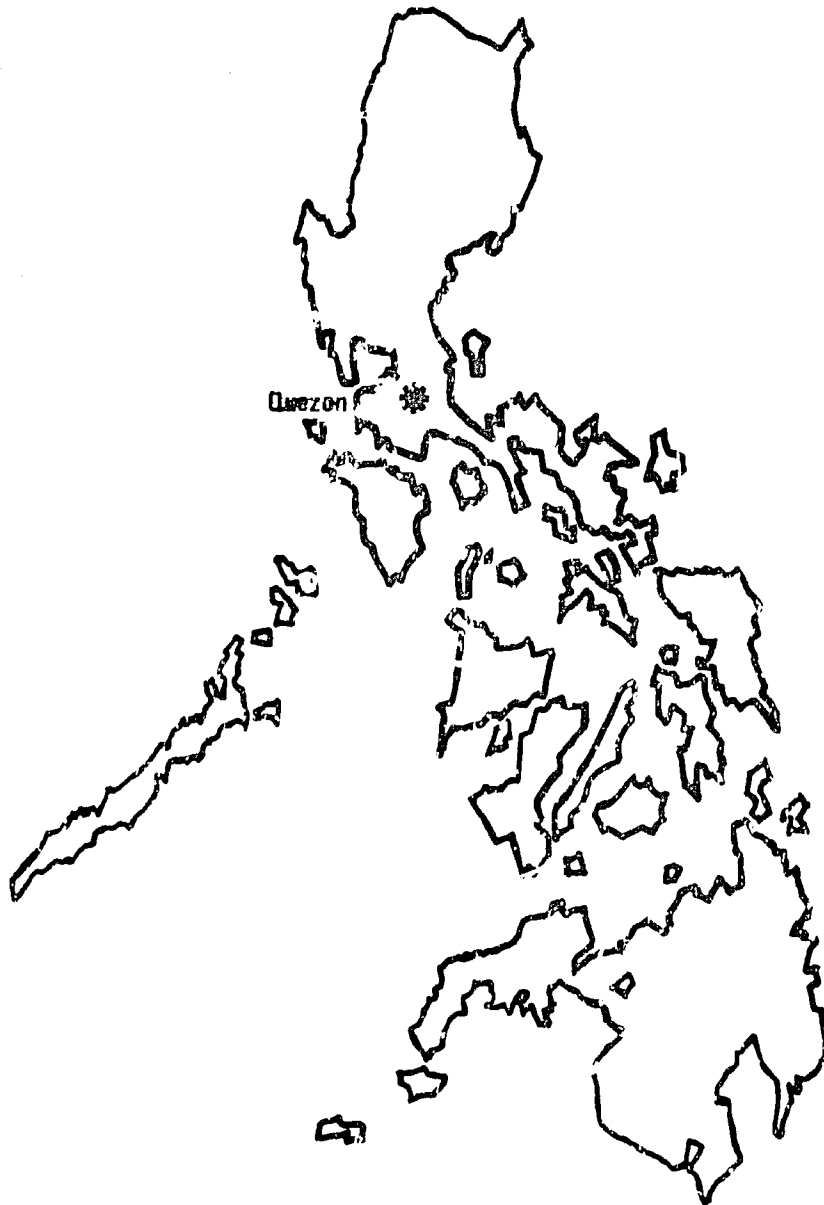
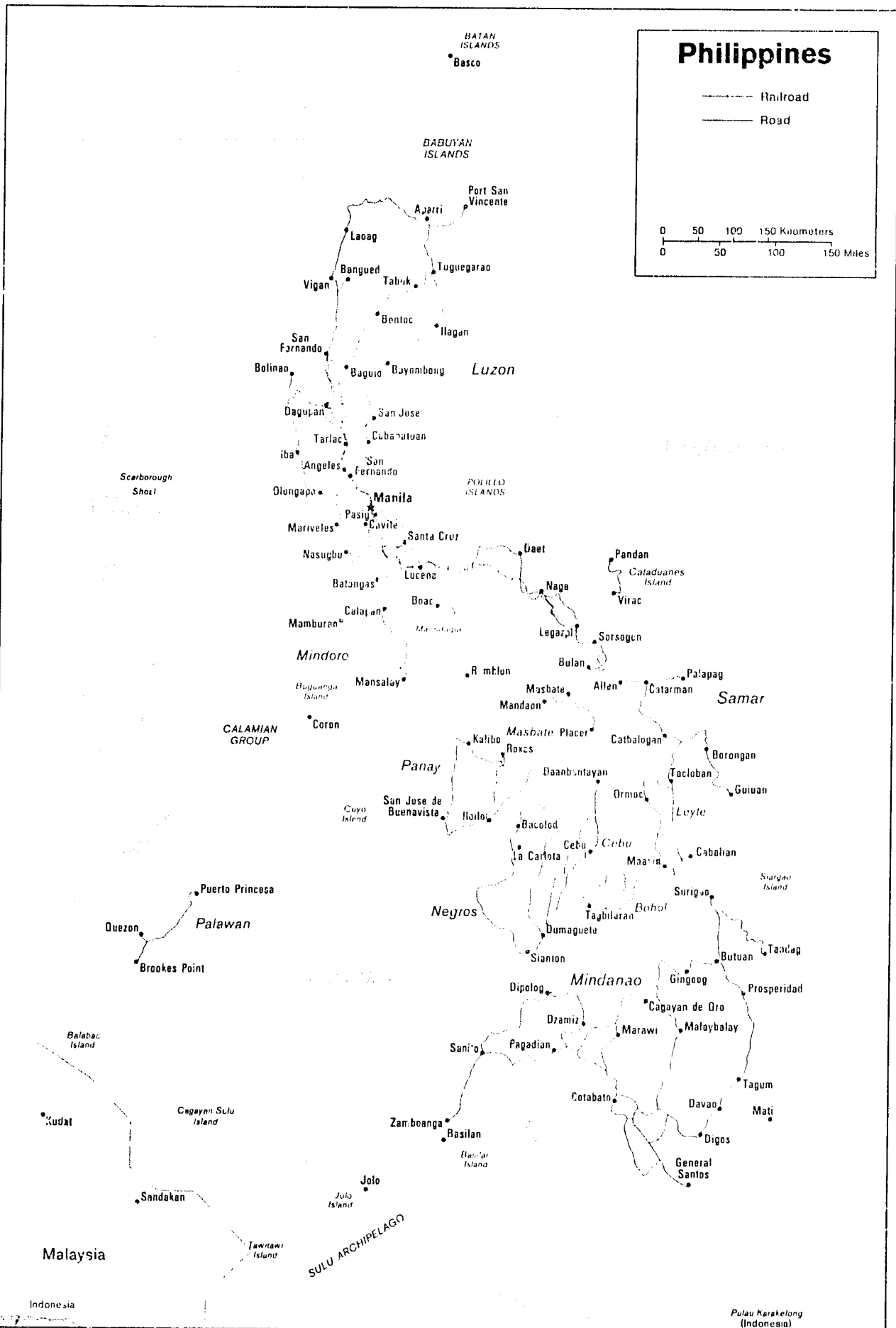


The Philippines

A Country Profile



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



PHILIPPINES: 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

Faye I. Henderson

Production by: Waverly Jackson, Jr. and Wesley Mossburg

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The country profile of the Philippines 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.

December 1988

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1. General Information1.1 Geographic Codes

AID Standard	492
AID Region	ANE/EA/P
State Region	EAP/PHL

1.2 Host Mission to the U.S.

Embassy of the Republic of the Philippines
1617 Massachusetts Avenue, N.W.
Washington, D.C. 20036
Tel: (202) 483-1414

Consulates general are located in New York,
Chicago, New Orleans, Seattle, San
Francisco, Los Angeles, Houston, Honolulu,
and Agana (Guam).

1.3 U.S. Mission to the Philippines

Embassy of the United States
1201 Roxas Blvd.
Manila
APO San Francisco 96528-8600
Tel.: [63] (2) 521-7116
Telex: 722-27366 AME PH

Consulate
Philippine American Life Insurance Bldg.
3rd Fl.
Jones Avenue
Cebu
APO San Francisco 96528-4230
Tel: [63] (32) 52044 or 52984
Telex 712-6226 AMCON PU

1.4 Time Zones

GMT + 8 hours
EST + 13 hours

1.5 Currency

The monetary unit is the peso (P), divided into 100 centavos.

U.S. \$1 = 21.12 pesos (Sept. 30, 1988)

1.6 Travel and Visa Requirements

Visa: For entry at Manila (Ninoy Aquino) International Airport: No visa is necessary for transit/ tourist stays up to 21 days; however, a traveler must have a passport valid for at least 6 months and onward/ return tickets. Authorities require a visa (no charge), one photo, and onward/return tickets for stays over 21 days and up to a maximum stay of 59 days. If applying by mail, include a stamped, self-addressed envelope. For entry at military bases of military personnel and dependents and for other types of visas, check Embassy (202-483-1414) or consulates general for specific requirements.

Health: Inoculations are not generally required, but yellow fever vaccination is required of travelers over one year of age arriving from infected areas. Children under one year of age arriving from an infected area are subject to isolation and surveillance. Malaria is largely confined to rural areas. Areas with chloroquine resistance include the islands of Luzon, Basilan, Mindoro, Palawan, Mindanao, and Sulu Archipelago.

1.7 Holidays and Calendar

New Year's Day.....	January 1
Bataan Day.....	April 9
Labor Day.....	May 1
Araw ng Kagitingan (Day of Bravery).....	May 6
Independence Day.....	June 12
Philippine-American Friendship Day.....	July 4
All Saints Day.....	November 1
Bonifacio Day.....	November 30
Christmas Day.....	December 25
Rizal Day.....	December 30

Maundy Thursday and Good Friday are moveable religious holidays in March or April. Government offices are closed during this long weekend which culminates in Easter Sunday.

1.8 Treaties and Agreements

Agriculture
 Atomic Energy
 Aviation
 Claims
 Consuls
 Copyright
 Customs
 Defense (includes agreements concerning
 military bases and military
 assistance)
 Economic and Technical Cooperation
 Employment
 Finance
 General Relations
 Health
 Informational Media Guaranties
 Investment Guaranties
 Judicial Assistance
 Maritime Matters
 Military Cemeteries and Monuments
 Mutual Security
 Patents
 Peace Corps
 Postal Matters
 Publications

1.8 Treaties and Agreements (cont'd)

Relief Supplies and Packages
(agreement providing for duty-free entry
into the Philippines and exemption from
internal taxation of relief supplies and
packages)
Social Security
Taxation
Telecommunications
Tourism
Trade and Commerce
Visas

1.9 International Organizations

Asian Development Bank (ADB)
Association of South East Asian Nations
(ASEAN)
Colombo Plan
Economic and Social Commission for Asia
and the Pacific (ESCAP)
Food and Agriculture Organization (FAO)
General Agreement on Tariffs and Trade (GATT)
Group of 77/Non-Aligned Movement
International Atomic Energy Agency (IAEA)
International Bank for Reconstruction and
Development (IBRD)
International Civil Aviation Organization
(ICAO)
International Development Association (IDA)
International Fund for Agricultural
Development (IFAD)
International Labor Organization (ILO)
International Monetary Fund (IMF)
International Maritime Organization (IMO)
International Telecommunications Satellite
Organization (INTELSAT)
INTERPOL
Inter-Parliamentary Union (IPU)
International Sugar Organization (ISO)
International Telecommunications Union (ITU)
United Nations (UN)
United Nations Economic, Social, and Cultural
Organization (UNESCO)
Universal Postal Union (UPU)
World Federation of Trade Unions (WFTU)
World Health Organization (WHO)

1.9 International Organizations (cont'd)

World Intellectual Property Organization
(WIPO)
World Meteorological Organization (WMO)
World Tourism Organization (WTO)

1.10 Geography

Location and Area: The Philippine archipelago, located in the western Pacific between latitudes 4°23'N and 21°25'N and longitudes 116°E and 127°E, consists of over 7,100 islands and extends more than 1,800 km. north to south. Eleven islands account for 94% of the total land area of nearly 300,000 square km.

Geographic Regions: The Philippines is part of a western Pacific island arc system that is characterized by active volcanism and strong seismicity. Less than 160 km. to the east of the islands, the Philippine Trough (Emden Deep) descends to a depth of 10,430 m.; the deep oceanic basins of the South China Sea and the Sulu Sea lie off the western Philippine coasts. Owing to the large number of islands and the irregular coastal features, the Philippines has one of the longest coastlines of any country in the world. Over 65% of the country is highlands, the interior mountain masses being bordered by coastal lowlands and interspersed with alluvial valleys. Most rivers are short, many are seasonal in flow and are subject to flooding in the monsoon and typhoon seasons.

The islands can be divided into three main groupings: Luzon, the Visayan Islands, and Mindanao. The Luzon region consists of Luzon Island (104,688 sq. km. and 35% of the total land surface), numerous smaller islands, and Batanes and Babuyan islands in the north. Luzon Island has seven major physiographic regions: the Cordillera Central, the Sierra Madre and Eastern Cordillera, the Cagayan Valley, the Zambales Mountains, the Central Plain, the southwestern volcanic area, and the Bicol Peninsula in the southeast. Luzon's largest

river is the Cagayan, which drains the Cagayan Valley. The Agno, Pampanga, and Pasig are other important rivers. Two of the country's largest lakes are in Luzon: Laguna de Bay and Taal Lake.

The seven large Visayan Islands, grouped around the Visayan Sea, are Masbate, Samar, Bohol, Cebu, Leyte, Panay, and Negros. Together with numerous smaller islands, they make up 21% of the total land area. Most have mountainous interiors, the only sizable lowland areas being Leyte Valley, Iloilo Plain on Panay, and the plains of western and northern Negros.

Mindanao (94,630 sq. km. and 34% of the land surface) has six major physiographic regions: the Eastern or Pacific Cordillera, the Davao-Agusan Valley, the Central Mindanao Highlands (Central Cordillera), the Bukidnon-Lanao Plateau, the Cotabato Basin-Tiruray Highlands, and the Zamboanga Peninsula. The longest rivers are the Agusan and the Rio Grande de Mindanao (Cotabato) rivers, and the largest lake is Lake Lanao in Lanao del Sur. The Sulu Archipelago (over 800 islands for a total of 4,144 sq. km.) is the island chain protrusion of the submarine ridge joining Mindanao with Sabah in Borneo.

Mindoro (9,733 sq. km.), Palawan (11,655 sq. km.), the Calamian group, Balabac, and the Cuyo Islands make up a unit that is geologically different from the rest of the archipelago, being part of an ancient continental shelf on which the island of Borneo is also located. Administratively, these islands are part of the Southern Tagalog region.

Climate:

The climate of the Philippines is described as maritime and tropical. Despite the extent of land area, the insular and oceanic nature of the country assures considerable uniformity of temperature. The mean annual temperature of 27.1°C in the lowlands has only about one degree variation between north and south. Seasonal variations between the hottest and coolest months are

small with an average annual range of 2.9°C. The greater variations correspond with different altitudes: Baguio, at 1,482 m. in the Cordillera Central of Luzon, has mean monthly temperatures 8°C below Manila's. Most of Luzon has a short "cold wave" during December and January from cold Asian air masses. The summer months of April, May, and June are dry and hot. With the beginning of the rainy season at the end of June, temperatures are lower but humidity is more oppressive. The average annual humidity in the Philippines is about 82%.

More variable than temperature, rainfall has a significant effect on the distribution of vegetation and crops. Local precipitation is conditioned by exposure, topography, altitude, and prevailing winds and their associated air masses. The principal air streams affecting the Philippines are the northeast monsoon (October to March, but most dominant during January and February), the southwest monsoon (May to October), and the north Pacific trades (over the entire country in April and early May and over central and southern Philippines in October). The position of the Intertropical Convergence Zone (ITCZ), the zone of convergence of southern and northern hemisphere air, determines the direction of the air masses flowing over the Philippines.

Average annual rainfall amounts of close to 4,000 mm. are experienced in the more exposed areas of eastern Samar, northeastern Mindanao, the Mountain Province, and western Panay Island. Areas having annual averages of less than 2,000 mm. are in valleys or plains and in regions sheltered by high mountains, such as Southern Mindanao, Central Visayas, parts of the Southern Tagalog provinces, the Central Plain of Luzon, and Cagayan Valley.

Tropical cyclones or typhoons (locally "baguios") are extremely important in Philippine weather. The majority originate near the Mariana Islands and bring strong winds and heavy rains to the Philippines, most frequently between July and November.

The coasts of eastern and northern Luzon and the eastern Visayan Islands of Samar and Leyte are struck with greatest frequency and severity. Southern Visayas and Palawan are affected less often and Southern Mindanao only rarely. About 20 such storms occur yearly in the Pacific in the Philippine Area of Responsibility.

1.11 History

Early History:

The Negritos, who are believed to have arrived from the Asian continent some 25,000 to 30,000 years ago via a then existing landbridge, are generally considered the aboriginal inhabitants of the Philippines. Human life may have existed in the islands much earlier than this, however, as evidenced by recent archeological research in the Cagayan Valley. Successive waves of Malay-Indonesian immigration over several thousand years before and after the beginning of the Christian era were the principal contributors to the Philippine population. A lively trade flourished between the islands and the Indo-Chinese states by 1000 A.D., and the Chinese had established residence in a few centers by the 12th century. Islam was introduced in the Sulu Islands in 1380 and spread from there to Mindanao. By the early 16th century, Moslem power extended as far north as Manila Bay.

Spanish Period:

Ferdinand Magellan, a Portuguese explorer in the service of Spain, opened the islands to the western world in 1521. Landing on Cebu, Magellan claimed the land for Spain, but he was killed soon after in a battle with the legendary Mactan chief, Lapu-Lapu. It was not until Miguel Lopez de Legaspi landed with a fleet in 1565 that a permanent Spanish settlement was established in the country, named "Filipinas" in honor of King Philip II of Spain. By 1571, the entire country, with the exception of Islamic Mindanao and the Sulu Islands and some of the upland areas of the north, was under Spanish domination.

Settlement proved less lucrative than the Spanish had hoped, for the colony had little apparent wealth in spices and precious metals. A second objective of the conquest was largely realized, however, in the conversion of most lowland Filipinos to Christianity. This was accomplished by the friars of several religious orders who not only exercised control over the cultural and intellectual life of the people but became major landowners as well. Finding no easily exploitable treasure in the islands and lacking any interest in native agriculture, the upper-class Spanish turned to the China trade. Thus, Manila became the link between China and the New World in a government shipping monopoly that lasted 250 years. In the galleon trade, Chinese traders exchanged Oriental goods for domestic products and the silver bullion that came from Mexico and Peru.

The Spanish employed a system of indirect rule for rural government, drawing from a hereditary native elite, the principalia. The barangay (renamed barrio), under the leadership of a local headman, the datu, remained the basic administrative unit. Filipinos also served at the next highest level, the pueblo, forerunner of the municipality, which was administered by a gobernadocillo (petty governor). This method of colonial rule thus perpetuated a local oligarchic system that had its origin in pre-Hispanic times.

Chinese mestizos, who were to become the most important social and political group in the Philippines in the 19th century, often married into the native gentry. Chinese traders and immigrants had long comprised a small but economically powerful segment of society. To escape persecution, many of them converted to Catholicism and took local wives. The offspring of these unions, who were able to move easily in both cultures, enjoyed a special position in society. Many acquired great wealth in land investments or money lending. By mid-century, the Chinese mestizo population had grown to some 250,000, out of a total population of four million.

Chinese immigration increased in the late 19th century as a more tolerant official attitude toward them was adopted, and a distinct unassimilated ethnic community also emerged.

It was from the mestizo elite, known collectively as ilustrados (enlightened ones), that the first expression of national consciousness developed. The European-inspired liberal thinking of this group merged with an earlier tradition of rural revolt to set the stage for an independence movement that climaxed in 1896. In December of that year, Dr. Jose Rizal was executed by the Spanish authorities for his alleged involvement in an armed rebellion that had broken out in August. Dr. Rizal, son of a wealthy Chinese mestizo family, was the most prominent of the nationalist thinkers. Filled with new determination after Rizal's death, the rebels continued the struggle under the leadership of Emilio Aguinaldo. After the Spanish fleet was defeated in Manila Bay by an American force, Aguinaldo proclaimed Philippine independence on June 12, 1898.

American Period:

Independence was not to be realized at this time, however, for under the terms of the Treaty of Paris, which ended the Spanish-American War, the Philippines was ceded to the United States. Insurrection against the United States erupted in 1899 and continued until 1902 when the Filipinos laid down their arms.

From the outset, the U.S. administration worked for the eventual independence of the islands. To support future self-government, U.S. officials emphasized public education and a sound legal system. The Catholic Church was disestablished and its landholdings were purchased and redistributed. Filipino autonomy was extended by a series of acts passed by the U.S. Congress, most notably the Jones Act of 1916 which gave Filipinos control of their bicameral legislature. Real democracy proved elusive, however, as the Filipino elite gained political power through kinship ties and economic influence. As large landowners,

the political leaders cared little for social reform, and the continuing problems of land ownership and the inequitable distribution of wealth went unaddressed during this period.

The 1935 Tydings-McDuffie Act established the Philippines as a self-governing commonwealth under President Manuel Quezon and promised complete independence after a 10-year transition period. World War II intervened, however, and U.S. forces in the Philippines surrendered to the Japanese after the fall of Corregidor in May 1942. In the joint U.S.-Philippine struggle to regain control of the country after 1944, Manila was largely destroyed and an estimated one million Filipinos lost their lives. Faced with the enormous task of national reconstruction, the Philippines became an independent republic on July 4, 1946, with Manuel Roxas as its first president. The official Independence Day was later moved to June 12 to commemorate the date when General Aguinaldo proclaimed the country's independence from Spain.

The transition to independence was complicated by the moral dilemma the country experienced in choosing legitimate postwar leadership. Anti-collaborationist sentiment ran high, though those who had supported the Japanese during the occupation argued that they had done so to protect the people. The wartime collaborators were challenged by Filipino leaders returning from exile and by those who had fought the Japanese as guerrillas. In choosing Roxas as president, a compromise of sorts was reached, for though he had served in the wartime government, he had maintained contact with Allied Intelligence and thus seemed exonerated. The issue of postwar economic relations with the United States raised additional difficult questions. Especially disturbing to Filipinos was the linkage of U.S. rehabilitation aid to Philippine acceptance of "parity" rights, which gave U.S. citizens equal access to previously protected Philippine resources.

Post-Independence
Period:

During the 1940s and early 1950s, the new government was threatened by a communist-inspired peasant revolt in central Luzon under the Hukbalahaps (Huks). The rebellion was put down by Defense Secretary Ramon Magsaysay with U.S. help. Magsaysay became president in 1953 and remained a popular figure until his untimely death in a plane crash in 1957.

In the 1965 elections, the incumbent president, Diosdado Macapagal of the Liberal Party, was defeated by Ferdinand Marcos, who had switched to the Nationalista Party. Marcos won reelection in 1969, but his second term was marked by economic difficulties and growing insurgencies - in the north, by the New People's Army (NPA), the armed wing of the outlawed Communist Party of the Philippines (CPP), and in the south, by the Moro National Liberation Front (MNLF), a Muslim separatist movement. In response to this perceived threat to national security and a prevailing climate of violence, President Marcos proclaimed martial law in 1972. He jailed most of his political foes and critics, including Liberal Party leader Benigno Aquino, suspended the national assembly, and began to rule by decree. A new constitution ratified in 1973 provided for a change to a parliamentary form of government and extended Marcos's term in office. Major constitutional changes, hastily drawn up in 1980, gave the president even greater power in a French-style presidential system and allowed him to serve an unlimited number of terms.

A number of new political institutions were established to strengthen central government during the Marcos years. Political power and wealth were concentrated in a new national elite headed by the president and his wife, Imelda Romauldez Marcos. Several referenda approved the extension of Marcos's presidency, but popular dissatisfaction was growing in the late 1970s in the face of a deteriorating economy and the evidence of official corruption. The Roman Catholic Church, as the only independent institution

in the country, became increasingly critical of the regime. A process of normalization began in 1978 with the election of an interim national assembly. This was followed by local elections in 1980 and by a presidential election in 1981. The government party, the New Society Movement, won overwhelming majorities in these contests. Though martial law was officially lifted in January 1981, Marcos retained strong control over the government.

The turning point came with the 1983 assassination of the leader of the opposition, Benigno Aquino, as he returned to the Philippines from exile. Popular outrage with the Marcos government, suspected by many of complicity in the assassination, expressed itself in protest demonstrations, now joined by middle class elements. Marcos called a presidential election for February 1986, 18 months before the scheduled time, to restore confidence in his administration. Corazon Aquino, widow of the slain former senator, and Salvador Laurel, leader of the United Nationalist Democratic Organization (UNIDO), headed the opposition ticket. Both sides claimed victory in the election, but independent election observers found evidence of fraud on the part of Marcos and his supporters and declared that Aquino and Laurel had actually won the greater number of votes. The showdown came shortly after, when a peaceful civilian-military uprising forced Marcos to flee the Philippines. Praising "people power," President Aquino took office on February 25, 1986.

1.12 Government

National Government: After taking office in February 1986, President Aquino suspended the 1973 constitution and governed the country under an interim "freedom" charter, pending the adoption of a new constitution. On February 2, 1987, a U.S.-style constitution was formally approved by plebiscite, restoring a presidential form of government and a two-house Congress, and providing for an

independent judiciary. The new constitution, which contains broad civil rights guarantees, also trims executive power and gives greater power to Congress. For example, legislative approval is required to impose martial law beyond a 60-day period and to lease Filipino territory to a foreign power. The document also authorizes local autonomy for Muslim-dominated areas and declares a nuclear-free policy for the country.

1. Executive Branch

The president and vice president are chosen by direct election. Under the new constitution, President Aquino and Vice-President Laurel will remain in office until 1992. Presidential terms thereafter will be for a single six-year term. The president governs with the assistance of an appointed Cabinet, which has undergone considerable reshuffling since the revolution. During the period after President Aquino took office and before the new Congress convened, the chief executive signed 302 decrees, the most important of which placed all public and private agricultural lands under agrarian reform.

2. Legislative Branch

The 1987 constitution provides for a bicameral Congress consisting of a Senate of 24 members elected for six-year terms and a House of Representatives of 250 members serving three-year terms. Two hundred members of the House are directly elected from legislative districts; the remainder are chosen from a party list system. In the congressional election of May 11, 1987, President Aquino's supporters won 162 of the House seats and 22 Senate seats. Former Defense Minister, Juan Ponce Enrile, who had supported Aquino in the February revolution, ran for the Senate in 1987 and is one of the two opposition members in that body.

3. Judicial Branch

After a reorganization of the judiciary in the mid-1980s, a 15-member supreme court heads a three-tiered system comprising local, regional trial, and intermediate appellate courts. All judges are appointed by the president. The judicial system is influenced by Spanish and American legal principles.

Regional Government: The country is divided into 12 regions, 73 provinces, 61 chartered cities, about 1,600 municipalities, and over 40,000 barangays (barrios until 1974). Metro Manila (National Capital Region), comprising the city of Manila and 16 surrounding communities, is governed by a Metropolitan Manila Commission.

The province is the largest administrative unit. Provincial governors, though elected locally, are the principal executive agents of the central government. Major government departments on both the provincial and chartered city levels are also responsible to their respective national departments. Unlike chartered cities, which are administratively independent, municipalities come under the jurisdiction of the province in which they are located. Both cities and municipalities are headed by mayors. The lowest subdivision is the barangay, inhabited by about 35 families and found in both municipalities and cities. Barangay officials, consisting of an elected council chaired by a captain, are responsible primarily for maintaining law and order.

A cabinet-level Department of Local Government was established in 1972 to assist the president in the supervision of local affairs. Local elections for governors and mayors were held on January 18, 1988. Village elections will be held in late 1988 or early 1989.

PHILIPPINE ADMINISTRATIVE DIVISIONS

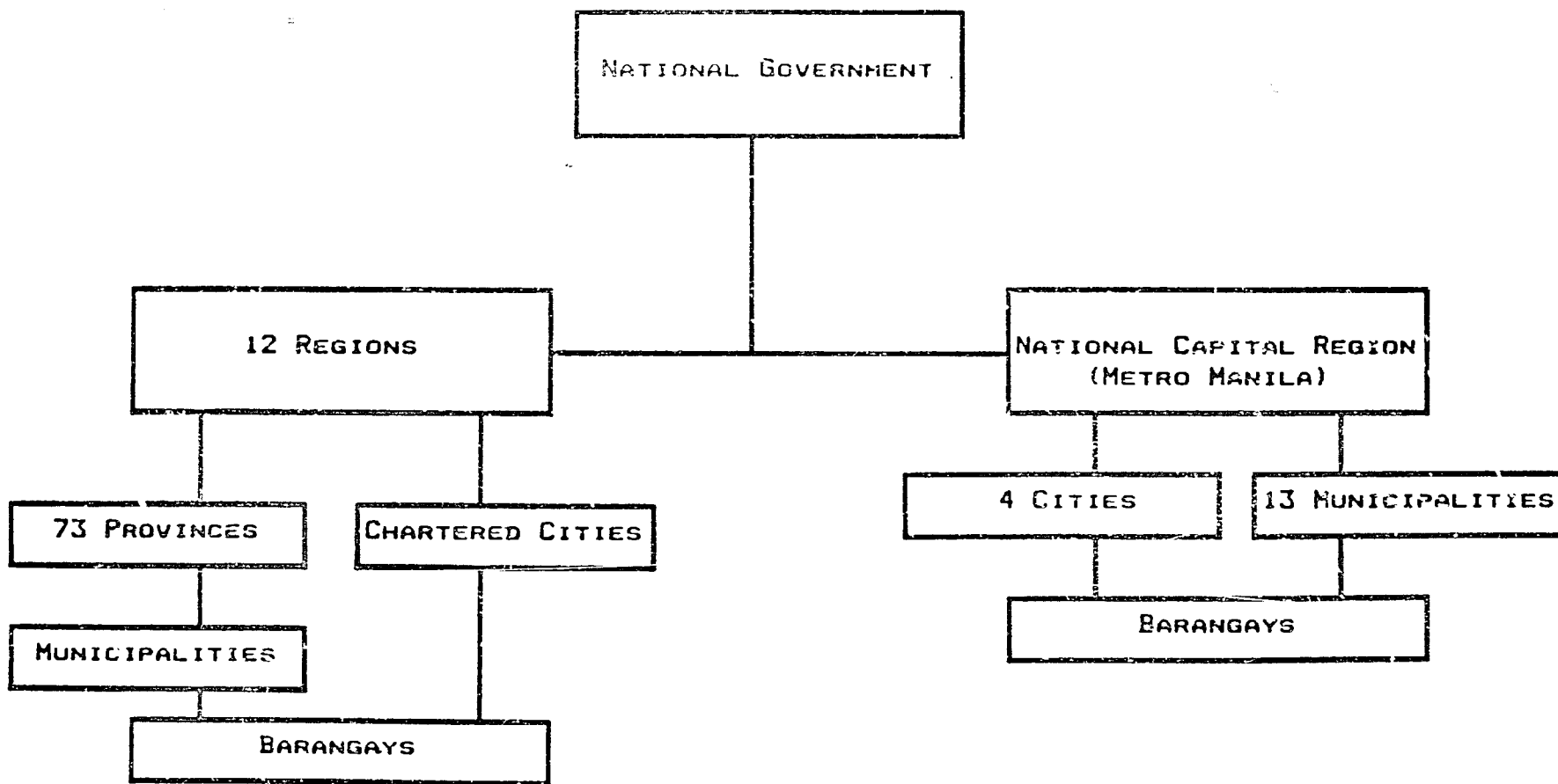


Figure 1.a.

- I Ilocos**
 1 Ilocos Norte
 2 Abra
 3 Ilocos Sur
 4 Mountain
 5 La Union
 6 Benguet
 7 Pangasinan

- II Cagayan Valley**
 8 Batanes
 9 Kalinga-Apayao
 10 Cagayan
 11 Isabela
 12 Hugao
 13 Nueva Vizcaya
 14 Quirino

- III Central Luzon**
 15 Zambales
 16 Tarlac
 17 Nueva Ecija
 18 Pampanga
 19 Bataan
 20 Bulacan

- IV Southern Tagalog**
 21 Aurora
 22 Rizal
 23 Cavite
 24 Laguna
 25 Batangas
 26 Quezon
 27 Mindoro Occidental
 28 Mindoro Oriental
 29 Marinduque
 30 Romblon
 31 Palawan

- V Bicol**
 32 Camarines Norte
 33 Catanduanes
 34 Camarines Sur
 35 Albay
 36 Sorsogon
 37 Masbate

- VI Western Visayas**
 38 Antique
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 40 Capiz
 41 Iloilo
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- VII Central Visayas**
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 44 Cebu
 45 Bohol
 46 Siquijor

- VIII Eastern Visayas**
 47 Northern Samar
 48 Samar
 49 Eastern Samar
 50 Leyte
 51 Southern Leyte

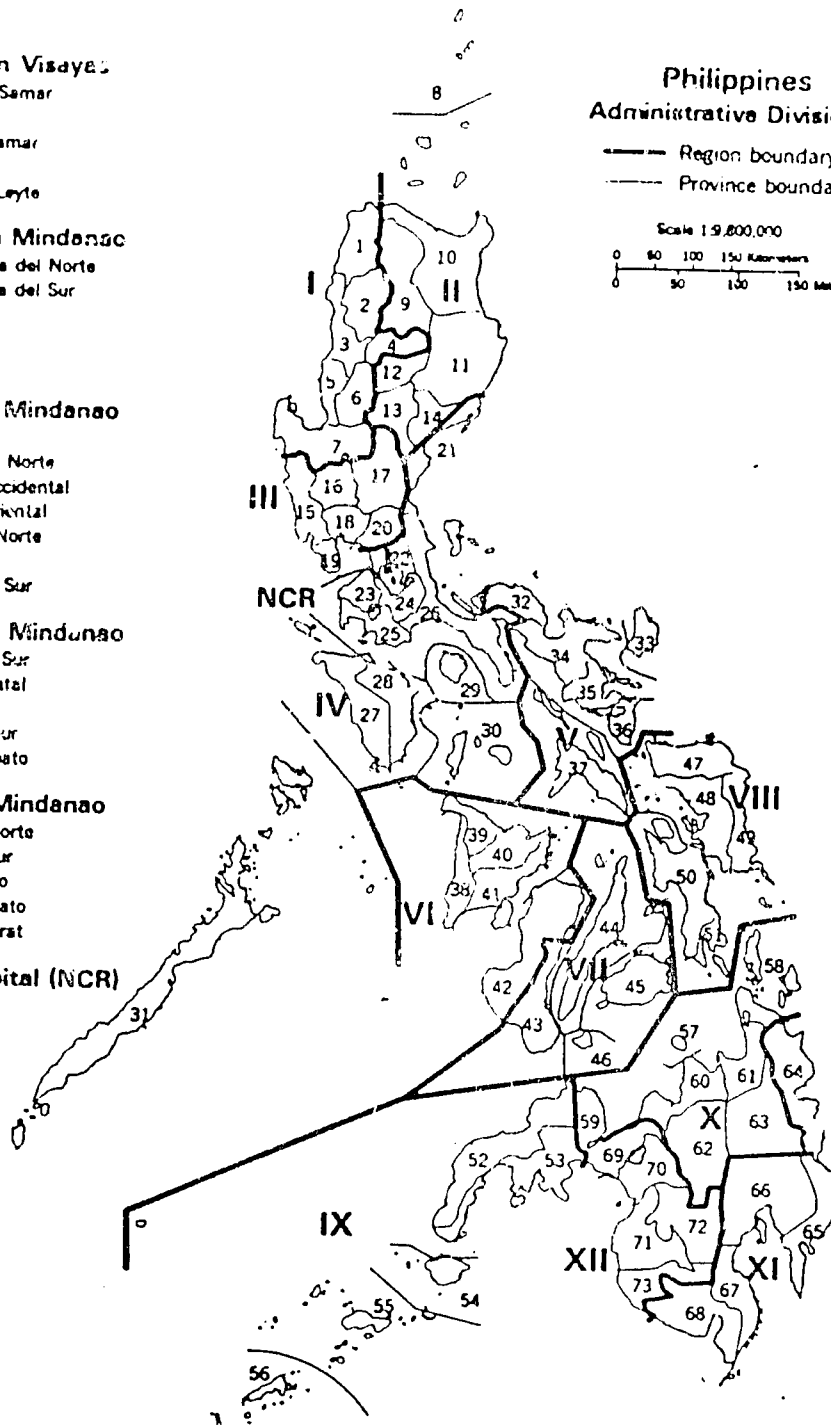
- IX Western Mindanao**
 52 Zamboanga del Norte
 53 Zamboanga del Sur
 54 Basilan
 55 Sulu
 56 Tawitawi

- X Northern Mindanao**
 57 Camiguin
 58 Surigao del Norte
 59 Misamis Occidental
 60 Misamis Oriental
 61 Lanao del Norte
 62 Bukidnon
 63 Agusan del Sur

- XI Southern Mindanao**
 64 Surigao del Sur
 65 Davao Oriental
 66 Davao
 67 Davao del Sur
 68 South Cotabato

- XII Central Mindanao**
 69 Lanao del Norte
 70 Lanao del Sur
 71 Maguindanao
 72 North Cotabato
 73 Sultan Kudarat

National Capital (NCR)
 Manila



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Map 1.b.

Political Parties: The two traditional parties, the Liberal and the Nationalista, were inactive during the martial law period when the personality of President Marcos dominated the political scene. The New Society Movement (Kilusang Bagong Lipunan - KBL) was organized as the government party in 1978 prior to elections for an interim National Assembly. When legal opposition resumed that year, former senators Benigno Aquino, Jr.--then in prison--and Lorenzo M. Tanada organized People's Power (Lakas ng Bayan - LABAN) to contest the elections. LABAN failed to return a single seat, and other opposition parties fared little better.

After the KBL won another lop-sided victory in local elections in 1980, the opposition turned to coalition-building. The United Nationalist Democratic Opposition (UNIDO), an alliance of moderate opposition groups which included the Liberal and LABAN parties, was the result. Failing in its attempt to get the Commission on Elections to change election rules to guarantee honest elections, UNIDO boycotted the 1981 presidential election. A successor to UNIDO --a 10-party coalition using the same acronym--was formed in April of the following year as the strategy of party realignment continued. Assemblyman Salvador H. Laurel led the alliance. The Philippine Democratic Party (PDP), organized in February 1982, merged with LABAN.

Several new parties were formed and new alliances forged after the Aquino assassination. In the 1984 National Assembly elections, PDP-LABAN broke with the pro-boycott group to which it was allied and participated in the balloting under the UNIDO banner. UNIDO was divided in choosing a candidate to run against Marcos in the presidential election expected in 1987. Delegates to a party convention in June 1985 chose Laurel as their candidate; however, UNIDO's LABAN component drafted Mrs. Aquino in November. When plans for an early election in February 1986 were announced, Aquino and Laurel agreed to stand as candidates for president and vice-president, respectively.

Pro-Aquino candidates running in a LABAN-centered coalition won the majority of votes in the legislative balloting of March 1987 and the local elections of January 1988.

Illegal political groups include the Moscow-oriented Philippine Communist Party (PKP); the more radical communist Party of the Philippines-Marxist-Leninist (CPP-ML) and its military wing, the New People's Army (NPA); and the Moro National Liberation Front (MNLF), a group representing Philippine Muslims.

Current Issues:

The process of redemocratization has been challenged by extremists within and outside the government. The two insurgencies - Muslim and communist - continue in 1988, although the Muslim rebellion in southern provinces has been relatively quiescent in recent years. Peace talks in 1987 between the government and the MNLF collapsed when the two sides failed to resolve their differences. Non-MNLF factions within the Muslim population were also unhappy because they had not been included in the negotiations. In keeping with the constitutional provision, a Regional Consultative Commission (RCC) was convened in March 1988 to "assist in the enactment by Congress of the Organic Act for the Autonomous Region in Muslim Mindanao." Under the RCC Act, a plebiscite will be required in the projected autonomous area to determine if autonomy is desired. The MNLF rejected the RCC's creation, calling instead for autonomy by executive decree. The communist insurgency is currently the more active of the two rebellions, with the New People's Army operating in over three-quarters of the country's provinces and in urban assassination squads known as "sparrow units." After peace initiatives failed, President Aquino adopted a more hardline approach, even tolerating the use of civilian volunteers in counterinsurgency activities.

In addition to opposition from these fronts, the Aquino government was challenged by three unsuccessful coup attempts in 1987. The first two were initiated by troops loyal

to Marcos; the third and most serious attempt was led by Colonel Gregorio "Gringo" Honasan who had supported Aquino in the February revolution. Although the uprisings may have represented a rejection of civilian authority by some politicized elements in the military, they also called attention to morale problems among soldiers because of low pay and promotion policies. The Aquino government has tried to reduce the possibility of future coup attempts by addressing legitimate grievances.

Agrarian reform is a lingering and potentially explosive issue. A Comprehensive Agrarian Reform Program (CARP) was instituted by executive decree, but the retention limit, the amount of compensation for landowners, and other details were to be decided by Congress. Though the concept of land reform is widely supported in the Philippines, the final law passed by Congress in June 1988 reflects several compromises to landowners that were necessary for passage. Implementation may be slowed, too, by the decisions of local land reform committees or by court cases testing the law. The communists, on the other hand, decry the law as too conservative and threaten to lead the poor in confiscating land on their own.

The five-year review of the 1947 Philippine-U.S. Military Bases Agreement (MLA) concluded in October 1988 with the signing of an accord that committed the U.S. to a sizable increase in payment for the bases during the years 1989-91 (\$480 million in cash grants yearly vs. \$180 million). The treaty which gives the U.S. conditional rights to large military bases in the Philippines expires in 1991 and can be terminated by either side with one year's notice. From the U.S. point of view, the bases are strategically vital; however, they are viewed with ambivalence by many Filipinos. Key topics in the 1991 negotiations will include the length of a new treaty, the question of operational control, and the amount of payment. A clause in the Philippine constitution

declaring a policy of freedom from nuclear weapons in its territory may present another difficult issue.

1.13 Ethnic Groups

With the exception of small minorities of ethnic Chinese, Negritos (Islands' earliest people), and Caucasians (mainly of Spanish and American origin), most Filipinos are Malay-Indonesian. Centuries of inter-marriage among the principal groups who have inhabited the islands has resulted in a unique ethnic blend and general cultural homogeneity. The Spanish succeeded in converting most of the lowland inhabitants to Christianity, but three groups have remained distinct and apart: the Muslims who live in parts of Mindanao and the Sulu Archipelago; the upland tribal groups; and the unassimilated Chinese.

Lowland Christians:

Lowland Christians make up the great majority of the population (about 90%). Sharing common social values and a common history, the various groups who make up the lowland Christians are differentiated mainly by language. The eight major linguistic groups are Tagalogs (Central Luzon Plain); Cebuanos (leading Visayan group); Ilokanos (western coast of Luzon and Central Luzon Plain); Ilongos (second to Cebuanos in the Visayas); Bikolanos (Bicol Peninsula, Catanduanes, Burias, Ticao, and adjacent parts of Masbate); Waray-Waray (Samar and eastern Leyte); and Pampangans and Pangasinans (interspersed with Tagalogs and Ilokanos). Living in Metro Manila and adjacent provinces, the Tagalogs are the most visible group. Their language is practically indistinguishable from Pilipino which has been designated one of the national languages.

Muslims:

The Muslims, or Moros, are the largest cultural minority, accounting for about 5% of the population. Fiercely independent and divided among themselves by different languages and political structures, the

Moros share a common separatist viewpoint. The pacification of the Muslim Philippines in the last years of Spanish rule did not put an end to the traditional hostility. Throughout the American colonial period, Muslim leaders pressed for a separate state.

The government policy after national independence of encouraging the migration of lowland Christians into the frontier of Mindanao confirmed Muslim fears that their land and culture could be lost. The response was increased insurgency that reached a peak in the years before martial law was declared. A cease fire in the war between the Moro National Liberation Front (MNLF) and government troops followed talks in 1976. Under the terms of an agreement signed by the GOP and the MNLF in Tripoli, a measure of autonomy was granted to two regions in Mindanao. This action helped to defuse Muslim nationalism but did not satisfy the demands of the more militant factions and fighting broke out again in 1977. Later the MNLF called for secession. The new Philippine constitution authorizes local autonomy for Muslim areas, and negotiations continue (See also 1.12 Government: Current Issues). The major Muslim groups are the Tausug (Jolo Island in the Sulu Archipelago); the Maranao (Lake Lanao area); the Maguindanao (largest Muslim group - Cotabato Province); the Samal and the Badjao (both sea-oriented in the Sulu Archipelago); and the Yakan (Basilan Island).

Tribal Groups:

Over 100 tribal groups live in isolated pockets in upland regions of Luzon, Mindoro, Mindanao, and other islands. A degree of acculturation with lowland Christians has occurred in some groups; others have had little contact with the outside world. The principal cultural groups living in the Cordillera Central of Luzon are collectively known as Igorots (Tagalog for mountaineer). They include the Ifugao (Ifugao Province) whose ancestors built the famous rice terraces of Banaue 2,000 to 3,000 years ago; the Bontoc (Mountain Province and Kalinga-Apayo Province); the Kankany and Ibaloi

(Benguet Province); the Kalingas (Kalinga-Apayo); the Tinguin (Abra Province); the Isneg (northern Kalinga-Apayo); the Gaddang (border between Kalinga-Apayo and Isabela provinces); and the Ilongot (Nueva Vizcaya Province). Some 40,000 Negritos live in widely scattered locations in the eastern range of the mountains.

Outside Luzon, the upland tribal groups are concentrated in Mindanao. The main populations are the Manobo (comprising several tribal groups in southern Bukidnon and Agusan del Sur provinces); the Bukidnon (Bukidnon Province); the Bagobo, Mandaya, Ata, and Mansaka (mountain areas around Davao Gulf); the Mamanua (Agusan-Surigao border region); and the Tiruany, Bila-an, T'Boli, and Tasaday (Cotabato provinces).

A special foundation called Presidential Assistance on National Minorities (PANAMIN) was created in 1967 to give aid and protection to tribal groups.

The Chinese:

The Chinese population, though relatively small, has made a significant contribution through the centuries, both culturally and economically. Active in commerce, Chinese have dominated the retail trade. Chinese mestizos, the offspring of Chinese-Filipino marriages, emerged as the most influential social and political figures in the country in the 19th century. Unassimilated Chinese have maintained a cultural separatism and have often faced discrimination. Ethnic Chinese numbered over 700,000, by unofficial count, in the early 1980s.

Socio-Economic Groups:

A class division with its roots in pre-Hispanic culture has characterized Philippine society. The division in the barangay was originally between datu (chief) and sakop (follower). Through the years the relationship evolved into landlord and tenant, or patron and client. The upper wealthy class has included local political figures and professional and business leaders as well as the holders of large estates. At the other end of the economic spectrum, making up the vast majority of the

Philippine population, are the small landowners, tenants, and landless workers. The great disparity in income level has been a source of civil unrest and accounts for the preoccupation with the issue of land reform that continues to the present time.

1.14 Languages

A multiplicity of indigenous languages (more than 70 languages and dialects) of the Malayo-Polynesian language family are spoken. Each of the major languages has several dialects, which in some cases are mutually unintelligible. Most Filipinos are multilingual. Government policy has promoted use of two official languages: Pilipino (a form of Tagalog), the national language understood by about 55% of the population, and English, the language of government, commerce, mass communication, and education, understood by about 45% of the population. A third official language, Spanish, spoken by about 3.6% of the population, is popular among a small landed and commercial elite. The Moros generally use native vernaculars rather than English or Pilipino. Chinese is the language of a small minority.

1.15 Religion

Approximately 85% of the people belong to the Roman Catholic Church. Muslims make up 5% of the population, and members of the Iglesia Filipina Independiente (Philippine Independent Church) account for another 5%. The remaining 5% is divided among various Protestant denominations, animistic tribal groups, and the Iglesia ni Kristo. The latter with its distinctive church architecture, is a fast-growing, highly authoritarian church that looks out for the interests and welfare of its adherents.

The Roman Catholic Church hierarchy has spoken out strongly in recent years on social and political issues. High ranking churchmen, including the nation's highest

prelate, Jaime Cardinal Sin, adopted a policy of "critical collaboration" during the Marcos years and finally encouraged the popular rebellion against the former president. Some polarization has occurred within the ranks of the clergy on the issue of social activism. A minority of clergy are members of the Basic Christian Communities which are suspected by some of being allied with the Communists. Most activist clergy reject violence, however, and disassociate themselves from the NPA. At the other end of the scale are the conservative clergy who oppose church involvement in politics as a general principle.

1.16 Education

Philippine society places a high value on education, and the public school system has been enlarged through the years to include even remote areas. The national literacy rate of about 90%--one of the highest in the East Asia and Pacific area--shows little difference between the sexes. The quality of education varies, however, and poor rural areas have literacy levels considerably below the national level.

The central government funds nearly all elementary education. Private schools predominate at the secondary level, enrolling about 40% of all students. Barangay schools make up the largest number of publicly-funded secondary schools, which also include national and city and provincial high schools. Education is viewed as a means of upward mobility, and parents are often willing to sacrifice to send children to secondary school and college. In addition to the more than 10 million children in government schools in 1984-85, nearly two million were being educated in private and religious schools (Roman Catholic and Muslim). The country has over 1,100 schools at the tertiary level of which about 800 are privately run. Metro Manila boasts several highly respected institutions of higher learning, including

the University of Santo Tomas and the University of the Philippines. The large number of students graduating from college each year has created a white-collar unemployment problem in the cities.

School Enrollment in the Philippines 1984-85

	<u>Total</u>	<u>Government</u>	<u>Private</u>	<u>Student/Teacher Ratio</u>
Pre-School	177,593	74,136	103,457	
Elementary	8,793,773	8,269,825	523,948	30.7
Secondary	3,323,063	1,957,444	1,365,619	32.1
Tertiary	1,127,968			33.2

Source: Ministry of Education, Culture, and Sports

1.17 Population

National	Total Population (1980 census).....	48,097,000
Demographics:	Projected Population (1988).....	58,721,307
	Density/sq. km (1980 census).....	160.3
	Estimated Density/sq km (1987).....	191.2
	Life Expectancy (1987)	
	Males.....	61.9
	Females.....	65.5
	Average Growth Rate.....	2.41

Sources: Philippines National Census and Statistics Office (projections for 1988); Encyclopedia Britannica; and Philippines Department of Health

The Philippine is the 17th most populous country in the world. The population grew dramatically from 27 million in 1960 to an estimated 58.7 million in 1988, and, assuming an average annual growth rate of 2%, is expected to reach about 75 million by the year 2000. An annual growth rate of 3% between 1950 and 1970 fell to about 2.7% during the 1970s, possibly influenced by emigration which was about 150,000 annually between 1975 and 1980. The present growth rate can only be estimated, but because of

the youthful age structure, declining mortality, and the slow decline in fertility, the momentum for future growth continues.

Recognizing that high population growth rates affected the national health status and impeded development progress, the Philippine government adopted a population policy in the late 1960s. A national Commission on Population (POPCOM) was created in 1970 to coordinate population-related activities of the various sectors. Since that time, numerous agencies, both public and private, have become involved in the delivery of family planning services. The Aquino government has authorized a continuation of the family planning program. As evidence of progress from these efforts, the total fertility rate declined from about 5.2 in 1975 to around 4.8 in 1984, and the crude birth rate dropped from 34.8 to 31.8 per one thousand during that same time period. Wide regional differences have been noted, however, with the least developed and least urbanized regions showing the slowest decline in fertility rates. Strong socioeconomic incentives for large families continue to be present in the Philippines, especially in the rural areas.

**Regional
Distribution:**

An overall population density of 160 persons per sq. km. in 1980 had grown to an estimated 191.2 in 1987. Of the three principal regions, population density was lowest in Mindanao in 1980, although that region had a higher growth rate than either Luzon or the Visayas during the 1975-80 period as a result of substantial immigration from the Visayas. Density was highest in the Visayas (196 persons per sq. km.). With 9,317 persons per sq. km. in 1980 (42,571.4 per sq km. in Manila and 20,702.9 per sq. km. in Quezon City), the national capital region had a much higher concentration than the rest of Luzon or the Visayas.

Urbanization:

The urban population doubled between 1960 and 1980, mainly from rural to urban migration but also from natural growth and the reclassification of adjacent areas. In

1980, 37% of the population lived in urban areas; by 1987, the proportion had grown to an estimated 41%. The primary metropolis is the Metro Manila area which had a population of nearly six million in 1980. The national capital area is expected to have a population of 13 million by the year 2000. Davao, in Mindanao, is the second largest urban center, with a population of 661,000 in 1980. The concentration of population in urban areas places a far greater demand on services--housing, water, sanitation, and transportation--than the government is able to provide. The result has been an increase in overcrowded, unsanitary squatter settlements. There are regional differences in urbanization. Besides Metro Manila, the most urbanized regions are Central Luzon and Southern Tagalog. The least urbanized regions are Cagayan Valley, Western and Central Mindanao, and Eastern Visayas.

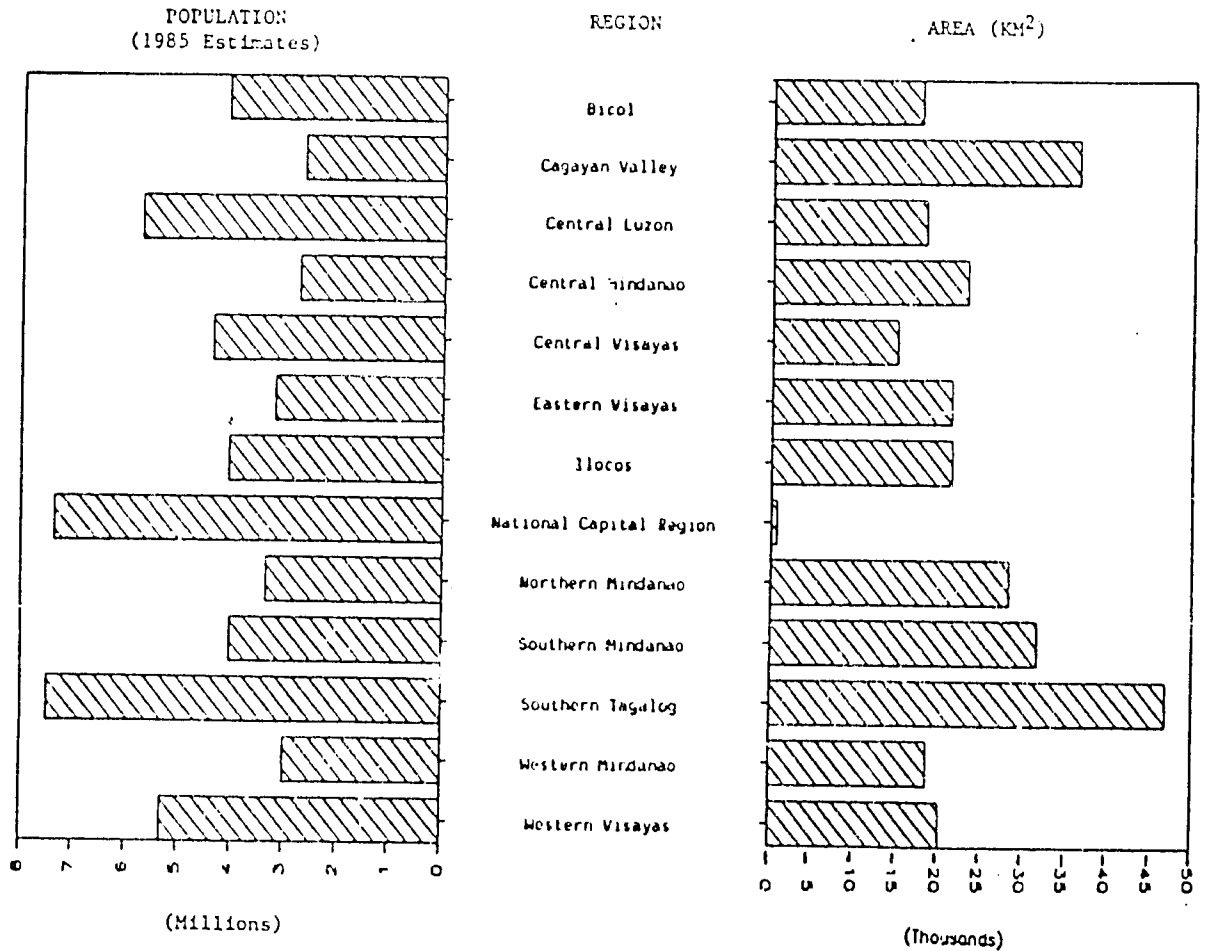


Figure 1.c.

1.18 Health, Nutrition, and Diet

Basic Indicators:	Crude Birth Rate/1,000 (1984).....	31.8
	Crude Death Rate/1,000 (1984).....	7
	Life Expectancy (1987)	
	Males.....	61.9
	Females.....	65.5
	Infant Mortality Rate.....	54
	(per 1,000 live births)	
	Number of Physicians (1986).....	9,599
	(public sector)	
	Number of Nurses (1986).....	11,585
	(public sector)	
	Number of Hospital Beds (1987).....	86,222
	Bed/Population Ratio (1987).....	1:628

Sources: USAID/Manila; World Bank Report No. 4650-PH (1984); Encyclopedia Britannica; Philippines Department of Health

Health Overview: The crude death rate fell from 20 per 1,000 in 1950 to about 7 per 1,000 in the early 1980s, reflecting improvements in national health care and environmental conditions. The proportion of deaths from communicable diseases declined during that period, while deaths from degenerative diseases showed a steady increase. As in previous years, the leading killer for all ages in 1984 was pneumonias. This was followed by diseases of the heart, tuberculosis, diseases of the vascular system, malignancies, gastroenteritis, and accidents. Respiratory ailments (including tuberculosis with prevalence rate of 6.6/1,000 population) were the leading causes of morbidity the same year; gastroenteritis, malaria, accidents, measles, diseases of the heart, and malignant neoplasms were other afflictions. The infant mortality rate of about 54 per 1,000 live births compares favorably with other developing countries. Deaths mainly from pneumonias and other respiratory conditions, gastroenteritis, malnutrition, measles, and perinatal causes suggest that infant death rates could be lowered still further with improvements in maternal and child health care.

While most diseases occur throughout the country, some regional variations in morbidity are noted. Malaria is the chief cause of illness in endemic regions, with the highest prevalence found in the Western and Central Mindanao regions and the island of Palawan. About 15 million Filipinos are at risk in affected areas, and the incidence appeared to be on the increase in 1984. The growing resistance of p. falciparum to chloroquine makes the problem more intractable. Next to China, the Philippines is the main endemic area for schistosomiasis japonicum. The disease affects about 620,000 people out of an exposed population of four million in 22 endemic provinces. Leyte and Samar report nearly half of all cases. Filariasis and leprosy occur in some areas but are not widespread.

Public health expenditures emphasized curative services in the past and favored urban areas. However, since the early 1970s, the GOP has reoriented priorities toward primary, preventive health care for the poor, establishing a network of Rural Health Units (RHUs) and Barangay Health Stations (BHSS) to deliver those services even to remote areas. In a series of five-year plans initiated in 1978, the GOP's emphasis on primary health care (PHC) focused on communicable diseases and malnutrition, poor sanitation, the increasing incidence of degenerative diseases and accidents, and the problems of rapid population growth. Specific programs were directed toward malaria, schistosomiasis, hypertension, and drug abuse.

The health delivery system in the Department of Health (DOH) operates on five levels: central, regional, provincial, municipal, and barangay. Hospitals under the DOH and other government agencies in 1987 numbered some 566 and were supplemented by over 1,000 privately-run hospitals. Government hospitals are of three types: primary, secondary or district, and tertiary (provincial, regional, and medical centers). The GOP reserves at least 70% of the beds in government hospitals free for indigent

patients and subsidizes care for the poor in private hospitals in areas with difficult access to public institutions. In addition, there were about 2,000 RHUs and over 8,800 BHSSs. The number of physicians and nurses in government service in 1986 were 9,599 and 11,585, respectively. Figures are lacking for health personnel in private practice, but a World Bank study assumed that in 1981 about 10,000 of the 17,000 physicians then in practice were in the private sector. Though there is no shortage of health manpower (the Philippines was the largest contributor in 1979 to the world's migrant physician and nurse population according to a WHO report), there has been a problem of maldistribution. Metro Manila, Southern Tagalog, and Central Luzon had more than 50% of the country's physicians in the early 1980s. Nevertheless, doctors of all specialities are found even at the district level. (See section 3.9 Health Resources and Appendix F for a detailed description of the health infrastructure and resources.)

Nutrition:

Malnutrition in the Philippines is more a function of buying power than of food availability. Data show that caloric consumption increases substantially with income, particularly in non-staple foods. The population segments most disadvantaged are the families of fishermen, landless farm laborers, and the unemployed. Regionally, the prevalence of malnutrition is greatest in the Visayas, intermediate in Mindanao, and lowest in Luzon. A particularly serious problem developed in Negros Occidental (Visayas) after the collapse of world sugar prices in 1984 forced growers to abandon production. Unemployment among sugar workers, who had no alternative means of livelihood, caused a further deterioration in the already fragile health and nutritional state of their children. A study conducted by the provincial government in 1985 with UNICEF's help showed that more than 140,000 children were moderately or severely malnourished. Government and private agencies cooperated to provide emergency feeding and to encourage home food production while longer-term solutions were being devised.

A strong association is seen to exist between malnutrition and poor sanitation. Similarly, there is a link between nutrition and childhood resistance to infectious diseases. Extreme deficiency diseases occur in some areas of the country: beriberi in regions where the diet consists mainly of polished rice; xerophthalmia, an eye disease often leading to blindness, in regions where vitamin A is seriously lacking; and goiter in mountainous areas.

Nutritional Status of Philippines Children Under Age Six (1987)

<u>Weight Status</u>	<u>Number</u>	<u>Percent</u>
Severely Underweight (3rd degree)	164,599	2.82
Moderately Underweight (2nd degree)	1,025,103	17.59
Mildly Underweight (1st degree)	2,376,361	40.79
Normal	1,944,563	33.38
Overweight	314,832	5.40
TOTAL	5,825,458	100.0

The National Nutrition Council (NNC) outlined objectives to reduce malnutrition in a series of Philippine Nutrition Plans (PNP) in the 1980s. Similar goals have been incorporated into agricultural and development programs. PNP activities, to be carried out by line agencies, include food assistance, nutrition education, health protection, and food production. The supporting programs are manpower development, promotion of income-generating activities, and program monitoring and nutritional surveillance. (The Philippine Nutritional Surveillance System was started in 1982 to provide comprehensive nutritional information.) The delivery of services by public and private sector agencies is coordinated by nutrition committees at the various administrative levels, with the NNC at the national level. A 1984 World Bank report pointed out the need for better coordination of PNP activities at the central level and for more effective targeting of programs.

Diet: Rice is the most important staple, used in the diets of more than 70% of the population (per capita consumption just under 100 kg. in 1980). More corn than rice is eaten in the Visayas and certain other regions where rice cultivation is not possible. Corn and root crops are generally considered inferior foods, however, in rice-producing regions. Diets tend to be high in carbohydrates with fish being the most important source of protein.

The following foods, grouped under general headings, are included in the Philippine diet:

Cereals: rice, rice noodles, rice cakes, corn grits, white corn, green sweet corn, corn flour/meal, yellow cakes, pan de sal, bread, cookies, pies, stuffed baked bread, lumpia wrappers

Meat/Fish/Poultry: pork, beef, carabeef, poultry, mutton, numerous species of fish (scad, anchovies, sardines, slipmouths, herring, bisugo, shrimp, crabs), eggs, balut (embryo duck eggs)

Vegetables and Fruits: Vegetables - leaf camote tops, cabbage, kangkong, pechay, malunggay, carrots, mustard, amagosa leaves, lettuce, eggplant, tomatoes, okra, banana blossoms. Legumes - sitao, mongo, paguio beans, peanuts. Roots and tubers - sweet potatoes, onions, Irish potatoes, garlic, cassava roots. Fruits - bananas, mangoes, papayas, citrus, calamansi, pineapples, lansones, melons, avocados, coconuts

Beverages: coffee, cocoa, soft drinks, alcoholic beverages made from fermented coconut, rice, or sugarcane.

1.19 Economy

Basic Indicators:	Gross Domestic Product (GDP) (1986)	
	\$30,540,000	
	Distribution of GDP (%) (1986)	
	Agriculture.....	26
	Industry.....	32
	Services.....	42
	Average Growth Rate of GDP (%)	
	1965-1980.....	5.9
	1980-1985.....	-0.5
	1986.....	1.5
	1987.....	5.1
	Public Expenditures (%) (1987)	
	Economic Services.....	17.8
	Social Services.....	19.5
	Defense.....	5.1
	General Public Services.....	11.3
	Net Lending.....	5.1
	Debt Service.....	41.1

Overview:

The Philippine economy expanded at a fairly constant pace during the 1970s, with the GNP growth rate averaging 6%. The seeds of a future crisis were being sown, however, as GOP policies created an inefficient, import-dependent industrial sector while neglecting agricultural investment. A large build-up of foreign debt to finance a growing current account deficit left the country extremely vulnerable to external events. The sharp deterioration in the terms of trade after the oil price shock of the late 1970s, and the ensuing global recession, revealed the underlying structural weaknesses.

The GOP's expansionary expenditure program undertaken as a counter-recessionary measure proved untenable as the economic crisis deepened. Political events further complicated the picture. The country was forced to adjust to severely reduced levels of foreign capital inflows after the Aquino assassination in 1983 triggered a crisis of business confidence.

In October 1983, the GOP declared a moratorium on certain categories of external debt repayments and introduced an austerity program. The adjustment program was supported by a Stand-by Agreement with the International Monetary Fund (IMF) concluded in December 1984. Stabilization measures included import restrictions, cuts in public consumption and investment, and depreciation of the peso. The economic and social implications of these actions were soon felt. Inflation, resulting from currency devaluations, surged to a postwar record of nearly 50% in 1984, unemployment rose to 22% in Metro Manila in 1985, and real per capita income declined by 14.8% between 1983 and 1985. The economic slowdown was most apparent in the manufacturing, mining, and construction subsectors which experienced general declines in their contributions to the GNP between 1984 and 1986. The agricultural sector showed greater resilience and recorded small increases during those years.

The Aquino government has added new reform measures to those begun under the previous administration. High priority is given to the privatization of public sector corporations acquired during the Marcos years. The full extent of the government's involvement in industry and business, in a complex architecture of crony capitalism, only came to light during the waning years of the former regime. In 1987, a quarter of the national budget was going to public corporate accounts. The Aquino government created the Asset Privatization Trust to carry out divestiture. Other measures to strengthen the economy and provide a more equitable distribution of benefits include tax reform, the liberalizing of import restrictions to create a more export-oriented manufacturing sector, business incentives to bring in foreign exchange, and a sweeping program of agrarian reform. In contrast to the policies of the previous government, the new administration's Medium-Term Development Plan (1987-1992) focuses on the rural sector and the creation of labor-intensive employment programs.

The statistics for 1987 show encouraging evidence of a reversal in the downward trend of the crisis years. Although growth was below the GOP target, possibly because of continuing political instability, real CNP increased by 5.7% and real per capita income rose by 3.2%.* Agriculture grew by only 0.72%, reflecting adverse weather conditions; industry fared better, posting an 8% gain overall, with the construction subsector showing the most dramatic improvement. Prices edged up again in 1987 after stabilizing the previous year, but the inflation rate remained well below the runaway level of 1984. The external debt stood at \$28 billion in 1987; however, rescheduling agreements covering \$13.2 billion eased the burden of debt servicing. A continuing tight budget situation limits the GOP's ability to provide essential services and carry out investment projects.

Unemployment and
Poverty:

An intractable problem in the Philippines is the high level of unemployment and underemployment and the highly skewed distribution of wealth. The labor force grew from just under 11 million in 1970 to over 20 million in 1986. Generating sufficient employment to meet such growth has been a difficult challenge for the GOP. Although the situation has eased since the crisis years and shows continuing improvement, the unemployment rate remained high at 9.5% at the end of 1987. The underemployment rate was estimated at 30% in mid-1987. The traditional answer to the unemployment problem--the export of skilled Filipino workers to other countries--became a less viable option during the early 1980s because of the worldwide depression.

As real wages fell during the recession, an upsurge in industrial disputes occurred. The number of strikes went down in 1987 after reaching a record total of 581 in 1986. Work days lost to such disputes dropped by half.

* The outlook for 1988 is even more encouraging, with GNP reportedly expanding by 6.8% during the first half of the year.

Analysts have not used a standard methodology for measuring poverty in the Philippines; hence figures vary. According to the 1985 Family Income and Expenditures Survey, about 60% of the population is below the poverty line, with the incidence of poverty greatest in rural areas. The bottom 40% of the population receives less than 18% of income, while the 20% at the top receives about 50% of total income.

Industry:

Manufacturing accounts for about a quarter of GDP, but because of the capital-intensive nature of much of the sector, it has contributed little toward absorbing the growing labor force. Industry was especially hard hit by the economic recession. The high cost of energy, the restrictions on imports, and the unavailability of foreign exchange and credit forced the collapse of many structurally inefficient industries. The capital goods industries (metals, transport equipment, and electric machinery) suffered the most, followed by intermediate goods (paper, pharmaceuticals, chemicals, and cement). Lighter industries with low capital intensities (electronics, garments) fared best.

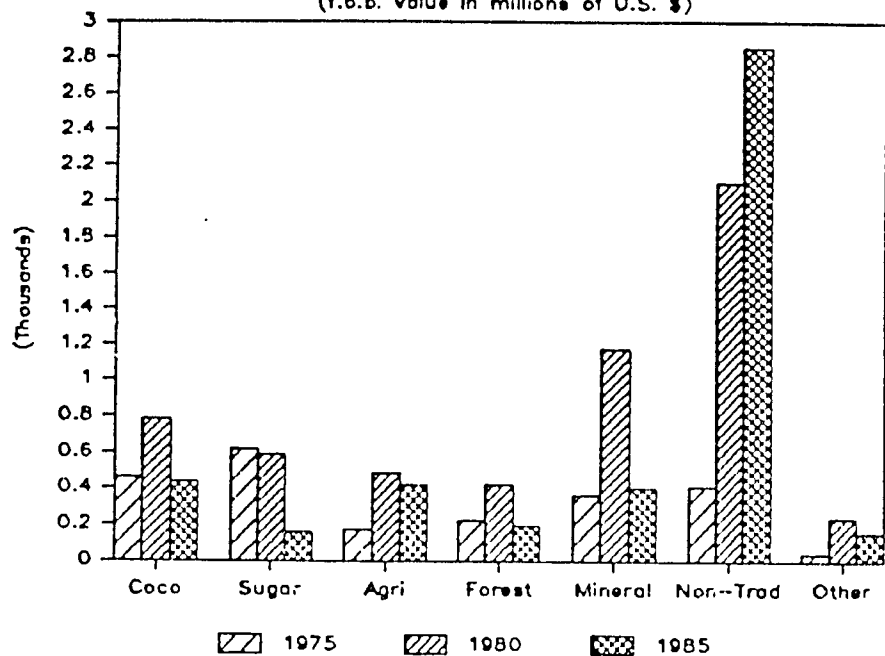
After two years of negative growth (over 7%), manufacturing rebounded slightly in 1986 and grew by 7.1% in 1987. Construction posted a growth rate of 17.2% in 1987 after three years of greatly slowed activity. Although the Philippines ranks among the top 10 mining countries for gold, copper, nickel, and chromite, the mining sector also fell on hard times in the 1980s due to steady declines in world commodity prices. With the exception of gold, the value of mine production fell after 1980, and many of the mining projects developed during the boom years of the 1970s collapsed during the economic crisis. Mining and quarrying continued to experience negative growth in 1987 (down 2.4% over 1986)

International Trade:

The balance-of-payments position was critical by 1983 and the international exchange reserves had fallen to \$865 million from the 1980 level of \$3.15 billion. The relief afforded by the rescheduling of debts along with adjustments in the level of imports permitted an overall balance-of-payments surplus after 1984. Before inflows of new money and the rescheduling of debt obligations, the year-end balance of payments deficit in 1987 was \$1,758 million; after exceptional financing, the balance of payments showed a surplus of \$264 million. Exports amounted to \$5,720 million in 1987, and imports totaled \$6,737 million, leaving a trade deficit of \$1,017 million.

Exports by Commodity Groups

(f.o.b. value in millions of U.S. \$)



Key:

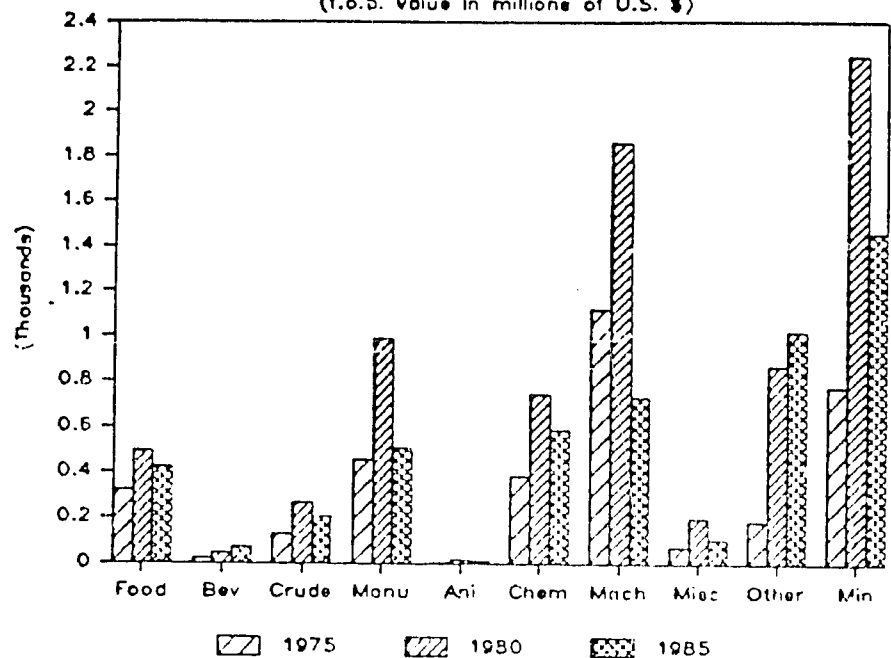
- | | | | |
|---------|-------------------------------|----------|--------------------------------|
| Coco | - Coconut Products | Mineral | - Mineral Products |
| Sugar | - Sugar and Products | Non-Trad | - Non-Traditional Manufactures |
| Agri | - Other Agricultural Products | Other | - Other |
| Forests | - Forest Products | | |

Figure 1.d.

The structure of exports has changed in the last few decades. Traditional exports (copra, sugar, bananas, logs, lumber, desiccated coconut, coconut oil, abaca, copper concentrates, and gold) accounted for 85% of total exports in 1950. Their share had dropped to 71% in 1975 and to 24% in 1985. The change was due to falling prices of these commodities in the world market and to the promotion of manufactured goods as exports in the 1970s. Non-traditional exports consist largely of electrical components, garments, and handicrafts. Exports rose 18% in 1987 but remained below import levels. Export expansion is considered essential to long-term recovery of the economy.

Imports by Commodity Groups

(f.o.b. value in millions of U.S. \$)



Key:

- | | |
|--|--|
| Food - Food and Food Products | Chem - Chemicals |
| Bev - Beverages and Tobacco | Mach - Machinery and Transport Equipment |
| Crude - Crude Materials, Inedible | Misc - Miscellaneous |
| Manu - Manufactured Goods (by Material) | Other - Other |
| Ani - Animal and Vegetable Oils and Fats | Min - Mineral Oils and Lubricants |

Figure 1.e.

The structure of imports has likewise changed through the years. Reflecting the emphasis on import substitution, the share of consumer goods in total imports fell from 90% in 1950 to 30% in 1984 after reaching a low of 11% in 1980. The share of capital and intermediate goods rose correspondingly. A fall in capital goods imports since 1975 reflects greater import substitution in that area as well as the slump in manufacturing during the economic crisis. Beginning in 1984, both volume and dollar value of imports declined dramatically as a result of quantitative controls and the depressed state of the economy. An increase in imports is now occurring (34% in 1987) with the trade liberalization policy and the beginning of economic recovery.

The principal markets for Philippine exports and the main suppliers are the United States, Japan, the ASEAN countries, and the European Community.

Agriculture:

Agriculture, including forestry and fisheries, is the mainstay of the Philippine economy, accounting for approximately half of total employment and nearly a third of domestic exports and GDP. About one-third of the country's 300,000 sq. km., or about 9.7 to 10.0 million ha., is under cultivation.

Since the area presently cultivated represents 99% of arable land, the amount of arable land per capita continues to decline. Ownership of farm land is highly skewed: about 50% of farmers cultivate only 16% of land, while 3% grow crops on 26% of land.

Despite policy biases toward industry and away from agriculture in the 1970s, agricultural production grew by about 4% a year. The sector also demonstrated greater resilience than the rest of the economy during the crisis of the early 1980s. Virtual self-sufficiency has been achieved in basic food production with the use of new technologies to raise yields. The area of irrigated land has nearly doubled since

1968, reaching about 1.5 million ha. in 1986--or about 47% of the potentially irrigable area. Reduced allocations in public expenditures during the recession caused cutbacks in new development as well as in maintenance of irrigation and other agricultural infrastructure. The Aquino government recognizes the critical role of the sector in the economy and intends to increase its share in total investment.

Of the major food crops, rice occupied about 28% of the total harvested area in 1986 and corn about 29%. The traditional export crops, coconuts and sugar, were planted on about 3.2 million ha. and 321,000 ha., respectively. The drop in world sugar prices in 1984 caused a precipitous decline in sugar production and area harvested. Other important crops are fruit (especially bananas and pineapples), nuts, and, to a lesser extent, root crops, abaca, tobacco, coffee, vegetables, rubber, cacao, and ramie. Although "other crops" occupied less than 15% of cultivated land in 1986, they accounted for about 40% of crop value. The output in forestry has declined in recent years as a result of the government's interest in conservation. Poultry production has expanded rapidly, as has fisheries. Since 1964, fisheries production has grown by an average of about 10% a year and aquaculture production by 12% a year.

Climate, terrain, and soils influence distribution of crops. Major rice production regions are Central Luzon (including provinces of Pangasinan, Tarlac, Nueva Ecija, and Bulacan), Cagayan Valley in northeastern Luzon, Bicol Peninsula, Western Visayas, and Southern and Western Mindanao. Rice generally has a year-round growing season. More than half of all corn is grown in the Visayan Islands and the upland areas of Mindanao. Coconuts are grown mainly in Mindanao (about 50% of nuts harvested), the Southern Tagalog region, and the eastern Visayan Islands, while sugarcane cultivation is concentrated in Western Visayas. Almost half of banana production comes from the

Visayan Islands; tobacco is grown mainly in western Luzon. (See Appendix B, Crop Dates and Appendix C, Crop Maps.)

Land Reform:

Poverty in the Philippines is concentrated in rural areas and in agriculture. The inequality of access to resources, especially land, is seen as a major factor in rural poverty. Of the total agricultural population, about 35% own the land they till; 27% are tenants or part tenants; and 35% are landless laborers. Agrarian reform has become a highly visible political issue in the Philippines, perceived as the key to a more equitable society and as necessary to political stability.

A program of agrarian reform undertaken by the Marcos government in 1972 was limited in scope, focusing on tenanted rice and corn lands. The Comprehensive Agrarian Reform Program (CARP) instituted by presidential decree in July 1987 covers all public and private agricultural land regardless of tenurial arrangements or crops produced. A Presidential Agrarian Reform Council (PARC) was established to oversee the program. The ultimate target for land reform under CARP is 5.5 million ha, beginning with the completion of the rice and corn program. The program is then scheduled to expand to idle and abandoned lands and finally to private and public landholdings. Land reform became law in June 1988 when Congress passed a compromise bill setting land retention limits and fixing the amount of payment to landowners. The law will be phased in over a period of ten years.

Financing the program will be difficult for the GOP given the present economic constraints. Besides the cost of compensating landowners, support services will have to be provided to farmer beneficiaries to ensure the program's success. President Aquino is looking to foreign donors for assistance with financing.

1.20 Power Supply

The total installed generating capacity was about 6,600 MW at the end of 1986. The government-owned National Power Corporation operated about 88% of that total. Reflecting the GOP's efforts to reduce dependence on imported oil by developing indigenous sources of energy, the NPC's installed capacity consisted of diverse sources: 41% oil-fired and diesel thermal plants; 37% hydropower plants; 15% geothermal plants; and 7% coal-fired thermal plants. A 620 MW nuclear power plant completed in Bataan in 1985 has been permanently "mothballed."

The NPC supplies power to most of the country's utility companies, cooperatives, and industrial customers. The largest utility company is the Manila Electric Company (MERALCO) whose franchise covers nine cities and 96 municipalities within a 60 km. radius. The National Electrification Administration is responsible for the government's rural electrification program. Electric service was available to about one-half the country's population in 1985; per capita power generation was about 363 kWh (370 kWh in 1986). The availability of service is skewed, however, with Luzon being better served than the other regions. The majority of transmission facilities and generating plants are in Luzon.

Electric current is generally 220 volts, 60 cycles, although 110 volts current is also found in some areas. Power system blackouts are common outside tourist areas.

1.21 Communications

General:

The communications capability of the Philippines includes telephone, telegraph, telex, radio, television, and the print media. Some data transmission services are also available. International communications are possible through satellite connections, submarine cable networks, and a troposcatter system. The Philippines is a member of INTELSAT, with the local entity, the

Philippine Communications Satellite Corporation (PHILCOMSAT), operating the Philippine earth station in Rizal Province. The Department of Transportation and Communications formulates policies concerning telecommunications. The National Telecommunications Commission regulates the activities of all private domestic and international carriers, except PHILCOMSAT.

Telephone:

The Philippine Long Distance Telephone Company (PLDT) is the country's largest private telephone operator, handling about 94% of the telephone stations and all international voice telecommunications. The Bureau of Telecommunications (BUTEL) is responsible for the operation of most of the government's telecommunications facilities. While international telephone service is described as excellent, local service is less reliable. The national transmission network consists mainly of a microwave terrestrial system which is vulnerable to storm damage. Moreover, telephone service is virtually non-existent in rural areas. Of the more than 920,000 telephones in operation at the end of 1986, 73% were in Metro Manila and the remainder were in other major cities and municipalities. The Philippines has one of the lowest telephone densities in Asia (5.3 main stations/100 population in Metro Manila but only 0.99 main stations/100 population over all). International telegraph service is handled by four carriers, including the Philippine Global Communications (PHILCOM); domestic telegraph service is provided by both government (BUTEL) and private companies. The latter include the Philippine Telegraph and Telephone Co. (PT&T) and Radio Communications of the Philippines (RCPI).

Radio:

Radio reaches more people than any other medium and is the main source of information and entertainment for rural dwellers. An estimated 7.5 million receivers were in operation in 1986 (1 per 7.5 persons). Licenses were issued to 294 AM stations in 1986 and to 80 FM stations. Most stations are commercially financed, although a few are subsidized by the government or other institutions.

Television: Television is also a popular medium but is less widely available than radio. Over 3.9 million receivers were in operation in 1986 (1 per 14 persons). There were 68 licensed television stations in 1986 and five major networks.

Newspapers: Strict controls were placed on content and comment in the written media during the period of martial law. With the lifting of those controls, the Philippines once again has a lively and diverse press. About half of the country's 26 daily newspapers are published in Metro Manila. The major newspapers of national circulation are the Manila Bulletin, the Daily Express, the Times Journal, the Manila Times, and the Daily Tribune. The Bulletin, Manila Times, and Times Journal are published in English; the Daily Tribune and the Daily Express are published in both English and Pilipino. These major dailies have tabloid counterparts which enjoy an even wider circulation. (See also section 3.11, Communications.)

1.22 Transportation

General: Because of the country's archipelagic character, both road and sea transport play major roles in the movement of freight and passengers. For the shipment of goods, road transport accounts for about 65%, shipping for about 35%, and rail and air transport for less than 1% each. Passenger traffic is primarily by road (90%); shipping accounts for 7% and air and rail combined for about 3%.

The existing transport infrastructure, though fairly extensive, requires considerable rehabilitation. The lack of public funds for maintenance has resulted in the deterioration of port facilities, highways, railways, and bridges.

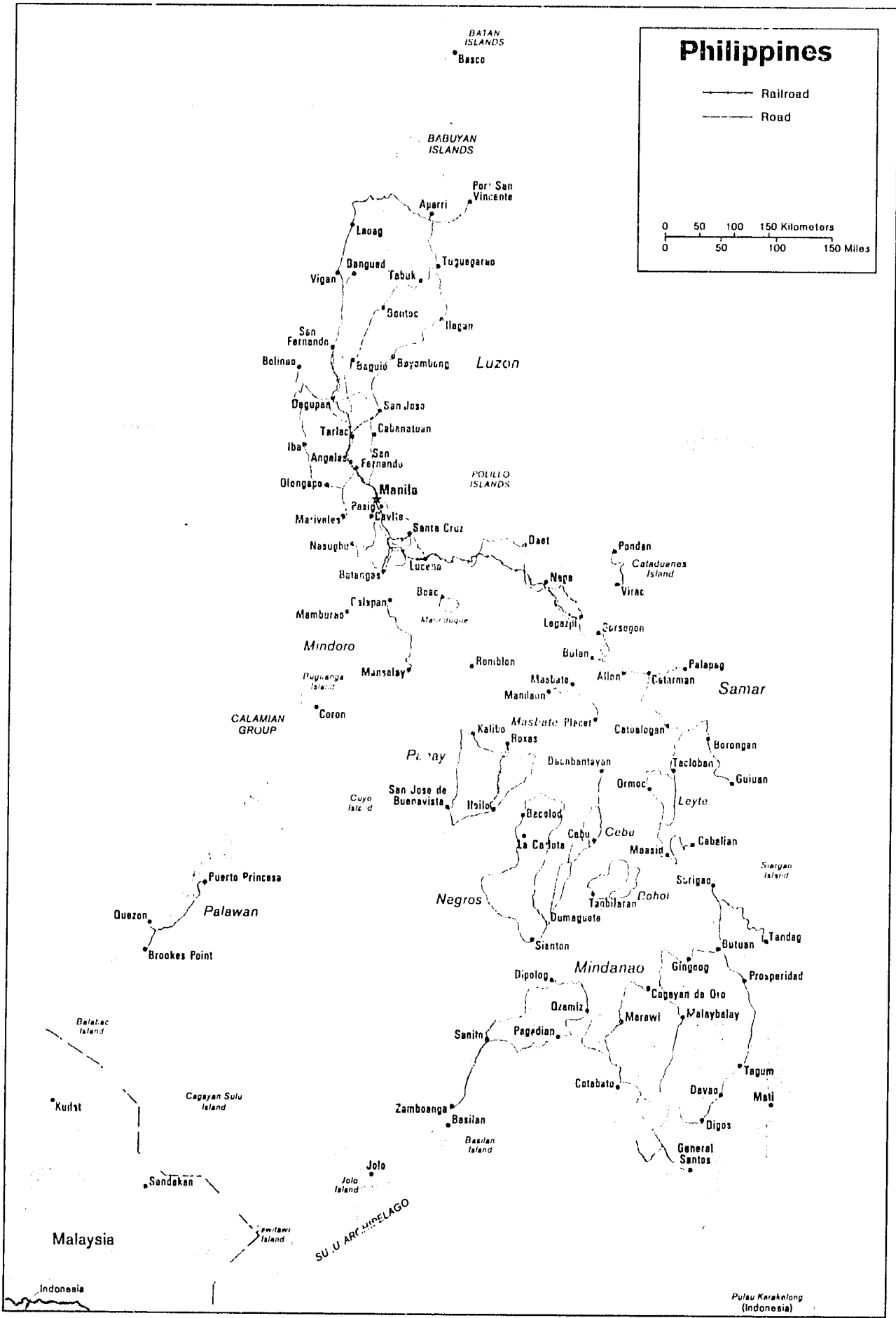
- Roads:** Of a total 162,325 km. of roads in 1986, over 26,000 km. were classified as national roads and some 136,000 km. were local roads. The latter included provincial roads (over 28,000 km.), city and municipal roads (nearly 17,000 km.), and barangay roads (over 90,000 km.), serving as feeder or farm to market roads. Less than one-half of the total road network is of all-weather standards. The major routes follow the north-south pattern of population distribution, and other systems have evolved around these major routes. The Pan-Philippine Highway is the main artery, extending from Aparai in northern Luzon through Samar and Leyte to Davao in Mindanao. There are over 11,000 bridges in the country, totaling 230,226 meters. To support development objectives, the medium-term development plan puts a high priority on improving the road subsector. Responsibility for transport planning and regulation is shared by the National Economic and Development Authority (NEDA), the Department of Transportation and Communications, the Department of Public Works and Highways, and the Department of Local Government.
- Railways:** A railway network of 750 km. operates in Luzon. The Philippine National Railway's (PNR) comprises a northern line between Manila and Dagupan City and a southern line between Manila and Legaspi. The railway is in a generally deteriorated condition, but because rail has been an important mode of transport in the Bicol corridor, especially in freight traffic, the GOP is rehabilitating the southern line. A 16 km.-long light rail transit system (electrically driven) began operations in 1984 in Metro Manila.
- Ports:** Being a country of over 7,100 islands, the Philippines has a long coastline and a great many ports. The exact number is uncertain as various sources give different totals. The largest estimate is 622 public ports and 314 private ports. The public ports consist of 19 major ports, 75 subports (national/municipal), and 528 minor municipal ports. Manila is the largest international and

domestic port, handling 31% of the total 63.3 million tons of traffic in 1986. Other major ports include Batangas, Cebu, Cagayan de Oro, Davao, Tacloban, and Iloilo. The physical facilities at most of the national ports need improvements. A project to rehabilitate North and South Harbors in the port of Manila is being implemented with assistance from the Asian Development Bank. The Philippine Ports Authority supervises port operations; the Maritime Industry Authority sets policies and regulations concerning shipping.

Airports:

There were 230 registered airports in the country in 1986: 87 national and 143 private. Domestic air transport has a significant role in passenger traffic and high-value cargo traffic. The Manila (Ninoy Aquino) International Airport is the primary airport in the country; five other international airports are located in Cebu, Davao, Puerto Princesa, Zamboanga, and Laoag City (Ilocos Norte). Philippine Airlines (PAL) provides domestic and international services around the world. A smaller domestic airline, Aero Filipinas, conducts charter flights to several countries in Asia and the Near East. The Bureau of Air Transportation is the regulatory body in the aviation sector.

(See sections 3.12, 3.13, and 3.14 for a more detailed discussion of transportation resources in the Philippines.)



Philippines

- Railroad
- Road

0 50 100 150 Kilometers
 0 50 100 150 Miles

BATAN ISLANDS
 Basco

BABUYAN ISLANDS

Por. San Vincente

Luzon

Manila

Mindoro

CALAMIAN GROUP

Palawan

Malaysia

Indonesia

POJILLO ISLANDS

Mindoro

Palawan

Negros

Mindanao

Basilan Island

SULU ARCHIPELAGO

Jolo Island

Samar

Leyte

Cebu

Mindanao

Davao

General Santos

Pulau Karakelong (Indonesia)

1/1/70

2. Disaster Vulnerability

2.1 Overview of the Physical Environment

The Philippines exhibits considerable regional diversity--both in geography and climate. The main island groupings of Luzon, the Visayan Islands, and Mindanao and the smaller islands of Mindoro and Palawan are treated as separate regions in an examination of the physical environment.

Luzon

The main island of Luzon, representing about 35% of the total land surface of the archipelago, has both the country's largest lowlands and the highest mountain ranges. The major lowland areas are the economically important Central Plain north of Manila, covering approximately 15,000 sq. km., the broad and fertile Cagayan Valley in the northeastern part of the island, about 14,000 sq. km. in area; and the Bicol Plain, extending 96 km. between San Miguel Bay and Albay Gulf in the southeastern peninsula. Smaller lowland areas are found in a narrow coastal strip in the Ilocos region of northwestern Luzon and in the alluvial plains bordered by volcanic uplands in the southwest.

Luzon has three major mountain systems, trending north-south. The massive Central Cordillera, with three parallel sub-ranges, contains Mt. Pulog (2,930 m.), the highest point in Luzon and the second highest in the Philippines. A transverse range, the Caraballo Mountains, at the southern end of the Cagayan Valley, connects the Cordillera Central and the easternmost system, the Sierra Madre. The rugged Sierra Madre continues south as the Eastern Cordillera, forming Tayabas Isthmus and the Bondoc Peninsula. The third major range is the Western Cordillera or Zambales Mountains, extending from Lingayan Bay through the Bataan Peninsula. Numerous volcanic peaks are scattered throughout Luzon, particularly in the southwestern and southeastern regions. Mt. Mayon (2,462 m.) and Mt. Bulusan (1,559 m.), located in the Bicol Peninsula, are two of the most active volcanoes in the country.

Luzon's largest river is the 320-km.-long, northward-flowing Cagayan which drains Cagayan Valley. The Magat, Chico, and Ilagan rivers are major tributaries. In the northwest, the Abra and Laoag rivers, with their headwaters in the Cordillera Central, empty into the South China Sea. The Bicol River, flowing north to San Miguel Bay, drains the Bicol Plain. Two important rivers of the Central Luzon Plain are the Agno, flowing northward to Lingayan Gulf, and the Pampanga which empties into Manila Bay. The 16-km.-long Pasig River flows through Manila and connects with Laguna de Bay, the country's largest lake. Located near Laguna de Bay in southwestern Luzon is Lake Taal which occupies an ancient caldera and has an active volcano on an island in its center.

Two small island groups north of Luzon--the Batanes and Babuyan islands--are the northern outposts of the Philippines. Volcanism created many of the islands in these groups, which are characterized by extremely rugged topography.

Luzon has several climatic regions. The Cagayan Valley and the Central Plain, both closed off by highlands to moisture-bearing air masses, have lower rainfall than the more exposed coastal areas. Precipitation is strongly seasonal in the Central Plain. The Ilocos coast receives the full brunt of the southwest monsoon, as does the Zambales coast, in a seasonal pattern of rainfall. The climatic regime of the Cordillera Central is characterized by cooler temperatures than that of the lowlands and by abundant precipitation in the higher sections. The Bicol region is generally well-watered and frequently in the path of destructive typhoons.

The Visayan Islands

The Visayan group in the central Philippines includes the larger islands of Samar, Leyte, Panay, Negros, Cebu, Bohol, and Masbate as well as the smaller islands of Tablas, Marinduque, Romblon, Sibuyan, Ticao, Burias, and Sequijor. The deep waters of the Sulu, Sibuyan, and Mindanao seas separate this group from the rest of the Philippines.

Samar, in the eastern Visayas, is the third largest island in the archipelago. The rugged hills of the interior are not a true mountain range. Lowlands are limited to coastal and riverine plains.

The narrow San Juanico Strait separates Samar from Leyte to the south. Leyte has three nearly parallel mountain ranges and extensive lowlands. Leyte Valley, between the northeastern and central ranges, is one of the largest contiguous lowland areas in the Visayas.

Bohol Island, midway between southern Leyte and the island of Cebu, consists largely of low mountains surrounding an interior plateau. A maximum elevation of about 854 m. is reached near the southeastern coast. Several small alluvial lowlands have formed where the island's many short streams reach the sea.

The long narrow island of Cebu, at the geographical center of the archipelago, has very little level land. The central uplands are highly dissected and denuded. Cebu City, on the island's eastern coast, is a major urban area.

The Tanon Strait separates Cebu from boot-shaped Negros, the fourth largest island in the Philippines. Some of the highest mountain peaks in the Visayas are on Negros in the volcanic main central range (Mt. Canlaon, 2,465 m.) and in the southeastern peninsula (Cuenos de Negros, 1,904 m.). The western plains of Negros, which are among the country's largest lowlands, are drained by the Ilog, Binalbagan, and Bago rivers.

Panay, in the western Visayas, ranks sixth in size among the country's islands. A high, rugged mountain system in the western part of the island contains two of the highest peaks in the Visayas (Mt. Madiac, 2,180 m. and Mt. Nangtud, 2,050 m.). The island also has an extensive lowland area in the Iloilo Basin whose principal rivers are the Jalaud, Jaro, and the Sibalum.

Masbate, eleventh in size nationally and the largest of the islands in the Sibuyan Sea region, has two relatively low mountain ranges and a broad band of lowlands on the west coast. The smaller islands in the Sibuyan Sea--Marinduque, Burias, Ticao, and the Romblon group--form a physiographic and cultural link between Luzon and the Visayas.

There is no strong seasonal pattern to precipitation in the eastern Visayan islands, which receive moisture from both the northeastern and southwestern monsoons and are often in the path of destructive typhoons. The western Visayas receive maximum rainfall during the dominance of the southwestern air masses and experience a drier season from November through May. The Central Visayas are partially sheltered from the full effects of moist air masses and thus receive lower rainfall than many other areas in the Philippines. Droughts may even occur in the early months of the year in this region.

Mindanao

With several deep embayments and large peninsulas, the island of Mindanao has an irregular shape and a long coastline. This second largest island in the Philippines (34% of total land area) also has a varied topography. Hundreds of small islands make up the Sulu Archipelago, which extends southwestward from Zamboanga Peninsula. Basilan and Jolo are the two largest islands in this chain.

The main island of Mindanao has at least five major mountain systems. The 400-km.-long Pacific Cordillera on the eastern coast, known as the Diuata Mountains in the northern massif, crests at the southern end of the range in Mt. Tagdalit (2,800 m.). Valley-like passes west of Lianga and Bislig bays permit access westward between the two heavily wooded masses. The much dissected Central Cordillera (400 km. long) has clusters of volcanic peaks in the south, including Mt. Apo (2,953 m.), the highest peak in the Philippines, and active Mt. Matutum (2,293 m.). In the volcanic Bukidnon-Lanao Plateau of the northcentral area, Mt. Kaatoan (Katanglad) and Mt. Catatungan (Kalatungan) reach 2,938 m. and 2,865 m., respectively. Two volcanoes (Mt. Makaturing and Mt. Ragang) in this plateau region have erupted within historical times, and Mt. Hibok-Hibok on Camiguin Island, off the north coast of the plateau, is one of the country's most active volcanoes. The Tiruray Highlands, or Cotabato Cordillera, in southwest Mindanao, contains Parker Volcano (1,842 m.), now inactive. In the Zamboanga Cordillera, the volcanic highlands reach their highest point in Mt. Malindang (2,425 m.), also an inactive volcano.

The principal lowlands of Mindanao are the Davao-Agusan Valley, extending more than 160 km. north and south between the eastern and central cordilleras; and the Cotabato Plain, stretching some 96 km. northwest-southeast between Illana and Sarangani bays.

Mindanao's two longest rivers, both over 320 km., are the Agusan, which flows northward through the Agusan Valley to the Mindanao Sea, and the Rio Grande de Mindanao, which drains the Cotabato Plain and empties into Moro Gulf. The Rio Grande has several main tributaries and is variously known as the Cotabato, Mindanao, and Pulangi. The second largest lake in the Philippines, Lake Lanao, is located at an elevation of 700 m. in the southwestern corner of the Bukidnon-Lanao Plateau. Lake Buluan, in the southern Cotabato Plain, and Lake Mainit, in Surigao del Norte, are other sizable inland bodies of water.

Except for sheltered locations along the north and south coasts and in the Cotabato Valley, most of Mindanao receives abundant precipitation. Typhoons are not unknown, but most of the island is located south of the usual tracks.

Mindoro and Palawan

Along with the Calamian group, Balabac, and the Cuyo Islands, the islands of Mindoro and Palawan make up a separate geological unit from the rest of the archipelago. All lie on the Sunda Shelf, an ancient landform also underlying Borneo.

Oval-shaped Mindoro has a mountainous interior, with Mt. Halcon (2,582 m.) and Mt. Baco (2,363 m.) the loftiest peaks. Narrow lowland strips extend along the eastern and western coasts. Lake Naujan in northeastern Mindoro is one of the largest lakes in the Philippines.

The long and narrow island of Palawan is the fifth largest in the Philippine archipelago. Its mountainous interior is broken at Honda Bay where a narrow lowland crosses the island. Other lowlands are confined to coastal strips. Mt. Matalingajan (2,085 m.) is the island's highest peak.

Northern and western Palawan and the Calamian group receive sufficient seasonal rain; however, the eastern regions of Palawan and Balabac Island are subject to periodic drought.

Mean Monthly and Annual Temperature (°C) for Selected Stations

REGION	STATION	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
LUZON	Aparri	23.4	24.1	25.8	27.7	29.0	29.2	28.9	28.5	27.7	27.0	25.5	24.1	27.1
	Baguio	17.8	18.3	19.4	20.3	20.4	20.0	19.5	18.9	19.2	19.4	18.9	18.4	19.2
	Baler	24.4	24.8	25.7	27.0	28.1	28.3	28.3	28.1	27.9	27.1	26.1	25.1	26.7
	Basco	22.0	22.6	24.2	26.2	27.8	28.3	28.3	27.8	27.5	26.4	24.7	22.9	25.7
	Cabanatuan	25.8	26.3	27.6	29.1	29.5	28.5	27.9	27.4	27.6	27.6	26.9	26.2	27.5
	Casiguran	23.7	23.7	24.9	26.4	27.6	27.9	27.7	27.6	27.3	26.5	25.4	24.4	26.1
	Coron	26.8	26.8	27.7	28.5	28.6	27.4	26.6	26.7	26.8	27.1	27.2	27.0	27.3
	Cuyo	26.9	26.6	27.6	28.8	28.9	28.1	27.7	27.7	27.6	27.8	27.9	27.5	27.8
	Daet	25.3	25.5	26.2	27.4	28.3	28.5	28.0	28.0	27.7	27.2	26.7	25.9	27.1
	Iba	25.6	25.8	26.9	28.2	28.4	27.6	27.0	26.6	26.9	27.3	27.1	26.3	26.9
	Infanta	24.5	24.8	25.9	27.2	28.2	28.4	28.2	28.1	27.8	26.9	26.3	25.3	26.8
	Laoag	24.4	24.8	26.3	28.0	28.9	28.2	27.7	26.9	27.3	29.4	26.5	25.4	26.9
	Legaspi	25.3	25.6	26.1	27.1	28.0	28.1	27.6	27.6	27.4	27.1	26.6	25.8	26.9
	Masbata	26.4	26.5	27.4	28.7	29.4	29.2	28.7	28.5	28.5	28.2	27.8	26.9	28.0
	Manila	25.4	26.2	27.4	29.0	29.5	28.5	27.7	27.3	27.5	27.3	26.7	25.8	27.3
	Pto. Princesa	26.7	27.0	27.6	28.6	28.5	27.6	27.3	27.0	27.2	27.3	27.2	27.0	27.4
Virac	25.9	26.0	26.5	27.3	28.0	28.2	28.0	28.2	27.9	27.3	27.1	26.4	27.2	
VISAYAS	Borongan	25.7	25.6	26.4	27.2	27.7	27.8	27.7	27.9	27.9	27.3	26.8	26.3	27.0
	Catarman	25.2	25.4	25.9	26.6	27.5	27.7	27.5	27.7	27.5	26.9	26.4	25.7	26.7
	Catbalogan	26.1	26.2	26.9	27.9	28.6	28.4	28.2	28.3	28.2	27.9	27.1	26.5	27.5
	Cebu	26.5	26.7	27.4	28.4	28.8	28.1	27.7	27.7	27.7	27.6	27.4	26.8	27.6
	Dumaguete	26.8	26.8	27.6	28.6	28.9	28.3	28.0	28.1	28.1	27.9	27.8	27.3	28.2
	Iloilo	25.8	26.1	26.9	28.2	28.6	27.8	27.3	27.2	27.2	27.3	27.0	26.4	27.2
	Romblon	25.8	26.4	27.0	28.4	29.0	28.4	27.8	27.7	27.7	27.5	27.1	26.3	27.4
	Roxas	26.4	26.5	27.3	28.6	29.0	28.5	28.2	28.1	27.8	27.7	27.7	27.0	27.8
	Tacloban	26.0	26.0	26.6	27.5	28.0	27.9	27.8	28.0	28.0	27.7	27.2	26.5	27.3
MINDANAO	Cag. de Oro	26.0	25.9	26.7	27.7	28.3	27.8	27.5	27.6	27.5	27.4	27.1	26.5	27.2
	Davao	26.4	26.5	27.2	27.9	27.8	27.3	27.0	27.1	27.2	27.4	27.3	26.9	27.2
	Gen. Santos	26.9	27.0	27.7	28.0	27.6	26.8	26.4	26.4	26.6	26.9	27.1	27.1	27.0
	Hinatuan	25.5	25.2	25.9	22.4	27.2	22.7	27.1	27.3	27.2	27.1	26.7	26.1	25.9
	Jolo	26.2	25.9	26.4	26.9	27.3	27.1	27.1	27.3	27.0	26.8	26.7	26.5	26.8
	Malaybalay	22.8	22.7	23.4	24.3	24.3	24.6	24.0	23.5	23.5	23.7	23.7	23.2	23.8
	Surigao	25.5	25.4	26.2	26.6	27.8	27.8	27.6	27.9	27.9	27.3	26.7	26.1	26.9
Zamboanga	26.6	26.5	27.2	27.5	27.6	27.2	26.9	27.0	27.0	27.0	27.1	26.9	27.0	

Source: Adapted from Climate of the Philippines, PAGASA, September 1984.

Mean Monthly and Annual Rainfall (mm) for Selected Stations (1951 - 1981)

REGION	STATION	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
MINDANAO	Aparri	133	82	39	31	93	152	195	232	273	354	386	198	2168
	Baguio	11	8	29	96	339	457	739	838	613	339	163	26	3658
	Baler	186	151	196	252	307	285	235	221	306	372	451	313	3275
	Basco	171	129	101	82	130	262	258	425	392	342	335	291	2918
	Cabanatuan	7	3	15	29	173	257	306	398	307	167	134	44	1840
	Casiguran	218	164	206	134	229	247	247	249	294	375	649	443	3455
	Doet	320	189	163	131	148	181	220	235	261	511	593	625	3577
	Iba	3	2	9	31	320	528	768	1098	655	220	87	27	3748
	Infanta	353	232	187	175	240	264	247	207	299	539	604	560	3915
	Laoag	5	1	2	14	123	373	407	529	371	101	48	11	1985
	Legaspi	305	201	202	168	192	232	246	278	254	328	475	520	3401
	Manila	13	4	6	54	112	240	335	426	323	192	128	55	1890
	Virac	223	134	120	123	199	234	215	186	239	400	478	435	2989
VISAYAS	Borongan	601	419	315	270	326	223	220	216	193	297	587	691	4358
	Catarman	414	247	212	158	143	183	208	154	194	374	480	509	3276
	Catbalogan	261	191	209	161	166	140	182	261	234	264	277	295	2641
	Cebu	122	88	88	71	88	151	194	200	196	173	182	165	1718
	Coron	28	8	4	18	84	343	484	539	429	297	140	91	2465
	Cuyo	18	3	6	32	192	393	448	405	360	274	151	57	2339
	Dumaguete	81	70	60	37	77	133	144	113	130	169	170	118	1302
	Iloilo	46	25	30	46	122	258	302	341	263	252	173	101	1959
	Pto. Princessa	33	20	41	40	157	180	181	182	193	216	212	146	1601
	Romblon	118	51	59	76	126	202	245	242	234	312	240	214	2119
	Roxas	109	53	70	54	140	259	259	237	238	333	244	188	2184
Taghilaran	109	82	72	63	80	139	122	105	128	178	185	113	1376	
MINDANAO	Cag. de Oro	105	66	50	32	108	205	220	216	213	176	129	119	1639
	Cotabato	71	91	95	132	256	252	248	327	219	243	175	98	2207
	Davao	115	104	81	143	217	198	176	176	181	175	145	112	1823
	Gen. Santos	64	64	40	48	87	99	92	90	82	92	82	74	914
	Hinatuan	631	546	454	335	286	262	210	198	201	225	348	590	4286
	Jolo	105	99	86	153	224	232	198	163	197	248	207	141	2053
	Kabacan	95	119	70	103	202	222	178	183	191	196	217	163	1939
	Mati	124	129	98	68	110	155	117	112	114	137	133	121	1478
	Malaybalay	164	124	110	118	239	330	321	316	319	313	193	154	2701
	Surigao	632	495	373	244	171	133	173	151	155	267	433	592	3819
Zamboanga	45	46	42	55	95	141	141	138	144	178	114	77	1216	

Source: Adapted from Climate of the Philippines, PAGASA, September 1984.

2.2 Disaster History

The Philippine archipelago is subject to virtually every type of natural disaster. Typhoons hit with the greatest regularity, with an average of 20 entering the Philippine Area of Responsibility (PAR) each year and five or six making landfall. Flooding and landslides result from heavy rains associated with typhoons and the southwest monsoon. Because of its location in the circum-pacific seismic belt, the Philippines also experiences devastating earthquakes and volcanic eruptions. Tsunamis and storm surges overrun coastal areas. Drought occurs periodically, with the western and central sections of the archipelago most often affected. Epidemics, fires, and accidents also affect the nation.

Selected Disasters since 1975

Date	Disaster Type	Location	# Killed	# Affected	# Homeless	Damage (\$000)
05/17/76	Flood	Central Luzon	274	2,700,000	n.a.	85,000
			Comments: Typhoon Olga (Didang)			
08/16/76	Earthquake	Gulf of Moro	6,000	175,000	n.a.	134,000
			Comments: Earthquake followed by tsunami; 6,348 injured			
09/03/76	Volcanic Eruption	Taal Volcano	0	15,000	n.a.	n.a.
03/19/77	Earthquake	Northeastern Luzon	1	60,000	n.a.	100
			Comments: 30 Injured			
11/14/77	Typhoon	Northern Luzon	102	30,000	30,000	3,600
			Comments: Typhoon Kim (Unding)			
04/09/78	Fire	3 cities, including Manila	1	12,000	12,000	7,500
			Comments: 3 fires			
05/00/78	Volcanic Eruption	Albay Province	0	25,000	n.a.	n.a.
			Comments: Mt. Mayon			
10/26/78	Typhoon	Central Luzon	340	1,500,000	n.a.	115,000
			Comments: Typhoon Rita; 148 injured			
04/15/79	Typhoon	Leyte	18	480,000	44,500	10,000
			Comments: Typhoon Cecil; 40 injured			
11/06/80	Typhoon	Northern Provinces	101	775,000	229,000	102,300
			Comments: Typhoon Betty			

Selected Disasters since 1975 (cont'd)

Date	Disaster Type	Location	# Killed	# Affected	# Homeless	Damage (\$000)
01/00/81	Flood	Mindanao	228	300,000	n.a.	27,000
11/25/81	Typhoon	5 Islands	261	840,078	n.a.	35,000 Comments: Typhoon Irma; 95 injured
12/25/81	Typhoon	Samar/Mindoro/ Luzon	250	180,000	180,000	26,000 Comments: Typhoon Lee
03/23/82	Typhoon	6 Central Provinces	250	485,000	304,000	69,000 Comments: Typhoon Nelson; 31 injured
00/00/83	Drought	Misamis Oriental	0	200,000	0	n.a.
08/27/84	Typhoon	Northern Luzon and Central Philippines	1,062	768,329	328,341	125,300 Comments: Typhoons June and Ike; Ike was worst typhoon since 1970
09/10/84	Volcanic Eruption	Albay Province	0	70,000	n.a.	n.a. Comments: Mt. Mayon; damage to crops, water springs and roads
11/03/84	Typhoon	Visayas	862	1,495,738	765,965	96,400 Comments: Typhoon Agnes (Undang); 217 missing; 191 injured
03/00/85	Fire	Manila	0	15,000	10,000	n.a. Comments: Paco District; more than 2,000 families homeless
10/18/85	Typhoon	Central Luzon	81	1,183,600	n.a.	27,000 Comments: Typhoon Dot; Nueva Ecija, Tarlac, and Pampanga; 24 injured
10/21/85	Landslide	Southern Mindanao	300	n.a.	n.a.	n.a. Comments: Gold mining camps
07/09/86	Typhoon	Luzon	106	730,357	n.a.	33,700 Comments: Typhoon Peggy; northern and central Luzon, including Manila; extensive damage

Selected Disasters since 1975 (cont'd)

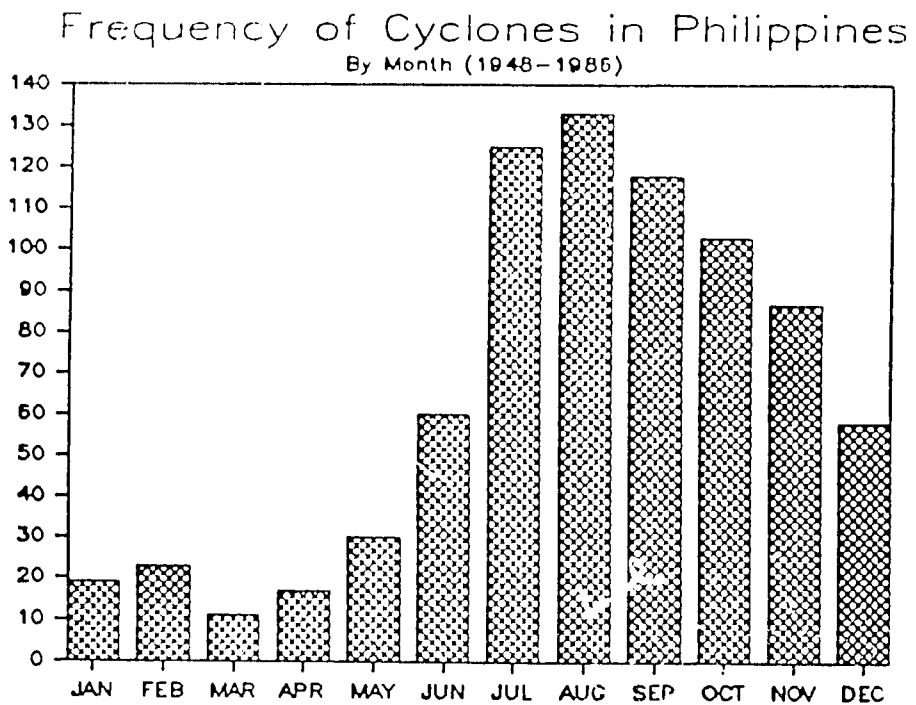
Date	Disaster Type	Location	# Killed	# Affected	# Homeless	Damage (\$000)
08/27/86	Typhoon	Luzon	23	482,700	n.a.	13,150
						Comments: Typhoon Miding; affected area included Metro Manila
00/00/87	Drought	18 Provinces	0	n.a.	0	n.a.
						Comments: Primary effect on employment
06/18/87	Earthquake	Kalinga-Apayo	7	n.a.	n.a.	n.a.
						Comments: 1 injured
08/12/87	Typhoon	Central Philippines	85	971,500	297,900	98,600
						Comments: Typhoon Betty (Herming); 9 missing; 425 injured
11/25/87	Typhoon	Bicol	882	1,818,185	n.a.	56,000
						Comments: Typhoon Nina (Sisang) and storm surge: especially Albay, Sorsogon, and Camarines Sur: damage to homes, crops, infrastructure
12/20/87	Ferry Accident	Off Mindoro	4,000	n.a.	0	n.a.
						Comments: Ferry Doña Paz collided with tanker in century's worst peacetime marine disaster

Source: OFDA Disaster History on file at the Office of U.S. Foreign Disaster Assistance in Washington, D.C. Covers 1900 to present.

2.3 Typhoons and Storm Surges

Typhoons - Typhoons are a yearly hazard in the Philippines. Most storms originate in the Caroline-Mariana Islands in the Pacific Ocean and move west-northwestwardly, often bringing very strong winds and heavy rains to the Philippine archipelago. Although these storms leave death and destruction in their wake, the beneficial aspects of typhoons must also be considered. About half of the country's rainfall is associated with typhoons and the less intense tropical storms and depressions. Even areas at considerable distance from a storm's center may experience increased precipitation.

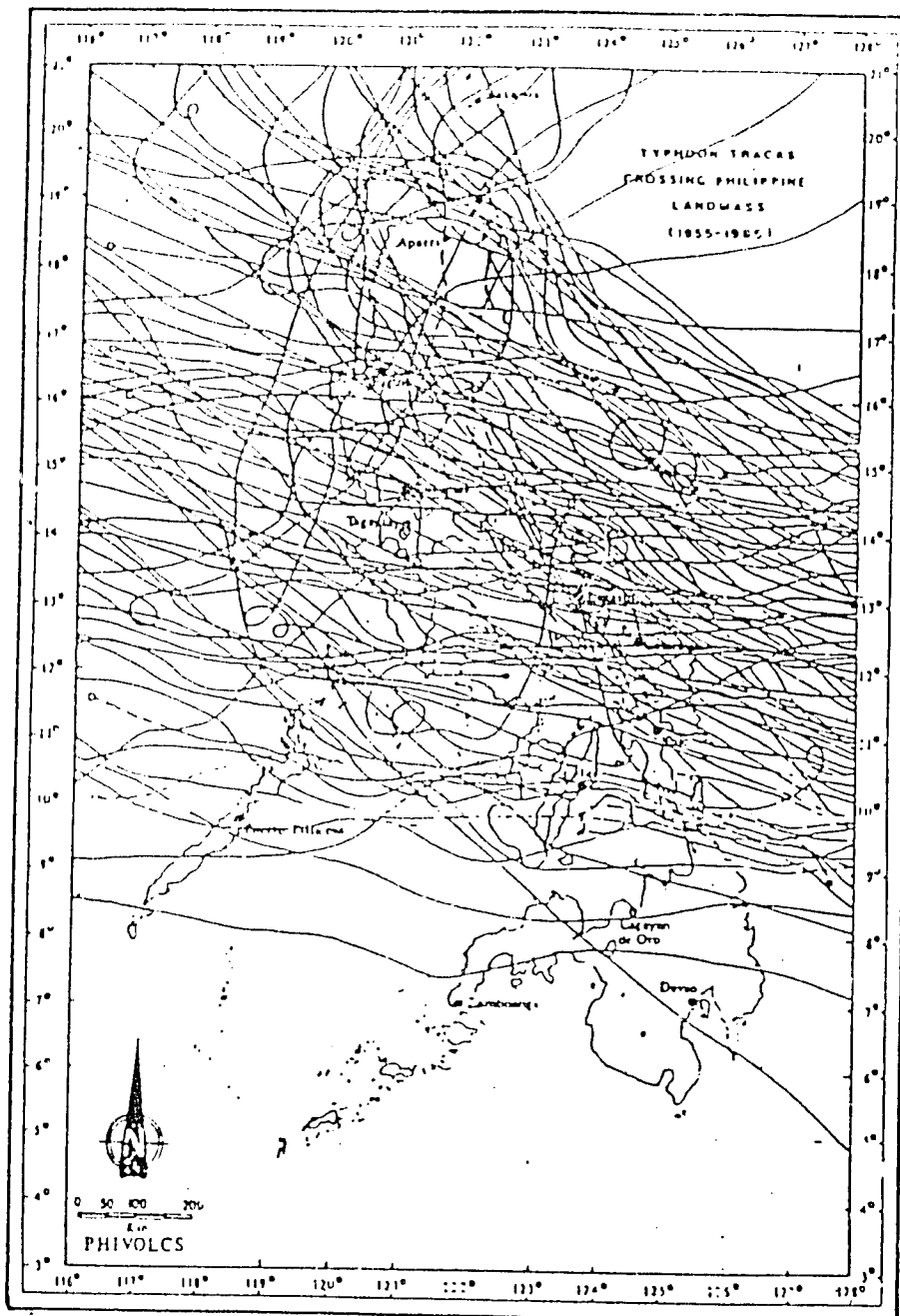
Some areas are more exposed to typhoons than others. The eastern and northern sections of Luzon and the eastern Visayan Islands are struck with greatest frequency and severity. Samar, Leyte, and the Bicol Peninsula, located in "typhoon alley," often receive the full brunt of these storms. Most of Mindanao, the southern Visayan Islands, and Palawan are outside the normal tracks, but even these areas are hit by an occasional severe typhoon.



Frequency of Tropical Cyclones in the Philippines Area of Responsibility

Source: Adapted from data in Program for Disseminating Public Information on Natural Hazards in the Philippines

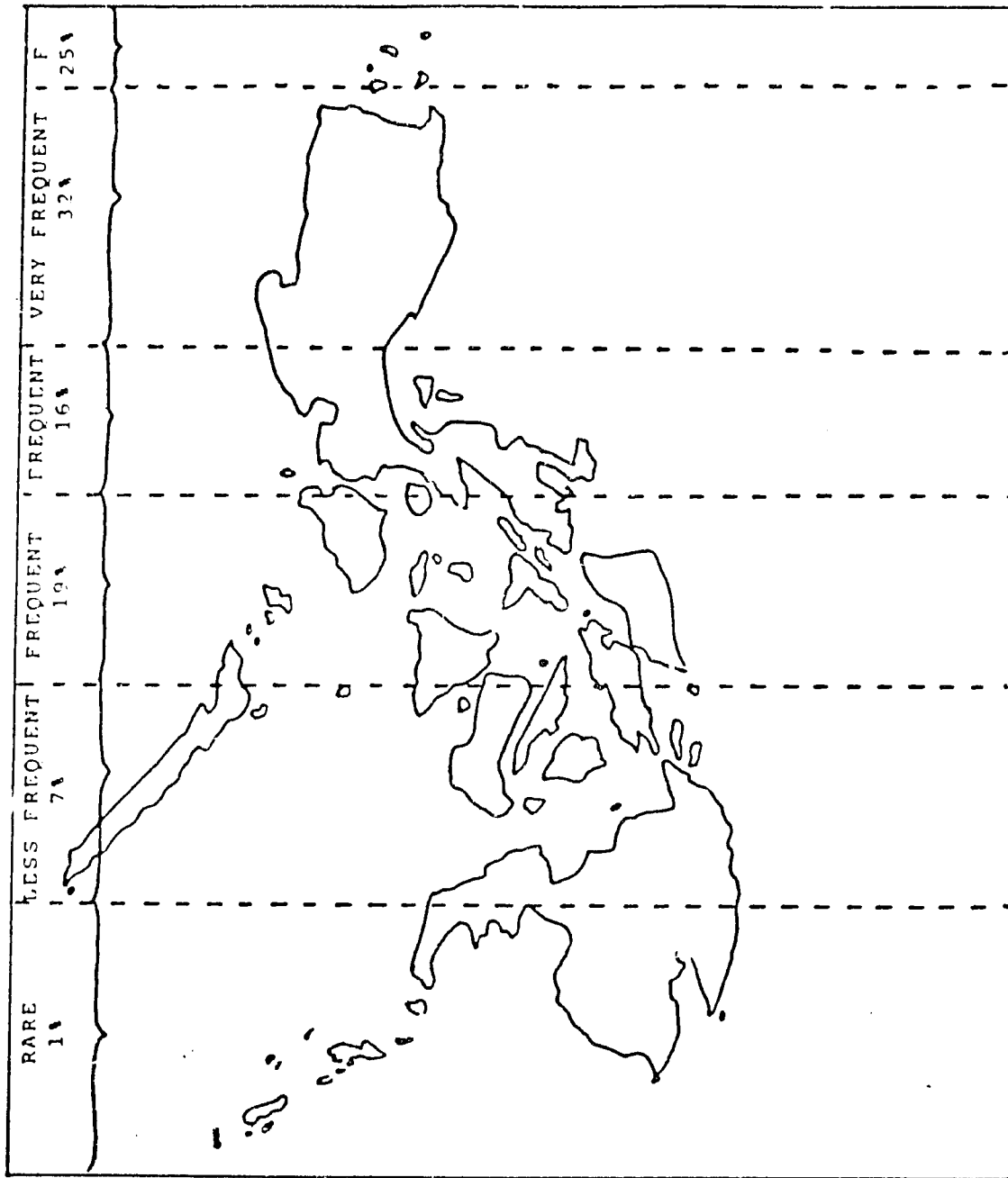
Fig. 2.a.



Source: Geologic Hazards and Preparedness Systems, PHIVOLCS

Map 2.b.

Frequency of Typhoons in the Philippines by Area



Source: Adapted from Climate of the Philippines, PAGASA

Map 2.c.

The tropical cyclone season in the Philippines ranges from June to December, with August the month of maximum frequency. Typhoons are rare but not unheard of during the January-to-May period. Early season (June to September) storms tend to pass through, or north of, the northern Philippines. As the season advances, storms follow more southerly tracks. According to OFDA's Tropical Cyclone Disasters in the Philippines, many of the more disastrous typhoons occur during the later months (October and November).

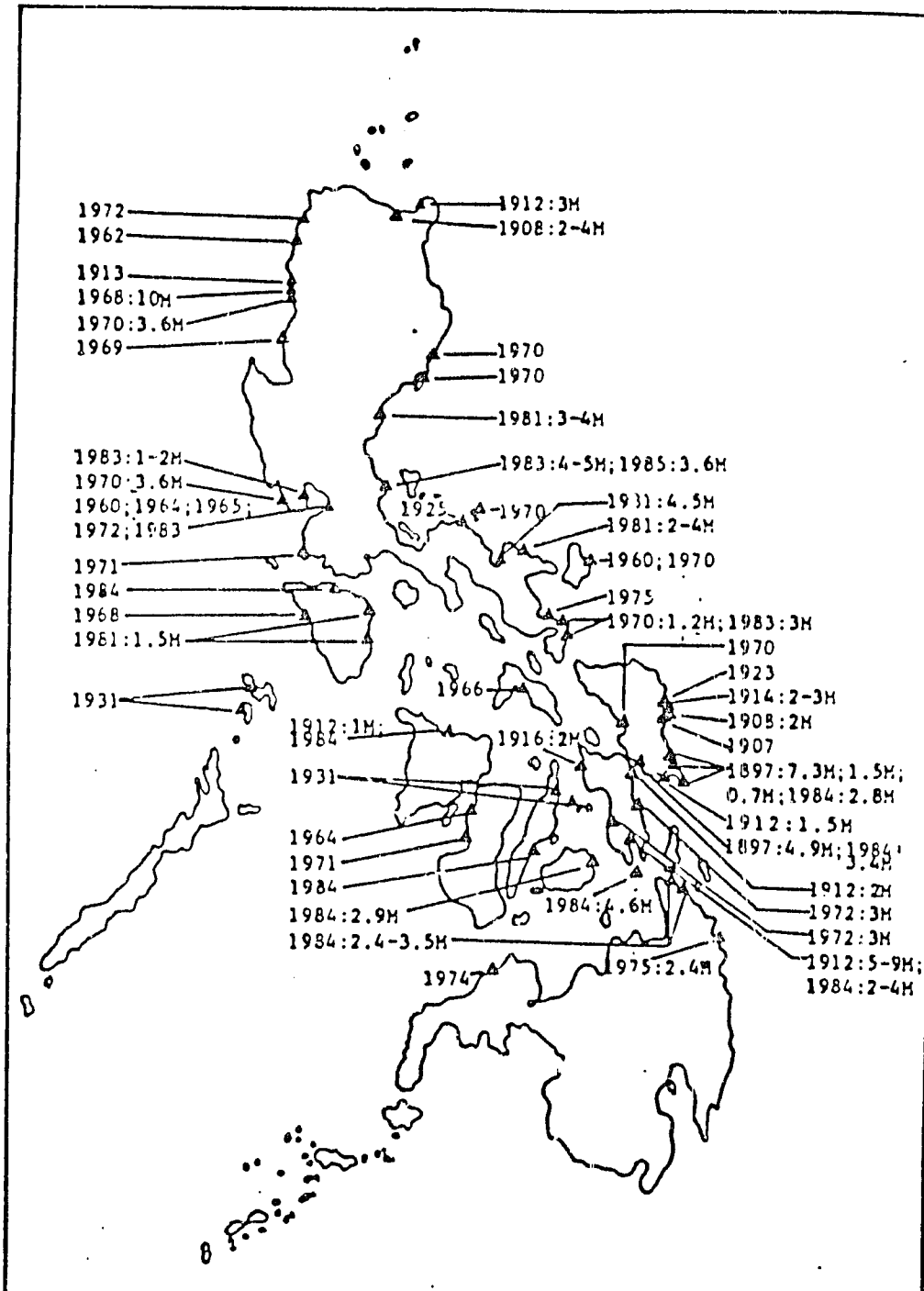
Typhoons surpass all other types of disasters in the Philippines in the number of lives lost and degree of damage inflicted. The Philippine Office of Civil Defense (OCD) compiled figures for the 1970-1986 period for all disasters. For those years the average annual damages from typhoons were as follows:

Dead	-	403.8
Missing	-	193.3
Injured	-	638
Houses destroyed	-	142,736
Houses damaged	-	299,925
Agricultural losses	-	P634,137,000 (about \$31.7 million)
Government property	-	P356,105,000 (about \$17.8 million)
Private property	-	P243,377,000 (about \$12.2 million)

Storm Surge - The majority of victims of tropical cyclones worldwide are claimed by storm surges rather than by winds. The Philippines has many areas subject to these deadly waves on both the eastern and western coasts. The surge occurs when the approaching storm's powerful winds cause the ocean water to literally pile up against the coastline. The coincidence of the storm with high tides exacerbates the surge. Other factors contributing to the height of the wave include (1) a concave coastline that prevents the rising water from moving laterally; (2) a fast-moving storm that does not allow time for the water to spread; and (3) shallow coastal waters.

Historically, numerous instances of damage and loss of life from a storm surge have been recorded in the Philippines. The storm surge accompanying a typhoon in October 1897 destroyed several towns and killed over 1,500 people in southern Samar and northern Leyte. More recently, a storm surge generated by Typhoon Irma in November 1981 swamped a village in Camarines Sur, killing at least 100 people. Many of the deaths from Typhoon Ike (Nitang) in September 1984 were from storm surge, and about 200 of the 882 victims of Typhoon Nina (Sisang) in the Bicol area in November 1987 drowned in a storm surge.

Areas Affected by Storm Surge in the Philippines
(Height in Meters)



Sources: Arafiles, C.P. et al. (1978); PAGASA Storm Surge Field Survey Reports (1981-1985), as cited in Program For Disseminating Public Information on Natural Hazards in the Philippines

Map 2.d.

According to OCD figures, the average annual losses from storm surge (1970-1986) were as follows:

Dead - 24.5
Missing - 5.2
Injured - 70.7
Agricultural losses - P19,363,000 (about \$968,000)
Government property - P4,337,000 (about \$217,000)

Frequency of occurrence: 3/16 (three instances during the 16-year period)

2.4 Volcanism

The plate tectonics theory explains much of the earth's volcanism. Volcanoes are usually concentrated at the boundaries of the huge moving plates that make up the earth's outer layer. When ocean plates converge along a subduction trench, magma (molten rock material) is generated and spurts to the earth's surface in parallel chains of coastal volcanoes. Diverging plates associated with ocean ridges trigger volcanic activity by allowing magma to rise through the resulting fractures. Volcanism may also occur in "leaky" transform faults in which crustal plates slide past one another.

In the case of the Philippines, some volcanism may be explained by leaky transform faults, but most is associated with the deep oceanic trenches bounding the archipelago. Several types of eruption are exhibited by Philippine volcanoes, the following five types being the most common: (1) strombolian - effusion of molten lava in a weak to violent eruption and showers of ejecta (bombs, cinders) but relatively minor amount of ash; (2) vuicanian - explosive eruption of ash and block in a high voluminous cloud, propelled by the release of large quantities of accumulated magmatic gas; (3) peléan - eruption of pyroclastic materials resulting from the release of large quantities of gas from extremely viscous magma and characterized by the presence of a nuée ardente or glowing avalanche (a fiery cloud of ash and pumice suspended in hot gases); (4) phreatomagmatic - eruption caused by the ejection of magmatic gases and steam, mixed with water, ash, and fresh magmatic ejecta in a high eruption column, having a radially spreading ring-shaped horizontal cloud at the base; and (5) phreatic - explosion driven by steam, involving the ejection of water, steam, and ash but no fresh magmatic material. Most volcanoes have a characteristic habit of eruption, although more than one type may occur in a particular volcano. Lahars--mudflows of volcanic debris during periods of heavy precipitation---are another hazard in some Philippine volcanoes.

The Philippine archipelago has more than 200 volcanoes, 21 of which have erupted in historic times and are considered active. Mayon and Taal are the most active, followed by Hibok-Hibok, Bulusan, and Canlaon. An examination of the geology and history of each of these five most active volcanoes, as well as of the density of population in threatened areas, will give an indication of the potential for disaster.

Mt. Mayon, in Albay Province some 300 km. southeast of Manila, dominates the landscape of the region with its nearly symmetrical cone. A stratovolcano, or composite cone, reaching about 2,462 m. above sea level, Mayon consists of deposits formed by four types of volcanic activity: airfall deposition, pyroclastic flows, rain-triggered debris flows, and lava flows. Mayon's eruptions are typically "vulcanian," characterized by the emission of fine ash and ash-laden gases in high "cauliflower" clouds.

Mayon has erupted at least 43 times since 1616, the most violent explosion having occurred on February 1, 1814, when over 1,200 people were killed and the towns of Camalig, Cagsawa, Budiao, and Guinobatan were severely damaged. A population of about 74,000 people living in a 6-10 km. radius of the volcano was affected to some degree by the most recent eruption in 1984. Thousands of homes were destroyed. The towns bordering Mt. Mayon and potentially at risk include Camalig, Guinobatan, Daraga, Legaspi, Santo Domingo, Ligao, and Malilipot.

Taal Volcano is located in the province of Batangas in the volcanic region of southwest Luzon. One of the lowest volcanoes in the world at a height of 311 m. above sea level, Taal is situated on an island in Taal Lake, itself a caldera formed by the collapse of pre-historic volcanic centers.

Taal has 35 identified cones formed by different types of volcanic activity: base surges (rapidly moving mixtures of volcanic debris and steam), airfalls, and effusion of lava. Twelve of Taal's eruptions occurred at the main crater in the central portion of the island between 1749 and 1911. There are also five major flank eruptive centers from which more recent eruptions have emanated. Most of Taal's eruptions are believed to have been phreatic (steam-driven explosions) or phreato-magmatic (steam and molten lava). The 1968 and 1969 eruptions, however, were strombolian with lava fountaining and effusions of molten rock.

Taal has had 33 recorded eruptions since 1572, the most catastrophic of which occurred in 1754 and 1911. The 1754 eruption destroyed the towns of Sala, Tanauan, and Taal on the lake shore. Volcano Island was devastated by the 1911 eruption which killed 1,334 people. Ash fall-out covered an area of 2,000 sq. km., extending as far as Manila (about 60 km.).

Volcano Island had a population of 3,631 in 1987 and a high growth rate. Evacuation in the case of an impending eruption would be complicated by the need to transport the entire population across the lake to the mainland. Coastal barangays potentially at risk had a total population of 81,333 in 1987.

Bulusan Volcano, in south-central Sorsogon Province, is part of the Bicol volcanic chain, extending from Camarines Norte in the north to Sorsogon in the south. The 1,559-m.-high volcano is classified as composite and is made up of lava flows and domes.

Bulusan's eruptive history shows periods of activity alternating with relatively long periods of quiescence. A lull in activity of 34 years followed the first recorded eruption in 1852. Eruptions in 1886, 1892, and 1894 were followed by a lapse of 22 years before new activity began in 1916. A series of eruptions occurred between 1916 and 1933, after which the volcano rested for another 45 years. A sudden ejection of ash-laden steam clouds on June 28, 1978, was blown by winds as far as Barcelona, 15 km. to the northeast. Mild phreatic eruptions have continued intermittently to the present time.

About 60 barangays in six municipalities (Barcelona, Bulusan, Casiguran, Gubat, Irosin, and Juban), with a combined population of over 78,000, lie within a 4-10 km. vulnerability zone.

Canlaon Volcano, rising to 2,435 m. in the north-central part of Negros Island, is part of the volcanic arc related to subduction along the Negros Trench. The volcano has a summit-collapse caldera at its center and numerous craters and parasitic cones. The edifice was formed by airfall deposits, lava and pyroclastic flows, and lahars.

Canlaon has erupted at least 21 times since the earliest recorded activity in 1866. A March 1985 phreatic eruption was followed by several more ash and steam explosions. Higher levels of seismic activity since that time and a general inflation trend may portend a future magmatic eruption.

Settlers on Canlaon's slopes and in the barangays of La Castellana, La Carlotta City, and Canlaon City are potentially at risk from future eruptions. The total population of these areas in 1987 (based on projections of the National Census and Statistics Office) was 34,614.

Hibok-Hibok is one of several volcanoes on Camiguin Island, located about 10 km. off the north coast of Mindanao. Other prominent peaks include Mt. Vulcan, Mt. Mambajao, Mt. Uhay, and Guinsiliban Peak. After a long period of dormancy (since 1902), Hibok-Hibok suddenly erupted in September 1948 and continued its activity until 1953. The most destructive phase of this eruptive period occurred on December 4, 1951, when a glowing avalanche, or nuée ardente, rushed downslope toward the municipality of Mambajao. The speed and intense heat (800°C) of the nuée ardente meant that nothing in its path could escape. Trees and houses

were incinerated and people and animals were charred or mummified. Possibly as many as 3,000 lives were lost. This typically "peléan" eruption is considered the most dangerous type of eruption. Other hazards posed by Hibok-Hibok include steam blasts, lava flows, earthquakes, and mudflows.

The area within a radius of 3 km. from Hibok-Hibok's crater is considered a high risk zone, but the entire portion of Camiguin Island north of a line connecting barangay Tangaro in Catarman municipality and barangay Tupsan in Mambajao is considered a potentially dangerous area. A total of 588 people lived within 4 km. of the volcano in 1987, part of the nearly 20,000 population within a 10-km. radius.

The following are active volcanoes that have erupted since 1800:

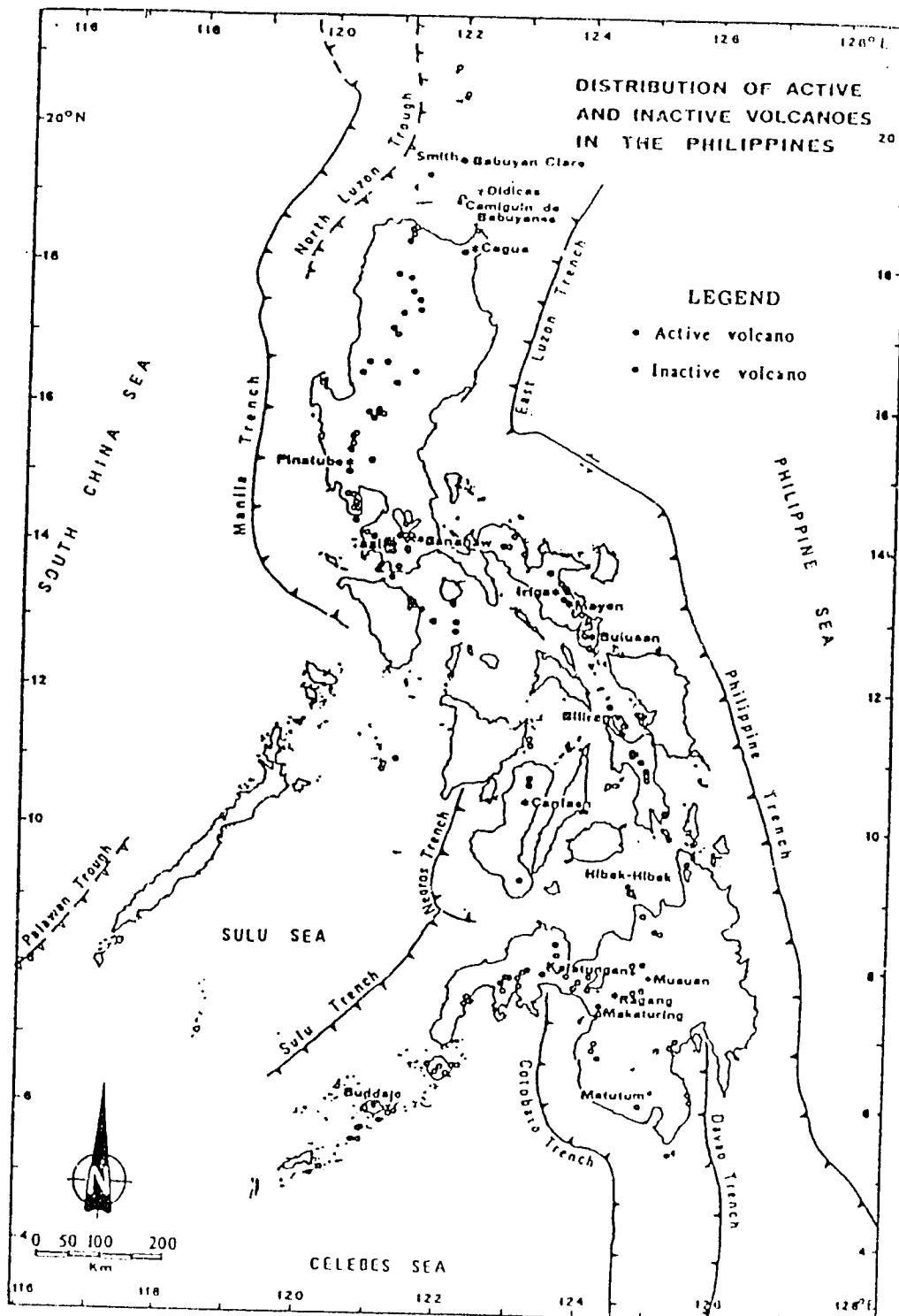
<u>Name</u>	<u>Height above Sea Level (m.)</u>	<u>Location</u>	<u>Last Eruption</u>
Babuyan Claro	837	North of Luzon	1931
Bulusan Volcano	1,559	Southeast Luzon	1988 (mild)
Mt. Cagua	1,158	Northeast Luzon	1907
Calayo (Musuan)	646	Mindanao	1886-87
Camiguin de Babuyanes	712	Luzon	1857
Canlaon Volcano	2,435	Negros	1986
Didicas Volcano	240 (edifice- 800)	North of Luzon	1978
Mt. Hibok-Hibok	1,332	Mindanao	1948-53
Jolo Volcano	811	Sulu Islands	1897 (submarine)
Mt. Mayon	2,462	Southeast Luzon	1984
Mt. Ragang	2,815	Mindanao	1916
Smith Volcano	6 (edifice- 610)	North of Luzon	1924
Taal Volcano	311	Luzon (Volcano Island)	1976-77

Although the hazards associated with the five most active volcanoes are well known, the potential danger associated with other active volcanoes or the reawakening of an inactive volcano is a matter of great concern to Philippine volcanologists. Some of the most violent eruptions have occurred after a volcano has had a long period of repose.

The average annual losses from volcanic eruption, according to OCD figures (1970-1986):

Dead - 0
 Agricultural losses - P 2,750,000 (about \$138,000)
 Government property - P 1,312,000 (about \$66,000)

Frequency of occurrence: 3/16



Source: Geologic Hazards and Preparedness Systems, PHIVOLCS

Map 2.e.

DESTRUCTIVE VOLCANIC EVENTS IN THE PHILIPPINES

YEAR	VOLCANO	ACTIVITY	CASUALTIES	PROPERTY DAMAGE
1572	Taal	Eruption		Crops destroyed
1628	Iriga	Avalanche	?	Old Buhi buried
1716	Taal	Eruption		Fish killed
1730	Banahao	Eruption	?	Old Sariaya damaged
1731	Taal	Eruption		Fish killed
1740	Taal	Eruption		Agricultural lands damaged; fish killed
1754	Taal	Eruption	Dead: 12	All animals on the island killed; total damage to old Taal, Lipa, Talisay and Sala
1776	Mayon	Eruption (Mudflow)	Dead: 46 Dead: more than 1,000	Agricultural areas damaged
1800	Mayon	Eruption		Budiao and Cagsawa destroyed
1808	Taal	Eruption		Much damage to neighboring towns
1814	Mayon	Eruption	Dead: 1,200	Three barrios totally damaged; heavy damage to Santo Domingo, Ligao, Guinobatan, Tabaco and Tiwi
1827	Mayon	Eruption		Thousands rendered homeless
1835	Mayon	Eruption		Carabaos and oxen killed
1853	Mayon	Eruption	Dead: more than 34	
1866	Canlaon	Mudflow		Plantations destroyed
1871	Mayon	Eruption	Dead: 3	Farmlands in Camalig and Guinobatan damaged
1871	Hibok-Hibok	Eruption	Considerable	Complete destruction within 3 km. from volcano
1874	Taal	Eruption		All livestock killed
1875	Mayon	Mudflow	Dead: 1,500	Heavy destruction
1886	Mayon	Eruption	Dead: 15	Santo Domingo and Legaspi severely damaged; 500 carabaos killed
1897	Mayon	Eruption	Dead: 350	Completely destroyed 4 barrios and part of 3 barrios in Santo Domingo; houses buried and farmlands became wastelands

DESTRUCTIVE VOLCANIC EVENTS IN THE PHILIPPINES

YEAR	VOLCANO	ACTIVITY	CASUALTIES	PROPERTY DAMAGE
1911	Taal	Eruption	Dead: 1,355 Injured: 199	Devastated 360 km. area
1915	Mayon	Mudflow		Property damaged
1948	Hibok-Hibok	Eruption		
1951	Hibok-Hibok	Eruption	Dead: 500	Trees and houses burned
1965	Taal	Eruption	Dead: 235	Destruction within 50 km.
1968	Mayon	Eruption Mudflow	Dead: 1	Thousands evacuated Damaged part of Camalig and Guinobatan
1969	Didicas	Eruption	Dead: 3	
1978	Mayon	Eruption		23,000 evacuated
1980	Malinao	Tiwi hot spring hydrothermal eruption		Total damage to 2 buildings; partial damage to Tiwi Hotsprings National Park; 7 families resettled
1981	Mayon	Mudflow	Dead: 40 Injured: 7 Missing: 9	Heavy damage in Legaspi
1984	Mayon	Eruption Mudflow	Injured: 4	70,000 evacuated; thousands rendered homeless; damage to crops, infrastructure, livestock, and houses totaled more than 55 million pesos
1985	Canlaon	Eruption		
1986	Canlaon	Eruption		

Source: Philippine Institute of Volcanology and Seismology (PHIVOLCS).

2.5 Seismicity

The Philippine archipelago is one of the most seismically active areas in the world, experiencing at least five imperceptible to perceptible earthquakes a day. The tectonic features generating this seismicity are the extensive subduction zones east and west of the islands and a major left-lateral, strike-slip fault, known as the Philippine Fault, extending nearly the length of the archipelago.

Various studies have been conducted to delineate seismic source zones in the Philippines. The following chart is based on the work of Father Sergio Su of the Manila Observatory in preparing seismic zone maps and on that of Lolita Garcia and co-workers at the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA) in preparing a seismotectonic map.

Division	Earthquake Generator	Philippine Seismicity (%)
Zone 1	East Luzon Subduction Zone	6.61
Zone 2	Philippine Trench	60.50
Zone 3	Philippine Fault	0.86
Zone 4	Double forearc associated with Manila Trench	12.08
Zone 5	Manila Trench	1.57
Zone 6	Negros and Sulu Trenches	4.31
Zone 7	Cotabato Trench and the northern extension of the Molucca Sea plate	14.07

As can be seen from the above list, the Philippine trench system is the most active of the major tectonic features. Many of the most destructive earthquakes in the Philippines have been associated with this subduction system, including major quakes in the Bicol region and in Samar, Leyte, and Mindanao. This trench is capable of producing great earthquakes (8.0 and above on the Richter scale).

Seismic activity is also high in the double forearc system associated with the Manila trench. Damaging earthquakes have been generated by this subduction system, which poses the major threat to the densely populated Metro Manila. Because of Manila's location on a thick alluvial plain, soil amplification in a strong earthquake is likely to be high.

Seismicity is relatively low in the Negros-Sulu arc systems, but major earthquakes have occurred there. The system extends from the island of Panay in the north to Sabah on the island of Borneo and includes Negros, the Zamboanga Peninsula, and the Sulu Archipelago.

Activity is infrequent along the Philippine fault which, however, is capable of generating devastating earthquakes. Since this fault extends from northwest Luzon to southern Mindanao and beyond, the area and population potentially at risk is great.

The possibility for catastrophe increases when there are large concentrations of people in an urban area that is subject to earthquake. In addition to Manila, cities "at risk" (having an average return period for occurrences of intensity VII MM* of less than four years) include the following:

<u>City</u>	<u>Island</u>	<u>Population (1980)</u>
Bacolod	Negros	262,400
Cagayan de Oro	Mindanao	227,300
Davao	Mindanao	610,400
Iloilo	Panay	244,800
Zamboanga	Mindanao	343,700

Cebu, with a population of 490,300 in an urban area of 1-2 million, is less at risk than the above cities but is not exempt from the possibility of a damaging earthquake.

The OCD figures (1970-1986) for the average annual losses from earthquakes are as follows:

Dead - 5.3
 Missing - 0
 Combined government and private
 property losses - P 1,403,000 (about \$70,000)

Frequency of occurrence: 4/16

A thick catalog of Philippine earthquakes compiled as part of the SEASEE project is a disturbing reminder of the recurring nature of this type of disaster. As part of that comprehensive study, a total of 63 events were included in a catalog of the most destructive earthquakes in the Philippines between 1589 and 1983. The following is a sampling of the earthquakes included on the "most destructive" list.

* The Modified Mercalli scale (MM) was used in the reports prepared for the project titled "An Earthquake Hazards Mitigation Program in Southeast Asia", begun in 1982 under the auspices of the Southeast Asia Association of Seismology and Earthquake Engineering (SEASEE). (See Appendix D). The Philippines usually uses an adapted Rossi-Forel scale to measure intensity (Appendix E).

Selected Earthquake Disasters in the Philippines

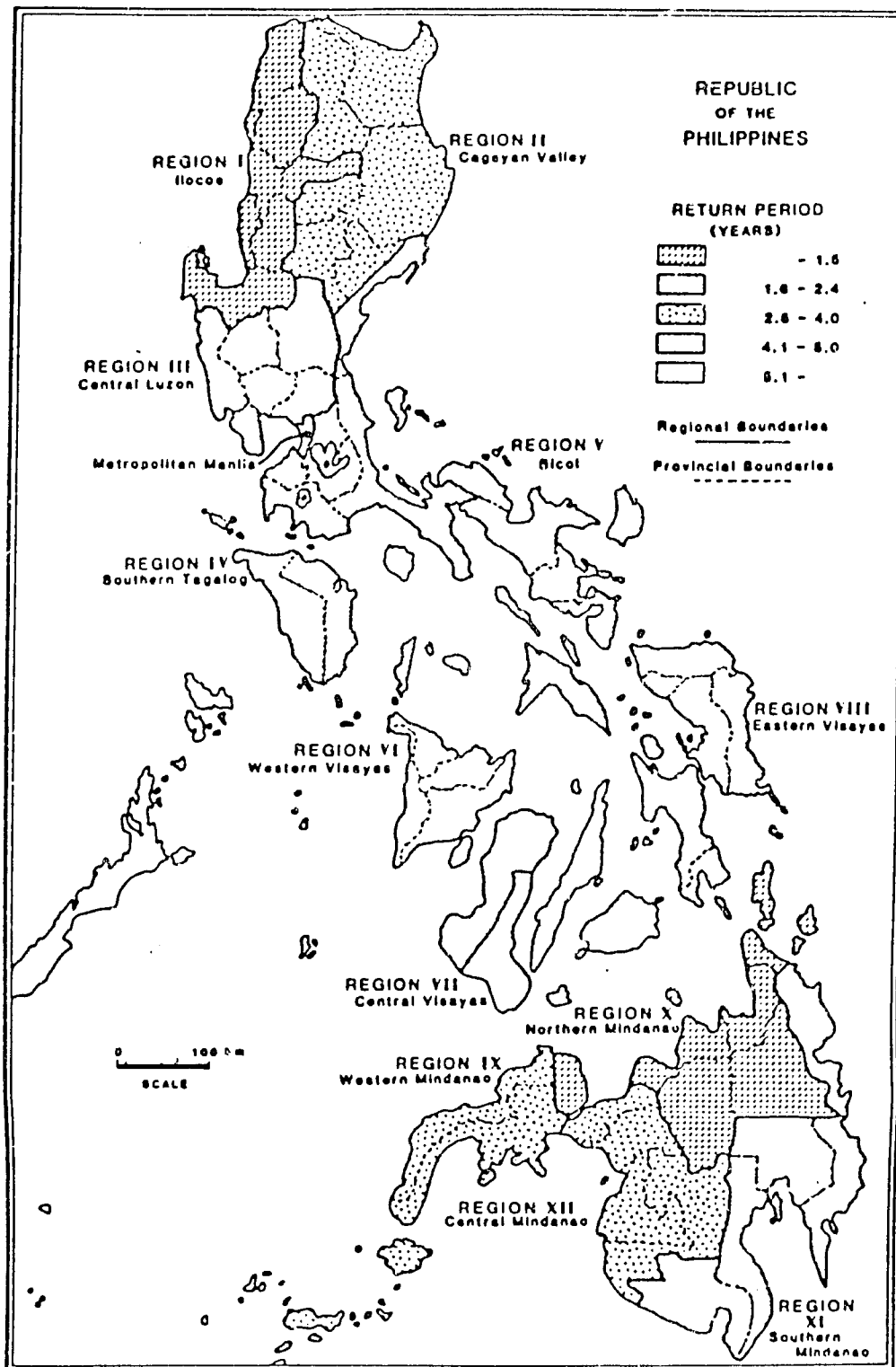
<u>Date</u>	<u>Areas Affected</u>	<u>Highest Intensity (MM)</u>	<u>Casualties</u>	<u>Damage</u>
Nov. 30, 1645	Manila and neighboring provinces	X	Dead: 3,000	Toppled stone buildings, including Manila Cathedral
July 13, 1769	Panay Island; Iloilo and Capiz	X	Several casualties	Stone churches and houses destroyed; fissures in the earth
March 22, 1840	Sorsogon, Albay	X	Dead: 17 Injured: 200	Churches and homes destroyed
June 3, 1863	Manila, Bulacan, Pampanga	X	Dead: 320 (Manila)	1,170 structures destroyed or damaged in Manila, including Cathedral
July 1, 1879	Mindanao; Surigao, Anaoan, Mainit	X		Damage to structures; earth dislocations; part of lake sank
July 18, 1880 (strong aftershock on July 20)	Luzon; felt over wide area	X		San Antonio destroyed; 230 buildings damaged in Manila
Sept. 21, 1897	Mindanao; Zamboanga, Basilan, Jolo, Cotabato; also Panay and Negros	IX		Heavy damage to stone buildings; tsunami generated by second earthquake swept away villages
July 12, 1911	Agusan Valley; felt throughout all of Mindanao, Sulu and Visayas	X		Damage to structures, even to those made of wood and thatch; trees thrown down; ground fissured; river waters disturbed
Aug. 15, 1918	Southern Mindanao	IX - So. Cotabato X - Gian	Dead: at least 100	All houses destroyed or damaged in S. Cotabato; landslides, tsunami caused many deaths

Selected Earthquake Disasters in the Philippines

<u>Date</u>	<u>Areas Affected</u>	<u>Highest Intensity (MM)</u>	<u>Casualties</u>	<u>Damage</u>
April 14, 1924	Mati in SE Mindanao	IX		Fissures and landslips; tsunami damaging along coast of Surigao and in northern Agusan Valley
Jan. 25, 1948	Panay; Iloilo City, Antique	IX		Repeated shocks over 47 days left 55 churches in ruins; historic buildings in Iloilo and Antique destroyed
July 2, 1954	Sorsogon, Bucon, Legaspi	IX	Dead: 13 Injured: 101	Damage to old structures, water pipes, communication lines
April 1, 1955	Mindanao; Lanao, Ozamis City (1,400 sq. km. area affected)	X	Dead: 400	Seiche in Lake Lanao and landslides; 85% of buildings in Lanao town demolished; many deaths from drowning when portion of town slipped into lake
Aug. 2, 1968	Casiguran, Nueva Vizcaya, Manila, (felt throughout Luzon and N. Visayas)	IX	Dead: at least 200 Injured: 261	Landslides, earth fissures, upheaval in Manglad River; severe damage to many modern multi-story buildings in Manila, especially those on alluvial deposits; heavy casualties in total collapse of six-story Ruby Tower
April 7, 1970	Eastern Luzon (shook all of Luzon and N. Visayas)	IX	Dead: 14 Injured: hundreds	Heavy damage to buildings, roads in Baler and other towns close to epicenter; scores of buildings damaged in central Manila; communications lines disrupted; railway water tank (40,000 gal.) collapsed in Naga; tsunami on Pacific coast
March 17, 1973	Ragay Gulf (macroseismic area of 157,000 sq. km.)	XI		Damage to buildings, roads, bridges, rail tracks, communications lines, electric and water systems in Tayabas Isthmus; 98 buildings destroyed, 270 damaged in worst-hit town of Calauag; minor damage in Manila at Intensity VI

Selected Earthquake Disasters in the Philippines

<u>Date</u>	<u>Areas Affected</u>	<u>Highest Intensity (MM)</u>	<u>Casualties</u>	<u>Damage</u>
Aug. 17, 1976	Moro Gulf, Zamboango del Sur, Lanao del Norte, Lanao del Sur, Cotabato, Sultan Kudarat, Maguindanao	X	Dead: up to 6,000 Injured: over 6,000 (figures vary in different reports)	Strong earthquake damaged buildings and infrastructure; great destruction and loss of life from tsunami



Thirteen Philippine regions and average return periods for an occurrence of a site intensity of VII MM. Areas left blank are without data or aseismic.

Source: SEASEE, Series on Seismology, Vol. 1, Summary, 1986.

Map 2.f.

Tsunami and Seiche - As can be observed in the above list of past damaging earthquakes in the Philippines, tsunamis have often been a secondary hazard. These large sea waves are generated by underwater or near-shore earthquakes or volcanic eruptions. The source may be a distant seismic event or a local one. Typically, the large waves of a tsunami are preceded by the lowering of the water level beyond the lowest tidal levels attained for an area. The several cycles of large waves following the initial retreat may reach heights of several meters above normal sea level and extend considerable distances inland.

The coastal areas of Mindanao facing the Celebes Sea are particularly vulnerable to tsunamis. (See map of tsunami-prone areas.) Inundation heights of 2.0 m. to 4.5 m. were reached by the tsunami following the Moro Gulf earthquake in 1976.

A seiche is an oscillation of the surface of an inland body of water generated by an earthquake, volcanic eruption, or landslide. The April 1955 Lanao earthquake produced a dramatic seiche in Lake Lanao.

The average annual losses from tsunamis as compiled by the OCD (1970-1986) are as follows:

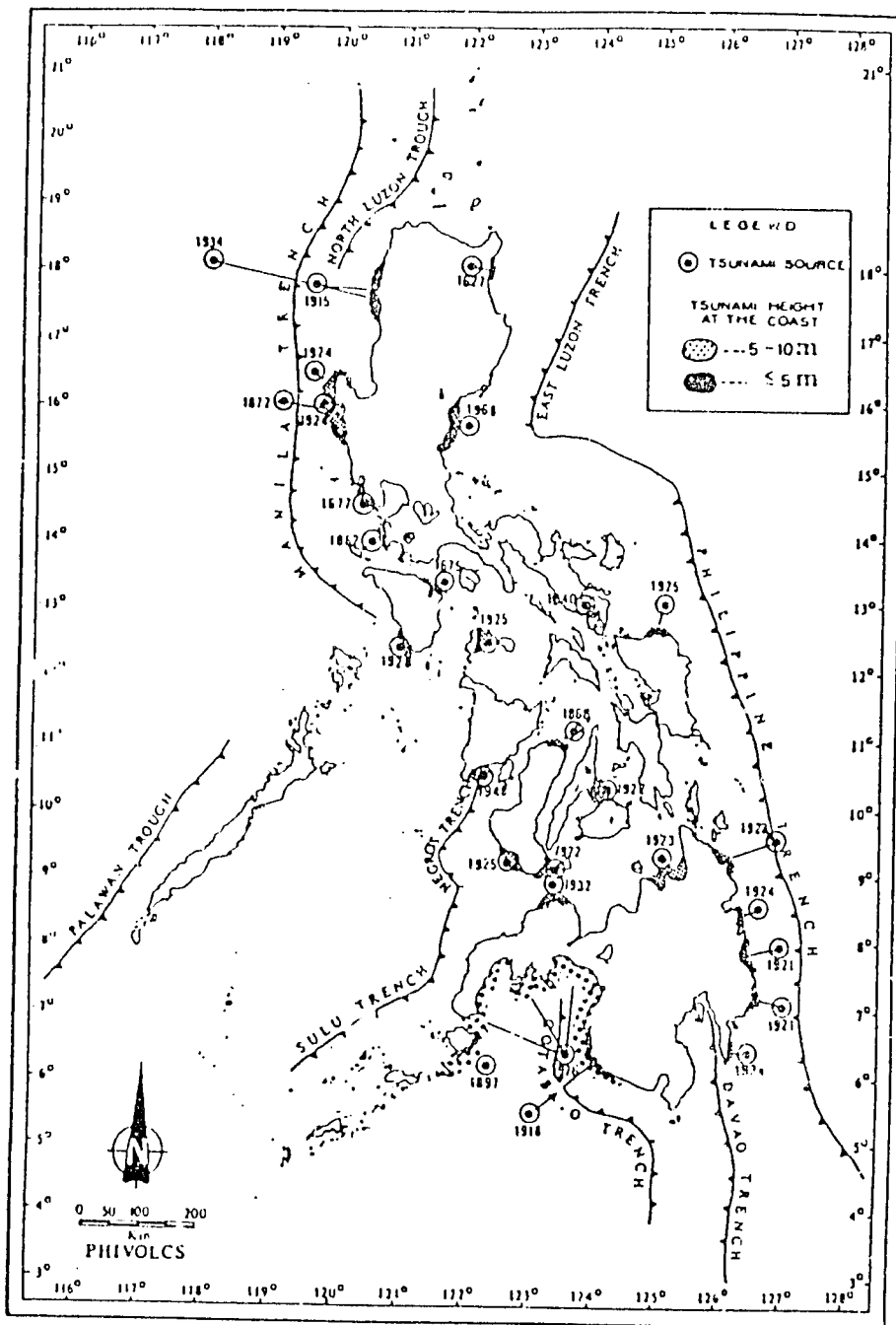
Dead - 237
Missing - 1,121
Injured - 577.5
Agricultural losses - P 128,000 (about \$6,000)
Government property - P 11,432,000 (about \$572,000)
Private property - P 3,873,000 (about \$194,000)

Frequency of occurrence: 1/16 (includes Moro Gulf tsunami)

2.6 Floods

The Philippines suffers considerable flood damage every year and is subject to all the major types of flooding: flash flooding in torrential rains of short duration; coastal flooding in areas affected by storm surge and tsunamis; river flooding caused by the heavy and continuous rains associated with typhoons and cyclical monsoons; and dam breaks and spill flooding resulting from prolonged rainy conditions.

Most of the country is vulnerable to this type of disaster, with the flood plains of major rivers most frequently affected. Metro Manila is especially prone to flooding because of its topographic and hydrologic conditions (low-level areas and low gradient of the Pasig River) combined with an inadequate drainage system. The removal of protective cover of forests in many watershed areas in the Philippines has aggravated flooding



Tsunami-Prone Areas

Source: Geologic Hazards and Preparedness Systems, PHIVOLCS

Map 2.g.

by allowing the rapid runoff of rainfall from hillsides and by contributing to silting in rivers and reservoirs. The presence of squatter communities on riverbanks increases the danger by diminishing the storage capacity of rivers and putting large numbers of people immediately at risk.

A brief description of some of the floods of recent years will give an indication of the great loss of life and damage associated with this type of disaster.

One of the worst floods in Philippine history occurred in July 1972 as a result of record-breaking monthly rainfall. In some stations in Manila and Baguio, total rainfall was about five times the mean value for the month. The increase in precipitation was attributed partly to an increase in tropical disturbances (four in July) which enhanced an already intense monsoon flow. Most affected was the Pampanga River Basin in the Central Luzon Plain. Low-lying areas in Pampanga and Bulacan were transformed into one vast sea in which only the rooftops of houses and treetops were discernible. All streets in Manila were submerged. Laguna de Bay in southwestern Luzon, the country's largest lake, overflowed its banks and inundated surrounding towns. Over 600 people died in the floods, 370,647 were left homeless, and 250,000 ha. of rice and other crops were damaged. The same general area of Central Luzon was affected by floods again in August 1974 during prolonged and intense monsoon rains. The most serious flooding in 1974 was along Manila's drainage canals which were congested by thousands of squatter shanties.

In October 1978, severe flooding associated with a typhoon and aggravated by the release of impounded water from Angat Dam took hundreds of lives and caused heavy damage downstream of the damsite in Bulacan.

Floods caused by six weeks of continuous rain killed more than 200 people and covered 200,000 ha. of agricultural land in Mindanao in January 1981.

Manila and other areas of Luzon were inundated by floodwaters after Typhoons Gading and Miding crossed the country in the summer of 1986 and caused monsoon rains to intensify. Thousands of hectares of cropland were damaged and at least 50,000 people had to be evacuated from their homes.

The OCD compiled the following figures for the average losses from floods (1970-1986):

Dead - 39.18
Missing - 16.6
Injured - 90.6
Agricultural losses - P 9,357,000 (about \$468,000)
Government property - P 18,563,000 (about \$928,000)
Private property - P 5,839,000 (about \$292,000)

Frequency of occurrence: 11/16

2.7 Landslides

The upheaval of the land in earthquakes and the deluges produced by heavy and prolonged rains often loosen rocks and soil on hillsides to create landslides or mudflows. Many areas are at risk in this mountainous country.

The area around Baguio, a popular resort city at an elevation of 1,460 m. in the Central Cordillera, is prone to landslides, but there are similar risks elsewhere in Luzon and the rest of the archipelago.

In a recent event in October 1985, a landslide following downpours in southern Mindanao buried 300-400 people (prospectors and their families in the gold mining area of Davao del Norte).

Debris flows (lahars) associated with volcanoes are a related hazard. This geological phenomenon occurs when exceptional rainfall induces slope failure and sends water and volcanic debris rushing down river channels. (See also section 2.4, Volcanism.)

Mayon Volcano, in the typhoon-prone Bicol Peninsula, has a history of lahars. The worst damage caused by Tropical Storm Kelley (Daling) in July 1981 was from a mudflow on Mayon Volcano unleashed by rain and winds. Boulders and volcanic debris cascaded down the slopes of the volcano to a distance of 6 km. from the foot of the mountain, taking many lives and destroying property. Lahars following the 1984 eruption of Mayon also caused considerable damage.

The following are the OCD figures for average annual landslide damage (1970-1986):

Dead - 5.2
Missing - 0
Injured - 6

Frequency of occurrence: 7/16

(Note: These figures may not include lahars.)

2.8 Drought

Drought is less common in the Philippines than many other natural disasters. However, droughts do occur periodically, affecting most often the western and central locations that normally experience a fairly long dry season.

The usual year-to-year variations in precipitation have significant effects on agricultural production, particularly for lowland rice which requires a great amount of moisture. The expansion of irrigation in recent years has provided some protection against inadequate rainfall and increased the area cultivated. Although the country has achieved self-sufficiency in rice production, imports have been necessary in years following particularly severe droughts such as those in 1983 and 1987. The Philippines expected to import some 200,000 MT of rice in 1988.

Scientists have observed a connection between drought conditions in the western Pacific and El Niño events. El Niño is a periodically occurring phenomenon characterized by higher than normal sea surface temperatures over a large expanse of the central and eastern equatorial Pacific. The phenomenon has been linked with climatic anomalies on a global scale. The two major periods of drought in the Philippines in this decade have been during El Niño years. Some areas of the Philippines experienced a prolonged drought in 1982-83, resulting in extensive crop failure. In 1987, a total of 183,600 ha. of rice and corn crop area were affected by drought, of which 41,900 ha. were totally ruined. Most of the country suffered some effects during the six-month period from December 1986 to June 1987; however, the most seriously affected areas were regions V (Bicol), VI (Western Visayas), VII (Central Visayas), VIII (Eastern Visayas), and IX (Western Mindanao) and portions of regions IV (Southern Tagalog), III (Central Luzon), II (Cagayan Valley), and I (Ilocos). Forty-four provinces were declared calamity areas, requiring rehabilitation programs for the affected farmers. Besides the damage to crops, the drought lowered water levels in dams and reservoirs, affecting the water supply and threatening to cut down production from hydroelectric plants.

The average annual losses from drought, according to OCD figures (1970-1986) were:

Human damage - 0
Agricultural losses - P 47,696,000 (about \$2,385,000)

Frequency of occurrence: 2/16

2.9 Deforestation and Environmental Degradation

A clear link exists between the deterioration of natural resources and the incidence of natural disasters. This is especially evident in the destruction of forest lands in many developing countries.

The Philippines is richly endowed with tropical forests which once covered an estimated 17 million ha. Forest products have long been an important source of foreign exchange, the main exports being pine, several kinds of hardwood, and Philippine mahogany. Rapid deforestation, however, as a result of commercial logging and slash-and-burn agriculture has

depleted forest reserves and created a serious soil erosion problem. An estimated 5.0 million ha. of forests had been clear cut in the Philippines by 1980, of which 1.4 million ha. were in critical watershed areas. The removal of protective forest cover has contributed to flooding and landslides by reducing the water-holding capacity of the soil on hillsides. The soil erosion that results from the loss of vegetation not only depletes the soil of nutrients but also allows rapid runoff of rainwater and sediment build-up in rivers, reservoirs, and drainage channels. Siltation decreases the storage capacity of riverbeds and reservoirs and reduces the life span of dams associated with the reservoirs.

Exports of forest products have declined in recent years as a result of conservation policies and the inaccessibility of much of the remaining commercially valuable forests. The government has enacted laws to protect forest resources and to require reforestation. These measures are not strictly enforced, however, particularly in remote areas, and illegal cutting continues.

Water and air pollution are other environmental problems aggravated by population growth and industrialization. The discharge of industrial wastes into rivers had created an environmental hazard by the 1970s, especially around urban centers. Air pollution from motor vehicles and industry was also a serious threat to health. Numerous government agencies have been created and laws passed to clean up the environment and regulate the use of natural resources. The task is great, however, and much remains to be done.

2.10 Fires

Fire is a constant hazard, especially in urban areas. The greatest risk is in squatter communities where there are large concentrations of people living in makeshift structures of highly combustible materials. Although the older slum settlements such as Tondo in Manila have fire hydrants, the new ones springing up daily are in areas not serviced by piped water. Two recent fire disasters in the Philippines occurred in squatter communities. A fire on April 28, 1988, razed an estimated 800 houses in Pandacan, a slum area in Manila, leaving up to 10,000 people homeless. Many small businesses were destroyed as well. A few weeks later, on May 3, a fire broke out in a squatter section of Iloilo City on the island of Panay. Some 1,200 people were left homeless by this conflagration.

Forest fires and industrial fires could cause major disasters as well. Only a shift in the wind kept the Manila fire described above from reaching nearby oil storage tanks.

A total of 4,222 fires were reported in the Philippines in 1987, of which 42% were structural, 21% were grass/forest, 6% were vehicular/ships, and 31% were other types. While the total number of fires went down by 2.56% between 1986 and 1987, the total property loss increased by 24.7%, reflecting the greater value of industrial and commercial buildings in which fires occurred.

2.11 Other Disaster Types

The list of disaster types which this very disaster-prone country may experience also includes tornadoes and such man-made disasters as accidents and civil strife.

Land tornadoes are a weather phenomenon occurring with some frequency, often accompanying typhoons. The average annual losses from twisters (ipò-ipò) as compiled by the OCD for the 1970-1986 period are as follows:

Dead - 1.6
Missing - 0
Injured - 9.2
Property damage - P 721,000 (about \$36,000)

Frequency of occurrence: 11/16

Accidents (motor vehicles, marine) take a high toll annually. More than 4,800 people died in Philippine road accidents in 1986 alone. Marine accidents attract greater attention, however, because of the large number of people affected in a single incident. The century's worst peacetime marine disaster occurred in the Philippines in December 1987 when the ferry Doña Paz collided with a tanker off Mindoro Island. Some 4,000 lives were lost in this disaster, which called dramatic attention to the hazards of interisland travel.

Industrial accidents (e.g., oil spills, chemical pollution) pose a threat as well. The only nuclear power plant in the Philippines has never been permitted to operate, and the Philippine constitution calls for a "nuclear-free" policy to reduce the possibility of nuclear accidents.

The most prevalent type of man-made disaster is civil strife. The continuing insurgencies (the Moro and Communist rebellions) have the potential to cause widespread human suffering and social displacement.

2.12 Vulnerability of Infrastructure, Housing, and Agriculture

The annual property and agriculture losses from natural and man-made disasters represent a serious and recurring setback to Philippine efforts to achieve self-sufficiency and economic stability. Damage is most often associated with typhoons and floods. Strong earthquakes, particularly those striking urban areas, may cause major, if less frequent, destruction. Damage from volcanic eruption, fires, and accidents is generally localized but no less devastating to the area affected.

The transportation and communications links are susceptible to damage in many types of disasters. The failure of these systems often hampers damage assessment and relief efforts. Roads, bridges, and rail lines may be submerged by floodwaters or volcanic flows or dislocated by the ground shaking and upheaval of the earth that characterize a major earthquake. Port and airport facilities may be put out of service by typhoons or earthquakes. The approach to some ports is normally difficult during the monsoon seasons, and some are safe only during favorable weather conditions. Fishing boats and other small craft have frequently been lost in storms and even ocean-going vessels have been damaged or run aground during typhoons or tsunamis. Communications service, which is inadequate in rural areas of the Philippines under normal conditions, is often knocked out completely when telephone lines are downed by the high winds of a typhoon. Earthquakes may also cut power and telephone lines and cause water and gas lines to rupture. Man-made events add to the destruction of infrastructure. Relief shipments to the Bicol area after the devastating typhoons of late 1987 were hampered by the loss of the Tara bridge in Sipicot, Camarines Sur, which had been blown up by communist insurgents in September. The bridge has since been rebuilt.

Dwellings and other buildings, such as schools, hospitals, and commercial structures, are also vulnerable in virtually every type of disaster. The concentration of populations in urban areas, on well-watered plains, and on the fertile slopes of volcanoes practically assures that many people will be displaced in a major disaster. The houses of traditional construction (i.e., of nipa palm, bamboo, and other indigenous materials) are usually not sturdy enough to withstand hurricane-force winds. Roofs of galvanized iron sheeting, which have replaced the traditional thatch on some houses, are frequently blown off in high winds, and even buildings with steel framing are susceptible to damage if not designed to resist wind forces. Traditional structures are also susceptible to water damage and fire, as are the makeshift structures of the urban poor. On the other hand, dwellings built of wood, palm, and bamboo are more resilient in earthquakes and less likely than unreinforced masonry structures to collapse or sustain serious damage. Residential areas in vulnerable zones are also at risk in volcanic eruptions. Pyroclastic flows or lahars may bury entire villages, and ash showers may cause unsound structures to collapse.

The history of earthquakes in the Philippines is filled with descriptions of damaged structures. The old stone and masonry buildings of Spanish design--churches, municipal buildings, and dwellings--were not built to be seismic-resistant, and many, including the Roman Catholic Cathedral in Manila, suffered repeated damage or total destruction. The architecture of many single-family homes in Manila today shows the Spanish influence in the use of masonry to give greater permanence to the buildings; however, the second story is often constructed of wood. This seems to reflect the dilemma of the Filipino: whether to build a masonry house that resists fire and wind damage or a wooden house that is less likely to collapse and injure its inhabitants in an earthquake.

Modern buildings, even those with reinforced concrete frames, have also suffered structural damage in earthquakes. Many of the multi-story buildings damaged in the August 1968 earthquake, including the Ruby Tower that collapsed, had reinforced concrete frames. Most of the damage in that earthquake was confined to Manila and to structures built on alluvial deposits. Other modern structures, built generally without seismic consideration, were damaged or collapsed in the Moro Gulf earthquake of August 1976 and the northern Luzon earthquake of August 1983.

Agricultural losses from natural disasters have a serious economic impact on the country, and most of the major disaster types are potentially damaging to farmlands. The heaviest losses to crops, livestock, and irrigation systems are from floods and typhoons because of the greater frequency of those disasters. The effect of drought on crops may be more widespread, however, in those years when droughts occur. Through burial by mudflows, singeing of vegetation, or settling of volcanic ash, volcanic eruption may also damage croplands and destroy farm animals in a localized area. Even earthquakes may affect agricultural production by uprooting tree crops such as coconuts and by damaging irrigation systems and other farm infrastructure. Damage to coconut and other tree crops can represent a severe economic hardship because of the length of time required to develop new stands.

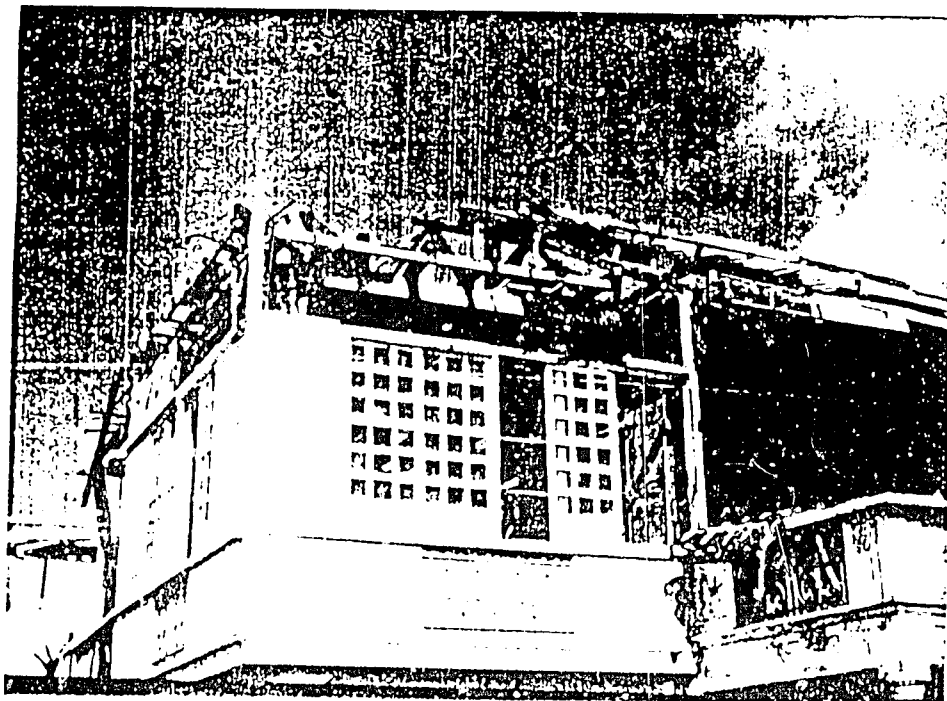


Fig. 2.h. Damaged house in Sorsogon after Typhoon Sisang

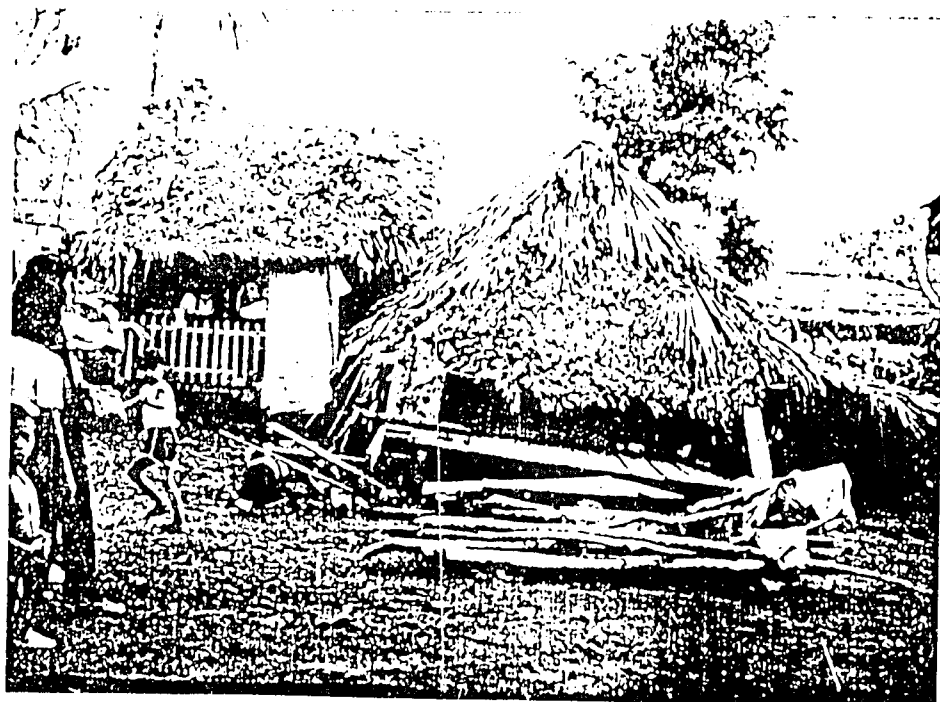


Fig. 2.i. Collapsed house with roofing still intact near Barangay Marioc

Source: Damage Survey Report on Typhoon Sisang in the Philippines, November 25, 1987.

3. Disaster Preparedness and Assistance3.1 Host Country Disaster Organization

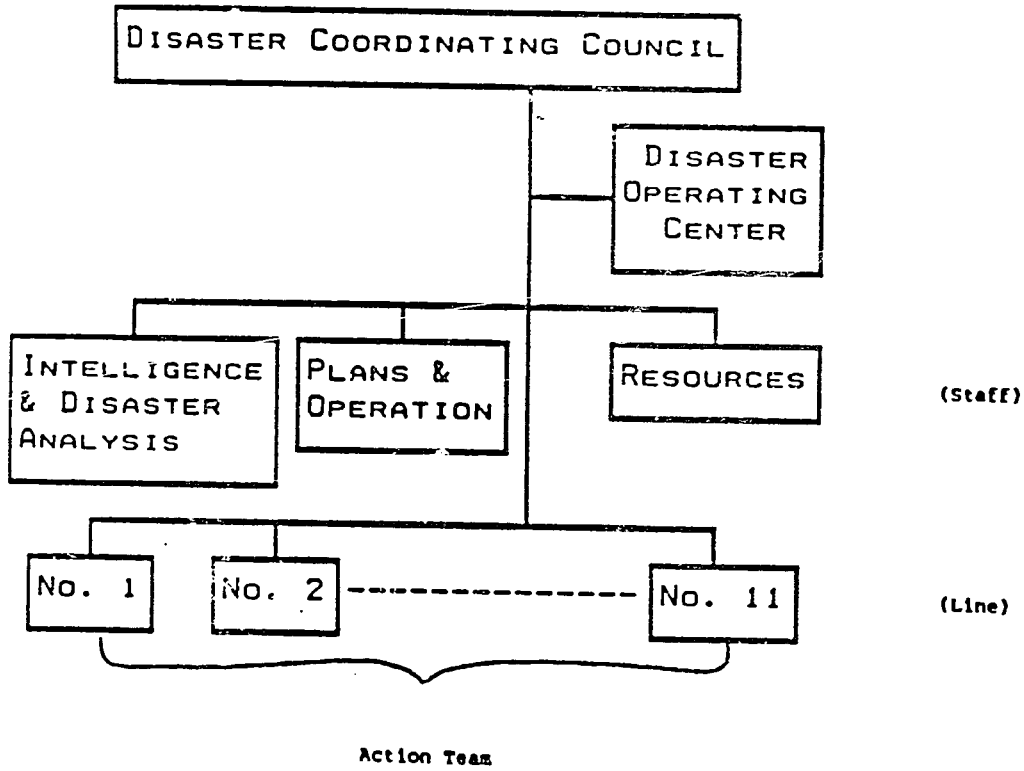
A Calamities and Disaster Preparedness Plan was drawn up in September 1976 following the disastrous Mindanao earthquake and tsunami. The plan established a national organization to serve as a vehicle for a concerted and coordinated disaster control effort at all administrative levels. Under the plan, the National Disaster Coordinating Council (NDCC), comprising the heads of major government departments and agencies, exercises direction over all emergency operations through the Office of Civil Defense (OCD). NDCC members contribute assistance (manpower, facilities, expertise) to carry out disaster operations. The NDCC uses OCD facilities at Camp General Emilio Aguinaldo, Quezon City, as its headquarters and operations center during disasters. Among other functions, the NDCC recommends to the President the declaration of a state of calamity when conditions warrant and sets priorities on resource allocations.

The NDCC is composed of the following members: the Secretaries of National Defense (Chairman), Public Works and Highways, Transportation and Communications, Social Welfare and Development, Agriculture, Education (Culture and Sports), Finance, Labor and Employment, Trade and Industry, Health, Environment and Natural Resources, Local Government, Budget and Management, and Justice; also the Director of the Philippines Information Agency, the Presidential Executive Secretary, the Chief of Staff of the Armed Forces of the Philippines, the Secretary General of the Philippine Red Cross, and the Administrator of the Office of Civil Defense (Executive Officer). The NDCC is scheduled to meet quarterly under normal conditions, and an Action Group is slated to meet monthly.

Disaster Coordinating Councils (DCCs), each having an operations center, have been established at the regional, provincial, municipal/city, and barangay levels throughout the country to complement the NDCC. Each council has a staff consisting of three major units: Intelligence and Disaster Analysis; Plans and Operations; and Resources. The functions of the various councils include the following services (not necessarily applicable at all levels): communications and warning, transportation, evacuation, rescue and engineering, health, fire and police, relief, public information, and rehabilitation.

The direction and control of disaster operations are exercised at the lowest level having the capability to manage such operations. When necessary, request for support is forwarded to the next highest level. When several towns or cities are affected by a disaster, operational control is the responsibility of the provincial governor. Each agency involved in disaster response must prepare an action plan.

ORGANIZATION AND FUNCTION OF DCC



<u>FUNCTIONS</u>	
<u>No.</u>	<u>Activities</u>
1	Communication and warning
2	Evacuation
3	Transportation
4	Damage control
5	Relief and rehabilitation
6	Rescue and recovery
7	Health
8	Welfare and rehabilitation
9	Fire
10	Police or security
11	Public information

The regional provincial and municipal DCC, do not hold the functions specified as No. 2 and 4 among the 11 functions. The barangay DCC handles all 11 functions.

Source: Office of Civil Defense

Fig. 3.a.

The responsibilities of some of the GOP agencies having a role in disaster response and preparedness are summarized below:

The Department of Agriculture (DA) maintains data on crops and livestock in disaster-prone areas; conducts surveys to determine losses after a disaster; and provides technical assistance to disaster victims suffering agricultural losses. The National Food Authority (NFA), under the DA, maintains grain warehouses and releases food for emergency feeding during disasters.

The Department of Education, Culture and Sports (DECS) organizes disaster control groups and reaction teams in all schools; makes school buildings available as evacuation stations; provides emergency food supplies from school feeding program stocks; and assists in public education campaigns.

The Department of Health (DOH) organizes disaster control groups and reaction teams in all hospitals and other health institutions; provides for the provincial, city/municipal, and rural health services to support their respective DCCs during emergencies; and maintains sanitary conditions in affected areas and issues warnings to the public on health hazards.

The Department of Local Government (DLG) oversees the DCCs of the provinces, cities/municipalities, and barangays in coordination with the OCD; and conducts training of the DCCs in cooperation with the OCD, the Department of Social Welfare and Development (DSWD), and the Philippine National Red Cross (PNRC).

The Department of National Defense (DND) performs a variety of functions through three agencies: the Armed Forces of the Philippines (AFP), the Office of Civil Defense (OCD), and the Philippine Constabulary/Integrated National Police (PC/INP). The AFP establishes communications linkages and provides transportation when needed for evacuation of people or the movement of relief supplies; assists with the reconstruction of damaged infrastructure; and helps with security coverage in disaster areas. The OCD makes its operations center available to the NDCC; helps organize DCCs and reaction teams; trains DCC members in coordination with the DSWD and the DLG; and receives bulletins from warning agencies which it disseminates to the public. The PC/INP organizes police and fire auxiliary services in cities, municipalities, and barangays; and provides security coverage in disaster zones.

The Department of Social Welfare and Development (DSWD) assists in the training of DCCs at all levels; organizes relief and rehabilitation services in coordination with local DCCs to provide immediate and longer-term assistance to disaster victims; and distributes relief donations. The DSWD, with workers at the grassroots level (over 6,000 nationwide and usually one social worker per municipality), is likely to be the agency most familiar with the area and people affected by a disaster and therefore able to help with assessments of housing and personal property needs. According to national policy, the National Red

Cross conducts initial relief operations, after which the DSWD takes over. The DSWD works with local churches and non-governmental organizations (NGOs) to deliver relief assistance. The DSWD's Bureau of Assistance is the planning and implementing office for disaster assistance.

The Department of Transportation and Communications (DOTC) coordinates emergency transport services; makes communications and transportation facilities available for disaster operations; and restores destroyed facilities. Through the Air Transportation Office, the DOTC conducts aerial search and rescue operations; repairs damaged airport facilities; and initiates interagency planning for air crashes outside airports.

The Department of Science and Technology (DOST) plays a major role in monitoring environmental conditions and issuing advisories on potentially destructive events. Under DOST, the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA) maintains a network of weather stations and prepares forecasts and severe weather warnings. Also under DOST, the Philippine Institute of Volcanology and Seismology (PHIVOLCS) issues advisories on earthquakes, volcanic activities, and tsunamis and helps determine suitable evacuation sites. (See also section 3.5 Warning Systems, and section 3.6, Mitigation/Preparedness.)

The National Economic and Development Authority (NEDA) analyzes the effect of disasters on socio-economic programs and develops damage assessment guidelines.

The National Housing Authority (NHA) assesses housing requirements of displaced persons, provides emergency shelter, and rebuilds destroyed areas.

The Philippine Information Agency (PIA) coordinates with the mass media to educate the public on disaster preparedness and to warn of impending disasters.

3.2 Host Country Non-Governmental Organizations (NGOs)

The Philippine National Red Cross (PNRC), established in 1947, has 83 chapters in provinces and cities throughout the country. The national society operates six service programs: disaster preparedness and relief services; a blood program; safety and first aid services; Red Cross Youth; nursing services; and social services.

The local chapter of the PNRC is expected to be first on the scene after a disaster, providing emergency relief (food, clothing, temporary shelter, and medical and nursing aid) and tracing services. National headquarters may assign a representative to assist the local staff in relief operations. Relief and rehabilitation services are normally taken over by the DSWD in three to five days.

In preparedness activities, the PNRC conducts training courses in the DCCs and elsewhere. The PNRC maintains small stockpiles consisting of rice, canned goods, blankets, and medicines. In the event of a major disaster, the PNRC can appeal to the League of Red Cross Societies for assistance. The PNRC also works closely with the International Committee of the Red Cross to provide short-term relief assistance to displaced persons in insurgency areas.

The Philippines has numerous smaller NGOs. Many of them serve as partner organizations to U.S. private voluntary agencies in implementing rehabilitation projects at the local level. CARE, for example, normally works with 40 to 50 local NGOs in carrying out its development programs. To implement a USG-funded housing rehabilitation project in Albay Province after the 1987 typhoons, CARE worked with three of these organizations: the International Institute of Rural Reconstruction (IIRR), Lingap Para Sa Kalusugan ng Sambayan (LIKAS), and Small Industries for Rural Development.

Philippine Business for Social Progress (PBSP), a national NGO comprising 125 businesses, has also channeled USG assistance after disasters, using partner organizations to work directly with the beneficiaries at the local level.

The church networks are similarly active at the community level in providing disaster relief and rehabilitation. (See also section 3.18 U.S. Private Voluntary Agencies.)

3.3 Host Country Contact List

PHILIPPINE GOVERNMENT AGENCIES

MALACANANG	521-23-01
Catalino Macaraig, Jr., Executive Secretary	742-16-45
DEPARTMENT OF SOCIAL WELFARE AND DEVELOPMENT (DSWD)	922-18-11
Dr. Mita Pardo de Tavera, Secretary	96-30-01
Ms. Milagros Llanes, Assistant Director Bureau of Assistance	96-29-40
Ms. Rita Roque, National Capital Region Legarda	741-95-59
Ms. Lourdes Peres, In Charge of DSWD Relief Operations Center (ROC), Villamor Air Base	832-09-77

REGIONAL DSWD CENTERS

Ms. Gloria Galvez, Director, Region I - San Fernando, La Union	41-25-05
Ms. Consolacion Arafiles, Director, Region II - Tuguegarao, Cagayan	446-16-36
Ms. Celia Yanco, Director, Region III - San Fernando, Pampanga	61-29-81
Ms. Cloria Mallari, Director, Region IV - Sampaloc, Manila	741-40-03
Ms. Aida Domingo, Director, Region V - Legaspi City	2926 DSWD Radio (SSB)
Ms. Lucila Marcaida, Director, Region VI - Iloilo City	77-481 DSWD Radio (SSB)
Ms. Lily Talagon, Director, Region VII - Cebu City	74-577 DSWD Radio (SSB)
Ms. Martiniana Mercado, Director, Region VIII - Tacloban City	321-3322 DSWD Radio (SSB)
Ms. Patricia Taracji, Director, Region IX - Zamboanga City	3044 DSWD Radio (SSB)
Ms. Leticia Gumabao, Director, Region X - Cagayan de Oro City	3339 DSWD Radio (SSB)
Ms. Lina Laigo, Director, Region XI - Davao City	71-964 DSWD Radio (SSB)
Mr. Kunasa Sekak, Director, Region XII - Cotabato City	2388 DSWD Radio (SSB)
OFFICE OF CIVIL DEFENSE (National Disaster Coordinating Council/NDCC)	79-21-12 77-49-71
Col. Victor Pagulayan, Administrator	78-68-58 77-49-71 70-77-69
Engr. Fortunato Dejoras, Deputy Administrator	77-49-71 79-42-66

REGIONAL NDCC CENTERS	<u>Military Line</u>
Mr. Vicente Tomasar, Director, Region I - San Fernando, La Union	2348
Ms. Elvira Calina, Director, Region II - Tuguegarac, Cagayan	180-R
Mr. Armando Duque, Director, Region III - San Fernando, Pampanga	3701
Mr. Hermenigildo Ebarle, Director, Region IV - Batangas City	725-3748
Mr. Renato Arevaio, Director, Region V - Legaspi City	4566 or 4660
Mr. Rodrigo Roldan, Director, Region VI - Iloilo City	76-671
Mr. Angel Gaviola, Director, Region VII - Cebu City	71-912
Capt. Salvador Estudilo, Director, Region VIII - Tacloban City	2877
Mr. Modesto Ancheta, Director, Region IX - Zamboanga City	2361
Mr. Isabelo Filomeno, Director, Region X - Cagayan de Oro City	3860
Mr. Ernesto Rivera, Director, Region XI - Davao City	77-641
Mr. Carlos Saladero, Director, Region XII - Cotabato City	2879
DEPARTMENT OF HEALTH (DOH)	711-60-80
Alfredo Bengzon, Secretary	711-60-55
Mr. Mario Taguiwalo, Chief of Staff, Office of the Secretary	711-60-80 711-60-55
Dr. Antonio Periquet, Office of Hospital and Facilities Services	711-95-72

DEPARTMENT OF AGRICULTURE

Carlos Dominguez, Secretary	99-89-46
Mr. Emile L. Ong, Administrator National Food Authority	71-16-29

PHILIPPINE INSTITUTE OF VOLCANOLOGY & SEISMOLOGY (PHIVOLCS)

Dr. Raymundo Punongbayan, Director	712-46-69
	712-46-56
	711-30-66
	711-34-44
	711-34-77

PHILIPPINE ATMOSPHERIC, GEOPHYSICAL & ASTRONOMICAL SERVICE ADMINISTRATION (PAGASA)

Dr. Roman Kintanar, Administrator	922-84-01
Atty. Crisostomo Reyes, Administrative Officer	922-84-01 ext. 213
Climatology	98-06-61 loc. 246
Weather Forecasting	922-77-44
Earthquake	97-74-76 97-44-77
Rainfall	97-42-50

NATIONAL TRUCKING & FORWARDING CORPORATION (NTFC)

Antonio Ruiz, Warehouse Manager	60-47-01
	60-37-29

PRIVATE VOLUNTARY ORGANIZATIONS

PHILIPPINE NATIONAL RED CROSS

Dr. Generoso C. Caridad, Secretary General	48-32-69
Ms. Lourdes C. Masing, Director Disaster Preparedness and Relief Services	48-32-69
Mr. Eduardo Angco, Public Information Officer	48-14-86

3.4 Problems in Disaster Response in the Philippines

The disaster response organization described above represents a serious national effort to bring together the resources of the country in times of disaster in a coordinated fashion and to involve government and private agencies at all levels in relief and preparedness activities. It seems clear that the national response capability has been significantly enhanced by the steps taken so far.

It should be pointed out, however, that despite the existence of an elaborate and sophisticated plan, relief operations are not always carried out effectively. That at least is the perception of many donors and government agencies. The principal complaint is that the effort lacks coordination and central direction. From the donors' point of view, response often appears to be ad hoc, with no designated organization determining what, if any, assistance is needed.

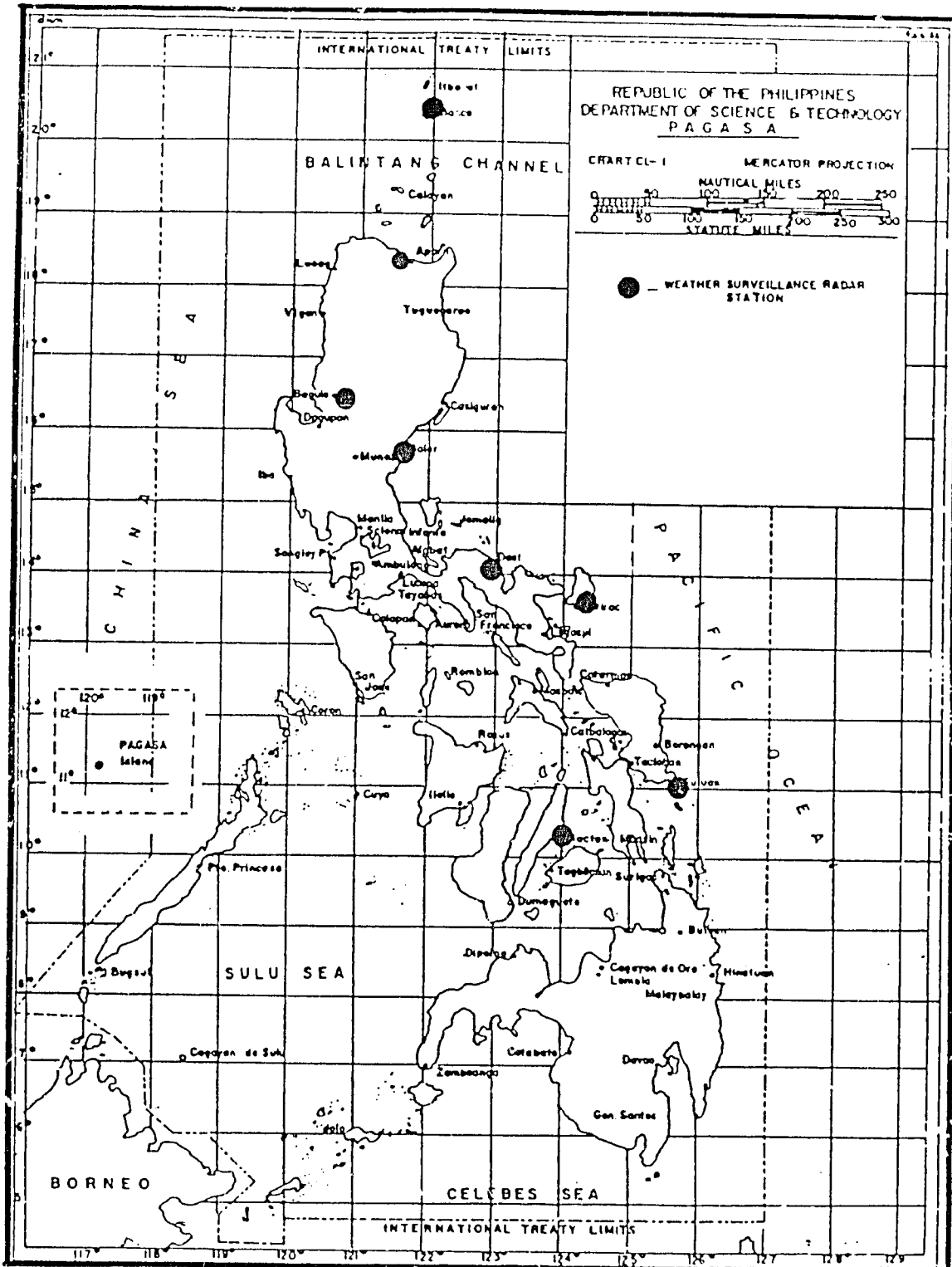
Several reasons can be suggested for the problems in implementing the national plan. Besides the apparent lack of depth in critical organizations, the failure of communications systems during disasters is often a constraint to effective reaction. The difficulty in getting good damage assessments is acknowledged by disaster relief officials. At the local level, officials have been unfamiliar with disaster response systems in recent disasters due to government reorganization since the recent elections. This has required extensive retraining.

3.5 Warning Systems

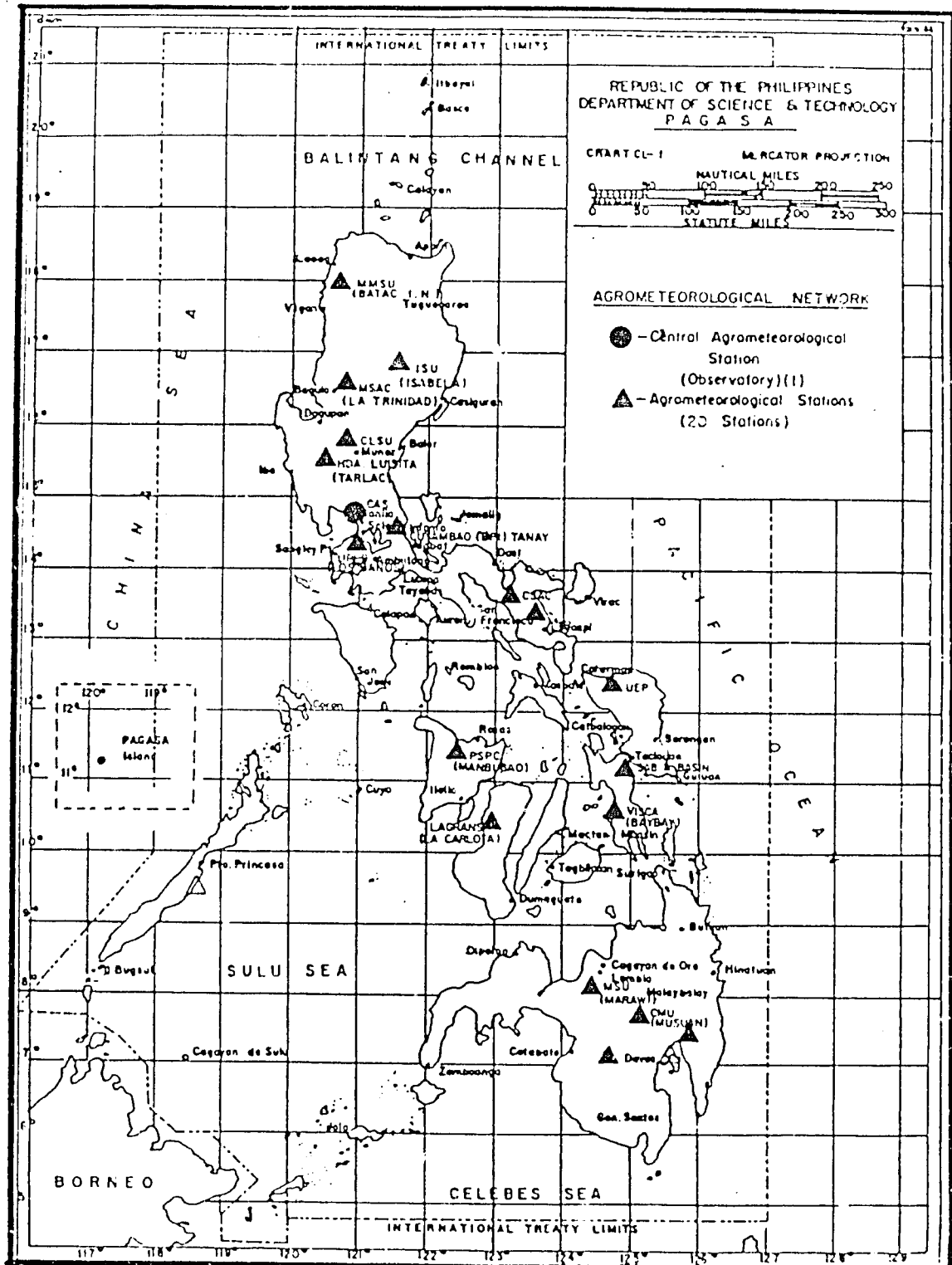
The timely dissemination of warnings of potentially destructive phenomena can help avert disaster by giving people time to leave the threatened area or take other protective action. The warning systems in existence in the Philippines are described below by disaster type. Advisories are issued by the warning agencies, PAGASA and PHIVOLCS, to the Office of Civil Defense which decides on a course of action to mitigate the effects of the impending event.

Typhoons

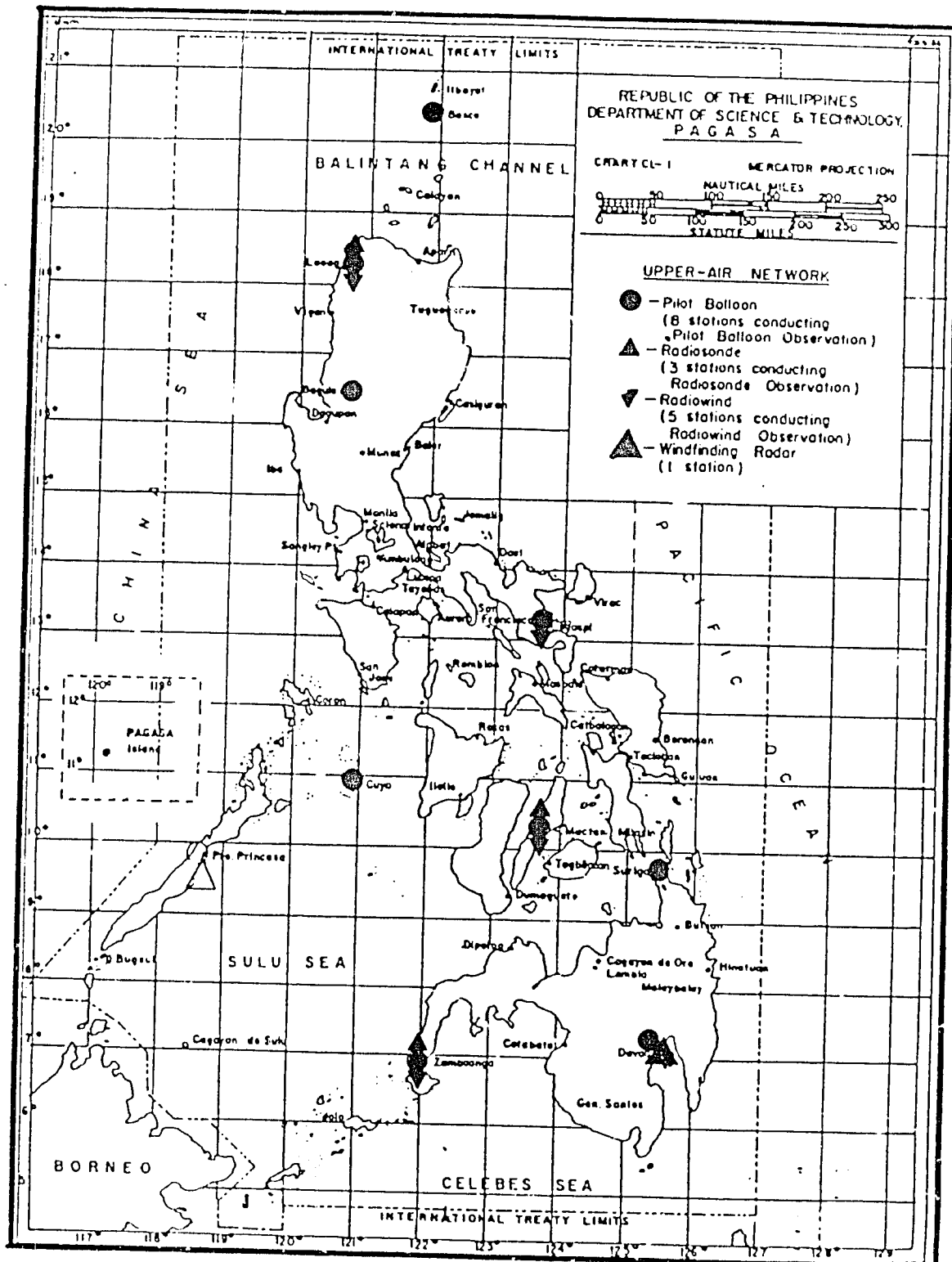
PAGASA maintains a network of surface and upper air synoptic stations, agrometeorological, and radar stations to monitor environmental conditions that might portend weather disturbances. The stations around the country feed information into PAGASA's central offices. PAGASA tracks tropical storms by means of satellite (the geostationary satellite of Japan) and radar. U.S. aircraft surveillance, formerly used in tracking, has been discontinued. Warnings are issued as long as a typhoon is within the Philippine Area of Responsibility (PAR) - i.e., between 135° and 115°E longitude and 5° and 25°N latitude. Public storm warnings are normally issued every six hours when a typhoon threatens (5 and 11 a.m. and 5 and 11 p.m.). Storm alerts are disseminated via three routes: the broadcast



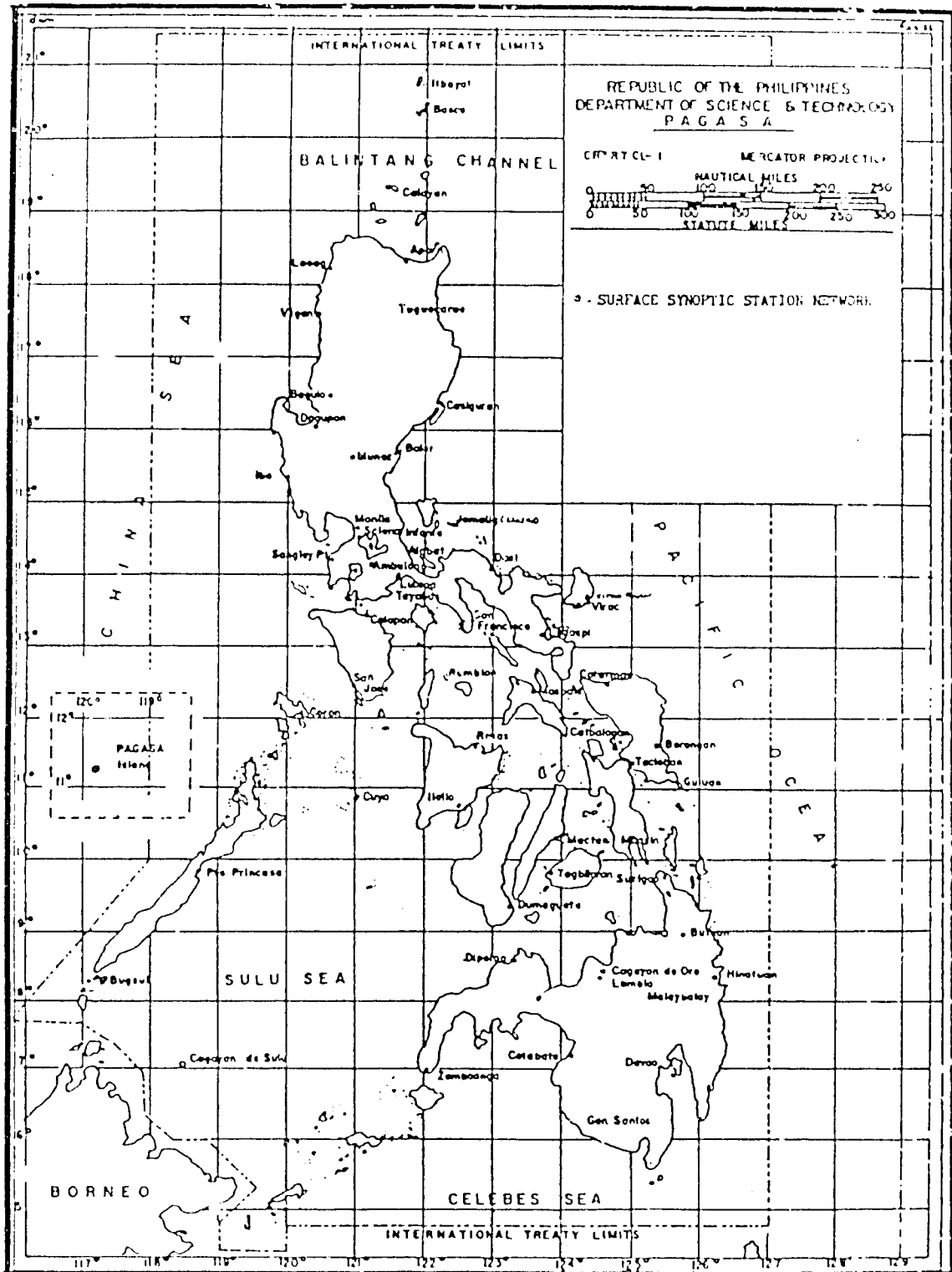
Map 3.b.



Map 3.c.



Map 3.d.



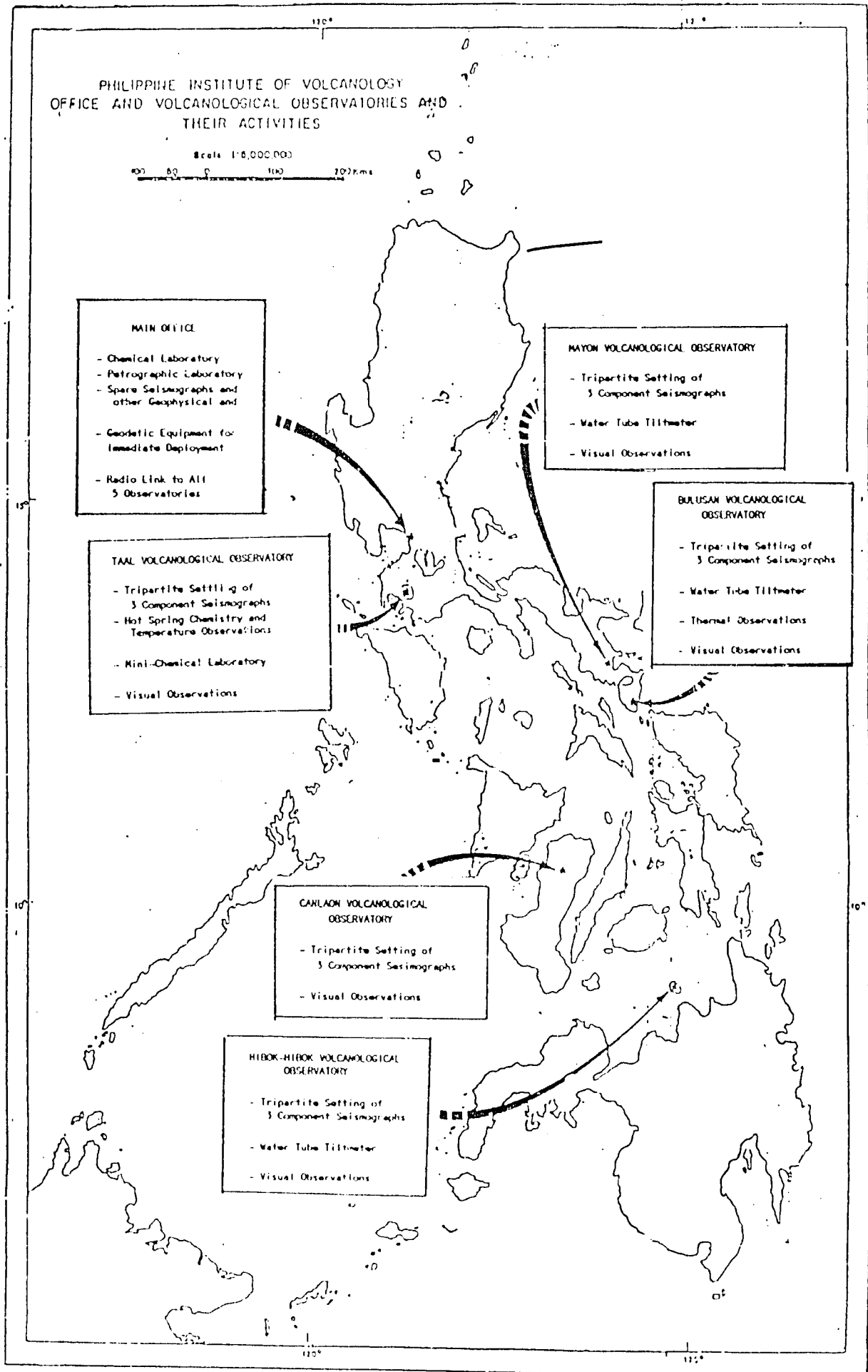
Map 3.e.

media and the government radio station DZCA, local weather stations, and local disaster control centers. PAGASA issues bulletins to the OCD which alerts the regional DCC(s) in the affected area. The regional DCC(s), or PAGASA field personnel, contact local officials and local broadcasting stations. In addition to public warnings, PAGASA also issues warnings for shipping and aviation. Visual storm signals are used for ships at sea, using standard international signals and lights at night.

The effectiveness of PAGASA typhoon warnings has been questioned in view of the continuing large number of deaths and heavy losses from typhoons and storm surge. PAGASA's typhoon warning service is hampered by inoperative equipment in some of the radar and surface observation stations and by inadequate telecommunications. The warnings issued are not always well understood at the village level - either because they have not been translated into local dialects or because the phrasing is such that the danger to a particular locality is not well conveyed. Moreover, the warnings do not carry explicit advice on measures to take to avoid danger. Experts from Science Applications International Corporation (SAIC) have studied PAGASA's typhoon warning and mitigation programs (OFDA-funded preparedness projects) and offered recommendations. Among other suggestions, the reports submitted by SAIC advise that sociological surveys be conducted to develop more effective message content and that educational programs be expanded to increase the public's understanding of the nature of typhoons and storm surge and the meaning of the warnings issued. Another recommendation is that warning message updates be issued between the normally scheduled releases. PAGASA agrees with the need to look at the frequency of issuance but cautions that the information given at more frequent intervals must be current and not just a repeat of old messages. PAGASA is looking into ways to make typhoon warnings more meaningful.

Volcanic Eruptions

PHIVOLCS maintains monitoring stations at the five most active volcanoes: Mayon, Taal, Bulusan, Canlaon, and Hibok-Hibok. Through seismic or visual methods, volcanic indicators such as seismicity, steaming, temperature, chemistry of lake and hot spring waters, and ground deformation are constantly being watched. Equipment employed includes seismographs to measure earth vibrations, tiltmeters and EDM (electronic distance meter) devices to measure ground deformation, and instruments to gauge chemical and thermal changes. Philippine volcanologists periodically inspect the country's other active volcanoes but are unable at the present time to constantly monitor more than the five mentioned above. Mobile equipment is available for emergency monitoring. Studies are being conducted to determine the eruptive history of all Philippine volcanoes so as to improve forecasting. These profiles have not been completed, however, because of the large number of volcanoes.



Map 3.f.

PHIVOLCS issues daily bulletins on the current state of the most active volcanoes. When a volcanic eruption is deemed likely, PHIVOLCS notifies the OCD, which passes the information on to the regional DCC. The local DCC disseminates warnings to the cities/municipalities/barangays likely to be affected. In coordination with PHIVOLCS, the DCC determines when evacuation should begin.

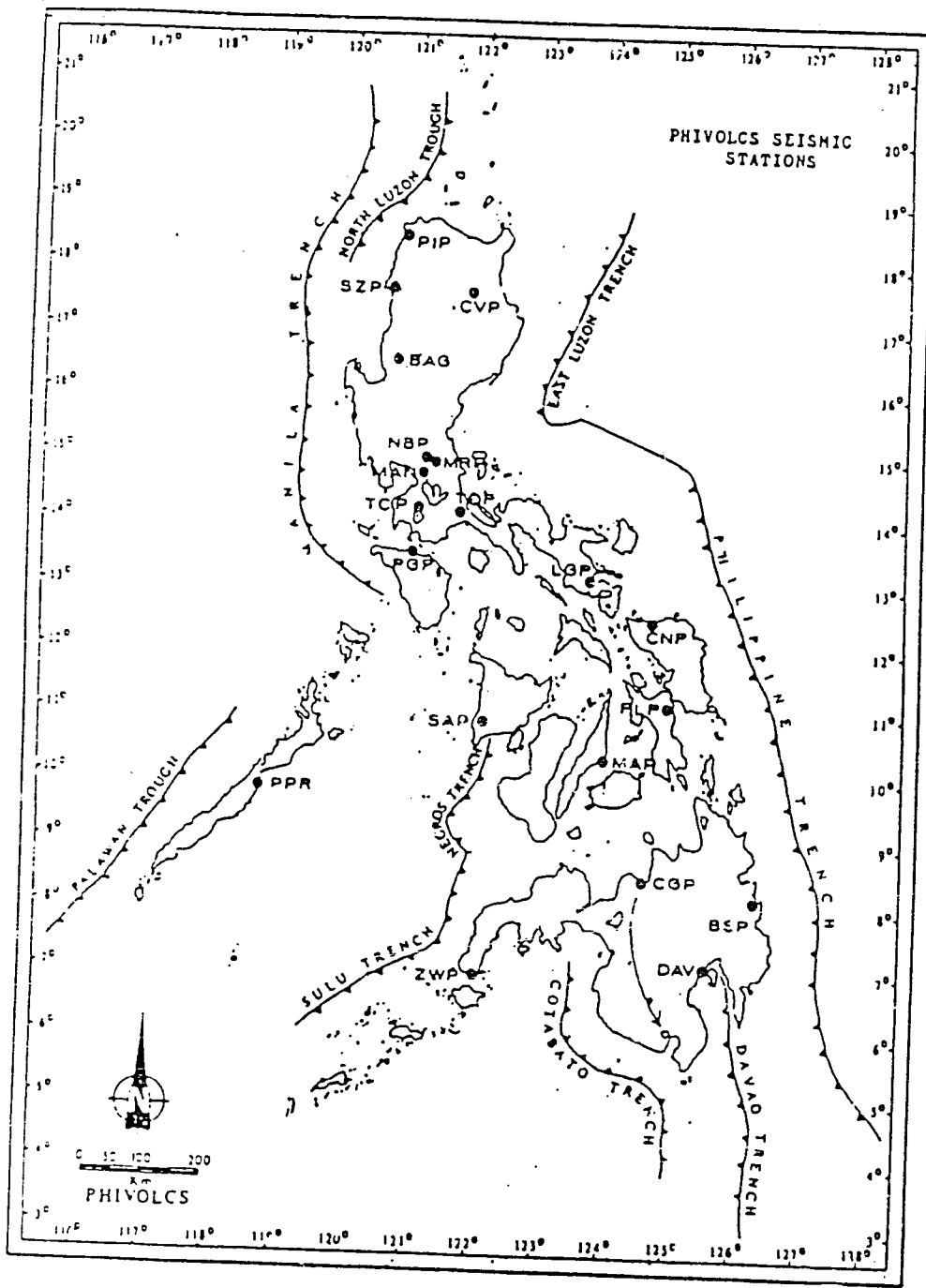
Issuing warnings for lahars/debris flows presents special problems. Although the initiation of lahars can usually be detected by the seismic stations on the slopes of volcanoes, the lead time for these events tends to be very short. As long as the weather is conducive to mudflows after an eruption, populations are urged to avoid at-risk areas.

Earthquakes and Tsunamis

Through the initiative of the United Nations Development Program (UNDP), a seismological program was undertaken in 1971 by several Southeast Asia countries to study earthquake hazards in the region. As part of the program, seismic stations were established in participating countries. By 1985, there were 17 stations in the Philippines, which, for logistical reasons, were sited close to urban centers or existing meteorological stations rather than in the most seismically active areas. With the use of a satellite navigator obtained by the Southeast Asia Association of Seismology and Earthquake Engineering (SEASEE), an outgrowth of the UNDP program, the exact ground position of the seismic stations has been determined. This makes it possible to plot the location of earthquakes more accurately. No precise techniques exist, however, for predicting earthquakes.

PHIVOLCS has been managing seismological research and activities since 1985 when the geophysical and astronomical office of PAGASA was transferred to PHIVOLCS and both agencies were placed under the Department of Science and Technology. PHIVOLCS maintains about 20 seismic stations, a number it considers inadequate to cover the large number of seismic zones. Few of the stations are equipped with radio telemetry to permit data to be transmitted from an unmanned station to a receiving station for recording. Most stations are manned by one person so that 24-hour coverage is not possible. The expanded use of radio telemetry seems desirable since the establishment of future seismic stations will likely be in more seismically suitable and therefore more remote areas where trained technicians may be unwilling to go.

Because tsunamis travel in all directions and to great distances from the source site, the Philippines could be affected by a tsunami generated as far away as Japan or the west coast of the Americas. The Philippines, therefore, depends on the Pacific Tsunami Warning System, with its headquarters in Hawaii, for notification when a tsunamigenic earthquake has occurred. PHIVOLCS thus has time to issue warnings for distant earthquakes. Locally generated tsunamis give very little lead time, however, making it almost impossible to warn residents of tsunami-prone



Key

- BAG - Baguio
- BSP - (vicinity of Bislig)
- CGP - Cagayan De Oro
- CNP - Catarman, Samar
- CVP - Callao Caves
- DAV - Davao
- LGP - Legaspi
- MAN - Manila
- MAP - Mactan, Cebu
- MRP - (vicinity of Angat)
- NBP - (vicinity of Angat)
- PGP - Puerto Galera
- PIP - Pasquin
- PLP - Palo, Leyte
- PPR - Puerto Princesa
- SAP - (vicinity of Sibalom, Panay)
- SZP - Santa
- TCP - (vicinity of Talisay)
- TOP - (vicinity of Tayabas)
- ZWP - Zamboanga

Map 3.g.

areas. PHIVOLCS stresses that at the present time the best protection against tsunami damage is the recognition of precursors (earthquakes, unusual tidal conditions) and the avoidance of coastal areas during the danger period.

Floods

A flood forecasting and warning system (FFWS) is operational in four major river systems in Luzon: the Pampanga, Agno, Bicol, and Cagayan. Under normal conditions, the stations in this system transmit rainfall and water level data by telemetry to the National Flood Forecasting Office (NFFO) of PAGASA every 12 hours. When tropical cyclones or other weather disturbances are threatening, hydrological data can be transmitted at shorter intervals. The NFFO issues three kinds of bulletins: an outlook (when water level at a particular point reaches 40% of maximum channel capacity); an advisory (when water level is 60% of channel capacity); and a warning (when water level threatens to reach or surpass the critical level, or 100% of channel capacity, in about 13 hours). After the initial flood bulletins are issued, subsequent bulletins are issued twice a day (5 a.m. and 5 p.m.) for major river basins and every three hours for major damsites. Messages are relayed to the NDCC, the Department of Public Works and Highways and other concerned agencies, and the broadcast and print media.

Phase I of a Flood Forecasting and Warning System for Dam Operations (FFWSDO) was inaugurated in 1986 to prevent recurrence of a disaster such as occurred in the 1978 flooding downstream of Angat Dam. Phase I covers the Angat and Pantabangan areas and the upgrading of the existing Pampanga FFWS. The second phase will establish a FFWS for Magat and Binga/Ambuklao dams and a PAGASA Data Information Center. The project includes a network of telemetering gauge stations; warning stations; supervisory control offices at the damsites; overall supervisory centers in the central offices of the National Power Corporation, the National Irrigation Administration, and PAGASA; and monitoring stations at the Department of Public Works and Highways, the OCD, and the National Water Resources Council. The telemetering system of the forecasting component consists of rain and water level gauge stations in watershed and reservoir areas as well as a communications system for transmitting data. The warning component includes fixed point stations installed with speakers and radio telephones for use in densely populated areas and mobile warning stations with loudspeakers and portable radio telephones for more remote areas.

While PAGASA's forecasting network covers major river basins in Luzon, there are many other flood-prone regions in the Philippines that are not as well monitored at present.

Drought

A Drought Early Warning and Monitoring System (DEWMS) has recently been added to the meteorological services provided by PAGASA. To assess the degree of dryness, monthly cumulative moisture indices are computed. (The moisture index is the ratio of rainfall amount to the estimated potential evapotranspiration.) The effect of other climatic features, such as temperature and humidity, on the rate of evaporation is also assessed. The DEWMS issues a series of drought advisories to the potentially affected regions. During the 1987 drought, copies of the advisories were sent initially to the governors of each of the provinces in the Bicol, one of the hardest-hit areas. Information was also disseminated through press releases.

PAGASA's drought forecasting service hopes to benefit from the international scientific research presently being conducted to develop techniques for forecasting global-scale climate changes associated with phenomena such as El Niño. The Philippine Department of Science and Technology also has a program with Australia to develop a means of using remote sensing to detect early signs of unusually dry conditions.

Landslides

PHIVOLCS is responsible for monitoring lahars/debris flows on volcanoes, but the short lead time for these events is not usually sufficient to warn people on lower slopes. (see Warning Systems - Volcanic Eruptions.) Assessing the vulnerability to landslides for non-volcanic terrain is a function of the Bureau of Mines and Geosciences. At the present time, the risk from landslides has not been well studied, and therefore the predictability of this hazard is at an early stage.

3.6 Mitigation Efforts/Preparedness

The adverse effects of natural hazards can often be lessened if the risks are understood and steps are taken to delineate danger zones and provide protection. Philippine agencies have made significant progress in disaster mitigation and preparedness, but serious weaknesses remain. The problems are partly technological (inadequate resources), partly educational, and partly the lack of an integrated national effort to establish policies and priorities. The accomplishments and weaknesses are discussed by disaster type.

Typhoons and Storm Surge

One way to mitigate the damage and loss of life from typhoons is to make dwellings more wind-resistant. The cost of reconstruction of typhoon-damaged homes represents a recurring national expense and a great hardship for the mostly poor people who are displaced. The houses most likely to be destroyed are those built of light-weight indigenous materials (palm,

bamboo, and thatch), but even these structures can be made stronger by the use of building techniques to resist wind forces. Such techniques were employed on a small scale in the reconstruction of homes in the provinces affected by Typhoon Sisang in 1987. An investigation should be made into the feasibility of using these techniques in future construction/reconstruction, perhaps with a training component to extend the benefits to a larger population. A study to determine the susceptibility of housing types to various wind magnitudes would be a useful first step.

Efforts are being made to better define the risk from one of the most dangerous features of typhoons, which is storm surge. Maps have been drawn up showing surge potentials for Philippine basins. It is probably unrealistic to expect that poor people who depend on the sea for a livelihood will avoid settlement in these areas even if the risk is known. If an effective storm surge prediction technique could be developed, coastal populations could escape death and injury, in most cases, by moving a few kilometers inland before the storm strikes. Local instruction is needed as to when and where to go, perhaps through the use of drills. The situation in the Philippines is not comparable to that in Bangladesh, for example, where low-lying terrain extends great distances beyond the coastal regions.

Volcanic Eruption

PHIVOLCS has prepared a guide called "Operation Volcano" for each of the five volcanoes being monitored. The guides include evacuation plans and other recommendations for coping with the hazards of an eruption, as well as a listing of the duties and responsibilities of concerned government agencies.

As a basis for the operational plans, PHIVOLCS drew up hazard zonation maps showing the areal extent of possible eruptive products, such as ashfall and lahar flows. Hazard risk maps were then prepared which delineated high risk zones in which human settlement should be prohibited, and potentially vulnerable zones whose inhabitants should be prepared to evacuate when an eruption is imminent. For Mayon, for example, the area within 6 km. of the summit is considered a permanent danger zone unfit for habitation; a moderate risk zone exists within 8 km. in which the population is alerted for possible evacuation when an eruption begins; and the area within 10 km. is endangered if Mayon erupts violently.

The prohibition against settlement near active volcanoes has not been strictly heeded. Volcano Island (Taal Volcano), though declared a permanent danger zone, continues to be home to a growing population. Other volcanoes have sizeable populations in historically affected areas. This adds to the urgency for a timely warning system and well-drawn evacuation plans. The efforts of PHIVOLCS to provide these have mitigated the hazards associated with the five most active volcanoes. The agency is concerned, however, with the possible danger posed by other active and inactive volcanoes that are not being monitored.

Two mitigation projects have been developed at Mayon Volcano to provide protective barriers. The JABO Works (constructed with Japanese technical and financial assistance) built spur dikes and other engineering structures to keep lahars from spreading toward nearby settlements. After the 1984 eruption of Mayon, the Department of Public Works built permanent and semi-permanent earthdikes in lahar-prone areas. These projects have been only partially successful.

Earthquakes

The Philippines is one of four member countries of SEASEE, along with Indonesia, Thailand, and Malaysia, to participate in an earthquake hazards mitigation program begun in 1981 with OFDA funding. The U.S. Geological Survey (USGS) coordinated activities and provided technical assistance. The objective was to better define the earthquake risk so that governments could establish building and land-use codes and builders could design safer structures.

As part of the mitigation program, the Philippine chapter of SEASEE compiled a catalog of earthquakes for that country going back to 1589 to serve as a seismological data base. This included catalogs of instrumental epicenters and intensity surveys for as many historical events as possible. From this data, seismic source zones were proposed and seismotectonic maps were prepared. The average return period for an MM intensity VII earthquake for each region was calculated to give some indications of the risk. (See Map 2.f.) The refinement of hazard maps, including microzoning of vulnerable areas, was planned for a later phase of research.

A review of existing building codes will be a necessary follow-up to the SEASEE research. The National Structural Code for Buildings presently in use considers earthquake forces in the design criteria. The code provides that every building or structure over 7.5 meters in height be designed and constructed to resist stresses produced by lateral forces. The code also requires certain types of buildings to be instrumented with strong-motion accelerographs (SMAS). The latter provision has never been implemented, and the code in general is not strictly enforced. Moreover, the design earthquake is the 1940 El Centro (Calif.) earthquake which is considered inappropriate because of the different soil conditions in the Philippines. The few SMAS presently in place in Manila were installed under the UNDP program in 1975. Since the instruments have a life-span of about 10 years, the network needs to be updated and augmented.

There is also a need for further study of the risk from tsunamis and for the preparation of tsunami hazard-zonation maps.

The National Society for Seismology and Earthquake Engineering in the Philippines, comprising governmental and non-governmental agencies and structural engineers, is the national body of SEASEE. The Philippines participates in the continuing activities of SEASEE, including the workshops and training courses held under SEASEE auspices to promote

cooperation between scientists and engineers in the field of earthquake engineering. One such activity - a Training Course in Aseismic Design and Construction of Structures - was conducted by the Asian Disaster Preparedness Center of the Asian Institute of Technology in Bangkok. The course, which was held in the Philippines in October 1987, taught builders and engineers the theory and techniques of designing earthquake-resistant structures. PHIVOLCS and the University of the Philippines were collaborating agencies. (See section 3.19, USG Disaster Relief and Preparedness Assistance.) This course was viewed as the first in a series of educational programs on hazards mitigation which SEASEE could continue to assist.

Floods

The Bureau of Public Works of the Department of Public Works and Highways is the agency responsible for developing and implementing flood control programs. Seven major flood control projects are being implemented, three of which are receiving priority attention: the Agno River Control Project in Pangasinan, the Pampanga River Control Project in Pampanga and Nueva Ecija, and the Metro Manila Flood Control Project. The other four - the Bicol River Control Project in Camarines Sur, the Cotabato River Control Project in Cotabato Province, the Hog-Hilabayan River Control Project in Negros Oriental, and the Agusan River Control Project in Agusan Province - are in an early stage of implementation. In addition to the major projects, there are 434 minor protection schemes throughout the country, consisting of dikes, levees, embankments, diversion channels, dredging, spur dikes and others.

Including the water projects of several other agencies, some 50 impounding dams and reservoirs are in existence or under construction. These include eight major projects: Pantabangan, Angat, Ambuklao, Binga, Bustos, Caliraya, Tagoloan, and Magat. Three of these - the Pantabangan, Angat, and Magat dams - are multipurpose dams, providing irrigation, power, water supply, and flood control.

Flood risk mapping studies have been undertaken but are not completed. The data bases on people and property at risk in flood-prone areas have yet to be developed.

Drought

The use of irrigation provides protection against drought as long as dry conditions are not prolonged. The irrigated area in the Philippines has expanded significantly during the last two decades, reaching a total of about 1.5 million ha. in 1986. The percentage of irrigated agricultural land is still relatively small, however.

To mitigate the effects of drought and other climatic conditions on rainfed agriculture, the Climate Application and Impact Assessment Center (CAIAC) of PAGASA's National Institute of Climatology issues a monthly bulletin with information on the current and potential effects of weather on rainfed crops. The impact assessments employ agroclimatic indices derived from historical rainfall data, as well as current meteorological data, and reports from PAGASA field stations. The bulletin includes regional assessments for upland and lowland palay and dry and wet season corn crops. Tabulated values of normal rainfall and generalized monsoon and yield moisture indices are provided for ready reference. The purpose of the assessments is to give food security managers, economists, and agricultural experts reliable early warning on potential food shortages so that they can plan alternate cropping or other strategies to reduce the adverse impact of climate anomalies. The assessment program dates from the mid-1980s when the Philippines was one of the countries benefitting from the training in agroclimatic assessment methods provided by the Assessment and Information Services of the U.S. National Oceanic and Astronomical Administration (NOAA), with support from OFDA and the U.N. Economic and Social Commission for Asia and the Pacific (ESCAP).

The Department of Agriculture's Bureau of Agricultural Statistics is another monitoring agency which is responsible for coordinating statistics on crop conditions.

Other measures are taken to counter the general effects of drought. During the drought of 1987, an Interagency Water Crisis Management Committee was formed to monitor the drought and its effect on agriculture and the country's water supply. On the recommendation of the committee, the Metropolitan Waterworks and Sewerage System (MWSS) reduced water production and stepped up efforts to repair leaks and reactivate old wells. Users of both urban and rural water supply systems were urged to conserve water. The MWSS, the National Power Corporation, and the National Irrigation Administration monitored the operations of reservoirs/dams and regulated the withdrawal of water.

Fires

Fire protection is the responsibility of the Integrated National Police (INP). The fire suppression function of the INP is carried out by some 8,442 firefighters nationwide (as of December 1987). Equipment consists of 967 operational firetrucks, including pumper trucks with 1,000 gallon capacity and trucks with aerial ladders. Helicopters would be needed for rescue in high-rise buildings.

There were 550 fire stations in 1,200 Philippine towns at the end of 1987. A 10-year program to expand service had to be curtailed because of economic conditions. Some of the Chinese communities have organized their own fire departments, manned by volunteers. A number of large commercial companies also have their own fire brigades for fighting fires on their premises.

Fire prevention is espoused - March is fire safety month each year - but the effort is inadequate, according to General Cordeta, Chief Fire Marshall of the Philippines. Most of the fire protection budget goes for fire suppression with little left for educational activities. Fire codes exist for large buildings, but they are not well enforced. Much of the home building occurs without the permits that would require inspection during construction for fire safety.

Forest fire suppression is the responsibility of the Forestry Service. Military support or outside assistance would probably be required for a major conflagration since the Forestry Service does not have spray planes.

The Bureau of Air Transportation is responsible for fighting airport fires.

Public Awareness

The Philippines has probably done more than most developing countries to promote public awareness of the threats posed by natural hazards. The OCD and other agencies have conducted educational campaigns using printed material and the broadcast media. Schools have incorporated information on disaster types into the curricula. Periodic drills and exercises are conducted in schools, hospitals, and other establishments to prepare people for an emergency.

Despite these efforts, the number of people killed or injured in disasters each year continues to be high, and the Philippine agencies concerned with disaster response and preparedness are frank to admit that much more needs to be done.

The ineffectiveness of past programs may be explained in part by the limited distribution of educational materials due to budgetary constraints and by the absence or poor enforcement of building and land-use codes. A certain apathy and fatalism in many Filipinos, the "bahala na" attitude ("God will take care of us"), is mentioned by disaster officials as a possible factor in the failure of people to heed warnings or otherwise prepare for emergencies.

The problem of poor public awareness is being addressed by a recently (May 1988) initiated public information dissemination program under PAGASA auspices. The program, to be implemented in pilot regions, will enlist the cooperation of public and private agencies in developing and disseminating multi-media materials to targeted audiences, both in schools and in communities at large. The ultimate goal is to establish an institutional framework for public education on natural hazards to recommend for government adoption. (See section 3.19, USG Disaster Relief and Preparedness Assistance.)

3.7 Host Country Resources

The effectiveness of disaster response depends to a large degree on the availability of resources to meet the needs of the affected population and on the country's ability to move goods and people as may be required during disaster operations. The next several sections will examine the adequacy of Philippine resources to provide some of the common requirements: emergency food, medical infrastructure and supplies to treat the injured, and building supplies and the technical capability to repair and rebuild damaged homes and other structures. Logistical capabilities and constraints will also be examined in sections on transportation and communications resources.

Other assets in the country that could be provided by the U.S. government or other donors to augment Philippine resources will be discussed in the final sections of this country profile.

3.8 Food Resources

Food supplies in-country are likely to be adequate for most emergencies. The more probable constraint would be in transporting those supplies to the victims of the disaster if roads and other infrastructure have been damaged.

The Philippines is generally self-sufficient in the production of major grain staples - rice and corn. Imports may be required some years (as in 1988 after drought and typhoons lowered production) to replenish government-held stocks. The National Food Authority (NFA), which is involved in rice and corn marketing to achieve price and supply stability, maintains warehouses of reserve stocks throughout the country from which grains can be released for emergency feeding. The DSWD has a standing agreement with the NFA to withdraw such stocks from the warehouses nearest a disaster site when the need arises.

The DSWD itself maintains food stocks and other supplies at central warehouses in Metro Manila (Camp Aguinaldo and Villamor Air Base). After access to the Villamor warehouse was cut off during the August 1987 coup attempt, the DSWD has been considering decentralizing its stockpiles. In addition to the central stocks, each provincial social worker has limited emergency funds for the local purchase of food supplies. The DSWD administers occasional food-for-work projects during the disaster rehabilitation phase.

The PNRC also maintains small stockpiles, including some food supplies (rice and canned goods). Like the DSWD, the PNRC has access to NFA stocks when it is involved in an extended disaster operation such as that required by the evacuation of residents of the Mayon Volcano area in 1984. Food stocks may be available in limited quantities in evacuation centers (e.g., schools which have regular feeding programs).

3.9 Medical Resources

The Philippines has a well-developed health infrastructure in a nationwide network of public and private hospitals, Rural Health Units (RHUs), and Barangay Health Stations (BHSs). Health services are underutilized, however, and not well coordinated, as a number of agencies provide parallel services.

Despite the outreach to the rural population in the Primary Health Care (PHC) program instituted in the 1970s, there continues to be an inequitable distribution of health services. This is particularly true of facilities for curative care which are largely concentrated in urban areas. Of the total 89,081 hospital beds in the country in 1986, in both public and private hospitals, over 29,000, or about one-third, were in the National Capital Region (NCR). The bed population ratio of 1:246 in the NCR was considerably lower than the national average of 1:628 and in contrast to those regions having the highest ratios - Region VI (Western Visayas - 1:1075) and Region VIII (Eastern Visayas - 1:1040). Trained health manpower, in both the public and private sectors, is also concentrated in the more developed and urban areas. Despite an oversupply of physicians nationwide, vacancies continue to exist for rural health doctors (400 in 1986).

The PHC program, which is largely implemented by the RHUs and BHSs, has improved the accessibility of preventive care. According to a World Bank study, an estimated 70% of the population had access to primary health care in 1984, but even the RHUs and primary clinics were often beyond the reach of the urban poor and the more remote rural regions. There were 1,962 RHUs in the country in 1986, each serving some 20,000 to 30,000 people. Each RHU is typically staffed with a doctor, a public health nurse, two or three midwives, a sanitary inspector, and sometimes a public dentist. Services include maternal and child care, family planning and nutrition, control of communicable diseases, and environmental sanitation. Trained midwives assisted by volunteer barangay health workers are the main health providers in the BHSs, of which there were 8,844 in 1986. Each midwife is responsible for a population of 3,000 to 5,000 in three to four barangays. The midwives are supervised by RHU doctors and nurses. Over half of the RHUs and BHSs were in need of repair and poorly equipped in the mid-1980s.

The inadequacy of allocations for health infrastructure in general has resulted in the deterioration of public facilities. The imbalances in allocations in the past that favored urban areas and certain regions is beginning to be redressed, however, in the policy changes of the new government.

The medical task unit of the DCC is responsible for identifying medical resources and coordinating assistance after a disaster. Medical services would normally be rendered by DOH personnel, Red Cross first-aiders, and volunteers, with local staffs augmented by health workers from higher administrative levels, if needed. The seriously injured would be transported to hospitals.

BED-POPULATION RATIO OF GOVERNMENT & PRIVATE HOSPITALS
BY REGION, PHILIPPINES, 1986

REGION	POPULATION	DOH		OTHER GOV'T AGENCIES		TOTAL GOVERNMENT		TOTAL PRIVATE		TOTAL GOV'T & PRIVATE		BED POPULATION RATIO
		HOSP.	BEDS	HOSP.	BEDS	HOSP.	BEDS	HOSP.	BEDS	HOSP.	BEDS	
PHILIPPINES	56,004,130	537	40,269	30	8,547	617	48,816	1,229	40,265	1,846	89,081	1:628
N C R	7,147,435	19	12,253	25	6,089	44	18,342	147	10,707	191	29,049	1:746
1	3,978,553	46	2,550	2	115	48	2,665	100	2,065	148	4,730	1:841
2	2,583,857	49	2,205	0	0	49	2,205	69	998	118	3,203	1:806
3	5,589,840	43	2,985	11	720	54	3,705	134	2,669	188	6,374	1:877
4	7,287,400	76	4,135	7	330	83	4,465	154	4,534	237	8,999	1:810
5	4,012,381	43	2,150	1	24	44	2,174	110	2,811	154	4,985	1:805
6	5,207,175	48	2,575	1	25	49	2,600	32	2,242	81	4,842	1:1075
7	4,278,191	36	2,785	3	262	39	3,047	58	3,022	97	6,069	1:705
8	3,128,592	47	2,060	3	100	50	2,160	28	849	78	3,009	1:1040
9	2,928,391	36	1,891	4	250	40	2,141	46	942	86	3,083	1:949
10	3,263,617	38	1,795	21	557	59	2,352	103	2,763	162	5,115	1:638
11	3,933,806	33	1,670	-	-	33	1,670	166	4,511	199	6,181	1:636
12	2,664,892	23	1,215	2	75	25	1,290	82	2,152	107	3,442	1:774

Source: Bureau of Medical Services, List of Government Hospitals, 1986
Philippines Department of Health

Rapid action is required after a major disaster to protect the water supply and provide medical treatment. The DOH does not stockpile drugs, and procurement might be a problem. With the exception of vaccines and oral rehydration salts (ORS), most pharmaceuticals are produced by the private sector using imported materials. The public sector, with limited production capacity, manufactures ORS (UNICEF and USAID also supply ORS). Polio and measles vaccine are entirely imported.

Although there is a sizable distribution network for pharmaceuticals, about 70% of the outlets are in Metro Manila and the rest are mainly in provincial towns. Each BHS has a stock of basic drugs and there are a number of village pharmacies, but drugs are often scarce and badly distributed outside urban areas.

Most public hospitals are equipped with emergency generators to maintain patient care even if the power supply is disrupted. Hospitals do not have reserve water supplies, however, if the public supply becomes contaminated.

3.10 Housing Resources

Rapid family formation, increasing land and construction costs, and the financial inability of many families to own homes are factors in the growing scarcity of housing. The housing shortage is particularly acute in urban areas and especially in Metro Manila where a high population growth rate is intensified by urban to rural migration. The competition for affordable housing units in major cities has resulted in a proliferation of overcrowded, unsanitary squatter communities. The annual losses in housing stock from natural disasters exacerbates the already severe housing shortage.

Faced with the growing housing deficit, especially in the low-income area, the GOP established the National Housing Authority (NHA) in 1975 to focus on low-cost housing and the resettlement of slum dwellers. A housing finance system, involving several agencies, was initiated in 1978 and placed with the NHA under the newly created Ministry of Human Settlements. Two of the agencies directly involved in the financing aspect of home construction were the Home Development Mutual Fund (HDMF), popularly known as Pag-IBIG, which was a mandatory provident/savings fund covering all employed persons, and the National Home Mortgage Finance Corporation (NHMFC), which established a secondary mortgage market to provide liquidity to home financing institutions.

The government's housing programs in the late 1970s and early 1980s did not have the desired effect of easing the low-cost housing shortage. The expanded financial system served the private sector and upper income groups almost exclusively. A lack of coordination between the production and financial arms of the GOP's housing agencies gave the NHA only limited access to housing funds. The NHA emphasized the upgrading of squatter

settlements through sites and services projects but added little to low-income housing stock. A Housing and Urban Development Coordinating Council (HUDCC) has recently been set up to try to eliminate some of the institutional problems.

The GOP's housing policy for the Medium Term Development Plan (1987-1992) seeks to redress the imbalances of the preceding decade by redirecting the focus to low-cost shelter production and encouraging private sector participation in the enterprise. The Plan will try also to achieve a better regional balance, as past activity has been largely concentrated in Manila. The Plan's goal of increasing the number of new units by 104,500 a year appears unrealistic to a World Bank study, when this is compared to the 1982-1986 average production of 17,800 a year. The Bank proposes a more modest version of the Plan (24,900 units a year).

The majority of households (over 93%), both rural and urban, occupy single family dwellings, according to the 1980 Census of Population and Housing. The number of dwelling units (one household) occupied at that time was 8.5 million, an increase of 41.4% over the 1970 census figure of 6 million. About 6.9 million (or 80.2%) households owned their own homes but not necessarily the land on which the homes were situated.

The census also surveyed the types of building materials used in dwellings. Over 4.4 million houses (52.1%) had roofs of galvanized iron or aluminum; most of the others (3.6 million or 42.6%) had roofs of cogon or nipa (indigenous natural materials). The outer walls of over half of the dwellings (about 5 million or 59.1%) were of "strong" materials, such as galvanized iron, aluminum, tile, concrete, brick, stone, wood, or plywood. Most of the other houses (3.5 million or 40.9%) had walls of "light" materials, i.e., bamboo, sawali, cogon, nipa, or makeshift/salvaged. A total of 3.2 million households in 1980 (37.2%) used electricity for lighting, an increase of 125% since the previous census. The households with access to electricity were concentrated in urban areas, and especially in Metro Manila. (Electricity was available to about one-half the country's population in 1985.)

The architectural styles found in the Philippines reflect traditional craftsmanship and colonial influences. Regional variations exist but the typical rural dwelling is a nipa hut or "bahay kubo". The typical Igarot house in mountainous areas is built high off the ground as protection from cold, rain, and landslides. Tree trunks with roots intact are used as support columns; walls are of solid wood panels and roofs are of tightly woven thatch. In the Batanes Islands, north of Luzon, houses are built of tile or stone to resist severe storms. In fishing villages in southern Philippines, where typhoons are less common, houses are often built on stilts over a body of water. In other areas, dwellings may be houseboats or built on rafts to enable them to float during flood conditions. The bahay kubo is of simple lay-out and construction, the choice of materials and orientation based on cultural preference. An enclosed elevated space functions as a sleeping and storage area. Domestic animals and farm implements are kept in the space underneath. The roof extension in front of the house is the area used for social activities.

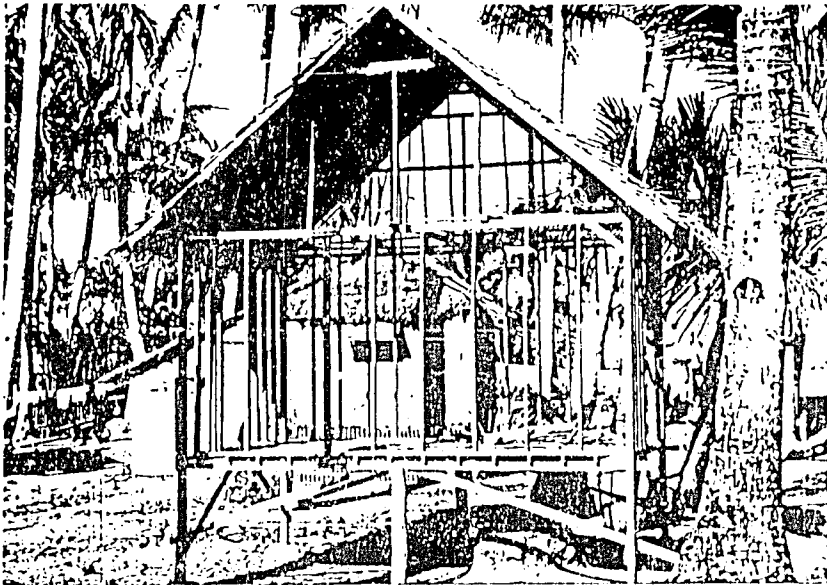


Fig. 3.h. Nipa house construction

Source: Damage Survey Report on Typhoon Sisang in the Philippines, November 25, 1987



Fig. 3.1. Typical Nipa hut

The basic rectangular shape of traditional houses is retained in modern dwellings, which, however, have partitioned interiors. The Spanish influence is apparent in the use of masonry for the foundation or first floor level. Iron grillwork and sliding panels over the windows are other Spanish elements. Tile roofs were also introduced by the Spanish, but the more modest single family homes today are more likely to have galvanized iron roofs.

Labor and materials are in adequate supply in the Philippines. Imported materials in conventional residential construction make up only 6-10% of total building costs and even less in low-cost construction. The principal imported products are iron and steel, industrial machinery and parts, and general hardware items. Domestically available building materials, supplied mainly by numerous small-scale firms, include bamboo goods, various vegetable materials such as nipa and cogon, timber products, and small precast concrete products. The cement industry is capable of producing enough concrete to meet demand. Timber products could eventually be in short supply if present deforestation trends continue.

Although some structural adaptation to environmental conditions has naturally evolved, a great many homes remain highly vulnerable to typhoon and earthquake damage. Every effort should be made, within the constraints imposed by economic conditions, to alter construction methods and/or materials to increase the resistance of such structures to wind and earthquake forces. (See section 2.12, Vulnerability of Infrastructure, Housing, and Agriculture.)

3.11 Communications

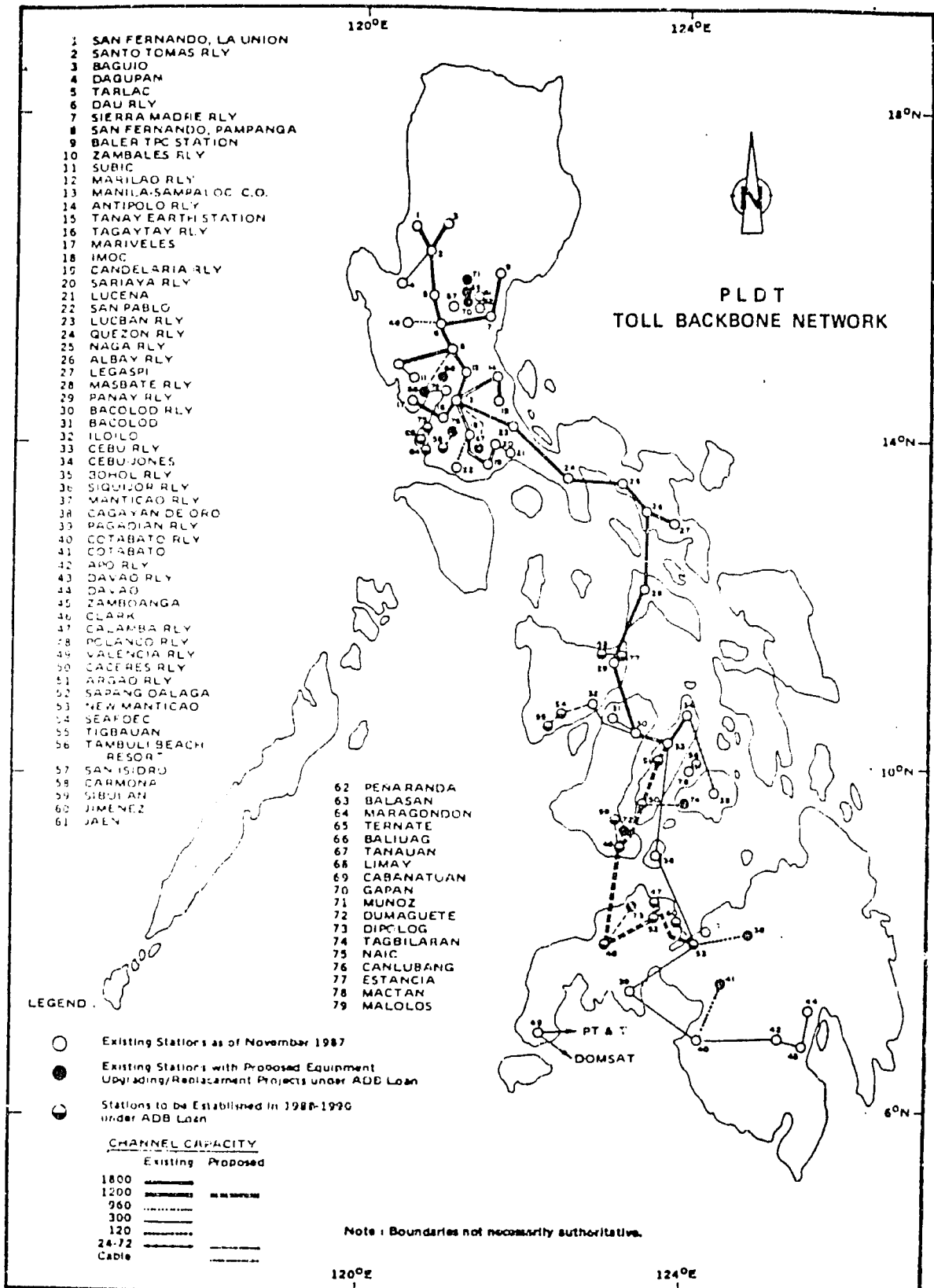
Telecommunications services are inadequate in the Philippines and especially unreliable during and after a disaster. Telephone installations are concentrated in Metro Manila (73%) and other major cities, and access to service outside those centers is limited. Maritime and meteorological telecommunications facilities are in need of modernization as are air navigation instruments at many airports. The national telephone transmission network consists mainly of a microwave terrestrial system that is highly vulnerable to typhoon damage. Power outages caused by storm damage may interrupt normal radio broadcasting as well. The breakdown in communications with threatened or affected areas frustrates attempts to issue warnings or to get reliable assessments after a storm or other disaster has hit.

About 94% of all telephone installations in the country are provided by one company - the Philippine Long Distance Telephone Company (PLDT). Some 54 smaller private companies and the government-owned Bureau of Telecommunications (BUTEL) serve the remaining subscribers. The records (telex, telegraph) services and data communications are handled by a number of private companies. The four international record carriers (as

of 1985) are Philippine Global Communications (PHILCOM), Eastern Telecommunications Philippines, Inc. (ETPI), Globe Mackay and Radio Communications (GMRC), and Capitol Wireless (CAPWIRE). BUTEL also provides some domestic telegraphic services and oversees maritime communications provided by 21 public and about 160 private coastal stations. PAGASA is responsible for developing meteorological communications, and the Bureau of Air Transportation is in charge of maintaining air navigation facilities. The Department of Transportation and Communications (DOTC) is responsible for policy formulation and planning in the telecommunications sector, as well as for regulation of the system through its regulatory entity, the National Telecommunications Commission (NTC).

The lack of a balanced telecommunications network serving all areas of the country is recognized by the GOP as a constraint to economic development. The Medium Term Development Plan outlines government objectives for upgrading and expanding the industry. Private sector investment in telecommunications is strongly encouraged in the implementation of the Plan. The public investment program for the 1987-92 period is directed mainly toward telephone services (77%). Other programs coming in for a share include the rehabilitation and development of radio monitoring and direction-finding facilities (10%); an ongoing maritime communications project (6%) to develop a coastal communications network to provide ship to shore and emergency communications; and a meteorological telecommunications project (3%) to modernize the system for transmitting data from weather stations throughout the country to the PAGASA forecast center for processing, analysis, and dissemination.

Although existing domestic telephone services are inadequate outside the major urban areas, international communications are generally described as excellent. PLDT's overseas services link the Philippines to all parts of the world via cable and satellite communications systems. The Philippines is a member of INTELSAT, and its national entity, PHILCOMSAT, operates an earth station in Pinugay, Rizal, some 45 km. east of Manila. The terminal stations for the submarine cable network are located in Baler, Quezon Province, and Currimaog, Ilocos Norte.



Map 3.j.

Source: Appraisal of a Proposed Loan to the Philippine Long Distance Telephone Co., Inc., for an Expansion and Service Improvement Program in the Philippines. Asian Development Bank. Used with permission of the ADB Desk Officer (Washington).

Owing partly to the unavailability of telephone service in many rural areas, radio is a popular medium for information and entertainment. An estimated 7.5 million receivers were in use in 1986 (1 per 7.5 persons), and about half as many television receivers were in operation - 3.9 million (1 per 14 persons).

The following chart gives the number of licensed stations by type in 1986.

<u>Type of Station</u>	<u>Number</u>
<u>Total</u>	<u>64,717</u>
Government	10,567
Private	54,150
Broadcast radio stations	378
Broadcast AM	294
Broadcast FM	80
Broadcast HF	4
Television Stations	68
Fixed point to point stations	19,130
Commercial	10,443
Non-commercial	8,687
Coastal stations	477
Aircraft radio stations	1,122
Land base radio stations	3,494
Land mobile radio stations	15,094
Citizens band radio stations	3,663
Amateur radio stations	4,983
Radio training stations	357
Fixed aeronautical stations	210
Ship stations	5,138
Maritime portable stations	36

Source: National Telecommunications Commission as cited in the NEDA Statistical Yearbook 1987.

Emergency Communications

The GOP agencies responsible for issuing disaster warnings and monitoring disaster situations have established emergency communications networks. Each of the PHIVOLCS monitoring stations is equipped with two-way single side band (SSB) transceivers to maintain contact with headquarters in Quezon City. PHIVOLCS transmits bulletins to the OCD when a volcanic eruption is imminent. The meteorological communications system established by PAGASA links weather stations around the country with the agency's forecast center. The communications equipment now in use is inadequate, however, both for internal transmission and for receiving weather data from outside sources. Transmission is principally by SSB which is subject to interference between sunset and sunrise. The Low

Frequency (3650 KHz) radio transceivers in the radar stations are less susceptible to interference but require a suitable antenna presently lacking in PAGASA's central office. The upgrading of the meteorological telecommunications system (planned with Japanese assistance) should greatly facilitate data collection and dissemination. The telecommunications equipment (radio network, telephone/facsimile system) installed under the Flood Forecasting and Warning System for Dam Operations provides another link in the country's warning systems. (See section 3.5 Warning Systems: Floods)

The OCD's network throughout 13 regional centers and some provinces and municipalities consists of SSB and very high frequency (VHF) units. The relay system used to establish contact with local officials after a disaster is not always effective, however. The SSB equipment used by the OCD is also susceptible to interference problems. The OCD depends on the telephone system landlines and on the long lines of the Armed Forces of the Philippines (AFP) as well as on its own network. Additionally, the communications facilities of the government and private agencies making up the Committee on Warning Systems (COWS) and the broadcasting stations of the members of the Emergency Broadcasting System can be used to disseminate disaster warnings. Radio station DZCA (AM 1170), a tri-agency broadcasting station of the OCD, PAGASA, and the Bureau of Broadcast, airs continuously to bring weather-related information to the public. All of Metro Manila is within the station's range.

The communications linkages of the Philippine Constabulary/Integrated National Police and other agencies may also be made available for disaster operations. Amateur radio stations are another possible resource for establishing communications when normal channels are inoperative after a disaster. The Philippines had nearly 5,000 licensed amateur radio stations in 1985.

See Appendix G, Amateur Radio Operators; Appendix H, Agencies with Point to Point Communications; and Appendix I, Telephone Numbers for Radio and Television Networks.

3.12 Ground TransportationRoads

The public road network of 162,325 km. in 1986 consisted of 26,230 km. of national roads (primary and secondary) and 136,095 km. of local roads. About 45% of the national roads - the main roads linking provinces, cities, and larger towns - had concrete or asphalt surfaces; the remainder were of earth or macadam construction. Only 7% of local roads were hard surfaced (concrete or bituminous pavement).

1986 Public Road Network - Surface Types (km.)

Road Types	Earth	Macadam	Bituminous	Concrete
<u>National</u> 26,229.68	747.13	13,702.00	5,618.34	6,162.21
<u>Local</u> 136,095.45	8,937.06	117,639.60	6,315.44	3,203.35
<u>Total</u> 162,325.14	9,684.19	131,341.61	11,933.78	9,365.56

Source: Department of Public Works and Highways as cited in National Economic and Development Authority (NEDA) Yearbook 1987

The existing networks of national, provincial, city, and municipal roads are considered generally adequate in extent and location; however, many roads are in a poor state of repair due to lack of maintenance and original low design standards in relation to actual use. Earth-surfaced barangay roads are in generally poor condition.

Recurring natural disasters, particularly floods, contribute to the deterioration of the road network. (See section 2.12, Vulnerability of Infrastructure, Housing, and Agriculture.)

The Medium Term Development Plan (MTDP) (1987-92) recognizes the significant role of the transport sector in stimulating agricultural activity and in strengthening interregional linkages. About one-fourth of total investment under the MTDP was allocated to the transport sector. By far the largest share of the transport sector's allocation (71%) is to go for road improvements. The emphasis is on maintaining and improving the existing road network and on upgrading and expanding rural roads,

including the replacement of weak and temporary bridges with permanent structures. A target of the MTDP is to raise the percentage of all-weather roads to about 60 and the percentage of paved national roads to about 55.

A road improvement project being carried out with the assistance of the Asian Development Bank will upgrade 715 km. of national roads - 123 km. in Cebu, 295 km. in Mindanao, and 297 km. in Negros. This component of the project involves strengthening of pavement, raising road embankments in flood-prone areas, improving drainage, restoring sea walls in coastal areas, and replacing bridges where needed. The project also includes road maintenance of selected national roads as well as a rural roads component for 710 km. in over 12 provinces.

The DPWH is responsible for the planning, construction and maintenance of national and barangay roads. Most urban highways are part of the national network and are therefore under the DPWH. Provincial, city, and municipal governments are responsible for roads in their respective jurisdictions, with all planning subject to DLG approval. The Department of Transportation and Communications has overall authority for transport policy, regulations, and administration.

Vehicles

In 1986, there were 1,185,832 registered vehicles in the country. Less than 10% of the trucks registered (93,798) held public utility licenses legally entitling them to operate for hire. The ubiquitous jeepneys provide short-haul passenger service and also connect with buses for longer trips. Buses provide both long distance and intraurban services. The Metro Manila Transit Corporation operates the city's largest fleet.

Although the average ownership of vehicles in the Philippines is relatively low - 20 vehicles per 1,000 population - traffic congestion is a serious problem in Metro Manila which has about 40% of the total number of registered vehicles in the country.

Railroads

The government-owned Philippine National Railways (PNR) operates a 750-km.-long rail network in Luzon, extending from Dagupan City (195 km. north of Luzon) via Manila to Legaspi (475 km. southeast of Manila). Because of low utilization, a stretch of rail line beyond Dagupan to San Fernando (La Union) was closed in 1984. The present operating network consists of about 670 km. of main line and 80 km. of single-track branch lines, including the 55 km. line from Tarlac to San Jose. Some of the branch lines, such as that between Cavite and Batangas, are no longer operating. The Panay Railways Incorporated, which mainly served the sugar industry, has also ceased operations.

The rail system has deteriorated and traffic volumes have declined over the past years. At the end of 1986, the PNR's network carried about 75,000 mt (17 million freight ton-km) and 4 million passengers (205 million passenger-km) a year. About 80% of the passengers were commuters traveling within Metro Manila.

A rehabilitation program was undertaken in 1976, chiefly for the southern line from Manila to Legaspi. The objective of the program, assisted by the Asian Development Bank, was to rehabilitate track and bridges and the telecommunications system (for train movement monitoring) and to improve PNR's operational practices, and management and organization. The project was about 75% completed in June 1986, but some of the rehabilitated assets were not being well maintained. Under new management since early 1987, the PNR has embarked on a revitalization program to improve operational performance.

A light rail transit (LRT) system, consisting of a 16-km.-long elevated rail line, began operating in Manila in 1984-85. The LRT carried 93 million passengers in 1986.

3.13 Ports

Owing to the country's archipelagic character, the transport system includes hundreds of ports, and shipping is the principal mode of the interisland movement of goods and passengers. Most imports and exports also pass through the nation's ports.

The public network comprises 19 major or base ports, 75 subports (national/municipal), and 528 minor municipal ports. Obsolete or poorly maintained facilities restrict ship and cargo handling activities at many of the public ports. The cargo carried by the more than 300 private ports is usually bulk commodities such as sugar, bananas, or copper concentrate. Total traffic handled at all Philippine ports in 1986 was 63.6% million tons - 56% domestic cargo and 44% foreign cargo.

The port of Manila is the primary port in the Philippines. About 31% of all traffic was handled by that port in 1986. Other major ports include Batangas (15% of total traffic); Cebu (13%); Cagayan de Oro (11%); Davao (5%); Tacloban (5%); and Iloilo (5%). The port of Cebu accounted for the largest number of passengers embarking and disembarking in 1986 (3.5 million), followed by the port of Manila (3.1 million).

The port of Manila consists of three parts: North Harbor, north of the Pasig River, handles domestic trade; South Harbor, south of the Pasig River, manages international trade; and the Manila International Container Terminal (MICT), west of North Harbor, handles international containerized cargo. Physical facilities at both North and South Harbors have deteriorated and are in need of rehabilitation. MICT was converted in

1974 for the use of international container vessels. With the improvements MICT is currently undergoing, the infrastructure in that part of the port will be generally adequate. In 1986, about 21.4% of all international cargo and 42.4% of all containerized cargo passing through the port of Manila was handled at MICT.

About 15% of the allocation proposed for the transport sector in the MTDP will go for ports. The improvement strategy includes feeder ports as well as major and secondary ports. A high priority is accorded to the rehabilitation of Manila Port. The Asian Development Bank (ADB) is assisting the GOP in a project to upgrade both North and South Harbors. The ADB project, due to be completed in mid-1993, will deepen entrance channels, basins, and slips at both North and South Harbors, provide navigational aids and passenger facilities, rehabilitate deteriorated wharves and buildings, and improve port access/egress. The project will also provide cargo handling and other port equipment, such as communications systems, a patrol vessel, firefighting equipment, and garbage disposal equipment.

The Philippine Ports Authority (PPA) establishes and enforces regulations, sets tariffs (e.g., pilotage, wharfage, cargo handling), and monitors port operations. Private companies are responsible for cargo handling operations within the broad policies established by PPA. The Maritime Industry Authority (MARINA) is charged with developing shipping, determining passenger fares and freight rates, and coordinating maritime training. The setting of maritime safety standards is being transferred from the Philippine Coast Guard to MARINA.

Principal Ports

BATANGAS/Luzon

lat. 13°45'N; long. 121°03'E

Approach: Semi-circular body of water between Cazador Point and Matoco Point, 14.4 km. wide. Anchorage for large vessels southeast of Santa Clara pier in 27.5 m. to 33 m.

Pilotage: Compulsory for vessels in foreign trade

Largest Vessel: Maximum length 170 m.

Accommodation: Santa Clara pier - northeast corner 5.18 m. depth and south-east corner 5.49 m. depth, decreasing shorewards. Caltex cargo wharf, 1.6 km. northwest, is 164.6 m. long at seaward face, with depths of 7.62 m. to 8.53 m.

Storage/Equipment: Seven private warehouses with total of 14,193 sq. m. One 25-ton capacity crane

Development: Reclamation of land to increase port area to 27 ha.

Radio Information: Local marine radio station 2 km. from port

Airport: Manila International, about 111 km.

CAGAYAN DE ORO/Mindanao
lat. 08°29'N; long. 124°39'E

Approach: Wharf located on west shore at head of Macajalar Bay, south of Cagayan Light
Pilotage: Compulsory
Largest Vessel: Maximum length 186 m.; maximum depth 9 m.
Accommodation: Concrete wharf 151.8 m. long, 9.14 m. depth at north end and 7.92 m. depth at south end
Storage/Equipment: Seven copra warehouses with total 3,000 ton capacity. One 25-ton capacity crane
Development: Reclamation of 10 ha. land; 415 m. quay extension; construction of 4,600 sq. m. open transit shed and 5,000 sq. m. container freight station
Airport: Local airport; domestic flights

CEBU/Cebu Island
lat. 10°18'N; long. 123°54'E

Approach: Temporary light. Harbor located on east side of Cebu Island in strait between Cebu and Mactan islands; entrance through either northeast or south ends of strait, but latter generally preferred
Pilotage: Compulsory
Largest Vessel: Maximum length 186 m.
Accommodation: Nine berths at Marginal Wharf and six berths at finger piers (max. depth 7.92 m.). International port north side of harbor has berths with total length of 690 m. and container freight station of 6,480 sq. m.
Storage/Equipment: Most storage in open, under tarpaulins; private export sheds with capacities up to 6,000 tons. Level luffing cranes of 25-ton and 35-ton capacity and 25-ton capacity floating crane
Radio Information: Globe MacKay Cable and Radio, 4328, 6492, or 8556 K/C
Airport: Mactan Airport, Cebu City; several flights daily to Manila

DAVAO/Mindanao

lat. 7°04'N; long. 125°37'E

Approach: Gulf and course to Davao are clear and free from hazards;
anchorage at either side of fairway

Pilotage: Compulsory

Largest Vessel: Maximum length 186 m.; maximum depth 9 m.

Accommodation: Four government wharves 3.66 m. to 9.6 m. depth alongside
and lengths up to 900 m.; 11 private berths 5.18 m. to
10.67 m. depth alongside and lengths to 400 m.

Storage/Equipment: Warehousing being increased on 10 ha. reclaimed land.
Cranes of 20-to 60-ton capacity. Three berths
available for containers, with ro/ro facilities.

Development: Upgrading in process. Proposed Free Zone 3.2 km. north of
port would provide new wharf of approximately 170 m.

Radio Information: Messages can be routed through RCA and Globe MacKay.

Airport: Sasa, 3 km. from Sasa Government Wharf

ILOILO/Panay Island

lat. 10°42'N; long. 122°34'E

Approach: Large vessels anchor off the river mouth; entrance to river
impossible until further dredging is completed

Pilotage: Compulsory

Largest Vessel: Maximum length 171 m.

Accommodation: Iloilo Straits wharf is 160 m. long and 9.14 m. deep
alongside; ample tugs and lighters for loading and
discharging in the roadstead.
New port area comprising 400 m.-long quay, ro/ro facilities
and 6,000 sq. m. container freight station at Loboc Point

Storage/Equipment: No shed accommodation.

One mobile crane and three forklift trucks of 18-ton
capacity

Airport: Local airport, 6.4 km. from port, with services to Cebu
International Airport

MANILA/Luzon

lat. 14°35'N; long. 120°58'E

Approach: Entrance to Manila Bay either by channel north of Corregidor or through south channel; latter not recommended during hours of darkness or in poor visibility.

Pilotage: Compulsory

Largest Vessel: Queen Elizabeth 267,140 grt

Accommodation: South Harbor - 58 ha. area; five finger piers with total berth length of 4,331.18 m., providing docking for 26 vessels
North Harbor - 30 ha. area; eight main piers and total quay length of 4,000 m.
International Port - 94 ha. area between North and South Harbors; designed for container traffic, breakbulk and ro/ro vessels; quay length of 988 m. with depth alongside of 13.7 m.

Storage/Equipment: Six public and 11 private bonded warehouses.
Floating cranes of 24, 40, 60, and 75 tons available

Development: Plans to upgrade North and South Harbors

Airport: Manila International Airport

TACLOBAN/Leyte Island

lat. 11°15'N; long. 125°00'E

Approach: Approach hazardous because of islets, reefs, shoals, and fish traps in the bay. If bound for Tacloban pier, vessels should anchor off Egbert shoal and await pilot; if not bound for the pier, good anchorage will be found in the vicinity of Dio Islet in 9.1 m. to 11 m., mud bottom. Maximum depth in San Pedro channel is 5.79 m., liable to silting.

Pilotage: Compulsory for vessels over 100 grt entering or leaving port through San Pedro Bay

Largest Vessel: Maximum length 154 m.; maximum depth 6 m.

Accommodation: City Wharf divided into four sections: north end - 114 m. long; west end - 411 m. long; south end - 102 m. long; and fourth section - 58 m. long connecting to shore

Storage/Equipment: Three warehouses with a total area of 2,448 sq. m.
No cranes available.

Development: Project planned to improve existing wharf and upgrade entrance channel

Radio Information: Available through local marine radio stations

Airport: Tacloban Airport, 9 km. from port

Other major ports include the following:

<u>Port/Island</u>	<u>Coordinates</u>	<u>Largest Vessel</u>
Aparri/Luzon	lat. 18°21'N; long. 121°38'E	maximum length 139 m. maximum depth 6 m.
Bataan/Luzon	lat. 14°32'N; long. 120°37'E	maximum length 236 m. maximum depth 12 m.
Dumaguete/Negros	lat. 9°18'N; long. 123°18'E	maximum length 101 m. maximum depth 6 m.
General Santos/ Mindanao	lat. 6°06'N; long. 125°9'E	maximum length 168 m. maximum depth 8 m.
Iligan/Mindanao	lat. 8°14'N; long. 124°14'E	maximum length 177 m. maximum depth 6 m.
Isabela/Basilan Island	lat. 6°42'N; long. 121°58'E	maximum length 99 m. maximum depth 6 m.
Jolo/Jolo Island	lat. 6°03'N; long. 121°00'E	maximum length 50 m.
Legaspi/Luzon	lat. 13°09'N; long. 123°45'E	maximum dwt 30,000 maximum depth 8 m.
Puerto Princesa/ Palawan Island	lat. 9°45'N; long. 118°44'E	maximum length 109 m. maximum depth 4 m.
San Fernando/Luzon	lat. 16°37'N; long. 120°19'E	maximum dwt 30,000 at anchorage, 10,000 at pier.
Tabaco/Luzon	lat. 13°22'N; long. 123°44'E	vessels with depth up to 7.01 m.
Zamboanga/Mindanao	lat. 6°54'N; lat. 122°04'E	maximum length 146 m. maximum depth 7 m.

(Consult Lloyd's of London, Ports of the World, for more detailed information on Philippine ports.)

Shipping

The domestic fleet comprises some 740 vessels of more than 50 gross tons (GT), including about 100 passenger/cargo ships of more than 250 GT, 200 ferries of generally less than 250 GT, 400 cargo ships, and 40 tankers. There are also numerous barges and smaller vessels in use in interisland traffic. About 15 companies dominate the liner fleet. The following are some of the larger companies:

Aboitiz Jepsen Bulk Transport Corp.
3rd Floor, King's Court Bldg.
2129 Pasong Tamo St., Makati (Metro Manila)
tel: (02) 887451 telex: 63201
36 vessels: services worldwide

Aboitiz Shipping Corp.
7th Floor, King's Court Bldg.
2129 Pasong Tamo St.
POB 4446, Makati (Metro Manila)
tel: (02) 208332 telex: 64363
29 vessels

Sulpico Lines, Inc.
415 San Fernando St., Binondo (Metro Manila)
tel: (02) 479620

Sweet Lines, Inc.
Pier 6, North Harbor, Manila
tel: (32) 92401 telex: 2397
6 passenger and multi-purpose vessels

William Lines, Inc.
POB 147, Cebu City
tel: (032) 92471 telex: 48031
22 passenger/cargo vessels

The oceangoing fleet consisted of 397 vessels in 1986, with total deadweight tonnage of 12.7 million. About 60 international liner vessels call at Manila Port, connecting with Asia, Europe, Middle East, North America, and Australia.

3.14 Airports

The Philippines has 87 national airports, some 121 private airports and landing strips, and 20 heliports (mostly in Metro Manila). The national airport network consists of two international airports - Manila (Ninoy Aquino) International Airport (NAIA) and Mactan (Cebu); four alternative international airports - Davao, Zamboanga, Laoag, and Puerto Princesa; 10 trunkline airports serving major commercial centers; 37 secondary airports serving smaller towns and cities; and 34 feeder airports serving towns and rural communities. NAIA is the only international airport with scheduled international flights.

In 1987, there were only 10 runways that were 2,000 m. or longer and only five that could support aircraft heavier than the BAC 1-11. About one-half of all national airports have the necessary navigational aids and meteorological equipment to be considered all-weather airports.

Philippines Airlines (PAL), a government corporation, is the sole domestic carrier, serving 42 airports throughout the country. PAL's domestic fleet consists of 11 BAC 1-11 aircraft (turbo-fan) and 17 HS-748 aircraft (turbo prop). PAL also provides international services to over 20 countries, including Australia, the People's Republic of China, France, the Federal Republic of Germany, Indonesia, Japan, Singapore, Taiwan, Thailand, the United Kingdom, and the United States. The aircraft used in international flights include two DC-10-30s, four B-747s, and five A-300s. The Airbus 300s are sometimes released from international routes to supplement domestic operations, especially between Manila and Mactan. International passenger traffic originating from and destined to, the Philippines reached 3.2 million in 1985. During the same year, PAL carried 3.3 million passengers on domestic scheduled flights.

Aero Filipinas, with a fleet of two Boeing 707s, provides charter passenger flights from Manila to Dubai, Hong Kong, Iraq, Jordan, Malaysia, Qatar, and Singapore.

The Bureau of Air Transportation (BAT) is the national regulatory body responsible for safety and airport operations. The Manila International Airport Authority (MIAA) controls expenditures for that airport.

The Relief Operations Center (ROC) at Villamor Air Base in Manila is the GOP staging point for aircraft operations after disasters.

Aircraft Entry Requirements

All private and non-scheduled commercial aircraft overflying or landing for technical or non-commercial purposes, or for commercial purposes for the first time, must obtain prior diplomatic clearance from the Philippine Department of Foreign Affairs. Permission may be requested through local firms acting as representatives or supplying aircraft services, through Philippine diplomatic or consular offices abroad or, if

necessary, through the American Embassy in Manila for relay to approving officials. Applications for clearances must be received by the Department of Foreign Affairs at least seven working days in advance of the proposed flight. Once a clearance is issued, strict adherence to the itinerary is requested, and any changes in flight schedule of more than 24 hours or in data provided must be reported at least 24 hours in advance to the Philippine Air Force, Division Commander, First Air Division, Colonel Jesus A. Villamor Air Base.

All requests must include (a) aircraft registration marks and radio calls, if different; (b) owner of aircraft; (c) type of aircraft; (d) departure point and date and time of departure; (e) planned route; (f) time of penetration of Philippine ADIZ and time over checkpoints; (g) name and citizenship of pilot and crew; (h) purpose of flight, number of passengers and/or description and pounds of cargo; (i) name of local agent, if any; (j) name, address, and business of charterer, if any; (k) requirements for fuel and lubricants while in the Philippines, specifying type and quantity desired; and (l) certification from operator that the aircraft will follow the approved route, that the aircraft will be used only for the purpose stated, that while over Philippine territory, the aircraft will maintain radio contact with The Bureau of Air Transportation facilities and will follow instructions and that if intercepted by air defense units, the aircraft will follow their instructions.

Non-scheduled commercial flights discharging or picking up revenue passengers, cargo, or mail in the Philippines, other than those flights landing for commercial purposes for the first time, must obtain a permit from the Philippine Civil Aeronautics Board. Requests must be submitted at least 7 working days in advance to the Executive Director, Philippine Civil Aeronautics Board, 1414, L&S Building, Roxas Blvd., Ermita Manila 2801 (TELEGRAPHIC ADDRESS; AVIOBOARD MANILA/TELEX: NONE) and must include the same information as listed above, submitted in triplicate with the first copy addressed to the attention of the Division Commander, First Air Division, Philippine Air Force, Villamor Air Base and the second copy to the attention of the Flight Safety Division, Bureau of Air Transportation, Pasay City.

Special Notices

1. An aircraft making a commercial flight for the first time must submit its application through the U.S. Embassy, 1201 Roxas Blvd., Manila (TELEGRAPHIC ADDRESS; AMEMBASSY MANILA/TELEX: 7227366).
2. All IFR rated passenger carrying aircraft below 5,682 kg. (12,500 lb.) gross weight on a flight in excess of one hour duration, regardless of type of flight plan filed, shall be provided with a rated co-pilot on board.

International Airports

<u>Location</u>	<u>Airport Name</u>	<u>Coordinates</u>	<u>Longest Runway*</u>	<u>Aircraft Accommodated</u>	<u>Field Lighting</u>	<u>Fuel Availability **</u>
Davao	Francisco Bangoy Int'l	07°08'N, 125°39'E	2013 m.	B-747	Low intensity runway lights Low intensity approach lights Visual approach slope indicator	100, JAI
Laoag	Laoag Int'l	18°11'N, 120°32'E	1983 m.	B-747	Low intensity runway lights Visual approach slope indicator	JAI
Lapu-Lapu (Cebu)	Mactan Int'l	10°19'N, 123°59'E	2593 m.	B-747	Low intensity runway lights Low intensity approach lights Visual approach slope indicator	100, JAI
Metro Manila	Manila Int'l	14°31'N, 121°01'E	3355 m.	B-747	High intensity runway lights High intensity approach lights Visual approach slope indicator	100, JAI
Puerto Princesa	Puerto Princesa Int'l	09°43'N, 118°46'E	2593 m.	B-747		100, JAI
Zamboanga	Zamboanga Int'l	06°55'N, 122°04'E	2593 m.		Low intensity runway lights Visual approach slope indicator	100, JAI

* Converted from feet expressed in nearest hundred; all are hard-surfaced runways.

** Fuel availability of other than 100 octane and 100 octane with low lead content (100 LL) is not cited. JAI indicates jet fuel ASTM type A1 with additives and icing inhibitor. JA2 indicates jet fuel ASTM type A1 without icing inhibitor.

3.15 U.S. Mission Plan

The eighth revision (provisional) of the U.S. Mission Disaster Relief Plan was issued in July 1988. The Plan serves as a guide to the U.S. Mission in the conduct of emergency relief operations in the Philippines, describing the responsibilities of the Mission staff in coordinating U.S. relief activities and outlining the accounting and reporting requirements.

The Chief of Mission (CM), who is the principal liaison with the GOP, is responsible for determining that an emergency exists warranting USG assistance. The CM designates a Mission Disaster Relief Officer (MDRO) to maintain contact with GOP disaster authorities on an on-going basis and to act as the chief operating officer for the Mission during a disaster situation. Under the direction of the CM, the MDRO also coordinates with international organizations, other donor governments, U.S. private voluntary agencies, and the U.S. Department of Defense officials, as appropriate. The MDRO maintains continual contact with OFDA throughout a disaster operation, requesting additional USG assistance as required. According to the Mission Plan, the MDRO must assess damage and needs, analyze resources available, and engage in commodity/service procurement. The CM also appoints an alternate MDRO and a Mission Disaster Relief Team (MDRT) to support the CM and the MDRO in the provision of an appropriate response. The MDRT is composed of officers from various sections of the Mission whose expertise may be useful during a disaster operation.

The Plan notes that additional resources may be employed during a disaster. This includes consulate officials to respond to inquiries about the welfare and whereabouts of U.S. citizens and the U.S. Information Service (USIS) to maintain liaison with the national and international media concerning the USG relief effort.

The measures to be taken to implement the Plan are described in some detail. The response measures cover the use of the CM's disaster assistance authority; the procedure for requesting additional USG assistance through OFDA; the mobilization of the MDRT; the types of assessment the USG might conduct (often in conjunction with GOP officials and representatives of voluntary agencies and other donors); the analysis of available resources (e.g., local market, U.S. Mission assets, OFDA stockpiles, voluntary agencies' capabilities); the provision of relief supplies and services and the logistical factors to be considered; and the monitoring of the distribution and use of relief supplies to ensure accountability.

The annexes to the Plan include a disaster preparedness checklist for the USAID director, deputy director, and MDRO; model cables; guidelines for recipients in the use of emergency relief grant funds; a survey and assessment guide; descriptions of civil relief operations at Clark Air Base (USG) and at the relief operations center at Villamor Air Base (GOP); a description of the GOP disaster organization; and a telephone contact list for key disaster relief organizations and persons in the Philippines.

3.16 Other USG Resources

The extensive A.I.D. development program in the Philippines and the large American community associated with the U.S. military bases, the Peace Corps, and the numerous U.S. private voluntary organizations (PVOs) in the country provide the U.S. Mission with a substantial fund of resources from which to draw in coordinating disaster relief and rehabilitation assistance.

U.S. Mission Assets

The Mission Plan notes that other U.S. assets include supplies, equipment, and commodities intended for normal A.I.D. programs, including P.L. 480 Title II food stocks. Mission transport and communications equipment can be employed in relief operations, and Mission personnel can lend their expertise to administering certain aspects of the relief effort. For instance, the USAID Science and Technology Office may be able to assist in locating equipment for monitoring volcanic and seismic events, or the USAID Health Office may play a role in the local procurement of medical supplies.

With USAID/Philippines approval, P.L. 480 Title II foods can be diverted from regular programs for emergency feeding. Free distribution is normally permitted until GOP-approved food-for-work programs are developed. Cooperative for American Relief Everywhere (CARE) and Catholic Relief Services (CRS) are the PVO sponsors of the P.L. 480 Title II program in the Philippines. A total of some 62,000 MT is the approved program level for FY 1989. CARE will administer approximately 30,800 MT (flour, bulgur wheat, and green peas) and CRS will handle about 31,400 MT (corn soy blend and bulgur wheat). (See also 3.18 U.S. Voluntary Agencies.)

U.S. Military Resources

The USG maintains two large military bases in the Philippines - Clark Air Force Base (13th Air Force) and Subic Bay Naval Base - and four smaller installations. The bases are responsible, through CINCPACREFIL, for providing assistance when civil resources are inadequate to cope with a disaster and when such assistance is requested by the U.S. Chief of Diplomatic Mission. (OFDA must approve the provision of supplies/services by the DOD if funded from OFDA-administered accounts.)

During and following a disaster, USAID may deploy a Disaster Relief Officer (DRO) to the operational centers at the bases to provide on-site liaison with U.S. military authorities and to assist in monitoring and coordinating the USG response. USAID maintains regular contact with the disaster preparedness officers at the bases.

The following are some of the services the U.S. military can perform in support of relief operations. Disaster Area Survey Teams (DAST) can be supplied by the military at OFDA's request. Both Clark Air Base and the Subic Naval Base can provide C-130 cargo planes and helicopters to transport relief supplies to stricken areas. (U.S. military air support for reconnaissance and transport is a frequently required service in a major disaster.) The military can assist with search and rescue and helicopter emergency evacuation. (Most SAR requests to Subic are for marine accidents or missing vessels.) Military doctors, equipped with essential medicines and supplies, can be made available to care for disaster victims. The Navy Seabees, whose activities are usually confined to local construction projects near the base, can be assigned to the disaster area to help in the repair and rebuilding of vital infrastructure. The Civic Action offices at the bases can perform a variety of services. Following Typhoon Sisang, for example, medcap (medical civic action program) units from Clark and Subic provided medical treatment to an average of 1,700 victims a day at the height of the relief operation.

The voluntary activities of U.S. military personnel and dependents can also make an important contribution to the relief effort. As part of the Sisang disaster response, the U.S. military airlifted to the Bicol about 80 MT of supplies that had been collected by military families at the U.S. bases.

Peace Corps

The Philippines hosts one of the largest Peace Corps (PC) programs in the world. About 300 volunteers are located in all regions of the country except Mindanao and some of the areas most threatened by insurgency. The PC works with three government departments: Agriculture (agricultural production, marine and fresh water fishing); Education (teacher training, deaf education); and Natural Resources (integrated forestry, hillside farming). In addition, several water and environmental sanitation projects have interagency support.

The Peace Corps can chiefly provide manpower in disaster response. Volunteers work with USAID, UNICEF, or other organizations channeling resources into the affected area. Activities include feeding disaster victims in evacuation centers and helping people rebuild homes and replant crops. After typhoons in 1984, PC volunteers formed chain-saw teams to help produce lumber to rebuild homes.

3.17 U.S. Government Contact List

UNITED STATES EMBASSY	521-71-16
Mr. Nicholas Platt, Ambassador	
Mr. Kenneth Quinn, Minister	Ext. 2276/ 2372
Col. Richard T. Ryer, Defense Attache	Ext. 2623/ 2624
Capt. Roger D. Wyckoff, CINCPACREPHIL, Liaison Officer	Ext. 2395/ 2396
JOINT U.S. MILITARY ADVISORY GROUP (JUSMAG)	
Maj. Chuck Nelson, Maintenance Officer	922-88-66 Ext. 6155
CLARK AIR FORCE BASE	
Capt. Gregory Williams, Base Director Preparedness Officer	71, then dial 33951
Capt. Don. C. Clements, Base Director Preparedness Officer	71, then dial 33951
MILITARY CIVIC ACTION DIVISION	
Maj. Robert A. Jones, Chief, MCAD/CAB	71, 55291
Weather Wing	71, 46249
SUBIC NAVAL BASE	Dial 728 and extension
Lt. Cdr. John Hayes, Chief Staff Command, Subic Center	46704
Capt. M.A. Atwell, Asst. Chief of Staff Operations and Plans	43105
Lt. Cdr. J.D. Van Sickle, Public Affairs Officer	43161
U.S. PEACE CORPS	
Ms. Barbara Pabotoy, Acting Director	Ext. 2692 59-24-21

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT	521-71-16 Ext. 2448 to 2451
Mr. Malcolm Butler, Mission Director	521-69-04/ 521-71-16 Ext. 2448
Mr. Bryant George, Mission Disaster Relief Officer	521-52-44/ 521-71-16 Ext. 2444 to 46 (Home) 58-34-12
Mr. Clark Billings, Alternate Mission Disaster Relief Officer	521-52-44/ 521-71-16 Ext. 2444 to 46 (Home) 833-79-21
UNITED STATES INFORMATION SERVICE (USIS)	
Mr. Robert F. Jordan, Director	521-71-16 Ext. 2230, 2258
Mr. Gerald Huchel, Press Attaché	521-71-16 Ext. 2363

3.18 U.S. Voluntary Agencies

A large number of U.S. private voluntary agencies (PVOs) are involved in development and social programs in the Philippines (109 listed in the TAICH* Directory in 1983). In a co-funding arrangement, USAID's Office of Food for Peace and Voluntary Cooperation supports selected U.S. and Philippine PVO development subprojects judged to be consistent with U.S. and GOP development assistance strategies. Two U.S. PVOs, CARE and CRS, are sponsoring organizations for the P.L. 480 Title II program in the Philippines. (See also 3.16 Other USG Resources.)

USAID also works closely with U.S. PVOs in delivering relief assistance after disasters as those organizations have established distribution systems throughout the country. Emergency feeding is often part of that assistance and can be accomplished through the release of Title II stocks from regular programs. The following PVOs are among those that have been particularly active in helping to implement USG disaster relief and rehabilitation projects.

* Technical Assistance Information Clearing House (TAICH).

ADVENTIST DEVELOPMENT AND RELIEF AGENCY (ADRA)

John Sipkins, Director
ADRA/Philippines 401
645 Quirino Ave.
Paranaque, Metro Manila Tel: 828-43-71

ADRA, with a staff of about five, works through 15 response units (five each in Luzon, Visayas, and Mindanao), which are part of the Adventist Church but not of ADRA per se. ADRA helps those church units with organization, planning, funding, and training (also disaster training) to carry out development projects (e.g., health, village infrastructure, income-generation, agriculture) at the local level. Additionally, there are nine Adventist hospitals in the Philippines (three in each of the three main divisions) and three church-run colleges.

ADRA is active in disaster response, not only in USG-declared disasters but in numerous smaller ones that affect a particular locality. After Typhoon Sisang (November 1987), ADRA carried out a housing rehabilitation program in Albay funded by OFDA. To assist the DSWD's goal of providing cooked food to disaster victims in the initial aftermath of a calamity, ADRA hopes to develop mass feeding units (portable kitchens) that can be strategically placed in the 15 response areas and in Manila to be quickly transported to the disaster site.

CATHOLIC RELIEF SERVICES (CRS)

Kenneth Hackett, Country Representative
CBCP Bldg., Corner Arzobispo and Real Streets
Intramuros, Metro Manila Tel: 47-55-91 to 93

CRS works through the welfare and project units (e.g., Caritas and Social Action Commission) of 74 Dioceses and also collaborates with DSWD and other GOP departments and private groups. In its health and nutrition program, CRS distributes P.L. 480 commodities throughout the country to some 440,000 beneficiaries in the Targeted Maternal and Child Health Program (TMCHP) of the Dioceses and to an equal number in the DSWD's Day Care Program. The socio-economic development projects assisted by CRS include food production, cooperative and rural development, and micro-industry and skills training. The CRS staff numbers 42 in Manila and six in the provinces.

Besides diverting food for emergency feeding in times of disaster, CRS can provide medicines and cash for the purchase of shelter supplies, chain saws, seeds, and other relief items. The widespread church network facilitates distribution and also provides credible assessments of the number of people affected, based on population figures for each Diocese.

COOPERATIVE FOR AMERICAN RELIEF EVERYWHERE (CARE)

Stanley Dunn, Director
Room 1400 Victoria Bldg.
429 United Nations Ave.
Manila Tel: 521-01-86 to 87

CARE has nutritional programs in all 12 regions (school feeding in nine and MCH in all 12), reaching nearly 2 million beneficiaries. CARE's economic development program focuses on four types of activity: crops, livestock, agroforestry, and micro-enterprise. Recipients of the food distribution program are targeted especially for income-generating assistance so as to promote self-sufficiency among those in greatest need.

Since 1985, CARE has operated an emergency program in Negros, involving both supplementary feeding and income-generation activities. After Typhoon Sisang, CARE administered an OFDA-funded housing/livelihood program, benefiting over 2,000 disaster victims.

CARE's headquarters are in Manila, but its operations are decentralized and concentrated in four areas: Negros Occidental (Region VI); Cebu (Region VII); northern Mindanao (Region X); and southern Luzon and Mindoro (Region IV). Staff comprises three expatriates and 88 nationals.

Other PVO contacts:

SALVATION ARMY

Capt. Emeline Urbien, Officer for Social Affairs Tel: 50-00-86 to 88

WORLD VISION INTERNATIONAL (Asia Regional Office)

Roy Challberg
3rd Floor Union Church Bldg.
Corner Legaspi and Rada Streets
Legaspi Village
Makati, Metro Manila Tel: 817-77-57

3.19 USG Disaster Relief and Preparedness AssistanceDisaster Relief

The USG has responded to 26 disasters in the Philippines (as of the end of fiscal year 1988) in the years since the Office of U.S. Foreign Disaster Assistance was created in 1964. The following chart summarizes the assistance provided in selected emergencies.

Strike Date	Disaster	Commodity/ Service	Provided Through	Cost
09/28/65	VOLCANO (Taal)	1,000 cots and 100 tents	DOD	\$47,234
		200 MT Title II food		\$13,600
		66 MT Title II food	CRS/CARE/CWS	\$15,068
		Other food (baking costs)	CRS	\$250
		Water purification units		\$1,916
		Volcanologist		\$600
		Total.....		
10/13/70	TYPHOON (Joan, Kate)	Airlift	DOD	\$21,827
		Local purchase food		\$4,496
		959 MT Title II food	CRS/CSW/CARE	\$155,254
		10,400 MT Title II food and transport	WFP	\$2,184,000
		School building project		\$1,500,000
		Baking cost of nutribuns		\$2,356
		Personnel support	DOD	\$100,000
		Seeds		\$11,566
		Total.....		
11/19/70	TYPHOON (Patsy)	U.S. Civil Defense biscuits		\$200,000
		797 MT Title II food and transport	CRS/CWS	\$176,838
		Generators		\$3,078
		Baking costs of nutribuns		\$3,032
		Personnel support	DOD	\$16,864
Total.....			\$399,812	

Strike Date	Disaster	Commodity/ Service	Provided Through	Cost
07/00/72	FLOOD	Assessment team, rescue and relief activities	DOD	\$5,820,000
		52,415 MT Title II food	GOP/WFP/ CARE/CRS	\$13,258,300
		Supplemental funds		\$43,975,000
		Medicines	UNDRO	\$5,000
		Relief supplies	PNRC	\$145,000
		Road project		\$55,000
		Total.....		
08/16/76	EARTHQUAKE	99 MT Title II food Grant	CRS PNRC	\$54,286 \$125,000
		Total.....		\$179,286
		08/27/84	TYPHOON (June and Ike)	Ambassador's authority 5,040 MT Title II food and transport Grants for rehabil- itation projects Project to restore electric power Seeds
Total.....			\$4,274,500	
09/10/84	VOLCANO (Mt. Mayon)	Ambassador's authority Volcanic monitoring and surveying equipment	PNRC	\$30,000 \$28,251
		Volcanologist	USGS	\$17,500
		Total.....		\$75,751

Preparedness Activities

In addition to providing relief assistance, OFDA has supported several preparedness and mitigation projects to enhance the GOP's early warning capability and help the nation be better prepared to cope with disasters. Philippine nationals engaged in disaster-related services have also participated in workshops and conferences supported by OFDA.

The major preparedness activities benefiting the Philippines include the following:

Typhoon Threat Assessment Program for the Philippines (FY 1984-85) - This program, which was carried out by Science Applications International Corporation (SAIC), analyzed PAGASA's warning system and provided technical assistance and technology transfer and equipment (hardware and software) to the GOP to improve the country's ability to monitor and predict life-threatening storms and disseminate timely warnings. A consultant was later contracted by OFDA to evaluate progress under the program. (See section 3.5, Warning Systems: Typhoons.)

Earthquake Hazard Mitigation Programs in Southeast Asia (FY 1981-85) - The U.S. Geological Survey provided technical assistance to the program, which was undertaken by the Southeast Asia Association of Seismology and Earthquake Engineering (SEASEE) and funded by OFDA. The purpose was to improve earthquake preparedness and mitigation in Malaysia, Thailand, Indonesia, and the Philippines through a program that generated earthquake catalogs and technical summaries of the seismicity, tectonics, geologic structure, and seismic source zones of each country, with accompanying maps. (See section 3.6, Mitigation Efforts/Preparedness: Earthquakes.)

Agroclimatic Assessment Program for South and Southeast Asia (FY 1984-85) - OFDA provided a grant to the Economic and Social Commission for Asia and the Pacific (ESCAP) to purchase computer systems as part of the National Oceanic and Atmospheric Administration/Assessment and Information Services Center (NOAA/AISC) technology transfer program on Drought and Food Shortage Assessment for South and Southeast Asia. The Philippines was a benefiting country. (See Section 3.6, Mitigation Efforts/Preparedness: Drought.)

Program for Disseminating Public Information on Natural Hazards (FY 1988-89) - An OFDA grant to PAGASA will fund an 18-month project (phase I) to provide information on natural hazards to targeted populations in selected geographic regions. The goal is to promote public awareness of the causes of disasters and of the strategies that can be employed to mitigate their effects. PAGASA will coordinate with the OCD and other GOP agencies. (See also section 3.6, Mitigation Efforts/Preparedness: Public Awareness.)

Regional Disaster Preparedness Training (FY 1985-86) - OFDA awarded a grant to the Asian Institute of Technology (AIT) in Bangkok as seed money for a regional disaster preparedness program. The Asian Disaster Preparedness Center (ADPC), established at AIT to carry out the program, conducts courses for regional participants to develop disaster management skills. Filipinos have attended these courses. The ADPC also conducted a specialist training course in the Philippines in October 1987 on Aseismic Design and Construction of Structures. Major funding for this technical course was provided by the USG. (See section 3.6, Mitigation Efforts/Preparedness: Earthquakes.)

Filipinos were among those receiving training in the OFDA-supported workshops and conferences listed below:

<u>Project</u>	<u>Dates</u>	<u>Place</u>	<u>Number of Filipino Trainees</u>
OFDA/PVO Conference	Oct. 26-28, 1983	Reston, VA	1
USGS Geologic Hazards Program	Mar. 5-30, 1984	Denver, CO	3
Pacific Congress on Marine Technology	Apr. 24-27, 1984	Honolulu, HI	n.a.
NFPA Fire Training Seminar	May 20-June 15, 1984	Washington, DC	1
Pacific Volcanology Seminar	June 9-11, 1984	Hilo, HI	n.a.
Earthquake Engineering Conference	July 21-28, 1984	San Francisco, CA	4
International Conference on Disaster Mitigation	Nov. 12-16, 1984	Ocho Rios, Jamaica	n.a.
Emergency '85	May 21-24, 1985	Washington, DC	1

<u>Project</u>	<u>Dates</u>	<u>Place</u>	<u>Number of Filipino Trainees</u>
ABA Housing and Urban Development Symposium	Oct. 23-26, 1985	Miami, FL	1
WMO Tropical Cyclone Forecasting Workshop	Nov. 25-Dec. 6, 1985	Bangkok, Thailand	3
2nd International Assembly Emergency Medical Services	Mar. 31-Apr. 5, 1986	Baltimore, MD	1
NFPA Fire Safety Seminar	Sept. 1-2, 1986	Manila, Philippines	126
NFPA Fire Command Seminar	Sept. 3-5, 1986	Manila, Philippines	99
ADPC Disaster Management Course	Oct. 20-Nov. 29, 1986	Bangkok, Thailand	1
First International Seminar/Workshop on Lahars and Landslides (OFDA sent trainers)	Dec. 8-13, 1986	Legaspi City, Philippines	n.a.
National Hurricane Conference	Apr. 1-3, 1987	Orlando, FL	1
2nd Annual International Earthquake Conference	Apr. 6-10, 1987	Los Angeles, CA	1
USTTI Emergency Communications Course	Apr. 29-June 20, 1987	Washington, DC	1
NFPA Seminar: Organizing for Major Emergencies	June 1-5, 1987	Manila, Philippines	52
ADPC Disaster Management Course (III)	June 22-Aug. 2, 1987	Bangkok, Thailand	1

<u>Project</u>	<u>Dates</u>	<u>Place</u>	<u>Number of Filipino Trainees</u>
First Disaster Management Workshop	Mar. 6-18, 1988	Tagaytay, Philippines	29
NFPA International Fire Chiefs Conference/OFDA Study Tour	Aug. 27-Sept. 2, 1988	Washington, DC	2

3.20 International Community

Several governments and international organizations represented in the Philippines are assisting disaster mitigation programs and are likely to be active in relief operations. The government of Japan is a major donor. Loans from the Japanese Overseas Economic Cooperation Fund (OECF) are helping to finance three large projects to assist PAGASA: the installation of a basic workstation to receive, process, and display satellite imagery from the Japanese geostationary satellite; the construction of a Data Information Center in connection with the Flood Forecasting and Warning System for Dam Operations (See section 3.5, Warning Systems: Floods and section 3.11, Communications); and the upgrading of the meteorological telecommunications network connecting field stations with PAGASA's central office. Japan also helped finance the building of protective structures to divert lahars on Mayon Volcano. Australia plans to finance a project that will help the Philippines make more extensive use of remote sensing technology for drought monitoring and typhoon surveillance. France is considering a loan to support PAGASA's plan to establish a regional forecast center, having satellite and facsimile receivers and a direct connection to provincial broadcast stations for faster dissemination of typhoon warnings.

The following international organizations with programs in the Philippines could be expected to assist relief efforts in some types of disasters.

INTERNATIONAL COMMITTEE OF THE RED CROSS (ICRC)

Erechem Bldg. Cor. Herrera and Salcedo Streets
Legaspi Village
Makati, Metro Manila Tel: 87-89-51 or 815-84-46

J.P. Laurel Ave.
Bajada
P.O. Box 377
Davao City Tel: 79-441 or 79-447

ICRC, whose mandate is to work in situations of armed conflict, has had a delegation in Manila since 1982 (Regional Delegation in East Asia) and in Mindanao (Davao City, Cagayan de Oro, and Zamboanga) since 1986. ICRC's activities include protection (visits to persons detained in connection with insurgency-related incidents); assistance (with the PNRC, relief operations for civilians affected by insurgency but not by natural calamities); and dissemination (with the PNRC, information drives to increase understanding of Red Cross objectives).

UNITED NATIONS DEVELOPMENT PROGRAM (UNDP)

Turhan Nanqun, Director
P.O. Box 7285
ADC Mia Rd.
Pasay City, Metro Manila 3120 Tel: 85-06-11 or 85-06-25

UNITED NATIONS CHILDREN'S FUND (UNICEF)

P.O. Box 7429
ADC
Pasay City, Metro Manila Tel: 86-42-45

WORLD HEALTH ORGANIZATION (WHO)

P.O. Box 2932
Manila Tel: 59-20-41

WORLD FOOD PROGRAM (WFP)

Freeman Hudson, Director
P.O. Box 1864
Manila Tel: 816-4098 or 810-6131

The WFP, with a total yearly program of about 10,000 MT of rice, is involved in child feeding and food-for-work projects (FFW). Some 150,000 pre-school children identified by the DOH and DSWL receive "wet feedings" from WFP commodities. WFP carried out a pilot FFW project in Negros to rehabilitate at least 33,000 sugar workers and families. WFP can respond in disasters by 1) diverting food from regular programs, 2) providing food-for-work as in Negros, or 3) donating up to \$50,000 in cash for the emergency purchase of food.

PHILIPPINES - Typhoon

Date: Nov. 25-26, 1987

Location: The administrative divisions of Central Luzon (III), Southern Tagalog (IV), the Bicol (V), and Eastern Visayas (VIII) with several provinces in Division V hardest hit

No. Dead: 882

No. Affected: 363,637 families

Damage: Total damage amounted to \$56,000,000. In all, 175,507 homes were lost. Most damage occurred in the typhoon belt--Region V (the Bicol Division), particularly in Albay, Sorsogon, and Camarines Sur provinces. Roofs were ripped off, traditional homes collapsed and disintegrated; 493 schools sustained damage; coconut trees were decapitated or uprooted; rice and vegetable fields were inundated; electric and water supplies were cut; and bridges were destroyed.

The Disaster

Super Typhoon Nina (Philippine name "Sisang") slammed into the Philippines on Nov. 25 and 26. The storm first struck the Bicol Administrative Division and traversed the country in a northwest path, crossing Southern Tagalog and Central Luzon divisions before moving into the South China Sea. Nina compounded the destruction and deaths left in the wake of Typhoon Betty. (For more information on Typhoon Betty, see OFDA Annual Report FY 1987.)

Nina and Betty, the worst in 30 and 20 years respectively, were two of the nine damaging typhoons which all crossed the same areas in Southern Luzon between August and December 1987. Typhoon Phyllis (Philippine name "Trining") added insult to injury plowing through the provinces of Samar, Leyte, Masbate, and Biliran only three weeks after Nina.

Winds and rains from the storms tore corrugated iron roofs from schools and clinics, caused the woven-leaf walls of traditional homes to disintegrate, decapitated or uprooted coconut trees (the staple crop important to the economy of the Bicol), sunk or swept to sea fishing equipment, and inundated fields of rice and vegetables. Typhoon Nina compounded outages of power and communications, much of which had not yet been restored after Typhoon Betty swept through the islands. Three ships plying the waters near the southern islands were forced aground.

Typhoon Nina rammed into coastal Bicol at peak wind speeds of 220 km. per hour and was followed by a storm surge on Nov. 26 which measured an average of three meters. The storm surge alone killed 200 residents of Matnog, a ferry port in Sorsogon Province along the San Bernardino straits, as the wave drew its victims into the sea. Falling coconut trees and debris were responsible for many other deaths throughout the affected areas.

Electricity in the Bicol Division and communications to remote areas within the affected administrative divisions were cut. Ham operators in Sorsogon provided initial disaster information. A major bridge on the route between the mainland and the Bicol Province was structurally damaged, impeding vehicular movement across the bridge. As a result, initial efforts to assess damage were hampered and immediate relief distributions depended upon air transport.

In the wake of the disaster, water and food were lacking. Sorsogon residents relied on manually obtained water which carried high levels of bacteria. In addition, the National Food Authority (NFA) warehouse in Sorsogon collapsed under the strain of water on its roof. A mixture of salt water, sewage, and rain inundated 45,000 bags of rice and palay being stored in the building. Philippine officials claimed that the palay could be dried and milled but that the rice could not be salvaged for human consumption. The strong winds and inundating waters damaged 364,000 ha. of coconut land, and more than 2,000 ha. of other agricultural land. In Sorsogon, 80% of the provincial banana and abaca plantations were devastated. Livestock and poultry were killed. In all, crop and livestock damage was reported to be \$17.4 million.

Private property damage totaled \$2.7 million and the public sector sustained \$14.5 million in damage.

Throughout the early typhoon season, Bicol Administrative Division was particularly hard hit and Typhoon Nina proved especially destructive for the following reasons:

- pre-Nina typhoons weakened structures so that they succumbed to subsequent attacks;
- there was little time between typhoons to allow for recovery and repair;
- due to a government re-organization, officials were often unfamiliar with disaster preparedness systems, and they failed to activate warning systems; as a result, many people did not evacuate coastal areas;
- insurgency problems had weakened local community groups and hampered government access to certain areas;

- communication links with the rest of the country were destroyed for several days so that damage could not be assessed;
- municipal water systems were highly vulnerable to contamination;
- typhoons coincided with the period of maximum growth of tropical crops and the rice harvest, amplifying the economic impact;
- the poor, who constitute 89% to 93% of the population in the affected areas, had built homes in marginal, unsafe locations and relied on export mono-crops, such as copra, for their subsistence, rather than food production.
- environmental denudation (forests, mangrove swamps, reefs) eliminated natural barriers which restrain flooding or storm surges.

Action Taken by the Government of the Philippines (GOP) and Non-Governmental Organizations (NGO)

The government of Corazon Aquino quickly mobilized relief operations as the storm swept off the eastern coast and as it received preliminary reports of the destruction indicating an immediate need for shelter, clothing, and food for thousands of victims. On Nov. 27, President Aquino promulgated Proclamation No. 191 designating the following provinces as disaster areas: Bataan Province (Division III); Quezon, Cavite, Batangas, and Marinduque provinces (Division IV); the provinces of Albay, Sorsogon, Masbate (including Burias Island), and Camarines Sur (Division V); and Leyte and Northern Samar provinces (Division VIII). A second proclamation, No. 193, added the Rizal, Laguna, Romblon, Oriental Mindoro, and Mindoro Occidental provinces (Division IV) and the provinces of Camarines Norte and Catanduanes (Division V) to the list of nationally declared disaster areas. The declaration of calamity allowed the government to commandeer food and other supplies needed for relief and rehabilitation.

Soon after reports of damage began trickling into Manila, various GOP offices rallied to formulate a relief implementation and distribution plan. On Dec. 3, the National Disaster Coordinating Council (NDCC) Action Group chaired a meeting of official Philippine agencies at the Office of Civil Defense. Participants reviewed incoming assessments and discussed the implementation of programs aimed at relieving the suffering of citizens who lost property, means of livelihood, and family members. Represented were the GOP departments of Agriculture, Education, Health, Labor, Justice, Natural Resources, Public Works, Transportation and Communications, Trade and Industry, and the Armed Forces. Local governments, the media, the presidential management staff, and the

Philippine National Red Cross (PNRC) also participated. Initial relief plans, as outlined by this group, involved the provision of food, medicine, transportation of supplies, and rehabilitation of housing and livelihood.

A Dec. 2 presidential tour through Sorsogon Province and assessments performed by the secretaries of Agriculture and the Department of Social Welfare and Development (DSWD) convinced President Aquino that food was desperately needed. As a result, she ordered the Department of Agriculture to release 1,000 MT of rice from Southern Luzon stocks for disaster victims throughout the Bicol Division. The GOP also authorized the regional directors of the Bicol and Eastern Visayas divisions to withdraw 5 MT of rice for each affected province from the National Food Authority (NFA).

Health became a major concern after the rains ceased as water became contaminated and medicine ran in short supply. An assessment performed by the Sorsogon provincial health officer indicated that a critical shortage of such medicine as antipyretics, anti-diarrheal, and IV solution existed. As a result, the Philippine Department of Health (DOH) sent medicine, valued at \$90,000, to Bicol Division and authorized an additional \$189,600 for the local purchase of medicine in the Bicol. Because officials feared possible outbreaks of various diseases in the region, the DOH sent a surveillance team to monitor health conditions in the Bicol and authorized Bicol field offices to use their small emergency budgets in support of the affected population.

Since the major bridge linking the main island and the Bicol Province was damaged, the movement of relief goods depended on air shipments. However, the lack of an airstrip in Sorsogon hampered relief flights and forced a dependence on helicopter shuttles to many areas. The DSWD airlifted about 1,500 boxes of assorted food items, candles, and clothing to Bicol residents early during disaster operations from Manila. DSWD Secretary Mita Pardo de Tavera accompanied the first mercy flight to Legaspi.

The GOP also supported various non-governmental attempts to supply housing and livelihood inputs to typhoon victims. One GOP NGO and three U.S. private voluntary organizations implemented such programs in order to restore housing, to grow food crops, or to get other livelihood activities underway.

On Dec. 8, the Philippine Business for Social Progress (PBSP)--a local NGO--presented an emergency relief and livelihood proposal to USAID/Manila OFDA agreed to grant the PBSP \$500,000 in support of the program which was implemented over a three-month period and provided relief to victims of Typhoon Nina in 40 municipalities located throughout Marinduque, Albay, Camarines Sur, and Sorsogon provinces. The program featured three components: (1) providing of seeds, nets, and other livelihood inputs to replace those destroyed; (2) rebuilding houses with traditional materials

either retrieved from debris resulting from the storm or through the local purchase of such materials; and (3) incorporating typhoon-resistance features into rehabilitated housing. As a result of the program, 2,717 households received income-generating assistance, 2,400 families rebuilt their homes with donated or salvaged traditional materials, and 1,300 additional families received assistance in rebuilding their homes to withstand future typhoon damage.

The PBSP worked closely with its local partners such as the Marbata and Sorsogon dioceses, Naga Social Action Center for Camarines Sur, the social action commission of the Diocese of Boac, and COPSDEN/Bicol University of Albay Province. These local non-governmental volunteer groups salvaged wood from the sea, acquired access to military stockpiles, and procured lumber confiscated from illegal logging operations. The PBSP stored the materials and transported them to beneficiaries who paid a fraction of the cost of materials according to their ability to pay. The funds collected by the PBSP were spent on other typhoon rehabilitation activities not covered by the OFDA grant.

During the immediate post-disaster phase, Philippine private voluntary agencies played crucial roles in the collection, dispersal, and monitoring of relief. The PNRC issued an appeal to the LRCS and managed incoming donations generated from the LRCS request. The PNRC also channeled the U.S. disaster assistance authority to the Sorsogon City Red Cross which purchased locally available food for the victims. By Jan. 2, the Sorsogon City Red Cross Chapter had extended relief assistance to 22,902 families. The commodities comprised 1,800 sacks of rice, 400 cases of sardines, and 900 packages of noodles; the cost of commodities and transport totaled \$37,851. The Diocese of Sorsogon, the archdioceses of Nueva Caceres and Naga, and Mother Theresa's Order (the Missionaries of Charity) aided in the monitoring and distribution of USG relief goods transported by the U.S. military to affected areas. Numerous Manila newspapers held a fund drive for those affected by the disaster and raised \$128,000 in pledges. The Manila Chamber of Commerce and Industry collected relief items for the typhoon victims.

Assistance Provided by the U.S. Government (USG)

On the same day that President Aquino declared a disaster in 11 provinces, U.S. Ambassador Nicholas Platt exercised his disaster assistance authority, releasing \$25,000, to the Sorsogon City Red Cross for the local purchase of food.

On Nov. 27, USAID officials arrived in Sorsogon Province and worked with local disaster relief teams in assessing damage and planning how to best use U.S. emergency funds. U.S. Mission Disaster Relief Officer Bryant George toured Sorsogon, the hardest hit of the central provinces, with DSWD Secretary Dr. Mita Pardo de Tavera the next day. USAID dispatched two additional assessment officials to the Bicol on Dec. 7. One

representative visited Albay and Camarines Sur provinces while the second, an engineer, joined the GOP Department of Public Works employees who assessed infrastructural damage, particularly to the Bicol electrical cooperatives.

Based on the available assessments, OFDA agreed to fund relief, recovery, and livelihood projects by PBSP, ADRA, and CARE. The prime objectives of all three programs were to restore housing to habitable condition at minimal cost and to get fast-growing food crops cultivated or other livelihood activities underway in order to ensure shelter and food to beneficiaries within three months. OFDA provided a \$500,000 grant to the PBSP for housing and livelihood projects in Marinduque, Albay, Camarines Sur, and Sorsogon provinces. For more information on this program, refer to the previous section, "Assistance Provided by the Government of the Philippines and Non-Governmental Organizations."

A \$26,000 grant by OFDA supported a three-month housing rehabilitation program designed and implemented by ADRA. The funding covered the cost of construction materials, transportation, and overhead for ADRA officials. Although the ADRA proposal initially targeted 500 families, the program assisted 992 families, principally victims residing on five small islands off the coast of Luzon and two barangays in Division III. Building materials were purchased locally by ADRA officials. The Seventh Day Adventists' Southern Luzon Mission assisted ADRA relief officials in distributing OFDA-funded construction material free of charge. The Filipino beneficiaries provided the labor.

CARE received an OFDA grant of \$270,515 which was used to provide core housing for 2,727 families and seeds for 1,792 families in Albay Province. CARE targeted communities where more than 60% of the homes were destroyed. The program lasted four months. Additional local currency for the program was available due to the depreciation of the peso against the dollar during the implementation period and an unexpected savings in the procurement of commodities for the program.

On Dec. 4, A.I.D.'s Office of Food for Peace (FFP) concurred with a CRS proposal to distribute CRS in-country stocks of P.L. 480 Title II food in Southern Tagalog and the Bicol administrative divisions. The food comprised 82 MT of NFDM and 218 MT CSM and was valued at \$161,480 (including ocean freight). FFP also agreed to the diversion of \$97,948 worth of in-country P.L. 480 Title II food from CARE's regular projects to an emergency relief program.

OFDA agreed on Feb. 4 to provide \$6,000 for 4.5 MT of rice and vegetable seeds to the International Rice Research Institute (IRRI) for distribution among the neediest farmers in the Bicol region. The program would have also involved the GOP Department of Agriculture and the Philippine National Rice Research Institute. However, IRRI did not purchase the commodities within the required timeframe and the money was remanded to OFDA.

DOD personnel and their families stationed throughout the Philippine islands not only coordinated with USAID/Manila in distributing relief goods but held their own collections and dispersal of relief goods. On Dec. 5, USAID and U.S. military authorities from Clark, Subic Bay, San Miguel, John Hay, and Capas U.S. military bases coordinated an airlift of 54.5 MT of relief supplies to Legaspi City aboard U.S. C-130s. Much of the donated goods, including medicine, food, and clothing, was collected by U.S. military personnel and their families stationed on the islands. Two Navy and Marine H-53 helicopters ferried items from Legaspi to the remote areas of Pilar, Dansol, Kasiguran, Magallanes, and Juban in Sorsogon Province. U.S. service personnel voluntarily flew the aircraft and distributed relief items directly to the victims at each landing site. U.S. military and Philippine constabulary officials trucked some of the available relief goods from Legaspi to Sorsogon City. OFDA provided \$50,000 to cover fuel costs for the operations. By Dec. 23, military personnel and their families stationed in the Philippines had airlifted and distributed a total of 59 MT of rice, used clothing, medicine, and canned goods in Sorsogon and service personnel had assembled approximately 15,000 family-sized food packets.

A joint U.S. Navy-USAID distribution effort occurred on Jan. 20. U.S. personnel distributed 21.8 MT of food, clothing, essential medicine, and books to the affected population in Camarines Sur Province; the goods were collected through volunteer donations from the Subic Bay elementary schools, naval stations in Japan and Okinawa, USS Jason personnel, and naval chaplains serving in the region. The goods were divided among approximately 3,000 families in the towns and cities of Naga, Iriga, Concepcion, Pasacao, Sangay, Balatan, and Minalabac.

DOD was particularly involved in the provision of medical relief. The Clark and Subic Bay medical civil action program (medcap) services were mobilized and by Jan. 4, medcap units were treating an average of 1,700 Filipinos per day, including pregnant and lactating women, malnourished children, those with dental problems, and those complaining of ailments which were aggravated by exposure. OFDA provided an additional grant of \$12,000 to DOD on Dec. 25 for gas and oil used by the medcap units. Clark AFB personnel also provided medicine and transport support in December and January for the GOP Department of Health which was treating the sick in five affected provinces. The U.S. Air Force flew small trucks filled with medicine into Legaspi. On Jan. 4, Ambassador Platt visited several provinces in the Bicol Peninsula which had been severely affected by typhoons Betty (mid-August) and Nina.

Summary of USG Assistance

Ambassador's authority channeled through the PNRG for the local purchase of relief supplies.....	\$25,000
Support of DOD airlift of donated relief supplies.....	\$50,000

Gas and oil for DOD medcaps.....	\$12,000
Grant to ADRA/Philippines for an emergency shelter relief program.....	\$26,650
Grant to PBSP for an emergency relief program.....	\$500,000
Grant to CARE for emergency family shelter and livelihood rehabilitation program.....	\$270,515
82 MT of NFDM and 218 MT of CSM from CRS P.L.-480 Title II stocks diverted for emergency feeding program and ocean freight (FFP funds).....	\$161,480
P.L. 480 Title II stocks diverted from CARE's regular programs to CARE's emergency relief program (FFP funds).....	\$97,948
Total OFDA.....	\$884,165
Total FFP.....	\$259,428
<u>TOTAL</u>	<u>\$1,143,593</u>

Assistance Provided by U.S. Private Voluntary Agencies

ADRA - implemented a housing rehabilitation program in Albay Province utilizing OFDA funding to purchase construction supplies, with assistance from the GOP agencies in identifying qualified recipients. ADRA contributed two full-time staff and in-country transportation costs. (See "Assistance Provided by the U.S. Government" for a detailed description.)

CARE - dispatched an assessment team to the Bicol on Dec. 10. Based on the team's recommendations, CARE implemented a housing and livelihood program through an OFDA grant. (Refer to "Assistance Provided by the U.S. Government" for a description of the program.) CARE personnel also diverted in-country FFP P.L. 480 Title II food from regular feeding programs to Sorsogon residents. Five full-time CARE employees worked on emergency food distributions and the housing and livelihood program.

CRS - distributed 82 MT of NFDM and 218 MT of CSM from P.L. 480 Title II stocks for distribution in Southern Tagalog Administrative Division on Dec. 4.

Assistance Provided by the International CommunityInternational Organizations

EEC - channeled \$434,082 through the Danish Red Cross and the PNRC for the local purchase of rice, canned food, clothing, blankets, and roofing materials. The EEC also sent food, medicine, and a medical team, worth \$186,035, through MSF/Belgium.

ILO - dispatched a team to assess damage sustained by small handicraft workshops.

LRCS - the following national Red Cross chapters channeled contributions through the LRCS:

Australia - \$3,448
Canada - \$3,817
Iceland - \$1,471
Sweden - \$49,587
Switzerland - 2,600,000 water purification tablets
U.K. - \$17,615

UNICEF - provided \$100,000 to purchase medicine, tarpaulins, supplementary food, and 5-liter water containers. UNICEF also sent two assessment teams to Bicol Division on December 3 and 7; the teams delivered initial supplies of medicine to the area. UNICEF coordinated donor contributions.

Governments

Australia - channeled \$37,586 through UNICEF and \$41,379 through PBSP. The Australian Embassy designated the PBSP donation for northern Samar Province where Australia sponsors bilateral development programs.

Belgium - provided \$60,000.

Canada - provided \$76,336 through the Canadian Red Cross.

Germany, Fed. Rep. - donated \$60,100 to the PNRC for food and clothing and gave a matching sum to West German NGO counterparts working in the affected areas.

Japan - contributed \$300,000.

New Zealand - donated \$62,500 through UNICEF.

Norway - provided \$100,770 through UNICEF for the purchase of food and medicine.

Sweden - channeled a grant through the LRCS (See International Organizations).

Switzerland - gave water purification tablets through LRCS.

United Kingdom - purchased local medicine (primarily antibiotics and vitamin A) and channeled the donation through the GOP Department of Health for distribution in Bicol Division; goods were valued at \$18,018. The U.K. also provided a matching cash contribution to UNICEF, \$18,000 through NEDA, and a cash grant through LRCS.

Non-Governmental Organizations

Caritas/Germany, Fed. Rep. - gave \$60,606.

MSF/Belgium - dispatched a 5-member team which worked with the Philippine Department of Health for 120 days dispensing medicine, monitoring the outbreak of epidemics, and providing food to children and lactating and pregnant women in the affected areas. The program targeted 380,000 people for assistance.

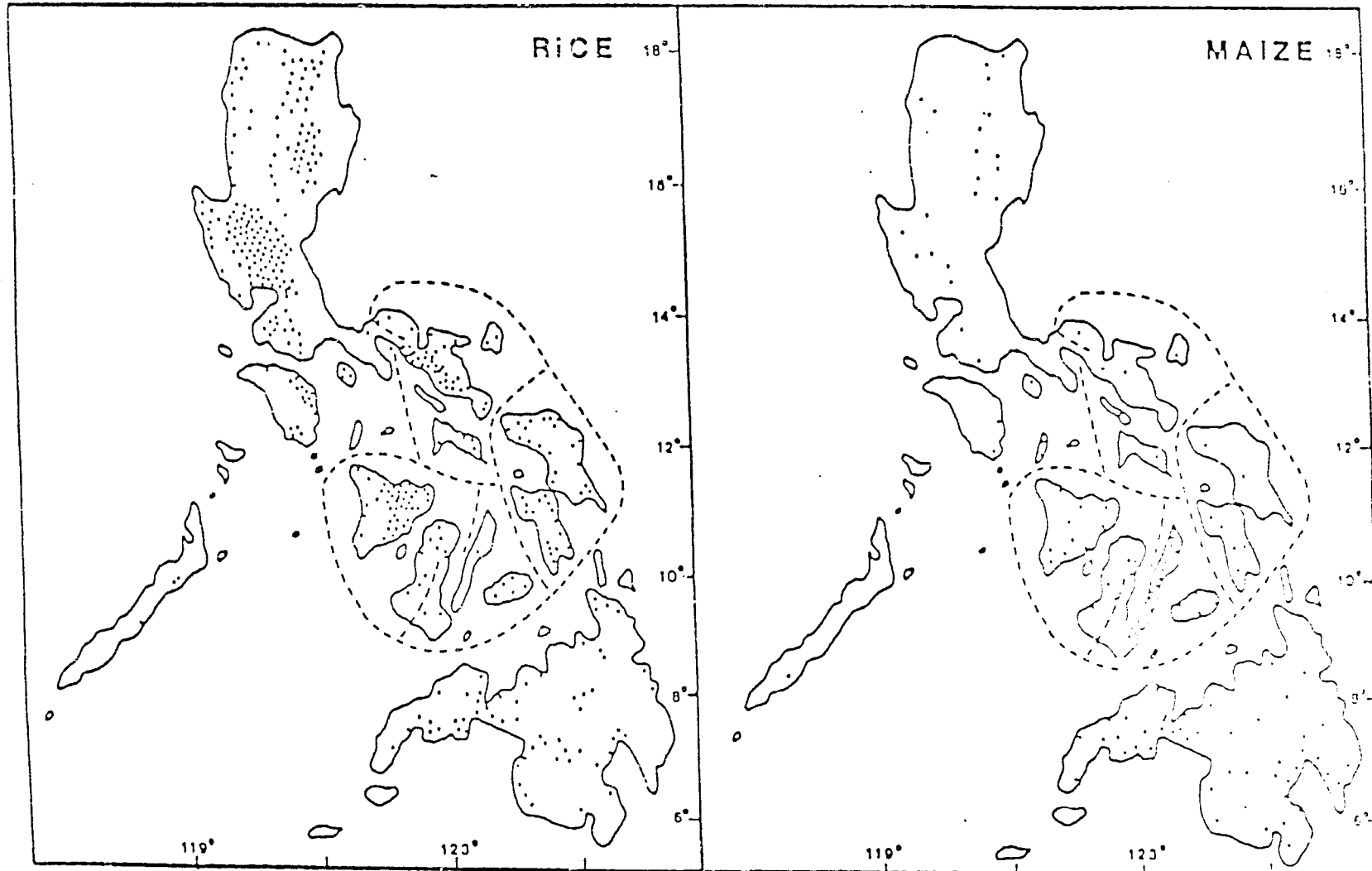
TOTAL \$1,691,450

Crop Dates

<u>Crops</u>	<u>Harvest Period</u>	<u>Bulk of Harvest</u>
Maize.....	June - September	August
Rice:		
Lowland.....	October - December	November*
Palagad.....	May - July	June
Upland.....	September - November	October
Sugarcane.....	October - April	March
Sugar.....	Campaign from September through August	
Potatoes.....	September - October	October
Sweet potatoes.....	September - October	October
Cassava.....	September - October	October
Onions.....	January - April	April
Tomatoes.....	March - June	June
Watermelons.....	January - March	March
Cabbage.....	November - May	May
Green peas and beans.....	August - September	September
Dry beans.....	August - October	October
Dry peas.....	July - Sept. and Nov. - Jan.	---
Cowpeas.....	Aug. - Sept. and Dec. - Jan.	---
Oranges, mandarins, tangerines, lemons.....	January - November	February
Grapefruit.....	Whole year round	---
Bananas.....	Whole year round	---
Avccados.....	June - August	August
Mangoes.....	May - July	July
Pineapples.....	June - August	August
Groundnuts.....	September - October	October
Soybeans.....	October - January	---
Coconuts.....	Whole year round	---
Coffee.....	January - April	March
Tea.....	January - April	---
Cacao.....	October - December	December
Tobacco.....	January - April	March
Cotton.....	January - March	---
Abaca, ramie and kapok.....	Whole year round	---
Rubber.....	Whole year round	---

*Lowland paddy accounts for more than two thirds of the total crop.

PHILIPPINES
RICE AND CORN DISTRIBUTION

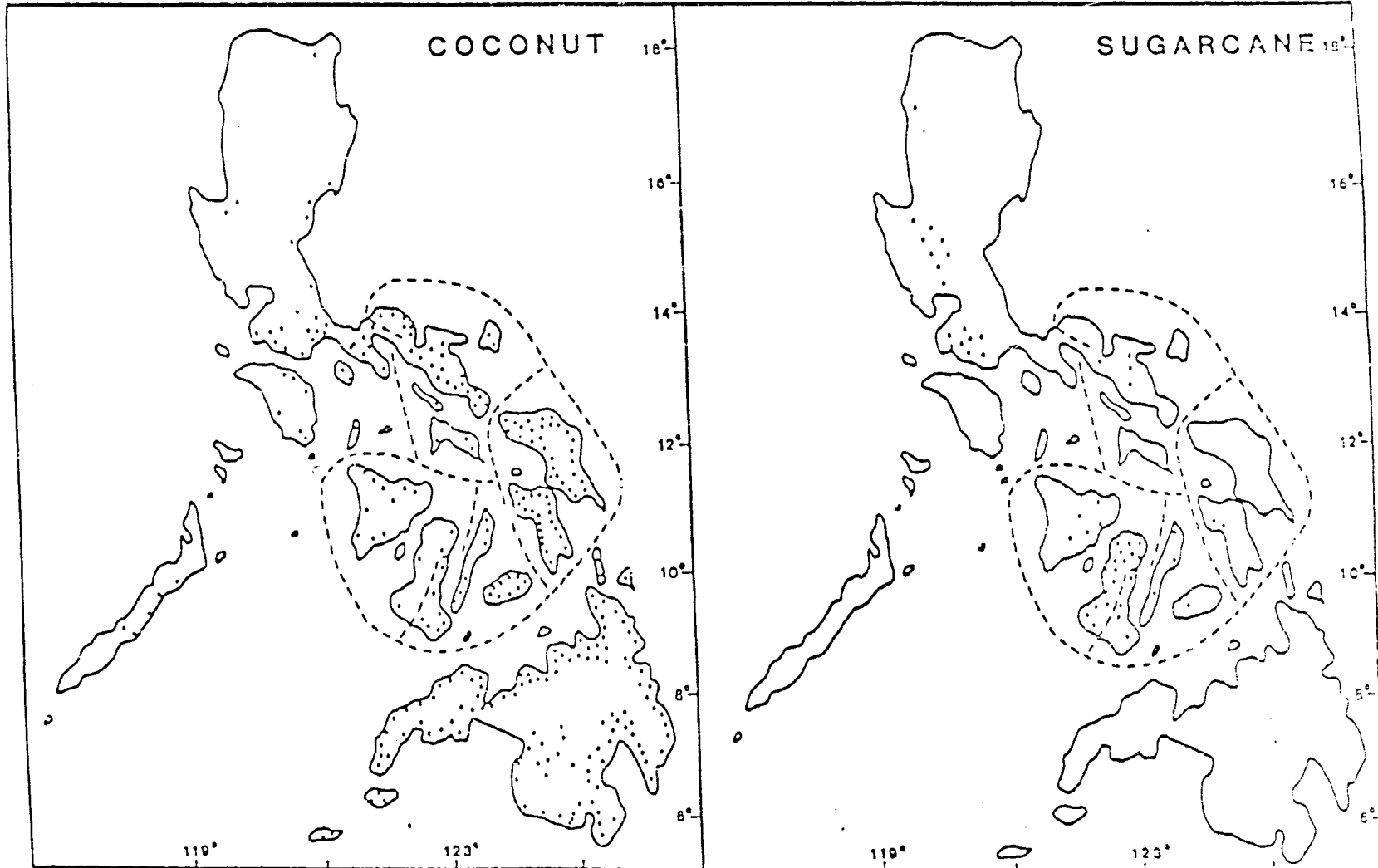


Distribution of Rice and Maize Grown in the Philippines.

Source: Proposed Agroclimatic Assessment Models for Policy Decision Making, Economic Planning and Rural Development in the Philippines

PHILIPPINES

COCONUT AND SUGARCANE DISTRIBUTION



Distribution of Coconut and Sugarcane Grown in the Philippines.

Source: Proposed Agroclimatic Assessment Models for Policy Decision Making, Economic Planning and Rural Development in the Philippines

MODIFIED MERCALLI INTENSITY SCALE
(1956 VERSION)

- I. Not felt. Marginal and long-period effects of large earthquakes.
- II. Felt by persons at rest, on upper floors, or favorably placed.
- III. Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
- IV. Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing cars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In the upper range of IV, wooden walls and frames creak.
- V. Felt outdoors; direction estimated. Sleepers awakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.
- VI. Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc. fall off shelves. Pictures fall off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church and school). Trees, bushes shaken visibly, or heard to rustle.
- VII. Difficult to stand. Noticed by drivers. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices, also unbraced parapets and architectural ornaments. Some cracks in masonry C. Waves on ponds, water turbid with mud. Small slides and caving-in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.
- VIII. Steering of cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken off trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.

- IX. General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. General damage to foundations. Frame structures, if not bolted, shifted off foundations. Frames racked. Serious damage to reservoirs. Underground pipes broken. Conspicuous crack in ground. In alluvial areas, sand and mud ejected, earthquake fountains, sand craters.
- X. Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.
- XI. Rails bent greatly. Underground pipelines completely out of service.
- XII. Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.

To avoid ambiguity of language, the quality of masonry, brick or otherwise, is specified by the following letters:

- Masonry A - Good workmanship, mortar and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces.
- Masonry B - Good workmanship and mortar; reinforced but not designed in detail to resist lateral forces.
- Masonry C - Ordinary workmanship and mortar; no extreme weaknesses like failing to tie-in at corners, but neither reinforced nor designed against horizontal forces.
- Masonry D - Weak materials, such as adobe; poor mortar; low standards of workmanship; weak horizontally.

Source: SE^SEE. Series on Seismology. Vol. IV. Philippines.

ROSSI-FOREL SCALE OF EARTHQUAKE INTENSITIES
ADAPTED

- I. Hardly perceptible shock - felt only by an experienced observer under favorable conditions.
- II. Extremely feeble shock - felt by a small number of persons at rest.
- III. Very feeble shock - felt by several persons at rest. Duration and direction may be perceptible. Sometimes dizziness or nausea experienced.
- IV. Feeble shock - felt generally indoors, outdoors by a few. Hanging objects swing slightly. Creaking of frames of houses.
- V. Shock of moderate intensity - felt generally by everyone. Hanging objects swing freely. Overturning of all tall vases and unstable objects.
- VI. Fairly strong shock - general awakening of those asleep. Some frightened persons leave their houses. Stopping of pendulum clocks. Oscillation of hanging lamps. Slight damage to very old or poorly-built structures.
- VII. Strong shock - overturning of movable objects. General alarm, all run outdoors. Damage slight in well-built houses, considerable in old or poorly-built structures, old walls, etc. Some landslides from hills and steep banks. Cracks in road surfaces.
- VIII. Very strong shock - people panicky. Trees shaken strongly. Changes in the flow of springs and wells. Sand and mud ejected from fissures in soft ground. Small landslides.
- IX. Extremely strong shock - panic general. Partial or total destruction of some buildings. Fissures in ground. Landslides and rock falls.

Source: SEASEE. Series on Seismology. Vol. IV. Philippines.

GOVERNMENT HOSPITALS LICENSED BY THE DEPARTMENT OF HEALTH *
Calendar Year 1987

REGIONAL HEALTH OFFICE NO. 1
San Fernando, La Union

LOCATION PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
<u>ABRA</u>				
Bangued	1. Abra Provincial Hospital	100	Provincial	T
<u>BENGUET</u>				
Baguio City La Trinidad	1. Dr. Efraim Montemayor Medical Center 2. Benguet General Hospital	350 100	Medical Center Provincial	T T
<u>ILOCOS NORTE</u>				
Batac Laoag City	1. Batac General Hospital 2. Ilocos Norte Provincial Hosp.	200 100	Provincial Provincial	T T
<u>ILOCOS SUR</u>				
Vigan Narvacan Tugudin	1. Gabriela Siland Memorial Hospital 2. Central Ilocos Sur General Hosp. 3. Southern Ilocos Sur District Hosp.	100 50 50	Provincial District District	T S S
<u>LA UNION</u>				
San Fernando Agoa	1. Ilocos Regional Hospital 2. Dona Gregoria Memorial Hospital	150 100	Regional Provincial	T T
<u>MT. PROVINCE</u>				
Bontoc Bauco	1. Bontoc General Hospital 2. Luis Hora Memorial Hospital	100 75	Provincial District	T S
<u>PANGASINAN</u>				
Dagupan City San Carlos Tayug Urdueta Alaminos	1. Gov. Teofilo Sison Mem. Hospital 2. San Carlos City General Hospital 3. Eastern Pangasinan District Hospital 4. Amadeo J. Perez Mem. General Hospital 5. Western Pangasinan General Hospital	200 150 150 50 75	Provincial District District District District	T T T S S
<u>BENGUET</u>				
Baguio City	1. Phil. Military Academy Station Hosp.	50	Military	S

LOCATION PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
REGIONAL HEALTH OFFICE NO. II Tuguegaro, Cagayan				
<u>BATANES</u>				
Basco	1. Batanes Provincial Hospital	75	Provincial	S
<u>CAGAYAN</u>				
Tuguegaro	1. Cagayan Regional Hospital	400	Regional	T
Aparri	2. Cagayan District Hospital (IPHO)	50	Provincial	S
Lasam	3. Lasam District Hospital	50	District	S
Piat	4. Nuestra Senora de Piat General Hosp.	50	District	S
<u>IFUGAO</u>				
Lagawe	1. Ifugao General Hospital	75	Provincial	S
<u>ISABELA</u>				
Iligan	1. Isabela Provincial Hospital (IPHO)	100	Provincial	T
Cabagan	2. Milagros General Hospital	50	District	S
Cauayan	3. Cauayan District Hospital	50	District	S
Roxas	4. Manuel Roxas District Hospital	50	District	S
Tumauini	5. Tumauini District Hospital	50	District	S
<u>KALINGA-APAYAO</u>				
Tabuk	1. Kalinga-Apayao Provincial Hospital	150	Provincial	S
Lubuagan	2. Kalinga District Hospital	50	District	S
<u>NUOVA VISCAYA</u>				
Bayombong	1. Nueva Viscaya Provincial Hospital	200	Provincial	T
Panbang	2. Magsaysay General Hospital	50	District	S
<u>QUIRINO</u>				
Cabaroquis	1. Quirino Provincial Hospital	100	Provincial	T
REGIONAL HEALTH OFFICE NO. III San Fernando, Pampanga				
<u>BATAAN</u>				
Balanga	1. Balanga Provincial Hospital	200	Provincial	T

LOCATION PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
<u>BULACAN</u>				
Malolos	1. Bulacan Provincial Hospital	200	Provincial	T
Sta. Maria	2. Sta. Maria District Hospital	100	District	S
Baliuag	3. Baliuag District Hospital	75	District	S
Calumpit	4. Calumpit District Hospital	50	District	S
Hageney	5. Mayor Emilio G. Perez Mem. Hospital	50	District	S
San Jose	6. Sapang Palay District Hospital	50	District	S
San Miguel	7. San Miguel District Hospital	50	District	S
<u>NUEVA ECIJA</u>				
Cabanatuan	1. Dr. Paulino J. Garcia Mem. Research & Medical Center	300	Medical Center	T
San Jose	2. Nueva Ecija Provincial Hospital	50	Provincial	T
San Antonio	3. San Antonio District Hospital	50	District	S
<u>PAMPANGA</u>				
San Fernando	1. Central Luzon Regional Hospital	250	Regional	T
Lubao	2. Escolastica Romero District Hosp.	50	District	S
Floridablanca	3. Romana Pangan District Hospital	50	District	S
<u>TARLAC</u>				
Tarlac	1. Tarlac Provincial Hospital	200	Provincial	T
<u>ZAMBALES</u>				
Iba	1. Pres. Ramon Magsaysay Mem. Hosp.	150	Provincial	T
San Marcelino	2. San Marcelino District Hospital	50	District	S
<u>HOSPITALS UNDER THE DEPARTMENT OF NATIONAL DEFENSE</u>				
Floridablanca, Pamp.	1. Basa Airbase Station Hosp. (AFP)	100	Military	S
San Miguel, Tarlac	2. Camp Aquino Station Hospital	100	Military	S
Palayan City, N. Ecija	3. Army Station Hospital Fort Magsaysay	100	Military	S
<u>HOSPITALS OF CHARTERED CITIES</u>				
Angeles City, Pamp.	1. Angeles City General Hospital	50	General	S
Olongapo City	2. Olongapo City General Hospital	150	General	T
<u>HOSPITALS UNDER THE PROVINCIAL GOVERNOR</u>				
Cabanatuan City	1. Nueva Ecija General Hospital	100	General	T

LOCATION PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
METRO MANILA AREA NATIONAL CAPITAL REGION				
<u>MANILA</u>				
Lopez de Vega	1. Dr. Jose Fabella Memorial Hospital	700	Special	T
Quiricada	2. San Lazaro Hospital	900	Special	T
Rizal Avenue	3. Dr. Jose Reyes Mem. Medical Center	450	Medical Center	T
Balut, Tondo	4. Tondo Medical Center	200	Regional	T
<u>QUEZON CITY</u>				
Banawa	1. National Orthopedic Hospital	700	Special	T
East Avenue	2. East Avenue Medical Center	350	Medical Center	T
E. Rodriguez	3. National Children's Hospital	250	Special	T
Project 4	4. Quirino Memorial General Hospital	200	Regional	T
Quezon Avenue	5. National Kidney Institute	117	Specialty	T
Quezon Avenue	6. Lung Center of the Philippines	303	Specialty	T
East Avenue	7. Philippine Heart Center for Asia	200	Specialty	T
E. Rodriguez Sr.	8. Quezon Institute	760	Special	T
Quezon Avenue	9. Phil. Children's Medical Center	200	Specialty	T
<u>RIZAL</u>				
Mandaluyong	1. National Center for Mental Health	5,200	Special	T
Marikina	2. Eulogio Rodrigues Sr. Mem. Hosp.	100	District	T
Pasig	3. Rizal Medical Center	300	Medical Center	T
<u>CALCOCAN</u>				
Tala	1. Dr. Jose M. Rodrigues Memorial Hospital	2,000	Sanitaria	T
<u>HOSPITAL UNDER OTHER GOVERNMENT AGENCIES</u>				
Caloocan City	1. Col. Salvador T. Villa Memorial Hosp.	115	Provincial	T
<u>HOSPITAL UNDER THE DEPT. OF JUSTICE</u>				
Mandaluyong	1. Bilibid Prisons Hospital	50	General	S
<u>HOSPITAL UNDER THE DEPT. OF NATIONAL DEFENSE</u>				
Mandaluyong	1. Pres. Security Group Hospital	50	General	T
V. Luna, Q.C.	2. A.F.P. Medical Center	1,700	General	T
North Ave., Q.C.	3. Veterans Memorial Medical Center	760	General	T
Camp Crane	4. Constabulary General Hospital	150	General	T
Fort Bonifacio	5. Marines Barracks Hospital	100	General	T
Fort Bonifacio	6. Fort Bonifacio General Hospital	750	General	T
Pasay City	7. Phil. Airforce General Hospital	100	General	T
Camp Bonifacio	8. Metropolitan Police Force Hospital	50	General	T

LOCATION PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
<u>HOSPITAL OF CHARTERED CITIES</u>				
<u>MANILA</u>				
Pres. Quirino	1. Hospital ng Maynila	300	Medical Center	T
<u>RIZAL</u>				
Pasay City	3. Pasay City General Hospital	100	General	S
<u>QUEZON CITY</u>				
Seminary Road	1. Quezon City General Hospital	250	Regional	T
<u>HOSPITAL UNDER THE CITY GOVERNMENT</u>				
<u>MUNTINLUPA</u>				
Mandaluyong	1. Mandaluyong Medical Center	50	General	S
REGIONAL HEALTH OFFICE NO. IV Quezon City				
<u>BATANGAS</u>				
Batangas City	1. Batangas Regional Hospital	200	Regional	T
Lemery	2. Batangas Provincial Hospital	50	Provincial	T
Lipa City	3. Lipa City District Hospital	75	District	S
Balayan	4. Don Manuel Lopez Mem. District Hospital	50	District	S
Nasugbu	5. Apacible Memorial District Hospital	50	District	S
<u>CAVITE</u>				
Trece Martirez City	1. Andres Bonifacio Memorial Hospital	150	Provincial	T
Cavite City	2. Dr. Olivia Salamanca Mem. District Hosp.	50	District	T
<u>LAGUNA</u>				
Sta. Cruz	1. Laguna Provincial Hospital	150	Provincial	T
San Pablo	2. San Pablo City District Hospital	150	District	T
Calamba	3. Dr. Jose P. Rizal Mem. District Hospital	50	District	S
Luisiana	4. Luisiana District Hospital	50	District	S
Pakil	5. Gen. Juan P. Cailles Mem. District Hosp.	50	District	S
<u>MARINDUQUE</u>				
Boac	1. Marinduque Provincial Hospital	100	Provincial	T
<u>MINDORO OCCIDENTAL</u>				
Namburao	1. Occidental Mindoro Provincial Hosp.	100	Provincial	T

LOCATTON PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
<u>MINDORO ORIENTAL</u>				
Calapan	1. Oriental Mindoro Provincial Hosp.	100	Provincial	T
<u>PALAWAN</u>				
Cuyo Puerto Princesa	1. Cuyo District Hospital 2. Puerto Princesa City District Hosp.	50 50	District District	S S
<u>QUEZON</u>				
Lopez Gumaca Lucena City	1. Magsaysay Memorial District Hosp. 2. Gumaca District Hospital 3. Quezon Memorial District Hospital	75 50 200	District District Provincial	S S S
<u>RIZAL</u>				
Morong Angono	1. Morong General Hospital 2. Angono District Hospital	75 50	Provincial District	S S
<u>ROMBLON</u>				
Odiongan Romblon	1. Romblon Provincial Hospital 2. Romblon District Hospital	100 75	Provincial District	T S
<u>HOSPITALS UNDER THE DEPT. OF NATIONAL DEFENSE</u>				
<u>BATANGAS</u>				
Lipa City	1. Fernando Airbase Station Hospital	100	General	S
<u>CAVITE</u>				
Cavite City	2. Naval Station Hospital	50	General	S
<u>RIZAL</u>				
Tanay	1. Camp Capinpin Station Hospital	50	General	S
<hr/>				
REGIONAL HEALTH OFFICE NO. V Legaspi City				
<u>ALBAY</u>				
Legaspi City Tabaco	1. Albay Provincial Hospital 2. Ziga Memorial Hospital	150 50	Provincial District	T S
<u>CAMARINES NORTE</u>				
Daet	1. Camarines Norte Provincial Hosp.	150	Provincial	T

LOCATION PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
<u>CAMARINES SUR</u>				
Naga City Libmanan	1. Bicol Regional Hospital	450	Regional	T
	2. Libmanan District Hospital	50	District	S
<u>CATANDUANES</u>				
Virac Bato	1. Eastern Bicol Medical Center	200	Provincial	T
	2. Bato Maternity & Children's Hosp.	50	District	S
<u>MASBATE</u>				
Masbate	1. Masbate Provincial Hospital	100	Provincial	T
<u>SORSOGON</u>				
Sorsogon	1. Sorsogon Provincial Hospital	100	Provincial	T
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REGIONAL HEALTH OFFICE NO. VI Iloilo City				
<u>AKLAN</u>				
Palibe	1. Dr. Rafael Tumbokon Memorial Hosp.	100	Provincial	T
<u>ANTIQUE</u>				
San Jose	1. Angel Salazar Memorial Hospital	100	Provincial	T
<u>CAPIZ</u>				
Poilan Roxas City Mambusao	1. Capiz Provincial Hospital	50	Provincial	T
	2. Roxas Memorial General Hospital	75	Provincial	T
	3. Mambusao District Hospital	50	District	S
<u>ILOILO</u>				
Iloilo City Pototan	1. Western Visayas Medical Center	300	Medical Center	T
	2. Iloilo Provincial Hospital	100	Provincial	T
Almodian	3. Alcosan District Hospital	50	District	S
Cabatuan	4. Ramon Tabiana Memorial District Hosp.	50	District	S
Dumangas	5. Dumangas District Hospital	50	District	S
Guimbal	6. Rep. Pedro Trono Memorial Hospital	50	District	S
Lambunao	7. Dr. Ricardo L. Ladrito Memorial Hosp.	50	District	S
Sara	8. Sara District Hospital	50	District	S
Sta. Barbara	14. Western Visay Sanitarium	300	Sanitaria	S

LOCATION PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
<u>NEGROS OCCIDENTIAL</u>				
Bacolod City	1. Corazon Locsin Memorial Hospital (Western Visayas Regional Hosp.)	400	Regional	T
Silay City	2. Dr. Jose Locsin Memorial Hospital	75	Provincial	T
Himamayland	3. Gov. Valeriano Gatus ao Mem. Hospital	75	District	S
Escalante	4. Vicente Gustillo Memorial Hospital	50	District	T
<u>HOSPITAL UNDER OTHER GOVERNMENT AGENCIES</u>				
<u>UNIVERSITY HOSPITAL</u>				
E. Lopez St. Jaro, Iloilo	1. West Visayas State University Hospital (Gov. Benito Lopez Memorial Hospital)	150	General	T
<u>REGIONAL HEALTH OFFICE NO. VII</u>				
Cebu City				
<u>BOHOL</u>				
Tagbilaran City	1. Gov. Celestino Gallares Memorial Hosp.	200	Regional	T
Talibon	2. Cong. Maximo Garcia Memorial Hospital	75	Provincial	T
Carmen	3. Cong. Simeon Toribio Memorial Hosp.	50	District	S
<u>CEBU</u>				
Cebu City	1. Southern Islands Medical Center	350	Medical Center	T
Lapu-Lapu	2. Lapu-Lapu City District Hospital	75	District	S
Minglanilla	3. Minglanilla District Hospital (Open District Hospital)	50	District	S
Bogo	4. Severo Verallio Memorial Hospital	50	District	T
Mandaue	5. Eversly Child Sanitarium	1,000	Sanitaria	S
<u>NEGROS ORIENTAL</u>				
Dumaguete City	1. Negros Oriental Provincial Hospital	250	Provincial	T
Bayawan	2. Bayawan District Hospital	50	District	S
Guihulugan	3. Guihulugan District Hospital	50	District	S
<u>SIQUIJOR</u>				
Siquijor	1. Siquijor Provincial Hospital	100	Provincial	T
<u>HOSPITAL OF CHARTERED CITIES</u>				
<u>CEBU</u>				
Cebu City	1. Cebu City Medical Center	200	General	T

LOCATION PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
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HOSPITALS UNDER THE DEPARTMENT OF NATIONAL DEFENSE

Cebu City	1. Army Station Hospital	100	General	S
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REGIONAL HEALTH OFFICE NO. VIII

Tacloban City

LEYTE DEL NORTE

Tacloban City	1. Tacloban City Medical Center	250	Regional	T
Ormoc City	2. Ormoc District Hospital	125	Provincial	T
Abuyog	3. Abuyog District Hospital	75	District	S
Buruæn	4. Buruæn District Hospital	75	District	S
Calubian	5. Calubian District Hospital (Northwestern Leyte Provil. Hosp.)	75	District	S
Palompon	6. Palompon District Hospital (Dr. Manuel Veloso Mem. Hosp.)	75	District	S
Baybay	7. Western Leyte Provincial Hospital	100	Provincial	T

SOUTHERN LEYTE

Maasim	1. Southern Leyte Provincial Hospital	100	Provincial	T
Anahawan	2. Anahawan District Hospital	50	District	S
Sogod	3. Sogod District Hospital	50	District	S

EASTERN SAMAR

Borongan	1. Eastern Samar Provincial Hospital	100	Provincial	T
Guian	2. Southern Samar District Hospital	50	District	S

NORTHWESTERN SAMAR

Catarman	1. Northern Samar Provincial Hospital	100	Provincial	T
Allen	2. Allen District Hospital	50	District	S
Laoang	3. Dr. Gregorio B. Tan Mem. Medical Center	50	District	S

WESTERN SAMAR

Catbalogan	1. Samar Provincial Hospital	100	Provincial	T
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REGIONAL HEALTH OFFICE NO. IX

Zamboanga City

SULU

Jolo	1. Sulu Hospital	100	Provincial	T
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LOCATION PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
<u>TAWI-TAWI</u>				
Bongao	1. Datu Halum Sakilan Memorial Hosp.	50	Provincial	S
<u>ZAMBOANGA DEL SUR</u>				
Zamboanga City	1. Zamboanga General Hospital	200	Regional	T
Pagadian City	2. Zamboanga del Sur Provincial Hospital	50	Provincial	T
Aurora	3. Aurora General Hospital	150	District	T
<u>ZAMBOANGA DEL NORTE</u>				
Dipolog City	1. Zamboanga del Norte Provincial Hosp.	100	Provincial	T
Sindangan	2. Sindangan District Hospital	100	District	S
Dapitan City	3. Rizal Memorial Hospital	75	District	S
<u>HOSPITALS UNDER THE DEPT. OF NATIONAL DEFENSE</u>				
Zamboanga City	1. Southern Command, AFP (RUC 9 General Hosp., NAFFP)	100	General	S
Suiu, Jolo	2. RUC 9 Hospital, Jolo, Sulu AFP (Southern Command Hospital)	100	General	S
<hr/>				
REGIONAL HEALTH OFFICE NO. X Cagayan de Oro City				
<u>AGUSAN DEL NORTE</u>				
Butuan City	1. Butuan Hospital	100	Provincial	T
<u>AGUSAN DEL SUR</u>				
Prosperidad	1. Agusan del Sur Provincial Hospital	100	Provincial	T
Bunawan	2. Bunawan District Hospital	50	District	S
<u>BUKIDNON</u>				
Malaybalay	1. Bukidnon Hospital	100	Provincial	T
<u>CAMIGUIN</u>				
Mambajao	1. Camiguin Island Provincial Hospital	100	Provincial	S
<u>MISAMIS OCCIDENTAL</u>				
Ozamis City	1. Mayor Hilario A. Ramiro Sr., Gen. Hosp.	100	District	T
Tangub City	2. Dona Maria Tan Memorial Hospital	75	District	S
Calamba	3. Calamba District Hospital	50	District	S
Oroquieta City	4. Misamis Occidental Provincial Hosp.	100	Provincial	T

LOCATION PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
<u>MISAMIS ORIENTAL</u>				
Cagayan de Oro Gingoog City Talisayan	1. Northern Mindanao Regional Training Hosp.	200	Regional	T
	2. Gingoog District Hospital	75	District	S
	3. Talisayan District Hospital	50	District	S
<u>SURIGAO DEL NORTE</u>				
Dapa Dinagat Placer Surigao City	1. Siargao District Hospital	75	District	S
	2. Dinalgat Island District Hospital	75	District	S
	3. Placer District Hospital	75	District	S
	4. Surigao Provincial Hospital	150	Provincial	T
<u>HOSPITALS UNDER THE CITY GOVERNMENT</u>				
Agusan del Norte	1. Butuan City General Hosp. & Medical Center	150	General	T
Misamis Occidental	2. S.M. Lao Memorial City Emergency Hosp.	150	General	S
<u>HOSPITALS UNDER THE DEPARTMENT OF NATIONAL DEFENSE</u>				
Cagayan de Oro City	1. Camp Evangelista General Hospital & Medical Center (Army Station Hosp.)	100	General	S
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REGIONAL HEALTH OFFICE NO. XI Davao City				
<u>DAVAO DEL NORTE</u>				
Tagun	1. Davao del Norte Regional Hospital	150	Regional	T
<u>DAVAO ORIENTAL</u>				
Mati	1. Davao Oriental Provincial Hospital	100	Provincial	T
<u>DAVAO DEL SUR</u>				
Davao City Digos	1. Davao Medical Center	350	Medical Center	T
	2. Davao del Sur Provincial Hospital (Southern Davao Provincial Hosp.)	100	Provincial	T
<u>SOUTH COTABATO</u>				
Koronadal Gen. Santos City	1. South Cotabato Provincial Hospital	100	Provincial	T
	2. Gen. Santos Emergency Hospital & TB Pavillon	100	District	T
<u>SURIGAO DEL SUR</u>				
Tandag	1. Surigao del Sur Provincial Hospital	100	Provincial	T

LOCATION PROVINCE (Town or City)	HOSPITAL	BED CAP.	CLASSIFICATION	CATEGORY
REGIONAL HEALTH OFFICE NO. XII Cotabato City				
<u>LANAO DEL NORTE</u>				
Baroy Kolambugan Iligan City	1. Lanao del Norte Provincial Hospital	100	Provincial	T
	2. Kolambugan District Hospital	75	District	T
	3. Mindanao Sanitarium & Hospital (Iligan City Hospital)	75		
<u>LANAO DEL SUR</u>				
Mawawi City	1. Anai Pak-Pak General Hospital	75	Provincial	T
<u>MAGUINDANAO</u>				
Maganoy	1. Maguindanao Provincial Hospital	50	Provincial	S
<u>NORTH COTABATO</u>				
Cotabato City Kidapawan	1. Cotabato Regional Hospital	200	Regional	T
	2. Kidapawan Provincial Hospital	50	Provincial	S
<u>SULTAN KUDARAT</u>				
Isulan	1. Sultan Kudarat Provincial Hospital	50	Provincial	T

T = tertiary
S = secondary

* Includes only tertiary and secondary hospitals with 50 or more bed capacity; does not include the numerous government-licensed primary facilities. A complete list of government hospitals in 1987 is on file in the OFDA library.

Amateur Radio Operators in the Philippines

The following clubs and individuals are among the 885 names listed for the Philippines in the 1987 Radio Amateur Callbook.

DUIBSP	Boy Scouts of the Philippines	181 Concepcion St. Ermita, Manila 2801
DUIDBT	Don Bosco Technical College Amateur Radio Club	c/o Mario Ricardo Maipid Box SM 29 Santa Mesa 2806
DUIGIE	Guzman Inst. of Electronics, GIT	Cinerama Bldg. CM Recto Manila 2805
DUIGSP	GSP Radio Society	901 Padre Faura Manila 2801
DUI MPC	Philippine Constabulary	Camp Crame Quezon City 3003
DUI MRC	Mabuhay Amateur Radio Club, Inc.	Arcegas Bldg. Cubao Quezon City 3005
DUI PAR	PARA 17th Floor Philcomcen Bldg.	Ortigas Ave. Pasig 3130 MM
DUI MVC	Mountain View College	Valencia, Bukidnon
DUI 9WB	William G. Bones	668 Plaridel St. Davao City 9501
DUI CDM	PARA	Box 4083 Manila 2801
DUI OPAR	PARA	Box 4083 Manila 2801
DX1L	Philippine Amateur Radio League	Box SM 159 Manila 2806
DUI 3BS	Philippine Baptist Theological Sem. and Bible School, Inc.	19 Tacay Rd. Baguio City 0201
DUI 3LUTS	La Union Technical School Arc	700 Quezon Ave. San Fernando 0501 La Union

DU5AK	Romeo B. Reyes	Naga City 4701
DU5AR	Renato Q. Lazaro	Camaligan 4705 Camarines Sur
DU6BB	Jose G. Chua	Iznart St. Iloilo City 5901
DU7GJ	Dan P. Ridad	P.O. Box 59 Dumaguete City 6501 Negros Oriental
DU7NAR	Negros Amateur Radio Club	Box 596 Bacolod City 6001
DU7TPC	Third PC Zone, Signal Station	Cebu City 6401
DU8AA	Alvin L. Sebastian	596 A. Moret Field Canelar Zamboanga City 7801
DU9FPC	Fourth PC Zone	Cagayan de Oro City 8401

I. AGENCIES WITH POINT-TO-POINT COMMUNICATIONS

A. PUBLIC

1. Armed Forces of the Philippines
2. Economic Intelligence Investigation Bureau
3. Bureau of Telecommunications
4. Bureau of Air Transportation
5. Philippine Information Agency
6. Philippine Constabulary/Integrated National Police
7. National Bureau of Investigation
8. National Telecommunications Commission
9. Office of Civil Defense
10. Philippine Atmospheric Geophysical Astronomical Services Administration (PAGASA)
11. Others that may be designated

B. PRIVATE

1. Amateur Radio Associations
2. Philippine Long Distance Telephone Co.
3. Philippine Chamber of Communications, Inc. (PCCI)
4. Radio Communications of the Philippines, Inc. (RCPI)
5. Republic Telephone Co.
6. Citizens Band Operators
7. Others that may be designated

II. AGENCIES WITH WARNING CAPABILITIES

A. FOR DETECTION

1. Philippine Institute of Volcanology and Seismology
2. Disease Intelligence Center
3. Philippine Constabulary/Integrated National Police
4. Environmental Management Bureau
5. Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA)
6. Philippine Nuclear Research Institute
7. National Power Corporation
8. Philippine Coast Guard
9. Bureau of Coast and Geodetic Survey

B. FOR PUBLIC DISSEMINATION

1. Bureau of Broadcasts
2. Philippine Constabulary/Integrated National Police
3. Kapisanan ng mga Broadkaster sa Pilipinas
4. Local Governments
5. Philippine Information Agency
6. Office of Civil Defense - DZCA

Source: Calamities and Disaster Preparedness Plan. OCD.

TELEPHONE NUMBERS FOR
RADIO AND TELEVISION NETWORKS

RADIO

ABS-CBN (101.9 FM, DZMM)	922-7954
DWFM 92.3	85-63-49 810-0549
DZFX - FM	817-3321
Filipinas Broadcasting Network	817-3848 817-7135
GMA	99-70-21 97-23-93
Kanlaon Broadcasting System	97-76-61 97-75-71
Manila Broadcasting Company	815-9131 88-16-60
National Broadcasting Corporation	86-79-36 87-31-39
Philippine Broadcasting Service	40-89-76 47-92-54
Radio Mindanao Network	70-34-10
Radio Philippines Network	97-76-61
Radio Veritas	90-26-66 to 69
Radyo Pilipino	816-1312

TELEVISION

ABS-CBN (Channel 2)	922-7954
National Media Prod. Ctr. (Channel 4)	96-48-04
Channel 7	99-70-21
Radio Philippines Network (Channel 9)	97-76-61 to 69
Inter Continental Broadcasting Corporation (Channel 13)	922-1745

Source: Provisional Mission Disaster Relief Plan, USAID. July 1988.

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