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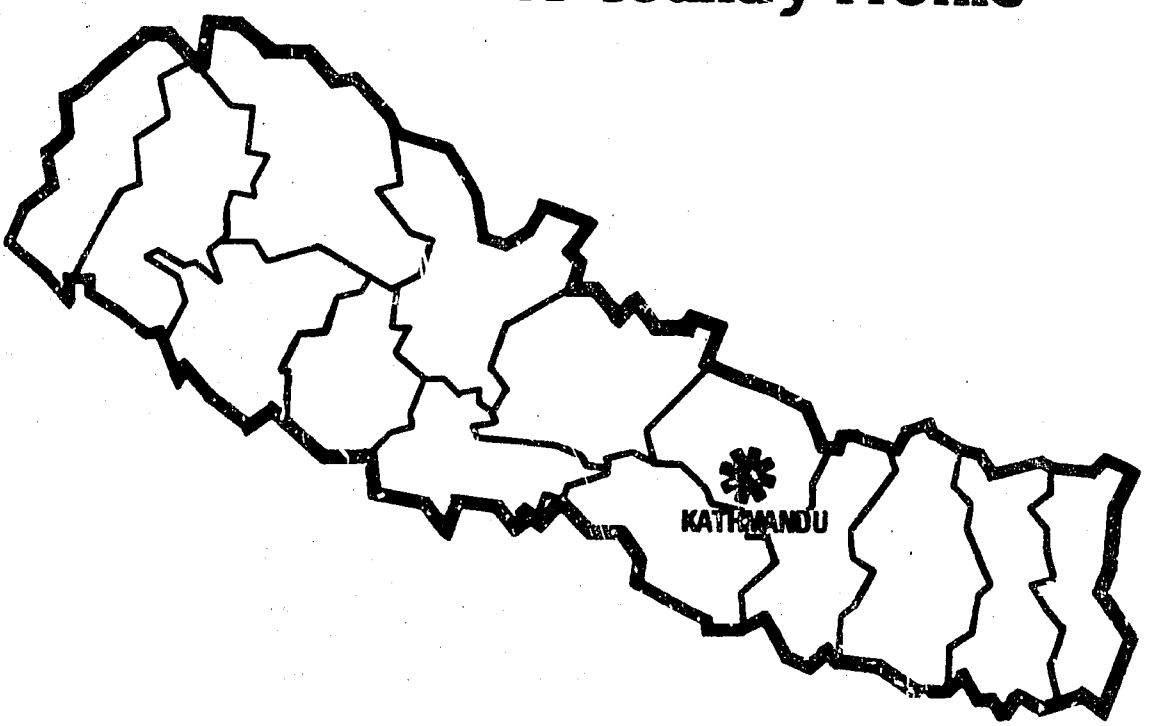
Nepal

A Country Profile



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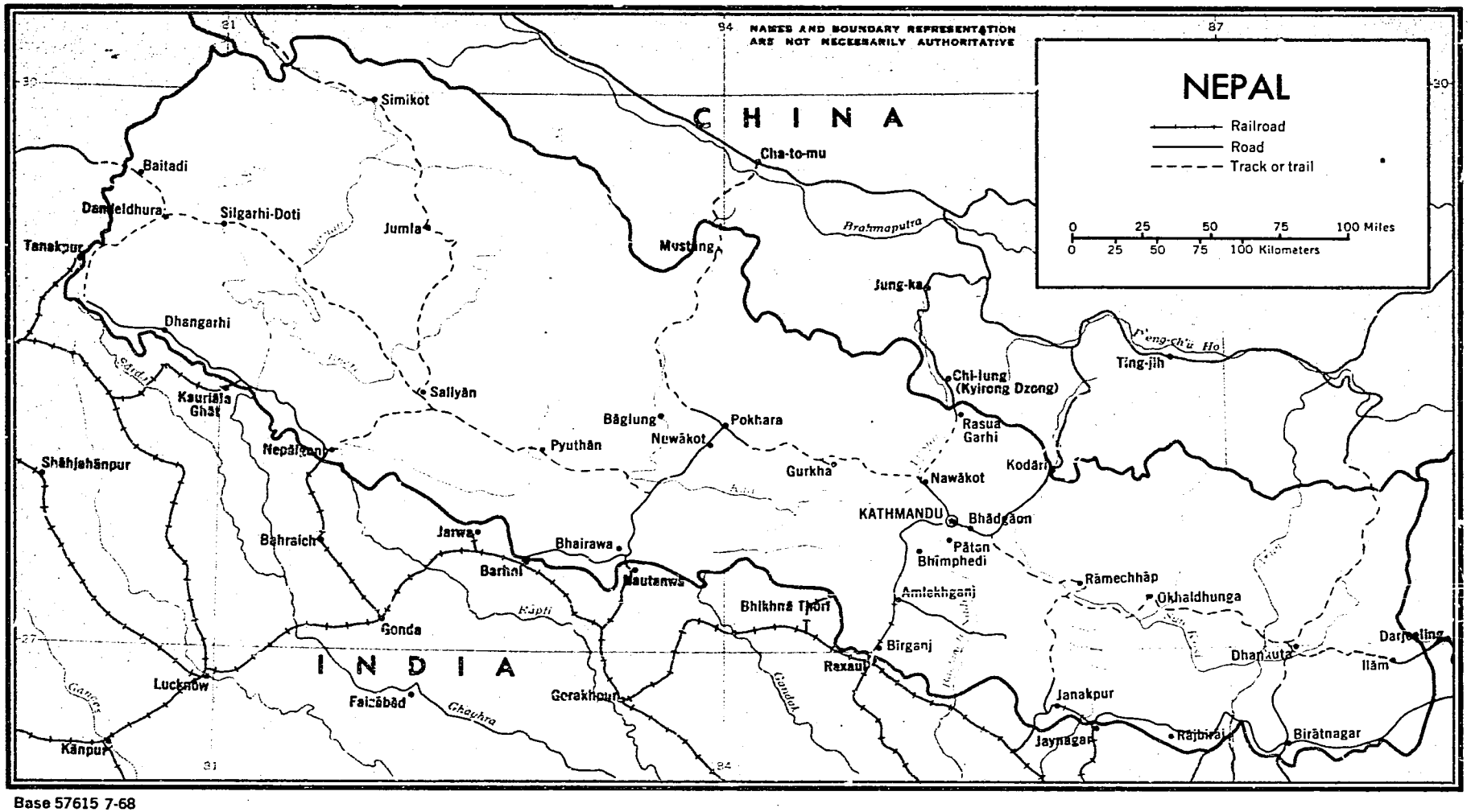
Agency for International Development
Washington, D.C. 20523



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NEPAL: A COUNTRY PROFILE

prepared for

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

by

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

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

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

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

July 1983

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1. General Information

1.1 Geographic Codes

AID Standard	367
AID Region	AID/ASIA
State Region	NEA/INS

1.2 Host Mission in U.S.

Chancery:

2131 Leroy Place, N.W.
Washington, D.C. 20008
Tel: (202) 667-4550

For current information on the Nepal Embassy staff, see U.S. Department of State, Diplomatic List.

1.3 U.S. Mission in Nepal

Embassy:

Pani Pokhari
Kathmandu
Tel: 11199, 12718, 11603/4

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

1.4 Time Zones

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

1.5 Currency and Exchange Rate

Nepalese Rupee (NR)
NR 14.3 = U.S. $1.00 (June 1983).
Since March 1978, a dual exchange rate system has been operating. The premimum rate is applied to all commodity imports except

petroleum products, cement, and chemical fertilizers.

1.6 Travel and Visa Information

Passport and visas are required. A photo and $10 dollar fee are required for a visa which is valid for three months; however, stay is limited to 30 days. Seven day visas can be obtained upon arrival at Kathmandu airport, or at any border. Smallpox, typhoid, and cholera immunizations are recommended, but not required. Paratyphoid and tetanus inoculations are suggested for travel outside Kathmandu.

1.7 Calendar and Holidays

Indra Jatra (Festival of Rain God)	August/September
Dasain (Durga Puja Festival)-over one week	October
Tihar (Festival of Lights)	October/November
Mahendra Jayanti and Constitution Day	December 15
King Birendra's Birthday	December 28
Tribhuvan Jayanti (Birthday of the late King Tribuhavn and Rashtriya Prajatantra Divas)-National Day	February 18
Shivaratri (in honor of Lord Shiva)	February/March
Navabarsha (New Year's Day)	April
Baishakh Purnima (Birthday of Lord Buddha)	April

1.8 Treaties and Agreements

Defense Agreement
Economic and Technical Cooperation
Highways

Investment Guarantees
Peace Corps
Trade and Commerce

1.9 International Organization Memberships

Asian Development Bank, Colombo Plan, FAO, Group of 77, ICAO, ILO, International Maritime Organization, IMF, IPU, ITU, NAM, UN, UNESCO, Universal Postal Union, World Bank (IBRD, IFC, and IDA), WHO, WMO, WTO.

1.10 Government

Nepal is a constitutional monarchy ruled by King Birendra through a Council of Ministers (King is Chairman), a palace Secretariat, and a four-tier system of panchayats or self-governing councils at the village, district, zonal, and national levels.

Villages with a population of 2,000 or more elect 11-member councils, who then elect members of zonal councils, who in turn elect 112 members to the National Panchayat; 15 of the 112 represent "class organizations," non-political interest groups of workers, farmers, etc. An additional 23 members are selected by the King for a total of 135 members in the National Panchayat.

The King selects the Council of Ministers from the National Panchayat, and appoints a 13 member Supreme Court. The Council of Ministers introduces all resolutions and the King retains absolute veto power over any subsequent legislation. As a result, the National Panchayat is more of a consultative body whose opinion is solicited by the King and his ministers. A ban on all political parties precludes any organized opposition to the government.

1.11 Ethnic and Sociocultural Groups

Despite the diversity of tribes and ethnic descent patterns, the Nepalese population can be broadly classified into two groups: Indo-Nepalese and Tibeto-Nepalese. The Indo-Nepalese comprise 80% of the population and reside mostly in Kathmandu Valley and the Tarai, a belt of land along the border with India. They include the Pahari, the largest single group in Nepal, the Newar, Tharu, and Indians of the Tarai. The Tibeto-Nepalese consist of the Tamang, Rai, Limbu, Bhote, Sunwar, Magar and Gurung groups. They live mostly in the north and east, although the Magar and Gurung can be found in west-central areas.

Despite official prohibitions, some occupational and social restrictions are still practiced in connection with the caste system, particularly in the Tarai and the Hill region.

1.12 Languages

There are over 30 languages and five regional groups of local dialects. Nepali, the native language of the Pahari, is the official language and mother tongue of half the population; it is spoken as a second language by another 30%. Hindu is widely spoken in the Tarai. A government act requires all companies to maintain records in either Nepali or English. English is, thus, widely spoken by the business community.

Languages by Region: Kathmandu Valley: Mostly Newari.

Hill region: Nepali is the lingua franca, followed by Newari, Marga, Gurung, Rai, Limbu, and Tibetan dialects (Thakali and Sherpa), especially in the east.

Tarai: Hindi dominates in the Tarai and in the Gangetic Plain, especially in North Uttar Pradesh.

Other languages include Urdu, Maithili, Bhojpuri and Bengali. The primary language varies by district: Maithili is spoken by 85% of the population in four eastern Tarai districts; Bhojpuri by 92% in three other eastern districts. Awadhi is the first language of 87% in four mid-western districts, and Tharu dialects dominate in three districts of the far west.

1.13 Religions

According to the 1971 census, 80% of the population is Hindu. The actual percentage is slightly lower because many are only nominal Hindus. Other religions of the Hill region include Mahayana Buddhism, a Tibetan religion called Bon, and local variants of animism.

Buddhists comprise about 8% of the total population throughout the country. The adoption of Buddhist practices by Hindus has blurred ethnic distinctions. Buddhist and Hindu festivals are often combined, with deities from both religions commonly worshipped. In addition, both Hinduism and Buddhism have assimilated some aspects of shamanism. The Moslem minority, about 2%, is concentrated in the east, mid-west, and far west Tarai.

1.14 Geography

Area: 145,305 sq km; about the size of North Carolina.

Topographic Regions: Nepal is divided into three major regions: the Tarai, the Hills, and the Mountains.

The Tarai is a fertile plain running the length of Nepal along the border with India. It is generally lower than 100 m in altitude and at most, only 45 km wide.

The Hills are actually the foothills of the Himalayas and range from 500 m to 4,000 m above sea level. Representing about 68% of the total land area, the Hills include the Mahabarat Lekh range and Kathmandu Valley.

The mountainous region runs along the entire border with the Tibetan Autonomous Region. Thirteen of the world's highest peaks are found in the Great Himalayas. Except for a few scattered settlements, the mountainous region is uninhabited.

Land Use: Only 10% of the land is flat or gently rolling. The remainder is hilly or very steep.

Climate: Nepal's climate depends on topography, altitude, and the amount of rainfall from the southwest monsoon (June-September). The amount of rainfall is a function of topography and the intensity of the southwest monsoon which travels in a northwesterly direction from the Bay of Bengal. Rainfall decreases from south to north and from east to west, with the greatest amount usually recorded where the plains meet the hills, especially at the base of the Great Himalayan range. At higher altitudes rainfall is continuous and less intense while the plains are subject to heavy downpours causing streams to rise in the foothills. High altitude valleys tend to be dry as the mountains obstruct the moisture laden winds from the southeast. Average rainfall in the Tarai is 25-38 cm in the Eastern Hills and 12-19 cm in the Western Hills.

	Average Annual Rainfall
Biratnagar (Southeast Tarai)	150 cm
Barah	250 cm
Dudh Kosi	166 cm
Khumbru Glacier	39 cm
Gadavari	250 cm
Kathmandu	170 cm
Nepalgunj (Southwest Tarai)	112 cm
Bilauri	100 cm

Source: Draft Environmental Report on Nepal, 1979

Temperatures vary widely by season and elevation. In the Tarai, temperatures range from 38-54°C in summer and 15-30°C in winter. In Kathmandu Valley the average temperature ranges from 10°C in January to 26°C in July.

Rivers: Rivers flow mostly from north to south and cut through the various ranges which divide the country. The most important rivers are the Kasi, the Narayani, and the Karnali. All three have their headwaters in Tibet. Although most of Nepal's rivers are navigable at lower elevations, they remain a precarious means of transport due to swift currents and frequent flooding.

1.15 Population

Demographic Characteristics (1981):

Total population	15,300,000
Density/sq km	
overall	96.4
Hills and Mountains density/sq km of cultivated land	1,070.3
Tarai density/sq km of cultivated land	335.0
Urban population	5% (1980)
Urban population in Kathmandu	27% (1981)
Population growth	4.9% (1970-1980)
Urban growth rate	6.0% (1970-1980)

Source: World Bank Development Report, 1982.

Regional (1971):

Eastern Region	2,798
Hills and Mountains	1,410
Tarai	1,388
Central Region	3,866
Hills and Mountains	2,096
Tarai	1,770
Western Region	2,466
Hills and Mountains	1,870
Tarai	595

	Far Western Region	2,427
	Hills and Mountains	1,834
	Tarai	593
Urban:	Kathmandu	171,400 (1976)
	Kathmandu Valley	408,314 (1978)
	Lalitpur*	178,902 (1978)
	Bhaktapur*	127,145 (1978)

*figures include adjacent rural areas

1.16 Health

Vital Statistics: (1980)	Births per thousand	42.0
	Deaths per thousand	20.0
	Rate of natural increase	2.5%
	Infant mortality per thousand births	150
	Life expectancy (1975)	
	Male	42.2 yrs
	Female	45.0 yrs
	Total	44.0 yrs

Major Diseases: Gastrointestinal diseases are endemic. Hepatitis, cholera, tuberculosis, and typhoid are widespread. A high incidence of cretinism and deaf mutism is concentrated in the north. Malaria outbreaks, mostly in the Tarai, have been controlled.

Nutrition: Malnutrition and protein deficiencies are prevalent, especially in the Hill region, and among children. Iodine deficiency is acute and goiter is endemic. Nutrition programs have been barely initiated. Only 9% of the population had access to safe water in 1982.

Health Care Admininstration: Health services are decentralized. Medical facilities are provided through hospitals at regional, zonal, and district levels and health posts at the village level. Only general medical care is available in rural areas, while specialized services such as surgery, obstetrics, gynecology, pediatrics, and orthopedics are concentrated in urban areas. Crowded conditions, shortages of staff and supplies, and poor sanitation are prevalent.

Health Facilities: (1978)	Total hospital beds	2,171
	Health centers	131
	Health posts	403
Health Personnel: (1978)	Physicians	435*
	Nurses, midwives	619
	Auxiliary health workers	590
	Ayurvedic doctors	116
	Ayurvedic health assistants	96

* 3.3/100,000 persons

(See section 3.5, Host Medical Resources.)

1.17 Economy

Overview:

Agriculture is the key sector of the Nepali economy. It accounts for more than 65% of GDP, 75% of merchandise exports, and provides a livelihood to over 90% of the population. Economic performance is, therefore, dependent on agricultural production, particularly food grains (rice, maize, and wheat) which comprise 90% of the cropped area. Other agricultural commodities include oilseeds, jute, potatoes, tobacco, sugarcane, and horticultural crops.

The industrial sector represents about 10% of GDP - mostly processing of agricultural raw materials including jute, sugar refining, and leather goods. During the late 1970s, cement, soap, and pipe factories were opened. A quarter of rural income is derived from cottage industries which provide otherwise unobtainable goods to inaccessible areas.

Nepal was unable to meet the 4-5% annual growth rate goal projected in the 1975-1980 Five Year Plan. The poor performance can be attributed to the failure of agricultural production to keep pace with population growth. During the five year period the economy grew at a 2.2% annual rate while the population increased by 2.1%. Population pressures are especially acute in the Hills where two-thirds of the population lives on one-third of Nepal's territory. Extensive

soil erosion and deforestation of marginal food growing lands are prevalent in this region. As a result, Nepalis from the Hills migrate seasonally to the Tarai and northern India in search of work and food. In addition, the poor monsoon season of 1979-1980 reduced foodgrain production, requiring the importation of 60,000 tons.

Foreign Trade: The GON's industrial development efforts have increased imports of capital goods and construction materials while lower rice production has reduced exports. However, increased tourism and remittances by Gourkhas (soldiers serving with the Indian and British armies) have alleviated Nepal's poor trade position.

The Tarai is economically integrated with India. While Kathmandu Valley is linked to the Tarai by motor roads, the Hills and mountain settlements are isolated and essentially fragmented markets.

Exports: Nepal's major exports are rice, maize, jute, herbs, and timber. In 1982, food exports were banned as a result of drought the previous year. India is the primary market receiving 67% of Nepal's exports.

Imports: The major imports are manufactured goods, chemicals, drugs, transportation equipment, food, and live animals.

Nepal's main suppliers are India (46% of total imports), Japan (14%), USSR (9%), and the United Kingdom (7%).

1.18 Communications

Radio: Radio Nepal, the only broadcasting company, is run by the government. It transmits on both short and medium waves in English as well as the Nepali language. There are stations at Jawalakhel and Khumaltar. Many Tarai residents listen to Hindi language broadcasts from India. In 1979, there were approximately 350,000 radios. There is no television in Nepal.

Telephone and Telegraph: The number of telephones was 13,400 or 1.2 per 1000 persons in 1982.

Telegraph links exist with both India and Pakistan, and a telex link exists between Kathmandu and various countries through Hong Kong. As of 1980, Nepal's first communications satellite was being built with British assistance. (See section 3.7, Communications Resources)

1.19 Transportation

Road Transport: Nepal's unfavorable topography and climatic conditions have hampered the development of a surface transportation system. The mountainous terrain of the north and the large number of rivers and streams in the south render the construction and maintenance of a transport infrastructure difficult and expensive. Bullock carts continue to comprise the principal means of transport in the flood-prone Tarai. In the Hills and mountains, porters and pack animals carry most goods by ropeway.

Major national roads include a link between the capital and the railhead in Raxaul at the Indian border, a highway running between Pokhara and Kathmandu, and an East-West highway which, upon completion, will span the breadth of the country. There are also short sections of road around Kathmandu in addition to a 28 km ring around the Valley.

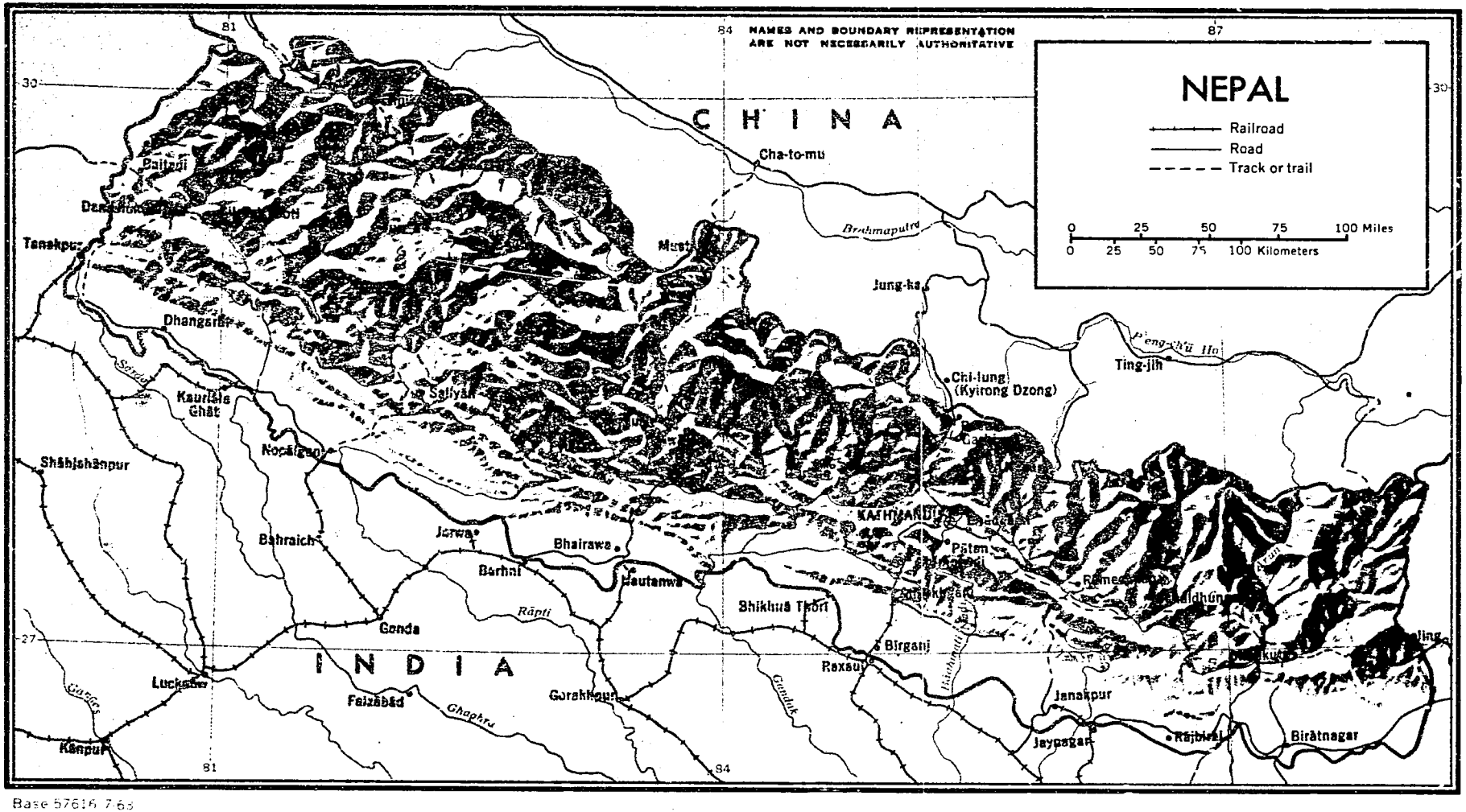
Railroads: There are three separate narrow gauge railroad lines linked to the Indian system which cover a total of approximately 100 km. The 1980-1985 Five Year Plan calls for the construction of a line between Vdaipur Garhi in the east and the port of Calcutta.

Ports and Waterways: Nepal is a landlocked country with no access to seaports except via rail. Goods shipped by sea and bound for Nepal usually come through the port of Calcutta. (See section 3.6, Transportation and Logistics.)

Inland waterways are used to a limited extent for transport. In the Tarai, grain is sometimes moved to India on small craft; however strong currents and flooding make this a dangerous method of transport.

Airports: Nepal has international airports at Kathmandu and Biratnagar. Thirty-five other airfields are located in all three regions of the country. (See section 3.6, Transportation and Logistics.)

Airlines: The following airlines serve Nepal: Royal Nepal Airlines, Bangladesh Biman, BAC (Burma), Indian Airlines, and Thai International. Air services link Nepal to India, Thailand, Sri Lanka, Burma, and larger towns within Nepal.



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2. Disaster Vulnerability

2.1 Overview of Physical Environment

The Kingdom of Nepal is a landlocked country situated along the southern slopes of the Himalayan mountain ranges. Nepal is about the size of Florida in total area stretching about 241 km from north to south and 805 km from east to west. It is bordered by the Tibetan Autonomous Region of China on the north and India on the southeast and west.

Nepal can be divided into three major regions: the Tarai, the Middle Hills, and the Himalayas. The climate varies from tropical in the Tarai region to arctic in the Himalayas. Weather patterns depend on topography, altitude, and the amount of rainfall received from the southwest monsoon which lasts from June through September. As the northernmost portion of the Indo-Gangetic plain, the Tarai is very hot and humid. Its southern belt is a rich agricultural region, while the northern section adjoining the foothills is a marshy area in which rainfall is intense and malaria is endemic. The Churia Hills and the Mahabharat Lekh range (305 to 4,600 m) define the Middle Hills and comprise 68% of the country. Between the two ranges are broad basins of increasingly deforested timber and savanna grasslands. Nine wide valleys including Kathmandu and Pokhara are located north of the Mahabarat range. The desolate and uninhabited Himalaya region (17% of Nepal) lies beyond the valleys of the Mahabharat range. The peaks range from 4,880 m in the Lesser Himalayas to over 8,000 m in the Great Himalayas where Mt. Everest or Sagarmatha is located. Rainfall is sparse in the high valleys as the steep mountains block the monsoon winds from the south.

The watersheds of Nepal's three major rivers - the Kosi, Narayani, and Karnali - lie beyond the Great Himalayas in Tibet. These rivers traverse valleys which are several thousand meters deep, and run southward toward the Tarai. In fact, most rivers in Nepal flow south from Tibet until they reach the midland valleys and the Mahabharat range, which deflects them eastward and westward, and eventually join the Ganges River on the Indian plain.

2.2 Hazard Analysis

Deforestation: Nepal's delicate mountain environment is rapidly deteriorating as a result of deforestation and associated soil erosion. During the last decade one third of Nepal's forests disappeared. The problem is so serious that the Food and Agriculture Organization has forecast the total denudation of the country by the end of the century. The major cause of deforestation is the continued clearing of hillsides for crops, firewood, and fodder. Consequently, the land is exposed to

surface erosion by wind and rain which washes away the topsoil. Although soil erosion is a natural process in the unstable Himalayas, deforestaion doubles the normally expected soil loss. To make matters worse, livestock, allowed to graze on cleared fields, consume any new growth. A vicious cycle ensues when depleted farmland can no longer support the population and new lands are then settled, cleared, and ultimately eroded.

Landslides: Landslides are a growing threat to Nepal's mountainous areas. During the monsoon season, heavy rains saturate the ground and produce massive movements of rock and soil into populated valleys and cultivated fields. Increasing deforestation, inadequate soil conservation, and improper watershed protection also contribute to increased landslide vulnerability. Few farmers practice contour planting and strip cropping which would alleviate erosion on steep hillsides.

Flooding: Increasingly frequent flooding is yet another symptom of Nepal's environmental degradation. Although natural forces account for significant river flooding, deforestation exacerbates soil erosion and consequent flooding. The accumulation of sand and debris on the floodplains raises riverbeds and, as a result, each monsoon season (approximately June to September), more water and sediment are carried down Nepal's rivers to the Tarai and the state of Bihar in India. Soil has been often called Nepal's most precious export.

While flooding is an annual phenomenon, its scope varies yearly depending on the onset and intensity of the monsoon. In July 1978, an unusually heavy monsoon seriously affected four zones in the Tarai: Narayani, Janakpur, Lumbini, and Raptai. About 4,000 houses and over 2,000 acres of food crops were damaged. Similar heavier than usual monsoon rains in November 1975 produced flooding in all of Nepal's fourteen zones.

Seismicity: Nepal is situated in an active seismic zone, particularly the far western districts of Bajhang, Baitadi, Barchula, and Darchula. A primary fault line runs the entire length of the Himalayan mountain front. The most recent major earthquake struck western Nepal in 1980 registering 6.0 on the Richter Scale. Ninety-nine fatalities in six districts were reported; major losses of cattle and damage to houses were also sustained. A major earthquake in 1934 destroyed large parts of Kathmandu and left thousands of people affected throughout the country. Earthquakes from 1966 to 1977 have affected the following districts: Acchan, Bajiera, Bajhang, and Danchula. These earthquakes registered from 4.7 to 5.2 on the Richter Scale.

Drought: Although the Hill Region of western Nepal appears more susceptible to drought, rainfall deficiencies can occur country-wide. Drought can either build up slowly over a number of years, or follow several seasons of excessive rainfall.

The 1973, 1979, and 1982 droughts significantly reduced the paddy crop in subsistence farming localities. Preceded by excessive rains the year before, the 1972/73 drought resulted in severe food shortages in the Hills. Late monsoon rains in 1982 produced widespread drought conditions with serious shortages of rice, wheat, and corn. In the Tarai, the early rice crop could not be transplanted and was also damaged by insect infestations. Simultaneous flooding in other areas further damaged the corn crop. The lack of soil moisture in some locations and the saturation of soil in others affected the 1983 wheat crop. Food shortages in 1983 have required imports of rice and grain.

Other hazards: Both natural and man-made fires pose a threat to agriculture and houses, especially during hot, dry days in June before the monsoon season. Malaria outbreaks are concentrated in the central part of the Tarai, but epidemics have occurred over the entire southern portion of the country from the Indian border northward to the lower slopes of the Himalayas. Other diseases which occur in epidemic proportion include typhoid, leprosy, filariasis, and syphillis.

2.3 Summary Disaster History

Disaster Type	Date	Location	Killed	Affected
Epidemic-Smallpox	63/11/00	Widespread	1,000	5,000
Drought	64/00/00	Mountain Areas	n.a.	1,000
Earthquake	66/06/27	Nepal-India Border	80	20,000
Drought	67/00/00	W. Mountains	n.a.	n.a.
Epidemic-Bubonic plague	67/09/24	Village of Naura	17	24
Flood	68/10/04	E. Himalayas	276	1,100
Flood	70/08/00	Southern Nepal	350	20,000
Landslide	70/09/27	Lete	21	n.a.
Drought	72/00/00	Hill Area	n.a.	900,000
Landslide	75/08/00	Kathmandu	125	75,000
Landslide	76/06/04	Pahire Phedi	150	n.a.
Flood	78/07/00	Tarai Area	130	27,000
Drought	80/00/00	Country-Wide	n.a.	3,500,000
Earthquake	80/07/29	Western	100	100,000
Flood	81/07/13	Northern Nepal	100	n.a.
Flood	81/09/29	Western Nepal	650	10,000

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

2.4 Vulnerability of Agriculture

Environmental deterioration in Nepal is threatening the agricultural sector which provides a livelihood for 95% of the population. In the hills and mountains, farmers continue to clear new forests and grasslands. Because of poor farming practices and lack of conservation, cultivated land area grows while productivity declines. Erosion contributes to flooding and landslides which destroys additional large tracts of farmland.

In the fertile Tarai plains, where many villagers have migrated from higher elevations, floods damage rice, jute, and other crops. Surface erosion has led to channel shifting and reservoir sedimentation, both of which cause further damage to farmland. Aside from erosion-induced flooding, the summer monsoon season is a critical determinant of agricultural performance in the Tarai. Insufficient rainfall, if sustained, can precipitate drought, while sudden, intense rainfall can damage standing crops and cause flash floods.

2.5 Commercial and Agricultural Crops by Region

Over 65% of Nepal's cultivated land is located in the Tarai, where major food crops are rice, corn, wheat, and barley. Jute, tobacco, oilseed, and sugarcane are the major cash crops. The early rice and jute crops are planted in April and harvested in September; the main rice crop is planted in July and harvested in November. Logging is extensive in the northern Tarai which is less fertile than the southern and eastern portions.

The Middle Hills produce a variety of crops, many of which are grown on terraced hillsides. The main crops are maize and rice, but millet, wheat, and barley are also grown. In addition, fruit and vegetable gardens are popular. Crops are planted in March, April, and May, and usually harvested in November.

The mountainous region is generally unsuitable for agriculture although potatoes, barley, and some vegetables are grown as subsistence crops. Livestock, mostly sheep and yak, are the main source of income for inhabitants of the Himalayas.

2.6 Vulnerability of Infrastructure

Landslides triggered by heavy rainfall, erosion, and earthquakes pose the greatest recurring threat to Nepal's infrastructure. Motor roads, bridges, power plants, and buildings are all vulnerable to landslides. Many settlements are situated adjacent to landslide-prone hillsides and on

unstable soil near riverbeds. Damage to roads and bridges is limited to Kathmandu Valley and the Tarai as nearly all other communities in the Hills lack roads. It is difficult to assess the relative vulnerabiliy of buildings because materials vary by region and ethnic group. See Housing Settlements and Materials section below.

In the Tarai, floods increasingly threaten the road network. Most feeder roads are impassable during the four month rainy season, and many paved, all weather highways are also subject to flood damage. Throughout Nepal, secondary airports, often the only link to isolated Hill communities, are closed during the monsoon season.

Fires, both natural and man-made, destroy many wooden houses and farm structures. This risk diminishes at higher elevations.

Housing Settlements and Materials by Ethnic Group

The Limbu live in dispersed settlements near Sikkim. Their homes are constructed mostly of wood with thatched gable roofs, and are usually two stories high. The ground floor is generally used for storage with living quarters on the second floor.

In areas north and west of Kathmandu Valley, the Tamang build their houses clustered along terraced hillsides. They are usually two stories high with wide-angled gable roofs.

The Gurungs' homes on the southern flank of Mt. Annapurna are rectangular and made of dry stone with slategable roofs. In the Pokhara area, the Gurungs have built elliptical and oval shaped houses with conical, thatch, or slate roofs.

The Magars who reside along the western and southern flanks of the Dhaulagiri Massif have large two-story houses with flat or hipped roofs.

Bhota homes north of Mt. Annapurna are perched on shelves in deep canyon walls. These fortress-like structures are made of stone and mortar, and usually have flat roofs.

In the high mountains west of Mt. Everest, the Sherpa live in two-story houses with white plaster walls and low-pitched roofs covered by slate, shingles, or wooden planks.

In the Tarai plains, most villages are compact. Houses are usually one story and rectangular with steeply pitched, gabled, or thatched roofs. While homes of the wealthy have tile roofs and mud walls, most houses have wattle walls (woven twig and coarse grass).

3. Disaster Preparedness and Assistance

3.1 Host Country Disaster Plan

No official disaster plan exists despite the submission of numerous proposals. In the absence of comprehensive guidelines, humanitarian and political organizations, the Nepalese Police, and the Royal Nepalese Army have been involved, often independently, in disaster relief operations. The Nepal Red Cross (NRC) has played the most active role in disaster relief, operating with the unofficial authority of the central government. (See section 3.2, Nepal Red Cross.) In 1976, it prepared a National Disaster Relief Plan which led to the creation of the Central Disaster Relief Operations Committee (CDRC). The plan calls for the CDRC to direct relief operations, allocate funds, and prepare a national disaster relief plan. While the NRC plan has not been legally adopted by the GON, it does enjoy informal acceptance and would be followed to some degree in the event of a major disaster.

As shown on the chart below, the organization extends through every district and village panchayat (assembly). The Minister for Home and Panchayat heads the CDRC and presides over the national committee and district commissions. CDRC members include the Minister for Forestry, who serves as Vice Chairman; the assistant ministers for Forestry, Home Panchayat, Food, Agriculture, and Health, the Secretary General of the Red Cross Society, and the Chairman of the Insustry and Commerce Association. A special office has been created in the Home Ministry to assist the government in programming, implementing, and coordinating disaster relief operations. The office also manages the Prime Minister's Relief Fund and the CDRC fund.

Disaster Relief Organization in Nepal

Central Disaster Relief Committee

Central Working Committee
or National Committee

Zonal Commissioner
(in each Zone Office)

District Disaster Relief Committee
(in each of the 15 districts)

Village Panchayat - Committee for Disaster Relief

According to the Plan, administrative bodies with separate budgets would be created at the zonal, district, and village levels. A commissioner would head the zonal office and assume administrative responsibility for relief operations in the districts. He would coordinate the preparation and implementation of district relief plans, determine assistance requirements, and identify suppliers both locally and internationally. The commissioner would also be empowered to suspend customs duties and other taxes on relief goods.

The District Level Committee would be directly responsible for relief operations. The committee would be composed of the following members: Chief District Officer, the District Panchayat Chairman, the Police Chief, an army representative, the Chief Health Officer, an engineer, a veterinarian, and representatives of the Red Cross and different district-level offices. The District Committee would prepare its own budget, relief plan, and disaster history. In the event of a disaster, the committee would be responsible for assessing damage and requesting needed relief supplies from the zonal committee.

Relief operations at the village level would be conducted by the chairman of the village panchayat. In a disaster situation, a volunteer corps would be formed in conjunction with the NRC to provide immediate relief to victims (food, shelter, and first aid). All details concerning disaster impact and relief would be transmitted to the District Committee.

The Village National Campaign Organization, a political group alerts citizens of imminent disasters and helps them take precautionary measures.

In addition to the disaster plan proposal and central committee, there are a number of laws related to relief operations, particularly dealing with epidemic management. The Sankra Mank Rog Ain (2020) allows the Government of Nepal to implement measures to control epidemics and also prosecute anyone interfering with relief operations. Zilla Panchayat 2019 obligates the District Panchayat to coordinate relief operations and provide water and medical supplies in response to epidemics. The Town Panchayat is required to control epidemics and also combat fires. Another act empowers the District Law Administrator to grant land revenue remissions when crop production has been affected by disasters.

3.2 Nepal Red Cross (NRC)

The NRC plays a major role in disaster preparedness and relief activities at both national and local levels. The Secretary General of the NRC is a member of the CDRC which meets in Kathmandu and is chaired by H. R. H. Princess Sharada Sharada Shah. NRC committees in each region supervise, control, and conduct relief operations. The Eastern Region Committee covers 16 districts and meets in Biratnagar, the Mid Region

Committee covers 11 districts and meets in Birgunj, and the Western Region Committee covers 19 districts and is located in Mahedranagar. The remaining 29 districts are considered inaccessible, and are, hence, covered from the capital.

Aside from emergency relief activities, the NRC conducts programs in first aid training, disaster awareness, and health and nutrition education. From 1975 to 1977 the NRC sponsored a Disaster Preparedness Program in collaboration with the Swedish Red Cross. The program consisted of training volunteers in disaster relief management increasing the stock of relief supplies, and expanding storage facilities. (See section 3.5, Host Medical Resources.)

3.3 Warning Systems

The Hydrological and Meteorological Department collects weather data at stations throughout the country. These stations identify potential flood and landslide hazards and relay messages to the command center in Kathmandu, where they are issued as warnings. The Village Compaign Organization, a politically-oriented group, then alerts citizens of the imminent disaster.

Nepal is covered by multiple passes of Landsat I and II as well as one Skylab pass. Canadian satellites also provide large-scale aerial photography. The Environmental Research Institute of Nepal is currently developing a remote sensing capability. Remote sensing includes the use of satellite imagery to identify forest fire risks and to monitor rainfall, river course, and ice and snow conditions. This data is used to predict floods and landslides in especially high risk areas.

In 1977, a seismographic center was established at Bhulchoky, the highest point in Kathmandu Valley. Two other centers are scheduled to open in Daman and Kakani, also in Kathmandu Valley.

3.4 Food Stocks

The GON discourages procurement of foodstuffs from abroad. The general practice is to purchase food as close as possible to the affected area. Adjacent Indian markets are often tapped for food supplies. Storage facilities are available at the four NRC warehouses located in Kathmandu, Birgunj, Biratnagar, and Mahendranagar. However, stockpiling is incomplete at all warehouses. As of 1978, the Nepal Food Corporation planned to boost its grain storage capacity from 22,000 MT to 65,000 MT by 1981.

Diet: The Nepalese diet is generally high in carbohydrates, and low in vitamins and protein. Rice is the main staple when available; potatoes, maize, millet, and barley are substitutes. Millet is made into flat bread or eaten as porridge. Low-income families eat the main meal late in the morning. Wealthier families eat a large second meal in the evening.

In the Karnali zone of western Nepal, the basic diet consists of rice and lentils or chepatis (flat bread) with maize or potatoes in some areas. Meat (sheep, goat, or poultry) is eaten infrequently.

In central Nepal, buffalo is the main source of milk from which chugu (oil), kola (skimmed milk), cottage cheese, and dahi (yogurt) are produced. Vegetables include tomatoes, kidney beans, sweet potatoes, chili, and spinach-like greens. Although rice is the preferred staple, millet and maize are often the only staples available. The average daily consumption of cereals is 572 g. Millet beer and tea are the most common beverages.

Religious Restrictions: Although Hindus are prohibited from consuming beef, other meat (wild game, deer, boar, and goat) is eaten when available. Meat consumption is highest in Kathmandu Valley.

3.5 Host Medical Resources

Nepal has 36 general hospitals, which are all located in densely populated areas. These hospitals are generally crowded, ill-equipped, and understaffed. Beds frequently lack linens and mattresses. Only the largest hospitals have X-ray facilities. The GON has established district disaster relief units which are staffed with doctors, nurses, and health specialists. Most western-trained doctors, however, reside in Kathmandu, while auxiliary health personnel staff health posts (410) and centers (34) in outlying areas.

A number of private groups also provide health services. The Nepal Red Cross operates mobile health clinics in Kathmandu Valley staffed by doctors, nurses, and paramedics. Other privately run health facilities include the 100 bed Shanta Bhawan Hospital in Kathmandu, the British supported Nepal Evangelistic Band in Pokhara, and a hospital in Banepa run by the American Seventh-day Adventists.

Hospitals

Location (Town)	# Beds	Location (Town)	# Beds
Ampipal[2]	10	Kailali	15
Baglung	15	Kalaiya	15
Banipur	15	Kathmandu Valley	
Banke[1]	50	Anandaban	100

Hospitals

Location (Town)	# Beds
Bardiya	15
Bhadrapur	25
Bhairawa	15
Bhaktapur	25
Bhaktapur[2]	20
Bhankuta	15
Bharatpur	25
Bhojipur	15
Biratnagar[1]	100
Birgunj	50
Butwal[1]	50
Chautara	15
Dandeldhura	15
Dang	15
Dharan	15
Dharan (British)	50
Gaur	15
Gorkha	15
Hetaura	25
Ilam	15
Inarwe	10
Jaleswar	15
Janakpur[1]	50
Jiri	25
Jumia	15

Location (Town)	# Beds
Kathmandu Valley	
Bir Hospital	300
Independent[2]	10
IRL Maternity	90
Kanti	50
Lalitpur	25
Royal Army	170
Shanta Bhawan	135
TB Association	25
Tokha	50
Mahendranagar	15
Pakihawa (British)	20
Penepa[2]	15
Parasi	15
Pokhara[1]	50
Rajbiraj[1]	50
Rangell	15
Sariahi	15
Shining	50
Solukhumbu Kunde[2]	11
Surkhet	15
Tainghas	15
Tansen[2]	20
Taullhawa Sibaraj	15
Trisuli[2]	25

[1]Zonal hospital
[2]Missionary hospital

Nepalese authorities try to obtain all medicine for disaster relief locally. Drugs are available from pharmacies in Kathmandu and other urban areas. Cold storage is available at major hospitals and Red Cross headquarters. Disaster relief materials, including medical supplies, are stored in four warehouses: Mahendranagar covering 19 districts, Birgunj, a transhipment point covering the flood-prone districts of Rautnahat and Chitiwan, and Biratnager. The Kathmandu warehouse covers the Valley as well as the western mountain districts. The NRC has recommended additional stockpiling of medical supplies at district depots.

According to the NRC, appropriate drugs include sulphur, antibiotics, antiacids, anti-spasmodics, anti-diarrheals, and cough sedatives and expectorants.

The NRC runs a blood bank in Kathmandu, and provides hemoglobin to district hospitals. Although supplies are limited, the NRC has proposed establishment of blood transfusion centers in rural areas. NRC ambulance service is only available in the largest towns.

3.6 Transportation and Logistics

Roads: Nepal's rugged terrain and erratic climate impede prompt and and efficient relief activities. Because surface transportation networks have been inadequately developed, helicopters are often the only way of reaching affected areas. In the Tarai plains, bullock carts continue to be the most common form of transport, while in the mountains, porters, mostly Sherpas, and pack animals carry goods over rugged paths and ropeways. A 42 km ropeway between Hetauda and Kathmandu can accommodate 25 tons of freight per hour. Additionally, a container truck fleet operates between Calcutta, India and Raxaul, Nepal.

Paved roads are limited to segments in and around Kathmandu Valley (28 km) as well as a few national highways. These include a road between Kathmandu and Pokhara, a road to Tibet via Kodari, and a link between the capital and the Raxaul railhead at the Indian border. In addition, the Siddartha Highway connects Pokhara Valley in the midwest with Sunauli on the Indian border. An east-west highway is being built with foreign assistance.

Railway: The Nepal Government railway system consists of three short separate narrow gauge lines covering a total of about 100 km. Only a 48 km segment is open: from Raxaul at the Indian border to Amlekhganj. Equipment on this line consists of 7 steam locomotives, 12 passenger cars, and 82 goods wagons. The Nepal railroad is linked to Indian Railways at the following border locations: Biratnagar, Janakpur, Nepalganj, Dhangarhi, and Raxaul. In addition, the Jankhpur Railway based in Khajuri operates a 53 km segment from Jaynagar to Bizulpura. Equipment consists of 9 locomotives, 22 passenger coaches, and 72 goods wagons. A line between Udaipur Garhi in eastern Nepal and the port of Calcutta has been proposed.

Maritime shipping: Because Nepal is landlocked, goods shipped by sea are transmitted through the Indian seaport of Calcutta, located on the Hoogley River. Shipment of goods can be problematic because of the difficult approach and existence of bore tides year-round. Vessel size capacity varies seasonally. Dock accommodation maximum width is 172 m and the maximum length is 1,372.5 m. A subsidiary port for deep draught vessels is being constructed further downstream at Haldiar. For further details, consult Lloyd's Ports of the World which is revised annually.

Airports: Air transport services render all communities accessible, however, as of 1978 only five regional airports had hard surfaced runways. The following cities have regular weekly connections with the capital: Baglung, Bhadrapur, Bhairawa, Bharatpur, Bhojpur, Biratnagar, Chaurjahari, Dhangari, Janakpur, Jiri, Jumla, Jomson, Lamindanda, Lukla, Mahendranagar, Meghauli, Nepalganj, Pokhara, Rajbraj, Sanfelbagar, Silghari/Doti, Simra, Surkhet, Tumlingtar.

In addition, regular air service links Kathmandu to the following cities in India: Calcutta, Delhi, Patna, Varnassi, as well as Colombo, Sri Lanka, Dhaka, Bangladesh, and Rangoon, Burma.

Royal Nepal, the national airline, maintains the following equipment: 2 B-727, 3HS-748, 8 DHC, Twin Otters, and 3 Pilatus Porters. During the four month rainy season, Royal Nepal suspends domestic air services to most Hill towns. Royal Nepal, RNAC Bldg., Kani Path, Kathmandu, Tel: 14511; Cable: AARENACEE.

The Nepal Civil Aviation Department (Barbar Mahal, Kathmandu, Tel: 11828) maintains the following equipment: 2 Boeing 727, 3 HS-748, 4 PC-6, 1 Alouette III, and 1 SA-300 Puma.

BIRATNAGAR/Biratnagar (RS)

Runway Characteristics

Location Coordinates	Designation/ Type	Class	Pavement Strength	Fuel/ Octane
26° 29' N 87° 16' E	09/27 N-INST	C	1520	n.a.

Remarks: alternate aerodromes - DHAKA, DHAKA/Tejgaon, KATHMANDU, PATNA.

Aids: NDB/L, SA, RWY, TE, DES, CLM, THR, TWY.

KATHMANDU/Intl. (RS)

Runway Characteristics

Location Coordinates	Designation/ Type	Class	Pavement Strength	Fuel/ Octane
27° 42' 02" N 85° 21' 47" E	02/20 INST	B	3040	100,JX

Remarks: alternate aerodromes - BIRATNAGAR/Biratnagar, CALCUTTA/Calcutta, DHAKA/Kurmitola, DELHI/Delhi, LUCKNOW, PATNA.

Aids: VOR, NDB/L, PA, VA, RWY, TE, B, DES, CLM, THR, FXD, TWY.

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

Key

Abbreviations

INSTR	Instrument Approach Runway
N-INSTR	Non-Instrument Runway
RS	International Scheduled Air Transport, Regular Use

Radio Aids

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

Lighting Aids

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

Marking Aids

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

Secondary Airports

Far Western Region	Eastern Region
Bajhang	Bhadrapur
Dhangarhi	Bhojpur
Mahendranagar	Diktel
Mangalsain	Khandiwau
Nepalganj	Lamidarela
Safe Bargar	Lukla
Silgarhi	Rajbiraj

Secondary Airports

Far Western Region
- Simikot
- Surkhet

Central Region
- Janakpur
- Jiri
- Simra

Eastern Region
- Taplejung
- Tumlintagar

Western Region
- Behi
- Bhairawa
- Gorkha
- Jomoson
- Meghauli
- Naryanghat
- Pokhara
- Rukumkot
- Tulsipur

3.7 Communications Resources

The communications network in Nepal has been insufficiently developed for warning and feedback purposes related to disasters. Consequently aerial surveys are often the only means of identifying affected areas and assessing damage. Telex and telephone service is limited to urban areas. In 1981, Nepal had about 12,000 telephones or 1.2 telephones per 1,000 persons. A wireless communications system also exists, but is subject to malfunctions during the monsoon season. Telex service exists between Kathmandu and various countries through Hong Kong. There are also direct telegraph links with India and Pakistan.

Radio Nepal is the country's only broadcasting company, transmitting on both short and medium waves. English and Nepali language broadcasts are transmitted from two stations: Jawalalkhel and Khulmaltar. In 1977 there were 350,000 radios or one radio for every 43.7 persons. In the Tarai, many people listen to All India Radio via regional stations at Patna, Luchnow, and Calcutta. A weekly radio program run by the Forest Ministry educates people on the need to protect the country's forests to prevent landslides and floods.

3.8 Energy Resources

Over 90% of Nepal's energy consumption is derived from firewood, dung, and agricultural wastes. Hydropower is potentially the most abundant energy resource and the least costly substitute for Nepal's tradi-traditional energy sources. The Central Nepal Power System consists of three major hydropower plants: Trisula (18 MW), Sunkowsi (10.5 MW), and Gundak (15 MW). As of early 1981, the Kulekhani (60 MW) and Devighat (14 MW) hydropower projects were under construction. By 1990 Nepal will need

additional generating capacity of over 160 MW. Nepal also operates diesel power plants with a total installed capacity of 11.1 MW. In eastern Nepal, the Eastern Nepal Power System distributes power imported from India.

The GON has launched a rural electrification program to meet rural energy needs by implementing several mini-hydropower projects. In early 1981, five mini-hydropower plants were operating with a capacity of about 1.0 MW. Twenty-three additional mini-plants were being constructed or planned. Nevertheless, almost the entire Hill country remains unelectrified.

3.9 U.S. Mission Disaster Relief Plan

The U.S. Mission Disaster Relief Plan was drafted in June 1978. In case of disaster, the plan authorizes the USAID Mission Assistant Director to establish a command post at the Embassy. The disaster relief team would consist of the following sections: Logistics and Supplies, Communications, Finance and Records, and Liaison. The Liaison section would coordinate assistance with Nepalese authorities, other government embassies, and U.S. voluntary and international organizations.

If the GON concurs, survey teams can be dispatched to assess damage and identify relief needs in affected areas. The Mission Plan provides details of how the survey should be conducted. A disaster history of Nepal, a directory of international organizations represented in Nepal, and a copy of the NRC proposal are appended in the Mission Disaster Plan on file at OFDA in Washington, D.C.

The U.S. Agency for International Development has sponsored many development programs in Nepal. Cooperation has taken place in the following sectors: power and transportation, education, agriculture, population policy, and resource conservation. Development projects for FY 84 include integrated cereals and cropping research, development of a remote sensing center, institutional development, and promotion of small-scale private enterprise. The introduction of alternative energy technologies and assistance in the implementation of government decentralization will be emphasized for the rest of the decade.

3.10 International Organizations and Private Volunteer Organizations

United Nations Development Programme
P.O. Box 107
Lainchuar, Lazimpat
Kathmandu
Telephone: 11939, 11944, 11757, 14989
Telex: 947 206
World Food Programme
Telephone: 14581, 15124

Food and Agriculture Organisation
Telephone: 1193/28

World Health Organisation
Telephone: 13583, 15232

Asian Development Bank
Telephone: 14217
International Bank for Reconstruction and Development
Telephone: 14792, 14793

3.11 U.S. Voluntary Agencies

The Thomas A. Dooley Foundation, Inc.
G.P.O. Box 225
Kathmandu

Provides advisory services in nursing to the Ministry of Health including technical supervision and training for the central supply Department. In 1977 this foundation was implementing and managing a radio telecommunications program to connect remote health posts with central medical facilities.

United Mission to Nepal
P. O. Box 126
1/29 Thapathali, Kathmandu

The UMN works under a written agreement with the Government of Nepal to operate projects and train Nepalis in the areas of health, education, and economic development. UMN manages hospitals and clinics throughout the country.

World Neighbors, Inc.
P. O. Box 916
Kathmandu

World Neighbors operates a number of village health programs in first aid training, preventive health, and family planning.

3.12 Mitigation Efforts

A number of forestry development projects have been initiated to combat the problems of deforestation and erosion. The Forest Department is promoting afforestation measures with community-level involvement. The goals of the projects are to develop fuelwood supplies and protect watersheds in the Hills where the deforestation problem is most acute.

An additional number of forestry projects are being implemented with foreign assistance. The World Bank is now developing over 50,000 hectares of Panchayat Forests in 28 Hill districts. The organization estimates that 1.3 million hectares of forest are needed just to meet fuelwood and industrial lumber demand. The Institute for Renewable Natural Resources at Pokhara is being established with assistance from the World Bank. The Asian Development Bank has established a large eucalyptus plantation for firewood, and USAID is involved in a number of village firewood projects. In 1979, a multi-university team funded by A.I.D. designed several conservation projects including nurseries and horticulture programs. In an effort to find alternatives to firewood as an energy source, the GON is exploring the feasibility of hydroelectric, biogas, and solar power.

Nepal's great hydroelectric potential could eventually be harnessed to reduce reliance on fuelwood. Although solar energy is too expensive for rural use, solar heaters are being used in urban areas. Biogas, a practical and inexpensive fuel supply, created by mixing farmyard manure with water in a large tank is now being tested in rural areas.

The Land and Water Conservation Department has become increasingly involved in the construction of dams, embankments, and field terraces throughout Nepal. In addition, a number of watershed control projects are managed at the district level with the assistance of the Department.

3.13 Disasters and the Development Process

The predominance of the agricultural sector in Nepal's economy implies special attention to environmental factors which affect production. Human activities, primarily deforestation, are degrading Nepal's already fragile habitat, and compounding the country's difficulties in raising agricultural production. Therefore, any attempt to reverse declining agricultural productivity must simultaneously reform farming practices that adversely affect the environment.

Development projects in Nepal can incorporate disaster mitigation measures. Irrigation systems can control floods, and also minimize drought potential. However, the well-known negative effects of irrigation should not be ignored. The promotion of timber for export should be accompained by conservation of forests to alleviate soil erosion, and consequent landslides and flooding. Hydropower projects and the introduction of biogas plants in households reduce firewood consumption,

thereby minimizing deforestation and erosion. Furthermore, roads, and power plants should be constructed with earthquake resistant materials.

Disaster considerations in agricultural development relate indirectly to industrial growth because the expansion of the manufacturing sector depends on Nepal's ability to increase productivity in agriculture. Economic growth in both sectors allows the GON to expand its tax base and spend more resources on social services. Thus, measures to alleviate Nepal's environmental deterioration are an important component of both social and economic development.

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