Environmental Administration in Thailand

by Roy C. Stubbs
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PREFACE

Southeast Asia is experiencing at present a group of problems that have come to be termed environmental. Uncontrolled growth of urban areas, shortages of rural land available for alternative uses, and, above all, the energy crisis have emphasized the need for wise use and management of national resources.

Ecologically sound management of development has come to mean not only the monitoring of industrial pollution but also the methods of planning and administration that are more complex and demanding than those used traditionally.

In Thailand, certain indicators show increased interest in these latter areas. Among these indicators we can include:

- The Fourth National Economic and Social Development Plan (1977–1980) has devoted considerable space to the need for environmental programming. Now the challenge is to address key questions about the nature of the administrative systems that must implement such programming.
- The 1978 amendment to the Improvement and Conservation of National Environmental Quality Act (B.E. 2521) has opened many possibilities with regard to the role of agencies in the planning and administration process.
- The recent reorganization of environmental administration agencies has implications for the balance of the existing system.

Several institutions have recognized questions and approaches here that may be of broad relevance and interest to other countries in the region who are addressing similar issues. These institutions are the Institute of Environmental Research of Chulalongkorn University; the National Environment Board (NEB) of the Government of Thailand; the Electricity Generating Authority of Thailand; and the Environment and Policy Institute of the East-West Center, Hawaii. Consequently, these institutions organized a Regional Conference on Environmental Administration in which the Thai experience was used as a focal point for discussing issues of general concern to countries in the region. The conference was held at Bhumibol Dam, Tak Province, Northern Thailand, from 3 – 9 February 1980.

The conference brought together approximately thirty-five administrative experts, practicing administrators, and others from the East-West Center region, with the emphasis being on Thai participation. New approaches were discussed and compared with current practices in Thai environmental administration.
The following report represents a summary of the papers presented at the conference together with insights gained from working groups convened at the end of the session. Specific papers are not cited in the report, although references that occur outside the conference are duly noted. The report concentrates on three areas:

• The present state of environmental administration in Thailand;
• The obstacles that presently stand in the way of more effective management; and
• The possibility that the Thai experience contains elements common to many other countries and therefore indicates that a discipline called “Environmental Administration” does exist as a separate body of knowledge and set of skills.

A discussion of the commonalities will be taken up in the final section, Problems in Environmental Administration.

Even with this additional material, however, it is important to point out the inherent limitations of a report of this type. I can do no better than to quote the comments of my esteemed colleague, the late Dr. W. Vella of the University of Hawaii, who in correspondence stated:

in the end the laws and planning and execution of environmental protection depend on the political scene. . . . The Thai government has a long history of drawing up pretty designs—for land settlement, urban renewal, educational reform—that somehow in reality never measure up to plans. The political facts make this so . . . both before and since (1973–76) governments have felt little or no need to respond to popular pressure. For there was none. And so the game goes on, with laws passed, bureaus created . . . but little surfacing in terms of tangible results.

. . . the reader may end up persuaded that if only this or that administrative technique were adopted, if only this or that office were combined with that other office, all would be solved. I believe the most horrendous of administrative organizations can succeed, given the will to succeed. And the most nicely designed structures can fail, given a large dose of apathy. In the case of environmental administration in Thailand, both structure and commitment are weak. But the fundamental weakness, in my view, is commitment.

While the insights of many participants have been incorporated into this report, special acknowledgement must go to Dr. Somluckrat Wattanavitkul, Thammasat University; to Mr. James Warren Evans, National Environment Board; and to Dr. Chaiyudh Khantaprab, deputy director of the Institute of Environmental Research, and his staff for their support and analysis of the conference proceedings.
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ABSTRACT

The environmental problems being experienced in Southeast Asia have forced governments there to question traditional methods of planning and administration. Recognizing the broad relevance to other countries of the issues being addressed in each, several institutions organized a Regional Conference on Environmental Administration, which took place at Bhumibol Dam, Tak Province, Northern Thailand, 3–9 February 1980. Thirty-five administrative experts, practicing administrators, and others from the east-west region attended; emphasis was on Thai participation. This report contains a summary of the papers presented at the conference (with the addition of two topics, mining and marine administration) and concentrates on three areas: (1) the present state of environmental administration in Thailand; (2) the obstacles that presently stand in the way of more effective management; and (3) the possibility that Thai experience contains elements common to many countries, indicating that a discipline called "Environmental Administration" exists as a body of knowledge and set of skills. The broad areas addressed include: environmental policy, law, impact assessment, education, and research; and the various administrative jurisdictions and their inherent problems (urban, forests, health, pollution control, mining, marine, and overall environmental administration). The strengths and deficiencies of environmental administrative analysis, interorganizational analysis, and systems analysis are explored.

GENERAL DESCRIPTION OF THAILAND

Geography

Thailand is a tropical country bound on the north and east by Laos, on the east by Cambodia and the Gulf of Thailand, on the south by the Federation of Malaysia, and on the west by Burma and the Andaman Sea. Its population is a little more than 45 million—as of 1978—and is increasing at the rate of 2.4 percent per annum. The country covers an area of
approximately 500,000 km² and has about 2,500 km of coastline. Essentially elongated, its greatest length is approximately 1600 km and, while in places its maximum width is nearly 800 km, at the Isthmus of Kra it is only some 50 km wide. The country is not particularly steep; the maximum altitude (Doi Inthanon) is only 2600 m.

The country has four main land types:

1. folded mountains, which are in the southeast and are a continuation of the Himalayan system;
2. flat alluvial plains intersected by winding rivers and irrigation canals, which are flooded during each rainy season;
3. a certain amount of undulating country; and
4. maritime features such as sandy beaches, mangrove swamps, irregular coastlines, and numerous islands.

For convenience in this report, the country is divided into four regions:

1. the northern, forested region and narrow river valleys;
2. the northeastern, relatively unfertile region;
3. the central plain, which is largely agricultural; and
4. the southern isthmus, with its rubber plantations and tin mines.

Climate

The climate is humid and tropical and is demarked by three seasons. The rainy season opens the southwest monsoon from May until late October; the cold season begins when the northeasterly winds bring dry, cooler air through November until February; and the hot season extends from March until May.

Economy

Thailand is essentially an agricultural country, depending on exports of raw materials such as rice, maize, timber (teak), tin, jute, livestock, and cassava. Until very recent times, the average economic growth rate has been high—during the Third Economic and Social Development Plan (1972 – 1976) for instance, the average growth rate was 6.2 percent.
Land Utilization

Land use can be divided into the following types:

1. farmland;
2. forestland;
3. idle land;
4. salt pan, shrimp, and fishpond;
5. marsh;
6. water;
7. urban areas; and
8. highways and roads.

While available figures are from 1972 only, it would appear that farmland and forestland then constituted the overwhelming majority of land-use types. Farmland constituted approximately 52 percent of all land, while forest occupied approximately 45 percent (a figure reduced to 38 percent in the Fourth Plan, [1977–1981]). Urban areas were still quite small, comprising 0.8 percent, which is no more than the area under water. It is indicative of the country's situation that idle land represented the lowest proportion of land types, comprising only 0.16 percent.

Environmental Problems

The Fourth National Plan classifies environmental problems in Thailand under three headings: Population Growth; Depletion and Deterioration of Natural Resources; Urbanization and Industrialization. So intertwined are these factors, however, that one may more fruitfully cost the problem in terms of the effect of population increase on natural resource exploitation, or the effect of that increase on urbanization and industrialization.

That population growth is a large enough problem of its own is clear. The growth rate of more than 3 percent per annum during the 1960s resulted in an increase in total population from 24.8 million in 1959 to 34.5 million in 1969; the present population is now (even with the growth rate currently at less than 3 percent) approximately 45 million. The pressures emerging from this high population growth were not noticed however, as long as abundant resources were available. It was not until the early 1970s that factors such as man-land ratios, levels of government expenditures on private education, unemployment rates, and the need
to provide social facilities began to demonstrate the seriousness of the problem. Figure 1, from the Thai national report to the U.N. Conference on Human Environment, illustrates the first attempt to tie these various factors together in a formal way.¹ A current belief is that the problems of interaction between the population and the environment are essentially those of equitable access to resources, and that efficient use of those resources will depend ultimately on this equity.²

The results of this interplay are evident. Eighty percent of the total labor force is engaged in agriculture and 85 percent of the total population is rural and dwells in villages. Only 10 percent of the population in these rural areas has safe potable water, with the result that 80 percent of all illness and 40 percent of all deaths can be attributed to diseases associated with human waste.³

Use of timber is high — per capita consumption of wood products is about 0.2 m³ per year and, together with about 1.3 m³ of firewood use, this makes a total of approximately 1.5 m³ per year. Thais consume approximately 7 million m³ of wood per year at a time when Thailand itself can only produce about 3 million m³. Wood is being imported at present at the rate of nearly 1.7 million m³ (1977 figures), and illegal felling is widely practiced. Estimates are that the present rate of loss of forest (2,500 km² a year) will result in total denudation in 25 years.⁴

Rapid increases in the numbers of hill-tribe people who have immigrated from Laos and Burma have resulted in destruction of vast areas of primeval forest (approximately 1.5 million km²). Estimates of the total number of such people vary widely, from 200 thousand to 600 thousand. No reliable figures are available.

The situation in the urban areas is little better. Bangkok is a primary city, with more than 11 percent of Thailand’s population living in its boundaries. Five million people (December 1979 figures) crowd into an area of only 1.5 million km². Bangkok produces 1 million m³ of polluted water daily.⁵ The city has no sewage system; the better houses have septic tanks, but the soil is impervious clay, and street drains eventually receive the effluent, which they dump directly into the Chao Phraya River. The river itself is a source of washing and cooking water for much of the poor population. During the dry season, dissolved oxygen between Bangkok and the river’s outlet to the Gulf of Thailand often reaches zero, and the water turns black and foul.⁶

Nearly half a million automobiles crowd the city’s inadequate streets daily, and urban congestion is so bad that at times the only wind present in the streets is that generated by the movement of the traffic.⁷ Carbon monoxide samples have been recorded at 700 ppm.⁸
Population Increase

- Industrialization
  - Noise
  - Wastes
- Urbanization
  - Noise
  - Wastes
  - Traffic
  - Housing
- Increase in Agriculture
  - Fertilizer
  - Pesticides
  - Deforestation
- Exploitation of Natural Resources
  - Reservoir
  - Building
  - Exploration
- Derelict Land
- Exhaustion of Natural Resources

- Water & Land Pollution
- Interrelate
- Air Pollution

Environmental Pollution Problems

Social Problems

Natural Resources Problems

Figure 1. Effects of population increase on environment.
Registered with the Department of Industrial Works are 65 thousand factories, of which about 15 thousand are located in the greater Bangkok area. The majority of these factories discharge their waste without adequate treatment into nearby rivers and canals. Mercury content in some parts of the Gulf of Thailand has been measured at forty times the tolerance limit for marine life; although .02 ppm of DDT can produce disturbances in fishlife, squid containing 0.61 ppm have been found in the upper gulf; and in the lower reaches fish containing 0.99 ppm have been found.

As resources dwindle in the rural areas, the attractiveness of the metropolis becomes greater for rural people. The population in Bangkok has increased by 1.6 million in the last 10 years, the difference in money income between Bangkok and the rest of the country being the major attraction. The inability of the market mechanism to handle increasingly complicated allocation systems has become one of the major sources of social and political tension. Although there appears to be no easy solution, it should be noted that the government often tends to handle these problems in a piecemeal and short-term fashion.

ENVIRONMENTAL POLICY

The first expressions of environmental policy in Thailand occur in the Constitution of 1968 (B.E. 2511) in which Article 63 states: “The State shall maintain places and objects of historical, cultural and traditional values.” The 1974 Constitution (B.E. 2517) is somewhat stronger and deals directly with the environment:

The State should maintain and preserve the balance of the environment and natural beauty, including forest, watersheds, waterways and territorial waters. (Article 77)

The State shall exploit natural resources for economic use of the Thai population in harmony with environmental conservation. (Article 78)

The State should maintain and preserve the environment in a clean condition and eradicate any pollution which is harmful to the welfare and health of the people. (Article 93)

In the 1978 Constitution (B.E. 2521), Article 61 states: “The State shall support research in arts and science and promote the use of research in national development.” With regard to the environment, it adds:

The State shall maintain the balance of the environment and rid it of toxic
pollution which is harmful to the health and well being of the population. (Article 65)

The State shall formulate population policy in harmony with natural resources, economic and social conditions and advancement of technology for the benefit of the national development in economic and social security. (Article 69).

These constitutional references are then specified more clearly in the various five-year development plans. In “Objectives and Policy,” the Second Plan (1967-1971, p. 23) stresses “mobilization of human and natural resources for optimum utilization in expanding the productive capacity and national income of the country, so that benefits of development can be shared equitably by all classes of people.” Further, the plan intends “to use natural resources more efficiently and in harmony with conserving resources for future generations” (p. 24). Neither the Second Plan nor the Third Plan considers environmental protection as a separate category, but some attention is given to its important aspects, including forest protection, institution building in the agricultural and human settlement areas, and accelerating population growth and urbanization.

The Fourth Plan (1977-1981) is the first with an entire chapter devoted to the environment. “Development and Conservation of Critical Economic Resources and Environment” (Part III, Chapter I) contains the steps to be taken. A short summary of the plan (p. 29) is worth quoting in full.

The deterioration of environmental conditions of major natural resources particularly forest, land, water and mineral resources is a fundamental problem which has considerable consequences for national survival and Thailand’s future development potential. During the Third Plan period, this problem has been intensified as a result of population growth and the pattern of human settlements associated with the Thai production structure that has evolved as well as the lack of clear cut policy on resource management and ecosystem preservation.

The serious problem of environmental deterioration and resource mismanagement is witnessed by the rapid depletion of forest land. At present actual forest area constitutes only about 38% of the total land area of Thailand. The depletion of forest area is due mainly to illegal selling and the destruction of watershed areas as well as the expansion of cultivated areas into forest land. So far, the Government has not been able to provide effective measures for the preservation of forests nor measures for ensuring that different types of land are put to their best uses. To date, the annual rate of forest destruction has tremendously outpaced the rate of replacement by the government’s reforestation program. In addition, the techniques used
for extracting mineral resources at present have been chosen without re-
gard for resource and ecosystem preservation. As a result, social costs are
unnecessarily high and social benefits tend to be on the low side.

At the same time unbalanced urbanization in Thailand has resulted in the
over-urbanization of the Bangkok Metropolitan Area, which is regarded as
one of the most dominant primate cities in Asia, and the under urbanization
in other regions of Thailand. This urban growth pattern has contributed
significantly to the deterioration of environmental conditions in the Bang-
kok Metropolitan Area.

From the foregoing discussion, it is evident that priority has to be given to
alleviating this critical problem in a systematic way.

If one can discern trends in the various plans, these might be the
following:

1. Environmental protection as a specific governmental objective
does not occur until the arrival of the Fourth Plan.
2. Concern with loss of natural resources is also a recent phenome-
non, and this tends to be limited to such areas as forest habitat and
wildlife.
3. There has been relatively little concern with control of environ-
mental pollution.
4. Feedback processes are lacking, including systematic monitoring
and impact evaluation, particularly in the area of satisfying hu-
man needs.
5. The need for a multisectoral approach at the budgetary level of
environmental management has not been recognized.

Policy statements from the National Environment Board (NEB) have
not yet become a regular part of the policy procedure. A "state of the
environment" report has been submitted to the cabinet in recent months.
An NEB plan, which incorporates the Conservation for Thailand: Policy
Guidelines of the International Union for the Conservation of Nature
(IUCN) has also been completed and is in the process of approval by the
cabinet. A description of this plan is included in this paper in the section
entitled Environmental Planning.

ENVIRONMENTAL LAW

The Thai legal system is a combination of both the European civil law
systems and the Anglo-American common law process. For various cul-
tural reasons, Thai society is not one given to litigation, and courts generally are used only when all else fails.

The legislation is based on a constitution, four basic codes (the penal code, the criminal procedure code, the civil procedure code, and the civil and commercial code), and various acts that make up the regulatory system of the administration. The acts themselves generally deal with the establishment of an agency, the allocation of a particular jurisdiction, and the type of authority that agencies may be given. Within these acts, discretion can be given for the issuance of regulations that emanate from the authority of the initial legislation. There is no process of administrative law as it is known in Western countries. Beyond this, the king has the authority to issue royal decrees, but in general each must be ratified by a bill to be approved by the assembly in session.

As we have noted, the first attempt at conscious environmental legislation was the insertion of certain environmental articles in the constitution that followed the October Revolution of 1973. Since that time, the environment issue has come and gone in various constitutions. The constitution promulgated on 22 October 1976 (B.E. 2519) gave no attention to it. Article 27 of the Interim Constitution (effective up to December 1978) dealt specifically with cases involving gross abuses of environmental resources and enabled the prime minister to take drastic action in the interests of the nation. The Kriangsak government did apply Article 27 in several cases of log poaching and fisheries dynamiting. On the other hand, the constitution promulgated in December 1978 contains no such insertions.

It therefore seems safe to assume that, at the present time, the question of environment has been relegated to the administrative system and those existing regulations that it can enforce.

While there is no administrative law per se, laws administered by the various government agencies can be broken down into four types, which represent the overwhelming proportion of law related to environment. These are:

1. laws on control of industrial and agricultural pollution, such as the Town Planning Act of 1975 (B.E. 2518) and the Factories Act of 1969 (B.E. 2512);
2. laws on conservation or protection of resources and aesthetic values, such as the first Forest Protection Act of 1897 (B.E. 2440), and the Preservation of Forests Act of 1938 (B.E. 2481);
3. laws on special problem areas, including the growing need for energy, and on the environmentally connected problems of population control and public health, such as the Public Health Act of 1941 (B.E. 2484); and
4. emergency laws for controlling pollution that causes imminent danger to life, personal injury, or damage to the properties of the people or the state. An example of this is the provision of Section 20 of the Improvement and Conservation of National Environmental Quality Act No. 2 of 1978 (NEQA 2) (B.E. 2521).

It is important to note that in exercising the powers invested in these laws, the public authorities do not have a judicial function.

The authorities cannot be interfered with, so long as they do not exceed or abuse these powers. By the same token, should a national agency detect a violation of these laws that it is unable to prevent, its only recourse is a direct appeal to the prime minister. Environmental laws of Thailand appear to suffer from two major defects. First, no judicial machinery appears available by which agencies can report on the disobedience of public authorities with respect to either NEQA. Second, considerable restriction of the definition of *locus standi* exists, in which the right to complain can only apply to an individual who has a proprietary interest and who can prove that damage to his property or his person is peculiar to himself and unreasonable. No device exists at present for including class action suits, public trust doctrines, or citizens' environmental rights, which are now a part of the legal paraphernalia of various Western countries. Basically, the environmental laws continue to be methods of administrative regulation rather than of litigation or dispute over public and private interests.

The Environmental Quality Acts

The foundation of environmental legislation in Thailand is undoubtedly the Enhancement and Conservation of National Environmental Quality Act of 1975 (B.E. 2518). The NEQA 1, as we call it, was the act that created the National Environment Board (NEB) in the Office of the Prime Minister. Section 5 of the act required the board to:

1. submit policy and opinion concerning the enhancement and conservation of environmental quality to the cabinet;
2. consider the implementation of policy in the design of projects or schemes affecting environmental quality;
3. consider and give opinions on the projects of government agencies, state enterprises, and the private sector that may have an adverse effect on environmental quality to the cabinet or government agencies concerned, as the case may be;
4. submit plans to the cabinet for the development, enhancement, and conservation of environmental quality;
5. recommend standards of environmental quality, including measures to be adopted for inspection thereof, and recommend sanctions against violators to the cabinet;
6. submit a report to the cabinet at least once a year on the national situation regarding environmental quality;
7. coordinate work between government agencies, state enterprises, and the private sector on matters concerning environmental quality;
8. consider any other matter concerning environmental quality as the cabinet or the prime minister may request; and
9. perform other functions as may be designated by law to be those of the NEB.

Section 6 of the act empowered the board to require government agencies, state enterprises, and other persons to submit documentary information on the environmental impact of proposed projects and plans. At face value, this appeared to be a standard environmental clause. The board, after reviewing material, was given this option: If it was of the opinion that a project or plan might cause adverse environmental effects of a serious nature, it could recommend remedial actions to the cabinet.

Section 12 also established the Office of the NEB, and gave it, among other responsibilities, the duty of supervising government agencies, state enterprises, and private sector organizations to ensure their compliance with environmental quality standards. Also given was the function of the receipt of appeals and the requirement to study existing environmental conditions and to recommend measures for their improvement. Finally, it was instructed to encourage and promote the study of environmental quality at every educational level.

The legislation, as written, was not particularly strong, but this was recognized by most as a necessary precondition for its general acceptance at the political level.

Experience with the act soon revealed a number of serious shortcomings. The impact assessment requirement appeared to be particularly vulnerable. Because the act did not authorize the board to issue regulations, the office could not require environmental impact studies as a routine obligation from agencies. Since each study required an individual request, problems lay, first, in receiving notification of the impending project soon enough to have some influence over it, and second, in being able to demonstrate that the effects were serious enough to demand such
a study. In effect, then, the office was required to perform an environ-
mental impact assessment by itself in order to justify the preparation of
the same assessment by the implementing agency.

While part of this was undoubtedly a problem of legislative inade-
quacy, there is no doubt that the difficulty of timely notification was also
due to a lack of understanding as to where the agency should sit in the
overall administrative system. By making the agency a specialized group-
ing within the Office of the Prime Minister, without embedding it in the
planning and budgeting processes, the legislation virtually isolated the
board from the day-to-day routine of the administrative system.

Within the area of environmental standards, other problems ap-
peared. The Ministry of Industry had been administering a Factories Act
of 1969, which established pollution standards for industrial waste water.
NEQA 1 did not indicate the status of such legislation vis-a-vis the new
NEB. Thus, though representatives of the board and the Ministry of
Industry officials have attempted to resolve the issue on numerous occa-
sions, the Ministry of Industry standards of 1970 remain in effect today.
Those opposed to this situation believe that the standard is not appropri-
ate for Thailand's conditions and further note that enforcement tends to
be sporadic.

With regard to industrial air pollution standards, the Ministry of In-
dustry also maintains historical jurisdiction through its standards of 1971,
which are basically visible pollution standards. Further ambiguities exist
in the area of automotive emissions, which, by virtue of the Automobiles
Act of 1930 (B.E. 2473) as amended, are under the authority of the
Transport Department. Again, however, the basis for action in the regula-
tion lies in the emission of "black smoke" by any vehicle.

Similar problems of jurisdiction exist with the Bangkok Metropolitan
Administration and the Ministry of Health. The latter continues to have
theoretical control over water pollution through the Public Health Act of
1941 (B.E. 2484) but in fact maintains no formal regulatory program.

To sum up, three major deficiencies were seen in NEQA 1: first, it
established no overriding authority; second, it gave no power to enforce
environmental impact assessment requirements; and third, it was ambigu-
ous with regard to the board's jurisdiction in the area of environmental
standards.

In an attempt to overcome these deficiencies, a second National Envi-
ronmental Quality Act was promulgated in 1978 (B.E. 2521). This will
henceforth be referred to as NEQA 2. In it, attempts were made to be
more specific about three areas.
General Authority

The first major amendment gives the prime minister authority to take any action deemed necessary to respond to an environmental emergency. While these emergencies might generally be thought of in conventional terms (e.g., oil spills or air pollution alerts), in fact the amendment gives the prime minister broad authority to take any measures that might be necessary to correct an undesirable situation. (Of course, it must be recognized that such measures must be within the bounds of political acceptability.)

Environmental Impact Assessment Requirements

NEQA 2 requires the preparation of an environmental impact study prior to the approval of any major project, whether it be in the private or the public sector. The NEB's approval of the study is necessary before the project may be implemented. While the intent of this measure is no different from that of NEQA 1, it makes clear the fact that no licenses will be issued for projects until environmental impact studies are prepared and approved, and it is therefore a specification of the decision-making process that must go on in the life of any project.

It should be noted that experience with the NEQA 2 has led the NEB and its office to attempt to minimize the categories requiring evaluation because of the strains put on available manpower, expertise, and budgeting. Categories are decided upon after consultation with representatives of the implementing and permitting agencies. Certain important agencies, including the Royal Irrigation Department and the Board of Investment, are still missing from this process, but the board is hopeful of including them in the future.

Environmental Standards

NEQA 2 authorizes the NEB to promulgate the basic environmental standards of the country. All other agencies must be guided by these standards. In the case of point-source pollution, the NEB will establish the basic stream quality standards throughout the nation. Again, it will be the responsibility of the appropriate enforcement agencies to formulate effluent limitations for particular discharges which will achieve the targets that the NEB has set for stream quality. The NEB will also issue ambient air quality standards and intends to work with the enforcement agencies in developing appropriate enforcement mechanisms.
In review, the new legislation appears to give as much as it takes. Although the requirements for standards and impact assessments are more specific, and the emergency intervention of the prime minister allows some extra power, there appear to be two major shortcomings. In the first case, the emphasis on technical procedure in the NEQA 2 implicitly puts in question the role of the board as environmental policymaker for the nation. Without more funding and personnel, it is difficult to see how the board will be able to carry out both functions in detail. In terms of agency priorities, the emphasis on assessment and standard setting implies that the agency will take a more enforcement-related role than a policy-related one. This has raised serious questions as to the appropriate location of the agency and predisposed a move from the Prime Minister's Office to a position in the ministries. In fact, this move did occur in 1979 when the board was moved to a more subordinate role in the new Ministry of Science, Technology, and Energy.

In the second case, use of the Prime Minister's authority is indeed a two-edged sword. Overuse of such a weapon could lead to serious problems if the board lacks supporting protection. The amendment is also dependent on the commitment of the Prime Minister to environmental protection—and, as we have seen, the appearance and disappearance of environmental issues in the constitution would indicate that this is a transitory happening. Paradoxically then, the strengthening of the Act has led to a decline in the position of the NEB with regard to the overall system of authority and has led to something of a gap in the area of environmental policymaking in Thailand.

Environmental Planning

Thailand is a centrally planned economy which, in recent years, has used the 5-year plan as a means of guiding its development. There have been four such plans: for 1962–1966, 1967–1971, 1972–1976, and for 1977–1981. Plans are developed by the National Economic and Social Development Board (NESDB) in cooperation with the Budget Bureau, various sectoral agencies, and other policy-oriented units, of which the NEB has, until the present time, been a part. While the planning agency does act as the enunciator of national policy, its role of negotiator and mediator among competing agency demands should not be minimized. With regard to environment, Thai planners have taken the attitude that socioeconomic growth remains the first priority of the nation and that any negative environmental consequences of that growth must be handled by substantive agencies through the enabling legislation that guides their
ongoing programs. By relying on the ability of the status quo to manage the environment, the planners have to some extent created a vacuum in the area of comprehensive environmental planning.

The evolution of environmental concern in national planning can be traced fairly easily. The First NESDB Plan (1962 - 1966) concentrated on the provision of infrastructure (hydroelectric stations, roads, and irrigation canals) in an effort to industrialize the country. Environment was not specifically considered, though forest conservation was mentioned in its role as a sectoral production factor. The First Plan emphasized the need for maintenance of existing forests and reforestation in watershed areas, with conservation programs aimed at covering 50 percent of the total area of the country. But the plan stated quite clearly that the ultimate objective was a permanent flow of timber supply for future uses. As a way of making this happen, a land-use survey throughout the entire country was planned, to be followed by a land classification program which would be completed by 1966.

The Second Plan (1967 - 1971) stated in its introduction that the basic objective was to accelerate improvements in the standard of living of the people. Again, this was interpreted as being the mobilization of human and natural resources for expanding the productive capacity and national income of the country (p. 23). Another objective was the more efficient use of natural resources in harmony with the policy of conserving resources for future generations (p. 24). There was, however, little indication as to how this was to be done. Further mention was made of forest protection and reforestation, technical and institutional improvement for irrigation projects, some attention to human settlements planning, and greater expenditures on public health and sanitation programs. It has been said that the main thrust of the plan was to cope with the problem of accelerating population growth and urbanization, but this was being done essentially from the economic point of view. That it was not stated from an environmental stance is evident from the fact that the heavy polluters in industry and mining received no mention for their role in, for example, the destruction of beaches.

The Third Plan (1972 - 1976) did enter this area. The plan called specifically for the Ministry of Industry to expand its activities in the areas of air and water pollution and occupational health, and, in the industry and mining budget of the same plan, Section 1.1 for the Department of Science notes expenditure for industrial water pollution. In the area of solid waste, the urban and local government budgets both provide sanitation expenditures.

The Fourth Plan (1977 - 1981) is the first that includes a chapter (Part III, Chapter I) specifically devoted to environment. In it approximately 2
percent of the total budget is directed toward environmental projects. Entitled “Development and Conservation of Critical Economic Resources and Environment,” the chapter is the first attempt to get at the cross-sectoral implications of environmental management. Its effect was undercut, unfortunately, by the fact that the introduction to the overall plan did not specifically mention environmental protection, nor did it allude to the existence of the NEB as a counterbalance to uncontrolled development.

Nevertheless, there were more mentions in the Fourth Plan of those factors that we now consider environmental than had ever appeared in any of the previous plans. Once more, there was a demand for a more realistic program for forest protection, the need for water resources planning was emphasized, and various land use and energy and mineral resources aspects were discussed. Much of this was on a superficial level. Statements recognizing that mining pollutes the environment and affects adversely marine fishing resources, or that methods should be found to improve the situation, were clearly not capable of implementation. Part IV of the Investment Program did not appear to include any project capable of carrying out this environmental protection.

Part of the problem seems to have been that the NESDB was still searching for a manner in which to express adequately environmental concern within the context of economic development. Thus, while rural land use was seen as related to deterioration of soil and other resources, the problem was regarded as one of land tenure, consolidation of plots, and reallocation of land (Fourth Plan, p. 146). Similarly, energy was seen as a problem of shortfall, and, therefore, plans were oriented toward limiting use of present fuels and exploiting alternative reserves of coal (Fourth Plan, p. 160). Environmentally, this approach has shortcomings in that the solutions are seen to emanate from one specific sector of government activity, as opposed to an approach that might attempt to deal simultaneously with several systematically related sectors.

The Thai planner’s view of the economy as a “through-put” for development transformations can be seen where the plan urges “the strict enforcement of existing laws to prevent or to reduce the causes of environmental problems and to minimize environmental deterioration. This applies particularly to the Industrial Factories Control Act, the Traffic Act, the City Planning Act, the Fishery Act, the Municipalities Order on Food Control, and the Revolutionary Council Decree on Black Smoke Emission from Car Exhaust Pipes.”

As a consequence, the plan objectives for the environment are somewhat vague. Short-term measures include:

- stricter enforcement of existing laws;
Environmental Administration in Thailand

- budgetary support for projects that support the environment; and
- seeking assistance from private individuals and organizations.

Long-term measures include:

- formulation of a national environmental plan;
- better coordination of agencies;
- definition of environmental standards;
- introduction of environmental impact statement (EIS) procedures;
- improvement of the administrative performance of agencies and public relations campaigns;
- formulation of comprehensive city plans; and
- issuance of industrial permits.

While all of these measures are desirable, an analysis of why these objectives have not been achieved in the past, and what will be done this time to achieve better results, is not forthcoming. At its best, the plan merely confirms the existing mandates of many of the agencies working in environment.

Environmental Planning Outside the National Plan

As we have indicated, one of the long-term measures suggested by the Fourth Plan is the formulation of a national environmental plan. NEQA I also establishes the obligation of the NEB to produce a "state of the environment" report, which is to be submitted to the cabinet and should therefore act as a basic document to any later environmental plan.

The first "state of the environment" report has now been submitted to the cabinet. The NEB has also completed a national environment plan, which will be published, if and when approved by the cabinet, in the Gazette as a national policy plan. This will afford the board the opportunity to review seriously the five-year development of the various agencies to check whether they are complying with the national environmental plan. The plan is composed of basically six chapters.

Chapter I states the principle that determines policy, as well as strategies for short-term and long-term measures outlined in the national plan.

Chapter II deals with the management of natural resources (forest, soil, land, water, minerals, and marine resources, and mangroves). The policy stresses optimum use of natural resources on a sustained yield basis and
certain measures to minimize impacts to the environment and ecosystem.

Chapter III deals with pollution control and emphasizes preventative measures. Included are policies and measures for control of water and air pollution, noise and vibration, and solid waste and toxic substances.

Chapter IV identifies the unbalanced distribution of population and the environmental problems of human settlements. Also indicated is the action that should be taken to improve the quality of life in urban and rural communities.

Chapter V attempts to strike a balance between development and the conservation of national heritages of natural scenic beauty, flora and fauna, arts, and the architectural and archeological values that constitute the Thai national identity.

Chapter VI summarizes measures to be taken in environmental education and in other activities designed to encourage public awareness and cooperation.

Among other factors, the plan incorporates the International Union for the Conservation of Nature (IUCN) report on *Conservation for Thailand: Policy Guidelines* which includes the following nature conservation policy goals:

- to conserve adequate populations of all native fauna and flora, as well as the natural physical environment on which they depend;
- to establish and maintain a permanent protected system of national parks, wildlife reserves, and so forth;
- to make adequate provision of additional trained persons and other facilities to ensure effective protection and management of protected areas;
- to ensure good management of all wild species outside the protected area system, based on sustained yield principles;
- to support a continuing program of monitoring and research of species;
- to manage and maintain a viable forest estate;
- to promote integrated planning and environmental assessment and control of land and water use to reduce the impact of development on the conservation of renewable resources;
- to maintain a continuing review on development and environmental legislation, regulation, and administrative procedures;
- to continue to develop an organizational structure of both governmental and nongovernmental components with adequate provision for personal training and research; and
- to stimulate public awareness and understanding of conservation values.
Responsibility for planning is made complex by the fact that the NESDB holds a mandate for producing national plans but lacks the staff to do the work of coordinating all environment-related government programming. At the same time, the Fourth Plan does not recognize the standing of the NEB in this area. The NEB, on the other hand, relies on legislation that exists outside the plan framework for its right to produce an environmental plan but presently lacks the influence over the budget that NESDB and the Budget Bureau have and thus is unable to add force to its pronouncements.

In the meantime, the sectoral agencies are left with much of the design of development plans after the broad objectives are specified in the national plan and must at times use their judgment as to the compatibility of their goals and those of the central planners. If one includes the desire for autonomy that such agencies have as a result of the centrifugal forces present in government bureaucracy, it is clear that the potential for gaps, overlaps, and even conflicts in planning is large.

GENERAL ADMINISTRATION

Even before its beginnings as a constitutional monarchy in 1932, Thailand had maintained a strongly centralized form of government. This government is divided roughly into a dozen ministries and departments with head offices in Bangkok and provincial and district offices throughout the country. Major ministries are arranged along traditional sectoral lines, including defense, finance, foreign affairs, agriculture and cooperatives, communications, commerce, public health, industry, education, and so forth. A Ministry for Interior takes responsibility for local administration, police, lands, public welfare, town and country planning, rural development, and policy and planning. In addition, the Prime Minister maintains an office that has attached to it a series of policy-oriented units. These include the National Economic and Social Development Board (NESDB), which prepares the national five-year plans; the National Education Commission; the Budget Bureau; and until recently, the National Education Board and the National Research Council (NRC). The university system is also controlled by the central government through an Office of State Universities, which has ministerial status and official responsibility for the twelve universities or academic institutes, most of which are located in Bangkok.

In the interior, the provincial government provides a system for control of the provinces and districts. There are seventy-two provinces, which in Thai are called changwats. The administrative head of each province is
the provincial governor, who is a senior civil servant appointed by the Ministry of Interior, with an office staffed by officials appointed by central government ministries but directly responsible to the governor. Within each province there are approximately five to ten districts (amphoes). Chief administrator of a district is the district officer, who is also appointed by the Ministry of Interior and has technical officers who are field representatives of central government agencies but are, again, directly responsible to him. The district is the smallest administrative unit with permanent representation from the central government. Each district is divided into approximately twenty communes (tambons), and then further divided into villages (mubahns). The chief (kamnan) of each commune is elected as is the head (puyaibahn) of each village. These men are not civil servants, but they have civil responsibilities; they are paid an honorarium by the government and are answerable to the district officer.

Four types of local government exist. The first is the changwat administrative organization (CAO), of which there is one in each province, and which covers all areas outside the jurisdiction of the municipalities and the urban areas. The CAO comprises an elected legislative assembly and a council, which is composed of some elected CAO personnel and the governor and his official staff, the latter serving as an executive function.

The second form of local government is the municipality, of which there are three grades determined by income and population density of the city or township that is served. The municipal assembly, mayor, and councillors are all elected and have considerable autonomy, since only the town clerk is appointed by the central government.

The third form is the sanitary district (sukapibahn), which is established in areas with fairly large populations outside townships. The district officer is the chairman of the sanitary district committee, and his committee-men are commune and village headmen and local officials.

The fourth type is the tambon administrative organization (TAO), which comprises the commune chief and the headmen of the local villages and is answerable to the district officer.

Theoretically at least, the local government has responsibility for maintaining law and order, education, social welfare, and public health, and for providing and maintaining roads and waterways, water supplies, and public parks. In practice, however, the central government exercises considerable control over local activities by virtue of the fact that most of the local tax money collected is paid into the central exchequer, who then reissues the funds to the provinces and districts as grants and financial assistance. Education, health, and the police are directed largely by the appropriate central government ministries.
ENVIRONMENTAL ADMINISTRATION

One could say that the Thai administration has been involved in environmental management for at least 40 years. The Ministry of Public Health maintained theoretical control through its Public Health Act of 1941 (B.E. 2484), as did the Ministry of Industry through its more recent Factories Act of 1969 (B.E. 2512). Other, more ancient acts can be found, such as the Forest Protection Act of 1897 (B.E. 2440).

Other legislation enacted from time to time could have been called environmental. The Forest Act of 1941 (B.E. 2484) could have been interpreted in terms of forest conservation; the Wildlife Preservation and Protection Act of 1960 (B.E. 2503) could have been used to protect wildlife; and the Act for the Cleanliness and Orderliness of the Country, also of 1960, could have been used extensively for modification and even destruction of buildings in poor condition.

But agency priorities at the time apparently did not stress the environment, and therefore, it can be said that environmental management did not occur.

Politically, the government did not enter the environmental field until 1971 when pollution of the Mae Klong River by sugar-mill owners became a source of controversy. Although the Factories Act was used as a threat, the government's real action was to set up an Environmental Quality Committee (9 February 1971). The secretary-general of the National Research Council (NRC) was designated chairman, and thirteen other agencies were represented on the committee.

Under this chairmanship, the committee prepared its first national report, Environmental Problems in Thailand, for presentation to the U.N. Conference on the Human Environment (Stockholm 5–16 June 1972).

With some perspicacity, the report noted:

The real root of various environmental problems in a developing country like Thailand, is a high rate of population increase. Rapid population growth means increasing needs for industrialization, urbanization, higher agricultural productivity, more exploitation of natural resources, in attempts to increase per capita income and the standard of living. Unfortunately, in the course of these developments, their consequent impacts on the environment are usually ignored because of unawareness and lack of financial resources and technological knowledge.11

By taking such a fundamental view, the committee encouraged a tendency already in evidence—the gradual addition to its ranks of more and more agencies. The group soon grew to a thirty-two man, two-layered structure: a National Environmental Control Committee of fourteen
members chaired by the Minister of Health, and an Executive Committee of eighteen members chaired by the Secretary-General of the Central Planning Agency, the National Economic Development Board (NEDB). Thus, the report formed the rationale for inclusion of environment as a national planning issue.

The arrangement was not entirely successful. Some possible reasons for this are:

1. the inability of the chairing ministry to obtain cooperation from other ministries and offices;
2. lack of support from those who benefited from unhindered development;
3. the appointment of some members on political rather than technical grounds; and
4. the unwieldy size of the groups.

Following a scandal in 1973 over the questionable use of the Tung Yai Wildlife Reserve by senior persons, the old organization was abandoned and a new Committee on Environmental Quality was established. This again had an executive committee, the substantive administration of which was delegated to a new Environmental Division within the enlarged NESDB. From this point, environmental planning and administration in Thailand probably began.

The composition of the new committee, however, was not greatly different from those that preceded it, and its failure was due probably to many of the same causes.

The Environmental Division of NESDB found itself associated with ineffectiveness, and it is likely that the public saw the NESDB as prodevelopment, and, therefore, antienvironment.

Political disruption continued and culminated in the October Revolution of 1973. Many environmentalists were present in the new government of Sanya Dharmasakdi, and two new environmental articles — numbers 77 and 93 — were inserted in the constitution, making Thailand one of the few countries at the time to recognize the environment as a constitutional matter.

This display of interest by the legislature had its corresponding effect within the administration. By one estimate, there were "over twenty agencies, universities, councils and committees working on water quality alone and at least another fifteen working on problems of population." 12

Recognizing the need for some organization of this activity, the government passed the Enhancement and Conservation of National Environmental Quality Act (B.E. 2518, 12 February 1975). Besides intending to
bring all environmental management under the umbrella of one organization, the act also attempted to provide a counterbalance to the developmental tendencies of NESDB, as the environmentalists saw them.

The act provided for the establishment of a National Environment Board (NEB), with an office to handle its administration. A considerable number of technical personnel were transferred from the NESDB Environmental Division to staff this office. The Environmental Division itself, however, was not disbanded, and through it, in spite of NEQA 1, the NESDB maintained the administrative right to the last word on incorporating environmental matters in national planning. Fear of creating a superagency had prevented the legislators from giving the new board strong legal powers, and the NESDB was therefore in a position to pursue a policy of diffusion of environmental responsibility throughout the administration.

**Formation of the National Environment Board**

It is an interesting commentary on the evolutionary relationship between legislation and administration that, while NEQA 1 brought the NEB into existence on 12 February 1975, the administrative arrangements designed to support the board had been the subject of a previous report written by the National Committee on Environment in November 1974. Among the shortcomings in the existing system of environmental management, the report noted the lack of:

1. a clearcut, comprehensive policy and plan;
2. a national environment secretariat;
3. a comprehensive environment protection and management act;
4. specific legislation;
5. power, responsibility, and so on in existing legislation;
6. environmental assessment guidelines;
7. planning guidelines;
8. a practical human settlement/environment planning policy;
9. a coordinated resource management policy;
10. a technology assessment policy;
11. environmental input in budgeting;
12. effective law enforcement; and
13. an efficient information retrieval system, especially in government agencies.
While the details of NEQA 1 were listed earlier in this report, to reiterate, the act instructed the board to:

1. submit policy and projects to a council of ministers;
2. submit a report on the environmental state of the nation on an annual basis; and
3. evaluate and coordinate the work of government agencies; state, educational, and private enterprise; and the citizenry.

The recommendations of the National Committee on Environment had been fairly specific; they had included (1) supervision, and advice to and coordination of all government agencies with respect to environmental policy, (2) provision of guidelines with regard to environmental planning, resource management, and impact evaluation, and (3) implementation of projects in environmental assessment, including the development of an information system that would feed into general management and the five-year plan. The committee recommended that the board be placed in the Office of the Prime Minister under the direct control of a Deputy Prime Minister. Its administrative support was to be an office, which was to be under the control of a Secretary-General, who was both a member of the board and head of the office. The board itself was surrounded by an elaborate system for political interaction, for example, an Environmental Appeals Council and an Environmental Technical Advisory Committee. The Technical Advisory Committee, in turn, had various subcommittees appended to it which presumably would address specific technical issues. Above the board and working directly with the cabinet was an International and Regional Relations Officer as a staff member. Below the level of Secretary-General there were two Deputy Secretaries-General, one for environmental management (resource management and environmental impact) and one for environmental protection (monitoring and pollution control). In addition, there was a Director for Research Coordination and various unspecified “environmental working parties.” The Secretary-General himself commanded directly administrative and extension services, including legal, educational, and public relations matters.

After its passage through the legislature and through civil service and budget committees, the proposed structure was reduced in the following ways:

1. The number of divisions was cut from six to five, namely, the Office of the Secretary, Promotion, Policy and Planning, Impact Assessment, and Standards.
2. Only one Deputy Secretary-General was provided and was given control over all divisions.
3. The post of Director of Research Coordination was not approved.
4. The appeals council was cancelled, and the function was given to the Legal Section of the Office of the Secretary.
5. The environmental technical advisory committee was not approved, and instead six technical ad hoc committees were formed to assist the board. These concerned themselves with land use, water, air and noise, nature and art conservation, population and human settlements, and education and public relations.

The environmental working parties were not established. The board itself was established with eighteen people on it—a number that, from a theoretical point at least, was uncomfortably large for the quality of decision making demanded of it. The board consisted of undersecretaries for Defense, Interior, Agriculture and Cooperatives, Industry, and Public Health; the director of the Marine Fisheries Division; the chief of the Plant Protection Division; the rector of Silpakorn University; the deputy secretary of the Board of Legislature; and senior members of the National Science Association of Thailand, the Association for the Conservation of Wildlife, the Bank Association of Thailand, and the Industrial Finance Corporation of Thailand. The final organization chart, as approved in 1975, is shown in Figure 2.

While this organization was effective in meeting the office's initial needs, experience showed that the work of environmental protection was more complex than envisioned initially. Accordingly, the original structure, while still maintained, underwent some modifications within the divisions themselves; the present organizational structure (from 1980) is shown in Figure 3. Primarily, the changes establish distinct sections or units for each environmental subject area considered important and expedite the development of links with other governmental agencies.

Coordination Arrangements (Expert Advisory Committees)

The NEB has relied for its technical advice on various ad hoc committees staffed by academicians, government officials, and individuals from the private sector. At first only six existed—Population and Human Settlement, Land, Water, Noise, Nature and Art Conservation, and Education and Public Relations. These committees provided suggestions to the board on programs that might be developed in all of these areas. A
Figure 2. Organization Chart (1975).
Figure 3. Organization Chart (1980).
seventh committee for Law was instituted in 1976. This evidenced preoccupation with procedural and institutional aspects of the problems, as compared to previous interests in technical, subject-oriented approaches. No corresponding committee was ever set up for studying administrative aspects, the suggested reason being that Thai environmental structure lacked expertise in the area. Since 1976 there has been a definite trend away from what we might consider sectoral preoccupations with committees for Nuclear Energy, Land Subsidence (in Bangkok), the problems of the Songkhla marine area, and the Bang Krachao green belt area. These four are attempts to deal in a comprehensive way with development activities. Nuclear energy is a response to the nation's use of energy as a whole, and land subsidence is not seen simply as a problem of overpopulation, but as an effect of too rapid development in the primary city of Bangkok. Songkhla has become a direct contact with development projects in their classic form, and Bang Krachao as a green area is a planned attempt to deal with Bangkok's air pollution problems, which have no single means of control.

Procedurally, the committees are chaired by one member, with an officer of the NEB as its secretary. The committees produce reports, which are then relayed to the Secretary-General and his division chiefs. These allocate the various tasks in committee to the divisions and act as the bearers of various recommendations to the NEB itself.

Conversely, requests for information from the NEB are forwarded to the Secretary-General (in his role as a member of the board), to the division chiefs, and then to the ad hoc committee. This arrangement produces a certain amount of difficulty in two respects. First, both the number and subject areas of the committees do not correspond perfectly with the organizational arrangement within the Office of the National Environment Board (ONEB), and a degree of ingenuity must be exercised by the Secretary-General and his division chiefs in turning the committee reports into workable programs for the office. Second, the essentially ad hoc contributions of the committees are difficult to control and fit into the orderly time frame that administrations would prefer. Both of these problems can be considered normal and depend on the ability of individuals for their successful solution.

The link between the ONEB and the central agencies, including the NESDB and the Budget Bureau, is still being developed. Administratively, the Secretary-General of the NESDB is an ex officio member of the NEB. Presently, officers of the NESDB normally are included in almost all committees and working groups established by the NEB. As noted earlier, a small environmental staff continues to be retained by the NESDB and serves as an institutional contact point within the planning agency.
While the Secretary-General of the NEB is not a member of the NESDB committee, the draft environmental plan prepared by the NEB was submitted to the NESDB's committee for approval prior to its inclusion in the Fourth National Development Plan (1977–1981). This submission formed ultimately a considerable part of the plan's chapter on "Development of Conservation of Critical Economic Resources and Environment."

The relationships between the NEB and other government agencies are being developed on an ad hoc basis. The NEB makes contact with many governmental units through its various committees and working groups. All decisions involving other government units must be referred for consideration to the cabinet.

A noteworthy omission in the present system is a means by which the NEB may intervene in budgetary allocations. At present, no formal way exists for the NEB to facilitate budgeting across sectors as environmental needs dictate. Only two alternatives are available to the NEB: first, the board may raise issues directly with the cabinet; and, second, it may work with the NESDB to screen development projects prior to their submission to the cabinet. The environmental impact statement procedure is the principal means of doing this at present, but it is possible that extended benefit-cost analysis procedures will be incorporated into the planning units themselves in the near future.

With respect to technical assistance on environmental matters, the NEB works closely with the Department of Technical and Economic Cooperation (DTEC) within the Office of the Prime Minister. This agency is responsible for the administration of funds received from international assistance agencies. By agreement between the DTEC and the NEB, all requests to DTC from other government agencies for international technical assistance are referred to the NEB for evaluation. This appears to be effective in insuring that such assistance takes into account environmental matters in a coordinated manner.

"Package" Planning

In seeking effective coordination, the NEB has found useful a modified approach to environmental impact evaluation. The strategy entails:

A. the use of an environmental impact assessment (EIA) as a guide for individual project planning and implementation, so that each project incorporates competent attention to environmental parameters; and
B. the preparation of comprehensive development plans for those areas or regions of the country that are especially sensitive to development pressures (e.g., Bangkok metropolis, the Songkhla Lake marine area, and Khao Yai National Park).

While it is generally recognized that the logical approach would be to complete the regional planning first, so that it could be known in advance which project should be promoted, in reality such plans are rarely ready in time. Considerably more reliance therefore must be placed on the EIA. The assessment then functions as a coordinating mechanism for feasibility studies and procedures, which often receive little attention in developing countries. In addition, by indicating the need for periodic monitoring of project operations, the assessment acts as a feedback mechanism for assessing a project plan's effectiveness.

The starting point for achieving cooperation from implementing agencies is to take advantage of positive enhancement of environmental values, as distinguished from protection of such values. This is especially true for many development projects taking place on lands already converted for human use. The environmental problem is not so much to protect natural resources (which are already largely replaced by economic development activities), but to take advantage of every opportunity to include positive measures in the plan whenever feasible that better the socioeconomic environment. Most development projects are believed to be initiated for a particular purpose, and hence latent potential for achieving many related improvements in community environment tend to be overlooked. For example, rural village water-supply projects often can be readily adapted to include gardening, irrigation, and/or aquaculture, which can increase considerably a family's income. The same hidden opportunities are being studied in major project planning; for example, multipurpose dams, large reservoir projects which usually focus on power, irrigation, flood control, and water-supply potential. NEB studies of such projects show clearly that these major impacts result from the project on all human settlements. The EIA is aimed therefore at including socioeconomic impacts within a regional and comprehensive point of view. In addition, while dam reservoir projects do not necessarily effect a primary impact on watershed forests and wildlife values, they do present significant opportunities for protecting these values, provided the concept is understood as part of the overall project plan.

As to follow-up monitoring, the board recognizes this is rarely done in developing countries, although it is essential in many cases because of the innovative nature of the projects. The assessment procedure places particular interest on whether improvement measures are accepted and used
in the manner intended by the beneficiaries. The assessment attempts to include such monitoring as an integral part of the overall budget, and in many cases the NEB is showing interest also in participating in the monitoring procedure.

By working with and through the implementing agencies, it is the NEB's aim to gain recognition for careful, tailored project planning. The board is working at present on procedures for thorough-going analysis of the organizational implications of such a strategy. In 1979, for example, the NEB and the Thailand Institute of Scientific and Technological Research initiated a three-year joint research project on "Integrated Planning for Water Quality Management of the Tachin River." (The river is one of the most important in Thailand and supplies water for agriculture, acts as an effective means of transportation, and is a fertile fishing ground for the rural community. Discharges from more than 400 factories on its banks have in recent years threatened the quality of the water to an alarming degree.) The NEB has initiated a multidisciplinary approach, in which water quality controls are made in accordance with their suitability to the economic, technological, societal, and environmental policies of the government. Important research projects include investigating the feasibility of using natural resources available along the river's banks, the feasibility of water quality control and self-purification processes, the ecosystem, the waste-loading dynamics of the river, the reduction of waste loads from industries, and river bank land-use patterns. Final results and findings will serve as a basis for a blueprint on integrated planning for water quality management.

**URBAN ADMINISTRATION**

**Policy**

Historically, urban policy has been notable for its absence. The Fourth Plan (1977 – 1981) lists as a major problem "The Lack of Definite Urban Development Policies, Insufficient Budgetary Support, the Absence of a Systematic Urban Development Plan, and the Lack of Rural-Urban Development Linkages in the Past National Plans" (p. 226). Thus, a top priority during the period was to develop such policies and, from this, to determine what legal and administrative measures might follow.

It might be added that the extremely high migration rates from rural to urban areas have resulted also in policies that are, in a sense, antagonistic to urban development. Thus, considerable attention is being given to
mechanisms for reducing migration into Bangkok, for encouraging migration back to rural areas, and for developing alternative regional centers. This policy has been hampered by the unexpected influx of refugees from neighboring countries, which has placed indirect pressures on the country's support systems, and by the downturn in the economy, which has reduced the resources available for regional development.

Legislation

Sectoral legislation for the Bangkok area is headed by the City Planning Act of 1975 (B.E. 2518), under which an interagency City Planning Committee may call for designation, by Royal Decree, certain areas for which comprehensive plans must be formulated.

A comprehensive planning procedure, including public hearings and reviews, enforcement procedures, and penalties, is also prescribed. The act is under the administration of the Department of City Planning within the Ministry of Interior.

Control of building construction is a traditional function under the Control of Construction of Building Act of 1936 (B.E. 2479). In Section 6, the act prohibits the construction of any building without a permit in writing from the local authority. Local authorities have the power to issue orders in writing that would require the applicant to modify the plan, design, or specifications submitted, so that they are in compliance with ministerial regulations or municipal ordinances. The local authority also has the power to order the removal or alteration of any building or part of a building constructed contrary to the terms of the written permit (Section 11). Other related regulations are possible under Section 45 of the City Planning Act.

Modification in, or destruction of, buildings is also possible under the Act for the Cleanliness and Orderliness of the Country of 1960 (B.E. 2503). Its major criterion is that the building should be "in an objectionably and irreparably delapidated condition" (Section 12). Other rulings can be issued on an ad hoc basis with regard to industrial facilities, and, in fact, the Ministry of Industry has done this. In 1976, new factories were forbidden to locate within the Bangkok area; however, the ban was later lifted. This illustrates the difficulty of maintaining a consistent set of regulations in a situation where political factions alternate in power and are in a position to approve or disapprove projects on an alternating basis.
Administration

As can be seen, a number of government organizations are active in the field of housing and urban development. The National Economic and Social Development Board (NESDB), of course, acts as a central coordinating agency for plans and projects in conjunction with the Budget Bureau.

Historically, the Ministry of Interior has had four units performing activities that involve housing and urban development. These have been: the Department of Development and Country Planning, the Housing Bureau (under the Department of Public Welfare), the Metropolitan City Municipality, and the Department of Land. The Department of Town and Country Planning has performed an advisory role in preparing general guidelines for the urban development of all municipalities in Thailand. It has also supplied information for planning and conducting surveys on future land-use patterns.

The Housing Bureau has performed the function of designing and administering the architectural and engineering infrastructure. The bureau has undertaken a number of housing projects and various other services on a long-range financial basis. The Metropolitan City Municipality, which had been created from various local government agencies in Bangkok and the Thonburi Municipality, was engaged in urban planning, road and drainage construction, slum clearance, and urban renewal. These agencies were supported by the National Housing Authority, which was mainly concerned with public housing.

The Bangkok Metropolis Authority was established by the Administration Act of 1975 (B.E. 2518). The first election of the governor, the deputies, and the Bangkok Metropolitan Assembly was held in August 1975. The form of government was different from the other four types of local government in Thailand (the Changwat Administration, the Municipal Government, the Sanitary District, and the Tambon or Commune Council).

The Bangkok Metropolis Authority is a juristic entity composed of a governor and four deputies, who handle executive functions, and an assembly, which handles legislative functions. The governor, deputies, and assembly have all been elected to serve 4-year terms.

Theoretically, at least, the Bangkok Metropolis is an entity of some power. It controls the area in which the central government is located, and it may undertake activities that lie outside its jurisdiction if such activities are necessary to other activities which are being carried out within the power of the Metropolis Authority. Extrajurisdictional activities may also be carried out if they are in the interest of Bangkok residents; for this to
happen, however, the activity must be approved by the assembly, by the councils of the local government of the area in which the activity is to take place, and by the Minister of the Interior.

The functions of the Bangkok Metropolis Authority are:

1. maintaining law and order, including setting up the Bangkok Metropolis police force and enforcing ordinances and laws within the power of the metropolis;
2. providing and maintaining roads, waterways, and drainage systems;
3. maintaining cleanliness and orderliness of the city;
4. providing public health, family health, and medical services;
5. providing public facilities;
6. providing and administering education;
7. promoting employment and occupations;
8. preventing and abating public disaster;
9. rehabilitating slums and providing public housing;
10. providing markets, ports, and ferries;
11. providing and controlling cemeteries and crematoria;
12. providing traffic engineering functions;
13. developing and conserving the environment;
14. providing and maintaining recreation centers;
15. providing and controlling animal slaughtering;
16. controlling animal husbandry;
17. controlling orderliness and sanitation in public places;
18. maintaining public utilities;
19. supervising public welfare;
20. promoting sports;
21. administering trade enterprises of the Bangkok Metropolis; and
22. providing other functions as ordered by the Prime Minister, the cabinet, or the Ministry of Interior, or as specified by law.

The function of conserving and developing the environment is scattered among different bureaus of the Metropolis Authority. The Bureau of Public Health has an Environmental Division, which takes responsibility for monitoring air pollution. The Bureau of Sanitation takes responsibility for garbage collection, waste disposal, and operation of the compost plant. The Bureau of Sewage and Drainage takes action with regard to waste water treatment, drainage control, and waterways (Klong) maintenance. The Office of the Undersecretary of State for Bangkok Metropolis administers traffic engineering. The Bureau of Social Welfare concerns itself with public parks, recreation, and slum areas.
In spite of (or because of) these multiple functions, the authority needs the cooperation of other government agencies for effective administration. For example, in the case of air pollution caused by automobiles, vehicle production is under the control of the Ministry of Industry, traffic control comes under the Traffic Police Department, and automobile licensing is the duty of the Police Register Department. Traffic systems, city planning, and land use are also the domain of the City Planning Division of the Ministry of Interior. Slum areas also come under the National Housing Authority and, again, the Social Welfare Department of the Ministry of Interior.

An exact analysis of the various administrative functions is somewhat premature at this stage, however, since, in February 1980, the House of Representatives and the Senate passed two pieces of legislation designed to change the status of the Bangkok Metropolis Authority. Under the new system, this body will have have the status of a bureau under the supervision of the Prime Minister's Office—a system that will allow the Prime Minister the chance of intervening directly in the affairs of this gathering of 5 million people. There are to be seven municipalities in the so-called Metropolitan Bureau. Until the new administrative arrangements are completely settled, the previous arrangement will continue to be in force.15

It should be clear from the preceding description, however, that the problems of urban administration represent a parallel case to those of the environment as a whole. Lack of clear policies, overlapping jurisdictions with insufficient authority for effective enforcement by any one agency, and a rapidly changing organizational environment make short-term solutions next to impossible. The reorganization of the Bangkok Metropolis Authority and the production of a workable comprehensive plan are important steps in the right direction. Whether these improvements can be made effective before the problems of the economy, population growth, and energy become insurmountable is a major issue for the future of Thailand as a whole.

### FOREST ADMINISTRATION

The Royal Forest Department was founded in 1897, and the first forest protection act was promulgated in the same year. However, no official policy or law related to reservation of forest land appeared until 1961. The lack of a definite policy until that time resulted in inefficient management of the forest in terms of reservation, reforestation, and maintenance. Forestry policy was first stated explicitly in the National Economic
Environment and Policy Institute

and Social Development Plan of 1961–1966 (the First Plan). The plan gave budgetary allowances to the Royal Forest Department for forest maintenance, protection, and reforestation.

Policy

Reforestation is carried out under the provisions of the National Economic and Social Development Plan, one of the preoccupations of which is the rapid depletion of forest land in watersheds. Through the Forest Department, the plan aims to reduce the present deforestation rate from 3.8 to 0.5 million rai (1 rai = 1,600 m²) and accelerate the reforestation rate to 0.5 million rai per year in all significant watersheds. The plan also acts to limit forest concession grants to areas where trees have reached maturity.

The department is also interested in human interaction involved with forestry management. In conjunction with the Forest Industry Organization (FIO), a Forest Village Program has been in effect since 1968. The objectives of the program are:

1. to collect and settle migrating farmers to prevent them from clearing more forest;
2. to make forest villages a source of labor for reforestation by using the inhabitants' seminomadic habits as a means for improving the condition of the forest; and
3. to harmonize the activities of rural communities with forest lands.

With the forest village unit based on the area needed to cover the entire rotation of the trees to be planted, the program provides various incentives, including free plots of land, free electricity and running water, and free education for children. Families may clear land and grow farm crops between the seedlings planted for the FIO. Further income is earned by performing various kinds of work related to the forests, such as weeding, pruning, and pesticide spraying. By 1978, the FIO had forty-seven forest villages with a total of 1,315 families engaged in the program.

In deforested areas, the department has been given the authority, since 1979, to allocate to farmers land in deteriorated national reserve forests. The purpose of this is:

1. to maintain the national reserve area for production and protection purposes;
2. to stop expansion of forest destruction; and
3. to resettle the scattered trespassers so that government assistance and services may be more concentrated.

This program also provides free land, although no title is issued to the user. The property is inheritable but nonnegotiable. Government agencies provide suitable vocational training, irrigation, feeder roads, schools, health stations, agricultural credits, and marketing services to each village. After the village is established, it is set up as an agricultural cooperative. By the end of 1979, thirty-six forest villages had been established in the deforested areas.

The department is also involved in hill-tribe development as a part of the Royal Project of Watershed Development of 1975. After selection of a suitable place to organize the hill tribes (taking into account soil, space, and support facilities), land is provided to the hill-tribe family. This land cannot be sold and can only be inherited with the consent of government authorities. Hill-tribe people have the opportunity to work in reforestation units.

Legislation

The Forest Department administers several important acts. The Wildlife Preservation and Protection Act of 1960 prescribes various rare species for preservation and protection. The act requires a coordinating committee, the Wildlife Preservation and Protection Committee, consisting of the Undersecretary of the Ministry of Agriculture and Cooperatives as its chairman, and the Directors-General of the Royal Forest Department, Local Administration Department, and the Land Department as ex officio members. Other members must be appointed by the Council of Ministers. The committee functions by giving advice to the minister of agriculture in several matters, including the determination of wildlife preserve areas.

The National Parks Act of 1961 is used to protect, preserve, and maintain natural features and resources such as woody plants, forest products, wildlife, scenic beauty, forest, and mountains in any area of land that might be in danger of annihilation or alteration by man. This act also requires a National Parks Committee, consisting of the Undersecretary of the Ministry of Agriculture and Cooperatives as chairman, the Director-General of the Royal Forest Department, one representative each from the departments of Land and Local Administration, and other members appointed by the cabinet. The committee has the duty to advise the Minister in matters related to the type of land to be reserved as a national park,
its extension or cancellation, its protection and maintenance, and any other matters upon which they may be consulted by the minister.

The National Reserve Forest Act of 1964 authorizes the Ministry of Agriculture and Cooperatives to determine any forest as national reserve forest, with a view to preserving its nature and other natural resources. The determination is made by Ministerial regulations rather than by Royal Decree (the trade-off here is that, while the Ministerial regulation does not carry the force of the Royal Decree, it can be produced in a much shorter time).

Forest protection is carried out by the various divisions which patrol the sanctuaries and the national parks.

Administration

The Royal Forest Department is in the Ministry of Agriculture and Cooperatives. In its present form it is divided into the Central Administration and the Territorial Administration.

Central Administration.

Organized into both functional and areal divisions, the Central Administration has fourteen units under the direct supervision of the Director-General. These divisions are the Office of the Secretary, and Finance, Forest Management, Forest Control, Silviculture, Forest Products Research, Legislation, Personnel, National Reserve Forest, Watershed Conservation, Planning, Conservation, National Parks, Wildlife Conservation, and Divisional Forest offices. The Divisional Forest Office is divided according to areas; there are at present twenty-one divisional forest area offices in all parts of the country. Their duty, among other things, is to advise both the provincial governor and the provincial forest officer on technical matters.

Territorial Administration.

The Territorial Administration is divided on classical lines with sixty-nine provincial forest offices, each provincial forest office being divided further into district forest offices of which there are at present 620. The provincial forest officers, however, are not under the direct supervision of the director-general of the Royal Forest Department. They act as its field agent and are considered to be a part of the Provincial Administration under the provincial governor. They generally communicate with the
Royal Forest Department through the medium of the governors. The duty of the provincial and district forest officers is, among other things, to help the governors and the district officers, respectively, in forestry work within their provinces and districts.

To make matters more complex, in 1961 the Thai government established a Forest Police Division under the command and supervision of the Department of Police. Its express mandate was to suppress forest crime.

An organization chart of the arrangement is shown in Figure 4:

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**Administrative Problems.**

In recent years, forests have been exploited and occupied increasingly by a large number of people. The main causes of this are:

1. Lack of administration. Until 1979, of the 336 forest protection units
required, only 220 units were established. The rate of reforestation was far behind the rate of deforestation. Although forest reforestation law has been in effect since 1938, it has not been effectively enforced. The reservation of forest equal to 50 percent of the land area of the country (as fixed by the First National Economic Development Plan) is also far behind schedule. The problem seems mainly that of shortages of trained manpower, budgetary appropriations, vehicles, tools, and other equipment.

2. Lack of law enforcement. Failure of law enforcement can be attributed to organizational defects in the Royal Forest Department, lack of power delegated to forest officials for the purpose of enforcing the forest protection laws, lack of budget, and perhaps the presence of insurgents in forested areas.

As noted, the Royal Forest Department is divided into Central and Territorial administrations. The Territorial Administration is based on civil administrative areas instead of real forest areas. Provincial and district forest officers, being under the authority of provincial governors and district offices, find themselves assigned to duties outside the field of forestry. The considerable mismatch between forested areas and administrative areas has led to ineffective and inefficient management.

3. Lack of Power. The power of forest officers to effectively prosecute offenders is limited. Because of this limitation, forest offenders arrested by forest officers must be handed over to local police for prosecution. In many cases, it may take several months or even years to settle cases. Because of the hard circumstances surrounding the existence of these offenders, courts tend to be sympathetic toward them, and many offenders are released or are not prosecuted thoroughly according to the law. The Forest Police Division is only marginally connected to the Royal Forest Department by virtue of budget appropriations. In all other circumstances, and particularly in the area of suppressing forest crime, it is under the command and supervision of the Department of Police.

Those with an interest in the proper management of the forests believe that the department's work could be made much easier by:

1. an education program designed to demonstrate the need and dependence of people upon the forest; and
2. the promulgation of a multiple-use sustained yield act. Such an act would attempt to rationally allocate forests according to their use for timber, recreation, watersheds, mining, and so on. A greatly increased forest village system appears to be useful, because with it the shifting populations of the north could be controlled, guided, and educated.
In sum, forestry officials are concerned that forest conservation should not mean nonexploitation but rather careful use so that forestry resources sustain their yield. The development of such a policy remains in the future of the department.

HEALTH ADMINISTRATION

Policy

Within the Thai context, environmental health is considered to include or relate to the following:

1. Water supplies, with special reference to the provision of adequate quantities of safe water that are readily accessible to the user, and to the planning, design, management, and sanitary monitoring of community water supplies (with due consideration to other essential uses of water resources)
2. Waste water treatment and water pollution control
3. Solid waste management
4. Vector control
5. Control of soil pollution
6. Food hygiene
7. Control of air pollution
8. Radiation control
9. Occupational health
10. Noise control
11. Housing and its immediate environment, in particular the public health aspects of public and institutional buildings
12. Urban and regional planning
13. Environmental health aspects of air, sea, and land transport
14. Accident prevention
15. Public recreation and tourism
16. Sanitation measures associated with epidemics, emergencies, disasters, and migration of populations
17. Preventive measures required to ensure a healthful environment

Although this comprehensive definition of environment obviously cuts across many administrative borders, the national health policy tends to concentrate on improving the efficiency of the health service delivery
system through the concerted efforts of related sectors and the general public through the expansion of rural health facilities and through the delegation of certain health responsibilities to provincial health administrations. Specific guidelines are:

1. to provide free medical care services to those people of low income who live in urban and rural areas;
2. to increase the number and capability of health personnel through improving the training system;
3. to encourage public participation through training village health volunteers and developing village community organizations;
4. to prevent and control drug addiction; and
5. to improve the nutritional status of the population.

Within the context of national planning, the first five-year plan emphasized construction and expansion of health facilities. During the second and third plan periods, health itself was recognized as an important part of the social sector, in conjunction with education and social welfare. These plans therefore accelerated the growth of rural health and medical care and the improvement of existing services, especially for the low-income groups. Public health activities were expanded, medical care services improved, and studies and research work were stepped up. Coordination of planning among the national, regional, and provincial levels improved and resulted in an increase of the resources available for public health facilities. Emphasis was put also on maternal and child care, family planning, communicable disease control and eradication, improvement and expansion of medical care, development of environmental health, integrated health services, and health manpower development.

The budget allocation for health for the first, second, and third plans constituted 4.90, 6.12, and 6.32 percent, respectively, of the total national budget. Toward the end of the third development plan, emphasis was placed on both the hiring and training of manpower, because of a poor distribution of health personnel in the rural and urban areas. This was aggravated further by the “brain-drain” problem and the fact that the universities, which trained doctors, nurses, and other health personnel, usually were left out of the health sector plan, since they came under the Office of the Prime Minister. Health planning in this period was based on the short-term (annual) and medium-term (five-year) plan submissions of divisions within the Ministry of Public Health. Long-term planning was practically nonexistent, except in a few cases where population projections were made at different fertility levels.

The fourth five-year plan, which came into operation in October 1976,
was a comprehensive document with inputs from the World Health Organization (WHO) and other multilateral and bilateral agencies. Primary emphasis was placed on the betterment of health in the rural population, especially at the village level. Within these overall objectives, the main environmental goals were:

1. to attain reduction in population growth;
2. to improve nutritional status;
3. to develop rural and urban water-supply systems, safe disposal systems, and to monitor water pollution and food pollution;
4. to integrate health services and build up health units at the village level;
5. to strengthen national health planning and management of related health information systems; and
6. to ensure maximum cooperation and coordination among various government agencies and make possible the effective solution of health problems.

Legislation

The acts that provide directly for environmental health include:

1. The Act for the Control of Cemeteries and Crematories, 1938 (B.E. 2481);
2. The Public Health Act of 1941 (B.E. 2484);
3. Act for the Control of Human Excreta as Fertilizer, 1943 (B.E. 2486); and

Legislation concerned indirectly with health measures includes those for occupational health (eg, the Civil Service Act of 1975, B.E. 2518) and those associated with occupational health, such as:

1. The Building Construction Act of 1936 (B.E. 2479);
2. The Minerals Act of 1967 (B.E. 2510);
3. The Factories Act of 1969 (B.E. 2512); and
Administration

The Ministry of Public Health has the responsibility for the organization and administration of public health services and most of the medical services of the government. The ministry is organized into six major components:

1. The Office of the Undersecretary of State for Public Health
2. The Department of Medical Services
3. The Department of Health
4. The Department of Communicable Disease Control
5. The Department of Medical Sciences
6. The Office of the Food and Drug Committee

All departments give technical support to the Provincial Health Department in their respective fields. Environmental health programs are organized community efforts and therefore tend to rely heavily on community support. The administration must ensure that programs receive acceptance, achieve their desired objectives, link their efforts with other health programs, and accomplish their work economically.

Administrative Problems

Unfortunately, environmental health programs have all too often failed to meet these administrative requirements. Failure seems to be associated with three factors: (1) the backgrounds of many administrators, (2) the complexities of contemporary social systems, and (3) the present state of administrative theory and technology.

First, environmental health programs frequently are administered by leaders who have been trained to high levels of technical competence, but who have minimal training in administration.

Second, especially great administrative expertise is needed by those who manage environmental health programs, because of the intricate ways in which such programs relate to the complex social and political systems of the communities in which they are carried out. Environmental health intervention seems to interact with the full spectrum of the community's political, social, economic, and cultural values. As a consequence, environmental health administrators have been called upon to deal not only with problems of engineering and management in their restricted sense, but with social issues and political decision making as well.

Third, administration is a developing discipline, and its theory has not been completely defined or agreed upon. Moreover, while the traditional
theories of organization and management embodied in most public governmental systems appear to be adequate for the administration of relatively limited social intervention programs, they have distinct shortcomings when applied to broad problems of socioeconomic development whose solution requires actions that cut across established organizational boundaries. Certain new approaches and methods may have emerged, but these have achieved limited success in the Thai context and even more limited acceptance, often having been rejected as "foreign bodies" incompatible with established patterns of administration.

In spite of these drawbacks, the level of public health consciousness and the general awareness of programs such as population control is impressive throughout the nation.

POLLUTION CONTROL ADMINISTRATION

Policy

Historically, pollution control policy is difficult to track because of the fact that infrastructure development (the supply of drainage pipes, dwellings, etc.) can be attributed to various sectoral priorities. Thus, the issue of water supply in urban and rural communities has been discussed since the first national plan was instituted, as has urban and rural sanitation. Industrial pollution control for manufacturing, however, did not enter the national plans until the Third Plan (1972–1976), and industrial pollution from mining not until the Fourth Plan (1977–1981). Pollution control is considered separately as a problem in water resources also since the Third Plan.

Pollution problems, according to the Fourth Plan, may take place anywhere, but areas with high population density and heavy concentrations of industry, such as the Bangkok Metropolis, are given priority in the control policy. Specifically, the problem areas considered are:

1. deterioration of the quality of water;
2. pollution from industrial plants and car exhaust pipes;
3. problems of noise and vibration, which disturb the physical and mental health of city inhabitants; and
4. garbage as a cause of various health problems.

Legislation

Pollution control legislation is complex. The Fourth Plan calls for the extended use of the Industrial Factories Control Act, the Traffic Act, the
City Plan Act, and the Revolutionary Council Decree on Black Smoke Emission from Exhaust Pipes to solve the problem (p. 170). This listing of legal instruments, however, is neither comprehensive nor an accurate indicator of legislative effectiveness.

For example, the Penal Code of 1908 (B.E. 2451) and its amendment of 1946 (B.E. 2499) list the number of environmental offenses related particularly to water pollution and noise pollution. The Act for the Cleanliness and Orderliness of the Country of 1960 (B.E. 2503) lists other related offenses. These provisions have been enforced only sporadically and do not represent an ongoing regulatory system. Moreover, major authority for pollution control is found currently in only two acts, the Public Health Act of 1941 (B.E. 2484) and the Factories Act of 1969 (B.E. 2512), with its subsequent amendments of 1975 (B.E. 2518) and 1979 (B.E. 2522).

The Public Health Act provides local authorities with the power to regulate activities that have a potential impact on public health and welfare. In addition to provisions addressed to such activities as garbage disposal, the selling of food, and the maintenance of public lavatories the act also allows the reduction of nuisances which represent a danger to health or safety (Sections 19–30). The Ministry of Health has indeed issued recommendations as to standards, particularly for water quality, and local governments have taken action in response to certain specific crises. The act is not enforced regularly, however.

The Factories Act and its amendments allow the Ministry of Industry to regulate discharge of pollutants as a part of its factory licensing procedures. The ministry may order modifications in factory facilities and suspend or revoke licenses in the event of nuisance or improper drainage. The Ministry of Industry has issued water quality standards pursuant to this legislation in 1970, but, again, the standards have not been enforced systematically.

Administration

Whether effective coordination for pollution control occurs between both the ministries of Health and Industry and the Office of the National Environment Board (NEB) is questionable. It seems possible, for instance, that polluting factories may be able to meet effluent standards required by the Ministry of Industry while violating health standards around nearby urban communities. The attitude of the Office of the National Environment Board (NEB) toward this question of standards is that it should set ambient standards (see summary at end of this section) and allow other agencies to determine the effluent standards admissible.
under the general guidelines. Such a procedure would demand coordinated decisions involving the ministries of Communications, Industry, and Interior, the Industrial Estates Authority of Thailand, the Bangkok Mass Transit Authority, and some others. In addition, the NEB would like to set emission standards for black smoke and carbon monoxide, which would be used by the Police Department and the Land Transportation Department. These programs are still in the process of being developed, however.

The traditional focus of Thailand's pollution control administration has been in the Industrial Works Department of the Ministry of Industry, which has had an effective industrial permit procedure for many years. The department has established a program which is a part of the Fourth Plan and includes two major aspects: (1) the Industrial Pollution Control Program, and (2) the River Conservation Program.

Under the first program, control measures regulate waste-water discharges from large-scale industries that produce volumes of waste water of high organic content, such as sugar mills, tapioca starch plants, pulp and paper mills, distilleries, breweries, and tanneries. The department has encountered some difficulties in its factory control program, partly because a large number of factories were established before the Factory Act itself and were not in a position to modify their operations sufficiently to satisfy the requirements of the act. In addition, certain types of industries, such as the pulp and paper mills, have treatment difficulties, and the department is proposing to revise existing industrial standards to a level more acceptable to factories.

The River Conservation Program administers six main rivers and the east coast area. Of the rivers, two basins—the Tachin and the Chao Phraya—are heavily populated with factories, and they also experience heavy domestic runoffs. In the case of the Tachin, an estimated 65 to 75 percent of the total biochemical oxygen demand (BOD) load entering the river derives from domestic sources such as fish and pig farms. Of the BOD load entering the Chao Phraya River, 75 percent is also domestic waste, much of it deriving from the 5 million inhabitants of Bangkok. Thus, although half the total industrial load in the Chao Phraya is due to slop discharges from three distilleries, even basic improvements in temporary disposal methods will not have a large effect on the overall problem. Until some means of controlling human waste is achieved, the permit procedures can only have limited effect. Control of such discharge is obviously beyond the jurisdiction of the Ministry of Industry.
Exhaust Emission Standards for Motor Vehicles

Standards published in the *Government Gazette* (vol. 97, part 35, special issue, p. 736–737, 4 March 1980) are:

1.1. CO from gasoline-powered motor vehicles shall not exceed 6 percent when measured by NONDISPER SIVE INFRARED DETECTION.

1.2. Black smoke from diesel-powered motor vehicles shall not exceed 40 percent when measured by BOSCH method or 52 percent when measured by HARTHIDGE method.

Ambient Air Quality Standards

The standards approved by the Ad Hoc Committee on Air and Noise Pollution are:

<table>
<thead>
<tr>
<th>AIR POLLUTANTS</th>
<th>1-HR AVERAGE SHALL NOT EXCEED (mg/m³)</th>
<th>8-HR AVERAGE SHALL NOT EXCEED (mg/m³)</th>
<th>24-HR AVERAGE SHALL NOT EXCEED (mg/m³)</th>
<th>ANNUAL AVERAGE SHALL NOT EXCEED (mg/m³)</th>
<th>TEST PROCEDURES</th>
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<tr>
<td>CO</td>
<td>50</td>
<td>20</td>
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<td>Nondispersive infrared detection</td>
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<td>NO₂</td>
<td>0.32</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Gas phase chemiluminescence</td>
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<td>SO₂</td>
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<td>–</td>
<td>0.30*</td>
<td>0.10**</td>
<td>Pararosaniline</td>
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<tr>
<td>Total Suspended Particulates</td>
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<td>–</td>
<td>0.330*</td>
<td>0.10**</td>
<td>Gravimetric</td>
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<tr>
<td>Photochemical Oxident (O₃)</td>
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<td>–</td>
<td>–</td>
<td>–</td>
<td>Chemiluminescence</td>
</tr>
<tr>
<td>Lead</td>
<td>–</td>
<td>–</td>
<td>0.01*</td>
<td>–</td>
<td>Wet ashing</td>
</tr>
</tbody>
</table>

* Maximum daily 1-hr average
**Geometric mean
Ambient Air Monitoring Program

Objectives: (1) Investigate background air quality in Bangkok. The selected stations represent residential, commercial, and industrial areas. (2) Data are to be used as feedback information for improving the emission standards from automobiles and industries. (3) Report ambient air situation to public.

Monitoring stations and pollutants to be measured (SPM = suspended particulate matter):

<table>
<thead>
<tr>
<th>Areas</th>
<th>Station</th>
<th>Pollutants</th>
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</thead>
<tbody>
<tr>
<td>Residential</td>
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<td>CO, SPM, O₃</td>
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<tr>
<td></td>
<td>Ladprao</td>
<td>CO, SPM, SO₂, NOₓ</td>
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<tr>
<td></td>
<td>Yaowaraj</td>
<td>CO, SPM, NOₓ, HC</td>
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<td>Bangkok</td>
<td>CO, SPM, NOₓ</td>
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<td>Pratunam</td>
<td>CO, SPM, NOₓ</td>
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<td></td>
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<tr>
<td></td>
<td>Vachira Hospital</td>
<td>CO, SPM, NOₓ</td>
</tr>
<tr>
<td></td>
<td>Wongwienyai</td>
<td>CO, SPM, NOₓ</td>
</tr>
<tr>
<td></td>
<td>Sukumvit</td>
<td>CO, SPM, NOₓ</td>
</tr>
</tbody>
</table>

Industrial Air Pollutant Emission Standards

Current work done:

(1) Emission Standards Setting (from literature by an expert working group).

- Particulates and Smoke
- Heavy metal, Lead and Copper
- SO₂ + H₂SO₄ mist
- CO
- H₂S
- HCl & Cl₂
- NOₓ
- Organic Solvent

(2) Industrial Air Pollutant Emission Inventory.

- Data Collecting
- Questionnaires
- Industrial Survey
- Stack Sampling (to be initiated soon)
Environmental Policy

Mining in Thailand is surprisingly diverse. Various minerals, including antimony, barite, fluorite, gypsum, iron ore, kaolin, lignite, manganese, marl, zinc, phosphate, rock salt, silica sand, tungsten, uranium, emery, potash, and small amounts of gold and copper and others are mined. By far the greatest proportion of gross mining income (77 percent) comes from the extraction of tin. Most mining is of the surface type from open pits and quarries, although tin is derived largely from alluvial sources and dredging.

Tin recovery has been going on for approximately 450 years, with the result that this aspect of mining is considered the historical center of mining policy. A multiplicity of management techniques has grown up over this period, showing the influence of Chinese, French, British, Portuguese, Dutch, Indian, and indigenous practices. The most obvious aspect of intensive development has been the rapid siltation of rivers, shoreline areas, and coral reefs by fine sand from the separation processes. It is becoming increasingly clear, however, that such mining is also having an effect on irrigation, forestry, and other areas of development activity.

The most explicit statement of policy with regard to protection of the environment is that of the National Environment Board (NEB), which issued a Policy on Mineral Resources in November 1978. The policy has six main statements, which deal with:

1. preservation of balance in the use of forest, water, agriculture, and mineral resources;
2. evaluation of mineral resources with regard to their rational exploitation;
3. support of existing and future mining concessions that are economically sound, with a view to management so that significant environmental damage will be prevented;
4. promotion of efficient use of mineral resources by reduction of mineral losses during mining, processing, and marketing;
5. control of the export of minerals used for fertilizer, and inclusion of such minerals in domestic agriculture use; and
6. prevention of environmental destruction and improvement of environments degraded by mining.

*This section is derived from R. Carter, "Mining Waste Pollution Control Program" (Office of the National Environment Board Report, December, 1979).
Implicit in these statements is the concept that mineral resources should not be exploited if the extracted value is less than the value of resources destroyed during mining.

The policy intends to rely upon permit systems for control, cooperation of the Department of Mineral Resources in review of concession rights, the use of environmental impact statements, and various cooperative arrangements with mining operations and other government agencies. In addition, appointment of a review committee staff dedicated to the examination of mining activities is also being considered.

Environmental Legislation

Several acts apply directly to the management of mining activities. The Mineral Act of 1967 (B.E. 250) regulates the discharge of turbid water (Regulation 10). A later regulation (Regulation 25) requires the miner to provide flow charts of the workings and its drainage system. Various parts of the regulation also deal with internal protection from such things as poisonous materials and require a general description of the mining project, that is, mapping of the mineral vein to location of tailings, buildings, and so on.

The Mineral Act No. 2 of 1973 (B.E. 2516) provides that the Ministry of Industry shall have charge and control of the execution of the act and the power to appoint officials and issue regulations. In addition, the act creates a committee chaired by the Undersecretary of State and including the directors-general of the Irrigation Department, the Department of Mineral Resources, the Land Development Department, and the Royal Forest Department, and three other persons appointed by the minister of Industry. The committee is responsible for giving advice and recommendations to the Minister on Enforcement of the act.

Mineral Act No. 3 of 1979 (B.E. 2522) replaced Mineral Act 1 and 2 and added special environmental requirements. For example, Section 4 requires that the environmental impact of a proposed mining operation be considered. Section 13 provides the Minister with the power to set special conditions for the issuing of a permit or concession (Prathanabat). Section 14 authorizes a surface rental fee (in addition to the license fee) to be paid to the Department of Mineral Resources for use in reclaiming mined areas and for developing the local area where the mine is located.

The National Environmental Quality Act of 1975 (NEQA 1) (B.E. 2518) allows the NEB to watch over the activities of government agencies (including the Department of Mineral Resources) to insure compliance with standards for national environmental quality. The amendment to
the act—the Improvement and Conservation of National Environmental Quality Act (NEQA 2) of 1978 (B.E. 2521)—allows the Office of the National Environment Board (ONEB) to check and evaluate enforcement of environmental quality regulations as they are issued by various government agencies. In addition, the amendment makes more explicit provisions for environmental impact studies. Section 20 also provides for the issuance of prohibiting orders by the Prime Minister in the case of serious pollution violations. This power can be delegated to the changwat Governor on behalf of the Prime Minister.

**Environmental Administration**

As we have noted, the effects of pollution from mining are more widespread than the simple siltation of rivers and dikes adjacent to mining developments. At the present time, the Department of Mineral Resources and the NEB are the two government agencies most concerned with mining waste control. Policy is set by the NEB, particularly with regard to the interpretation of environmental impact statement evaluation. The board's role is limited, however, to recommending standards and making statements with regard to control effectiveness.

While the departments of Fisheries, Health, Irrigation, Forestry, Land Development, and certain state enterprises are also concerned with the effects of pollution, only the Ministry of Industry and the Office of the Prime Minister are invested with the power to enforce mining law. Apart from the multiagency committee set up by Mineral Act No. 2, no administrative system appears available to incorporate the needs of all concerned agencies.

**Problems**

Although the stated environmental policy with regard to mining seems to cover most aspects of the problem, there seem to be difficulties at the level of the law and its enforcement. In places, the law is so strict that miners must violate it simply to carry out their mining. In addition, the small amount of money charged as fines for violations make it more economical for the miners to pay the fine and to abandon the mined areas rather than reclaim them for other purposes.

The concession system managed by the Department of Mineral Resources has proved inadequate with regard to environmental factors because the department does not have the staff to administer these addi-
tional functions. No system is in operation at present that allows periodic review of miners' activities. Such a function might be carried out through the NEB system of ad hoc committees but would be in danger of replicating the interagency grouping developed by Mineral Act No. 2.

The attitude of the miners themselves, however, is undoubtedly a major part of the problem; it is unlikely that they have sufficient understanding of the environmental effects of their activities, and indeed it may be that certain aspects, such as the destruction of mining dykes during flood seasons, are considered by them a natural part of their existence. Considerable re-education of the miners is necessary therefore in the immediate future.

MARINE ENVIRONMENTAL ADMINISTRATION*

Environmental Policy

The agencies connected with administration of the marine environment can be divided quite clearly into two areas, that of marine fisheries and that of marine pollution, but their orientation tends to be national rather than international. Past policies toward marine fisheries have been based on the concept of sustained catch regardless of rate of production. At the same time, the efforts of Thai fishermen and the sophistication of their methods has increased. With time, this has caused the Thai fishing fleets to leave Thai fishing grounds and fish in waters considered international, and it has been only the consequent political action that has forced the fleets back into Thai waters. Subsequent decreases in catch per unit of effort have affected not only commercial fishermen but also those engaged in fishing for subsistence. A need exists for policy changes in the

*This section is derived from:

General remarks regarding Thai policy also reflect personal communication with Dr. Weerawat Hongsakul, chief of the Marine Fisheries Laboratory, Thailand.
area of setting marine fishery yield goals on a sustained yield basis. Such a policy would require the resetting of zonal quotas, permit procedures, regulations, and enforcement. Supporting organizations—those for fish marketing and cold storage—have been similarly oriented toward sustained catch. Their main objectives include the bringing of prosperity to the fish market, the control of market activities and services for fish trade, and the promotion of fishing cooperative societies and associations.

Legal measures to control marine pollution—such as the Act on Navigation in Siamese Waters (12) of 1979 (B.E. 2522)—are only applicable to cases of casualty or accident in Siamese navigable waters. Legislative policies of international conventions, as drafted by the Inter-Governmental Maritime Consultative Organization (IMCO) or Intergovernmental Oceanographic Commission (IOC), for example, have not yet been developed for Thailand. No organized body in the country is regularly in contact with international bodies on the subject of policy, and the country has had to rely largely on ad hoc delegations to this point. No single government agency is solely responsible for oil spill cleanups, and regulations that might develop a coordinating committee are still under examination. Thailand has yet to ratify the 1969 Civil Liability Convention, which would provide full compensation to victims of large-scale oil pollution who are not sufficiently covered by the 1969 Convention; to relieve ship owners of the added financial burdens of the 1961 treaty is also not a part of Thai policy.

In the area of general definition, however, Thailand is a member of the ASEAN Experts Group on Marine Pollution and has been involved in the preparation of the Draft ASEAN Contingency Plan for the Control and Mitigation of Marine Pollution. In this area, Thailand has provided information on potential pollution problem areas, the formation of oil spill prevention and contingency planning by the oil industry, shore reception facilities for the storage and disposal of recovered oil, and wind, current, tide, and other meteorological data. Absent from this list is the national contingency plan itself, which would set clean up policy, the resources available, and the modes of coordination among government, industry, and the reporting network.

Environmental Legislation

Fisheries

Legislation in this area is well established, the first notification coming by a Royal Decree, 22 September 1921 (B.E. 2464). This established a
Department of Aquatic Animal Conservation within the Ministry of Agriculture and related its reporting responsibilities to the Ministry of Finance. The functions of limitation and restriction of fishing areas, fishing gear, and fishing licenses and the collection of taxes and fees were removed from the Ministry of Finance and given to the Ministry of Agriculture by the Fisheries Act of 1947 (B.E. 2490), which, besides establishing a large number of new regulations, also repealed nine existing proclamations and regulations. The Fisheries Act was modified subsequently by the Act Governing the Right to Fish in Thai Fishery Waters of 1949 (B.E. 2492), and the Fisheries Act II of 1953 (B.E. 2496).

The Fish Marketing Organization was established by the Fish Marketing Act of 1953 (B.E. 2496) and was intended to provide markets for fishery merchandise, to allow the fishery industry to control and direct services and activities of the market, to promote the welfare of fishermen and their villages, and to promote fishing cooperatives.

The Cold Storage Organization was created in 1958 by the Royal Decree of Cold Storage Establishment of 1958 (B.E. 2501). Its functions were to provide cold storage services to the state and to the public, and to carry on business relating to the cold storage industry.

**Marine Pollution**

The legislation most relevant to marine pollution is the Act on Navigation in Siamese Waters (12) of 1979 (B.E. 2522), which applies to cases of marine pollution resulting from shipping accidents in Siamese navigable waters. The act provides that, where an accident to or in a ship has occurred that might endanger navigation in Siamese waters and that causes marine pollution, the official appointed by the Minister of Communications shall have the power to provide for the elimination or prevention of the said pollution. The act does not apply to accidents on the high seas, and it does not provide any appropriate procedures for the exercise of these powers.

**Environmental Administration**

With regard to fisheries, the basic elements of a production system already exist. The Ministry of Agriculture and Cooperatives, the fourth largest ministry in the Thai government, has direct control of the Department of Fisheries, the Fish Marketing Organization, and the Cold Storage Organization. The National Economic and Social Development Board (NESDB), the Ministry of Finance, and the Civil Service Commission
maintain their traditional control over national planning, budget approval, and staffing and personnel matters. The Harbor Department has jurisdiction over licensing and inspection of vessels; the Ministry of Communications regulates ship-to-ship and ship-to-shore communication; the Ministry of Industry regulates factory licensing; and the Ministry of Health has control over product standards.

In the future, the development of large-scale brackish water aquaculture in mangrove areas will imply interaction of the Royal Forestry Department and the Royal Irrigation Department, both of which are in the Ministry of Agriculture and Cooperatives. Further, the development of such infrastructures as dams, reservoirs, and irrigation systems will require consultation with the Royal Irrigation Department.

Universities have also worked closely with the government agencies in the area of fisheries production. Chulalongkorn University has at present a Department of Marine Sciences, within the Faculty of Science, and the Environmental Research Institute. Kasetsart University has a Faculty of Fisheries, which provides a number of Bachelor of Science and Master of Science graduates.

Various multinational and international organizations are involved also. Germany has assisted in establishing troll fishing; Denmark has established and is operating the Phuket Marine Biological Centre; and Canada is giving assistance in fish technology to the National Inland Fisheries Institute. The Food and Agriculture Organization (FAO), the United Nations Development Programme (UNDP), and other specialized organizations assist in regional programs, and the Southeast Asia Fisheries Development Center (SEAFDEC) is available for multinational cooperation. The Indo-Pacific Fishery Council (IPFC) and the Indian Ocean Fishery Commission (IOFC) both provide forums for policy discussions on fishery matters among member countries. Finally, the Asian Development Bank and other lending institutions provide development loans for fishery activity.

The Department of Fisheries is predominant among these organizations. The agency developed from a Fishery Revenue Division of the Ministry of Finance, which had been established in 1901. In 1921, a fishery administration staff was formed in the Ministry of Agriculture, and in 1926 this was converted by Royal Decree to a Department of Fisheries. The primary purpose of the department was to improve and maintain the management of aquatic animals and to promote the establishment of industry and its markets.

By 1975, the Department had eight divisions — a Secretariat, divisions of Finance, Fisheries Control and Conservation, Inland Fisheries, Brackish Water Fisheries, Marine Fisheries, Fish Processing Technology, and
Exploratory Fishing. These divisions are physically located in Bangkok, but a Marine Fishery Laboratory and a Fishery Technology Training Laboratory are located close to fish markets, and twenty other laboratories and stations are located throughout Thailand. The department also maintains forty-eight provincial fisheries officers spread among the seventy-two provinces of the country. Provincial fishery officers and district fishery officers are Department of Fisheries staff members responsible to the provincial governments. They enforce laws and regulations, carry out extension work, collect statistics, and perform various other activities. The department is fairly large (305 technical staff members) and quite well trained (62 at or above the master's level). A serious staff shortage exists at the administrative level, however, where a high degree of expertise is required in both the fishery development and the management areas.

The Fish Marketing Organization also is located in the Ministry of Agriculture and Cooperatives and is funded in part through that ministry. It operates somewhat as a government corporation, however, under an executive committee or board of directors, the members of which are appointed by the Council of Ministers. From an environmental point of view, the actual structure of the Fish Marketing Organization is of marginal importance. The organization does receive, however, 1 percent of gross sales at two fish markets; this money can be used for various organization activities — conceivably environmental ones.

The Cold Storage Organization also is partly funded by the Ministry of Agriculture and Cooperatives, but acts also as a semigovernment corporation under an administrative committee or board of directors, the members of which are also appointed by the Council of Ministers. The functions of the organization, established by the Council of Ministers, are primarily technological and consist of maintenance of various cold storage facilities. The organization is, however, in a position to control prices paid to primary producers and therefore has some influence over the entire system.

As we have noted, then, the elements described here are parts of a fishery production system; opportunity or motivation to develop an environmental role for the system does not seem to be great.

Within the area of oil contingency, there is no single government agency solely responsible for cleanup. Effective oil spill control requires a great deal of advanced planning, and this does not seem to have made a deep impact on the management-oriented government agencies. These questions — Which agencies should play a part in containing oil pollution? What is the responsibility of the private sector? and What is the role of the Office of the National Environment Board (NEB)? — have not yet been
addressed adequately. The NEB has asked its Legal Committee to set up a subcommittee to look at this problem and suggest recommendations. A principal outcome of this inquiry may be the establishment of a marine oil pollution control board, whose membership should include the Undersecretary of State for Communications as chairman, the Secretary-General of the NEB, the Director-General of the Department of Fisheries, the Director-General of the Harbor Department as secretary, representatives of various government agencies and oil companies, and other qualified persons. Such a board would coordinate, advise, and authorize government agencies to control oil spill testing.

**Problems**

The problem both in fisheries and in oil spill management is that their environmental impacts are far from being resolved or even considered. The administrative structure that does exist tends to be production oriented, and management appears limited primarily to achieving a sustained yield of various fish types. The manner in which this goal interacts with national development objectives is something that still requires considerable thought. With regard to personnel, there appears to be a good basis for technical management but very little available administrative skill. Interagency coordination at this stage appears to be rudimentary.

**ENVIRONMENTAL IMPACT ASSESSMENT ADMINISTRATION**

**Policy and Legislation**

Because the assessment process has grown out of legislation rather than policy, the two aspects will be treated together.

The National Environmental Quality Act of 1975 required that the National Environment Board (NEB) perform several functions, most of which were oriented toward reporting, policy development, and coordination. One of these requirements is to coordinate work of government agencies, state enterprises, and the private sector on matters concerning environmental quality. The environmental impact assessment (EIA) process was used as a means not of preventing undesirable activity but of guiding implementing agencies into more desirable directions. Certain aspects of the 1975 act resulted in legal ambiguities, and these were re-
vised eventually in the amendment of December 1978. Sections 17 and 18 of the 1978 amendment are significant:

The Prime Minister shall, with the advice of the National Environment Board, have the power to issue notification of categories and magnitude of projects or activities of government agencies, state enterprises, or private organizations which are required to submit a report concerning the study and measures for the prevention and remedy for the adverse effect on environmental quality during the preparation stage to the National Environment Board for consideration and approval before further proceedings. (Section 17)

In the case where there is a notification under Section 17, the official invested by law with the power and duty to consider and grant a permit to any person in order to enable him to carry out any project or activity shall submit a report concerning the study and measures for the prevention of and remedy of the adverse effect on the environmental quality during the preparation stage of such application to the Office of the National Environment Board for consideration and approval before further proceedings. (Section 18)

While Section 18 identifies the responsibility of submitting an assessment to the NEB as that of the agency seeking permission, it does not clearly identify who is responsible for preparing the assessment. The problem is particularly complex when projects require approval from more than one agency. Currently, the feeling is that the assessment study and report should be the responsibility of the so-called "lead agency," that is, the agency most responsible for implementation of a given project.

Thus, the purpose of the evaluation is to develop a planning tool, rather than to develop a system of licensing. The basis of the final environmental impact statement, however, is a set of "terms of reference," which derive from the initial environmental impact evaluation. Permission to proceed with a project is therefore intimately tied to careful planning and evaluation.

From an environmental point of view, this subtle distinction is important. While the environment as an issue has been a policy matter in constitutional design, the actual process of environmental planning as a part of policy has never been clear. The Fourth Plan does not recognize explicitly the NEB as a coordinating agency, and EIA is not a routine procedure within the National Economic and Social Development Board (NESDB). Such authority as exists for environmental planning comes explicitly from the Environmental Quality Acts of 1975 and 1978 and from those guidelines which the NEB produces and gains acceptance for from other agencies.
Administration

Impact evaluation procedures have been published and distributed by the NEB in the Manual of NEB Guidelines for Preparation of Environmental Impact Evaluations. The manual is actually a series of guidelines, each dealing with a particular aspect of evaluation. It includes:

1. general guidelines for the preparation of environmental impact statements;
2. supplementary EIS guidelines for specific project categories; and
3. guidelines for preparation of terms of reference for preparation of impact statements.

Although the list is to be modified periodically, projects that come under administrative examination currently include:

a. Dam and reservoir projects greater than 100 million m³ or with a surface area greater than 15 km²
b. Irrigation projects of a size greater than 80 thousand rai
c. All airports
d. All rapid transit systems and expressways
e. Hotels bordering waterfronts or national parks of a size greater than eighty rooms
f. All mechanical mining operations
g. Thermal power plants of 10 MW or larger maximum design production capacity
h. Industries of the following types:
   Size
   1) Petrol chemical—raw material requirements of 100 MT/day or greater
   2) Natural gas—all
   3) Soda ash—combined to production capacity of 100 MT/day or greater.
   4) Chloralkali—combined to production capacity of 100 MT/day or greater.
   5) Iron and steel—production capacity of 100 MT/day or greater or total capacity of furnaces 5 MT/batch or greater
   6) Cement—all
   7) Smelting—smelting capacity of 50 MT/day or greater
   8) Pulp and paper—pulp production capacity 50 MT/day or greater
   9) Oil refining—all
j. All industrial estates
While the intention here is not to dwell on all the mechanics of the assessment process, Figure 5 illustrates the general flow. The assessment process thus establishes a functional coordinating system within the government. While the process is by no means complete as yet, Table 1 shows the list of agencies which have nominated environmental officers to deal with the coordinating functions for established environmental units.

**Administrative Problems**

Problems noted by the NEB in attempting to implement this system include increased project costs, delays in project implementation, and lack of manpower and expertise for assessing the impacts. Problems of funding and delay are being attacked by integrating environmental planning with other project planning parameters at the earliest possible moment, so that cost and time requirements are built in at the beginning. The problem of technical expertise and data is being attacked by attempts to collect only that essential baseline data which are required for accurate impact projection.

Some members of the Office of the National Environment Board, however, consider the most significant problem inhibiting the success of environmental impact assessment as a planning tool that effectively transferring EIA results and recommendations to decision makers so that appropriate decisions will be made and subsequent actions taken. To this end, the office is attempting to ensure that administrators become aware of and appreciate the benefits from and necessity of environmental planning. Further, as the agency with most responsibility for most coordination, the NEB is requesting all appropriate offices to establish environmental offices or units. The office recognizes, however, that simple designation of an officer is insufficient by itself. The institutional organization of many large implementing agencies is complex. An agency has different sections for functions such as planning, budgeting, and designing, as well as divisions arranged by development project type, size, or location. The office is considering the possibility of first ensuring that the environmental officer is also a decision-making administrator, and, second, that he is the coordinator of an agency environmental committee. This committee would incorporate the various functional and subject units, and, would allow the active participation of a representative of the NEB.

The NEB takes the attitude that environmental planning, including environmental impact assessment, should be the responsibility of the primary implementing agencies, and therefore should be a decentralized
Proponent submits proposed project brief to DEIE/NEB

either

Project proponent prepares IEE and submits it to DEIE/NEB

DEIE field spot checks of implementation of environmental protection, mitigation, and enhancement measures in EIA including monitoring program

NEB evaluation of the effectiveness of the above

DEIE = Division of Environmental Impact Evaluation
IEE = Initial Environmental Evaluation

Figure 5. Sequence of action: environmental impact assessment in Thailand.
Table 1: EIS Related Agencies and Status of Environmental Units of Enterprises.

<table>
<thead>
<tr>
<th>Agency/Enterprise/Consultant</th>
<th>Status</th>
</tr>
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<tbody>
<tr>
<td>Electricity Authority of Thailand</td>
<td>In planning</td>
</tr>
<tr>
<td>Royal Irrigation Dept.</td>
<td>In planning</td>
</tr>
<tr>
<td>Ministry of Industry, Factory Works</td>
<td>Limited to pollution control</td>
</tr>
<tr>
<td>Dept. of Mineral Resources</td>
<td>Establish-limited activity</td>
</tr>
<tr>
<td>Offshore Mining Organization</td>
<td>None</td>
</tr>
<tr>
<td>Harbor Dept.</td>
<td>In planning</td>
</tr>
<tr>
<td>Dept. of Public Welfare</td>
<td>Under consideration</td>
</tr>
<tr>
<td>National Economic and Social</td>
<td>Active</td>
</tr>
<tr>
<td>Development Board</td>
<td></td>
</tr>
<tr>
<td>Ministry of Interior</td>
<td>In planning for 1980</td>
</tr>
<tr>
<td>National Energy Administration</td>
<td>Active</td>
</tr>
<tr>
<td>Petroleum Authority of Thailand</td>
<td>Status unknown</td>
</tr>
<tr>
<td>Industrial Estate Authority</td>
<td>None (environmental engineering group)</td>
</tr>
<tr>
<td>Housing Authority</td>
<td>None</td>
</tr>
<tr>
<td>Fish Marketing Organization</td>
<td>In planning</td>
</tr>
<tr>
<td>Dept. of Fisheries</td>
<td>Status unknown</td>
</tr>
<tr>
<td>Forestry Dept.</td>
<td>Project-oriented team</td>
</tr>
<tr>
<td>World Bank</td>
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</table>

function. The control of these decentralized functions should be through a mechanism, such as that of the "packaged project" and its management team, which considers the administrative and environmental implications of various development projects. A description of this "packaged project" technique is given in the section on planning.

ENVIRONMENTAL EDUCATION

Policy

Formal education in Thailand has existed from at least the Sukothai Period (1238–1378), when education was organized around the palaces and monasteries. In the Ayudhaya Period (1350–1767), education was a function of the monasteries alone and was a means of preparing children, particularly boys, for monkhood. Education did not become a governmental function until the reign of King Mongkut (Rama IV), when Western influence was advanced considerably. A Department of Education was first set up in 1887 and was raised to the status of a ministry in 1889. The first Primary Education Act was established in 1921. At
present, Thailand is under the National Scheme of Education of 1977 (B.E. 2520), which is the tenth in a series of such schemes. This scheme is the first to give emphasis to the environment and natural resources. Chapter IV, Article 52, of this act states: "The State shall provide education which will develop an awareness of the need for preserving natural resources and the national environment. Consciousness of the problem of population growth should also be promoted."

The primary aims of environmental education in Thailand are to educate the general public as well as students in both formal and nonformal systems of education. The general policy is to create a readiness among them to cooperate, participate, initiate, or advise one another and the government in solving problems of the environment, so that the integrated aim of society toward improvement of quality of life can be achieved.

Administration

The educational system is divided into four levels, each of which carries with it different administrative responsibilities:

• Preschool level
  Department of Education, Ministry of Education
  Department of Teacher Training
  Office of the Committee for Private Education
  Office of University Affairs

• Primary level
  Municipality
  Bangkok Metropolitan Authority
  Provincial Administrative Organization
  Ministry of Education
  Office of the Committee for Private Education
  Department of Teacher Training

• Higher education
  Office of University Affairs
  Asian Institute of Technology

Other types of nonformal education are also available. These can be placed in three categories:
1. Systematic. These are curricula equivalent to primary and secondary education, such as Integrated Adult Education and Fundamental Adult Education.

2. Semisystematic. These are predetermined curricula with durations ranging from 5 to 10 hours to 1 year or longer. They cannot be equated to formal education.

3. Nonsystematic. These are noncurricular activities aimed at constructing social values and providing information. They include education provided through mass media such as films, radio, television, newspapers, public library seminars, and so forth.

Agencies responsible for these various activities include:

1. Department of Education, Ministry of Education
2. Department of Vocational Education, Ministry of Education
3. Office of Accelerated Rural Development
4. Office of National Youth
5. Central Division of National Security
6. Department of Labor, Ministry of Interior
7. Department of Rural Development, Ministry of Interior
8. Department of Public Welfare, Ministry of Interior

Education in environmental issues started comparatively slowly after the Environmental Act of 1975 and has represented the cooperative effort of several government agencies, particularly the National Environment Board (NEB), the Ministry of Education, and several universities. In accordance with the 1977 educational scheme, the Ministry of Education has revised the curricula of primary and secondary education under their jurisdiction. Environmental education has been included at various levels, including electives on “conservation of natural resources and the environment” and programs aimed at creating awareness of population and environmental problems, for example, “Our Country,” “Population Study,” and “Introduction to Geography.” Adult education courses also focus on health, environmental sanitation, and social sciences, particularly in the areas of cooperation, community development, and conservation of natural resources, such as streams and forests.

Within higher education, a certain amount of what we might call environmental education had already been occurring in the fields of sanitary engineering and municipal engineering, as well as in such areas as botany and zoology in the faculty of science. The Faculty of Engineering at Chulalongkorn University has offered programs in the study of Sanitary Engineering at the bachelor degree level for more than twenty years, while
ecology has been taught in the Faculty of Science in the same university for a longer period. It has been only since the mid-1970s, however, that environment as a comprehensive subject has been taught. Ecological issues have been added to the contents of certain basic college requirement courses, such as Introductory Sociology, Economics, and Biology. Many courses have been revised for the more comprehensive approach; the Sanitary Engineering Program, for instance, has been expanded to cover industrial pollution control, environmental planning and management, air pollution, and environmental impact assessment. Environmental engineering is now offered at such universities as King Mongkut Institute of Technology, Khon Kaen University, Prince of Songkhla University, and, in the near future, Chiangmai University.

At higher degree levels, programs in environmental science are offered at the Faculty of Science, Chulalongkorn University, and at the Department of Conservation, Faculty of Forestry, and Graduate School, Kasetsart University. Other master's degree programs are available at the Technology of Environmental Management Program, Faculty of Environment and Resource Study, Mahidol University, and at Environmental Engineering and Environmental Technology at the Asian Institute of Technology (AIT). The program at AIT differs from the others in also offering doctoral degrees.

Social sciences and humanities program designers have been concerned with adding environment to their existing subjects, or with adding new courses dealing with environment to their programs. At Ramkamhaeng University, the Department of Sociology and Anthropology has introduced a course entitled “Human Ecology,” while in the Faculty of Management Science at Prince of Songkhla University “Introduction to Environmental Science” is a general requirement for undergraduates. At Khon Kaen University, the Faculty of Education has introduced two courses on environment for environmental science teachers.

A preliminary survey of environmental education shows courses related to environment in other academic departments. These include:

1. Department of Preventive and Social Medicine, Faculty of Medicine, Chiangmai University
2. Department of Geography, Faculty of Social Sciences, Chiangmai University
3. Faculty of Tropical Medicine, Mahidol University
4. Faculty of Medicine, Khon Kaen University
5. Faculty of Natural Resources, Prince of Songkhla University
6. Department of Landscaping and Environmental Conservation, Faculty of Agricultural Production, Maejo Institute of Agricultural Technology, Chiangmai
In addition, the Institute of Environmental Research collaborates with the institute of General Studies at Chulalongkorn University in conducting courses on environment for undergraduates in the social sciences and humanities.

Within the field of administration, only one specific course appears to exist. This occurs within the first year of the Mahidol University master's program and is entitled “Administrative Systems for the Environment.” The course dwells on the inadequacy of existing laws and regulations concerning resources and the environment, the impotence of existing agencies due to overlapping and conflicting interests, the problem of ill-defined authority, pressure from business and industry, and the lack of money and manpower.18

ENVIRONMENTAL RESEARCH

Policy

Besides the various constitutional articles supporting the preservation of the environment, others exist for the specific topic of research. Article 61 of the 1968 Constitution (B.E. 2511) states: “The State shall support research in arts and science.” Article 74 (B.E. 2517) of the 1974 Constitution states: “The State shall support research in arts and science and utilize science and technology in national development.” Article 61 of the 1978 (B.E. 2521) Constitution states: “The State shall support research in arts and science and promote the use of research in national development.”

Under the National Scheme of Education of 1977 (B.E. 2520), Article 47, research in education and the importance of research are stated clearly for the first time: “Research and production of texts and other teaching materials shall be supported, especially in institutions of higher learning, with the view to accelerating the advancement of knowledge and professional development”.

In the third and fourth National Educational Development Plans, (1962 – 1966) and (1967 – 1971), policies are oriented toward: (1) the promotion of education and research in science and technology; and (2) the promotion of activities concerning education, research, writing of texts, academic services to the society, and the conservation of art and cultures.
Administration

The Office of the National Research Council (NRC), established in 1959, is vested with the responsibility of advising the cabinet on national policy and research projects, and of promoting and supporting research work of government departments, organizations, and individuals. The office is also responsible for setting up research budgeting and for granting research funds as well as coordinating research within and outside the country.

The office has recently been transferred to the new Ministry of Science, Technology, and Energy and has assumed the status of a department with it. The NRC has the following research policy:

1. Research must be implemented to promote the welfare, capability, and well-being of the people.
2. Research must be conducted to solve economic, cultural, and environmental problems in order to maintain national integrity and culture.
3. Research must enhance technical knowledge which may lead to the development and evolution of science and technology.

The Office of the NRC is divided into an Office of the Secretary and six divisions, namely, Projects and Research Coordination, Research Registration, Policy and Planning, Document Services and Library, Translation and Foreign Affairs, and Division of Research Promotion.

All divisions come under the Secretary-General of the NRC who also acts as chief administrator. The technical work of the NRC is carried out by several research committees and subcommittees. There are ten branches of research.

1. Physical Sciences and Mathematics
2. Medical Science
3. Chemical and Pharmaceutical Science
4. Agriculture and Biology
5. Engineering and Industrial Research
6. Philosophy
7. Law
8. Political Science and Public Administration
9. Economics
10. Sociology

It is of particular interest to students of public administration that
research activities concerned with environment are actually under the Engineering and Industrial Research Committee. This committee has a policy that encourages research that reinforces the ability of the Thai people in the development of agricultural engineering, industry, and other infrastructure provisions, such as irrigation, transportation, and various forms of energy, with consideration of their effects on the environment. The five-year plan is taken into account through priorities on:

1. the economic use of energy;
2. the utilization of natural fuels;
3. the study and solution of environmental problems;
4. research and promotion of local raw materials for use in industry;
5. drainage of rainwater and sewage; and
6. the solution of traffic problems.

Other research is carried out through university research organizations, and this can occur in several forms. Individual researchers may pursue areas of their own interest, or groups from the same faculty or discipline may get together for research of mutual interest, or their research may be tied to some graduate study. Some universities attempt to centralize all research activities and put them under the responsibility of a research director. Others formally establish research institutes or research centers so that they assume the status of a faculty and have their own staff, budget, and some support facilities. Such organizations include:

Chulalongkorn University
   Institute of Population Studies; Institute of Health Research;
   Institute of Social Research; Institute of Environmental Research
Mahidol University
   Institute for Population and Social Research
Thammasat University
   Center for Thai Studies
Kasetsart University
   Institute of Food Research and Production
   National Corn and Sorghum Research Development Center
Chiangmai University
   Faculty of Medicine; Anemia and Malnutrition Research Center
Sri Nakharinwirot University
   Institute of Research in Behavioral Sciences
   Educational and Psychological Test Bureau
Research may also be carried out in-house by government agencies. In the area of education, departments in the Ministry of Education, the local administration department in the Ministry of Interior, the Office of University Affairs, and the Office of the National Education Commission perform a large share of research. In science and engineering, some research work is carried out by the Scientific and Technological Research Institute; the National Energy Authority within the Ministry of Science, Technology, and Energy; the Electricity Generating Authority of Thailand, and others.

The long-range plan of the Office of the NEB is to encourage the establishment of environmental research institutes at key universities in three regions—Prince of Songkhla in the south, Khon Kaen in the northeast, and Chiangmai in the north. In addition to the regional institutes, the office is building its own central laboratory at Bangkok, which is expected to work closely with the Scientific and Technological Research Institute of Thailand and the complex of universities and other research agencies.

Thailand invests approximately 3 to 5 percent of its gross domestic product in education. This percentage places it in the same group as Japan, Korea, Malaysia, Singapore, and Sri Lanka. This also means, however, that Thailand's investment in education is relatively low compared to neighboring countries (eg, Malaysia and Singapore) since their gross domestic products are much higher. It is difficult to estimate the actual amount of money spent on environment-related research activity, since certain development projects having nothing to do with research can be categorized as such because of budgetary procedures. In the area of government agencies, however, we can roughly estimate sectoral allocations for research as follows (as of 1976):

<table>
<thead>
<tr>
<th>Percent</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>30.8</td>
</tr>
<tr>
<td>Transportation</td>
<td>0.7</td>
</tr>
<tr>
<td>Fuels and Energy</td>
<td>0.6</td>
</tr>
<tr>
<td>Industry and Mining</td>
<td>0.8</td>
</tr>
<tr>
<td>Education</td>
<td>27.0</td>
</tr>
<tr>
<td>Public Health</td>
<td>6.1</td>
</tr>
<tr>
<td>Community Services</td>
<td>34.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Some special projects are funded also through the NRC, the NEB, and the Energy Authority. This money represents about half the agency allocation (214 million baht [approximately US$ 10.7 million] as compared to
524 million baht [approximately US$ 26.2 million]. The allocation among these three agencies (as of 1976) is approximately:

<table>
<thead>
<tr>
<th>Percent</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Office of the National Research Council</td>
<td>27</td>
</tr>
<tr>
<td>Office of the National Environment Board</td>
<td>12</td>
</tr>
<tr>
<td>National Energy Authority</td>
<td>61</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
</tr>
</tbody>
</table>

Among the universities, allocations according to sectors are roughly as follows (1976):

<table>
<thead>
<tr>
<th>Percent</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture and Biology</td>
<td>39.2</td>
</tr>
<tr>
<td>Energy and Industry</td>
<td>28.0</td>
</tr>
<tr>
<td>Economics</td>
<td>8.2</td>
</tr>
<tr>
<td>Sociology</td>
<td>6.8</td>
</tr>
<tr>
<td>Political Science and Administration</td>
<td>4.6</td>
</tr>
<tr>
<td>Medical Science</td>
<td>4.2</td>
</tr>
<tr>
<td>Physical Science and Mathematics</td>
<td>4.1</td>
</tr>
<tr>
<td>Philosophy</td>
<td>2.7</td>
</tr>
<tr>
<td>Chemistry</td>
<td>1.7</td>
</tr>
<tr>
<td>Law</td>
<td>0.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The total amount represents approximately 1.8 percent of the total budget for 1976. The actual per capita amount for research is not large. The graduate school of Chulalongkorn University, for example, receives approximately 100 baht (US$5) per student for research. Other sources of funding are available, such as the NRC and the University Development Program. Various private sector institutions, such as the Thai Farmers' Bank, also provide subsidies. Nevertheless, a considerable proportion of research must be funded through tuition fees.

**Research to Date**

Research in Thailand appears to have a complementary flavor to it. The majority of faculty research is conducted in the fields of medicine, social sciences, and agriculture, respectively, with research in the field of engineering and fine arts ranking among the lowest. On the other
hand, government agencies support engineering studies to a much greater degree.

The NEB has supported several projects of national importance, such as the investigation of land subsidence problems in the greater Bangkok area, the ecology of the Songkhla Lake basin, the pollution problems of the inner gulf zone, potential problems of the Pattaya Beach Resort, and many others. The office has also documented the environmental impact of various water resources projects and initiated an environmental impact procedure as a primary research approach in the review, planning, and approval of national development projects.

The Electricity Generating Authority of Thailand, besides conducting in-house research projects, has also contracted out various others, such as the economy of artificial rainmaking, the impact of coal used as a fuel for thermal power plants, and environmental impact assessments of several multipurpose dam/reservoir projects.

The Asian Institute of Technology also has conducted a number of research projects in connection with its environmental engineering programming. Studies have included the relation of air lead levels to blood levels and associated health effects. Air quality monitoring and research have also been conducted by the Bangkok Metropolitan Authority and the Department of Health, Ministry of Health. The latter department has also conducted water quality surveys on several bodies of water in Thailand, as has the Ministry of Industry through its Department of Industrial Works and Mineral Resources. The Scientific and Technological Research Institute also has conducted several projects concerning water management.

**Administrative Problems**

The basic problem with environmental research and education appears to be that, while there are many institutions, agencies, and universities interested in problems of the environment, adequate coordination is lacking. Much research is done independently and with a lack either of communication or the integration of results. Resources are insufficiently pooled and experiences inadequately shared. In this respect, while it has been suggested that the office of the NEB could act as a national focal point for an environmental education and research network, this is unlikely. As noted earlier, the post of director for research coordination was not accepted in the initial organizational plan of the board, and, given the new relationships that exist between the Ministry of Education and the NRC not to mention the Ministry of Science, Technology, and Energy at
large, it is unlikely that this responsibility will be handed over to the board. Nevertheless, the problem needs to be discussed, and some coordination can be developed through the national education development plans.

**PROBLEMS IN ENVIRONMENTAL ADMINISTRATION**

Assessment of the problems inherent in any administrative system is heavily dependent on the experience that individuals have in trying to implement the system. During the Regional Conference on Environmental Administration, the results of which are documented in this report, an attempt was made to obtain a preliminary estimate of the problems from the participants, on the grounds that they were likely to be the people most concerned with the arrangements as they stand presently. The list compiled follows.

1. Difficulties in coordination among agencies
2. Absence of a clear pattern or map of authority
3. A national plan which follows rather than leads the environmental effort
4. Problems in communication related to types of information and the channels they should follow
5. Problems with public participation
6. Conflicts of priorities among agencies and difficulties in resolving this conflict
7. Lack of a scientific basis for environmental administration
8. Personnel problems involving scientific and management backgrounds
9. Lack of adequate technology exchange and transfer
10. Problems in predicting future environmental scenarios
11. Problems in evaluating present environmental procedures

While emphasizing the fact that solutions to these various problems must be essentially "Thai," participants welcomed the assistance of outside agencies, such as the Environment and Policy Institute of the East-West Center, in helping them come to a better understanding of the factors involved.

In discussing specific administrative functions, the following comments were made:

- With regard to policy, there was a need for more explicit comment, starting from the level of the national plan. There was a need for a
strengthening of the environmental component in the plan, particularly with a view to improving integration of programs across sectoral lines.

- With regard to organization, there was considerable interest in finding out the implications of the move of the National Environment Board (NEB) from the Office of the Prime Minister to the Ministry of Science, Technology, and Energy. The move has generated thoughts about reorganization within the agency and also about a need for decentralization to the regional levels.

- With regard to decision making in general, it was felt that the process of group decision making was occurring gradually and presented no great problems at the time.

- With regard to staffing, there was, as one might expect, a need for more people trained in environmental administration and management.

- With regard to coordination, it was accepted that this was an extremely difficult situation, and that coordination, particularly at the implementation levels, was not good. There was a need to set up environmental units in the various natural resource agencies and to involve them in an integrated environmental system.

- With regard to reporting, it was felt this was basically routine (for example, production of "the state of environment" report), but that better reporting to the public was required, and internal reporting needed to be developed.

- With regard to budgeting, there was a critical need for influence of the environmental agencies at the national budgeting level and also for a greater input from the NEB in the development of research.

- With regard to authority, it was recognized that there was a need for greater support of the enforcing agencies, since enforcement remained a weakness in the entire system.

Besides an examination of specific problems and administrative functions, the participants of the conference also examined the situation from the point of view of an agency that attempts to implement projects under an ideal management system. Major development projects were divided in the following way:

1. Preplanning
2. Planning
3. Construction, Operation, and Maintenance
Preplanning

A consensus existed in the group that the national development plan often states objectives, and thus the means to achieve such objectives, in an extremely vague way. Much of the necessary development plans are left for the implementing agencies to design, and, consequently, it is not uncommon that inconsistencies arise. More often than not, each implementing agency, in trying to achieve recognition for its successful performance, finds itself pushing its own part of a project to the fullest limit of its physical and budgetary constraints. Thus, unbalanced growth of the various development activities in the sectors has resulted.

To make matters worse, these vague objectives have not been made explicitly clear in terms of their direction and relative magnitude. Implementing agencies often have to use their own judgment for the sake of getting something done, and have to hope that what they achieve will not contradict the national objective, whatever that might be. It was agreed therefore that there is clearly a lack of comprehensive regional plans that spell out in fuller detail the main objectives most suitable for each region and how such objectives might contribute to the success of those of the nation. It was agreed also that better information dissemination is needed so that the plans are known and understood by the implementing agencies.

The second issue identified was the unclear line of authority in environmental administration. For instance, the jurisdictional extent of environmental impact assessment and its approval is in question. Agencies have been known to submit proposals for environmental appraisal and to interpret approval of that appraisal as an approval of the whole project. Unfortunate consequences result with regard to other agencies that may have their own appraisal procedures. There exists a natural tendency to believe that the environmental impact appraisal procedure is overstepping its authority and interfering with the enforcement policies of other departments or their regulations.

In questions of jurisdiction, which have occurred between the Ministry of Industry and the NEB in the area of industrial enterprises, there is a need to clearly delineate, perhaps by size, the types of enterprises that each agency may administer in terms of monitoring and standard setting.

The third major issue is the lack of personnel capable of handling the job within the implementing agencies. Often, such tasks fall to persons with less than adequate knowledge, commonly regular permanent staff who have been seconded to the tasks without prior training. It was agreed that there was a strong need for external consulting and advice.
Planning

At the project planning stage, concern is evident about whether individual plans contradict the objectives specified in the national plan. The consensus was that as long as the development project is being carried out by a government agency, such contradictions need not exist. When projects with environmental consequences are initiated by the private sector (such as in the case of mineral extraction and industrial activities), however, contradictions may result due to a basic conflict of interest.

Construction, Operation, and Maintenance

These stages were discussed together in the context of project monitoring. Once again, the consensus was that cooperation, in principle, among government agencies has not been a problem, since the ultimate objective of keeping at a minimum harmful effects on environmental quality is a goal common to all agencies. Consequently, close monitoring (e.g., by the Electricity Generating Authority of Thailand of a forest clearing activity by the Forestry Industrial Organization before dam construction) has not been necessary.

On the question of operation and maintenance monitoring, discussion centered on the effectiveness of the Ministry of Industry in implementing and/or enforcing effluent standards on industrial factories. Reportedly, policing of industrial producers has been somewhat successful. Problems of environmental degradation have arisen in this respect from the inappropriate disposal by the consumers of various used products. A suggestion was made that certain nonformal educational programs on "appropriate" disposal of used products (for example, plastic sheeting) should be initiated and offered regularly to the public.

Overriding specific discussions was a concern about loss of control over activities previously under an agency's jurisdiction.

Although the NEB was established in 1975, it was not until 1978, when the amendment to the National Environmental Quality Act was passed, that it was given the authority to scrutinize all projects having possible effects on the environment. As a practical matter, it is unlikely the NEB will exercise in full the authority given to it. Various implementing agencies, however, are uncomfortable with the implications of the act. The atmosphere in these discussions reflected clearly a basic problem in environmental administration in Thailand—that is, the lack of practical coordination and cooperation among the agencies involved. The development of a comprehensive management system, therefore, could be one of
the most difficult steps in the future of Thailand's environmental administration.

Conceptual Basis

Comparison of this conference with others that have been carried out on a similar basis yields some interesting results. In the area of environmental problems, the following issues appear consistently:

1. increasing demands for development by a growing population;
2. comparatively low per capita income;
3. competing demands for resources which the resource base is unable to fill;
4. exhaustion of resources; and
5. pollution of resources.

In tackling these issues, the common administrative obstacles have been:

1. lack of clear central policy;
2. lack of coordination and cooperation;
3. lack of comprehensive planning;
4. lack of clear maps of authority and responsibility;
5. conflicting agency priorities or noninvolvement of agencies affected by other agency's decisions;
6. poor information systems; and
7. insufficient public participation.

Some of the common administrative characteristics have been (1) groups of organizations whose activities affect one another; (2) because these organizations have different values and priorities, their activities occur under conditions of partial conflict; and (3) these activities occur under conditions of a poorly defined or weak authority structure.

The major administrative problem, therefore, becomes one of finding procedures that ensure the individual organization's retention of autonomy in sectoral production areas, while at the same time permitting united effort in areas requiring comprehensive or multisectoral management.

The theoretical studies made of these problems can be divided roughly into three areas.
**Development Administration**

Under the general term of integrated management, such programs as rural, agricultural, and watershed development are viewed as projects in which the performance of implementing agencies must be coordinated by various planning procedures. This approach is common in development planning documents, national plans, and various project documents of aid organizations. Basically, the procedure defines various project stages in a cycle, ranging from project identification through project formulation, design appraisal, implementation, completion, and evaluation. The preoccupation of the development administrator is to ensure that all affected agencies are involved at every stage of the project cycle. 

**Interorganizational Analysis**

Using the model of a political economy, and taking the organization as a unit of analysis, administrative networks are viewed in terms of their exchanges of resources (funding, personnel, etc.) for power or their penetration of neighboring jurisdictions. The networks are considered to exist in some larger environment, which may be political, social, or even "environmental" itself. The existence of conflict in the network is a given. The network relies for its effectiveness on agreement by all agencies over jurisdiction and on appropriate approaches to common tasks, evaluation of agencies regarding the quality of each others' work, and coordination occurring in activities and programs. Strategies for change include cooperation through agreement and joint planning, disruption by threatening resource generating capacities, manipulation of money and power sources, and authoritative action by agencies existing outside the network and controlling resources. Various administrative sciences and sociological works on network analysis, organizational interdependence, and organizational environments have dealt with the subject.

**Organization Systems Analysis**

Within the field of large-scale or multisectoral administrative systems analysis, networks are considered as a rational system of information flows, decision points, and feedback/evaluation loops. Political factors are minimized or considered separately so that problems, such as changes introduced into existing organizational systems, are attacked outside the actual analysis. The technique has become familiar to us through Planning and Programming Budget Systems, PERT, and Management Information Systems (MIS).
As one would expect, the use of these three concepts has varied depending on what part of the environment one is attacking. Thus, environmental administrative analysis in project development has occurred at the level of the environmental impact assessment; the Thai package-planning technique described in the foregoing pages is a typical example of this method. In the area of interorganizational analysis, emphasis has been placed on the use of the method in welfare and social service delivery systems. Finally, the use of systems analysis has been noticeable mainly in the areas of health administration and in various human settlements documents.

In each case, the specialized approach has resulted in a less than comprehensive conceptual model for administrative analysis. By its very nature, project development administration has some difficulty coping with routine and non-project-oriented administration. Interorganizational analysis is, at least so far, able to produce a stimulating set of variables useful for basic analysis but has been unable to apply these in a meaningful way. Although it need not necessarily be the case, systems analysis has tended to rely on rationality and computerization at the expense of equally important behavioral concerns. While it well may be true that no one model will ever provide a satisfactory synthesis, the development of environmental administration as a discipline is highly dependent on our future ability to produce linkages among these different areas.
## APPENDIX

**Topics Presented at the Regional Conference on Environmental Administration, 3 – 9 February 1980**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Presenter(s)</th>
</tr>
</thead>
</table>
| Welcome Address                                            | Narong Tienman, Superintendent Engineer  
|                                                            | Bhumibol Dam  
|                                                            | Electricity Generating Authority of Thailand                             |
| Welcome Message                                            | Kasem Suwannakul, Rector  
|                                                            | Chulalongkorn University                                                          |
| Conference Report                                         | Kasem Snidwongs, Secretary-General  
|                                                            | Office of the National Environment Board                                      |
| Opening Address                                            | Choop Karnjanaparakorn  
|                                                            | Ministry of Science, Technology, and Energy                                   |
| Environmental Administration: Some General Concepts         | Chalermrath Khambanonda, Fellow  
|                                                            | Environment and Policy Institute  
|                                                            | East-West Center                                                             |
| Factors in the Development of Environmental Administrations | Roy Stubbs, Research Associate  
|                                                            | Environment and Policy Institute  
|                                                            | East-West Center                                                             |
| The Role of Environment in National Planning in Thailand    | Kasem Snidwongs, Secretary-General  
|                                                            | Pakit Kirabanich, Deputy Secretary  
|                                                            | Office of the National Environment Board                                      |
| Administrative Implications of Environmental Legislation and Enforcement | Amorn Chandara-Somboon, Secretary-General  
<p>|                                                            | The Juridical Council of Thailand |</p>
<table>
<thead>
<tr>
<th>Title</th>
<th>Author and Affiliation</th>
</tr>
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<tbody>
<tr>
<td>Administrative Policy for Conservation — A Case Study in Thailand</td>
<td>Nid Hin-Cheeranan, Director-General Department of Town and Country Planning Ministry of Interior</td>
</tr>
<tr>
<td>The Administration of Forest Protection and Conservation in Thailand</td>
<td>Phairot Suvanakorn, Director Wildlife Conservation Division Royal Forest Department Ministry of Agriculture and Cooperatives</td>
</tr>
<tr>
<td>Administration and Control of Environmental Pollution in Thailand</td>
<td>Bisith Noiphan, Deputy General Department of Industrial Works Ministry of Industry</td>
</tr>
<tr>
<td>The Problem of Environmental Health Administration in Thailand</td>
<td>Praporn Charuchandr, Director Environmental Health Division Department of Health Ministry of Public Health</td>
</tr>
<tr>
<td>Environmental Impact Assessment for Environmental Management</td>
<td>James Warren Evans, Expert Advisor The Office of the National Environment Board</td>
</tr>
<tr>
<td>Environmental Management of Water Resource Development Projects</td>
<td>Prasit Niratsayakul, Chief, Environmental Division Public Communication Office Electricity Generating Authority of Thailand</td>
</tr>
<tr>
<td>Problems of Environmental Administration in the Bangkok Metropolis</td>
<td>Saridwongsa Wongsathuaythong, Senator Deputy Governor of Medical Services Bangkok Metropolitan Administration</td>
</tr>
<tr>
<td>The Administration of Environmental Education and Research in Thailand</td>
<td>Surin Setamanit, Director Chaiyudh Khantaprab, Deputy Director The Institute of Environmental Research Chulalongkorn University</td>
</tr>
</tbody>
</table>
Environmental Administration in China

Chen, Jia-He
Environmental Protection Office
State Council
China

Comments on Environmental Administration in the United States

Arthur Atkisson
Department of Public and Environmental Administration
University of Wisconsin
Green Bay, Wisconsin, U.S.A.
NOTES


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Niyonkha, P., and Wongham Chao, W.

Pescod, M., et al.

Piamphongsant, S.

Rodgers, J.
Rondinelli, D.

Schaeffer, M.

Suwarnarat, K.

Swain, H., and MacKinnon, R., eds.

Thailand


**Constitutions**


**National Economic and Social Development Plans** (5-year plans)


**Legislation**

1979 Mineral Act No. 3 (B.E. 2522)
1979 Act on Navigation in Siamese Waters, 12 (B.E. 2522)
1978 National Environmental Quality Act (NEQA 2) (B.E. 2521)
1977 National Scheme of Education (B.E. 2520)
1975 Royal Project of Watershed Development (B.E. 2518)
Civil Service Act (B.E. 2518)
Bangkok City Planning Act (B.E. 2518)
National Environmental Quality Act (NEQA 1) (B.E. 2518)
Administrative Act (B.E. 2518)
1973 Minerals Act No. 2 (B.E. 2516)
1972 Labor Act (Announcement of the Revolutionary Party No. 103) (B.E. 2515)
1967 Minerals Act (B.E. 2510)
1964 National Reserve Forest Act (B.E. 2507)
1961 National Parks Act (B.E. 2504)
1960 Act for Cleanliness and Orderliness of the Country (B.E. 2503)
Wildlife Preservation and Protection Act (B.E. 2503)
1958 Royal Decree for Cold Storage Establishment (B.E. 2501)
1953 Fish Marketing Act (B.E. 2496)
Fisheries Act II (B.E. 2496)
1947 Fisheries Act (B.E. 2490)
1943 Act for the Control of Human Excreta for Fertilizer (B.E. 2486)
1941 Public Health Act (B.E. 2484)
Forest Act (B.E. 2484)
1939 Act Governing the Right to Fish in Thai Fishing Waters (B.E. 2492)
1938 Act for the Control of Cemeteries and Crematories (B.E. 2481)
1936 Control of Construction of Buildings Act (B.E. 2479)
1921 Royal Decree (Sept. 22) (B.E. 2464)
1908 Penal Code (B.E. 2451)
1897 Forest Protection Act (B.E. 2440)

United Nations

United States, Department of Health, Education, and Welfare.

Virasai, B.
East-West Environment and Policy Research Reports contain Institute or cooperative research results that reflect the EAPI concept and approach to natural systems assessment for development, human interactions with tropical ecosystems, environmental dimensions of energy policies, and marine environment and extended maritime jurisdictions.

Manuscripts for this series are reviewed for substance and content by referees outside the Institute before the EAPI Academic Publications Committee makes a recommendation to publish.

Richard A. Carpenter, Chairman
EAPI Academic Publications Committee
Sheryl R. Bryson, EAPI Publications Officer
ecology has been taught in the Faculty of Science in the same university for a longer period. It has been only since the mid-1970s, however, that environment as a comprehensive subject has been taught. Ecological issues have been added to the contents of certain basic college requirement courses, such as Introductory Sociology, Economics, and Biology. Many courses have been revised for the more comprehensive approach; the Sanitary Engineering Program, for instance, has been expanded to cover industrial pollution control, environmental planning and management, air pollution, and environmental impact assessment. Environmental engineering is now offered at such universities as King Mongkut Institute of Technology, Khon Kaen University, Prince of Songkhla University, and, in the near future, Chiangmai University.

At higher degree levels, programs in environmental science are offered at the Faculty of Science, Chulalongkorn University, and at the Department of Conservation, Faculty of Forestry, and Graduate School, Kasetsart University. Other master's degree programs are available at the Technology of Environmental Management Program, Faculty of Environment and Resource Study, Mahidol University, and at Environmental Engineering and Environmental Technology at the Asian Institute of Technology (AIT). The program at AIT differs from the others in also offering doctoral degrees.

Social sciences and humanities program designers have been concerned with adding environment to their existing subjects, or with adding new courses dealing with environment to their programs. At Ramkhamhaeng University, the Department of Sociology and Anthropology has introduced a course entitled "Human Ecology," while in the Faculty of Management Science at Prince of Songkhla University "Introduction to Environmental Science" is a general requirement for undergraduates. At Khon Kaen University, the Faculty of Education has introduced two courses on environment for environmental science teachers.

A preliminary survey of environmental education shows courses related to environment in other academic departments. These include:

1. Department of Preventive and Social Medicine, Faculty of Medicine, Chiangmai University
2. Department of Geography, Faculty of Social Sciences, Chiangmai University
3. Faculty of Tropical Medicine, Mahidol University
4. Faculty of Medicine, Khon Kaen University
5. Faculty of Natural Resources, Prince of Songkhla University
6. Department of Landscaping and Environmental Conservation, Faculty of Agricultural Production, Maejo Institute of Agricultural Technology, Chiangmai.