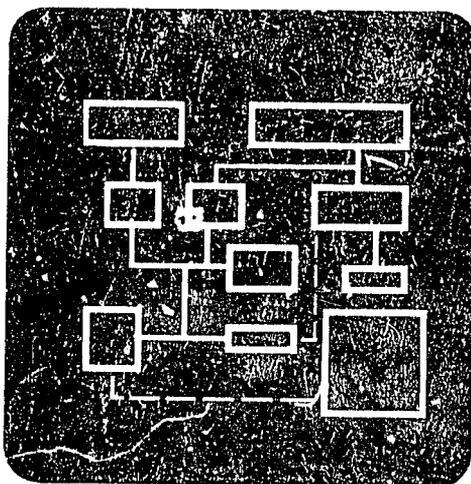


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# Holistic Nature and Fragmented Bureaucracies: A Study of Government Organization for Natural Systems Management

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Report of a Seminar\*  
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\*Based on discussions and conclusions of a seminar on Alternative Organizations for Managing Natural Systems, held in June–August, 1983, at the East-West Environment and Policy Institute of the East-West Center.

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## FOREWORD

The Environment and Policy Institute (EAPI) of the East-West Center was established in October 1977 to conduct research and education programs through multinational collaboration on the environmental aspects of policy and decision making in the Asia-Pacific region. The program of the Institute emphasizes (1) analysis of various policies to illuminate their dependence and impacts on natural systems and thus on the objectives of the policies, and (2) assessment of scientific and technical information about natural systems for more coherent policy formulation and implementation through planning and management. This systematic approach avoids the polarization of environmental values versus sectoral goals.

The EAPI Program Area on Natural Systems Assessment for Development has involved several hundred scientists, development agency officials, and government bureaucrats in program activities. Most of these collaborative efforts have been aimed at developing better methods for environmental assessment in developing countries and economic valuation techniques for nonmarket aspects of natural resource use and environmental quality.

The topic of governmental organization has been raised frequently in program area work, suggesting that efforts to ensure the sustainable exploitation of natural systems are suffering from government disorganization and mismanagement. The summer seminar upon which this Workshop Report is based was an effort to gather helpful information about the performance of existing government organizational arrangements in representative countries, to analyze why some organizational arrangements work and others do not, and to prepare guidelines for the design of more effective organizational arrangements for coordination, integration, and conflict resolution.

This report presents the findings of the summer seminar and some suggestions for additional work. While useful insights have been obtained, many more data and many more experienced observers need to be involved. It is hoped that there will continue to be an exchange of ideas on this issue as a result of this report. Through activities such as these, we strive to contribute to a creative resolution of issues that are vital to the national and international interests of countries in the Asia-Pacific region.

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## EXECUTIVE SUMMARY AND CONCLUSIONS

The environmental awakening of the 1970s has resulted in a significant increase in the number of laws and institutions directed at managing natural systems for sustainable uses. In spite of (and in some cases because of) those increases, there remains a substantial gap between the formal intent of such laws and their actual effect on natural systems. As the number of organizations involved with specific natural resource management tasks increases, coordination of efforts becomes more difficult and more important.

These implementation gaps can be accounted for, in part, by a lack of knowledge, political will, and resources; however, a significant part of the problem is due to the inadequacy of organizational structures and administrative processes in the management of natural systems.

A fundamental dilemma in managing natural systems is that, although nature is whole, the management of human activities affecting nature is organizationally fragmented, piecemeal, and uncoordinated. While knowledge about the dynamics of natural systems and the effects of human activities on those systems is increasing rapidly, much less is known about how best to coordinate natural systems management activities.

The major organizational problems are fragmentation: difficulties in coordinating agency management activities and conflicts among policies, resource uses, and agency jurisdictions.

No country in the study dealt with the problem of fragmentation by means of major governmental reorganization. Rather most of the countries established a central environmental unit at a subministerial level. Some countries

have also established environmental units in mission agencies.

Central environmental units in all countries in the study react to resource use proposals affecting natural systems from other agencies and nongovernmental organizations (NGOs). None have major planning or coordinative responsibilities in the design or planning of major economic development activities with natural systems management implications.

Coordination involves both communication and conflict resolution. Increasing communication has involved the use of mandated reviews (e.g., environmental impact assessments [EIAs]) and permanent and *ad hoc* coordinative committees for information sharing and mechanisms such as press releases for communicating commands and mandates to subordinate agencies and levels of government.

As the emphasis on environmental management increases and management agencies proliferate, policy conflicts, resource use conflicts, and jurisdictional conflicts become more apparent. A variety of mechanisms have been employed to cope with such conflicts.

This study is necessarily a partial snapshot of a large dynamic enterprise (i.e., development based on renewable natural resources). Some trends are worth noting.

Central environmental units were initially symbolic and still perform as tangible points of liaison and rallying for environmental interests. Many are quite recent in terms of statutory base and specific mission. They are working to be upgraded in the government hierarchy and in resources for their operations. When they have the role of advocating environmental protection, they create con-

flicts that must be settled at a higher level of government. Their participation in high level planning councils is only beginning to be accepted, if at all. They seem to be losing momentum but deserve support.

The world recession has affected the implementation of sustainable use policies. Developing countries, viewing the apparent turnabout of environmental protection effort in the United States (which incidentally was more of a rejection of overregulation), have questioned any diversion of their own economic growth for the sake of conservation. At Stockholm, the developing countries (e.g., the group of 77) were skeptical about environmental concerns. Now they recognize sustainable use as essential but see industrial countries hedging on commitments.

Sustainable use concepts and EIAs are not well understood by old-line agencies. Person-

nel trained in ecosystems management are in short supply. Awareness by top officials of sustainable use development must now be matched by practical means of continuing growth without unacceptable damage. Environmental units within mission agencies are being established to respond to demands for EIAs, but they may also improve agency plans, which would be a more direct contribution to successful sustainable use.

Rapid industrialization, rapid urbanization, continued growth in populations and in affluence — all these factors will make sustainable use management more difficult in the future than it was in the past. For example, where most water in developing countries is now used for agriculture, in the future most water, at one time or another in its course to the sea, will be used in industry with a concomitant chance of pollution.

## INTRODUCTION

Since the environmental awakening of the late 1960s and early 1970s, significant advances have been made in understanding the causes and consequences of major natural systems management problems. There also have been widespread changes in the legal and institutional frameworks for managing resource uses. In spite of these institutional changes and the growth of knowledge, even a cursory inspection of worldwide environmental problems reveals a significant gap between the environmental goals espoused by many governments and international agencies and existing environmental conditions.

The persistence of degraded environments, nonsustainable forms of use, and even life-threatening resource conditions is due to many factors. In some countries, some adverse environmental conditions such as flooding are regarded as natural or inevitable even where these events are exacerbated by human activities such as deforestation. Other natural resource problems represent conscious or unconscious trade-offs for short-term economic gains. Lack of knowledge, political will, or inadequate management capabilities are partial explanations for these problems. In addition, the persistence of some problems reflects the inevitable time lag between the implementation of management efforts and visible, measurable changes in environmental conditions.

Although less-than-desirable conditions can be linked to many causes, a central conclusion emerges: It has proved to be exceedingly difficult to institutionalize the environmental awakening. To be sure, there is no shortage of new laws, plans, agencies, regulations, and programs. Indeed, an analysis of one single man-

agement innovation that is associated with efforts to institute better management practice (i.e., the EIA requirement) reveals that an impressive number of countries and subnational jurisdictions have instituted such requirements. What is frequently lacking, however, are the means, resources, knowledge, and will to translate environmental awareness and management goals into effective programmatic action. The gulf between awareness of natural systems management problems and the desire to engage in more effective management on the one hand and effective programmatic action on the other constitutes an implementation gap of increasing concern. Soil is eroding, water quality is being degraded, watersheds are losing storage capacity, impoundments are filling with sediments, agricultural crop yields are falling short, and insect pest outbreaks are occurring. Understanding how implementation gaps emerge and designing strategies for narrowing such gaps represent a research and policy challenge of the first order.

During the past six years several hundred scientists, development agency officials, and government bureaucrats have participated in various studies in the Natural Systems Assessment for Development program at the East West Environment and Policy Institute (EAPI). Most of this multinational collaboration has had to do with methods for environmental assessment in developing countries and economic valuation techniques for nonmarket aspects of natural resource utilization and environmental quality.

Although there were few experts in public administration among these participants, the topic of governmental organization was fre-

quently raised as an important factor affecting the exploitation of natural systems. A wealth of anecdotal evidence suggested that efforts around the world to ensure the sustainable exploitation of natural systems are suffering from government disorganization and mismanagement. These problems are no less persistent in the Asia-Pacific region, the area of focus for the East-West Center.

A cursory survey of the Asia-Pacific region indicated that some countries are experiencing difficulties in achieving urgently needed economic development while conserving and sustaining the productivity of renewable natural resources and environmental quality. This lack of progress is attributable to the reasons mentioned here. In this study we address the question, "To what extent and in what ways do government institutions, organizations, and their relationships affect the management of natural systems?"

In reflecting on implementation gaps in natural systems management, it is useful to begin by noting the fundamental mismatch between the organization of natural systems and governmental organizations to manage natural systems. The central characteristic of nature is that it is a system — a highly interrelated structure of many complementary functions. An ecosystem comprises communities of plants and animals with their nonliving surroundings of soil, air, and water plus the dynamic flows of energy and nutrients. By natural systems we mean the renewable natural resources and the health and quality of the air, water, and landscape — that is, ecosystems including human beings.

The central characteristic of government organization for natural systems management is fragmentation: jurisdictional gaps, polarization of interests, jurisdictional conflicts, incompatible policies, conflict of uses, lack of coordination and communication.

Since the United Nations Conference on the Human Environment at Stockholm in 1972, more than 100 nations have established separate environmental ministries or departments with the mandate to protect or defend environmental values, presumably against the activities of other government agencies, citizens (collectively and individually), and the private sector. In addition, each country has a range of traditional narrow-purpose agencies created at different times for special missions. A pervading (cross-cutting) element such as natural systems is not easily addressed.

In dealing with this apparent mismatch, Charles Lindblom (1973, 84) warns against "the logical fallacy of believing that the only way to improve these interconnections is to deal with them all at once." As he notes:

Clearly, everything is connected. But because everything is connected, it is beyond our capacity to manipulate variables comprehensively. Because everything is interconnected, the whole of the environmental problem is beyond our capacity to control in one unified policy. We have to find critical points of intervention — tactically defensible, or strategically defensible points of intervention (Lindblom 1973, 84).

## THE EAPI STUDY ACTIVITY

Our search for critical points of intervention began with a prospectus mailed in August 1982 to about 50 persons in the United States and Asia-Pacific countries. It was hypothesized that characteristics of government organization (i.e., forms, procedures, regulations,

devices for coordination) could be correlated with outcome measures of natural systems management (i.e., sustainable or degraded productivity of forests, farms, or fisheries and improved or lowered environmental quality). In order to avoid yet another academic exer-

cise in modeling public administration, we proposed an empirical approach: (1) information gathering on the performance of existing government organizational arrangements in a few representative countries; (2) analysis and objective critique by knowledgeable observers leading to an understanding of why certain organizational arrangements work and others do not; and (3) collaborative preparation of a set of guidelines for the design of more effective organizational arrangements for coordination, integration, and conflict resolution.

The response to the prospectus was encouraging and instructive. Five countries were selected to provide a variety of experience: Korea, Malaysia, the Philippines, Thailand, and the United States. Because the field of natural resources and the environment is broad, three management sectors were chosen for more detailed analysis: water resources (including forest watershed), coastal zones, and administration of the EIA. Participation of several academics and experienced management officials was arranged for the summer of 1983.

An extensive literature search emphasized the gap between the promise and intent of plans, statutes, regulations, or organizational charts, and the actual performance as measured by changes in the condition of the natural systems. A tentative framework for gathering and analyzing information was sent to all collaborators in March 1983 to aid them in preparing for the summer study. Not surprisingly, substantial revisions and simplifications were necessary on the basis of their response.

The initial premise was that, out of all the factors affecting successful management of natural systems, the organizational variable could be isolated. This was challenged repeat-

edly in correspondence and initial discussions but emerged as a validated basis for the project. The consensus was that as countries go forward organizing and reorganizing for economic development of their natural endowment, they are making rational decisions and trade-offs. The outcome of these decisions (in terms of sustainable use and environmental quality) is related, in part, to organizational structure and processes.

The 1983 summer study comprised a continuous core group, with visitations by others of 2–6 weeks largely overlapping in late August. A report was prepared for each country outlining the governmental organization for, and history of, natural systems management. Administration of the EIA process and at least one of the other management sectors was studied for each country. A great part of the collaborative effort was devoted to just how organizational effectiveness could be rigorously and quantitatively evaluated—a research agenda for the future.

This report presents the findings of the summer study and some suggestions for additional work. While useful insights have been obtained, many more data and many more experienced observers need to be involved. We hope to continue a multinational study through the EAPI and invite all interested readers to send their comments and experiences to us.

This report is the responsibility of the authors, although it was circulated in draft to all participants, and is intended to represent the variety of viewpoints rather than to attempt consensus. The generous and stimulating contributions of our colleagues are gratefully acknowledged.

## RESEARCH FRAMEWORK

In general, public policy implementation refers to those administrative processes and behaviors by which the goals of public policy are translated into outcomes of government activity. The concept of implementation gaps is a graphic, shorthand way of describing the variance between the formal intent of public policy as expressed in statutes, plans, and official pronouncements and actual conditions. In natural systems management, such conditions are manifested in tons of soil eroded or sediment delivered, loss of natural habitats, acres of illegal deforestation, days of excessive air pollution, and similar indicators.

The emphasis on implementation of policy as a critical stage in natural systems management is based on the recognition that it is a complex, even chaotic set of processes involving the mobilization and coordination of organizations, personnel, and resources; the application of general decision rules to specific cases; the performance of complex analyses with imperfect and frequently fragmentary information; the surveillance of numerous actors who are frequently disbursed over broad jurisdictions; and the politically difficult and technically complex trade-offs among competing social and economic needs. The emphasis on implementation of policies and programs has particular relevance for the countries in the study. As one author notes:

To a much greater extent than in the political systems of the United States and Western Europe, the process of implementing public policies is a focus of political participation and competition in the countries of Asia, Africa, and Latin America. This is true because of characteristics of the political systems themselves, such as the remoteness and inaccessibility of the policymaking process to most individuals and the extensive competition engendered by widespread need and very scarce resources. Thus, while in the United States and Western Europe much political activity

is focused on the input stage of the policy process, in the Third World a large portion of individual and collective demand making, the representation of interests, and the emergence and resolution of conflict occurs at the output stage (Grindle 1980, 15).

"Implementation gaps," in this study, is a new name for a problem familiar to organizational and administrative scholars. From the perspective of compliance theory, implementation gaps are treated as a problem to be dealt with by developing and maintaining managerial control by means of compliance systems (e.g., Etzioni 1964). The organizational conditions associated with the exercise of managerial control over organizational subordinates have thus been a central focus of some scholars of the implementation gap.

Another body of literature treats implementation as synonymous with organizational effectiveness. In this literature it is assumed that there is some pattern of relationships between effectiveness as an outcome, on the one hand, and some particular precursor, on the other. Normative organizational theory, including scientific management theory (Taylor 1967), bureaucratic theory (Weber 1947), the public administration model (Gulick and Urwick 1937), the consonance theory of the relationship between structure and effectiveness (Woodward 1965; Burns and Stalker 1961), and the human relations model (Likert 1961) all assume such a relationship between some aspect of organization and effectiveness, although they differ with regard to what the relevant aspects are.

A third significant body of literature focuses explicitly on implementation processes. Numerous case studies have been written, seeking to identify what went wrong in the implementation of particular programs (e.g., Derthick 1972; Pressman and Wildavsky 1973; Jones 1975; Lieber 1974). In addition, there have been several important efforts to provide some conceptual integration to the study of imple-

mentation and at least one attempt to describe the legal and administrative preconditions for effective implementation (Hargrove 1975; Bardach 1977; Van Meter and Van Horn 1975; Sabatier and Mazmanian 1979).

While each of these theoretical approaches has informed our study, no single approach or framework has proved wholly adequate to the research tasks we set. An emphasis on the compliance of implementing officials is useful if there is broad agreement about the policy goals with which officials are expected to comply. In the countries studied, implementing officials frequently must choose among competing goals in reviewing permits or license applications. Similarly, focusing on the organizational effectiveness assumes the possibility of an objective definition of effectiveness that is not so dependent on persons and contexts as to be generalizable. The difficulties in constructing such a theory have been demonstrated (Mohr 1982). Finally, concepts and frameworks in the implementation literature are useful for the analysis of any single natural systems management program, such as soil conservation. They are much less useful, however, for the analysis of natural systems management efforts in the aggregate.

This research focused on three broad questions related to the implementation of natural systems management programs.

1. What institutional structures and administrative processes have been developed to manage natural systems?
2. What major types of institutional problems have emerged in the implementation of resource management programs?
3. How have countries sought to cope with these problems?

The emphasis on institutional structures as they relate to effective implementation represents a deliberate delimitation of research scope. The quality and effectiveness of implementation is obviously greatly affected by a host of other factors including the resources available for management, the skill and experience of implementing officials, relevant information,

and the degree of political support for management efforts. These types of variables have received a substantial amount of research attention. Their importance in ensuring effective implementation is relatively well understood. The relationships among organizational structures and processes and implementation processes are less well understood.

The countries in the study have developed different institutional frameworks and organizational processes for managing natural systems. These frameworks reflect different administrative traditions, colonial histories, current timetables, and approaches to natural systems management. Some countries have assigned the tasks of management to traditional mission agencies such as health departments, while others have developed environmental superagencies. We began with the hypothesis that the choices of institutional frameworks for management have affected the quality of implementation. We did so without assuming that there was necessarily an optimal institutional framework to which each country should aspire.

The implementation of natural systems policy occurs at two levels. At the national level, the process of implementation, as well as the process of policymaking, may involve a policy field or network of government and nongovernment agencies that plan, manage, monitor, and supervise programs affecting natural systems. We assume that the structure of such policy fields and the interactions among the constituent actors affect the quality of policy and the effectiveness of its implementation (Mayntz 1978). Within the policy field, specific natural resource management projects or programs are frequently assigned to a certain agency. For our purposes we refer to implementation efforts at the level of the policy field as macroimplementation and to the implementation of a single natural systems management program (e.g., coastal zone management) as microimplementation.

The research phase reported here focuses on implementation within the national policy field. More specifically, we were interested in how organizational structures and processes affect the quality of implementation at the na-

tional level. In so doing we are seeking to peer into the black box of processes by which policy goals are translated into outcomes of governmental activity. In instances in which national agencies are responsible for direct management of natural systems, as would be the case of a national agency with exclusive responsibility for managing national forests, the relationships between structures, processes, and outcomes (in terms of sustainable yields) are direct and observable. In the case of some national agencies, however, the effects of governmental activity are indirect. When national agencies delegate management responsibilities to state or regional agencies, national management efforts are manifested in coordination efforts, knowledge production, and other outcomes that may be important in promoting sustainable yields of natural systems but are nevertheless indirect in their effects on such systems.

In seeking to organize and describe the various policy fields in each country, we found it useful to employ systems terminology (i.e., policy articulation, system complexity, system interdependence, system dynamics and maintenance). These system concepts provided a framework and a set of questions that could be used to organize descriptive information about each country. Each of these systems characteristics is discussed below.

### **Policy Articulation**

Both implementation theory and compliance theory suggest that the prospects for effective implementation are enhanced by specific, clearly-stated policies (Sabatier and Mazmanian 1979). Specific policies provide clear directions to implementing officials, particularly if priorities are established among policies. In the analysis of the policy field of any specific country, several questions can be raised: How specific are natural systems management policies? How internally consistent are natural systems management policies? How consistent are natural systems manage-

ment policies with economic development policies?

### **System Complexity and Interdependence**

Generally speaking, the greater the number of agencies responsible for aspects of natural systems management, the greater the possibility of agency conflict; hence, the greater the need for interagency coordination and communication (Mayntz 1978). How many public agencies or units are legally responsible for natural systems management? How many non-governmental organizations are responsible for management? How many levels of government are legally responsible for management? How many agencies and levels of government are responsible for the same management functions? How is authority for natural systems management distributed horizontally? How is it distributed vertically? How many agencies exercise veto power over potential management actions? How is political influence distributed among agencies? What mechanisms (sanctions and incentives) are available for ensuring coordination among agencies?

### **System Dynamics**

In describing the policy field in each country, we sought to learn something about the interagency conflicts in each policy field. More specifically, were conflicts likely to be over policies, over jurisdictional issues, or over specific resource uses? What are the level and intensity of interagency policy conflicts? What are the level and intensity of interagency conflicts over the uses of specific resources? What are the level and intensity of jurisdictional conflicts?

### **Maintenance**

We are also interested in how each country sought to reduce conflicts and increase communication among agencies. Specifically, what are the mechanisms for interagency communication? What are the mechanisms for interagency conflict resolution?

## COPING WITH FRAGMENTATION

In describing and analyzing each country's experience in natural systems management, some central themes emerged. There was broad consensus among the participants that management organizations need political clout, skilled personnel, and money to ensure effective implementation in natural systems management (see Appendix B). There was also agreement that fragmentation of responsibility, inadequate communication among agencies, poor coordination, and interagency conflicts over policies, jurisdictional responsibilities, and specific resource uses constituted management problems in each country. There was less agreement, however, over the degree to which any one of these problems was experienced in any one country or how administrative structures or processes might be restructured so as to increase management effectiveness.

In reflecting on how to redesign administrative structures and processes, it is useful to return to the principles of systems analysis:

In physical systems there is a direct cause and effect relationship between the initial conditions and the final state. Biological and social systems operate differently. The concept of equifinality says that final results may be achieved with different initial conditions and in different ways. This view suggests that the social organization can accomplish its objectives with varying inputs and with varying internal activities. Thus the social system is not restrained by the simple cause and effect relationship of closed systems (Beishon and Peters 1972, 23).

The equifinality of social systems is important in the management of complex organizations. The concept suggests that there may be no one best way to achieve a given objective or to cope with a problem. Rather, there may be a variety of satisfactory solutions to management problems.

It is for this reason that we chose to identify in this section some of the ways in which the countries in the study have sought to deal with the problems of jurisdictional fragmentation, inadequate communication, and interagency conflict. The techniques described should be considered not as organizational solutions to the problems identified but as efforts to cope with these problems.

### Changes in Development Planning

Institutionalization of natural systems management has taken place within an evolutionary change in economic development toward multiple-objective planning. Before the late 1950s, development was driven primarily by either (1) an economic need, which was then met within engineering limitations, or (2) a technological opportunity, which was then financed as justified by projected internal rates of return on investment (but not in consideration of costs and benefits to society as a whole). As examples, the need for electricity resulted in the damming of rivers for hydropower; the manufacture of chipboard resulted in concessions for the felling of forests.

The addition of social welfare concepts and the calculation of costs and benefits distribution (among economic sectors and classes of people, geographical units and generations) accompanied the shift from trickle-down theories to more targeting of poor groups and basic infrastructure by international assistance agencies. Concerns for the environment began in the early 1970s but were and are largely separate from and after the fact of decision making.

Environment-conservation-sustainable use considerations are only one ingredient of policy formulation and decision making. They should not dominate the process any more than any other objective (e.g., national security, income distribution, full employment). But having become recognized as important and in need of emphasis to redress past degradation and to provide for future continuous produc-

tivity, natural systems factors should be fully integrated into the economic paradigm by which the world operates. The identification of strategic points of intervention to ensure sustainable development remains more of an ideal than a reality.

### **The Trend toward Special Environmental Units**

Although each nation is unique, there are patterns and trends that are discernible in organizing for the management of natural systems and environmental quality. Following is a list of five such patterns:

- No specified environmental units. Mission agencies manage ecosystems, water, minerals, and fuels.
- Central environmental unit. May be inter-agency committee with staff. Advises government, operates EIA process. May administer pollution regulations.
- Environmental units within mission agencies.
- Environmental component of central economic planning unit.
- Regional superagencies.

Before the Stockholm United Nations Conference on the Human Environment in 1972, few nations had any unit specifically named to deal with these matters. Virtually all governments, however, contained agencies for the managed ecosystems (agriculture, forestry, fisheries, range lands, and wildlife habitats), for fuel and mineral extraction, and for water resources. These units went about their rather narrowly defined missions guided by engineering and financial (usually return-on-investment) analyses to achieve economic growth goals. Enlightened agronomists practiced soil conservation, crop rotation, and biological control of insect pests. Foresters recognized the multiple uses of forest lands for watershed protection, recreation, and wildlife. Public health was a strong motivation for assuring potable water supplies and controlling insect disease vectors. Clear public preferences

supported parks and recreation areas. But there was no comprehensive, systematic management of natural systems as a whole or with regard to long-term, off-site effects of intensified use of the land and water.

After Stockholm many countries passed environmental protection legislation and established departments of the environment or similarly designated agencies. The functions of these units have included liaison with the United Nations Environment Programme, provision of advice to government leaders on policies for natural systems management, coordination of activities of various other agencies, acting as rallying points for nongovernmental environmentalist and conservation groups, and being protagonists for environmental quality and sustainable use. These central environmental units have been formed as interagency committees or as part of a ministry (usually health or science and technology). Experience in many countries has shown a tension between these environmental units and other mission agencies and a polarization of the conflicts between economic growth and environmental protection.

A third pattern is the inclusion of an environmental group in each mission agency. The functions of these units are to keep their agencies in line with overall policy and serve to prepare environmental assessments of projects. They can exchange information with other similar units throughout the government and may affect coordination. They are more apt than outside groups to be involved in early planning of the agencies' activities. These internal environmental units have not proved effective in resolving disputes between agencies or in accomplishing uniform national policies for the environment that cut across jurisdictional lines.

The fourth pattern (and one without actual examples at the present time) is the inclusion of environmental expertise as part of the organization and staffing in the national economic planning board or agency. An aid to solving many environmental and developmental conflicts is the internalization of costs and benefits of sustainable use into the project appraisal delibera-

tions. In the United States, the Council on Environmental Quality, the Office of Management and Budget, and the Council of Economic Advisers are all within the Executive Office of the President. But the full integration of ecological and environmental science information into economic planning would seem to require an acceptance of natural systems expertise directly within the planning unit.

A decentralized mechanism to accomplish integration and control is the geographic or regional approach, in which a special entity (e.g., commission or authority) is given complete charge of the landscape. In the Philippines, the National Council for Integrated Area Development may manage a river basin, a watershed, or an entire island such as Palawan. The Electric Generating Authority of Thailand manages large schemes in Northeast Thailand. The Mahaweli Development Board in Sri Lanka is planning, building, and operating a huge water transfer project. The U.S. Tennessee Valley Authority has been a model for such special organizations since the 1930s.

Because of their limited geographic focus, regional superagencies frequently offer the possibility that environmental matters will have a better chance of being integrated early into planning of these systematic, area-wide projects. Where donor funding is involved from the World Bank or USAID, a comprehensive EIA is required for the project and this helps to build a sustainable use of natural systems (e.g., the Mahaweli scheme).

A key research question was the organizational status given to natural systems management. The Stockholm conference provided the impetus for the creation of central environmental agencies. All of the five countries studied (and more than 100 others throughout the world) have some such organization.

- Korea. The Ministry of Health contains the Office of the Environment, established in 1980.
- Malaysia. The Ministry of Science, Technology and Environment contains the Division of Environment and an Environmental Quality Council.

- Philippines. The Ministry of Human Settlements contains the National Environmental Protection Council (NEPC), established in 1977. The NEPC is chaired by the President of the Philippines and comprises heads of relevant ministries and agencies.
- Thailand. The National Environment Board (NEB) is a unit in the Ministry of Science, Technology and Energy (MSTE). The NEB was created in 1975 as a part of the Office of the Prime Minister but was moved to the MSTE in 1979.
- United States. The Council on Environmental Quality, created by the NEPA in 1970 and comprising three presidential appointees, is a unit of the Executive Office of the President.

In general, we have found that the central environmental units have been at too low a level of government to struggle equally with other interests. They are inadequately funded and staffed for the tasks assigned. Most important, they are not in on the inception of economic development planning or natural resources management when decisions are made that often control the course of projects and determine their soundness in terms of conservation and environmental quality.

Councils of high level officials offer the possibility of political clout but may seldom actually meet because the members are busy, while lower level designees attend instead. Such councils also are prone to back scratching, in which the environmental transgressions of each agency are overlooked by mutual consent. Councils can advise but are not an efficient means of operating programs. Councils do appear to be effective in guiding the implementation of EIA regulations, especially in reviewing these reports.

Environmental agencies at the subministerial level find it difficult to participate in policy formulation and decision making. Priorities of other missions of the ministry (e.g., health or energy) may obscure, dilute, or distort the objective of sustainable use. Such lower level agencies are at a hierarchical disadvantage in

commenting on the practices of other ministries.

In some instances the central environmental agency is given responsibility for administering and enforcing pollution control laws. This regulatory (or police officer) function inhibits the much-needed coordination role of these units.

The ability to implement sustainable use policies varies with the proponent or the economic development activity. Projects managed solely by government agencies may be difficult for the environmental agencies to deal with for the many reasons listed herein. But in many countries the private sector investments are not covered by requirements for coordination or preparation of an EIA. And in many countries, government-chartered corporations (e.g., in Korea referred to as "Korea Inc.") are exempt from mechanisms that coordinate normal agencies. Finally, even some agency projects are exempted from having to prepare an EIA (e.g., energy projects in the Philippines), when they are so important that it is felt no delay or diversion can be countenanced. In the Philippines, a minister may initiate a request for an exemption; however, the NEPC will then place full responsibility for any adverse environmental consequences on that agency.

### **Interagency Communication**

One of the obvious requirements of effective implementation is that those charged with the responsibility of implementation must know what they are expected to do (Van Meter and Van Horn 1975; Sabatier and Mazmanian 1979). Policy decisions and commands, program plans, new agency initiatives, and specific project proposals must be communicated to all those who will share in the responsibility for various aspects of implementation. Effective communication requires not only that information be transmitted but that it be received and understood as well.

Interagency communication is impeded by vague or inconsistent policy directives. Policy directives that exhort agencies to promote natural systems management objectives, but do not indicate what priority such goals have when

weighed against development objectives, are a characteristic type of vague policy directive. Such vague messages are a primary obstacle to effective communication. Vague messages frequently reflect either a lack of consensus about policy goals to be achieved or about how such goals are to be achieved.

The problems associated with vague messages were cited by Thai officials in discussing delegation of management authority to regional officials or officials of functional agencies.

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 (Stubbs 1981, 75).

Inconsistent policy directives are another common communication problem frequently

associated with natural systems management efforts. Minimizing coastal erosion may be national policy, for example, but so may be the construction of small breakwaters to create safe mooring areas for local fishermen, even though the construction of such breakwaters interferes with seasonal long-shore wave action and thus increases erosion. The sheer complexity of the national policymaking processes also contributes to communication difficulties. There are frequently numerous agencies and nongovernmental actors involved in various managerial aspects of the same natural systems. The large number of such actors and the volume of messages among them greatly increase the possibilities for miscommunication.

The need for effective communication is generally recognized in principle, if not always in practice. The countries in the study have developed a variety of formal mechanisms for enhancing communication within the various policy fields; however, a variety of informal communication networks exist as well. Some of the more prominent mechanisms are outlined here. Several participants remarked on the characteristics of interagency relationships in Asian countries. Consultation is a way of life, and interagency groups are a cultural necessity. Conflicts are often resolved by compromise with perhaps a memorandum of agreement having the force of law. Delegation of responsibilities from one agency to another is a means of avoiding conflict. Sometimes personnel from a proponent agency are loaned to a review agency and, in effect, comment on their own proposals.

Communication is a necessary but not a sufficient condition for effective implementation. Agency personnel may be receiving clear directives and may understand such directives but still choose to ignore them if they perceive them to be inconsistent with their agency's mission or other personal or organizational goals. Effective communication is merely one of several prerequisites to effective implementation.

#### *EIA as a Coordinating Device*

The EIA has been widely adopted as an information-gathering and analysis tool to aid

economic development decision making (see Horberry 1983; Clark et al. 1980; Sammy 1982; Carpenter 1981). Here we are not concerned with the direct results of EIA but with the indirect consequence of its effect on coordination among various units of government. The countries in our study implement an EIA procedure in somewhat varying ways.

*Korea*—In February 1981 the Office of Environment (OOE) promulgated "Regulations for the Preparation of Environmental Impact Statements." Eleven types of government development projects are subject to an EIA but private sector projects are excluded. The proposing agency is responsible for preparing the EIA, which is reviewed by the OOE. Universities and research institutes may actually perform the assessment. The EIA is prepared before final decisions are made but usually not before the basic plan for the project is formulated. There is little public participation. Because EIA is relatively recent in Korea, there are few trained assessors and the concept is poorly understood by most agencies (see Han 1983).

*Malaysia*—The EIA is not yet formally required but the government states that some trials are occurring and that the next five-year plan beginning in 1986 will fully implement a procedure. In the meantime, the Department of Environment has sponsored the preparation of a few EIAs and the Environmental Quality Council (which includes one public member) has reviewed these documents. The strong role of the states in managing natural systems will complicate the uniform implementation of the EIA (see Masters and Jaafar 1983).

*Philippines*—In December 1981 a Presidential Decree established the current EIA procedure to be implemented by the National Environmental Protection Council (NEPC). This replaces a procedure in effect since 1977, which had proved to be overly ambitious. Now the EIA is required for public and private projects of only three types (heavy industry, resource extraction, and infrastructure) and for twelve environmentally critical areas (e.g., mangroves, coral reefs). The major responsibility for ordering an EIA, review, and issuance of the compliance "Environmental Clearance

Certificate" is with the NEPC. Other agencies are required to acquire and provide pertinent information about their projects. Each environmentally relevant agency is to establish its own environmental unit to work with the NEPC. The project proponent prepares the EIA, circulates it for comment and sometimes presents it at a public hearing, and the NEPC approves the EIA or returns it for revision or inclusion of protective measures.

*Thailand*—The National Environmental Quality Act was amended in late 1978 to require the preparation of an EIA for NEB approval on any public or private project. Guidelines were published in the next two years. An initial environmental evaluation is prepared by either the project proponent or the NEB. On the basis of this document a decision is made on whether to prepare a full EIA for the project. If one is needed, the terms of reference (TOR) are prepared by the NEB. The EIA is prepared according to these TOR, reviewed by the NEB, approved or returned for revision, and finally monitored for compliance by the NEB (see Lesaca 1983). NGOs and the public are not often involved in the EIA although they may object to projects. If disputes arise over NEB approval, the proponent may appeal to the National Economic and Social Development Board (NESDB) or the cabinet.

*United States*—The National Environmental Policy Act (NEPA) of 1969 established the environmental impact statement (EIS) for "major actions of Federal agencies significantly affecting the environment." Because permits and licenses to private sector projects are construed to be such actions, virtually all new developments in the United States are covered. The Council on Environmental Quality (CEQ) has issued guidelines, most recently amended in 1978. The proponent is responsible for preparing a draft EIS and all relevant agencies must provide information for and review this document. The draft EIS is made widely available for comment from all interested parties and a public hearing may be held. The EPA is responsible for review of the environmental quality (pollution) aspects of the proposed project. The EIS is revised based on the com-

ments received and issued in final form, again being made widely available. There is no veto or approval of the project by the CEQ or the EPA. The proponent may proceed unless challenged in court as to the adequacy of the EIA. The history of implementation in the United States shows many instances of substantial delay and contentious debate during the early years. However, as agencies became better at preparing adequate EISs and as legal precedents have developed, the delays have been reduced in number and length of time.

Coordination of natural systems management is fostered by the EIA process to the extent that the following procedures are involved:

- Scoping, or setting the boundaries of an EIA, may take the form of a meeting called by the project proponent at the inception of the project. All relevant and interested agencies, NGOs, and affected parties are notified and participate. Thus agencies are informed of actions that may affect their own programs and can begin providing information and opinions.
- Information responsibilities. Each agency may be designated as the source of authentic information about the part of natural systems with which it is concerned (e.g., soils in a department of agriculture, air quality in a department of health, wildlife habitat in a department of natural resources). Any proponent agency must go to the other agencies for these data to prepare the EIA; thus, an additional exchange is promoted.
- Review. The EIA report may be circulated for review and comment (preferably at the draft stage) to all other relevant agencies. Each agency may be required to issue a written comment, thus promoting a sincere review of the adequacy of the EIA and the consequences of the proposed project to other missions of government.
- Public participation. When the EIA process is open and participative, all agencies must become aware and prepare to comment on proposed projects. Hearings often involve testimony from many different agencies and

a degree of coordination results through this increased information exchange.

- **Monitoring and post-project evaluation.** The predicted consequence of a project as revealed by the EIA may affect many agencies. Each agency will monitor those consequences that matter to it and will feed information back to the operating agency. If this continuing guidance to management is built into the EIA, then coordination will be enhanced.

In general, the EIA procedure generates and distributes more information about government activities and opens up the decision-making process to groups that have diverse views and objectives. Departures from overall national policy, conflicts among goals, and failures of compliance with regulations are exposed. The central environmental agency, which implements the EIA, can use this notification process and information-exchange events to improve coordination.

#### *Coordinative Committees*

Coordination is usually thought of as having two dimensions: communication and conflict resolution. The distinctions between these two dimensions are frequently blurred in practice, but it is useful to distinguish them analytically. In this section the emphasis is on the communicative function.

There are both permanent and *ad hoc* coordinative committees. In most of the countries in the study, the cabinet or the equivalent constitutes the major permanent coordinative committee, in which ministries communicate policy goals, plans, and changes in ministry priorities and intentions. Other examples of permanent committees are Malaysia's National Councils, in which federal-state communication occurs.

Officials in most countries recognize that programmatic action related to natural systems management usually involves activities that transcend the jurisdictional scope of any single agency. It has become quite common, therefore, to find a proliferation of *ad hoc* coordinative

committees, usually involving officials from several agencies or ministries, to deal with particular natural systems problems or initiatives. These temporary, technical, interagency, or steering committees frequently have a variety of functions, among which communication may be paramount. Sometimes such committees are formed by a single lead agency or ministry for the purpose of informing other agencies about plans or programs and to indicate, explicitly or implicitly, allocations of authority for particular management problems. In other cases, the primary purpose of such committees is to share information and expertise. The Interagency Committee on Toxic and Hazardous Substances in the Philippines is an example of the latter type of committee. This committee, composed of representatives of the Central Bank, National Pollution Control Commission, Ministry of Health, National Crop Production Center, University of the Philippines Institute of Public Health, Fertilizer and Pesticide Authority, Bureau of Foods and Drugs, Atomic Energy Commission, Ministry of Labor and Employment, National Environmental Protection Council, and Ministry of Trade and Industry, has as one of its primary tasks the identification of gaps and problems in the control and management of toxic and hazardous substances.

In Malaysia, there is a variety of coordinative committees operating at several levels of government to formulate policy and facilitate communication. The supreme policy formulation bodies of the government are the national constitutional councils (the National Land Council, the National Finance Council, the National Council for Local Government and the National Forest Council) made up of various federal ministries and state officials and certain other representatives. These councils are, in a way, above the Cabinet, since they are essentially joint bodies of federal and state representatives (Masters and Jaafar 1983, 9).

In Thailand, some coordinative functions have been performed by *ad hoc* committees staffed by academicians, government officials, and individuals from the private sector. These committees have provided technical advice to the National Environment Board. Most of the

work of these committees has related to recommendations regarding potential new programs rather than to the coordination of information or activities regarding existing programs (Stubbs 1981, 25).

### *Cabinet Papers*

Cabinet papers represent another type of communication device used in some countries such as Malaysia. Cabinet papers usually represent the views of a particular ministry regarding a particular national problem. The papers typically include a definition of the problem and a rationale for a particular management strategy for dealing with the problem. Circulation of the paper provides officials in other ministries an opportunity to critique the problem definition and proposed management strategy prior to implementation of the strategy.

### *Press Releases*

Press releases are used by some countries for communication of particular policies or initiatives. Press releases are usually used to communicate both management intent and the importance attached to a particular initiative.

## **Conflict Resolution**

Conflicts among agencies are a basic condition in the implementation of natural systems management programs. Such conflicts occur at the same level of government and between levels of government. There are three basic types of agency conflicts of particular relevance in the implementation of natural systems management programs: jurisdictional conflicts, policy conflicts, and resource use conflicts. Jurisdictional conflicts may occur when two or more agencies are legally responsible for managing the same geographic area, the same resource, or the same activities or resource uses. Policy conflicts, as used here, refer to situations in which two or more agencies are pursuing separate policies that in practice (if not necessarily in principle) are incompatible. Use conflicts oc-

cur at specific geographic locations as two or more agencies each seek to promote different uses of a particular resource. Each type of conflict may be latent or manifest. In general, however, our interest is in conflicts that have occurred or are about to occur. Conflicts also vary greatly in intensity.

Each of these types of conflict is discussed here. For each type of conflict, a variety of conflict management mechanisms are described; each one of which is used by one or more of the countries in the study. Throughout the analysis we treated conflict as a condition that may be positive or negative. Although it is clear that conflict may sometimes be a problem that impedes effective management, it also at times provides an opportunity for designing mechanisms to promote effective cooperation.

### *Jurisdictional Conflicts*

Jurisdictional conflicts, as noted earlier, may occur when two or more agencies are legally responsible for managing the same geographic area, the same resource, or the same activities or resource uses. Jurisdictional conflicts are a characteristic condition of natural systems management. In the past two decades a plethora of new programs have been developed to deal with particular natural systems management problems. Sometimes these new programs are integrated into existing management structures, but more frequently new institutional structures have been developed alongside existing structures. The development of coastal resource management programs in the United States provides a case in point. Although land-use management is the traditional management function of municipal governments in the United States, the national Coastal Zone Management Act provided substantial incentives to states for developing management programs to manage coastal resources. In some states, such as California, these new coastal resource management programs resulted in management systems that overlapped with existing municipal land-use controls, such as zoning and subdivision controls. Although such duplication of authority may be desirable from the

viewpoint of placing greater emphasis on natural systems management goals, it also creates delays in review processes and increases costs. These factors can contribute to a political backlash against natural systems management programs.

Jurisdictional conflicts can be minimized by legislative action, judicial decisions, and presidential directive (and other executive action). In addition there are several other mechanisms that may be useful.

*Coordinative committees* — Just as coordinative committees are formed to facilitate communication, they also serve to resolve jurisdictional conflicts. In Malaysia, some jurisdictional conflicts are dealt with by the Federal-State Liaison Committee and the National Development Planning Committee. At the state level, state action committees seek to resolve jurisdictional problems. The Philippines has also developed a number of coordinative committees, as noted earlier. Part of the responsibility of committees, such as the Interagency Task Force on Coastal Zone Management, is to deal with jurisdictional conflicts.

In Thailand, potential jurisdictional conflicts between the NEB and other governmental units have been mitigated somewhat by the requirement that all NEB decisions involving other governmental units must be referred to the Cabinet for consideration (Stubbs 1981, 29).

*Memoranda of agreement* — The Philippines deals with some jurisdictional conflicts by use of memoranda of agreement. Agencies in conflict negotiate agreements over jurisdictional issues. These agreements are then developed into formal memoranda that allocate jurisdictional responsibilities.

A primary example of the use of the memorandum of agreement mechanism is the Philippine coastal zone program. About 50 governmental institutions are directly or indirectly involved with coastal zone research or management, but none has overall management responsibility. Jurisdictional conflicts abound. For example, jurisdiction over various aspects of corals was claimed by the Bureau of Fisheries and Aquatic Resources, the Bureau

of Forest Development, and the Bureau of Mines and Geosciences. Similar jurisdictional conflicts existed over mangroves, marine parks, and other resources and activities (Tolentino 1983, 13).

In late 1979, the NEPC requested that a Coastal Zone Management Interagency Task Force be formed. This task force is composed of 22 agencies with environmental- or coastal zone-related government jurisdictions. A memorandum of agreement defined the roles and responsibilities of each agency (Tolentino 1983, 14).

*Adjustment office* — Korea has established an adjustment office, to which appeals regarding jurisdictional conflicts may be made.

### *Policy Conflicts*

A fundamental conflict that transcends all other aspects of natural systems management is that between immediate economic gains and long-term sustainable production from the renewable resource base. Economic growth and development are essential for improved quality of life. Much of this growth requires exploitation of natural systems to generate food, clothing, shelter, and foreign exchange and to accumulate capital for industrialization. At the same time, conservation of natural systems is necessary, or development becomes self-defeating and an empty accomplishment. Unfortunately, at least four influences act to favor the short term over the long term. Financial analyses consider only a narrow project or sector (return on investment) and not the net benefits to the whole society. Broader economic analyses still necessarily reflect interest and discount rates that favor the present over the future. Political terms of office are relatively short and prevent the long view. And human nature means each of us prefers immediate gratification. Acting against such factors are an often vague ethical concern for preservation of the environment and a responsibility toward our posterity. Thus, sustainable use is inherently difficult to implement. The best organization will still struggle with these trade-offs between immediate benefits and perpetuation of natural systems. But

weak, ineffective organization will surely result in a degraded landscape and loss of productive potential.

Policy conflicts are a central condition of natural systems management programs. The most obvious conflicts are between policies intended to promote economic development activities and those designed to ensure sustainable resource use. Such policy conflicts are rarely resolved at the policy level by explicit choice of one policy over another, except when a natural systems management problem reaches crisis proportions—such as in severe cases of water pollution or deforestation. More frequently a balance is sought among conflicting policies in the context of a particular resource use issue at a particular site. There are, however, several mechanisms that have been used for dealing with policy conflicts at a more general level.

*Coordinative committees*—Coordinative committees, whether permanent or *ad hoc*, have been used to deal with policy conflicts. In Malaysia, for example, most of the policy conflicts are dealt with by permanent coordinative committees such as the Cabinet, the National Action Council, the National Land Council, and the National Council for Local Governments. In the Philippines, the Interagency Task Force on Coastal Zone Management provides an example of an *ad hoc* committee that is addressing policy conflicts.

*Comprehensive plans*—In some countries, sub-national units have undertaken comprehensive planning efforts to establish policies and priorities among policies. Comprehensive city planning, as practiced in the United States in the 1950s and 1960s, was touted as a means of resolving conflicts among planning policies involving housing, recreation, transportation, industrial uses, and other land uses by indicating, in general terms, the proposed use of every land unit within the jurisdiction of the city and expressing those uses on maps. Such comprehensive planning endeavors have fallen into disfavor both because they were not truly comprehensive in terms of dealing with all the relevant needs of the community and because they did not reflect market forces.

Properly understood, comprehensive planning can provide a more holistic approach to integrating development objectives and natural systems management objectives. Branch (1983, 6) defines a comprehensive plan as a “set of interrelated policies and sequential actions derived from continuous analysis and decision concerning the present state and future development of the organism.” An organism is an “inanimate entity, activity, or other structural or organizational unity” such as a governmental jurisdiction, private enterprise, military unit, association, or project. Practically, it is usually easier to do a comprehensive plan for an organism such as an organization rather than for a region or other spatial entity subject to the legal authority of several organizations. Nevertheless, comprehensive planning remains an integrative mechanism, the potential of which has not been fully explored (e.g., see Sazanami and Oya 1984).

Comprehensive policy planning, as practiced in some jurisdictions, seeks to avoid many of the problems of comprehensive city planning by eschewing maps. Regional development plans have been developed that identify policy priorities, identify resource needs and constraints, assign responsibility, and identify the time frame within which policy goals are anticipated to be achieved. Hawaii, for example, has enacted a state plan that includes goals, objectives, and priority actions to achieve those goals and objectives (State of Hawaii 1978). Policy decisions by state agencies, including the Department of Budget and Finance, are required to be consistent with the policy statements in the state plan. In addition, the act requires that functional plans be prepared for tourism, agriculture, housing, education at all levels, conservation lands, energy, and transportation. Municipal plans are required to be consistent with the state plans and with functional plans. The act also established a state plan policy council whose members represent state and county agencies and the public. This policy council identifies policy conflicts and seeks to resolve them. Policy conflicts that cannot be resolved are reported to the state governor and the legislature.

The Philippines is also seeking to manage policy conflicts in some locations by means of a comprehensive planning mechanism. This mechanism, the integrated area development (IAD) approach, is being used for planning the development of rural areas. The IAD involves comprehensive planning for projects in agriculture, small- and medium-scale industries, infrastructure, and social services in rural areas. Recently, the agency responsible for implementing the IAD concept, the National Council for Integrated Area Development, has sought to incorporate environmental considerations more systematically into its planning efforts.

In Thailand, the NEB is requiring the preparation of comprehensive development plans for those areas or regions of the country that are especially sensitive to development pressures, such as the Bangkok metropolis, the Songkla Lake marine area, and the Khoa Yai National Park (Stubbs 1981, 30).

### *Use Conflicts*

Use conflicts involve issues about how a specific resource at a specific site should be used. Should a specific wetland that is a habitat for migratory birds be filled to construct more housing? Should a dam that would be used to generate hydroelectric power be constructed at a particular site even though valuable croplands would be flooded? Should a license be issued to harvest a forest that is protecting a watershed at a particular site? This is the level at which most conflicts over natural systems management are manifest. This is the context within which policy conflicts are most apparent.

There are two fundamental approaches to such use conflicts: proactive and reactive. Proactive mechanisms are those that seek to indicate in advance of any specific application or proposal how specific resources at specific sites will be used. Reactive mechanisms are those that establish procedures for reviewing such applications for the uses of resources at particular sites. Each of these types of mechanisms is discussed here.

*Proactive mechanisms*—Proactive mechanisms seek to specify optimal uses for resources in a particular region. Such mechanisms are, typically, agency plans for resource use. These plans seek to identify particularly valued resources, to map them, and to indicate which among such resources may be used and the conditions under which they may be used. National forestry plans that indicate where and when certain forests may be harvested are a case in point. The current efforts of the Philippines to identify mangrove forests and to indicate the circumstances under which these mangroves may be harvested provide another example. Similarly, coastal zone plans that indicate preferred uses for particular coastal areas are another example.

*Reactive mechanisms*—A variety of reactive mechanisms are available for managing resource use conflicts at specific sites, but the most typical mechanisms are standard administrative review procedures by which specific applications are reviewed. In the best of such processes, detailed guidelines for reviewing applications have been developed. These guidelines alert the reviewers to the variety of resource use problems that may be raised by specific uses.

## A CONCLUDING NOTE

This report represents a snapshot of a complex, dynamic process. It identifies at a particular moment in time the mechanisms used by one or more of the five countries in the study

to cope with institutional fragmentation, conflicting management objectives, and varying resource management problems that characterize the countries. As does any two-dimen-

sional representation, this report lacks depth and perspective. Space does not permit a detailed, historical examination of the antecedents of these mechanisms; nor can we identify, except in the broadest generalities, the future evolution of organizational arrangements to achieve sustainable development. These are worthy tasks that deserve to be undertaken so that we may better understand how to manage human activities in ways that promote sustainable development. In particular, further research should be directed at determining the relative effectiveness of four mechanisms for achieving greater integration of development objectives with natural systems management objectives:

- Case-by-case integration by means of coordinative committees and other coordina-

tive mechanisms such as environmental impact assessments;

- Comprehensive area-wide planning (e.g., IAD in the Philippines);
- Comprehensive planning for particular resources (e.g., water, forests);
- Comprehensive development policy planning at the national or subnational level.

This study clearly states that, at present, there is no single optimal organizational arrangement to promote sustainable development. To the extent that we have identified alternatives that may be adopted for use in particular contexts and inspired others to pursue research in this important area, we have succeeded in our modest task.

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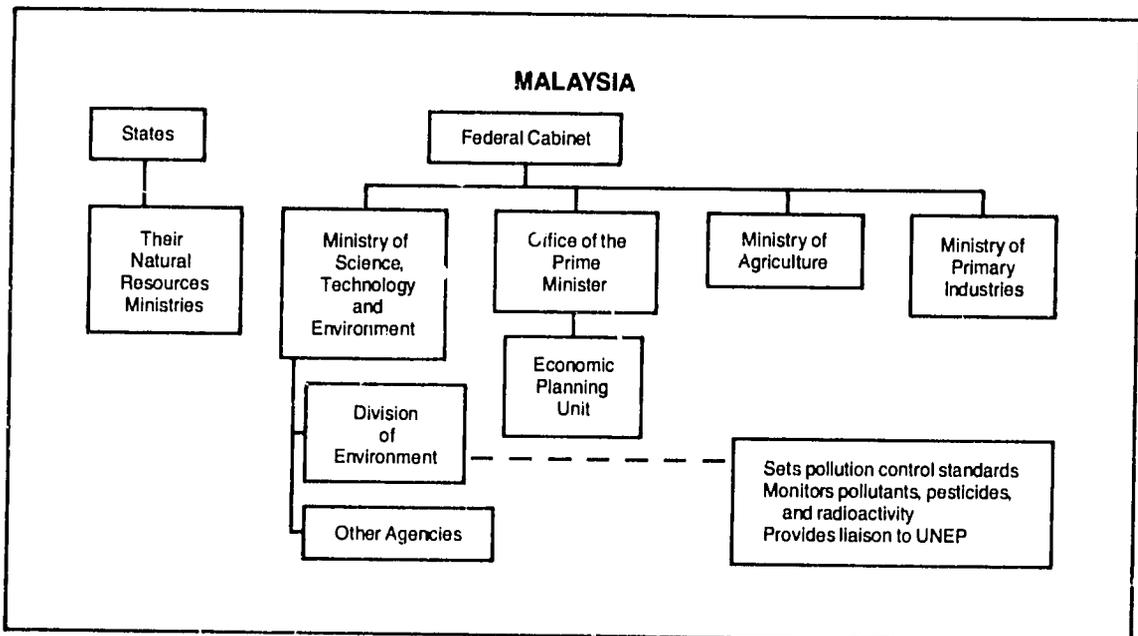
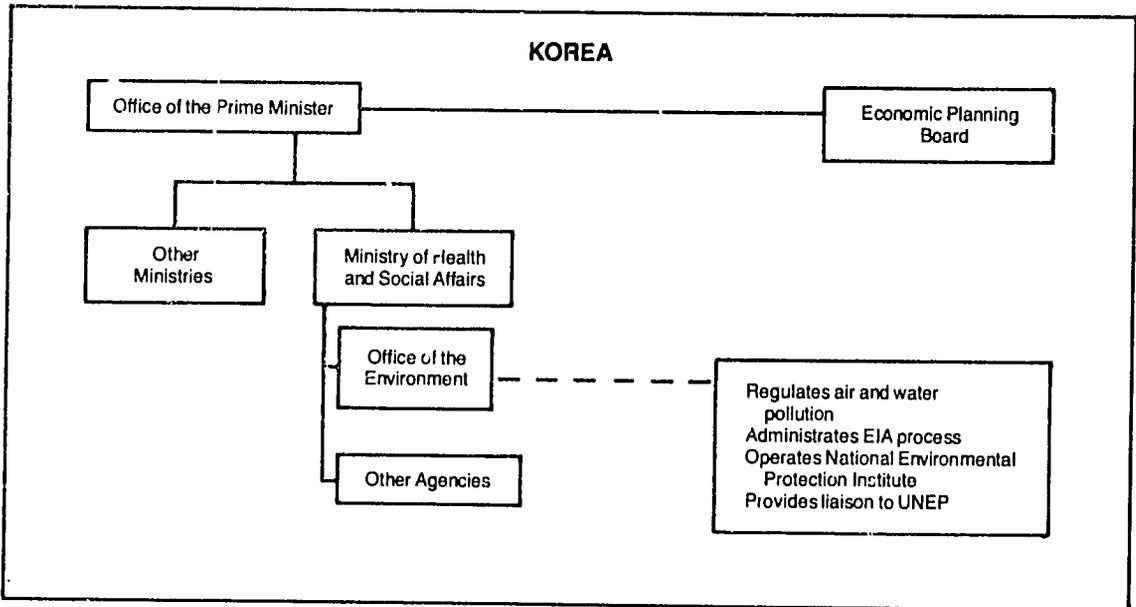
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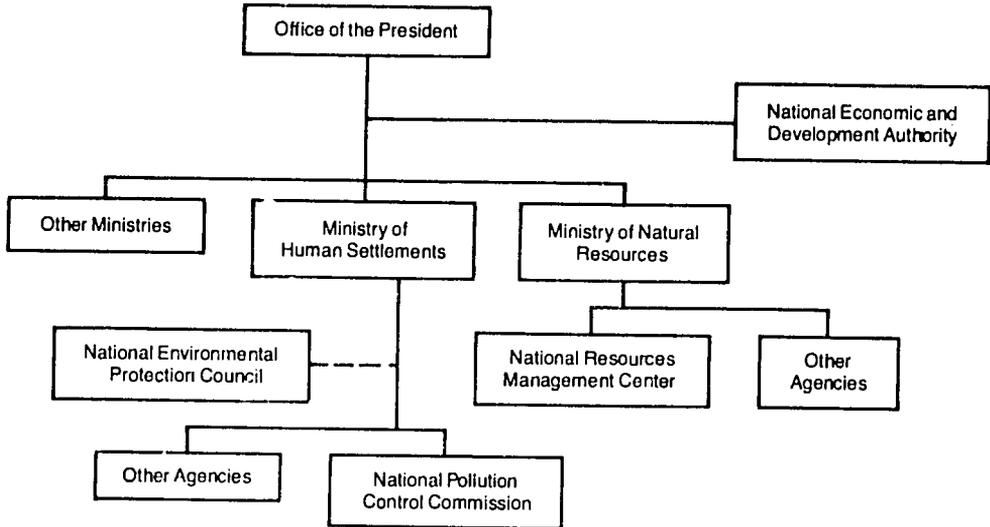
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## APPENDIX A

### Simplified Organizational Charts for Natural Systems Management

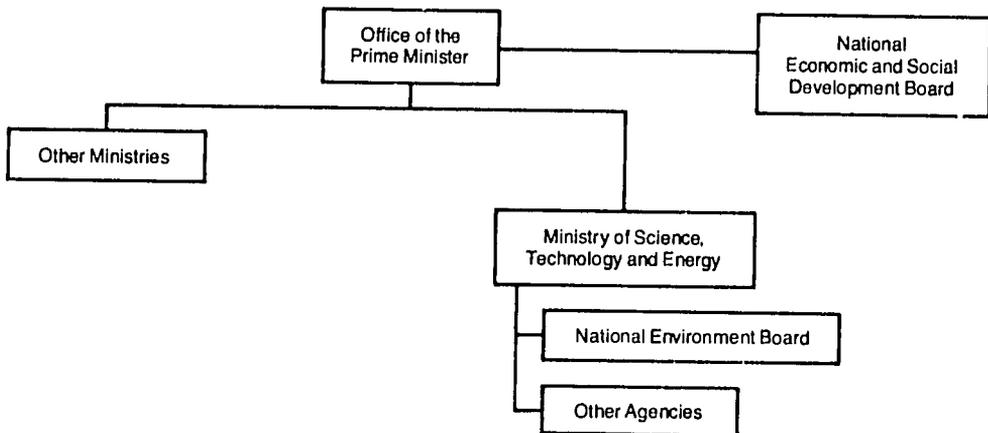


## PHILIPPINES

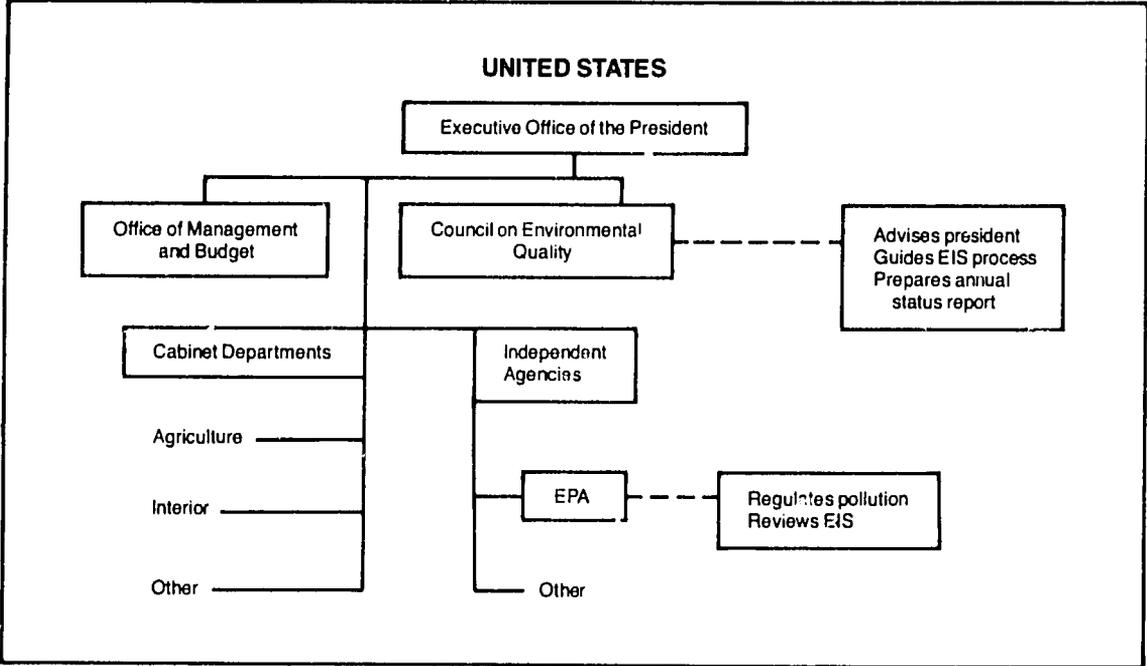


NEPC administers EIS process, provides liaison to UNEP.  
NPCC sets air and water quality standards.  
NRMC prepares EIS and operates remote sensing center.

## THAILAND



NEB sets pollution control standards, administers the EIA process, and provides liaison to UNEP.



## APPENDIX B

### Ranking of Key Organizational Variables

Program participants sought to identify the relative importance of organizational variables affecting natural systems. In this exercise organizational variables were first nominated by the participants. Then each participant was asked to rank order the variables in terms of their perceived importance in ensuring "successful" management. The individual scores were summed, and this ranking is reported in column 1.

In the second exercise, done two days after the first, participants again sought to determine the importance of each variable by examining the "interaction effect" of paired comparisons among the variables. Each variable was paired with all the other variables and the "importance" of the interaction was rated on a 3-point scale. From this exercise rankings among the variables were compiled. These rankings are reported in column 2.

The primary value of the exercise was in the discussions it provoked about the meaning of each variable and the individual considerations that motivated the assignment of ranks.

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Variable	Type 1	Type 2
Concentration of Authority	7	4
Administrative Environmental Controls	5	5
Political Clout	1	2
Organizational Effectiveness	4	1
Resources	2	3
Hierarchical Integration	11	9
Coordination	6	6.5
Conflicts	12	10
Compliance Mechanisms	9	6.5
Policy Articulation	3	8
Monitoring	8	12
Experience	10	11
Stability	12	13

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