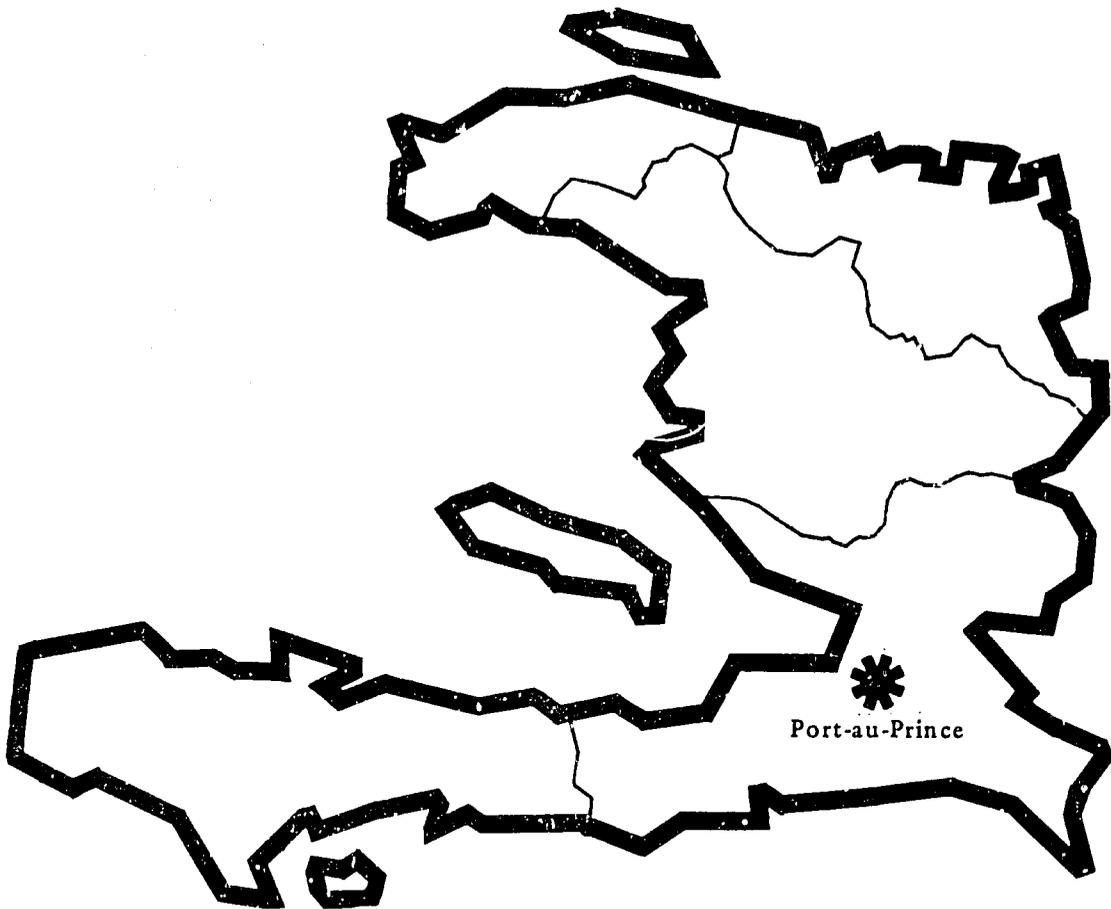
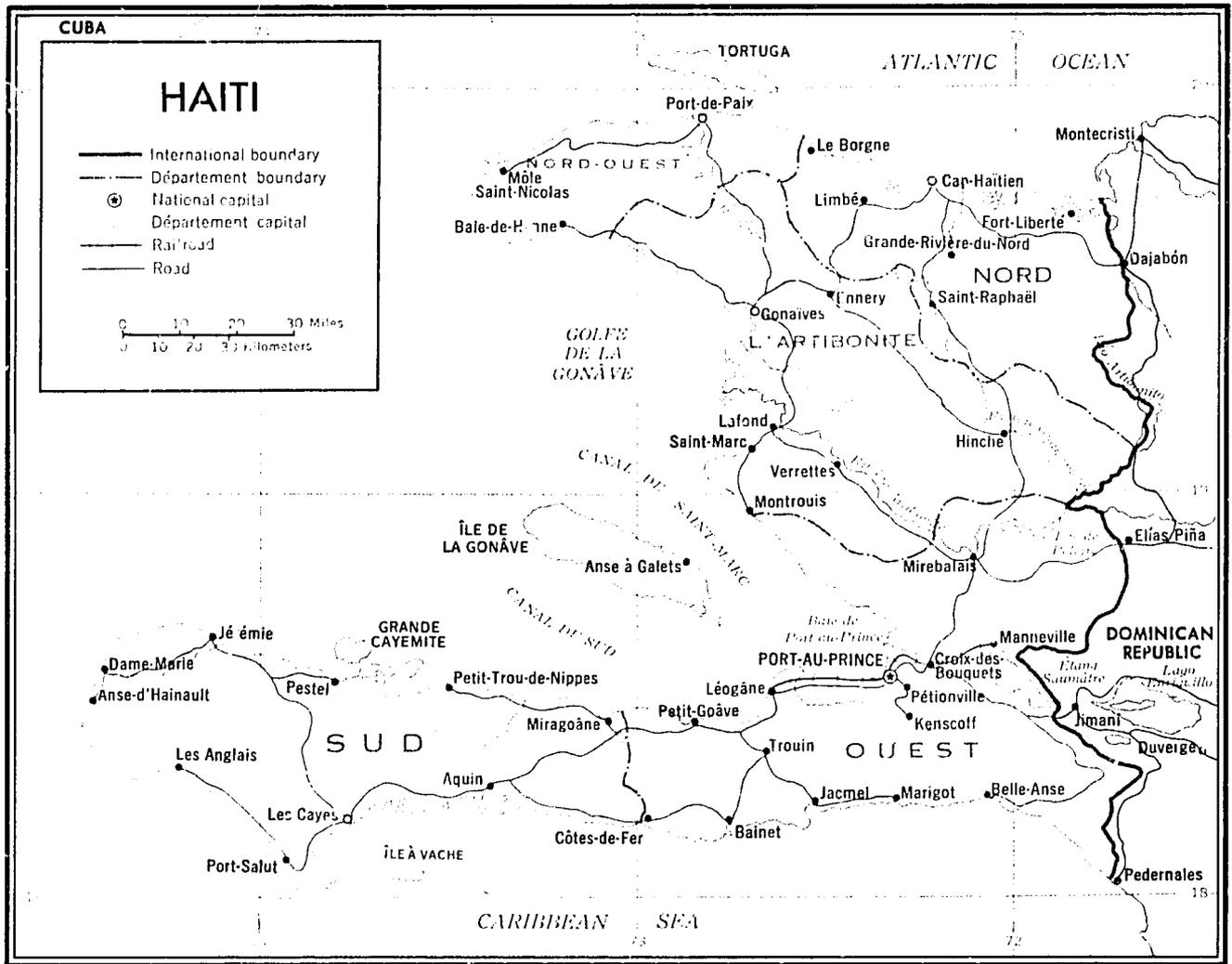


Haiti

A Country Profile



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



Base 77974 9-70

HAITI: A COUNTRY PROFILE

prepared for

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

by

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

The profile of Haiti is part of a series designed to provide baseline country data in support of the planning and relief operations of the Office of U.S. Foreign Disaster Assistance (OFDA). Content, scope, and sources have evolved over the course of the last several years; the relatively narrow focus is intentional. To avoid redundancy, some topics one might expect to find in a "country profile" are not covered here.

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

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

May 1984

OFDA COUNTRY PROFILES: MAY 1984

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General Information1.1 Geographic Codes

| | |
|--------------|-----|
| AID Standard | 521 |
| State Region | ARA |
| FIPS | HA |

1.2 Time Zones

EST
GMT - 4

1.3 Host Mission in U.S.

Embassy of Haiti
2311 Massachusetts Avenue, N.W.
Washington, D.C. 20008
Tel.: (202) 332-4090

Consular Offices:

25 Southeast 2nd Avenue
Ingrahm Building, Suite 709
Miami, Florida 33131

60 E. 42nd Street
Room 1365
New York, New York 10017

919 North Michigan Avenue
Suite 3311
Chicago, Illinois 60611

For current information on the embassy staff,
refer to the U.S. Department of State
Diplomatic List.

1.4 U.S. Mission to Haiti

Embassy of the United States
Harry Truman Boulevard
Port-au-Prince, Haiti
Tel.: 2-0200

Mission Disaster Relief Officer: James Gardner
Chief Engineer

Alternate MDRO: Dale Puffenburger
Tel.: 55500

For current information on the U.S. Embassy staff in Haiti, consult the most recent edition of the Department of State Key Officers of Foreign Service Posts.

1.5 Currency

5.00 Gourdes = \$1.00 U.S.
U.S. currency is legal tender in Haiti and is completely interchangeable.

1.6 Travel and Visa Information

Passport and visa not required of tourists for stays of up to three months. Tourists must have proof of citizenship and complete an immigration card upon arrival; a \$10.00 exit tax is charged at time of departure.

While no vaccinations are required for travel within Haiti, a current tetanus shot and gamma globulin are recommended. Malaria suppressants are also recommended.

1.7 Calendar and Holidays

| | |
|----------------------------|-----------|
| National Day | January 1 |
| Heroes of Independence Day | January 2 |
| Shrove Tuesday/Carnival | * |
| Easter Friday | * |
| Easter Monday | * |
| Pan American Day | April 14 |
| Labor Day | May 1 |
| Ascension Day | May 12 |
| Flag Day | May 18 |
| National Sovereignty | May 22 |

| | |
|-------------------------------------|-------------|
| Corpus Christi | June 2 |
| Holy Trinity (half-day) | June 14 |
| National Thanksgiving Day | June 21 |
| President's Day | June 22 |
| Assumption Day | August 15 |
| United Nations Day | October 2 |
| Death of Jean Jacques Dessalines | October 17 |
| All Saints' Day | November 1 |
| All Souls' Day (half-day) | November 2 |
| Army Day | November 18 |
| Discovery Day | December 5 |
| Christmas | December 25 |

* variable dates

1.8 Treaties and Agreements

Agricultural Commodities, Customs, Defense, Economic & Technical Cooperation, Investment Guaranties, Maritime Matters, Meteorological Cooperation (Hurricane warning agreement), Migrants-Interdiction, Pacific Settlement of Disputes, Peace Corps, Relief Supplies and Packages (duty-free entry and exemption from internal taxation of relief supplies and packages), Telecommunications (amateur radio operators), Trade Commerce.

1.9 International Organization Memberships

FAO, G-77, GATT, IADB, IAEA, IBA, IBRD, ICAO, ICO, IDA, IDB-Inter-American Development Bank, IFAD, IFC, ILO, IMCO, IMF, INTELSTAT, IRC, ITV, OAS, PAHO, SELA, UN, UNESCO, UPU, WHO, WMO, WTU.

1.10 Government

Haiti is a republic composed of a lifetime President, a unicameral 58-member legislature (National Assembly) with very limited power, and a judiciary appointed by the President. The constitution, adopted in 1964 and amended in 1971, provides for a lifetime president to be designated by his predecessor and ratified by the electorate in plebescite.

President-for-life, Jean-Claude Duvalier, assumed the presidency upon the death of his father, the previous President-for-life Francois Duvalier. Although three political parties exist in name (National Unity Party-government party, Haitian Christian Democratic Party, and Haitian Christian Social Party), they are inactive. Legislative elections, held every 6 years, were conducted in February 1984. Suffrage is universal over age 18.

1.11 Ethnic and Socio-cultural Groups

Over 90% of the population is black of African descent. The remaining 5-7% are mulatto, except for a small number of recent European and Middle Eastern immigrants. A growing middle-class composed of well-educated and affluent blacks is focused in Port-au-Prince. Members of this elite speak French and practice Catholicism.

The majority of the population is poor, rural, and illiterate.

1.12 Languages

French is the official language; however the majority of the population speak only Creole, a dialect of French that developed out of the French West African trade language. Among the educated, French and some English are

regularly spoken. Adult literacy rate is 23%.

1.13 Religions

Roman Catholicism is the official religion, but only about 30% of the population is practicing. Voodoo is the religion of the majority in the rural areas. Other religious groups are well represented; American missionaries are active throughout the country.

1.14 Geography

Topography:

Haiti occupies the western third of the island of Hispaniola in the Caribbean, less than 965 km from the coast of Florida. The geography of the country is sometimes described as resembling the jaws of an alligator - a long peninsula extends out into the Caribbean in the southwest and a smaller peninsula juts into the Atlantic and the Windward Passage in the northwest. The island of Gonave sits in the middle of the large Gulf of Gonave between the gaping "jaws" of the mainland.

Several long mountain systems transect the island running from the northwest to the southeast, or directly east-west on the southwestern peninsula. (These mountain chains play a significant role in the rainfall patterns in Haiti.) Between the mountains are narrow steep-sided valleys. Other lowland areas along the coasts are similarly small and unconnected. (See section 2.10 Vulnerability of Agriculture, and Figure 5.)

Climate:

Located in the northern tropics, Haiti's average temperature seldom falls below 25° C at sea level and varies only about 4° C between warm and cold months. Temperatures are likely to fluctuate more in the course of the day, as trade winds cool the island

around dusk.

Rainfall and temperature vary with altitude and location. Rainfall is usually higher on the northern and eastern slopes of the mountains and lowest in the northwest, on La Gonave island, and in the southwest. The rainy season typically extends from May through November with the north coast experiencing more winter rain.

1.15 Population

Eighty percent of Haiti's nearly 6 million people live in rural areas. The remaining twenty percent are located primarily in Port-au-Prince.

Haiti conducted a census of the population in 1982. The national population totaled 5,053,791, of which 1,241,940 lived in urban areas, 3,752,583 in rural areas, and 59,268 in quarters. Figure 1 indicates the major population centers. Outside of Port-au-Prince, nine cities have populations of 10,000 or more: Cap-Haitien (64,406), Gonaives (34,209), les Cayes (34,090), St. Marc (24,165), Jeremie (18,493), Port de Paix (15,540), Jacmel (13,730), Petite Rivieres de l'Artibonite (10,099), and Hinche (10,070). All regions have been affected by the exodus to the cities and abroad. The Haitian census estimated that approximately one million Haitians were living abroad in 1982.

1.16 Health

| | | |
|-----------------------------|---------------------------------|------------|
| Vital Statistics (1980): | Life expectancy at birth | 53.2 years |
| | Crude birth rate (per thousand) | 35.5 |
| | Infant mortality (per thousand) | 114.6 |
| | Access to safe water | |
| | Total (% of pop.) | 14.0 |
| | Urban | 38.0 |
| | Rural | 7.0 |
| | Population per physician | 5,936.3 |
| | Population per nursing person | 2,936.9 |

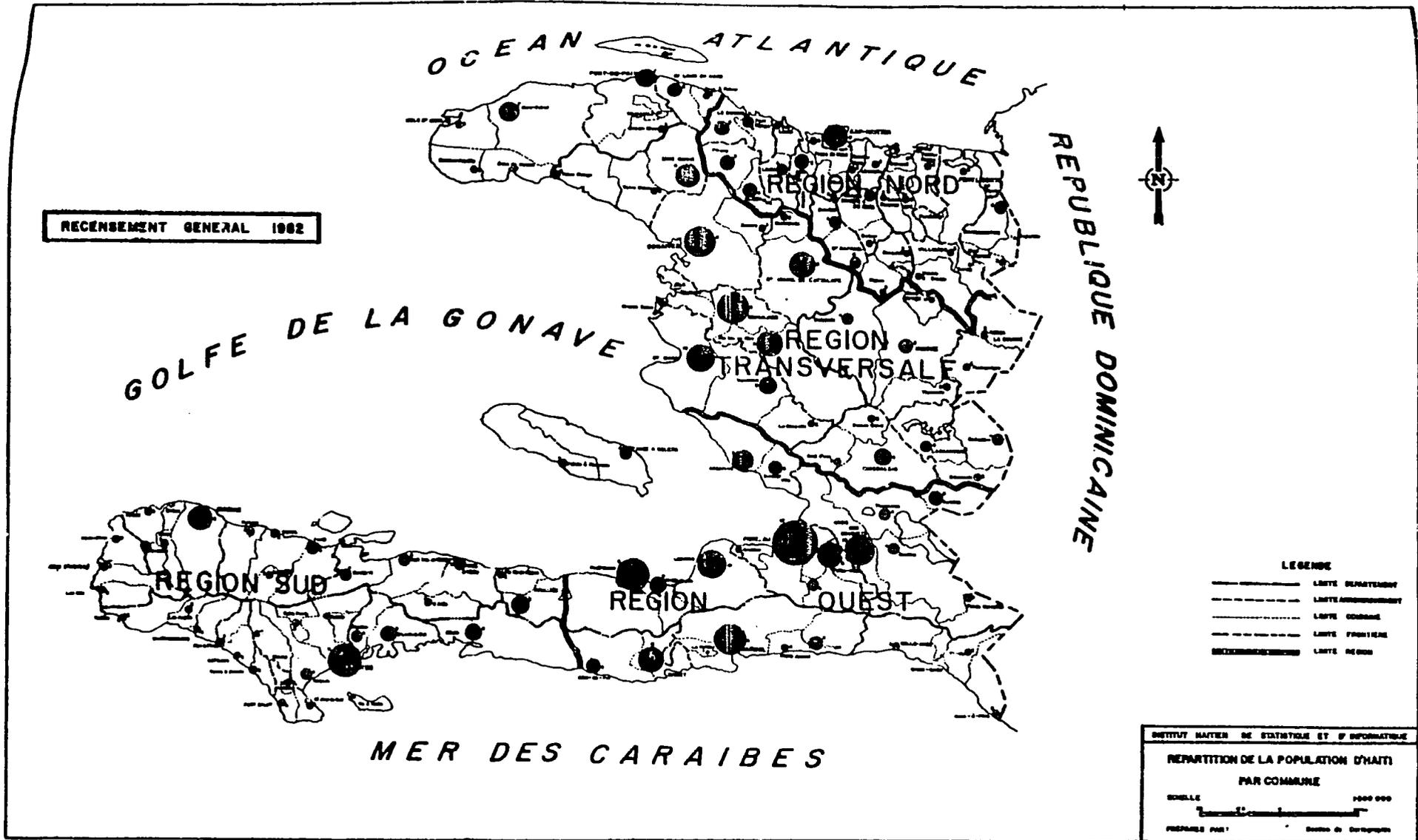
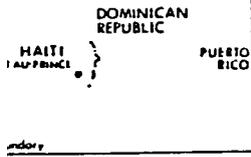


FIGURE 1 Major Population Centers in Haiti

Source: Government of Haiti, Resultats Preliminaires du Recensement General, 1982

FIGURE 2

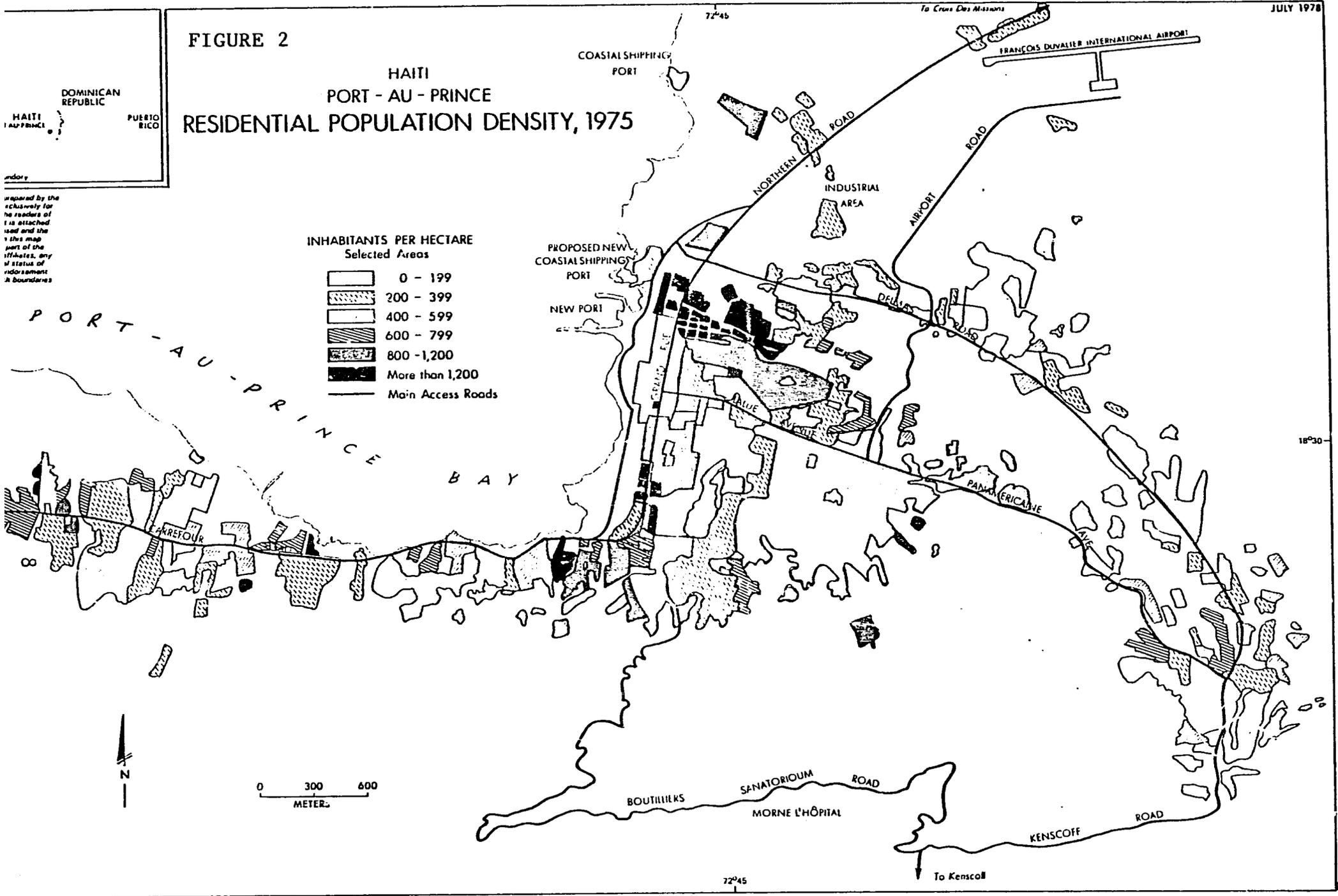
HAITI
PORT - AU - PRINCE
RESIDENTIAL POPULATION DENSITY, 1975



Prepared by the
author for the
readers of
this map
part of the
figures, any
of status of
redistrictment
boundaries

INHABITANTS PER HECTARE
Selected Areas

| | |
|------------------------|-------------------|
| [White box] | 0 - 199 |
| [Dotted box] | 200 - 399 |
| [Horizontal lines box] | 400 - 599 |
| [Vertical lines box] | 600 - 799 |
| [Cross-hatch box] | 800 - 1,200 |
| [Solid black box] | More than 1,200 |
| [Thick line] | Main Access Roads |



Source: Haiti Urban Sector Survey, The World Bank. April 1979.
(Used with permission.)

Health facilities are provided nationwide under the direction of the Department of Public Health and Population (DSPP). The DSPP extends care through a tiered system of health care and referral that starts with the local health worker, moves to the dispensary, the health center, regional hospital, and national hospital. Overall, health care facilities beyond the dispensaries are underutilized nationwide.

Nutritional deficiencies are the largest cause of morbidity and mortality in Haiti, followed by pneumonia, tetanus, enteric diseases, and tuberculosis. Malaria is endemic at elevations below 500 m. Malnutrition contributes to reduced resistance to infection, growth stunting, and brain damage. Caloric and protein deficiencies are aggravated by intestinal diseases; diarrhea alone is responsible for 40% of infant deaths. (See section 3.3, Health Facilities.)

1.17 Economy

Although Haiti is moving into the assembling industry with some success, agriculture still provides a livelihood for the majority of the population and more than 50% of exports. Continuous population pressure on the limited arable land, small isolated holdings, lack of irrigation, and soil erosion all contribute to almost negligible growth in the sector. For example, coffee accounts for about 40% of export earnings; Hurricane Allen in 1980 destroyed more than half the crop and a worldwide drop in coffee prices combined to produce a 61% drop in export earnings in 1981. Light industrial products, bauxite, essential oils, and cocoa contribute the remaining export earnings.

Tourism, traditionally the second largest source of foreign exchange, fell off in 1983 and 1984 as a result of international fear of acquired immune deficiency syndrome (AIDS).

The World Bank estimated per capita income at \$270 in 1980, with 55% of the urban population and 78% of the rural population living below the estimated absolute poverty level. Haiti is infamous as the poorest country in the Western Hemisphere; as much as 75% of its operating budget is financed by international donors.

1.18 Communications

See section 3.7, Communications, and section 3.9, Radio, Television, and Telephone Networks.

1.19 Transportation

Roads:

A paved road connects Les Cayes in the south to Port-au-Prince and continues north through Gonaives to Cap Haitien on the north coast. This artery constitutes the major part of the nation's 600 km of paved roads. (Many streets in Port-au-Prince are also paved.) An additional 950 km of improved highway and 1,650 km of unimproved roads complete the highway system. Most roads are narrow, poorly graded, with little or no shoulder. Erosion is found at several points on the southern peninsula, and is due to poor siting, inferior materials, and heavy traffic.

Railroads:

The 50-km government-owned railway has been disassembled. Still operational is the 80-km narrow gauge single track privately-owned industrial line.

2. Disaster Vulnerability

2.1 Overview of Physical Environment

All of Hispaniola is mountainous, which contributes to a shortage of arable land and dramatic climatic changes by altitude. Year-round temperatures average 25° C at sea level. The rainy season extends from April through December; however, Haiti lies in the rain shadow of the Dominican Republic: rainfall is heaviest on the northern and eastern slopes of the mountains and lowest in the northwest, and the western and southern lowlands. Humidity is high even in the arid lowlands, but sea breezes provide comfortable conditions, especially at the higher elevations. See Figure 6, Isohyetal Map and Figure 7, Physiographic Map.

2.2 Hurricanes

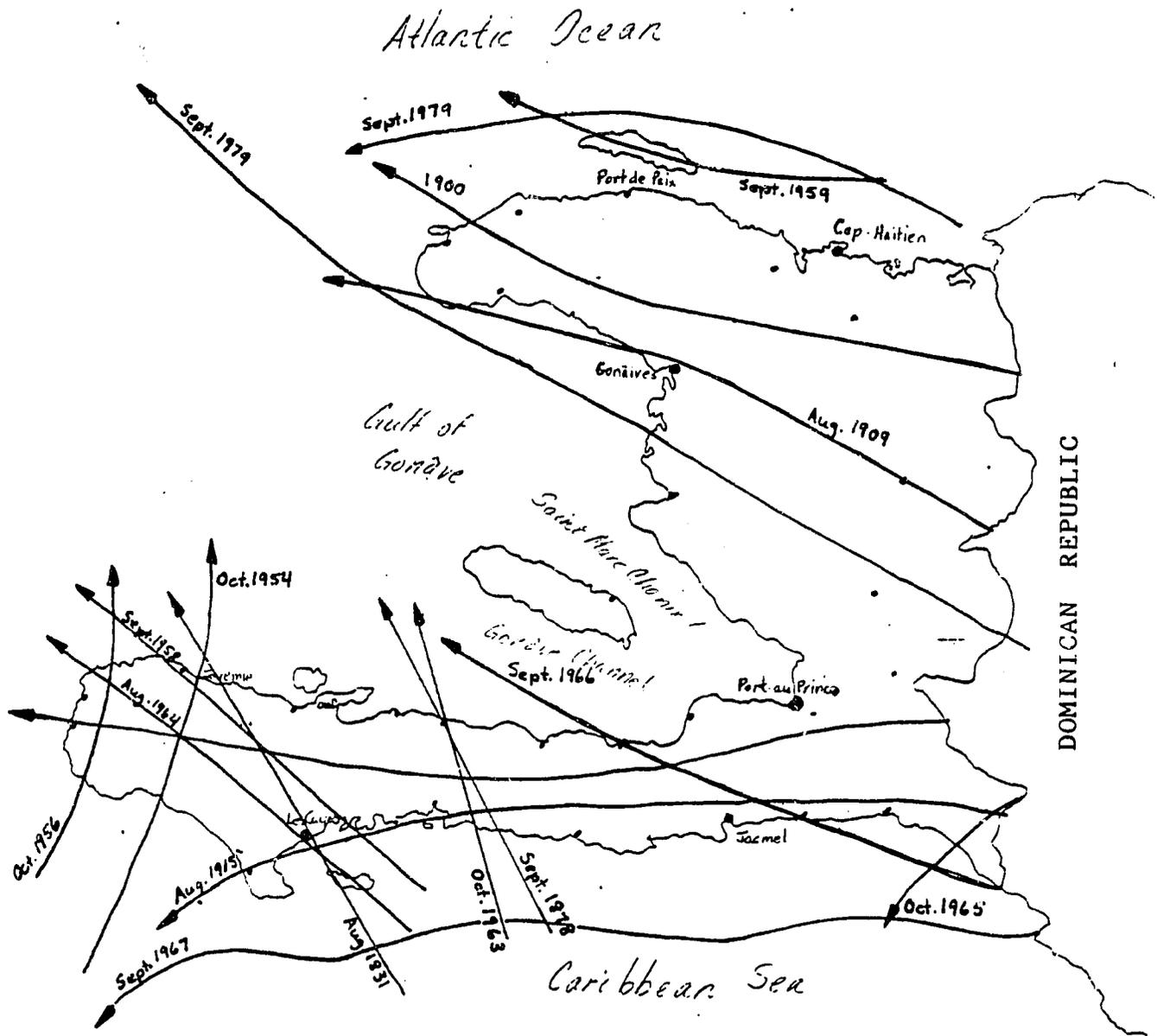
Figure 3 illustrates the course of the major hurricanes that have struck Haiti in the last 150 years. The damage hurricanes have caused, and will likely continue to cause, is staggering. High winds carry off roofs, level homes, and knock down power and communications lines. Fruit trees are decapitated and coastal and low-lying areas are inundated by high seas, storm surges, and flooding. Staple crops are damaged or destroyed, robbing the population of their source of both food and income.

As indicated in Figure 3, most hurricanes that hit Haiti strike the southern peninsula, although the few storms which have swept across the Artibonite and Northwest areas have been devastating (see OFDA Case Reports on Hurricanes Allen, David, and Frederick). Hurricane season runs from June through October, with the greatest likelihood of a storm during August, September, and October. (See Table I for information on planting schedules.)

2.3 Flooding

Large areas of Port-au-Prince are subject to flooding during the rainy season and following severe storms (see Figure 4). While the city's drainage system is generally adequate to carry large amounts of rainwater, it is not capable of transporting as much solid materials as it is forced to carry. The system is widely used for disposal of solid waste which is dumped into the system directly or washes into it from hillsides, streets, and empty lots. As a result, flooding occurs regularly during the rainy season and gets progressively worse as the absorptive capacity of the soil and carrying capacity of the drainage system decrease.

FIGURE 3

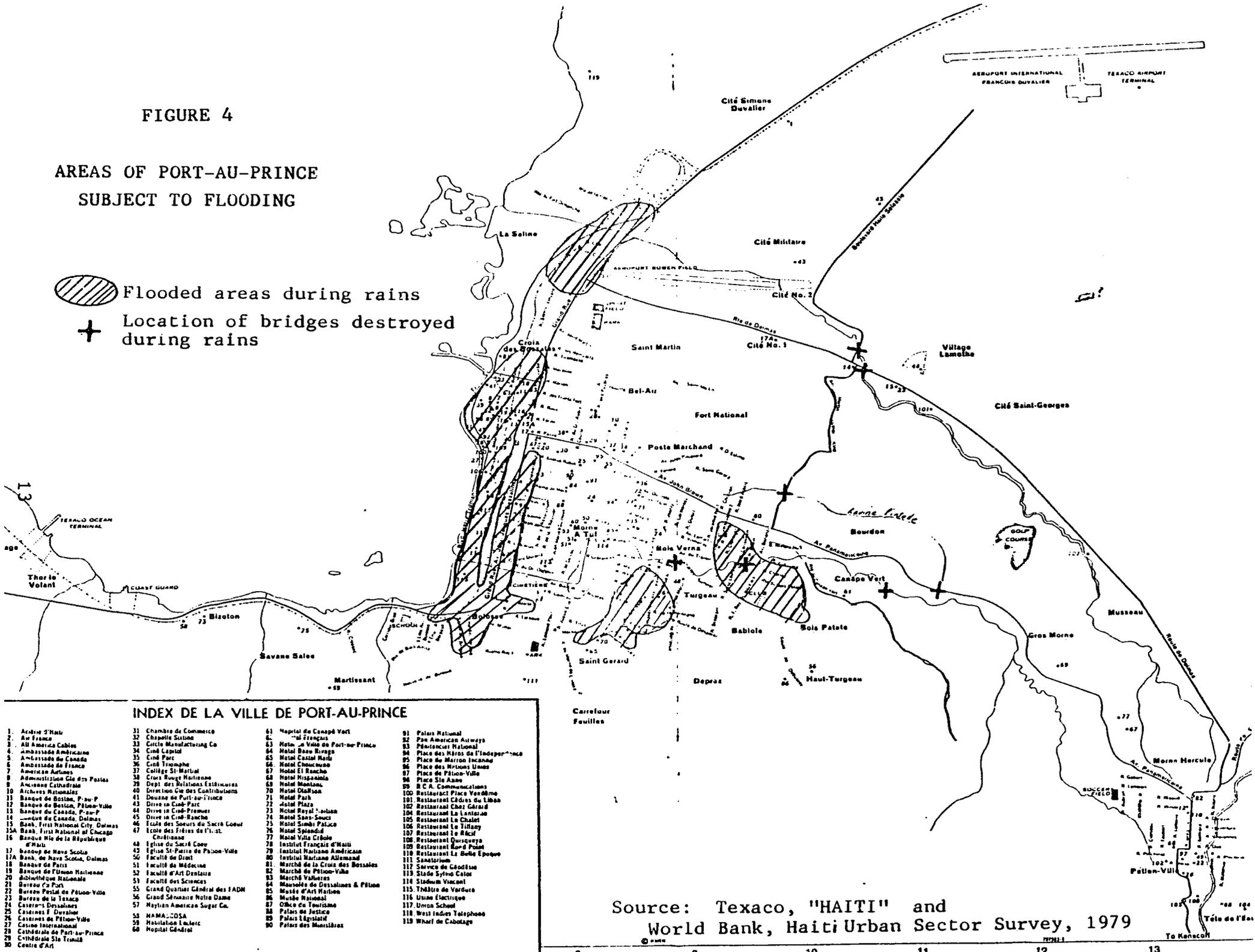


Major Hurricanes to Strike Haiti, 1831-1984

FIGURE 4

AREAS OF PORT-AU-PRINCE
SUBJECT TO FLOODING

 Flooded areas during rains
 Location of bridges destroyed during rains



INDEX DE LA VILLE DE PORT-AU-PRINCE

- | | | | |
|------------------------------------------|---------------------------------------------|--------------------------------------|---------------------------------------|
| 1. Académie d'Haïti | 31. Chambre de Commerce | 61. Hôpital du Canopé Vert | 91. Palais National |
| 2. Air France | 32. Casernes Simone | 62. Hôtel François | 92. Pan American Airways |
| 3. All America Cabines | 33. Circle Manufacturing Co | 63. Hôtel de Ville de Port-au-Prince | 93. Périmètre National |
| 4. Ambassade Américaine | 34. Cité Capital | 64. Hôtel Beau Rivage | 94. Place des Héros de l'Indépendance |
| 5. Ambassade du Canada | 35. Cité Parc | 65. Hôtel Castel Harlé | 95. Place du Maréchal Toussaint |
| 6. Ambassade de France | 36. Cité Trompette | 66. Hôtel Choucouffe | 96. Place des Nations Unies |
| 7. American Airlines | 37. Collège St-Martin | 67. Hôtel El Rancho | 97. Place de Péligon-Ville |
| 8. Administration Générale des Postes | 38. Croix Rouge Haïtienne | 68. Hôtel Hispaniola | 98. Place St-Jean |
| 9. Ancienne Cathédrale | 39. Drapeau des Nations Unies | 69. Hôtel Montebello | 99. R.C.A. Communications |
| 10. Archives Nationales | 40. Direction Générale des Contributions | 70. Hôtel Duvalier | 100. Restaurant Place Vendôme |
| 11. Banque de Boston, P.-au-P | 41. Direction de Port-au-Prince | 71. Hôtel Park | 101. Restaurant Cœurs de Libans |
| 12. Banque de Boston, Péligon-Ville | 42. Direction de la Santé | 72. Hôtel de la Poste | 102. Restaurant Chez Gérard |
| 13. Banque de Canada, P.-au-P | 43. Direction de la Sécurité Publique | 73. Hôtel Royal Haitien | 103. Restaurant Le Louve |
| 14. Banque de Canada, Dalmat | 44. Direction de la Trésorerie | 74. Hôtel Sans-Soucis | 104. Restaurant Le Châlet |
| 15. Bank, First National City, Dalmat | 45. Ecole des Soeurs du Sacré-Coeur | 75. Hôtel Samba Palace | 105. Restaurant Le Village |
| 16. Bank, First National City, Chicago | 46. Ecole des Frères de l'Institut Chrétien | 76. Hôtel Splendid | 106. Restaurant Le Récif |
| 17. Banque Nive de la République d'Haïti | 47. Ecole St-Pierre de Péligon-Ville | 77. Hôtel Villa Crêole | 107. Restaurant D'Orquy |
| 18. Banque de Nova Scotia | 48. Église du Sacré-Coeur | 78. Institut Français d'Haïti | 108. Restaurant Rond Point |
| 19. Banque de Nova Scotia, Dalmat | 49. Église St-Pierre de Péligon-Ville | 79. Institut Maritime Américain | 109. Restaurant La Belle Époque |
| 20. Banque de Paris | 50. Faculté de Droit | 80. Institut Maritime Allemand | 110. Sanatorium |
| 21. Banque de l'Union Nationale | 51. Faculté de Médecine | 81. Marché de la Croix des Bossales | 111. Service de Coiffure |
| 22. Bibliothèque Nationale | 52. Faculté d'Art Dentaire | 82. Marché de Péligon-Ville | 112. Stade Sylvio Célor |
| 23. Bureau du Port | 53. Faculté des Sciences | 83. Marché Vallières | 113. Stade Vaucalet |
| 24. Bureau Postal de Péligon-Ville | 54. Grand Quartier Général des FADN | 84. Musée de Dessalines & Péligon | 114. Théâtre de Verdure |
| 25. Bureau de la Trésorerie | 55. Grand Séminaire Notre-Dame | 85. Musée National | 115. Usine Électrique |
| 26. Casernes Desalines | 56. Grand Séminaire Notre-Dame | 86. Musée National | 116. Usine Électrique |
| 27. Casernes de Péligon-Ville | 57. MAMA:COSEA | 87. Office du Tourisme | 117. Usine Schaud |
| 28. Casino International | 58. Habitatation Emertz | 88. Palais de Justice | 118. West Indies Telephone |
| 29. Cathédrale de Port-au-Prince | 59. Hôpital Général | 89. Palais Léopold | 119. Wharf de Cabotage |
| 30. Centre d'Art | 60. Hôpital Général | 90. Palais des Ministères | |

Source: Texaco, "HAITI" and World Bank, Haiti Urban Sector Survey, 1979

In the flatter downtown areas the drainage system fails completely during storms. The U.S. Embassy, the USAID Mission, the embassies of several other countries, and the headquarters of the Haitian Red Cross are all located in this flood plain (see Figure 4). Water and mud flow through the streets and stagnate in the shoreline landfill area. The health hazards associated with continual flooding in this area are compounded by the presence of solid and human waste in the stormwaters and its infiltration into the potable water distribution system.

The effects of flooding are most serious for the low-income population of the city. Low-income housing built on steep streets, ravines, and along large drainage channels is invariably damaged or destroyed. In addition, flooding in the densely populated slum areas of La Saline, Brooklyn, Cite-Simone, and St. Martin causes severe health hazards. The problem takes on a further dimension when flooding occurs in the central market area downtown where the majority of agricultural produce for the city is handled. The accumulated agricultural waste, human waste, and stagnating water are the feeding ground for pigs, goats, and rats, as well as the breeding ground for a variety of disease vectors.

One positive aspect of the flooding of these high density areas is that the rain often flushes away waste and debris that accumulate during the dry season.

Much of the flooding problem in urban Port-au-Prince is directly attributable to uncontrolled waste disposal and erosion. Major factors contributing to the erosion problem include: deforestation, goat grazing, and inappropriate agricultural practices on the Morne l'Hopital (outside Port-au-Prince), uncontrolled urbanization on the lower slopes of the mountain, and newly constructed roads with inadequate drainage. A large sand quarry on the southern side of the Morne L'Hopital contributes to the siltation problem.

2.4 Earthquakes

During the past 300 years, major quakes have twice destroyed the city of Port-au-Prince (in 1751 and 1770), and caused substantial damage and loss of life in other populated areas (see Section 2.9).

Haiti is transected east to west by three parallel fault systems. (See Figure 5.) The system along the north coast originates in Cuba and runs through Santiago in the Dominican Republic and on to Puerto Rico. A second system extends from the Yucatan in Mexico, through Jamaica and crosses central Haiti in the Artibonite Valley. The entire southern peninsula and the Cul de Sac Plain lie along an active system which originates in Honduras.

The northwest peninsula, the Cul de Sac Plain near Fort-au-Prince, and the area of Anse-a-Veau on the southern peninsula are the areas where earthquakes are most frequent. Moïse St. Nicholas, Gonaïves, Port-de-Paix, and Cap Haitien have experienced numerous quakes. In a study of seismic risk in Haiti conducted in 1922, these areas were identified and practical measures to reduce vulnerability and loss of life and property were recommended. The same recommendations are being made today.

Most large cities and towns in Haiti are built along the coast on alluvial soils which cannot withstand strong seismic motion. Construction will inevitably continue on alluvial soils, but the risk of damage can be significantly reduced by extending the building foundations to bedrock. The same result can be achieved by building on a thick reinforced concrete plate which causes the building to move as a whole when subjected to seismic activity. Buildings should be either so elastic that they yield without falling apart, or so strongly reinforced that they are not damaged by shocks. The elastic building must be well braced and jointed to withstand the force of vertical and horizontal movement.

Basic recommendations for use of indigenous materials and improved quality control measures for the construction industry include using clean sand for mortar in brick and masonry work and using lime that is completely burned and slacked, without impurities and reinforced with cement. Rocks of irregular size and shape imbedded in poor lime make very unstable walls. Heavy roofs, parapets, and overhanging cornices present additional hazards.

2.5 Environmental Hazards

An undetermined quantity of pesticides left over from anti-malaria sprayings conducted on a large scale in the early 1970s are stored in several low-lying areas of Haiti. Principally malathion, the pesticides are not stored properly to insure that there is no leakage into the soil. While this is not a large scale problem it poses potential risks.

Air pollution is acute in downtown Port-au-Prince. Traffic congestion, old automobiles in poor states of repair, and inadequate waste removal services contribute to the poor air quality.

2.6 Fire

Fire is a real and growing hazard in urban areas. Large scale fires in slum areas of Port-au-Prince have left thousands of already destitute people homeless. High population densities, the use of flammable materials in spontaneous slum shelter construction, and grossly in-

adequate fire services to these areas combine to enhance the likelihood of fire.

2.7 Erosion

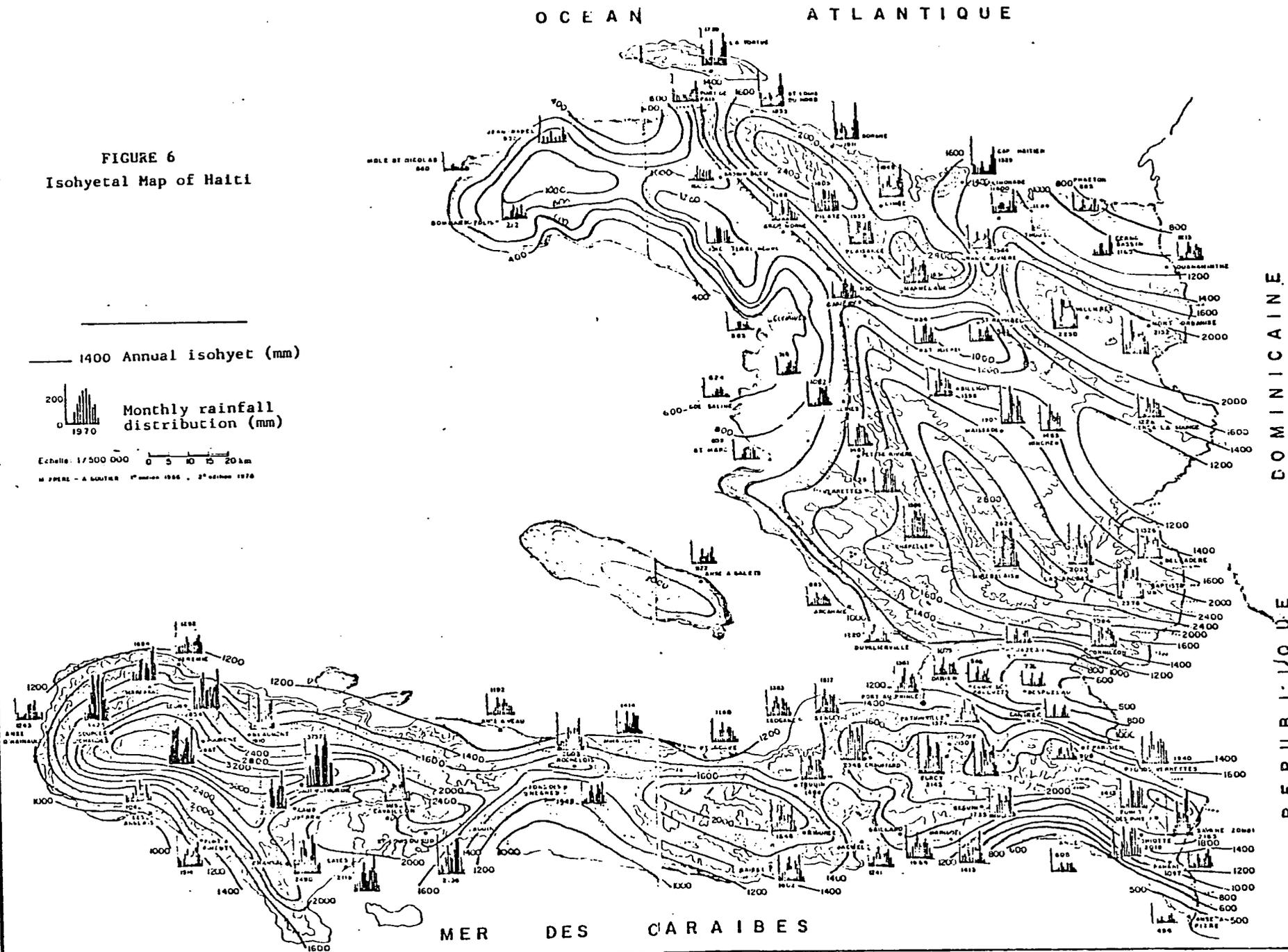
Years of uncontrolled tree cutting for firewood and construction have denuded the hillsides throughout Haiti. Combined with poor farming practices on the steeply sloped hillsides, the deforestation has accelerated erosion throughout the country. The lack of trees contributes to the loss of topsoil and water retention of the remaining soil. This further compounds siltation problems in rivers and streams. Siltation at a rate of several mm per year is reducing the power generating capacity at the Peligre Dam, a major source of power for the city of Port-au-Prince.

2.8 Drought

Drought is currently the most destructive disaster type that afflicts Haiti. Lack of rainfall is only part of the problem. A history of stripping the land of forests and other vegetation for fuel and agricultural activity aggravates the effects of the shortage of rain and reduces the land's ability to retain moisture when rain does fall. Population pressures have pushed farmers to cultivate even the most unsuitable mountain slopes. Although the agricultural yield is meager because the soil is poor and shallow, the cost to the environment is enormous. Without protective cover to hold the soil to the hillsides, it is washed away with any amount of precipitation. The limited availability of land also reduces the period of rest during which the land lies fallow to restore lost nutrients. Drought conditions in Haiti can affect small or large areas and can last for one growing season or many.

Seasonal drought conditions usually result in a decrease in the food supply and an increase in food prices. The effect of these two changes will depend on existing food supply conditions and the size of the affected area. When a large area of Haiti, and thus a major crop, is affected, dislocation of the national market can be expected. Drought can also cause food shortage indirectly, as in the Cote de Fer region where a combination of drought and declining world demand for the region's sole crop, sisal, deprived the area's inhabitants of any source of income. The food shortage in this southwestern community is therefore economically induced.

FIGURE 6
Isohyetal Map of Haiti



Source: National Meteorological Service of Haiti

Another hardship is a nationwide epidemic of African Swine Fever, identified in 1978, which required that Haiti's entire pig stocks be slaughtered. This drastically affected the local population's ability to recover from periods of drought. Because pigs constituted insurance or "money in the bank," the complete decimation of this source of convertible income has had longlasting effects on the rural population. International efforts to reintroduce pigs into Haiti are progressing at a slow pace.

2.9 Disaster History

| <u>Date</u> | <u>Disaster Type*</u> | <u>Location</u> | <u>Number Killed</u> | <u>Number Affected</u> | <u>Damage (\$000)</u> |
|-------------|-----------------------|-----------------------------------------|----------------------|------------------------|-----------------------|
| 09/11/1701 | Earthquake (VII) | Leogane | n.a. | n.a. | - |
| 15/09/1751 | Earthquake (X) | Port-au-Prince | n.a. | n.a. | n.a. |
| 21/11/1751 | Earthquake (X) | Port-au-Prince | n.a. | n.a. | n.a. |
| 03/06/1770 | Earthquake (X) | Port-au-Prince | 250 | n.a. | n.a. |
| | | Leogane | | | |
| 29/07/1785 | Earthquake (VI) | Port-au-Prince | n.a. | n.a. | n.a. |
| 20/11/1818 | Earthquake (VIII) | Cap Henri | 5 | n.a. | n.a. |
| 12/08/1831 | Hurricane | Les Cayes region | +100 | n.a. | n.a. |
| 07/05/1842 | Earthquake (IX) | Cap Haitien | 5,500 | n.a. | n.a. |
| | | Port de Paix | | | |
| 07/05/1842 | Tsunami | Port-au-Prince | n.a. | n.a. | n.a. |
| 08/05/1842 | Earthquake (VII) | Cap Haitien | n.a. | n.a. | n.a. |
| 04/09/1878 | Hurricane | South and SW | n.a. | n.a. | n.a. |
| 17/06/1881 | Earthquake (VII) | Islandwide | n.a. | n.a. | n.a. |
| 23/09/1887 | Earthquake (IX) | Mole St. Nicholas | n.a. | n.a. | n.a. |
| | Tsunami | | | | |
| 28/09/1908 | Hurricane | Cul de Sac Plain | n.a. | n.a. | n.a. |
| 23/08/1909 | Hurricane | Artibonite | n.a. | n.a. | n.a. |
| 12/11/1909 | Hurricane | Cul de Sac, Leogane & Jacmel area | 150 | n.a. | n.a. |
| 11/05/1910 | Earthquake (VI) | Cap Haitien | n.a. | n.a. | n.a. |
| 06/10/1911 | Earthquake (VIII) | Hinche | n.a. | n.a. | n.a. |
| 12/08/1915 | Hurricane | Entire S/SW area | 1,600 | - | - |
| 27/05/1924 | Earthquake (VII) | Port-de-Paix | 3 | n.a. | n.a. |
| 21/10/1935 | Hurricane | Jeremie & Jacmel | 2,150 | n.a. | n.a. |
| 27/10/1952 | Earthquake (VII) | Anse a Veau Petit trou de Nippes | 6 | n.a. | 20,000 |
| 12/10/1954 | Hurricane Hazel | SW Haiti | 410 | 250,000 | n.a. |
| 30/08/1958 | Hurricane Ella | Southwest coast | n.a. | n.a. | n.a. |
| 02/10/1963 | Hurricane Flora | SW Haiti | 5,000 | n.a. | 180,000 |
| 14/11/1963 | Flood | | 500 | n.a. | n.a. |
| 24/08/1964 | Hurricane Cleo | Les Cayes | 132 | 80,000 | 10,000 |
| 00/10/1965 | Hurricane Katy | SE Belle Anse | n.a. | n.a. | n.a. |

| <u>Date</u> | <u>Disaster Type*</u> | <u>Location</u> | <u>Number Killed</u> | <u>Number Affected</u> | <u>Damage (\$000)</u> |
|-------------|-----------------------|--------------------------------|----------------------|------------------------|-----------------------|
| 29/09/1966 | Hurricane Inez | SW Hispaniola | 480 | 670,000 | 20,000 |
| 00/00/1968 | Drought | NW peninsula | n.a. | 210,217 | 1,000 |
| 20/05/1972 | Flood | Les Cayes | 78 | 40,000 | 959 |
| 07/08/1972 | Fire | Port-au-Prince | n.a. | 5,000 | 50 |
| 00/11/1974 | Drought | NW peninsula | n.a. | 507,000 | n.a. |
| 00/00/1977 | Drought | Country-wide | n.a. | 405,000 | n.a. |
| 00/03/1977 | Power Shortage | Port-au-Prince | n.a. | 500,000 | n.a. |
| 31/08/1979 | Hurricane David | N, NW, S | 8 | n.a. | n.a. |
| 11/05/1980 | Fire | Port-au-Prince (St. Martin) | 0 | 10,000 | n.a. |
| 25/08/1980 | Hurricane Allen | SW, Port-au-Prince | 220 | 835,000 | 40,000 |
| 00/00/1981 | Drought | Southwest | n.a. | 103,000 | n.a. |
| 00/00/1983 | Drought | Northwest | n.a. | 133,000 | n.a. |

* Roman numerals in parentheses indicate the earthquake's magnitude on the Mercalli scale.

Source: OFDA Disaster History on file in Washington, D.C. Covers 1900 to the present, and Geology of the Republic of Haiti, "Earthquakes," by Wendell P. Woodring.

2.10 Vulnerability of Infrastructure

Housing

Housing conditions in Port-au-Prince are poor. About 13% of the dwellings are made of scrap material (newspaper, cardboard, and garbage), 19% of wattle/wicker and straw, and 32% of wood. Approximately 25% of the homes in the city are connected to water systems. Residential densities are extremely high as it is common for several families to share one room in a tenement.

Many of the same problems which plague Port-au-Prince affect other urban areas as well, but on a smaller scale. Construction on marginal land, along steep ravines, hills, marshlands and riverbanks contribute to accelerated erosion, and waste disposal problems.

Conditions in rural areas are significantly better. Individual dwellings are usually larger and house only one family. Typical lower income construction is wattle and mud walls with straw roofs. Scrap is not usually available. As incomes rise, families invest in corrugated metal roofs and building support structures. Housing construction costs are generally lower due to lower labor costs.

Housing throughout Haiti is basically of three types: concrete roof and walls; concrete block with steel sheet roofing and mud, and wicker walls with thatched roofs. Houses with concrete block walls and reinforced concrete roof slabs, found almost exclusively in urban areas, represent at most 2% of the national housing stock. These are well-constructed to withstand hurricanes and high winds, as well as flooding. They are not usually structurally flexible enough to withstand earthquakes. The fact that the greatest concentration of this type of construction is found in Port-au-Prince, an area expected to experience seismic activity within the next 20 years, is a point to consider in introducing and promoting seismic resistant designs and building codes.

Approximately 25% of the nation's housing is of concrete block or brick masonry walls with corrugated steel sheet roofing. Roof frames are of wood. This type of housing endures earthquakes well because the structure flexes with the seismic motion. Hurricane winds, however, can carry off roofs that are not properly secured. If well-constructed and maintained, these houses can withstand the force of flood waters, but are vulnerable to fire. Because this type of construction is found in about 70% of urban housing, the fire hazard is a real and extensive threat.

Most housing in Haiti is of the third type: small buildings with mud and wicker plastered walls supported by wood pole framing. Thatched roofs, again on wood pole framing, cover the structure; floors are usually packed dirt, sometimes with some cement. Because the wooden frame construction is both light and flexible, this type of house should resist seismic movement if the joints are well secured. However, the frames are often made of poles of uneven length producing an unstable structure. High winds associated with hurricanes are especially damaging to these homes, carrying away thatched roofs and completely leveling the most unstable units. This type of construction requires diligent maintenance; flowing flood waters erode the base of these structures and pests eat away at the mud and wicker walls. This type of housing is also highly vulnerable to fire; in gusting wind conditions fires can spread rapidly from one thatched roof to the next.

A final type of shelter found almost exclusively in Port-au-Prince, but increasingly in other urban areas such as Cap Haitien, is the squatter housing constructed of waste material, i.e., newspaper and cardboard boxes. The health hazards inherent in these dwellings, which sometimes house multiple family groups, need no elaboration. These shelters also pose serious fire hazards.

Sanitary facilities are extremely inadequate for the urban population. Although access to sanitation facilities is limited in rural areas, the lower population density reduces the dimension of this problem.

Roads and Bridges

Roads and bridges suffer serious damage during hurricanes and floods. The principal highway which connects Les Cayes in the southwest with Cap Haitien in the north is paved, and fairly new. Several sections are suffering from erosion, particularly in the south, because the road was constructed on soil types which are especially susceptible to erosion and landslides. The two-lane highway is narrow, but is the sole route for trade to and from Port-au-Prince and the outlying towns. Traffic on the southern peninsula stretch to Jeremie or Les Cayes is congested at most times.

In Port-au-Prince many roads are paved, all are narrow, with little or no shoulder. Both the potential and actual incidence of traffic accidents involving injury and loss of life are high. These roads are frequently flooded following storms and heavy rains. Figure 4 pinpoints those bridges on the major Port-au-Prince commuter routes which are likely to be flooded in the event of a hurricane or heavy rains.

Agriculture

Hurricanes and droughts are the two major disaster types which have historically caused large scale damage to the agricultural sector. Hurricane Allen in August 1980 affected all agricultural activities in the southern peninsula, from plantain, banana, and corn crops, to commercial production of coffee, cocoa, and fruit. Because Allen struck while the region was suffering from a prolonged drought, food supplies were already scarce. When high winds and water destroyed the recently planted crops, the seed reserve and future food supply for an already suffering people were also lost. A majority of the Haitian population finds itself in this position of compounded vulnerability.

Major crops planted for domestic consumption include beans, sorghum, sweet potatoes, cassava, millet, bananas, plantains, and mangos. Because the planting season for many of these crops falls within the hurricane season, a likely effect of a hurricane would be to drown or wash away young seedlings. Table I indicates the planting, growing, and harvesting seasons for the major crops in both mountain and valley zones. (Also see Figure 7 to locate mountain and valley zones.)

Table I
Planting, Growing, and Harvesting Dates

Mountain Zones*

| Crops | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|----------------|---------|--------|--------|--------|--------|------|--------|--------|--------|--------|--------|--------|
| Corn | | P----- | G----- | | | | H----- | | | | | H |
| Millet | H---H | | | | | | | P----- | G----- | | | G |
| Potatoes | H-----H | | | | | | P----- | G----- | | | | G |
| Coffee | H---H | | | | | | | H----- | | | | H |
| Beans | G-H--H | | P--G-- | H--H-- | H--H-- | | | P--G-- | H--H-- | H--H-- | | P--G-- |
| Sweet potatoes | | P--G-- | | | | | H--H-- | | | | | H |
| Cassava | H--H | | P--G-- | | | | | | | | H--H-- | H |

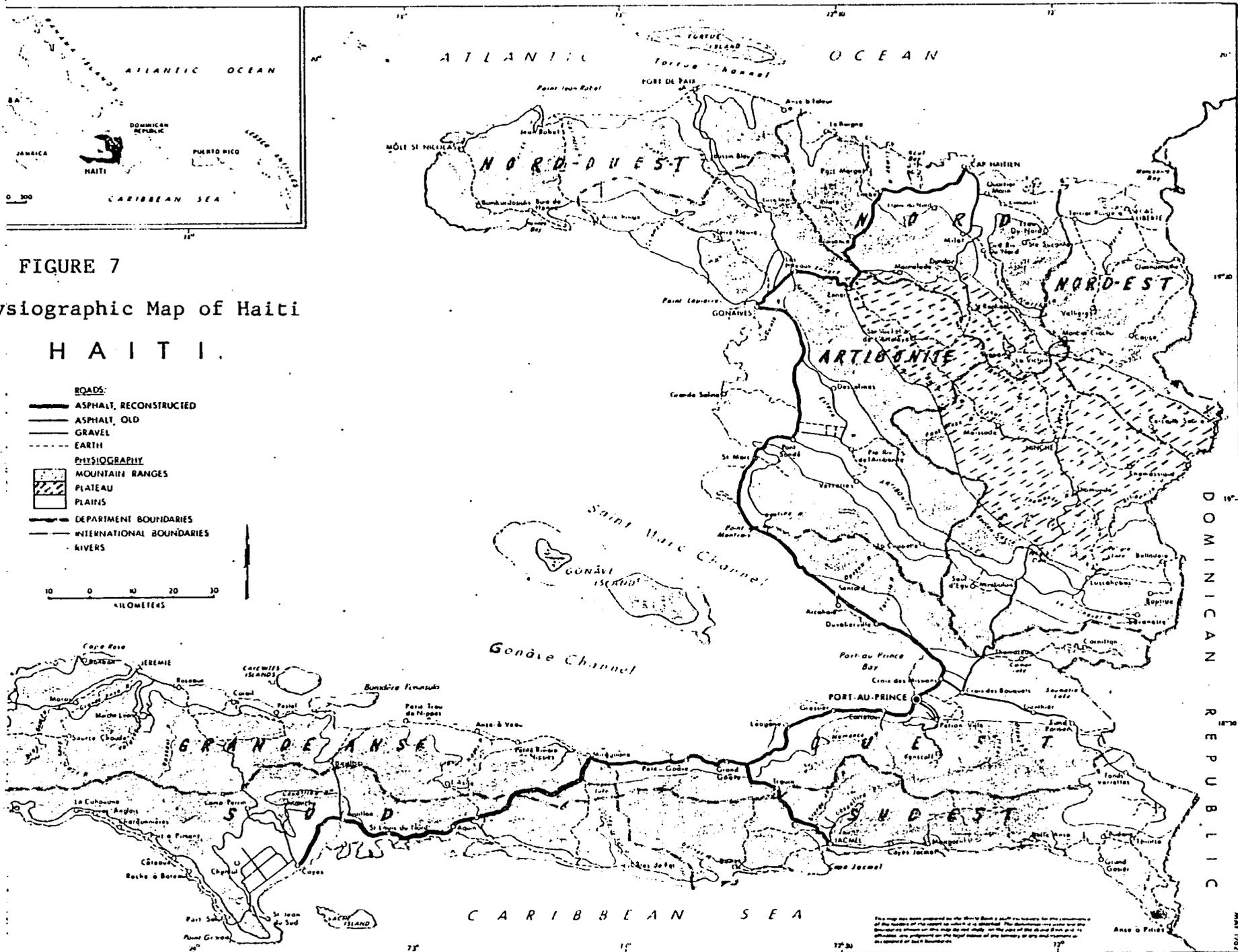
Valley Zones

| | | | | | | | | | | | | |
|----------------|--------|--------|--------|--------|--------|--|--------|--------|--------|--------|--|---------|
| Corn | | | P----- | G----- | | | H----- | | | | | H |
| Millet** | H--H | | | | | | P----- | G----- | | | | G |
| Rice | H | P--G-- | H--H-- | H--H-- | | | | P--G-- | H--H-- | H--H-- | | H |
| Sweet potatoes | H--H | P--G-- | H--H-- | H--H-- | | | | P--G-- | H--H-- | H--H-- | | H |
| Sugarcane | H----- | | | | | | | | | | | H-- |
| Millet*** | | | P--G-- | H--H-- | H--H-- | | | | | | | |
| Beans | H---H | | | | | | | | | | | P---G-G |
| Cotton | H--H | | | | | | P--G-- | | | | | H-- |

KEY

P = Planting dates
G = Growth stages
H = Harvesting dates

* = No irrigation in Mountain Zones
** = Local
*** = Hybrid



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3. Disaster Preparedness and Assistance

3.1 National Disaster Planning

In 1983, the Government of Haiti enacted a law creating the Organisation Pre-desastre et de Secours (OPDES) for disaster relief. OPDES was established under the Department of Public Health and Population to coordinate all disaster preparedness activities of the public and private sectors and external agencies, and to plan and organize relief efforts in response to disasters.

OPDES' scope of responsibility is divided into three phases. During Phase I, before a disaster, OPDES is charged to:

1. Inventory and identify available commodities for use in case of disaster including hospitals and medical facilities, beds, and personnel; public works services and equipment (trucks, cars, moving equipment, etc.); telecommunications media (TV, amateur radio operators, telephones, other radio networks); and buildings in each community which could serve as shelters.

2. Prepare a national disaster plan with appropriate plans for each type of potential disaster (e.g., hurricane, earthquake, drought, food shortage).

3. Establish an infrastructure to be used in case of disaster in cooperation with national and international technical organizations, including the training and development of qualified personnel.

4. Suggest administrative measures which could be implemented to prevent disasters such as construction of hurricane or seismic-resistant housing, promulgation of building codes, and creation of a fire service.

In Phase II, during a disaster, OPDES is charged to:

1. Determine the affected area, and promptly assess the effects and extent of loss of life, damage, etc.

2. Evaluate immediate local needs for shelter, food, medical assistance.

3. Immediately communicate urgent needs to the national coordinating committee and implement the preestablished relief plan.

4. In coordination with other concerned departments, take necessary measures to reestablish normal public services (road clearing, electricity, potable water, telephones).

5. Coordinate relief activities of the Haitian Red Cross, and other private non-governmental and external bilateral and multilateral agencies.
6. Utilize available resources in the local affected area.
7. Keep the public informed of activities and obtain their active collaboration in relief plans.

In Phase III, after the disaster, OPDES is to:

1. Within the first 90 days after the crisis period, prepare a report of relief activities already undertaken and those rehabilitation programs to be carried out and completed within a specified time frame.
2. Inform the relevant ministries and organizations of the work plan and review future steps to be taken and completed.
3. Keep the public informed of these activities and developments.

Finally, OPDES is authorized to exchange information on disasters with other organizations, especially with those in the Caribbean region, and solicit technical assistance from international agencies.

Haiti's disaster vulnerability, combined with overwhelming development needs make it one of the most challenging countries in the region in which to implement a comprehensive disaster plan.

The position of Director General of OPDES is clearly a comprehensive and challenging one which requires substantial experience in planning, organization, logistics, as well as hazards analysis and management. In August 1983, the Ministry of Public Health and Population which has the authority over OPDES, appointed a new Director, Dr. Roger Laforet, a medical doctor, to OPDES.

OPDES has just been established. In April 1984, it was not yet headquartered in space suitable for setting up an emergency operations center, it had a very limited staff, and the hurricane season was approaching. The task of disaster preparedness, relief, and management in Haiti is large and complicated by the pervasive poverty and widespread corruption throughout the country. Establishing a national level relief organization is only a first step toward beginning to address the comprehensive emergency management needs in Haiti. Intense rivalry and political maneuvering between responsible government agencies handicap the coordinated approach required for effective disaster relief. A strong commitment on the part of the government leadership would motivate actors at all levels to make the disaster field one of opportunity for the disaster victims and not just another opportunity for personal acquisition by those least affected.

3.2 Regional and Local Disaster Planning

The Haitian Red Cross has traditionally been the principal relief organization during disasters in Haiti. With the creation of OPDES, the Red Cross will focus more exclusively on small, sudden impact disasters, and will coordinate closely with OPDES.

Headquartered in Port-au-Prince, the Red Cross has a network of 14 regional and more than 50 local committees, a central warehouse of emergency relief items, and many years of experience on the scene.

Recognized by the League of Red Cross Societies, it often receives and channels international assistance following disasters in Haiti. Unlike most Red Cross societies, however, many members of regional and local committees of the Haitian Red Cross are government officials. This has sometimes created conflicts of interest during relief operations.

During small or local emergencies, the Red Cross is likely to provide immediate assistance, at the request of the local or regional government authority. During the destructive fire which swept through the St. Martin slum area of Port-au-Prince in 1980, the Red Cross set up emergency shelters and tents for the 10,000 people made homeless by the fire. Most residents, however, preferred to stay at the scene, unwilling to abandon the site of their homes.

The 1983 law creating OPDES also established a hierarchy of committees to carry out disaster-related activities nationwide. At the local level, Intervention Teams in each rural section are composed of a local agricultural technician, health workers, a representative of the Ministry of Public Works, Transport and Communications, the Red Cross, and the Head of the Rural Section. The Teams work closely with the existing Community Action Councils in each commune. As the plan is envisioned, it is these local Intervention Teams that will form the basis of all direct OPDES interventions and relief activities.

Because drought and resultant food shortages are recurring problems in the northwest, an established system exists for distributing food in this region through the Organization for the Development of the Northwest (ODNO). ODNO is responsible for:

1. Forming and supervising all regional and local committees.
2. Formulating and discharging distribution plans on the regional level.
3. Providing transportation of all commodities and personnel on both the regional and local levels, including trucks, fuel, and drivers.
4. Monitoring all distribution on the local level.

In response to the recent drought, ODNO formed Regional Committees in Gonaive, Port-de-Paix, and Jean Rabel to advise and assist in administering the food distribution program. ODNO also formed committees in each commune, ideally representing a wide spectrum of the local society, including medical personnel, agricultural specialists, GOH officials, farmers, clergy, and PVOs if available. The committees are responsible for identifying the affected population groups and conducting all distributions on the local level. They are assisted by the Community Action Committees which are located throughout each commune. The Community Action Committees are the operative political authority at the local level.

When the drought situation in the northwest deteriorated in 1983, the newly created OPDES approached ODNO to assist in providing emergency food supplements to the affected population. Problems developed when AID food monitors learned that the emergency food was not reaching the target population. They discovered that, in practice, the responsible Community Action Committees were composed almost solely of government officials; representatives of religious and private groups were usually excluded. The Committees were under strong political pressure to satisfy the needs of the urban population before considering the rural sections. As a result, ration cards were distributed to those who could afford to purchase food, and the most destitute and isolated rural population continued to suffer.

3.3 Health Facilities

The Department of Public Health and Population (DSPP) completed an inventory of Haiti's medical facilities in January 1984. The computerized inventory provides the most current information on all types of medical facilities, by region and district, and indicates the number of doctors, nurses, and auxiliaries currently working in the facility (as well as the number of vacant positions).

It is difficult if not impossible to separate Haiti's overall medical needs from those which are specifically disaster-related. Primary health care at the regional and local level is nowhere near adequate. Although health problems, deaths, and injuries directly attributable to disasters striking Haiti are few, the normal, non-disaster conditions continue to claim 5,000 infants each year. (Under present conditions, of 200,000 children born in 1983, 25,000 will die before their first birthday as a result of diarrhea, malnutrition, tetanus, pneumonia, measles, and tuberculosis.) The Haitian government is working to decentralize the health care system, and is actively training local health workers and traditional midwives to work in the community. In 1981, the government estimated that 25% of the rural population had access to some kind of health care; the current plan aims to provide health care to 70% of the rural population by 1986.

In the meantime, local health workers are being trained in basic health care and extension. Each health worker is responsible for 1,500 to 2,000 people, visiting each family in his/her community regularly to record births and deaths, monitor sanitary conditions, recommend improved nutritional practices, and refer cases of illness to the next level of care at the dispensary.

The local health worker would, therefore, be a good source of information and contacts in a disaster. A recent study recommended that the health workers be incorporated in Red Cross and/or PAHO-sponsored disaster training. As decentralization in the health sector progresses, such training should be part of regional and district level programs. To date, 20 regional health officers have participated in a USAID sponsored workshop on Post-Disaster Health Assessments.

Medical Supplies/Pharmaceuticals

In the event of disaster, the medical stores are likely to be inadequate. However, there is a substantial pharmaceutical manufacture and assembly industry in the Port-au-Prince area. USAID has surveyed the members of the Haitian Chamber of Commerce and other groups to identify available stockpiles and sources of needed commodities. The results of this survey are being entered in a computer file maintained at USAID, for ready update and retrieval during a disaster.

The Ministry of Health developed a list of 65 standard drugs which are distributed through a network of community pharmacies in the rural areas. It established a semi-autonomous agency, Agence d'Approvisionnement des Pharmacies Communautaires (AGAPCO), to deal with procuring, stocking, packaging (in unit doses), and selling the medicaments. Because the drugs distributed are generic, costs are low. The aim of the program is to get drugs out to the rural areas at reasonable cost. The program is not permitted to operate in urban areas where it is presumed that private companies are already meeting demand. Communities are encouraged to establish local pharmacies under the direction of the community councils. AGAPCO also supplies pharmaceuticals to the regional hospitals which each have a budget to purchase needed stocks.

An additional note: In the event of an emergency, USAID is permitted to use disaster funds to locally procure needed relief supplies. In the event of a malaria epidemic in which the U.S. Ambassador declares a disaster, it should be noted that chloroquine is produced and assembled in Haiti by Pharmval, a pharmaceutical company owned by the Boulos family. Pharmval supplies both chloroquine and oral rehydration salts.

Other medical services during emergency situations are likely to be inadequate. Facilities are available at Duvalier Airport to refrigerate drugs (see Section 3.5, Airports).

3.4 Food Resources and Storage

Maize is the staple food of the majority of Haitians, along with sorghum, millet, sweet potatoes, plantains, and cassava. Beans and peas provide an important source of protein. Meat, fowl, and fish are rare in rural diets.

The GOH does not stockpile food for emergency needs. During the 1980 hurricanes, the only large stores of food available were from the private voluntary agencies engaged in P.L. 480 Title II maternal child health and other food distribution programs. Because USAID policy then allowed voluntary agencies to maintain a reserve of 25% of their normal annual P.L. 480 food, they were able to immediately distribute this food to the hurricane victims. Present A.I.D. policy allows voluntary agencies to maintain no more than 5% of their annual P.L. 480 stocks. This does not represent a very large amount of food and it is likely to be the only source of food for emergency distribution.

During the 1983-84 drought in the northwest, OPDES called a meeting of international donor representatives to solicit assistance in meeting the needs of the drought victims. After consulting with A.I.D., CARE was able to offer 1,200 MT of food to OPDES for distribution in the northwest. This was the only food available to meet the emergency needs of the drought-affected population.

Below is a list of major voluntary agencies' storehouses and capacity.

| <u>Agency</u> | <u>Location</u> | <u>Storage Area</u> | <u>Capacity</u> | | |
|---------------|-----------------|---------------------|-----------------|-------------|-------------------|
| | | | <u>MT</u> | <u>Bags</u> | <u>Containers</u> |
| CARE | Port-au-Prince | 20,000 sq. ft. | 2,000 | 88,000 | 72 |
| | Gonaives | 10,000 sq. ft. | 800 | 35,200 | 36 |
| | Cap-Haitien | 12,000 sq. ft. | 1,000 | 44,000 | 43 |
| | | 6,000 sq. ft. | 500 | 22,000 | 21 |
| | Port-de-Paix | 5,000 sq. ft. | 400 | 17,600 | 18 |
| CRS | Port-au-Prince | 5,000 cu. ft. | n.a. | n.a. | n.a. |
| | | 12,000 cu. ft. | n.a. | n.a. | n.a. |
| | Les Cayes | 8,000 cu. ft. | n.a. | n.a. | n.a. |
| | Jeremie* | 4,000 cu. ft. | | | |

* CRS has closed down its warehouse in Jeremie and its program in the southwest due to excessive pilferage. CRS hopes to resume operation of its feeding programs in this area when better warehouse management can be secured.

3.5 Airports

There are two principal airports in Haiti: Francois Duvalier International, about 10 km outside of Port-au-Prince, and Cap Haitien International, on the outskirts of Cap Haitien on the north coast.

During 1983-1984, significant improvements were made in the operating procedures and equipment at Francois Duvalier Airport. Several studies have been conducted by international aviation organizations including the ICAO and the FAA. In addition, both American Airlines and Air France have refrigerated facilities available to store perishable medical supplies.

Airfield lighting consists of medium intensity variable, edge lights, threshold lights, taxiway, and apron boundary lights. New runway lights and a new PAPI have been installed. There are no approach lights; runway lights are on one circuit.

The airport has expanded staff training, introduced regular drills for the firefighting company, and focused attention on overall airport safety. The WMO is training Haitian meteorologists in the operation of new weather data and tracking systems. ICAO has supplied personnel to train Haitian air traffic controllers using sophisticated simulation equipment.

Airport Facilities

1. The Francois Duvalier International Airport. Situated at the mouth of the Plain of Cul-de-Sac, it is located in a completely flat terrain approximately 10 km from the center of Port-au-Prince. The concrete landing strip is 3,050 m long and 42.75 m wide, 33 m above sea level, and oriented in an E/W direction. The two-story terminal building (64 x 34 sq. m) has a built-in control tower and serves all passenger aircraft. Freight operations are conducted in four separate buildings. This airport has a V.O.R. Radiobeacon, Omnidirectional Alignment VHF, landing lights, a rotating beacon, and an automatic starting generator on stand-by.

Cargo handling equipment at the airport includes 7 forklifts with capacity up to 18,000 lbs., 2 container pallet loaders, 1 pallet loader, 5 200-volt ground power units, 2 28-volt ground power units, 4 air starters, 5 conveyor belts, a scissor lift, 12 tugs, 54 container dollies, 30 pallet dollies, and 30 baggage carts.

2. The Cap Haitien Airport. Located on the edge of a low, flat coastal plain, it is only 3 m above sea level and approximately 3 km from the city of Cap Haitien. The bituminous-surfaced landing strip is 1,350 m long and 60 m wide and oriented in a NNE/SSW direction. A small (15 x 8 sq. m) control building located 75 m to the west and near the NNE end of the strip is adjacent to an aircraft parking area that measures 75 x 60 sq. m. Accessible from this parking area (located about 85 m from

the center of the strip) is a hangar (17 x 13 sq. m) that is used for small repairs. This airport has a short-wave radio receiver-transmitter for communication with aircraft, field lights, and landing aids.

3. Port de Paix Airport. Located between the town and the estuary in the narrow alluvial valley of Trois Rivières, the airport is dangerously close to the town and only 4 m above sea level. The natural-ground strip is covered with grass and shows indication that it may be unusable in wet weather. The strip is 1,560 m long and 90 m wide, and is oriented in a NE/SW direction. A small (10 x 6 sq. m) control facility is located only 10 m to the east of the edge of the strip. The airport has a short-wave radio receiver-transmitter for communications with aircraft but no other navigational or landing aids.

4. Gonaives Airport. Located on the salt flat 2 km to the south of the town, the airport is only 60 cm above sea level. The natural sandy soil strip is 914 m long and 90 m wide, oriented in a NNE/SSW direction. A small facility houses the military and civil control personnel, as well as a short-wave radio receiver-transmitter for communications with aircraft.

5. Jeremie Airport. Situated approximately 6 km to the WNW of the town, the airport is built in a relatively rugged coastal zone about 50 m above sea level. The gravel surfaced strip is well-graded and drained. The strip is 960 m long and 60 m wide, and is oriented in a ENE/WSW direction. A dangerous feature is a steep-cut slope on the north side of the strip. The strip has an average 3% longitudinal rising slope towards the WSW extremity. A small (15 x 7 sq. m) building provides housing for control and communications personnel. The airport has a short-wave radio receiver-transmitter for communication with aircraft and other airports, but no other navigational or landing aids are available.

6. Les Cayes Airport. Les Cayes Airport is located 9 km to the NNW of the town. It is 58 m above sea level and is situated in the vast Cayes Plain. The natural ground surface, mostly covered with grass, is partly gravel, partly soil, and there are sections, particularly at the east end, where an outcropping of rock is in evidence. The strip is 1,220 m long and 50 m wide and is oriented in an E/W direction. A small control facility (6 x 6 sq. m) is located 30 m to the south of the eastern extremity of the airstrip. This facility houses military and civil control personnel as well as a short-wave radio receiver-transmitter for communications with aircraft.

7. Jacmel Airport. This airport is situated 2 km to the east of the town in the small alluvial valley of the Jacmel River. It is approximately 30 m above sea level, and is on natural soil covered with a dense growth of grass. The strip is 1,220 m long and 60 m wide and is oriented in a N/S direction. A small control facility houses the military and civil control personnel as well as a short-wave radio receiver-transmitter for communication with aircraft. The proximity of trees in the surround-

ing fields, and the hills around the valley, reduce the safety margin of this airstrip. The drainage of the strip also appears to be less than satisfactory.

3.6 Ports

Two major ports, Port-au-Prince and Cap Haitien, are open to shipping; there are also 12 minor ports. An expansion program at Port-au-Prince, where the bulk of imports and exports are handled, was expected to be completed in 1978. Included in the project are a new reinforced concrete quay and two warehouses; a new channel provides access to vessels up to 52,000 tons. Cap Haitien can accommodate only one ship at a time. The IDA-assisted development of coastal shipping ports at Port-de-Paix and Jeremie should help integrate their respective regions (northwest and Grande Anse) with the rest of the country.

All ports are handicapped by inadequate harbor facilities and shallow coastal waters. Nearly all lighthouses along the Haitian coast are in working order. Picolet (Cap Haitien) and Isle of Vache (Cay's) should be functioning by mid-April 1984.

The port in Port-au-Prince is a modern facility capable of handling all types of shipments, bulk cargo, Roll-on/Roll-off, flat bed and container trailers, and large sealed containers. During Hurricane Allen relief efforts, movement of materials was relatively problem free and warehouse facilities in Port-au-Prince were sufficient to handle all food and material shipments. Trucks, leased or owned by PVOs, were available to carry supplies to the affected areas in the southern peninsula.

Cap Haitien

Coordinates: Lat. 19° 46' N; long. 72° 12' W.

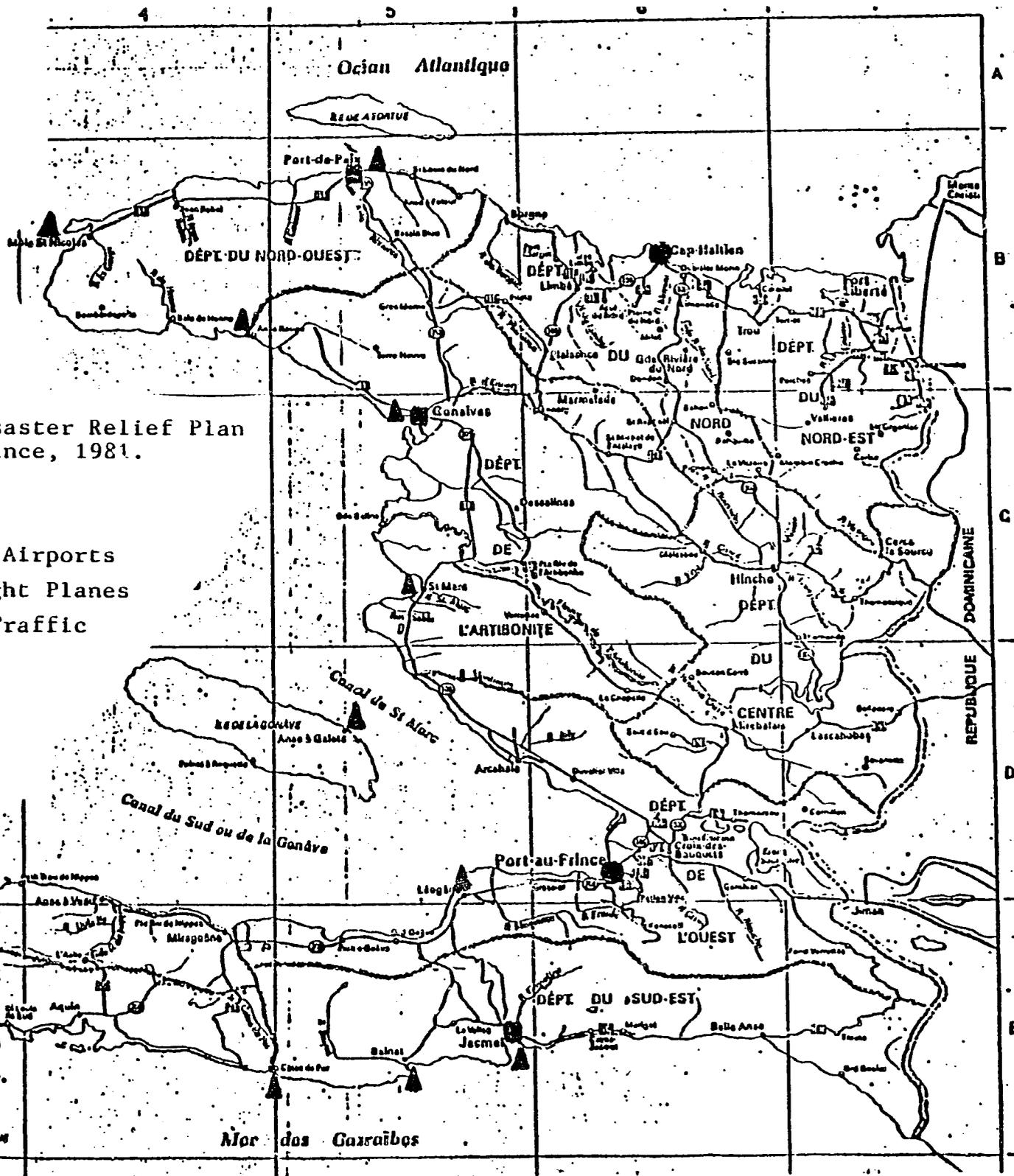
Authority: Resident Inspector of Customs

Approach: Approach from the westward until Picolet Light bears 160° to 220°. From the eastward, having passed Monte Christi shoal, stand to the westward until the highest part of Haut du Cap bears 220°, and steer towards it. When Picolet Point Light is sighted, stand in for the entrance. When the northern extremity of Cap Haitien bears 270°, the vessel will be abreast the N end of the reef.

FIGURE 8
Ports and Airports
in Haiti

Source: U.S. Mission Disaster Relief Plan
U.S.A.I.D., Port-au-Prince, 1981.

- International Ports and Airports
- Regional Airport for Light Planes
- ▲ Port for Inter Coastal Traffic



Accommodation: Depth at entrance, 36.6 m. Depth on bar, 3.66 m. Depth in harbor, 17.6 m. Wharf, 182.9 m long, depth alongside 6.70 m, providing berth for one sea-going ship. Automatic blinker light on buoy on Mardi Gras Reef.

Les Cayes

Coordinates: Lat. 18° 11' N; long. 73° 44' W. Port closed to shipping.

Fort Liberte

Coordinates: Lat. 19° 41' N; long. 71° 51' W. Port closed to shipping.

Gonaives

Coordinates: Lat. 19° 27' N; long. 72° 42' W. Port closed to shipping.

Jeremie

Coordinates: Lat. 18° 39' N; long. 74° 07' W. Port closed to shipping.

Miragoane

Coordinates: Lat. 18° 27' N; long. 73° 06' W.

Cargo: A pier accommodating ships up to 10,000 tons has been
Facilities: built by the Reynolds Co. for the shipment of bauxite in bulk. Port closed to other shipping.

Port-au-Prince

Coordinates: Lat. 18° 33' 0" N; long. 72° 21' W.

Approach: Depth at entrance, minimum 15.24 m.

Accommodation: Depth in harbor, 6.10 m up to 8.53 m alongside southern part of pier. From August to November, to be approached with caution. Three quays with 6.10 to 8.53 m, 5.49 to 6.70 m and 2.13 to 3.66 m alongside respectively. Inner harbor on north side of pier dredged to a depth of 9.14 m and able to accommodate three vessels including container

ships. A finger pier, extension of the existing pier, 243.8 m long, can accommodate two cruise ships (one each side) up to 20,000 tons each. Draft alongside 9.14 m. A new port, north of the Old Pier, has been built and is operational. This pier can accommodate three vessels, particularly container ships. A port trainer for discharge of containers (6 to 12 m) is available. Capacity 30 tons. Water depth, 9.7 m.

Private Wharves: Owned by the cement factory, flour mill, sugar factory, and various oil companies.

3.7 Communications

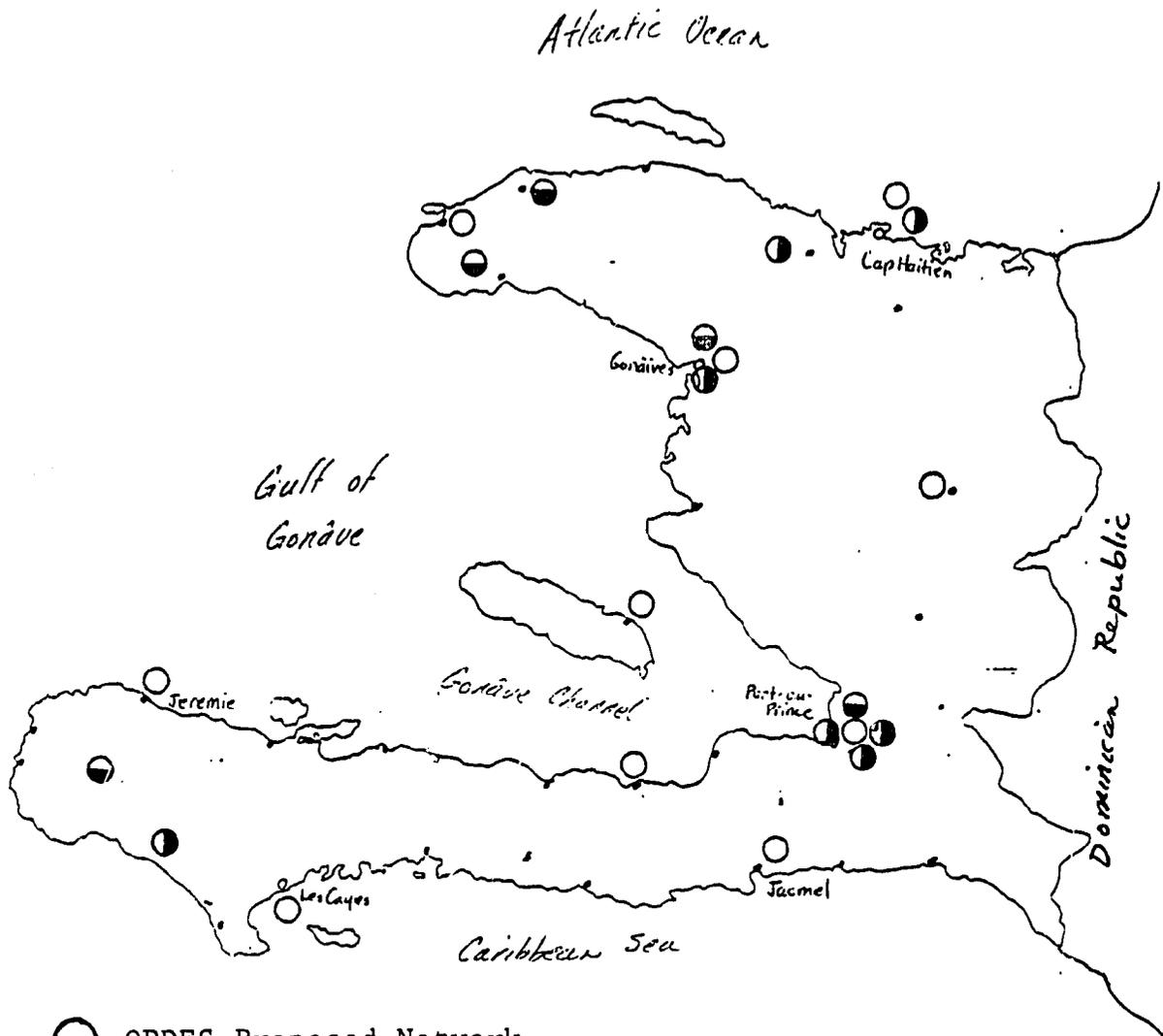
The Emergency Communications System throughout Haiti is being upgraded as a result of efforts by the Pan Caribbean Disaster Preparedness Team (PCDPPP) and the work of the UN's International Telecommunications Union. The military system provides nationwide coverage through a network of VHF and shortwave radios. While this network could be called upon in cases of natural disaster, it exists principally to serve the military's needs and therefore its use during relief operations would be limited to availability.

OFDA and PCDPPP teams have been working with OPDES to establish a comprehensive radio network devoted to emergency communications. The network will comprise ten SSB radios deployed in the following locations: OPDES headquarters in Port-au-Prince, Jacmel; Petit-Goaves; Jeremie, Cayes, Anse a Galets, Hinche, Gonaives, Mole-St.Nicholas, and Cap Haitien. Figure 9 displays the proposed OPDES network as well as the UN radio system and the CARE network.

The twelve channels of the OPDES system will provide direct contact with the Haitian Red Cross headquarters, the Haitian Amateur Radio Net, PCDPPP, the Jamaican Emergency Net, the Trinidad Seismic Net, and the Eastern Caribbean Inter-island Police. Additionally, OPDES will be able to communicate with CARE, the UN system, and other PVO and missionary networks through the Red Cross channel. OPDES will also be tied in with the police and fire departments, the Port Authority, and the Claude Duvalier Airport Meteorological Office. A proposed further addition is a mobile emergency operations center, in the form of a radio-equipped truck, which would be dispatched to the disaster scene and communicate with OPDES via VHF or HF.

Normal radio communications, i.e., commercial radio operations (Radio National, Radio Lumieres, Radio Soleil), should be a medium for preparedness messages. Radio is a highly effective communications and educational tool in both urban and rural areas, especially among the most vulnerable and largely illiterate population. The PCDPPP team has developed public awareness/education announcements for use as radio

FIGURE 9
EMERGENCY RADIO COMMUNICATIONS NETWORKS



- OPDES Proposed Network
 - Port-au-Prince (headquarters)
 - Petit-Goave
 - Jacmel
 - Les Cayes
 - Jeremie
 - Hinche
 - Gonaives
 - Mole St. Nicholas
 - Cap Haitian
 - Anse a Gallet

- ◐ CARE Network
 - ◐ Port-au-Prince
 - ◐ Gonaives
 - ◐ Source Chaudes
 - ◐ Bombardopolis
 - ◐ Jean Rabel

- ◑ United Nations Network
 - ◑ Port-au-Prince (UNDP, FAO, and ITU Offices)
 - ◑ Chardonnières
 - ◑ Gonaives
 - ◑ Limbe
 - ◑ Cap Haitien
 - ◑ Mount Organize

spots. These have been translated into French and Creole and should be broadcast before the onset of the next hurricane season. The messages have been developed for use in the Eastern Caribbean with due consideration and incorporation of the habits, attitudes, and linguistic characteristics of each island audience.

3.8 Electricity

Electric power for Port-au-Prince is supplied by three diesel electric plants and the hydro-electric plant at Peligre Dam. The total installed capacity is 109.3 MW, 47.1 MW from the Peligre Dam (3.15.79 MW units) 15.2 MW from Joseph Janvier plant, 8 MW from Delmas plant, and 39 MW from the Varraux Central plant. However, several factors contribute to reducing the actual electricity generated. The total average requirements for the Port-au-Prince metropolitan area is 55 MW per day, with a peak demand of 58 MW.

The Peligre Dam is used for hydro-power and irrigation. Agricultural irrigation requirements dictate how much water is released from the reservoir and at what rate. However, it is the release of water for agricultural needs that produces the city's base load power. Diesel generators at Delmas, Varraux, and Joseph Janvier meet the remaining needs. However, the continuing drought in Haiti as well as accumulating siltation at the dam have contributed to a dramatic decrease in the dam's generating capacity. By the month of March, the dam operates only one 15.7 MW unit, and by April, no hydro power is available at all. The diesel generators are not adequate to fill the gap. At any given time, as much as 16.8 MW, or 27%, of the city's generating capacity may be out of commission due to equipment failure, lack of spare parts, or poor operating and maintenance practices. A serious shortfall in power generation results.

In a short term response to this problem, in FY 1977 and FY 1983 OFDA, through the U.S. Dept. of Defense, provided six generators and a team of operators, which were used to provide backup for the existing GOH generating capacity. The generators were installed at the Carrefours Furilles substation outside Port-au-Prince.

Located at the Port-au-Prince port is the ocean fuel dock owned by Shell Oil and used by Texaco and Esso as well. Shell is the major fuel supplier to Electricite d'Haiti, the Port Authority, USAID and the Embassy, and other Haitian government agencies. The company maintains a 6-week reserve supply of gasoline, a 6-week reserve of fuel oil, an 8-week reserve of kerosene, and a 4-week reserve of diesel fuel.

Texaco provides fuel to the Duvalier airport with two 4,000-gallon tractor tankers and four 3,000-gallon tanker trucks. Texaco maintains a five- to six-week reserve of all fuels (jet fuel, aviation gasoline, diesel fuels, and automobile gasolines), and could bring a tanker to the ocean terminal within a week during an emergency. If the ocean port facility is damaged, floating lines could be used to directly offload the fuel.

Esso provides fuel to the power plants of Les Cayes on the southern peninsula and Cap Haitien on the north coast, as well as to the Army, Coast Guard, and Department of Rural Agriculture and Natural Resource. Esso's refueling tanker arrives every six weeks and provides a three-week reserve supply.

Electricite d'Haiti Power System
Generating Power Capacity

| <u>Site</u> | <u>Fuel</u> | <u>Units</u> | <u>Maximum Capacity</u> |
|----------------|---------------|---------------------|-------------------------|
| Peligre Dam | Hydroelectric | Three 15.7 MW units | 47.1 MW |
| Joseph Janvier | Diesel | 15.2 MW | 15.2 MW |
| Delmas | Diesel | Four 2.5 MW units | 8 MW |
| Varreux | Diesel | 39 MW | 39 MW |
| | | | <u>109.3 MW</u> |

3.9 Radio, Television and Telephone Networks

Radio constitutes the primary information and advertising medium for most of the country. Most stations broadcast in both French and Creole from Port-au-Prince or Cap Haitien.

Principal stations are Radio Haiti Inter, B.P. 737; Radio Metropoli, B.P. 62; Radio Nationale, rue du Magasin de d'Etat; Radio Nouveau Monde, place de l'Hotel de Ville, all in Port-au-Prince. Other stations are Voix de la Revolution Duvalieriste, Radio Union, Radio Port-au-Prince, M.B.C. Radio Union, Radio Port-au-Prince, M.B.C. Radio Cacique, Radio Lumiere, and Radio 4 VEH. The army, the United Nations, and various voluntary agencies operate internal radio networks. (See figure 9.)

The telephone system is maintained by a semi-private company (TELECO) and is generally dependable for domestic and international circuits. Of the approximately 28,000 lines in service in 1984, 23,000 are in the Port-au-Prince metropolitan area. Cable and telex services are also provided by Teleco via ITT and Western Union.

The government owns the television broadcast station Tele-National and transmits to Les Cayes, Jeremie, and Gonaires from Port-au-Prince.

Cable television is also available in the Port-au-Prince area through Tele-Haiti; three of the five channels are received from the United States and one from Canada.

3.10 Voluntary Agencies

Voluntary agencies play an important role in providing a variety of social and medical services throughout Haiti. It has been said that every religious denomination in the world has missionaries operating in Haiti. As the country with the lowest per capita income in the hemisphere, Haiti is the target of many charitable organizations' activities.

The USAID Mission has initiated a nationwide survey of voluntary agencies active in Haiti. The target of the survey is both expatriate and indigenous groups. The survey results will provide a comprehensive overview of the major activities and areas of involvement of some 80 principal voluntary agencies. By February 1984, more than 80 such groups had been identified and contacted to obtain detailed information on the foci of their programs, identify their target populations, and catalog the resources and expertise they have available. Follow-up interviews were underway in February 1984.

The principal international voluntary agencies active in Haiti are the following: CARE, Catholic Relief Services (CRS), Church World Services (CWS), and Seventh-day Adventist World Service (SAWS). These organizations are involved in large-scale food distribution and maternal-child health programs.

In addition, a newly formed organization, the Haitian Association of Voluntary Agencies (HAVA) represents at present 51 Haitian voluntary agencies. The association was founded to provide a forum for coordinating the many diverse activities and programs of the volags. Through HAVA, members hope to be able to more effectively solicit and utilize development funds and promote their coordinated and cooperative work toward improving conditions in Haiti. HAVA is in the early stage of defining its role, establishing cooperative relationships among its members, and identifying areas for potential joint action. The group's action to date is impressive. Because development and disasters are so integrated in Haiti, the potential role of HAVA in promoting disaster preparedness and public awareness and in coordinating disaster assessment and relief is great. They are an organization which should be encouraged to work with OPDES in this area.

Haitian Red Cross
Victor Laroche, President
Place des Nations Unies
B.P. 1337
Port-au-Prince
Tel.: 2-1035
Cable: HAITICROSS, Port-au-Prince

Catholic Relief Services
Peter Strzok, Director
Stephan Dix, Assistant Director
14, rue Dantes Destouches
B.P. 947
Port-au-Prince
Tel.: 2-0654
Cable: CATHWEL, Port-au-Prince, 329-100 via RCA/Haiti

CARE
Larry Holzman, Director
21 Avenue Marie Jean
B.P. 793
Port-au-Prince
Tel.: 2-2314, 2-3537

Church World Service
John Mullenberg, Director
B.P. 285
Port-au-Prince
Tel.: 6-4321

Seventh-day Adventist World Service
James Fulfer, Director
B.P. 11196
Port-au-Prince
Tel.: 4-1006

Convention Baptist d'Haiti
Jack Hancox
B.P.
Port-au-Prince

Rev. Andre Jean
B.P. 20
Cap Haitien
Tel.: 2-0567

Oblates of Mary Immacula
Rev. Hubert Constant, Provincial Vicar
40 Avenue N
B.P. 691
Port-au-Prince
Tel: 5-5654

Operates extensive radio network in the southwest and northeast.

Mennonite Central Committee
Eldon Stoltzfus, Director
B.P. 2160
Port-au-Prince
Tel: 6-1739

Salvation Army
Mjr. McKenzie, Division Secretary
B.P. 301
Port-au-Prince
Tel.: 2-4502

Haitian Association of Voluntary Agencies (HAA)
Raymond Etienne, Secretary General
Pierre Armand, President
60 rue Geffrand
B.P. 2481
Port-au-Prince
Tel.: 2-5432

Groupe Technologie Intermediare d'Haiti
Premeeta Jansens, Executive Director
17, Rlle. Wilson 2eme, Pacot
Port-au-Prince
B.P. 15233
Petionville
Tel.: 5-4125

Compassion International
Danny Cook, Director
B.P. 2539
Port-au-Prince
Tel.: 6-2781

Oriental Mission Society
Luc Joseph, President
B.P. 1739
Port-au-Prince
Tel.: 2-2906

3.11 International Organizations

United Nations Development Program
Fred Thomas, Resident Representative
18 Avenue Ducoste
B.P. 557
Port-au-Prince
Tel.: 2-5689, 2-4488
Cable: UNDEVPRO, Port-au-Prince
Telex: 203-0091

Ms. Edith Lataillade has been named Disaster Liaison for UNDP.

UNICEF
Raymond Janssens
B.P.
Port-au-Prince

Pan American Health Organization
Dr. Robert Fisher
B.P. 1330
Tel.: 5-1732, 5-0764
Cable: OFSANPAN
Telex: 203-0149

3.12 U.S. Resources

The U.S. Mission Disaster Relief Plan was updated in December 1981. It includes a history of past disasters, scenarios for likely disasters, i.e., hurricane and drought, outlines responsibilities of members of the Mission Disaster Relief Team, and indicates the types of assistance the U.S. government might be willing or able to provide. In addition, the U.S. Embassy Emergency Action Plan contains sections on response in disaster situations.

The U.S. Embassy is located on Harry Truman Boulevard along the shore of Port-au-Prince Bay. In the event of a severe storm or hurricane striking the Port-au-Prince area, the U.S. Embassy would be subject to flooding, wind damage, and even tidal surge. The A.I.D. Mission will move to new headquarters in the same general vicinity in mid-1984 which will continue to expose it to these potential risks.

The U.S. Mission maintains close communication with its staff through a system of hand-held radios (walkie-talkies). In the event of a disaster, this communication system of some 20 radio units could be of assistance in contacting skilled individuals to assist in relief efforts. The Mission's vehicle fleet consists of the following:

- 2 carry-all diesel trucks
- 2 half-ton pick-up trucks
- 1 1,500-gal. water tank
- 1 5-ton truck
- 2 Eagle stationwagons
- 2 4-passenger diesel jeeps
- 3 9-passenger suburban carry-alls
- 2 6-cylinder Cherokee 4-passenger trucks
- 4 5-passenger Blazers
- 1 2-ton forklift
- 1 2,000-gallon diesel fuel tank
- 1 3,500-gallon gasoline fuel tank
- 2 200-gallon mobile fuel tank
- 1 1-ton ramp

3.13 Mitigation Activities

Through the Mission in Port-au-Prince, USAID is supporting several programs directed at mitigating the effects of disasters in the most vulnerable sectors. The agency is working with the Haitian government, private voluntary and international organizations, and with Haiti's Agricultural Cooperatives. Through the Haitian Department of Agriculture Natural Resources and Rural Development (DARNDR), A.I.D. is financing four projects aimed at strengthening DARNDR's institutional capacity to meet the needs of small rural farmers. These include efforts to identify seed varieties and crops which will flourish in the Haitian environment, develop skills among the DARNDR staff to collect agricultural data, and strengthen the capability of the Bureau for Agricultural Credit (BAC) to provide credit to small farmers.

Improving the Bureau for Agricultural Credit's services and capabilities will be of great assistance in a post-disaster situation. The BAC could be used to finance repair and reconstruction projects following a disaster. A.I.D. and other international donors are seeking ways to channel relief and rehabilitation funds to the most affected population and the BAC could provide the mechanism.

Working with PVOs and international relief organizations, A.I.D. is supporting an agro-forestry outreach program designed to check Haiti's accelerating deforestation. The program promotes support production and distribution of tree seedlings and provides training and public education in the value and importance of trees for the country's immediate and long-term environmental health.

The World Meteorological Organization (WMO), the PCDDPP team, and other organizations are working to improve Haiti's ability to anticipate and thereby prepare for disasters such as hurricanes, severe storms, or earthquakes. At present, there is no seismic measuring equipment located in Haiti, although a major quake can be expected there within the next 20 years. The PCDDPP project has proposed establishing a seismic net composed of six seismic stations which would telemetrically relay information to a central recording station in Port-au-Prince.

The WMO has proposed operating a weather surveillance radar on the island of Hispaniola, in the Dominican Republic, which would provide coverage of Haiti's southern peninsula. WMO is also training operators at the National Meteorological Service in operation of new teletype machines at Duvalier Airport to facilitate broadcast of meteorological reports to and from Haiti.

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