

WORKSHOPS IN TECHNIQUES OF ENVIRONMENTAL INVESTIGATION



PROGRAM FOR INTERNATIONAL DEVELOPMENT

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Southeast Asia Overview

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1.1 Introduction

The four countries chosen for this environmental profile are representative of South-east Asian examples of environmental issues in development. Each of the countries, Banladesh, Nepal, Indonesia and the Philippines is representative of particular Asian environments; deltaic regions, mountainous regions, islands, and forests. Each of the countries is also a major recipient of foreign assistance.

There are several environmental problems which are common to the Asian countries. They include problems of:

A. Deterioration of the Physical Environment:

Many of the physical problems associated with this deterioration are interrelated. They include deforestation, soil erosion, leaching of the soil, lack of soil rejuvenation, silt build-up, increased vulnerability to flooding, lower water tables, problems of waste disposal, and health-related issues. Prior to the arrival of Europeans, many of these societies had established sets of social institutions which function within the limitations of the physical environment. Colonial policies, however, tended to displace these social systems, frequently placing new pressures on the physical environment.

B. Population Pressure:

Asia has approximately two billion people, a majority of whom are under 16, and a majority of whom are male. Each of the four countries experiences more rapid population growth than expansion in agricultural production. Thus, in some

countries in Southeast Asia, as many as two-thirds of the population suffer from some form of malnutrition, especially in the last month or two prior to the harvest of new crops. Malnutrition invites a host of related diseases. Food deficits also mean that agricultural products must be imported, decreasing supplies of already scarce hard currencies.

C. Health:

Population pressures give rise to health problems. Poor nutrition decreases productivity and increases vulnerability to disease. Deficiencies of animal protein, especially in rural areas, create long-term vulnerabilities to debilitating diseases. Further, all four countries have inherited European-style, urban based, curative-oriented medical systems. Only recently have questions been raised about linkages between environmental situations and health problems. Yet the majority of people suffer from environment-related diseases such as T.B., cholera, malaria, and all the diarrhoeic diseases. None of the countries has been able to respond to these problems with an integrated plan which incorporates environmental considerations directly into health programs.

D. Agricultural Productivity:

The biggest problem in the regions agricultural sector is productivity, both in food and cash crop. Problems in productivity can be attributed to many factors including environmental degradation caused by increased pressure on

the land, the weakening of traditional agricultural processes,
difficult access to land, scarce capital, and poor information
on marketing and crop needs. From the mid 19th century, cash
cropping has taken precedence over food cropping in order to
attain cash incomes and hard currency. Advantages of cash crop-
ping to individual farmers have placed individual interests ahead
of national interests and frequently the nation's food production
has been the loser. Priorities are being reevaluated currently
although there is not yet agreement that national food self-
sufficiency is either a realistic or a desirable goal.

E. Hazards:

Drought, flooding, earthquakes, tidal waves, hail storms,
and volcano eruptions are severe hazards in many parts of South
and Southeast Asia. The countries included in this profile are
vulnerable to hazards, both because of their physical location,
and especially because poverty increases their vulnerability.

The physical environment is part of the problem. Inter-
secting climatic zones; annual movements of Monsoonal winds;
and close interaction between combinations of high mountains,
zones of substantial rainfall, and semi-arid regions give rise
to irregular weather patterns and sometimes intense storms.
The unreliability of climate conditions, combined with high
densities of rural population, increase changes of both seasonal
and annual food shortage, sometimes culminating in famine.

The region is also one of intersecting geological zones where movement of interacting plates of the earth's crust result in earthquakes and volcanoes. Both climatic and geological fluxes contribute to tidal waves. The unique combination of population pressures, economic disruption from the colonial experience, and high potential for the incidence of natural hazards makes this part of the developing world particularly vulnerable to catastrophic interaction between the human population and the natural environment.

2.1 Bangladesh

A. Agricultural Production:

Agriculture is Bangladesh's most important economic activity. More than 80% of the people are farmers. Agriculture provides 60% of the Gross Domestic Product with rice production alone accounting for 30% of GNP. Exports of jute, tea, sugarcane, and oilseed provide the major source of foreign currency.

The principal unit of agricultural production is the family farm, many of which suffer from fragmented holdings. In 1960, 61% of all farms were owner-occupied of less than 3.5 acres; 37% were owner-cum-tenant-farms of less than 4.3 acres; and 2% were tenant farms of less than 2.4 acres. Large farms of more than 25 acres comprised about 0.5% of the total number of farms. During the past 15 years, the trend has been toward fewer owner-tenant farms and instead

toward more farms in excess of 7.5 acres. As small farmers give up their land to larger land owners, incentives for cash cropping increase. Labor saving agricultural machinery and technology such as tube wells and diesel pumps are introduced. Costs of acquisition and maintenance mean that only well-to-do farmers can afford the technology and peasants are made marginal. As only about 14% of all farms in Bangladesh employ permanently hired labor, the former owners/tenants become seasonal workers. Alternatively, they migrate to urban areas seeking wage employment.

Bangladesh is the world's fourth largest producer of rice. 80% of the nation's total crop area is given over to it. Only about 30% of rice production enters the market system, the rest being consumed by those who grew it or in local markets. There are three basic varieties of rice; Aman, Aus, and Boro, each having an individual set of environmental constraints. Aman paddy rice is the preferred crop of the lower lands. Approximately 55% of the total crop area is under Aman. It accounts for 12% of the marketed rice. Aman is sown in May or June and harvested in November or December, and yields a good crop of about 1,100 pounds per acre. Aus is planted in the Ganges delta where soil quality differs according to the relative heights of levees and backwater depressions. Aus accounts for only about 8% of rice that enters the market. Yet aus occupies 30% of the total crop area, yielding about 800 pounds per acre. Aus is perceived to be a very risky crop to grow because it does

not survive the inundations of water that often comes with the main rains of July and August. In order to reduce the risk of planting Aus, a farmer will plant jute with it. Jute, a cash crop, is less susceptible to inundation but depletes the soil faster than Aus. Another problem is that the price for jute is unreliable and has been dropping in recent years.

Boro rice comprises 14% of the marketed rice. It is transplanted onto the lowest lands in November or ^{with Aman} December and yields about 1000 pounds per acre. It is the only form of rice that is widely irrigated. Traditionally it has been irrigated by water scoops and shovels. During the past 15 years it is increasingly being irrigated by low lift diesel pumps. Between 1968-1972, there was a 40% increase in production as compared to 17% for Aman and 15% for Aus. This increase was in part due to the increase in the acreage with pump irrigation.

The production of marketable rice has remained static for almost a decade. In 1963-64, 10,460 thousand tons were produced, in 1972-73 10,090 thousand tons were produced. Over the same period the population increased 25%. One of the effects of this is that 10% of the nation's GNP must be spent on grain imports alone. Bangladesh cannot feed itself now and the dependency on foodstuff imports is increasing.

B. Health and Nutrition:

Bangladesh has three principal health problems:

(1) the widespread incidence of malnutrition, (2) communicable diseases, and (3) a general lack of public health facilities.

Malnutrition is the most pressing of the three problems. Bangladesh with about 80 million people and a population density of 1,300-1,500 per square mile, is one of the world's most populous nations. Population grows at a rate of 3.3% in contrast to agricultural growth which is about 2.5% a year. At least half of the population suffers from malnutrition.

The country requires 13 million tons of grain per annum to feed its population. In 1966-67 it imported 1.5 million tons of food grains; in 1972-73, 2.9 million tons; and in 1973-74, 2.8 million tons. The urban areas and the center of the country, which are given over to jute production, are most dependent on food imports. The northwest is the only region that has been able to sustain a food surplus while the southwest has, at times, almost achieved food self-sufficiency.

The diet of rural Bengalis is predominantly starch with some vegetables and pulses. It consists of 439 to 726 grams of food grains a day; total daily intake averages about 840 or more grams. The total calorific value of food intake is between 1,780 and 2,251 calories. The diet is almost totally deficient in animal proteins, vitamins A, C, and Riboflavin. The most common nutritional disease is protein-

calorie malnutrition in the form of either kwashiorkor (absence of proteins) or marasmus (absence of calories). Malnutrition affects at least half of all children in the country. One-third of the population suffers from anaemia. One-quarter have goiter.

Nutritional problems increase vulnerability to communicable diseases which afflict most Bengalis and which are generally environmentally related. Gastro-intestinal (e.g. cholera) and respiratory (e.g. tuberculosis) diseases are principal causes of death in the country. These diseases thrive in conditions of over-crowding, poor sanitation, and malnutrition. > *prevalence*

In the case of cholera, between September and May, nearly half of all villages will correctly report at least 5 cases. 50% of people contracting cholera will die from the disease. The overall death rate from cholera is 1.4 per 1,000 people. Tuberculosis is an airborne disease contracted by inhalation. In Bangladesh, the incidence of the active disease is estimated to be 500 per 100,000 population.

The public health system has not had sufficient resources to answer the many needs of the country. The system's emphasis is on a western, curative, urban hospital model that is mostly directed towards the illnesses of affluence. As of 1970 there were 9,723 beds and about 155 hospitals, almost all located in urban areas. The doctor/patient ratio is among the least satisfactory in world - 1:10,000. Nor does this figure show the maldistribution of doctors in the

country. In the rural areas the figure is closer to one doctor per 60,000 people. Although the nation's 8,000-12,000 doctors are well trained by U.S. or British standards, much of the training is not suitable for the nation's health needs. Little has been done to develop health auxiliaries and other health facilities that could be more appropriate.

C. Urbanization:

Bangladesh is one of the least urbanized nations in the world. Less than 6% of total population live in cities. The 1961 census reported only 24 cities with populations exceeding 25,000 inhabitants. In 1971 only Dacca, Chittagong, Khula and Barisal had over 100,000 people, and only Dacca has over one million. (1.5 million). Urban population growth in 1961 was about 5.2%. Much of this growth can be attributed to migration from rural areas where 7 to 11 persons per 1,000 migrate to towns each year. The majority of the migrants are males between 20 and 30 years of age. Yet much of the urban migration is temporary. There is a continuous two-way flow. The males go to areas to earn cash. After a period of time they return to their villages. Seldom do they send for their families and settle in urban areas. If in the future migrants stayed permanently in the urban areas, the urban growth rate could go up to 11% or more.

D. Hazards:

Cyclone and flood are the two principal natural hazards in Bangladesh. Hazards are present in many parts of the

world. Disasters occur when extreme hazards strike vulnerable populations.

In an effort to decrease vulnerability, the Bangladesh government is opening new farming areas. A great deal of land reclamation has been underway, particularly along the southern coast. These new lands are attractive to poor and landless people. Yet these new lands, designed to decrease the nation's poverty, are in high risk areas which have been prone to previous cyclones and floods. Thus, expansion into marginal areas may have reduced poverty, but also placed more people in the paths of hazards.

Cyclones frequently occur during harvest time and can be devastating such as the disaster of 1970 in which about 300,000 people died. Losses extend also to livestock, crops, and the soils which become saline-saturated and take several years to return to previous levels of productivity.

Yet storms need not cause such destruction. Since the disaster of 1970, the government has organized emergency centers which house communication facilities, contain emergency health and food supplies, and, in many cases, are located on higher ground so people can survive the impact of tidal waves and tidal surges. These centers offer an interesting precedent for dealing with a particular environmental situation, or at least to reduce vulnerability to an environmental hazard.

River flooding is also perceived as a great environmental problem. It is ironic that annual river floods are simultaneously one of the countries greatest resources. The peak flood flow of the three major river systems (the Ganges, the Brahmaputra and the Meghna) is five million cusecs (twice the all time peak flow of the Mississippi). The sediment load is 2.4 billion tons a year, with approximately 8-10 million acres of cultivable land receiving both water and a layer of silt.

Until about 1947 there existed a traditional system for coping with flooding. This was maintained by the large Hindu land owners. This system utilized embankments, dikes, barrages and techniques of building up higher land with fill taken from excavations for ponds to catch and hold water. The landlords who maintained this system formed the traditional power elite, a source of authority. When East and West Pakistan were created in 1947, these Hindu landlords were removed and emigrated to India. With the landlords removed, the system of irrigation and filling broke down and soil losses and degradation resulted.

Flooding, then, offers still another example of an environmental hazard whose effect on the population is largely dependent on the nature of the social and political institutions which are in place to deal with the problem.

2.2 Nepal

A. Introduction:

Nepal is regarded as one of the three least developed countries in the world (along with Laos and Afghanistan),

having one of the lowest amounts of internal resources for development of any of the least developed nations. It is predominantly a mountainous country, landlocked and lacking essential commodities so that it needs to import much of its food, textiles and tobacco requirements. 94% of the population are involved in agriculture which provides (a) 67% of the G.D.P. (b) 70% of the export earnings and (c) raw materials for industry for example jute, textiles and cigarettes.

According to the Area Handbook (Harris et al; 1973) the country probably has a wider physical diversity than any country of comparable size. The mountain mass in the North has some of the world's highest peaks. To the South (100 miles away) lie the cultivated fields and jungles of the Northern edge of the Gangetic Plain. Numerous streams flow southwards from the mountains, meander across the Terai plain and join the Ganges in Northern India

Nepal has a population of 11.55 million (1971). Although overall population density is not particularly high and the population growth rate of 2.07% (Table 2.21) is not exorbitant compared to other least developed countries, some parts of Nepal are considered to be overpopulated. 66% of Nepal's land area is in the Himalayan and Hill Regions, where 60% of the population lives. But these regions have less than one-third of the total cultivated area. Population pressure has prompted many younger people to seek employment or land in India or in the Terai.

TABLE 2-21

Population Characteristics of Nepal

Characteristic	1961	1971
Population (thousands)	9,413	11,555
Density per square kilometer	67	79
Per cent in urban areas*	3.6	4
Per cent employed in agriculture	94.3	94.37
Average rate of population increase		2.07

*Defined as settlements of 10,000 or more inhabitants.
Source: Central Bureau of Statistics.

Economically Active Population in Various Sectors: 1950-71

Year	Total	Agriculture	Industry	Services
1950	4,199 (100.0)	3,920 (93.30)	89 (2.12)	190 (4.53)
1960	4,385 (100.0)	4,140 (94.43)	90 (2.05)	155 (3.52)
1971	4,852 (100.0)	4,579 (94.37)	106 (2.19)	167 (3.44)

Source: The 1950 and 1960 information is from 1950-85 Labour Force Projections of ILO and 1971 information is from Population Census 1971, Central Bureau of Statistics, Nepal.

Today the Terai is geographically and culturally a transition region between the hills and the plains. In this area it is possible to see typical mountain style dwellings with accommodation for animals and tools on the ground floor. This settlement of hill people on the Terai has to a certain extent increased political conflict between the groups. Few Terai people (of Indian origin) are in any position of power. Most of their political representatives are originally from the hill regions. This situation has implications for the administration of development projects.

Despite these conflicts, the Terai is Nepal's economic frontier. For years it formed a natural barrier between Nepalese in the hills and the Indians in the South. Historically Nepal's leaders prevented clearing of the Terai forests to keep effective defense against India. The area had endemic malaria and recent campaigns have aimed at eradicating the disease. Now after extensive clearing, the area generates over 50% of Nepal's G.N.P., is the scene of resettlement schemes and is absorbing migration from the mountains.

The West of the area has an annual rainfall of 600 mm per annum, naturally has dry tropical savanna and bamboo vegetation, but the cleared areas support intensive cultivation all year round. The East has an average rainfall of 2,500 mm per annum and supports moist tropical deciduous forest-cultivation being limited to cleared areas near streams. The far west is the habitat of several species

of large game animals and poisonous snakes. The Central Inner Terai is the only place in Asia where wild rhinos still exist. Despite the protection of forest guards numbers are declining, which is causing concern among environmentalists.

The Terai has a rice surplus which is transferred to the hill regions and to India. In spite of this, many of the Terai's farmers are subsistence, often running into debt before the harvest. They then have to sell their rice as soon as it is harvested, when prices are low, to pay back their debts. The future is not particularly bright for the Terai. If present population growth continues, in the not-too-distant future, the area could be trying to support densities of over 800 per square mile, which will inevitably drag many more people down to the subsistence level. The few rich live comparatively well but even now share some of the problems of the rest of the population, for example lack of abundant and pure water supply and the prevalence of a great variety of virulent diseases. Evidently, comprehensive development plans are needed for Nepal and in particular for the Terai.

B. Land Deterioration:

The 1970-75 National Plan had hoped to raise the G.N.P. by four percent per annum in Nepal. In fact, during that period agricultural production in particular declined by 5.4%. This was said to be a result of crop failure, but in fact

little effort had been made to increase agricultural production in ways that were readily available.

Population pressure, in selected areas of Nepal, has led to overuse of land, so that its productivity is gradually decreasing. In the Gangetic Plain, where there has been dense population, overgrazing and overcultivation for decades, some regions have become dusty, arid wastes. It is thought that such conditions await the Terai if ecological desiccation is not interrupted.

The Terai has heavily forested lands in the Far West and Far East, but extensive clearing has taken place recently. Migration to the Terai has increased deforestation. The last stands of timber are being felled by settlers in the Gangetic Plain and in the mountains overcutting has left timber stands of commercial value isolated, clinging to steep slopes.

At the moment, a third of Nepal is covered by forest. Which represents an important economic resource. Commercial exploitation is confined to the south and along with haphazard land clearance is leading to alarming depletion of the forests of the Terai. 87% of Nepal's timber revenue comes from the Terai, largely because there are roads available to transport the wood to India. Effective utilization of Nepal's forest resources requires scientific management because at present, not only are the trees being cut without replenishment, but large tracts of land are being lost due to increased soil erosion and flooding.

In 1954, a U.N. forestry specialist warned that erosion was "slowly but surely robbing the Mahabharat of habitable land"... because drainage basins were being deforested. Deforestation and erosion cause a decline in soil fertility and productivity. In general the soils of Nepal lack humus, nitrogen and phosphates. Even so, there are unusually high numbers of people who attempt to use marginal areas such as the slopes of narrow mountain valleys. Farmers get into a vicious circle. When soil is exhausted they clear more land - often forest land of marginal quality, which needs terracing on steep slopes and the terraces often wash away in the rainy season. Heavy cloudbursts cause landslides and avalanches of boulders. The sides of mountains disappear into valleys carrying terraced fields with them.

Erosion is also being accelerated by excessive overgrazing. In the mountains, cattle, sheep, yaks and cross-breeds are kept. The animals often have defective nutrition which cause disability and numerous animal diseases. Pasture is poor and in the long dry season farmers have developed the habit of using leaves off trees as fodder. They cut whole branches which weakens and destroys trees, and thus contributes to deforestation and soil erosion.

The heavy rains do not merely cause problems of erosion - they also bring heavy floods. Streams which are dried up in September to June become raging torrents in the monsoon season. The alluvial soils of the Terai are generally very fertile and suited to intensive agriculture but on these cultivated

plains vast areas of cropland are lost or damaged annually by floods. These floods also disrupt transport. The majority of food is transported by bullock cart and the tracks are impossible during the monsoons. Sometimes famine is a real threat because rice cannot be transported into the hill regions from the Terai.

C. Raising Agricultural Production:

In 1965, Nepal was the fifth largest exporter of rice in the World. In 1967 the late King Mahendra launched his "Back to the Village" National Campaign. Which among many political aims hoped to implement land reform: promote the cooperative spirit; explain to the people the importance of reforestation and conservation; to stress the value of increased agriculture and expansion of industry. So far, increased agricultural production has come mainly as a result of increased acreage being brought into cultivation. In the future, efforts to raise production must overcome the following difficulties:

- i. land reform and lack of domestic investment
 - ii. soil improvement and erosion control
 - iii. irrigation and drainage
 - iv. prevention of plant and animal diseases/introduction of alternative crops.
- i) Land reform has been only a partial success. Land was rationed so that higher acreages were given to hill farmers than to farmers in the Terai but no consideration was given to productivity within different land types.

Reform has dispossessed the peasants and left them with weaker bargaining power. It has also created laborers with no legal rights and unrecognized tenants who also have no rights to credit or subsidized government help.

> results of land reform

There is thus a lack of investment by farmers.

Scattered farms, villages, and family units do not provide the framework for agricultural activity much above subsistence level. The government holds the purse and controls fertilizer, pesticides, improved seeds and implements and extension services. The individual farmer can only provide land, labor, and management. Since 96% of the population are rural, all efforts to better the lot of the people must be concentrated at this level of the individual villager.

strings

ii) Generally there is a shortage of fertilizers in Nepal.

Animal manure, oilcake and crop residues are used but they are of insufficient quantity and unsatisfactory quality. Table 2-22 shows that chemical fertilizers are expected to do more to increase yields of major grain crops than any other planned improvement. In addition to improving soils, plans are underway to give over areas of steep slopes for reforestation to replenish the depleting forest reserves and protect thin soils on the mountainous and hilly areas.

iii) Many have looked to irrigation to greatly increase agricultural production. Seven major rivers of Nepal have the capacity to irrigate five million acres. Up to now

TABLE 2-22

INDICATORS SHOWING CONTRIBUTION OF VARIOUS INPUTS IN THE
ESTIMATED ADDITIONAL PRODUCTION

(in per cent)

Inputs	Crops			
	Paddy	Maize	Wheat	Foodgrains
Chemical Fertilizers	42	28	29	33
Improved seeds	26	18	26	22
Irrigation	20	15	27	17
Plan Protection & Others	5	22	13	14
Additional Acreage	7	17	5	14
Total	100	100	100	100

Source: National Planning Commission, Fourth Five Year Plan, 1970-75, Kathmandu (1970).

there has been some bad investment in medium or large scale irrigation projects where returns have been poor. Irrigation canals and distributaries have been constructed without making sure that individual farmers had field channels, so many schemes are not used or underused. The area actually irrigated is 75-80% of potential. Irrigation could improve the possibilities of multiple cropping. At present only 20% of land under cultivation is double cropped.

- iv) Greater yields could be achieved by controlling diseases in plants. For example, it is estimated that more food could be produced by growing potatoes than any other crop if potato diseases were controlled, since this crop grows up to 14,000 in the mountains. There could also be a better choice of crops for certain areas. At the moment rice is planted at too high altitudes on poor unirrigated soils where corn and potatoes would be more effective. 80% of Nepal's cultivated land is empty in winter and in some areas winter wheat could easily be grown. Instead, low value crops are increasing in acreage as opposed to high value crops like Maize, oilseeds and sugarcane (the only crops to have shown gains in yields). Millet, a subsistence crop, is being grown in small plots on hillsides, mainly because farmers have so few monetary resources that they have to grow the cheapest seeds, which rules out crops like wheat. Table 2-23 shows the intended inputs to agriculture during the Fourth and Fifth Year Plan.

TABLE 2-23

CHEMICAL FERTILIZER TO BE SOLD DURING THE FOURTH PLAN PERIOD
(Nutrient m M. T.)

Fertilizer	1970-71	1971-72	1972-73	1973-74	1974-75
Nitrogen	5,930	9,000	11,000	13,000	15,000
Phosphorus	2,360	4,500	5,500	6,500	7,000
Potash	390	1,200	1,600	2,200	3,000

SALE OF IMPROVED SEEDS DURING THE FOURTH PLAN PERIOD
(In M. T.)

Seed	1970-71	1971-72	1972-73	1973-74	1974-75
Maize	136	204	306	408	510
Wheat	546	780	1,092	1,326	1,510
Paddy	400	600	800	1,100	1,400

DURING THE FOURTH PLAN PERIOD
SALES TARGET OF AGRI-TOOLS AND PLANT PROTECTION MATERIALS
(Rs in THOUSAND)

	1970-71	1971-72	1972-73	1973-74	1974-75	Total
Agri-Tools	775	1,100	1,425	1,750	2,225	7275
Pesticides	375	525	780	1,000	1,250	3930

Source: 4th Five Year Plan of Nepal

D. Urbanization and Industrialization:

There is a low level of urbanization in Nepal. Only 4% of the people live in the six settlements of over 10,000 population. However, these settlements are the only places where modern medical care, education, and social services are generally available.

There is also a low level of industrialization. This stems from a lack of natural resources, absence of suitable credit, inadequate public services (for example power and water), no growth of market for goods and inadequate transport to overcome the landlocked problems (Nepal is 400 miles from Calcutta - the nearest port).

Priority needs to be given to measurement of the country's natural resources, especially soil analysis, groundwater surveys and geological/mineralogical research. The two major known natural resources are timber and hydro-electric power potential. Species of valuable hardwoods are available to make furniture, veneer, plywood, and paper pulp. Existing industries include jute, textiles, matches, cigarettes, food processing, stainless steel and distilling. Table 2-24 shows that there are plans to introduce agriculture related industries such as fertilizer plants, tool manufacture and food processing.

A major obstacle to economic development has been the lack of transport facilities. In the hills, deep gorges are a formidable barrier to communication which is by foot along paved stepped tracks up the mountain sides. An aerial

TABLE 2-24

INDUSTRIES TO BE ESTABLISHED DURING THE FOURTH PLAN PERIOD

Class A.

(1) Import Reducing Industries	Annual Production (capacity)
Textiles	20 million Yards
Flour Mill	9,000 tons
Iron Pipe	3,000 tons
Soap	2,000 tons
Sugar crushing	daily 1000 tons sugar cane crushing
Brewery	1.8 million bottles (11 oz)
Slaughter house & Meat processing	Daily 25 Buffalos, 25 pigs, 130 chicken
Leather Tanning	11,000 Hides
Tobacco Refining	12,000 tons
Cigarettes	1000 million sticks
(2) Export Promoting Industries	
Jute	10,000 tons
Fruit canning & Preservation	40,000 bottles squash 14,000 bottles Jam
Resin and Turpentine	24,000 tons turpentine 10,000 tons Resin
Strawboard	6,000 tons
Ghee Refining	300 tons daily
Ginger Refine	1,500 tons
(3) Basic Industry	
Cement	65,000 tons
Iron and Steel	20,000 tons
Brick and Tile	40 million

Class B

Hotel	3,060 beds during the whole Plan period
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Class C

(1) Agriculture	
Modern Rice Mill	24,000 tons
Cold Storage	1,00,000 mds storage
Bakery Industry	3.6 million loafs
Vegetable ghee	7,500 tons
Feed Mixing Plant	50,000 metric tons
(2) Forests	
Pulp and paper	15,000 tons
Saw Mill	1 million cubic ft.
Plywood	19.2 million sq. ft.
Pharmaceutical based industry	
(3) Mineral based	
Paint & Varnish	2,000 tons
Glass	20 tons/day

ropeway (with a capacity to transfer 5 tons of freight per hour) during the monsoons, was constructed from Dharsing to Katmandu Valley. Although air transport is continuing to develop, human bearers will remain important in this area for years to come. On the lower plains areas, modernization has only affected the urban areas. Tarmac roads have not yet come to the whole of the Terai. In many areas, there are not bridges or hard surfaced roads so that streams which can be forded on foot in the dry season, when flooded in the wet season, are impassable.

The railways provided the most effective means of transport from the nineteenth century onward. If you needed to move goods E-W across the Terai, it was quicker to take the railway south into India, go E-W on Indian railway, and then take another train northwards into Nepal. The Indian market thus absorbed much of the Terai's goods because there was a limit to the amount of goods which the hill people could carry home on a back-pack. This has led to a lot of Indian investment and interest in Nepalese industry. 88% of Nepal's industrial investment is in the Terai. In order to lessen Nepal's dependence on India, the hill people supported the king's plan to build an E-W highway across the Terai, to link isolated subregions, and increase national unity. Unfortunately, until an adequate network of feeder roads is built to link areas to this highway, only the Terai will benefit.

Improved power sources are also required for industry. Nepal has enormous almost untouched H.E.P. potential. It's

generating potential is the highest in the world, estimated to be 83,000 mw equal to the combined installed capacity of Canada, the United States and Mexico. In 1963, 3 H.E.P. plants were in production. Recently, India has built an H.E.P. plant in Biratnager District to ease the power shortage of Eastern Nepal. But much of the power from this scheme has not been efficiently used because of an inappropriate grid system. Even though the scheme involved a major dam network, little attention was given to the full resource potential of the water. Several other H.E.P dams have been built in the Katmandu area and there are plans for the United Nations Special Fund to provide money for the Karnali River Project which will produce vast quantities of power for export to India.

Nepal suffers from a lack of technical personnel. In 1972, 61% of graduates were registered to take liberal arts degrees (see Table 2-25). In 1965, the number of people employed in factories was 15,000 - just 50% of the number employed by the civil service. There is obviously a priority need to educate and train to raise the productivity of labour.

Population growth is going to have an impact on the demand for education, employment and social services. At the moment, 40% of Nepal's population are under 15 years. Fertility rates do not decline sharply. The government will need to expand primary school enrollment three or four times every twenty years to achieve universal primary education by the year 2000.

Table 2-25

Registered Graduates: Subject-wise Classification

Subject	No. of Graduates	Per Cent
1. Liberal Arts	6,041	61.3
2. General Science	1,267	12.9
3. Commerce	1,135	11.5
4. Medicine	341	3.4
5. Engineering	325	3.3
6. Law	263	2.7
7. Education	263	2.7
8. Agriculture	133	1.3
9. Veterinary	33	0.3
10. Ph. D.	57	0.6
Total	9,858	100.0

Source: Harka Gurung, Graduates in Nepal: a Diagnostic Study (National Planning Commission, Nepal, 1972), p. 5.

In response to population pressure there has been considerable migration of Nepalese men to India. This out-migration began during the British colonization of India, because the British prized the Nepalese Gurkas for their abilities as fierce and dedicated soldiers. Today Nepalese people migrate to India seeking employment for periods of 1-5 years. 83% of the Nepalese men in India are employed as compared to 57% of the Indian males. There is no reason however to think that India can provide land or employment for an increased number of migrants. Nepal will increasingly have to deal with this problem herself.

E. Aid:

60% of Nepal's development expenditure comes from foreign aid. Table 2-2 shows the sources of this external assistance.

<u>Donor Country</u>	<u>Percentage Aid given</u> <u>1967-70</u>
India	52%
China	27%
U.S.A.	16%
U.K.	2%
Soviet Union	2%
Others (18 countries)	1%

The dependence on foreign aid results from i) extreme poverty ii) a low level of monetization of the economy iii) absence of taxable industries and heavy dependence on low yield agriculture and iv) absence of primary products desired by the world market. A high rate of population growth contributes to this dependence.

Many donors argue that Nepal is receiving more assistance than they can use, because they have such a limited number of technically skilled people. On the other hand without assistance they cannot train the skilled technicians. Nepal is also having basic problems in receiving aid. They are finding it difficult to engage in long-term planning because of the large number of donor countries who all want to follow their own approach and sometimes even their own accounting procedures. In addition western aid donors often assume that by raising the standard of living of the people they will inevitably improve stability and help democracy progress. This is all part of the same misconception that it is a simple matter to superimpose western technology on completely different culture with diverse philosophical and religious beliefs.

2.3 Indonesia

A. Population Pressure/Land Deterioration:

Indonesia is the largest nation of South East Asia being the fifth most populous nation in the world. The country has a total land area of 736,000 square miles. In 1975 the population of Indonesia was 138.5 million expanding at a rate of 2.4% per annum. Two-thirds of these people live on the islands of Java, Madura and Bali which comprise 4% of the total land area. The country's average population density is 60 per square kilometer but on Java the average density is 574 per square kilometer and on the outer islands 24 per square kilometer.

The first settlement of Indonesia occurred on the fertile alluvial lands and the lower slopes of volcanoes. The density of population gradually increased over the years and the pattern of settlement was strengthened by the colonials who preferred the fertile areas, brought urban functions, social facilities and employment possibilities there, which attracted the majority of the people.

Nowadays the average peasant on Java cultivates less than half a hectare of land and this is usually divided into small parcels. Multiple cropping is prevalent (more than a quarter of the plowed land is double cropped), but it is only possible to get two crops of rice per year if a farmer has modern irrigation systems. If they are dependent on the rains and traditional irrigation, only one crop of rice is possible. But other dry farming crops can be grown such as soya beans, yams or maize. In the past there have been attempts at land reform, but as elsewhere in South East Asia, this has led to the creation of landless laborers, land shortage and much rural unemployment. Living standards in crowded villages are low. Even if land redistribution occurred, there is not enough land available on Java to provide each farmer with a two hectare plot.

With the exception of Bali all the outer islands have room to extend cultivated areas. Sawah (wet rice cultivation) only covers 1% of all these areas. The dominant mode of cultivation is swidden (slash and burn or shifting cultivation). The problem here is that there is very little pri-

maeval forest left in Indonesia, so the Swidden farmer normally clears parcels of second growth forest (which have been cleared innumerable times) or may even turn land covered by alang grass, which is far less fertile than that which has rested for several years under dense forest. The longer the fallow - the larger the area needed to support swidden. On average a swidden cultivator requires ten times as much land as the Javanese peasant.

Forest clearance for agricultural land is a growing problem. Java has been without arable forest land since 1945. Now all wood cut on Java for domestic purposes is obtained from abandoned estate lands or from trees shading the village. Natural forest regrowth is hampered because in most of Indonesia water buffalo are allowed to graze in clearings. In-roads into the forest on the outer islands are causing erosion and flooding problems, which can only be checked by reforestation of most exposed land. Land which is cleared for agriculture is exposed to the weather. High temperatures and heavy rains combine to cause leaching that lessens the productivity of the soil. If there is a marked dry season this is not as critical a problem, but areas with steady rainfall often have severe leaching and the development of laterite soils. Laterization must be regarded as a great danger for most of Indonesia where natural rain forest has been cleared. In addition, soil erosion, caused by deforestation is one of the country's most pressing problems.

B. Agricultural Productivity:

Indonesia remains crippled by the failure of the agricultural sector to grow at a rate significantly greater than the population. Agriculture employs 73% of the labor force and given the present population growth rate, agriculture is going to have to absorb more employment. We have already outlined the problems of population pressure on Java or Madura. It is evident that greater agricultural production is only going to come either by increasing the yields of present products or increased cultivation of the outer islands. A combination of the two would be most preferable. Since the early 1960's the Indonesian government has aimed to encourage these activities in one way or another.

In some areas of young volcanic soils, the land is very productive. Where streams flow through volcanic areas, they can productively be used for irrigation since they pick up minerals from the soils, which adds nutrients to irrigated land. Unfortunately the situation is not always so simple. Where traditional gravity irrigation is used, soil nutrients, fertilizers and plant protection chemicals are carried off by irrigation waters. Fifty-nine % of the arable land in Indonesia is planted with rice, but only thirty-three percent of this land is irrigated. In many areas irrigation is not possible because of the underlying geology, steep slopes or leached soils. Despite this it is generally agreed that Indonesia will benefit greatly by extension of irrigated acreages. Shortage of good irrigation

is a most important limitation to the introduction of new varieties of rice with better yields. Application of irrigation, use of fertilizers and insecticides or introduction of new crop varieties will require changes in the perceptions of the peasant who often suffer from "subsistence-mindedness." Transfer of labour from crop production to repair of irrigation works could increase total production considerably; spending less money on fertilizer and more on animal vaccines could increase total income; and in most parts of Indonesia there are one or more crops which if grown or grown more widely would yield higher incomes.

The government has tried many campaigns to raise agricultural productivity. In the late 1960's rice culture guidance programs failed because (i) poor crops in 1967 dampered earlier successes (ii) peasants often adapted and modified new technology installed by extension workers to compromise between old and new systems - this lessened the effectiveness of the technologies (iii) agricultural extension workers did not live in the villages involved and the program became too large to administrate.

The first Five Year Plan of 1969-74 aimed to increase rice production and rehabilitate rural infrastructure. A 46.5% increase in rice production was planned and domestic production of nitrogenous fertilizers was to rise by 767%. IR5 and IR8 rice seeds were distributed arbitrarily to villages. Packages of fertilizers were delivered and each peasant had to receive the prescribed dose of fertilizer

consistent with the needs of these particular seeds. Hansen (1972) has outlined the reasons for the failure of the scheme:

- (i) Government records of soil composition and agricultural conditions was poor to sketchy - fertilizer were often of the wrong type
- (ii) Aerial spraying was applied at intervals but peasants varied in their planting times - so spraying was often useless
- (iii) There were ecological dangers in widespread aerial spraying - fish died in inland ponds from insecticide poisoning
- (iv) IR8 rice variety had been developed in the Philippines and was vulnerable to pests in Indonesia
- (v) Consumers did not like IR8 and this meant demand was low and market price was low (often below non IR rice)
- (vi) Peasants shifted to non IR rice production that required less fertilizer. Large amounts of low price surplus fertilizer was sold on the market driving the prices below government required prices
- (vii) Because of the failure of the scheme, peasants refused to pay back the loans from the government
- (viii) Even when yields were much greater farmers had problems with rats who were attracted to the better food supplies.

When this scheme failed, the government terminated its contracts with foreign firms. Late in 1970, they began to distribute seeds developed in Indonesia and they abandoned aerial spraying. Village credit banks are being set up to disperse credit easily to the villagers. The Second Five Year Plan 1974-79 is concentrating on integrated rural development, with attention being given to provision of low cost housing units, health centers and schools as well as agricultural extension help.

C. Land Reclamation and Colonization:

In response to land shortage on Java, reclamation and settlement schemes have been introduced on coastal swamp marshes. These have not been particularly successful for the following reasons: (i) In some areas potential acid sulphate soils and deep peat soils were found (ii) there was often too little gravity to obtain desired water tables (iii) salt water intrusions occurred (iv) the areas were too remote (v) settlers faced health hazards particularly malaria (vi) damage was caused to land and property by insect pests, rats and wild pigs.

Much more successful have been the colonization schemes involving migration of participants from Java and Madura to the outer islands. Indonesia is a nation rich in resources (population, land and minerals) but poor in management, organization, infrastructure and finance. The major problem is that the population resources are on Java, Bali and Madura whereas minerals and land resources are on the Daerah

(Outer Islands). Therefore to many Indonesians development is seen to be transferring the population to the more promising areas.

As early as 1901 the Dutch appreciated this problem. Colonization or transmigration became official policy for the last fifty years of Dutch rule. Whole villages were moved to Sumatra to provide labour for plantation in the early days. The Lampung area of southern Sumatra was the first to be colonized. The Dutch put in irrigation works, cleared land and gave each family a house, land and enough food to last till the first harvest. By 1911, 6,073 people had moved to Lampung but obviously the scheme was proving expensive. As the Dutch reacted by providing less for the settlers, fewer settlers came. There was a steady stream of migrants but the scheme was interrupted by the Second World War and the War of Independence. After 1950 the newly established Transmigration Office aimed to move 48 million people in thirty-five years! By 1961, the population of Java had increased by 18 million and only 265,000 people had emigrated. The 1961-68 8 Year Development Plan planned to move 1.5 million people per annum which would have meant 5,000 people daily and the irrigation of 1000 ha. of land per day - impossible targets to fulfill. Often the people who moved were the less active and least resourceful. All colonization was based on wet rice cultivation which was very expensive to establish and was not necessarily practical for the soils of the outer islands. For example,

the volcanic soils of Sumatra are much more acid than those of Java and on sandier soils it is more productive to grow corn, peanuts or sorghum. Costs could have been lowered considerably if the government had planned diversification of crops instead of trying to provide irrigation. Extension workers could have helped the Javanese to adapt to other types of cultivation than wet rice agriculture. Other mistakes were made. Sites were often badly surveyed; good soil or water were lacking; land was sometimes not ready so colonizers had to dig their own canals and clear their own land; infrastructure to aid marketing, processing etc, was missing. In the face of such setbacks many migrants went back to Java.

The first Five Year Plan (1969) regarded transmigration as a means to open up new agricultural land. Migrants were selected from disaster areas, areas of poor and eroded soils and areas to be flooded by dam construction. Much bigger colonization units were planned to attract non-agricultural workers as well, located if possible near to expanding mining or forestry areas. To aid migration infrastructure has been improved. Roads to ferry points (e.g. Merak) have been upgraded and many sectors of the Trans Sumatra Highway have been completed. A strip of land 15 Km. to either side of this highway is set aside for transmigration projects.

There has been variable success in colonization. Sumatra still accepts 58% of all migrants (Lampung province 29%) but migration is taking place to Sulawesi and Kalimantan in Sulawesi.

Balinese and Javanese have successfully established settlements. Problems there have been caused by the local people-shifting cultivators - who have moved into the hills behind the plains and are instigating soil erosion. For the migrants there are common flooding problems and in the dry season irrigation facilities are inadequate.

In Sumatra some settlers are willing to invest for the future to grow commercial crops, use fertilizer etc. In other areas farmers continue to use their traditional tools and methods. Many persist with swidden cultivation. In the outer islands, reduction of the forest cover much below 40% would involve serious risks of soil/water management. Therefore expansion of agriculture in these areas needs a replacement of swidden by permanent agriculture. As most soils left to be settled are not inherently fertile, skill and persistence will be needed to make cultivation successful.

D. Natural Hazards:

Perennial hardships such as drought, flood and volcanic eruptions have hampered efforts to achieve agricultural self-sufficiency. The majority of Indonesians live in the sight of a volcanic crater. There are 77 active volcanoes in the countries. The most recent eruptions took place in 1954, 1961 and 1962. Eruptions can be helpful if they deposit limited amounts of ash containing minerals on agricultural land. Generally in the short term they are disruptive and in the worst cases calamitous. In the long term they provide the basis for the development of fertile soil.

Earthquake tremours are numerous but fortunately not of high intensity. The most common hazards are periodic droughts particularly in North Western Java and conversely floods which can affect all areas. In Sumatra, heavy flooding damaged areas near Palembang in the post war period, because rivers which were normally dredged had been allowed to silt up during the war. Coastal areas are susceptible to flooding in the typhoon season. Fortunately, although the South China Sea and the Indian Ocean have numerous typhoons annually comparatively few affect Indonesia because the winds are usually favorable.

In the face of all these potential natural hazards, most Indonesian peasants show a basic reluctance to move. When crop fails they do not leave their villages, they regard it as an act of god and with traditional communal concern, try to carry on despite tragedy.

E. Industrialization:

In 1974, for the first time in 20 years, industrial production increased its relative share of the G.N.P. Historically, small household industries have been important, but the major part of industrial production came from processing agricultural products and minerals. Until 1974, rubber was Indonesia's second export providing 8% of export earnings. But production has declined and if Indonesia is to maintain its market for rubber it must plant new stands and completely replant old stands in the next fifteen years. Since rubber is important to the economy and gives good

yields on the relatively poor soils of Sumatra and Borneo it seems sensible to comply.

Forestry has become important to the economy of Indonesia. It now provides 15% of export earnings. Foreign firms, principally Japanese or Philippine, have been given contracts to run logging enterprises in Kalimantan and Sumatra. There are protests that these firms are logging without replanting. Only one-fifth of Indonesia's forest is now primaeval. Fryer (1970) suggested that as much as half of the forest cutting of the world's entire humid forest was taking place in Indonesia. On Java, the teak tree has been cut for decades and where extensive forest clearance has taken place "savannization" has occurred - replacing the humid forest with drought resistant vegetation. Now Sumatra and Kalimantan have become frontiers of settlement, more deforestation is likely. Accompanying this deforestation is eradication of species of animal. The main endangered species in Indonesia is the Rhino - hunted by the Chinese still for their horns, which when powdered are deemed to have aphrodisiac properties.

Indonesia has become an attractive investment prospect for foreign firms. The majority of investment is in oil, timber and rubber (since 1971 \$1½ billion of pledged foreign investment). There is also investment in other mineral exploitation such as tin, bauxite, nickel, coal and low grade iron ore. Present obstacles to industrial development include deficiencies of infrastructure, weakness of

public utilities, lack of skilled or semi-skilled labour and lack of tax incentives to stimulate growth of industries on outer islands. Establishment of manufacturing industries has been particularly hampered by lack of power in South East Asia. This inhibits mineral processing in particular.

Asahan Falls on Sumatra has the largest potential for hydro-electric power in Indonesia. If exploited aluminum and tin smelting are likely to follow. All this will take place near to Medan the largest manufacturing centre outside Java. This will follow the pattern of Java where industry tends to be concentrated in certain localities, for example the textile industry is concentrated around Bandung in Java. Another concentration of industry is planned for Plaju where a petrochemical plant and liquified natural gas plant will be set up. Such concentration of heavy industry is bound to bring pollution problems. Near Surabaya petrochemical fertilizer plant there is a notice which reads "Danger don't use Poison Water!" Black sludge coats the mud bottom for several yards west of the coastal point at which effluent enters Madura Strait. Also in Jakarta Bay pollution poses a health risk especially where filter feeding molluscs are exposed to pollutants and contaminated fish, transfer viruses such as typhoid to humans.

Particular problems are likely to result from petroleum exploration. Petroleum is already being produced in the Java Sea (near Jakarta), off the East coast of Kalimantan and north of Balikpapan. There are already eight refineries

(Central and East Java; Palembang Sumatra; East Kalimantan and Bali). A report of the Smithsonian Institute claimed that coastal pollution by oil is not yet a serious problem in Indonesia. Areas most susceptible to pollution are as follows:

(i) Tourist areas - particularly Bali and Jakarta.

Tourism has already been adversely affected by beach pollution in Kepulauan - Seribu and Bina Beach Jakarta. Tar balls on the beach have come from ship traffic. If slicks developed a Western monsoon would be a disaster.

(ii) Estuarine and shallow coastal waters are most likely to be affected by pollution from land and open sea. They are breeding grounds and habitats of young fish and shrimps which are sensitive to changes in water quality.

In intertidal areas, seaweed provides a major source of protein/carbohydrate food in rice shortage. This food source would be taken away if pollution occurred.

(iii) "Tambak" - brackish water fish ponds are a most important coastal resource. They are very vulnerable to pollution because tidal and estuarine flows bring pollutants. A layer of oil on top of the water limits photosynthesis and lowers oxygen levels. This inhibits the growth of phytoplankton, which harms the fish. Industrial effluent and organochlorine insecticide in agri-

cultural run-off and domestic waste water, are already affecting the fish ponds.

In fresh water areas inland (e.g. Palembang Sumatra) refinery wastes have led to a disagreeable taste in the fish caught there.

Pertamina (the state owned oil firm) has a budget equal to the governments and a major development role. It is imperative that development of petroleum resources and associated industrial development is not haphazard and that effective measures are introduced to safeguard against pollution.

F. Urbanization:

Rural to urban migration has created more urban nodes than any other nation in South East Asia. Jakarta, Surabaya and Bandung, all on Java, have populations exceeding one million. There are 27 other cities with populations between 100,000 and one million. Most of these cities are on Java or Sumatra although Kalimantan and Sumatra now have the highest rates of urbanization. One possible explanation for the large number of cities is the isolation of the island clusters and the separate ethnic groups in each cluster. It is likely that the Indonesian perceives correctly that greater opportunities for employment and education are available in urban rather than rural areas. To a certain extent this is true, as many students have to go to Javanese cities, in particular for higher education. People are drawn to the Jakarta area and other urban areas on Java for employment. Jakarta has

an annual population growth rate of 6-8%.

Unfortunately, there are notoriously high rates of unemployment and underemployment among educated Indonesians. And as elsewhere in the world, towns are characterized by a development of shanties on the outskirts. Jakarta has continuously struggled to overcome the undesirable effects of excessively rapid urbanization, but with a population of 5 million and a steady growth rate prospects are not bright.

As already mentioned in section D, outside extractive industry all other investment is concentrated in urban areas. Most investors want to set up business in the Jakarta region. This imbalance of capital investment creates social and economic problems in national development. Talks have taken place between government and international aid agencies to plan the establishment of industrial estates in other parts of the country, with electricity, water and telecommunications laid on, to try to spread investment evenly.

G. Health:

Indonesia has one of the highest infant mortality rates in South East Asia (125 per 1000). Life expectancy is still low - 48. In 1930 the death rate was 28/1000 which had fallen to 20/1000 in 1971. This decline had not been as great as in Malaysia or Hong Kong whose death rates are now 10/1000. The reasons for this are many and varied. For example, (i) Indonesia was late to begin health and sanitation programs because of the War of Independence, (ii) Fluctuating food supplies have negated much of the disease eradication program,

(iii) medicine has high cost and there were rapid rises in food prices particularly in the 1960's.

Food production did not keep pace with population growth in the 1960's. Levels of food consumption fell as did nutrition in terms of quantity and quality. Indonesia has a low animal protein intake per capita and has a lower per capita intake of general protein than Bangladesh. In 1966, the UNICEF free milk program ceased. Milk is a major factor in the decline of morbidity and mortality in children. There has been a rising importance of childrens diseases in the causes of death. Large parts of the coastal plain were infested with malaria, before the war. A fund was set up to spray these areas with DDT. In 1963, the fund ended and the number of malaria cases has increased continuously even in previously eradicated areas. In 1968, there was a plague epidemic. The population is still very susceptible to T.B. and cholera. (There were 48,387 cases of cholera reported in 1976).

This erratic progress in public health was mainly due to inflation. Also doctors preferred to live in the cities, so rural health clinics lacked doctors. In 1974, there was only one doctor on average to 21,470 Indonesians. The second Five Year Plan has done much to improve this situation. Each sub-district should have a health center by 1979. Major allocations have been made to improve rural drinking water. With UNDP and World Bank assistance the planned parenthood compaigns have been expanded.

Since 1968 levels of mortality have fallen as the food productivity programs have been expanded. If family size increases because of decreased mortality, it will be impossible to do what has been done in the past - that is clear new land, multiple crop increase irrigated acreage. The response must come in the form of reduced fertility, rural-urban migration or migration from Java to the Outer Islands.

2.4 Philippines

A. Introduction

The population of the Philippines in 1970 was 37.5 million and growing at a rate of 3.3%. Most people live on the eleven largest of the 7,100 islands which comprise the Philippines. The islands are spread over 15 degrees of latitude and together have a combined land area of 115,830 square miles. Most of the islands experience a tropical climate. Rainfall averages vary from 35 inches to 216 inches per year with a national average in excess of 100 inches.

There are several outstanding environmental concerns in the country: agricultural productivity, health, urbanization, and deforestation. The first three of these themes are treated in this overview. The fourth, deforestation, is of such importance that one of the case studies for the workshop focuses specifically on it.

B. Agricultural Productivity

About 20 million people or half the population are dependent on agriculture. Six major products dominate Philippine agriculture: rice, corn, coconuts, sugar, abaca and tobacco. Except for rice and corn, they are all cash crops grown for export. Rice, corn and coconuts accounted for 80% of all farm output involving about 16 million people in their production. Rice is the preferred crop. It is planted in approximately 45% of the country's total crop area. Three quarters of the farms grow it exclusively, most of them being small tenant farms of less than three hectares. Rice is planted between late April and early June and harvested from late September to early November.

High yield varieties (HYV) of rice were introduced in the 1960's. By 1970, half of the total irrigated crop area was seeded in HYV yielding about 1.6 tons per hectare. Many of the HYV's were developed by the International Rice Research Institute at Los Banos in the Philippines. The two most widely adopted HYV's in the Philippines are IR-8 which was the first to be introduced and IR-5 which has both a better yield and more appealing taste. Under ideal conditions, HYV's should at least double the per hectare yield as compared to more traditional varieties.

The "ideal" farming practices for HYV differ from

traditional practices. HYV are dependent on controlled irrigation, fertilizers, insecticides and appropriate farming techniques. It is difficult to compare traditional yields with HYV yields, as HYV tend to be grown under more controlled conditions. They are almost always grown on the best land that has always produced high yields. There is a set of institutions that support the production and adoptions of HYV's. These institutions include (i) extension workers sent out by both the government and IRRI, (ii) local agricultural development councils, (iii) irrigation cooperatives, (iv) agro-service centers, (v) credit, marketing, storage and processing facilities. The problems of HYV's are (i) greater susceptibility than traditional varieties to diseases and pests such as leafhoppers and army worm; (ii) dependency on fertilizers, without which the crop would fail; (iii) availability of credit to finance the additional expense of these methods.

After rice, maize is the Philippines most important food crop. It is the principal cereal for 20% of the population. There are about 500,000 maize farms, about half of which are in Mindanao. Maize is usually double-cropped. The first planting is in May or June, the second between August and October, and harvesting is about five months after planting. Maize production has increased by about

5.5% a year since the early 1960's. The increase is attributable to improved yield and larger areas under cultivation.

There are two environmental problems associated with maize production: storage difficulties, and soil erosion resulting from traditional methods of cultivation. Maize often is grown on hillsides with the furrows running up and down the slope of the hill.

Coconut products are the most valuable agricultural export. The Philippines is the world's largest producer of coconut products. There are about 500,000 coconut farms, 65% of whom are under 4 hectares. In the 1970's, Mindanao became the major coconut producing area, followed by Eastern Visayas, Bicol, and Southern Tagalog.

Sugar is the country's second most important agricultural export and is carefully regulated by the government. Under the Laurel-Langley agreement, the Philippines' sugar exported to the United States received preferential customs duties. According to the same agreement, the United States guaranteed to purchase up to 1.5 million metric tons. This purchase comprises about half of the Philippines' total annual sugar exports. Sugar tends to be grown on large owner-operated estates. Farms of a hundred hectares or more occupied 50% of the total crop area under sugar.

Perhaps one of the greatest hinderences to agricultural

productivity is the land tenure system. There have been two major legislative attempts to reform land ownership, one in 1963 and a second in 1972. Yet these efforts have had little impact. About 40% of all farms are tenant farms, but in the rice and corn producing areas of Ilocos, Central Luzon, and southern Mindanao, the percentage runs as high as 75%.

Throughout the country there are two general types of tenancy arrangements: shared tenancy and lease hold. The land reforms of 1963 outlawed shared tenancy but it still is the dominant form of land tenure. Shared tenancy is a semi-feudal system instituted by the Spanish. Under shared tenancy, the tenant supplies the labor and sometimes a draft animal. The landlord will supply the land, tools, seed, and capital to support extra labor during planting and harvesting.

The landlords are small businessmen who seldom own more than 10 hectares. The interest they charge, ranging from 50-400%, is a major source of livelihood for them, and simultaneously, a source of poverty for the peasants.

The second general form of tenancy is lease hold. The landlord only supplies the land and the tenant must supply all the inputs. To cover the costs of these inputs, the tenant will usually borrow money from the landlord. Unlike a share holder whose rent varies according to the yield, the leaseholder's rent is set at a fixed annual rent. The

rate is based on the land's potential according to what it has yielded in the past.

Neither form of tenancy is conducive to improving land productivity. In the former case of the shareholder, he will still have to give up a large part of his crop to the owner. In the latter case of the lease holder, it is unprofitable to increase yield as it will mean an increase in the following year's rent. As farmers are bound to their landlords who have the power of life and death over them, they do not have incentives to increase their productivity. The landlords' situation is not much better than that of the tenants. They are small businessmen who cannot raise the necessary capital to make improvements such as better irrigation because of their outstanding debts. In addition, many do not live near their farms and therefore cannot make improvement through their own industry.

C. Urbanization

The Philippines are becoming one of the most rapidly urbanized nations in the developing world. In only nine other developing countries does the principal city hold a larger percentage of the national population. The Metropolitan Manila Area "MMA" holds 12% of the nation's total population. The "MMA" was established as an administrative unit in 1975. It comprises five cities and 23 municipalities.

Within its boundaries live 4.5 million people, one third of the total urban population. "MMA" is growing at a rate of 5% a year in comparison to other principal urban areas of the country which are growing at a rate of less than 4%.

In the "MMA," in-migration accounts for 50% of the growth. Most of the migrants come from Central Luzon, Cagayan Valley, and Ilocos. Migrants from the Visayas tend to go to the highly industrialized cities of Mindanao. Most of the migrants go to "MMA" because of shortages of agricultural employment in their native regions, rather than being drawn in by the promise of industrial jobs. In Mindanao, the reverse is more common. It is in the informal service sector that most of migrants find employment. The migrants move into shanty towns in and around the core city and are often moved about by government officers seeking to clear slums. But all that occurs is that the slum dwellings are relocated somewhere else. Most of migrants do not return to their native areas except for short periods and "MMA" becomes their home.

The principal problems of "MMA" are housing and health. "MMA" suffers from an acute housing shortage. The rate of housing construction just about equals the population growth rate. The problem is that most housing is beyond the reach

of the urban masses due to high construction costs and high fees. Thus, the majority of urban residents cannot afford the costs. The government has not taken on active lead in supplying public housing. The result is very low quality housing for most of the people.

In "MMA" 85% of the dwellings are single family units. Yet only 20% of all dwellings have either electricity or piped water. And only 10% of the houses have flush toilets. The lack of adequate clean water, waste disposal, and sewerage systems create major environmental health problems. The gastro-enteritis group of diseases are most closely related to the lack of these services. These water and sewerage systems were installed before the Second World War. They have been updated several times with the help of World Bank assistance, but health conditions continue to be a major problem for the Philippines' urban areas.

D. Health

In general, the health system of the Philippines is better than most of the other Asian countries. The single most important reason for this is the nation's program of Rural Health Units. In 1953, the government established a rural health program that centered on rural health units. The purpose was to improve the distribution of health services in the country. Yet distribution of services

is still uneven. Manila, for example, has four times the number of health services of Cagayan Valley, Bicol, Eastern Visayas, and Mindanao.

As of 1975, 1500 RHU's had been established. On average, they provide health service to 20,000 people. The number of people served varies drastically as the units were along administrative lines rather those of need or population density.

The rural health units are staffed with a rural health physician, a public health nurse, a midwife, and a sanitary inspector. Staffing the units has presented one of the program's biggest obstacles. The problem is not lack of trained personnel but rather the preference of trained personnel to stay in urban areas or work in other countries.

There are several other problems with the health units. They lack equipment, medicine, supplies, transport facilities, and often electricity and clean water. However, even with all these shortcomings, the health units have proved to be very successful in providing necessary care.

The RHU's form the foundation unit of the public health system. The next level comprises health department clinics and provincial and regional hospitals. At this intermediate level, planning and implementation has been minimal for an

overall health strategy.

The most sophisticated level of health care is found in Manila. Some of the hospitals in Manila rival and surpass hospitals in the developed world in terms of equipment, level of training, and development of new techniques. Almost half the graduating doctors in the Philippines take staff positions in a U.S. Hospital as they are trained according to U.S. criteria. They leave to seek greater income, a different lifestyle, and to practice the specialized medical skills in which they have been trained.

Except for the RHU's, the country's health care system emphasizes high technology and hospital-centered curative medicine, while primary causes of illness and death are environmentally linked diseases and malnutrition.

The biggest environmental health problem is that 60% of the population does not have access to either potable water or sanitary facilities. Raw sewerage is frequently dumped into the nearest source of water. Those who live downstream end up drinking it. It is only the large urban areas that have a municipal water system and most urban areas do not have a sewerage system. Water is obtained from unimproved wells, springs, rivers, and streams.

Poor sanitary facilities result in high incidence of gastro-intestinal diseases. Gastro-intestinal diseases are the prime cause of death among children, it also promotes malnutrition. T.B., pneumonia, influenza, cholera, malaria, and schistosomiasis are other diseases that are related to poor sanitary conditions. Cholera, schistosomiasis, and malaria incidence increases seasonally but cases are reported all year-round in each province. These environmentally linked diseases are most common in Mindanao, Central Luzon and in eastern Visayas.

E. Nutritional Problems

The nutritional level of the population is one of the country's most pressing problems. The nation does not produce enough food to meet the minimum per capita calorific needs of its population. The low nutritional level involves more than the difference between the supply and the demand for food. There are three aspects to the problem (1) the most common cause of inadequate calorific intake is insufficient incomes. Many people cannot afford to buy the quantity and quality of food necessary to feed and keep the family in good health. It is not surprising that the six poorest regions (Western Visayas, Central Visayas, Eastern Visayas,

Southwest Mindanano, Southern Luzon, and Bicol) are also the most nutritionally deficient areas. (ii) Food distribution within the family accounts for much of the infant and child malnutrition. Cultural norms dictate that the male "producer," usually the father, has the first choice of what there is to eat as well as the largest share. A pregnant or lactating mother has the next priority, with older children being next. The youngest children and infants come last. Because most poor families have poor child spacing, there may be several very young children competing with each other and the older children for food. The younger children and infants have more difficulty than the older children in actualizing their desires for food. This puts the youngest children at a nutritional disadvantage. (iii) Dietary imbalance is the third major aspect of the problem of nutrition: cereals, rice and maize provide about 66% of calorific intake, with meat, poultry, and sea food accounting for about 8% of intake, dairy products, and yellow and leafy vegetables provide the least amount of calorific intake. The average per capita calorific intake is 1672 calories and 47 grams of protein. Not only is average calorific intake low, the quality of what is ingested is poor. When a person experiences nutritional deficiencies, the body's energy needs take precedence over the repair and building of tissue.

Cereals, starchy roots, and sugar - the principal foodstuffs that are consumed - tend to supply only the energy need.

Documented Sources Used in
Asian Overview

- AID Bureau for Program and Policy Coordination, 1977. ASIAN ECONOMIC GROWTH TRENDS, Office of Program Information and Analysis Service, Washington, May 1977.
- Asian Development Bank, 1971. SOUTHEAST ASIA'S ECONOMY IN THE 1970's, Praeger, New York.
- Booth, A., 1977 IRRIGATION IN INDONESIA, Bulletin of Indonesian Economic Studies, Vol XIII, No. 1, pp. 33 -75.
- Burley, T.M., 1973, THE PHILIPPINES: AN ECONOMIC AND SOCIAL GEOGRAPHY, G. Bell and sons. London.
- Chen, Lincoln, 1973. DISASTER IN BANGLADESH, Oxford University Press, New York
- Concepcion, Mercedes, 1969. PHILIPPINE POPULATION IN THE SEVENTIES, Community Publishers, Manila.
- Corpuzi, Onofre, 1965. THE PHILIPPINES, Prentice-Hall, Englewood Cliffs, New Jersey.
- Dutt, Ashok K., 1974. SOUTH EAST ASIA: REALM OF CONTRAST Kendall and Hunt, Dubuque, Ohio
- Dutt, Ashok K., 1974a. POPULATION PRESSURES IN BANGLADESH, Focus, Volume XXV, No. 3/4
- Franda, Marcus, n.d. POLITICS AND USE OF WATER RESOURCES IN BANGLADESH. AUFS Field Staff Reports, Volume XVIII, #3.
- Franda, Marcus, 1973. REALISM AND THE DEMOGRAPHIC VARIABLE IN THE BANGLADESH FIVE YEAR PLAN. AUFS Fieldstaff Reports, Volume XVII, No. 6.
- Gaige, Frederick H., 1975. Regionalism and National Unity in Nepal, Univ. of California Press, Berkeley.
- Geertz, Clifford, 1968. Agricultural Involution: The Processes of Ecological Change in Indonesia, University of California Press, Berkeley.

Documented Sources (pg. 2)

- Glassburner, Bruce (ed.), 1971. The Economy of Indonesia, Cornell University Press, Ithaca, New York.
- Hansen, Gary E., 1972. INDONESIA'S GREEN REVOLUTION: THE ABANDONMENT OF A NON-MARKET STRATEGY TOWARD CHANGE. Asian Survey, Vol. XII No. 11, Nov. 1972.
- Hansen, Gary, 1975. INDONESIA 1974 - A MOMENTOUS YEAR. Asian Survey, Vol. XV No. 2, Feb. 1975.
- Harris, George L. et. al., 1973. Area Handbook for Nepal, Bhutan and Sikkim, U.S. Government Printer, Washington, D.C.
- Hicks, George L., 1971. Trade and Growth in the Philippines: An Open Dual Economy, Cornell University Press, Ithaca, New York.
- Huke, Robert E., 1963. Shadows on the Land, Bookmark, Manila.
- Huke, Robert F., 1974. SAN BARTOLOME AND THE GREEN REVOLUTION. Economic Geography, Vol. 50 No. 1, p. 47-58.
- International Bank for Reconstruction and Development, 1976. The Philippines: Priorities and Prospects for Development, The World Bank, Washington, D.C.
- Islam, Aminul, Kunreuthen Howard. THE CHALLENGE OF LONGTERM RECOVERY FROM NATURAL DISASTER IMPLICATION FOR BANGLADESH, 1973. Oriental Geographer, Vol. XVII, No. 2.
- Khan, Azizar, 1972. The Economy of Bangladesh, Macmillan, New York.
- King, Dwight, Y., 1974. SOCIAL DEVELOPMENT IN INDONESIA. Asian Survey, Vol. XIV, No. 10, Oct. 1974.
- Nafziger, Wayne, 1976. BIAFRA AND BANGLADESH: THE POLITICAL ECONOMY OF SECESSIONIST CONFLICT. Journal of Peace Research, Vol., XIII, No. 2.
- Neill, Wilfred T., 1973. Twentieth Century Indonesia, Columbia University Press, New York.

Documented Sources (pg. 3)

- Nepal, H.M. Government National Planning Commission, 1970. Fourth Plan (1970-1975), H.M.G. Press, Kathmandu.
- Office of International and Environmental Programs, 1974. Coastal Zone Pollution in Indonesia, Smithsonian Institute, Washington, D.C.
- Pant, Y.P. and Javi S.C., 1972. Long Term Planning for Agriculture in Nepal, Vikas Publications, Delhi.
- Ravenholt, Albert, 1967. MIRACLES WITH NEW RICE TECHNOLOGY, AUFS Fieldstaff Reports, Vol. XV, No. 2.
- Ravenholt, Albert, 1972. RURAL EMPLOYMENT FOR THE GREEN REVOLUTION. AUFS Fieldstaff Reports, Vol. XX, No. 6.
- Robinson, Austin, 1974. Economic Prospects of Bangladesh, Overseas Development Institute, London.
- Shaha, Rishikesh, 1975. Nepali Politics: Retrospect and Prospect, O.U.P., Delhi.
- Soemardjan, Selo, 1972. Imbalances in Development: The Indonesian Experience, Ohio University Center for International Studies, Southeast Asia Program. Series No. 25, Athens, Ohio.
- Takahashi, Akira, 1969. Land and Peasants in Central Luzon, East-West Center Press, Honolulu.
- United Nations, Economic Commission for Asia and the Far East, 1971a. Asian Industrial Development, News No. 7, U.N., New York. 1971b, Statistical Yearbook for Asia and the Far East, U.N., New York.
- U.S. Dept. of Commerce, Bureau of Census, 1972. Levels and Trends of Mortality in Indonesia, 1961-1971. International Research Document No. 2.
- Weiner, Myran, 1973. THE POLITICAL DEMOGRAPHY OF NEPAL. Asian Survey, Vol. XIII, No. 6, p. 617.
- Wernstedt, Frederick, Spencer, J.E., 1967. The Philippine Island World, University of California Press, Berkeley.