in all of the urban and town areas. Planned improvements in urban water supplies include a project on the Coral Coast to cater for increased demand from tourism development. Rakiraki, Levuka, Savusavu, and Korovou water supplies are targeted for improvement during the next five years.

Rural Water Supplies

A borehole subsidy scheme provides untreated and unmetered water to villages and settlement communities, which are expected to contribute one-third the cost of materials plus free unskilled labor. Pilot projects are underway involving new techniques such as desalination, either by reverse osmosis or solar still, and solar pumps. Vaturu dam was recently completed to provide treated water to the Nadi/Lautoka region.

3.6 Sanitation

About 75% of Fiji's population relied on pour-flush or pit latrines in 1973 as compared to 55% in 1984 as shown in the table below.

Table 4Estimated Population Served by Methods of Sewerage Disposal

	<u>Population Served by Sewerage Facilities</u>					<u>Total</u>
	<u>Sewage Treated</u>	<u>Sewage Untreated</u>	<u>Septic Tanks</u>	<u>Pit Latrine</u>	<u>No Facilities</u>	
1973	2%	5%	18%	75%	n.a.	100%
1977	5%	5%	20%	70%	n.a.	100%
1980	6%	6%	28%	60%	n.a.	100%
1984	13%	0%	32%	54%	1%	100%

Source: Fiji's Ninth Development Plan, 1986-1990, Parliamentary Paper No. 69 of 1985.

Reticulation to villages is minimal and as a result many villages located within town boundaries and adjacent to trunk sewers still rely on pit latrines or septic tanks for waste disposal.

3.7 Communications

The Department of Posts and Telecommunications is responsible for national telegraph and telephone services. There are automatic exchanges in most urban areas and direct dialing is possible between major towns. Increased demand for telephone services has resulted in a backlog of requests for telephones. The waiting list in 1984 stood at 10,261 by the end of the year and service in rural areas and especially outer islands is very limited.

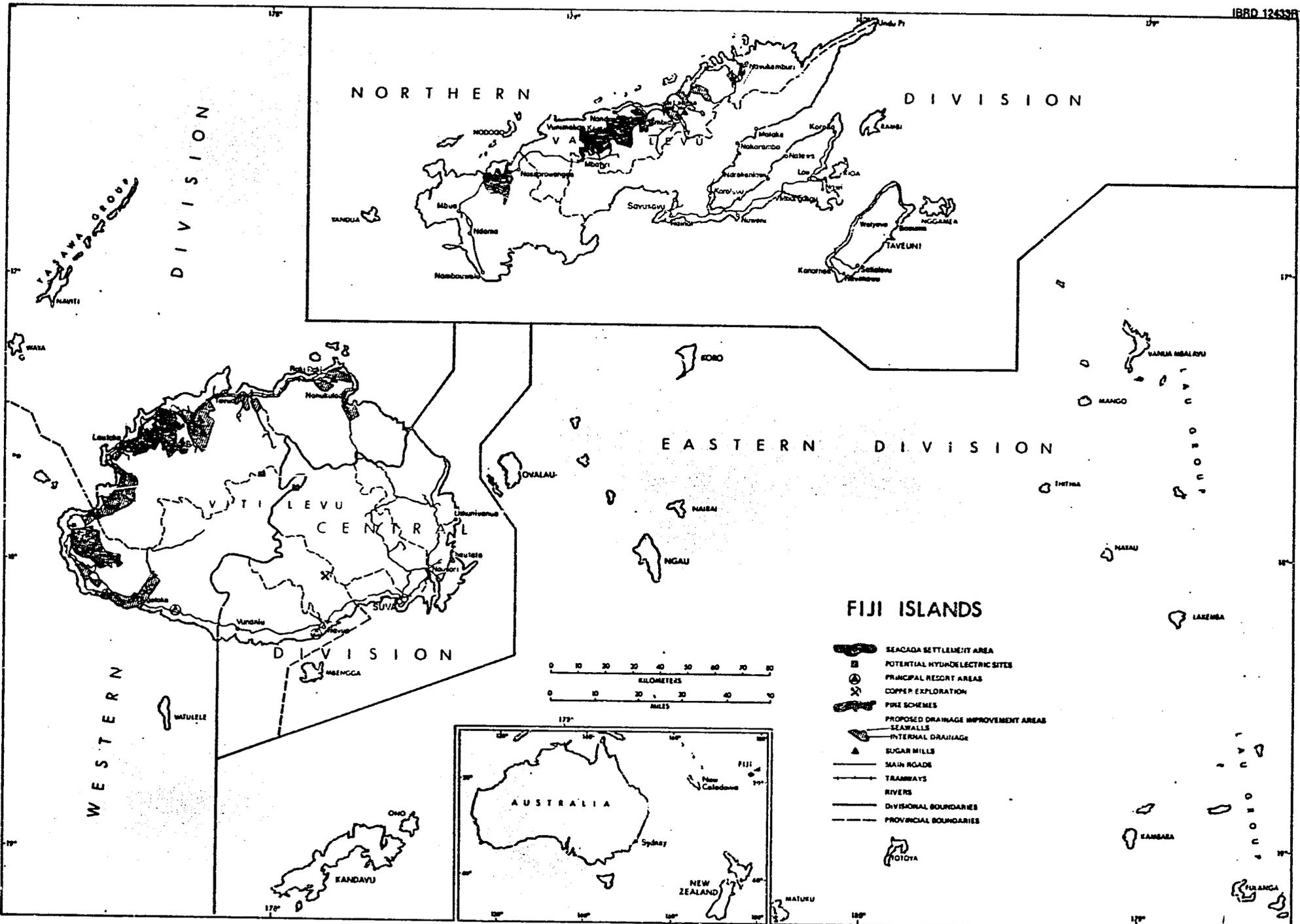
In times of natural disaster, disruption of services is likely. The GOF is planning to upgrade the existing trunk telephone network and provide alternative routes to avoid these disruptions. Telecommunications such as telex and data transmission are also targeted for improvement. Telephones or radiotelephones link almost all islands. The Department of Posts and Telecommunications has 130 radiotelephone stations in place around the country.

Fiji is the telecommunications center for the South Pacific Region. International telecommunications links are provided by Fiji International Telecommunications Limited (FINTEL), a private company licensed by the GOF. The government has a 51% share in the company with Cable and Wireless (U.K.) as joint partner. FINTEL operates a submarine coaxial cable at Vatuwaqa and a satellite earth station at Wailoku. Worldwide telecommunications is provided through direct circuits and utilization of several overseas switching centers. FINTEL also provides leased circuits and facsimile service. A transpacific cable that links Fiji to Australia, New Zealand, Hawaii, and Canada is FINTEL's largest single investment. The company is also acquiring capacity in other facilities in order to have direct terrestrial service to Papua New Guinea and Great Britain through the new cable.

3.8 Road Transport

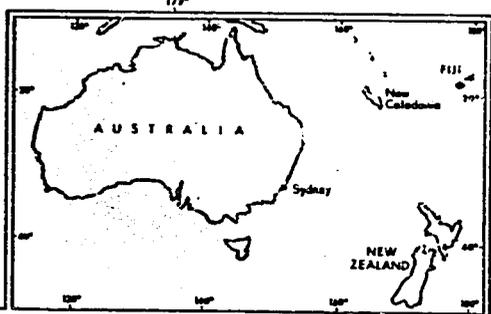
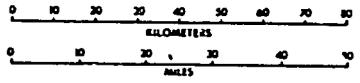
The road network in Fiji has expanded from 2,600 km in 1970 to 4,600 km in 1984. A total of about 600 km are sealed. The longest road in Fiji circles Viti Levu and measures 510 km. A stretch of this road is the multimillion dollar highway between Suva and Nadi (Queen's Road) completed in 1985. On the other main island, Vanua Levu, a system of roads connects the major towns but rural and outlying areas lack access roads. The islands of Gao, Koro, and Lakeba have substantial road networks while Kadavu, which is larger and more populated, is very poorly provided with roads.

During the last decade the government has given priority to providing roads in remote and isolated areas. With this focus on rural roads, main urban and arterial roads have been relatively neglected and



FIJI ISLANDS

- SEACADA SETTLEMENT AREA
- POTENTIAL HYDROELECTRIC SITES
- PRINCIPAL RESORT AREAS
- COPPER EXPLORATION
- PINE SCHEMES
- PROPOSED DRAINAGE IMPROVEMENT AREAS
- SEAWALLS
- INTERNAL DRAINAGE
- SUGAR MILLS
- MAIN ROADS
- TRAMWAYS
- RIVERS
- DIVISIONAL BOUNDARIES
- PROVINCIAL BOUNDARIES



MSW

maintenance has not kept pace with pressures from increased traffic volume. By the end of 1984 Fiji had 57,700 vehicles, nearly half of which were private cars.

3.9 Air Transport

Air Pacific is the national airlines of Fiji. For international flights the company's fleet includes one B-737; two BAC 1-11s for flights to Australia, New Zealand, and certain South Pacific islands. Air Pacific also operates a domestic service. In addition, there are eight private companies involved in domestic air services with a total of 28 aircraft, mostly 10 and 18-seaters. Nineteen government and private air landing facilities are situated throughout the country including the international airports at Nadi and Nausori (see Figure 9, page 37). Nadi International airport is one of the main international airports in the region. It maintains a high standard and offers all facilities necessary for servicing international flights. The smaller Nausori Airport, located just outside of Suva, has limited facilities for customs and immigration as well as limited health inspection and medical facilities. Aircraft with weight in excess of 115,740 lbs. or tire pressure in excess of 100 psi are not permitted to land at Nausori Airport. Airplanes inbound from malarial areas are also prohibited from landing at Nausori.

3.10 Ports

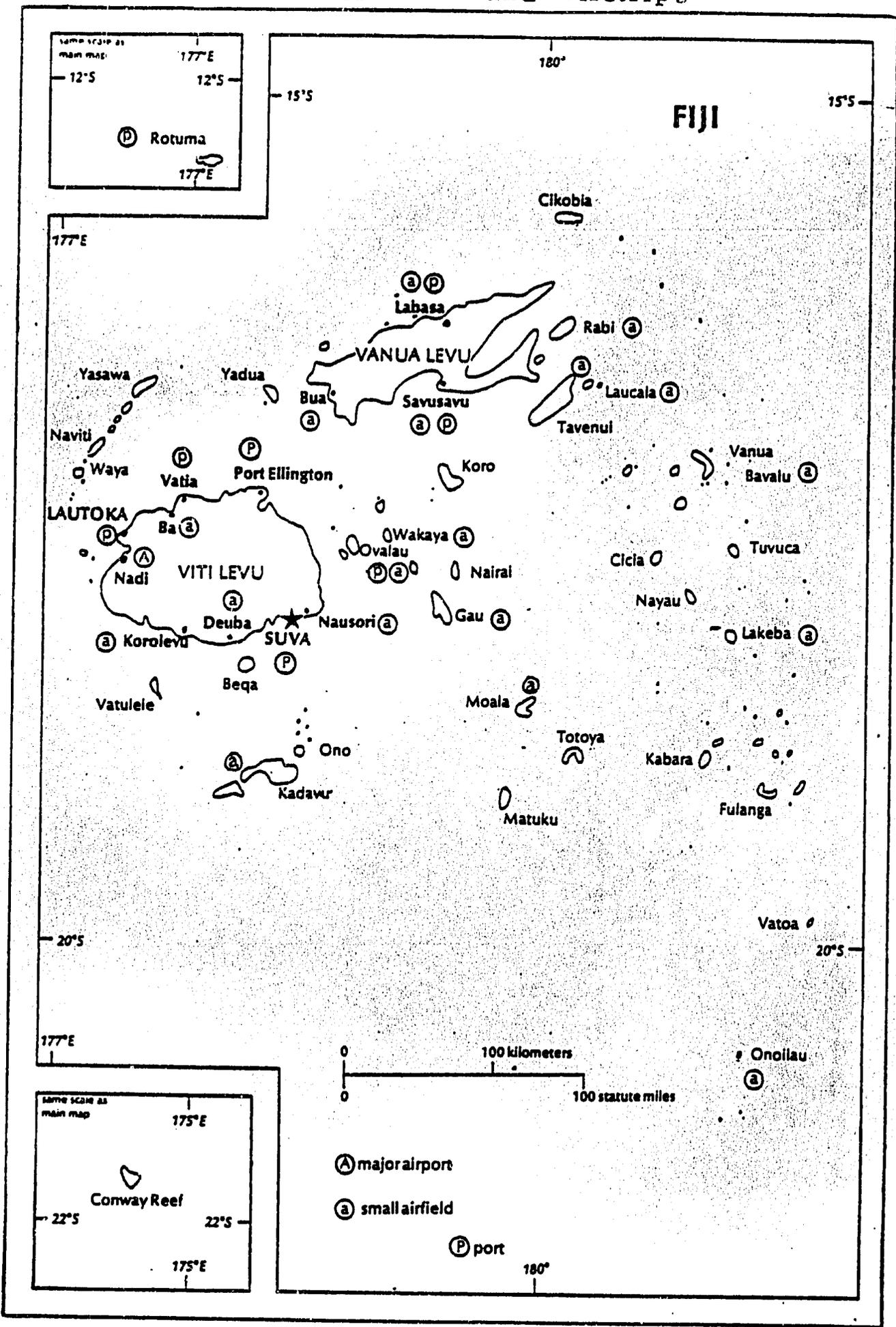
Water and fuel oil can be obtained at all three major ports (Suva, Lautoka, and Levuka). Ships' derricks discharge all cargo as there are no cranes at the ports. At Lautoka and Suva, ships can be connected to telephone services and at Suva, harbor tugs are available.

The main Suva wharf has a face of 495 meters and can take vessels up to 42,000 tons. Recently, Suva wharf was upgraded to cope with greater amounts of cargo and container technology. Similar improvements are underway at Lautoka. Smaller wharves are located at Vatia and Ellington on Viti Levu, at Labasa and Savusavu on Vanua Levu and at Rotuma. A total of 19 jetties are located in Fiji, mainly on the bigger islands. Figure 9 on page 37 shows the location of Fiji's ports.

3.11 Marine Transport

The government fleet has 50 vessels of which nine are medical vessels and 20 are used for commercial passengers and cargo carriage. The remaining 21 vessels are for supply and maintenance of island telecommunications, dredging, and official government use. Approximately 45 large private vessels are available in Fiji. Many are very old and some

FIGURE 9 Location of Ports and Airstrips



Source: PIDP, Disaster Preparedness and Disaster Experience in the South Pacific, August, 1982.

have become obsolete or unseaworthy. Compared to the private vessels, the government vessels are generally larger in size with an average age of eight years.

A major marine transport bottleneck is the lack of regular and reliable shipping services to all ports of Fiji, particularly isolated areas. One reason for the poor service is a tendency of private operators, who transport the bulk of commercial cargo by sea, to compete heavily on the more lucrative routes while others are neglected. Moreover, although marine infrastructure such as ports and jetties are developed sufficiently in the main islands, the outer islands do not have adequate facilities.

3.12 Energy

Fiji Electricity Authority (FEA) is the sole provider of Fiji's electric power. With the opening of the \$230 million Monasavu Hydroelectricity Project in 1983, the GOF envisions that oil imports will eventually be cut by more than 60 percent. The project is expected to provide sufficient power generation capacity to satisfy Viti Levu's needs up to 1992. About 50 percent of total energy used in Fiji is derived from local energy sources.

3.13 Housing

The primary threat to housing in Fiji is from cyclones and to a lesser extent, earthquakes and floods. Virtually each time a cyclone passes over Fiji, thousands of homes are destroyed. Moreover, many areas of Fiji are affected two or even three times per decade. The following table shows the number of homes and school buildings destroyed in selected cyclones from 1972-1985.

Table 5

Destruction of Homes and School
Buildings, 1972-1985

Cyclone	Houses Destroyed	School Buildings Damaged or destroyed (a)
Bebe	11,770	251
Juliette	n.a.	13
Lottie	1,373	62
Val	758	38
Betty	n.a.	1
Anne	84	n.a.
Bob	180	n.a.
Fay	317	n.a.
Meli	1,322	263
Tia	605	31
Wally	269	31
Arthur	569(b)	22(c)
Oscar	4,653	301(d)
Eric/Nigel	9,646	116(e)

Source: Dealing with Disaster - Hurricane Response in Fiji; Office of U.S. Foreign Disaster Assistance Annual Report FY 1983; and PIDP's Cyclone "Eric" and "Nigel" Report, February, 1985.

^aThese figures may be overestimates as they refer to the number of buildings constructed as replacements rather than the number damaged or destroyed. In many cases, two smaller buildings were constructed to replace one destroyed.

^bThis figure may be an underestimate as it does not include housing losses in Nadroga.

^cThis figure may be an underestimate as it refers only to the number of schools affected rather than the number of buildings.

^dThis figure refers to the number of classrooms actually destroyed.

^eThis figure refers to the number of school buildings actually destroyed.

In Fiji, buildings are constructed of wood, concrete block, corrugated iron, or thatched pandanus. The latter are known as "bures" and are considered reasonably resistant to high winds especially when built along strictly traditional patterns. Wood frame and concrete block homes are considered the least vulnerable to cyclone damage while homes built of corrugated iron tend to be most vulnerable.

Following massive insurance payouts after the 1982/83 and 1984/85 cyclone seasons, Fiji's Commissioner of Insurance, supported by the insurance industry, set up the Fiji Building Standards Committee to help prevent such crippling insurance losses in the future, and to ensure that it remains profitable for insurance companies to operate in Fiji. As part of this new initiative, the GOF has produced a pamphlet of guidelines for homeowners that gives advice on how to upgrade a house. The homeowner chooses from three design upgrades, makes the repairs, and then is issued a certificate by a structural engineer after the house has been thoroughly inspected. Only then is the homeowner considered eligible for insurance coverage. Home finance authorities have agreed to provide finance to persons wishing to make such improvements, subject to individual loan criteria.

The GOF has also taken action to reduce the vulnerability of structures to earthquakes. New Zealand earthquake design codes have been adopted and are supposed to be applied to all domestic and commercial construction in urban areas. Considerable difficulty remains in enforcement of these regulations, particularly in construction of private dwellings. In general, major multistory building design is handled by overseas (Australian or New Zealand) engineers.

For a comprehensive study of the vulnerability of the housing sector in Fiji, see Improvement of Low Cost Housing in Fiji to Withstand Hurricanes and Earthquakes, prepared by INTERTECT for OFDA in April 1982.

3.14 Host Country Voluntary Agencies

In Fiji the PVOs are coordinated by the Fiji Council of Social Services (FCOSS). In 1986, FCOSS created a disaster emergency sub-committee comprised of PVOs involved or interested in relief work and chaired by the Director of the Fiji Red Cross (FRC). The group has reported its combined capabilities to the GOF with the aim of playing a more active role in the EMSEC's relief operations.

The FRC is the major PVO involved in disaster relief. It has 16 branches and a headquarters in Suva that remain in an admirable state of preparedness for the frequent cyclones that affect Fiji. Stocks of clothing, blankets, food, plastic sheeting, toiletries, and first aid kits are maintained at the national and branch offices. After a disaster, the FRC sends relief teams to the stricken areas for immediate distribution of supplies to the most needy. The Director of the FRC

attends EMSEC meetings and is kept abreast of activities at the national level. Coordination with EMSEC at the district level, however, is difficult and duplication of relief efforts has been a problem in the past.

The FRC has also provided shelter assistance to victims of disasters. The recipients have been those with no active income earner in the family; the elderly; and widows or deserted wives with children. Another disaster relief project conducted by the FRC was a school book assistance project. Eighteen schools received text and exercise books following Cyclone Eric in 1985. The books remain the property of the school for use by needy students in successive classes. As part of another project, thirteen rural boarding schools whose gardens had been destroyed by Eric benefited from a school ration project. The two-month rations were intended to supplement the rations provided by the PMRRC.

Other local groups that can be expected to provide assistance in disasters are FCOSS, Seventh-Day Adventists, and Fiji Council of Churches. St. John Ambulance Association provides ambulance services in Suva, Nausori, Vatukoula, and Nadi. Individual churches or church groups may also play a role in relief.

Addresses for these PVOs are:

Fiji Red Cross Society
G.P.O. Box 569
Suva
Telephone: 24585

Fiji Council of Social Services
G.P.O. Box 2400
Suva
Telephone: 312649

Seventh-Day Adventists
P.O. Box 297
Suva
Telephone: 361295

Fiji Council of Churches
Marks Street
Suva
Telephone: 313798

St. John Ambulance
G.P.O. Box 70
Suva
Telephone: 24584

See also Section 3.17, U.S. Voluntary Agencies.

3.15 USAID Mission and Other U.S. Resources

The USAID/South Pacific Regional Development Office (SPRDO) is located at the American Embassy in Suva. SPRDO administers the USAID program in ten Pacific countries including Fiji and has a continuing relationship with OFDA, given the region's proclivity to natural disasters. SPRDO assistance is focused on agriculture (including fisheries), health, and development administration. Training and private enterprise development are major themes in these programs. To date, the bulk of SPRDO assistance to the ten countries has been implemented indirectly through PVOs, regional organizations, and a small grants "Accelerated Impact" program with the Peace Corps. A bilateral agreement with the U.S. is currently under negotiation and, if signed, would begin direct government-to-government assistance to Fiji.

The Peace Corps is very active in Fiji with 120 volunteers as of September 1986. On an informal basis, volunteers in the past have been involved in disaster relief work either in their home villages or in conjunction with a local voluntary organization.

Mission Disaster Relief Plan

A South Pacific Regional Mission Disaster Relief Plan was written in 1983. The plan identifies the responsibilities of the Chief of Mission, Mission Disaster Relief Officer (MDRO), and the Emergency Action Committee. The current SPRDO staff also attempt to maintain an updated list of resources and local contacts in times of disaster.

3.16 U.S. Disaster Relief and Preparedness Activities

Emergency Activities

Since the establishment of OFDA in 1964, the USG has responded to 12 disasters in Fiji. Emergency assistance has included tents, food, grants to PVOs, and the provision of assessment teams. The following list gives a more detailed description of U.S. disaster relief in Fiji:

Table 6

U.S. Disaster Assistance to Fiji 1964-1986

<u>Year</u>	<u>Disaster</u>	<u>Commodity/Service</u>	<u>Provided Thru</u>	<u>Cost</u>
1964	Flood	Amb. Auth.	Govt.	\$10,000
	Flood	Food Title II	Local RC	\$10,600
				<u>\$20,600</u>
1965	Cyclone	Food Title III	ANRC	\$5,211
				<u>\$5,211</u>
1973	Cyclone	Airlift		\$14,511
	Cyclone	Amb. Auth.	Govt.	\$25,000
	Cyclone	Food	U.S. Mission	\$3,700
	Cyclone	Food		\$73,171
	Cyclone	Food		\$6,256
	Cyclone	Food Title II		\$161,300
	Cyclone	Tents		\$285,260
	Cyclone	Vehicles		\$150,104
	Cyclone	Water Tanks		\$118,180
			<u>\$837,482</u>	
1974	Cyclone	Amb. Auth.	Govt.	\$1,300
				<u>\$1,300</u>
1975	Cyclone	Airlift	DOD	\$113,447
	Cyclone	Airlift	CWS	\$10,059
	Cyclone	Airlift	ADRA	\$10,392
	Cyclone	Airlift	Govt.	\$15,000
	Cyclone	Amb. Auth.	Local RC	\$3,000
	Cyclone	Assessment Team	DOD	\$6,977
	Cyclone	Blankets		\$2,847
	Cyclone	Cots		\$15,527
	Cyclone	Disaster Experts	OFDA	\$2,900
	Cyclone	Tents		\$123,000
				<u>\$303,149</u>
1980	Cyclone	Amb. Auth.	Govt.	\$25,000
	Cyclone	Food		\$250,000
	Cyclone	Personnel Support	PCV	\$0
				<u>\$275,000</u>

<u>Year</u>	<u>Disaster</u>	<u>Commodity/Service</u>	<u>Provided Thru</u>	<u>Cost</u>
1983	Cyclone	Airlift	Trans America	\$304,740
	Cyclone	Airlift		\$104,258
	Cyclone	Amb. Auth.	Govt.	\$25,000
	Cyclone	Assessment Team	DOD	\$125,000
	Cyclone	Food		\$5,506
	Cyclone	Grant	ADRA	\$52,780
	Cyclone	Grant	FSP	\$125,476
	Cyclone	Grant	Govt.	\$71,600
	Cyclone	Medical Personnel	DOD	\$0
	Cyclone	Personnel Support	DOD	\$0
	Cyclone	Personnel Support	PCV	\$0
	Cyclone	Plastic Sheeting		\$81,076
	Cyclone	Tents		\$634,025
	Cyclone	Tents		\$200,125
			<u>\$1,729,586</u>	
1983	Cyclone	Amb. Auth.	Govt.	\$25,000
	Cyclone	Grant	Govt.	\$27,160
	Cyclone	Water Containers		\$2,280
			<u>\$54,440</u>	
1985	Cyclone	Airlift	DOD	\$288,505
	Cyclone	Airlift	Trans America	\$215,823
	Cyclone	Airlift	Eastern	\$2,755
	Cyclone	Amb. Auth.	Govt.	\$25,000
	Cyclone	Disaster Experts	OFDA	\$1,200
	Cyclone	Insecticide		\$2,306
	Cyclone	Sprayers		\$7,443
	Cyclone	Transport		\$2,339
	Cyclone	Water Containers		\$7,316
	Cyclone	Plastic Sheeting		\$174,080
	Cyclone	Tents		\$84,150
			<u>\$810,917</u>	
1986	Flood	Medical Supplies		\$25,000
	Flood	Insecticide		\$2,204
	Flood	Sprayers		\$3,506
			<u>\$30,710</u>	
		GRAND TOTAL		<u>\$4,118,395</u>

Source: OFDA, Commodity/Services File. August, 1986.

Preparedness Activities

In an effort to improve Nadi's cyclone early warning system for the South Pacific, OFDA funded the installation of a satellite direct readout station at the Nadi Weather Forecasting Center at Nadi Airport. High resolution satellite receiving equipment was provided which processes, analyses, and displays data from GOES and GMS satellites. The installation was completed in August 1986.

In 1984, OFDA gave a grant to the East-West Center's Pacific Island Development Program for a community preparedness and development program in the South Pacific. The project objectives were to provide written reports on the state of preparedness and vulnerability of island nations including Fiji and to conduct workshops geared toward assisting national governments in planning and developing their own disaster response programs.

OFDA also gave a grant to Cornell University for an evaluation of seismic risk in the Fiji-Tonga-Vanuatu region of the Southwest Pacific. The objective of the project was to develop a seismicity information base to help in regional earthquake prediction, building design, and civic planning. The project began in 1978 and was completed in 1985.

OFDA sponsored the participation of Fiji's Director of Meteorology at a 1985 World Meteorological Organization workshop in Bangkok, Thailand. The workshop focused on tropical cyclone forecasting.

3.17 U.S. Voluntary Agencies

Save the Children Fund operates a sponsorship scheme to assist children in need with school fees and other educational expenses.

Save the Children Fund
P.O. Box 2249
Government Bldgs., Suva
Telephone: 313178

Salvation Army World Service Organization sponsors a variety of programs in Fiji aimed at community service and youth activities. A rehabilitation center offers accommodation and training in carpentry, farming, and welding. The organization has been heavily involved in past disaster relief and rehabilitation efforts and in 1983 received a grant from OFDA to provide building materials, tools, equipment, technical assistance, and logistical support to assist reconstruction work following Cyclone Oscar.

Salvation Army
P.O. Box 1458
Suva
Telephone: 315177

The Foundation for the Peoples of the South Pacific (FSP) has supported a wide range of programs in several South Pacific countries. FSP's projects in Fiji have included assistance in housing development, youth welfare, agricultural and religious training, credit union development, fisheries development, women's programs, and in the improvement of private hospital facilities and nutritional standards.

FSP has also been involved directly in disaster relief activities. Following Cyclone Oscar in 1983, USAID gave a grant to FSP for a one year cyclone rehabilitation program. The program helped villages to reconstruct kitchens and toilets and rehabilitate damaged gardens.

Foundation for the Peoples of the South Pacific
P.O. Box 1493
Suva
Telephone: 311392

World Vision International also has a program in Fiji and can be contacted at:

World Vision International
Pacific House
Suva
Telephone: 314377

3.18 Regional Organizations

The South Pacific Bureau for Economic Cooperation (SPEC) is a regional organization with 11 South Pacific country members. SPEC's role is to encourage and promote regional cooperation in the expansion of trade and economic development. In 1977, SPEC was given a mandate by member governments to coordinate a regional disaster relief and preparedness strategy, and a regional disaster fund was set up to supplement locally available relief resources. However, the evolution of SPEC as a regional disaster focal point has not occurred, although a disaster advisor was hired in 1984 on a short term contract to disseminate information and set up preparedness programs.

SPEC
Ratu Sukuna Rd.
Suva
Telephone: 312600

3.19 International Organizations

The United Nations Development Program (UNDP) has a wide range of projects in Fiji. The UNDP resident representative acts as the UNDR0 coordinator in times of disaster and is mandated by a general assembly resolution to convene disaster meetings in response to a request from the stricken country's government. Donor government representatives and other representatives from concerned bodies attend these meetings to plan coordinated responses and monitor the disaster situation.

UNDP
Private Mail Bag
Suva
Telephone: 312500

Both the European Economic Community (EEC) and the World Food Program (WFP) have offices in Fiji. In the past, these organizations have been most active in supplying food assistance to disaster victims following cyclones. WHO also has representatives in Fiji and is involved in a wide variety of health projects.

WFP
National Bank of Fiji Building
Victoria Parade
Suva
Telephone: 313529

WHO
YMCA Building
Suva
Telephone: 313499

EEC
Dominion House
Suva
Telephone: 313633

3.20 Mitigation and Development

Fiji has achieved one of the highest per capita incomes in the South Pacific. The economy is based on a highly competitive sugar industry, a well-established and efficient tourism industry, and related trade and banking services. The country leads the South Pacific islands in the health and social fields and offers a credible government and stable political environment to foreign investors and lenders. In the past, cyclones in particular have caused costly setbacks to agriculture and tourism, but the economy has shown itself to be remarkably resilient.

The GOF can be commended for its system of disaster response mechanisms and an early warning network that performs reasonably well. Moreover, decision makers have recently shown an increasing awareness of risks, especially to housing, by implementing building codes and new cost reducing insurance initiatives. These accomplishments notwithstanding, the process should be taken further to address disaster mitigation in the context of development.

Specifically, the GOF could further lessen the impact of disasters through the following initiatives. First, more strict design standards are needed for development projects. Design and location of projects should minimize risks and, where such risks cannot be satisfactorily covered, contingency plans should be put in place. In April 1986, flooding and silting damaged the main water intakes at Nausori and Tamavua and resulted in severe water pollution and shortages in the Suva metropolitan area. Suitable plans to cope with flooding and redundancy in the water supply system's design would have helped to prevent the severe consequences of this disaster.

Programs in public education should be initiated to encourage the planting of crops that are less affected by disasters. Of course few, if any, plants can survive the full impact at the center of a severe cyclone, but not all crops are equally vulnerable. Policies should be pursued that discourage the consumption and farming of food staples that are highly susceptible to cyclone damage. For example, cassava has a high stalk and is thus extremely vulnerable to wind damage whereas sweet potatoes grow close to the ground and mature much more quickly. The GOF should also adopt land use regulations to control erosion and deforestation. Agricultural practices need to be carefully monitored and farmers should be actively encouraged to incorporate measures that minimize soil erosion.

Finally, strict enforcement of recently adopted building codes and techniques should be pursued, if only to achieve a reduction in skyrocketing insurance premiums. It is critical that disasters be anticipated and that mitigation and preparedness be built into Fiji's planning process. In this way, Fiji will be better able to absorb a disaster and reduce the human suffering that inevitably results.

FIJI - Cyclones

Date: Cyclone Eric - January 17-18, 1985
Cyclone Nigel - January 19-20, 1985
Cyclone Hina - March 17, 1985

Location: Western and Central divisions, especially western and southern Viti Levu

No. Dead: Cyclones Eric and Nigel - 28
Cyclone Hina - 1

No. Affected: Cyclones Eric and Nigel - over 100,000 people affected; an estimated 30,000 homeless. Cyclone Hina - 20,000 evacuated

Damage: Cyclones Eric and Nigel - Widespread damage to housing (21,846 homes totally or partially destroyed), schools, and other public and commercial buildings; power, transport, and communications systems; and crops. Building insurance claims reached \$73 million. Cyclone Hina - extensive damage to subsistence and commercial crops in Sigatoka Valley. Property damage estimated at \$3 million.

The Disaster

Cyclone Eric slammed into the main island of Viti Levu on the evening of January 17, the first of several cyclones to hit Fiji in an exceptionally severe season. The storm followed a southeasterly course, passing over the capital city of Suva before moving on to the country's eastern Lau Group. Described as one of the worst storms ever to hit Fiji, the storm's fury was at its peak as it crossed western Viti Levu. The Nadi and Lautoka areas were hardest hit, but damage was extensive throughout the southern half of the main island.

Before Fiji could begin to recover from Eric's onslaught, a second cyclone named Nigel struck the country on January 19 and January 20, with nearly the same force as Eric and following a similar path. As with Eric, the Lautoka area took the brunt of the storm.

The death toll mounted to 28 in the wake of the twin storms (17 in the Western Division, six in the Central Division, and five in the Eastern Division). With entire villages virtually demolished in some parts of Viti Levu, the number of homeless reached an estimated 30,000. Approximately 80% of the more than 21,000 homes damaged or destroyed were in the Western Division. Extensive damage to the electrical system, estimated at \$1.5 million, left most of Viti Levu without electrical

FIJI - Cyclones

power for several days. Communications between Suva and western Viti Levu were also disrupted, and the international airport at Nadi was forced to close briefly. Crop damage was substantial in both the Western and Central divisions. The year's production of sugar, Fiji's principal export crop, was expected to be down by 10% as a result of storm damage to stored and standing cane.

Just as the cyclone season was nearing its end, two more storms inflicted renewed but less severe damage on the Fiji Island group. On March 5 and 6, Cyclone Gavin passed close to Fiji, affecting many parts of the country with gale force winds and flooding. This storm was followed by Cyclone Hina on March 17. A powerful storm with sustained winds of up to 140 knots in the center and gusts of up to 160 knots, Cyclone Hina fortunately veered in a southerly direction away from Viti Levu as it approached Fiji. Most of the country experienced heavy squalls and gale force winds of up to 50 knots as Hina passed by.

One death was attributed to Cyclone Hina, and crop losses were substantial in the Sigatoka Valley. Damage to buildings and infrastructure, however, was generally slight. Again, the Western and Central divisions were the most seriously affected, mainly by flooding. Sensitized by the three earlier cyclones, the threatened population responded quickly when the alert was given. Personal and property damage was thus kept to a minimum. Some 20,000 persons sought refuge in evacuation centers until the storm had passed.

Action Taken by the Government of Fiji (GOF)

The GOF began aerial and ground surveys of the cyclone devastated areas in Viti Levu on January 18. The arrival of Cyclone Nigel the following day postponed completion of the damage assessment and added to the task. Ships were also dispatched to the outer islands to make an assessment and deliver relief supplies.

The GOF's Emergency Services Committee (EMSEC) met regularly during the initial phase of the disaster to coordinate relief efforts. Relief centers were set up throughout the affected area to accommodate the homeless and serve as feeding stations. When the evacuation sites were closed toward the end of January, cyclone victims returning to their homes were provided with shelter materials and food supplies as needed.

On January 22, GOF officials outlined to prospective international donors the longer-term rehabilitation needs which the government had identified. These included a six-month food-rationing project for 10,000 households to be supplied, in part, by a faster-yielding vegetable production

FIJI - Cyclones

program mounted by the Directorate of Agriculture; a rehabilitation program for approximately 10,000 shelter units; and improved internal communications, particularly between the national center for weather monitoring and forecasting in Nadi and the capital city of Suva. Administration of the relief and rehabilitation program was transferred from EMSEC to the Prime Minister's Relief and Rehabilitation Committee on January 31.

At the request of the GOF Permanent Secretary for Agriculture, a research fellow with the Disaster Preparedness Project of the Pacific Islands Development Program arrived in Fiji on January 28 to review EMSEC's procedures manual and to assist the GOF in assessing the impact of the cyclones on Fiji's agriculture.

With the arrival of Cyclone Hina on March 17, the evacuation sites designated by EMSEC were again used as a precautionary measure. The GOF officially requested external assistance in coping with the renewed damage.

The Fiji Red Cross (FRC) dispatched teams to the Lautoka and Nadi areas after Cyclones Eric and Nigel to distribute relief items (clothing, blankets, and soap) in the evacuation centers. The FRC also launched a local appeal for cash and clothing.

Other local organizations providing disaster assistance included the following:

Association of Banks of Fiji - \$14,000 in cash.

Fiji Muslim League - \$2,300 in cash.

Fiji Sixes Charity Fund - cash donations totaling \$92,000.

The Fiji Times - \$9,200 in cash.

Hare Krishna Movement - contributed to a feeding program.

Rotary International - unspecified donation.

Shell Oil Company - \$9,200 in cash.

FIJI - CyclonesAssistance Provided by the United States Government

Based on reports of the severe damage inflicted by Cyclone Eric, U.S. Ambassador C. Edward Dillery determined on January 18 that a state of disaster existed in Fiji. He authorized the release of \$25,000 from the Disaster Assistance Account to be donated to the Prime Minister's Hurricane Relief Fund.

In view of the urgent need for temporary shelter, and in response to the Mission's request, OFDA arranged with the DOD to airlift 2,000 tents and flies, 20 tent repair kits, and 240 rolls of plastic sheeting from AID's disaster stockpile in Guam. The items arrived in Fiji on January 21 and January 22. In addition, OFDA provided 2,000 five-gallon plastic water containers purchased in Australia and delivered to Fiji over the period of January 24 to January 31. When aerial inspections revealed more severe damage to housing than originally estimated, OFDA released another 460 tents from the Singapore stockpile, along with an additional 200 rolls of plastic sheeting to assist the GOF's school rehabilitation program.

OFDA also supplied equipment requested by the GOF Ministry of Health to help prevent an outbreak of dengue fever and Ross River fever (both endemic in Fiji) and to reduce the public health hazard posed by the increased presence of rats in the cyclone-damaged areas. Two vehicle-mounted sprayers and a supply of rat poison were purchased in the U.S. and airlifted to Fiji on February 2.

U.S. Embassy and USAID personnel closely monitored the disaster situation and the USG-assisted relief effort. Ambassador Dillery and the Mission Disaster Relief Officer (MDRO) made an aerial inspection of Viti Levu by an EMSEC-chartered helicopter on January 21. On the same day, an OFDA disaster officer arrived in Fiji to supervise the receipt of USG-donated relief items and work with EMSEC in their distribution. The MDRO joined GOF officials on January 30 in making an extensive aerial surveillance to assess distribution and utilization of USG-donated shelter supplies.

Following Cyclone Hina, Ambassador Dillery made a second disaster determination on March 18. He did not exercise his disaster assistance authority; however, in response to the GOF request for additional rolls of plastic to replace that supplied earlier and damaged during Cyclone Hina, OFDA

FIJI - Cyclones

authorized the release of 200 rolls of sheeting from the Guam stockpile. The plastic, which arrived in Fiji on March 25, was required mainly to keep classrooms in the western division serviceable while undergoing rehabilitation.

Summary of USG Assistance

Ambassador's Authority contributed to the Prime Minister's Hurricane Relief Fund.....	\$25,000
Increase in Ambassador's Authority for local transport of USG relief supplies.....	\$2,339
Regional purchase of 2,000 water jugs.....	\$7,316
DOD airlift of tents and plastic from Guam.....	\$288,505
Additional cost of airlifting relief supplies from stockpiles.....	\$215,823
Value of tents, plastic sheeting, and tent repair kits.....	\$258,230
Pesticides, sprayers, and air transport.....	\$12,504
Travel and administrative expenses of a disaster relief officer.....	\$1,200
TOTAL	\$810,917

Assistance Provided by U.S. Voluntary Agencies and Private Groups

Continental Airlines - donated cargo space for the transport of relief supplies.

Salvation Army - \$24,000 in cash for food and shelter programs.

TOTAL	\$24,000
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Assistance Provided by the International CommunityInternational Organizations

EEC - provided grant money totaling \$1,091,000 to assist the GOF's food rationing and home repair programs.

FIJI - Cyclones

South Pacific Bureau for Economic Cooperation - \$27,000 in cash to the Prime Minister's Relief and Rehabilitation Fund (PMRRF).

South Pacific Commission - \$4,500 in cash to the PMRRF.

UNDRO - \$20,000 in cash to the PMRRF.

Governments

Australia - airlift of shelter material (1,000 tarpaulins and heavy duty plastic sheeting); army engineering reconnaissance team; transport services; airlift of water containers and other relief supplies donated by Australian non-government organizations; and a cash grant to the PMRRF. As of February 19, total assistance valued at \$1.8 million also included three airlifts containing 50 refrigerators (to store vaccines and drugs), 30 outboard motors (to enable nurses to reach isolated areas), 5,000 bedsheets, 2,000 towels, 1,450 liters of malathion, and medical and pharmaceutical supplies.

France - airlifted relief commodities including 2.2 MT of plastic sheeting, four military tents, 60 beds with linens, 4.8 MT of food, three tarpaulins, and 60 meters of rope, value not reported.

India - \$45,500 worth of medical supplies.

Japan - \$105,000 in cash to the PMRRF.

Malaysia - \$10,100 in cash to the PMRRF.

New Zealand - provided Orion aircraft (with an 18-man detachment of the Royal New Zealand Air Force) for aerial surveys; helicopter services for relief work; Wellington weather reporting; donated clothing; gave cash grants to the PMRRF totaling \$131,450, electrical equipment (24.5 km of power lines and 25 generators), valued at \$29,744, for the Fiji Electricity Authority, and the pledge of additional electrical repair assistance, valued at \$26,607.

Papua New Guinea - \$27,000 in cash to the PMRRF

Sri Lanka - one MT of tea, value not reported

Tahiti - \$30,000 in cash to the PMRRF

FIJI - Cyclones

Tonga - \$21,100 in cash to the PMRRF

United Kingdom - donated \$55,000 in cash to the PMRRF and lent military tents and four large marquees currently stored in Fiji.

Voluntary Agencies and Other Private Groups

Bushell's Tea (Australia) - \$12,000 worth of tea.

East Trade Center (China, Rep. of) - \$30,000 in cash to the PMRRF.

Fiji Community in Melbourne - \$9,000 in cash.

Fiji Community in North America - collected clothing and other supplies which were shipped to Fiji via donated cargo space on Canadian Air Pacific, value not reported.

Qantas Airlines - donated \$9,000 in cash to the PMRRF and cargo space for the transport of relief supplies.

Watties Food Processors of New Zealand - delivered \$4,500 worth of canned food via cargo space donated by the Reef Shipping Company.

TOTAL \$3,488,501

DRAFTFIJI - Floods/Cyclone

Date: Cyclone: April 12-13, 1986
 Flooding: April 17-23, 1986

Location: Cyclone: Vanua Levu, from Labasa to Undu Point
 Flooding: Central Division, especially Suva

No. Dead: Cyclone: 2
 Flooding: 17

No. Affected: Cyclone: 15,000
 Flooding: 200,000

Damage: Cyclone: The cyclone destroyed or damaged 1,822 houses and 34 classrooms. Sugar, kava, coconut, and rice crops were damaged.

Flooding: Flooding and landslides in the Central Division wiped out roads, bridges, and houses. Damage to pumping stations disrupted the city's piped water supply for several days.

The Disasters

Cyclone Martin raced through the second largest island in the Fiji group, Vanua Levu, and smaller surrounding islands on April 12-13. The cyclone, with winds over 65 knots, left a trail of devastated crops, bridges, and buildings approximately 40 miles wide. Sugar crops suffered the greatest damage, unofficially estimated at \$9 million.

Storms and torrential rains immediately preceded and followed the cyclone. Soon after Martin passed by, a second cyclone began to form about 400 miles north of the Fiji group. This second weather system became a slow-moving depression rather than a cyclone. It caused extremely heavy rains on April 17-18, bringing widespread flooding to the eastern part of Fiji's main island of Viti Levu. Areas bordering the Rewa River and its tributaries were devastated by the storm which released an estimated 29 inches of rain within a 24 hour period. Flooding forced Nausori Airport to be closed for one week and severely affected Suva, the capital city. Landslides demolished houses and blocked many roads, cutting off entire communities. Hundreds of people were trapped as the floodwaters submerged their homes and livestock. More than 8,000 people were temporarily sheltered in evacuation centers operated by the government. Blockages of silt at the pumping stations caused the shut off of piped water to about 200,000 people in the Suva/Nausori area for several days. Repair/replacement costs for various sectors were estimated as follows: posts and telecommunications - \$275,229; water systems - \$344,037; roads and bridges - \$5,412,844; electric utilities - \$91,743; and housing (Suva district only) - \$275,229.

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In a related catastrophe, a barge delivering relief supplies to cyclone-stricken Vanua Levu capsized during the storms, killing eight people.

Action Taken by the Government of Fiji (GOF) and Local Voluntary Agencies

Fiji's Emergency Services Committee (EMSEC) was activated on April 12 in response to Cyclone Martin. EMSEC workers used government vehicles to evacuate villagers in the path of the storm. In the aftermath of the cyclone, EMSEC officials toured the stricken area by helicopter and sent out survey teams. Based on survey results, donor governments and international organizations were asked on an individual basis to supply relief items and assistance. Within a few days, the GOF had distributed tents and food rations from government supplies to the most needy cyclone victims. As EMSEC's emergency role in the cyclone disaster began to wind down, responsibility for the relief effort shifted to the Prime Minister's Relief and Rehabilitation Committee which addresses long term needs.

EMSEC was reactivated on April 17 in response to new storms and massive flooding in the Central Division. Sixty-eight evacuation centers were set up for people affected by the floods. The GOF utilized private boat owners to assist in the evacuation. The flood damage was assessed by helicopter and survey teams were sent out. However, landslides blocking major roads and unavailability of aircraft prevented the teams from completing the assessments for several days. The military were deployed to re-establish communications with affected areas and the Public Works Department cleared roads and delivered water in Suva and environs by tank truck. The Ministry of Health, fearing a potential outbreak of infectious diseases, issued warnings to boil water and destroy mosquito breeding grounds.

On April 22, the foreign secretary called a meeting of all heads of diplomatic missions for a briefing. Donor representatives were later presented with requests and were asked to respond. Local voluntary agencies carried out relief efforts under the informal leadership of the Fiji Red Cross (FRC). The Seventh Day Adventists and Fiji's Methodist Youth Fellowship were also heavily involved in relief work. The Seventh Day Adventists contributed \$34,400 to the relief effort. The FRC distributed food packs, blankets, and other relief assistance, all valued at \$17,000. Fiji's national airline, Air Pacific, donated cargo space for goods collected in Australia.

Assistance Provided by the United States Government

On April 21, Ambassador C. Edward Dillery determined that a disaster existed in Fiji and used his Ambassador's Authority of \$25,000 to purchase pharmaceuticals, medical supplies, and insecticides locally. OFDA contributed an additional \$8,968 for these supplies.

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OFDA also supplied equipment requested by the GOF Ministry of Health to help prevent an outbreak of dengue fever and Ross River fever (both endemic in Fiji). The supplies included 24 backpack sprayers and 24 sets of respirator masks, hard hats, gloves, and splash goggles, all valued at \$3,123. In addition, USAID/Suva requested that OFDA provide spare parts for two vehicle-mounted sprayers that were donated by the USG in the cyclones of 1985. The spare parts cost \$383.

To reduce the public hazard posed by the increased presence of rats in the flooded areas, OFDA gave a supply of rat poison valued at \$2,204.

Total \$39,678

Assistance Provided by U.S. Voluntary Agencies

CWS - donated \$5,000 in cash from the Executive Director's Emergency Fund.

Total \$5,000

Assistance Provided by the International Community

International Organizations

FAO - contributed \$8,000 for a foodcrops re-activation scheme.

LORCS - gave a cash grant of \$10,152 to the Fiji Red Cross.

WCC - gave \$10,000 in cash to the Fiji Methodist Church and issued an appeal for \$30,000.

WFP - donated canned fish for free distribution to the affected population, valued at \$123,000.

Governments

Australia - donated \$280,374 in cash for roofing iron and building material through the Australian High Commission; shipped forty tons of blankets and clothing donated by the public, value not reported.

Japan - provided \$103,681 which included the cost of sending two medical teams.

New Zealand - provided reconnaissance aircraft, value not reported.

United Kingdom - gave \$51,170 in cash through the British High Commission.

DRAFTVoluntary Agencies

Australia Catholic Relief - gave \$6,800 in cash.

Australia Red Cross - donated blankets, value not reported.

Caritas Germany, Fed. Rep. - gave \$20,270 in cash.

Caritas Switzerland - gave \$4,800 in cash.

Total \$618,247

InterviewsFijiNadi:

Ram Krishna, Director of Meteorology
Apimeleki Rakavono - Meteorology Officer

Suva:USAID

Louis Kuhn - Regional Development Officer
Bill Paupe - Chief of Mission

GOF

Temo Stuart, Director of Rural Development
Dr. Wainiqolo, Assistant Director of Health Planning
Ratu Jone Y. Kubuabola, Permanent Secretary of Finance
Temo Tuiloma, Deputy Secretary for Home Affairs
John Samy - Permanent Secretary of Economic Planning,
Development, and Tourism
Lopeti Vulaono, Planning Officer
Central Planning Office
Clive Amputch
Deputy Commissioner of Insurance
Emori Naqova, Permanent Secretary of Posts and Telecommunications
Josua Cavalevu, Permanent Secretary of Fijian Affairs

PVOs

Kini Rokose, General Secretary
FCOSS
Susan Douglas, Executive Director
Fiji Red Cross
Dave Wyler, Country Director
Foundation for the Peoples of the South Pacific

UNDP

Ross Mountain, Acting Resident Representative

Luc Delestre, Junior Professional Officer

High Commissions

Australia

John Munroe, Counselor for Development Assistance

New Zealand

Alex Matheson, Deputy High Commissioner

SPEC

Trevor Sofield, Deputy Director

John Flavell, Disaster Advisor

Peace Corps

Van Richards, Director

FINTEL (Fiji International Telecommunications, Ltd.)

Alfred Chung, Assistant Managing Engineer

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