

**Integrated Coastal Zone Management:  
Policy Issues, Approaches and Research Priorities**

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**INTEGRATED COASTAL ZONE MANAGEMENT:  
POLICY ISSUES, APPROACHES AND RESEARCH PRIORITIES**

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**PROBLEMS AND ISSUES IN INTEGRATED COASTAL ZONE MANAGEMENT:  
THE CASE OF MALAYSIA**

Over the last several decades, Malaysia has experienced rapid industrial growth and urbanization, characterized by high levels of resource exploitation. Much of this development has occurred within the coastal zone.

Malaysia is a coastal state, with a 48,000-km coastline. Key coastal ecosystems include mangroves, sandy beaches, coral reefs, estuaries and mudflats. About 36 percent of the country's 15 million population live in the coastal zone. Some 110,000 fishermen are directly dependent on the coastal fisheries resources. Fisheries supply approximately 75 percent of the protein requirement of the country's population. Mangrove forest in Malaysia covers about 600,000 ha.

The coastal zone is the site for important ports and harbors and the coastal waters are the main means of transportation in many parts of Malaysia. With the promotion of tourism, the coastal zone is also the center of recreational activities. Much of the terrestrial area in the coastal zone is in agriculture including oil palm, rubber, coconut, aquaculture, and fruits.

**Management and Resource Use Conflicts**

Rapid economic development and efforts to increase the standard of living in Malaysia have resulted in conflicting uses of resources in the adjacent land and sea area. In the last few decades, the sediment load of rivers has increased tremendously due to the conversion of forest land for agriculture, logging, mining, urbanization and other economic development activities. Between 1972 and 1983, 4.8 million ha of forest land in Peninsular Malaysia were cleared for development under the seven regional land development schemes by the Ministry of Land and Regional Development. Consequently, more than 50 percent of the rivers in Malaysia are heavily polluted with silt and chemical contaminants, resulting in filling of estuaries and destruction of coral reefs.

Although certain mangrove areas, such as the Matang forest reserve, are well managed on a sustainable basis, several large mangrove areas have been cleared for agriculture, housing, aquaculture and industrial purposes. This has resulted in the loss of habitats and livelihoods. Coastal erosion, due to construction of tourism facilities and other poorly planned development, has resulted in coral reef destruction and deteriorating water quality.

Fish landings, which increased three-fold from 200,000 t in the early 1960s to 700,000 t in 1980, showed a sharp decline in catch per unit effort during the same period. This situation, together with the high percentage of trash fish landed, indicate that the inshore fishery resources are overexploited.

Pollution is being caused by indiscriminate dumping of solid and toxic wastes into natural waterways. From 1980 to 1984, Malaysia experienced six major oil spills in the Strait of Malacca and the South China Sea. The control of discharge from ships both within the harbors and in the open sea is hampered by the lack of treatment facilities and by Malaysia not being a party to the relevant International Conventions for the Control of Pollution from Ships.

### **Legal and Institutional Arrangements**

Malaysia is a federation of 13 states and the Federal Territories of Kuala Lumpur and Labuan. The State government has jurisdiction over all land, minerals and waters up to 3 miles from shore, while the Federal government has jurisdiction over these same resources which are beyond 3 miles from shore and over all marine and estuarine living organisms and plants life, except in the states of Sabah and Sarawak. Forest and freshwater organisms and plants and turtles fall within the jurisdiction of the State government.

Coastal zone management is a new concern in Malaysia. There is yet no policy or legislation which singles out the coastal zone as an area of special interest for management. Nor is there a single body or act which has established a comprehensive mechanism for the effective coordination of all the various laws and jurisdictions pertaining to development in the coastal zone. There are more than 10 parent acts and many subsidiary pieces of legislation which have relevance to coastal zone management. Except for the Fisheries Act of 1985, which makes it the responsibility of the government to ensure sustainable and optimal exploitation of the living resources in the sea and subsoil of the seabed, none of the other existing legislation has any clear mandate as to the management of the coastal resources on a sustainable basis.

The authority for the development and management of all land and non-fisheries resources lies with the respective State governments. The regulation, control and planning of land use and building rests with the local authorities who are involved in planning and who are subject to the guidelines established by the State Planning Committee. Although the Federal government may recommend national policies pertaining to development, it is up to the discretion of the State government whether or not to adopt them.

### **Plan Formulation and Implementation**

Planning and management of resources in Malaysia has traditionally been conducted on the basis of single economic sectors and regions and has not embraced broader multisectoral or multiresource system approaches. This unisectoral approach greatly limits finding effective solutions to management of complex, interrelated coastal resource systems. While there have been several attempts at coordination of agencies for resource management, the absence of a strong mandate for such actions and a three-tier system of government has not resulted in a significant shift away from the unisectoral approach (Ch'ng 1988, 1991).

## INTRODUCTION

The multiplicity of laws and agencies involved in development in Malaysia and the interrelated nature of coastal resource systems illustrates the complexities of planning for integrated, multisectoral coastal zone management in developing countries. Rapid urbanization and economic development in many countries of the world have spawned a host of complex resource use conflicts and environmental degradation problems in the coastal zone. The issues have become more serious in many coastal developing countries beset with hunger, unemployment, poverty, rapid population growth, large-scale, quick-profit commercial enterprises, and lack of awareness and understanding of the economic contribution of coastal resources.

Conventional unisectoral resource management has not been effective in addressing the complex management issues of the coastal zone. These issues are often multisectoral in nature wherein the activity of one sector depends upon or adversely affects the activity of others. The coastal management issues have become a major threat to economic stability and environmental quality; intensifying use conflicts and creating social unrest. The need for an alternative equitable and efficient management system is obvious.

An integrated management approach to coastal resource utilization has been in place in the United States since the early 1970s with varying degrees of success. Since then, a number of coastal nations have attempted or practiced various forms of coastal management. Since the last decade, integrated coastal zone management (ICZM) has been widely considered as a viable alternative to conventional unisectoral management. Thus, national and international efforts have been directed towards promoting public awareness and ICZM programs in Southeast Asia, South and East Asia, Europe, the Caribbean, and Latin America (Clark 1991).

Recognizing the socioeconomic importance of the coastal zone, the recently concluded United Nations Conference on Environment and Development (UNCED) has prominently placed integrated management of coastal and marine areas in the now famous Agenda 21. More coastal nations, donor agencies and banking institutions are now focusing greater attention on the planning, development and management of the coastal zone.

Despite the above efforts, the problem in the application of ICZM lies in the lack of appropriate typology and adequate guidelines for adoption under varying political, social, cultural, economic and environmental conditions. In addition to an understanding of the biophysical and socioeconomic conditions of coastal resources and users, ICZM will require effective coordination, complemented by strong government mandates, political will, legal instruments and financial inputs. These are new concepts in many developing countries and will require a restructuring of institutions and legislation.

The purpose of this paper is to discuss essential concepts, issues and experiences for establishing policies and research priorities for integrated coastal zone management in developing countries. The paper is based heavily on lessons learned through ICLARM's six-year experience of ASEAN/US Coastal Resources Management Project.

## CONCEPTS AND DEFINITIONS

Before entering into a discussion of integrated coastal zone management, some concepts and terms need to be defined. The definition of many of these concepts and terms have only recently been agreed upon. This section is based, in part, on a report by Sorensen and McCreary 1990.

**Coastal Management.** Coastal management refers to any government program established for the purpose of utilizing or conserving a coastal resource or environment. It is a broad term and is intended to include all types of governmental intervention in a society. Use of the term implies that the governmental unit administering the program has distinguished a coastal area as a geographic unit apart, yet between, the ocean domain and the terrestrial or interior domain. The resources and/or environments being managed define the geographic extent of the coastal area. The coastal management program can consist of just one type of resource, or, as is more common, several types of resources.

**Coastal Area.** The term "coastal" conveys the notion of a land-ocean (or estuary) interface. The land-ocean interface has two principle axes. One axis lies parallel to the shoreline (or longshore). The other axis runs perpendicular to the shore (or cross shore). The cross shore axis profiles a coastal zone of transition between the ocean (or estuary) environment and the terrestrial or inland environment.

Coastal area refers to a geographic space that has not been defined as a zone. In other words, in coastal areas the inland and the seaward boundaries to the zone have not been set. Use of the term merely means that there is a national or subnational recognition that a distinct environment exists between the ocean and terrestrial domains.

**Boundaries.** Given the environmental, resource and governmental differences among coastal nations and subnational units, there is considerable variety in the selection of boundaries to delineate both the seaward and inland extent of the coastal zone. Ideally, a coastal nation or subnational unit should set boundaries of the coastal zone as far inland and seaward as necessary to achieve the objectives of the management program. Since problems and opportunities that motivate the creation of a coastal zone management program vary considerably from one unit of government to another, the selection of coastal zone boundaries would also be expected to exhibit considerable variation among coastal nations as well as subnational units (Fig. 1).

The boundaries of the coastal area should be based upon the issues to be addressed in the coastal management program, e.g., the problems to be solved by the coastal management program exist within a certain area and this area can be defined as the coastal zone for either a nationwide or a subnational program. Ideally, the boundaries should be set as far inland and seaward as necessary to achieve the objectives of the program. Making the coastal zone too large may limit the authority the program can expect to gain and may jeopardize the chances to achieve integrated resource management.

**Coastal Systems.** At least nine major systems affect coastal management: (1) large scale geomorphic or oceanographic units, (2) estuary watersheds, (3) estuary circulation systems, (4) ocean basins, (5) longshore circulation cells, (6) air basins, (7) populations of sport and commercial species, (8) watersheds, and (9) public service systems. Of the nine systems, four are specific to the coastal zone - (1), (3), (4) and (5). Five systems have hydrologic dynamics as the interconnecting mechanism. A recognition that these nine systems interconnect the coastal zone through impact networks must be a cornerstone of coastal zone management.

Developing coastal nations probably will be concerned with management of those coastal systems which have direct and significant effects on the national economy or society. They may be less concerned with protecting coastal viewsheds unless coastal tourism is an important sector of the economy.

***Coastal Sectoral Management or Planning.*** Coastal sectoral management or planning connotes the management of a single resource or use by a unit of government. For instance, a program focused on control of shoreline erosion in the coastal zone is a coastal sectoral management program.

***Integrated Management.*** The purpose of integrated management is to allow multisectoral development to progress with the fewest unintended setbacks and the least possible imposition of long-run social costs. In contrast to a sectoral development plan, the focus of an integrated management plan is on mitigating measures to reduce social costs associated with sectoral activities accruing both inside and outside the sector in question. To be effective, management plans should be integrated with development plans, and implementation in a coordinated fashion.

***Integrated Coastal Zone Management.*** Integrated coastal zone management (ICZM) is a dynamic process in which a coordinated strategy is developed and implemented for the allocation of environmental, sociocultural and institutional resources to achieve the conservation and sustainable multiple use of the coastal zone.

ICZM should have the following five attributes:

- (1) It is a process that continues over considerable time. ICZM is a dynamic program that usually will require continual updating and amendments. It is not a one-time project.
- (2) It has a geographic boundary that defines a space which extends from the ocean environment across the transitional shore environments to a specified inland extent.
- (3) There is a management arrangement to establish the policies and process for making allocation decisions.
- (4) The management arrangement uses one or more strategies to rationalize and structure the allocation decisions.
- (5) The management strategies selected are based on a systems perspective which recognizes the associations between coastal resources and processes. The systems perspective usually requires that a multisectoral approach be used in the design and implementation of the management strategy.

ICZM involves a non-sectoral approach to the management of coastal resources. It must consider the environmental, natural resource, socio-economic, political, cultural and geographic dimensions of the coastal zone in a multisectoral framework.

***Ocean Management.*** Ocean management involves national direction and control of "ocean space" including surface waters, the water column, the seabed, and the subseabed. The area covered by ocean management can extend from the inland limit of national jurisdiction (usually mean high or low tide) out to the ocean extent of its most seaward claim. Most coastal nations have established an Exclusive Economic Zone (EEZ) as a result of the Convention on the Law of the Sea. The EEZ is usually 200 nautical miles oceanward from the coastal baseline.



***Differences and Commonalties Among Coastal Nations.*** Sorensen and McCreary (1990) have identified six main characteristics they found useful in distinguishing a coastal nation's disposition to coastal resources management. A developing countries coastal characteristics also suggest alternative governance arrangements and management strategies for coastal programs. These characteristics are:

- geographic disparities (dimensions of coastlines and ocean claims; the larger the coastline, the higher value to coastal management);
- coastal resource value (economic sectors linked to the coast, which influence the value nations attach to coastal resources);
- concentration of development and population;
- coastal orientation (contribution, dependence, cultural);
- level or degree of development of the nation; and
- existing or potential government powers in the coastal zone.

### COASTAL AREAS AND SUSTAINABLE DEVELOPMENT

Geographically, coastal areas form the interface between land and sea, the complex physical and biological processes played out there testifying to the close terrestrial-aquatic links. Ecologically, coastal areas contain a number of critical terrestrial and aquatic habitats, which comprise unique coastal ecosystems, containing a valuable assortment of natural resources.

A coastal ecosystem (e.g., coral reef, mangrove forest, seagrass beds, marshes, sandy beach-dune, lagoons-estuaries) or cluster of ecosystems provides goods and services, especially to human users. A great variety of such goods and services are generated by these natural systems, both renewable and nonrenewable; some of which form the economic backbone of many developing countries. Apart from direct contribution to food and employment, the resource systems also provide environmental services that are often intangible and difficult to quantify in monetary terms. For example, among the many functions of coral reefs is that it acts as a physical barrier against wave action generated by ocean and tidal movement thereby reducing coastal erosion. Likewise, mangroves, which in addition to serving as an important nursery ground for fish, traps sediments to prevent loss of nutrients and erosion of coastal lands. The coastal waters also provide services such as navigation, recreation and industrial uses apart from its obvious environmental role in various coastal ecosystems. These natural productive and defense systems are maintained in ecological equilibrium through the interaction of a set of physical, chemical and biological processes.

These interrelated ecosystems are closely linked with the socioeconomic systems to form resource systems. Resource systems can be conceptualized as encompassing the interactions among biophysical, terrestrial and aquatic environments and human activities, including the governing institutional and organizational arrangements. The cross-hatched area in Fig. 2 represents the coastal zone, while the shaded area illustrates the coastal resource system.

Ecological imbalance occurs when human intervention begins to affect the coastal processes by impairing the functional integrity of the resource systems. The net consequence is the degradation of the resource base and a breakdown of its goods and services delivery system. This trend is particularly evident in many developing countries in Asia and to a certain extent in Latin America. For instance, many of the coastal fishing grounds in Asia (e.g., Gulf of Thailand, inland seas of the Philippines) are heavily fished beyond their biological and economic maximum sustainable level.

Coastal areas have long been focal points of human activity. Developing economies tend to be dominated by resource-based activities. Economic diversification, while increasing the complexity of economies and making the component sectors more interdependent, does not necessarily reduce significantly the dependence on natural resources, and can, in fact, increase both the occurrence and severity of natural resource and environmental conflicts.

As a result, natural resource and environmental concerns present a significant development challenge in coastal areas. Degrading and overexploitive uses of land, water and other coastal resources, and disruption of environmental processes through degradation of environmental quality and loss of critical terrestrial and aquatic habitats can lead to serious deleterious impacts on the health and productivity of coastal ecosystems, adversely affecting the food availability, health and economic welfare of coastal peoples.

On the one hand, unmanaged economic growth, a commonly pursued path to development, often creates pollution, destroys natural habitats and encourages excessive depletion of natural resources. In such cases, development efforts are undermined because rising incomes from economic growth in these areas are offset by costs imposed by pollution on, for example, health and quality of life. Also, natural resource problems such as loss of critical habitat through irreversible conversion into other uses may reduce productivity of, and resulting economic benefits derived from, current coastal activities and limit potential for productive activities and benefits in the future.

On the other hand, many environmental problems, such as persistent excess effort and overinvestment in fisheries in much of the developing world, are the indirect result of lack of other opportunities - a condition caused by inadequate levels of economic development - coupled with open access. For example, many coastal fisheries contain no effective or enforceable barriers to entry, and are severely overfished. Despite the low incomes of many of the fishers, their extremely low opportunity costs resulting from lack of alternative employment significantly hinder their exit from the fishery. This creates dissipation of resource rents (profits) and serious and wasteful misallocation. Resource rents dissipation involves the loss of benefits which could be derived from unpriced inputs into the fisheries production process if they were used more efficiently. Unpriced inputs include fish stocks and undegraded habitat, for which fishers don't have to pay to use.

The solution to this downward spiral is not to accelerate or decelerate the pace of development, or to increase or reduce its magnitude. Rather, it is necessary to develop differently, that is, in a word, sustainably. For development to be sustainable, it must meet multiple objectives - economic, social and environmental. In pursuit of sustainable development, available coastal resources and the coastal environment must be allocated and used efficiently and equitably among diverse uses, such as agriculture, aquaculture, tourism, industry, residential and capture fisheries. Appropriate allocation of resources will require guidance and management interventions.

Current management measures unfortunately have not been successful in reversing the trend of resource degradation including conflicts arising from resource use. Hence, the threat to the functional integrity of resource systems remains unabated. Projected over time, unsustainable activities will lead to changes in coastal ecosystems that will be very difficult and costly to mitigate, e.g., building a coastal embankment to replace the removal of fringing mangroves along the coast. This trend may accelerate further with the expected increase in human population and economic development. If these issues are not effectively resolved or mitigated, particularly the continued disruption of ecological processes, loss of environmental function and habitat destruction, their adverse ecological and socioeconomic impacts will certainly negate or reduce whatever potential gains that could be obtained from successful implementation of research results and technological advances.

Significant implications for management are apparent. Intersectoral relationships among activities must be fully recognized and given due consideration in the choice of the economic activities to lead economic development and diversification in coastal areas; a more integrative approach is needed. Nevertheless, some tradeoffs are inevitable, and should be anticipated. Beneficial development may continue to entail some environmental losses, such as some degree of wetland draining and mangrove conversion, since to ban these completely would likely impose high opportunity costs. To minimize societal losses associated with these tradeoffs, a well-balanced management perspective is needed in which the benefits and costs of alternatives are critically compared, the appropriate management interventions known and made available, and the necessary institutional and organizational arrangements worked out and put in place.

Constructively, critical evaluation of tradeoffs requires that the positive and negative socioeconomic effects of coastal activities, including environmental effects, be assessed in the context of the prevailing national development objectives and the societal goal of sustainable development. Such an analysis should explicitly account for environmental costs in addition to the private benefits and costs attributable to the coastal activities. Even if development activities are privately beneficial, they should not be undertaken unless there are positive net social benefits.

For most goods (e.g., fish) and services (e.g., tourism), prices are established in the market, and these prices represent their real value to society. However, for other goods (e.g., seagrass beds) and services (e.g., nursery or shoreline protection functions of mangroves) for which effective and enforceable property rights do not exist, accurate values are not set by the market due to market failure, or complete inhibition of market formation. Whereas no markets typically exist for seagrass beds, land markets sometimes exist for mangrove areas. However, these markets fail to incorporate the values which accrue more broadly and therefore would be difficult for a purchaser of the mangrove area to capture.

Exacerbating market failures are policy failures, wherein government actions actually encourage activities which result in non-optimal resource use and environmental change. For example, heavy subsidization of irrigation water tends to encourage inefficient water use in irrigated agriculture, and often leads to excessive withdrawals from surface waters and underground aquifers. Severe environmental impacts can result, such as land subsidence and change in salinity patterns of estuarine habitats.

In the absence of effective property rights and their enforcement, markets often fail. This failure results in externalities or spillover effects, wherein some benefits or costs associated with a production or consumption activity are external to the one undertaking it. Consequently, the person producing the externality will not take into account its effects on others. In the case of a negative externality, the full costs of the activity are not considered in decisions and it is continued beyond the socially desirable level.

Both market and policy failures abound in coastal areas. A solution is to correct the distortion caused by market and policy failures through a variety of government and community/indigenous interventions. This may include changes in property rights and other institutions governing resource use; policy instruments such as market-based incentives and regulatory measures; and direct public investments.

For example, to address the specific issues of loss of coral reef habitat, a combination of several management actions can be taken. Rights governing the use of specific coral areas can be clarified by establishing territorial uses rights in fisheries for the local communities. In addition, destructive fishing methods, such as blast fishing and muro-ami, as well as coral extraction can be directly regulated and enforced by the community. A market-based disincentive can be used through the imposition of taxes on coral products. Finally, the public can become involved through public investment in natural reef-seeding programs, the placement of artificial reefs, and the establishment and management of marine parks and protected areas.

Guidance for appropriate government intervention is best achieved through a multisectoral, integrated approach that addresses the key factors - biotechnical, economic, social and institutional - that influence progress toward sustainable development. It is essential to evaluate the functional integrity of the coastal resource system as a whole instead of directing attention at only one component or sector of the system. Integrated coastal zone management planning is an attempt to meet this challenge through the identification of relationships, both diagnostically and prescriptively, between and among these relevant factors.

### EVOLUTION OF COASTAL AREA MANAGEMENT

Sorensen and McCreary (1990) have identified a process which nations (and subnational units) follow in the evolution of integrated coastal zone management programs. These steps begin with an initial awareness stage and culminate in program implementation and evaluation (Fig. 3). The general process is described below.

***Incipient Awareness (Stage 1).*** Political recognition by a nation or subnational unit of the need for an integrated coastal management program usually requires obvious coastal resource damage or extensive destruction from coastal hazards. These events are compounded by the occurrence of intense conflicts among different coastal use activities and their associated interest groups. In other words, a nation's or subnational unit's coastal resources and environments usually have to exceed some threshold of resource degradation, natural hazard destruction, or conflict before government will take action. In addition, international travel of government, industry and academic representatives to conferences and visits by foreign experts stimulates awareness of the prospects for ICZM. This process of coastal awareness has been documented and followed in ten nations - the United States, England, France, Greece, the Australian states, Sweden, Ecuador, Sri Lanka, the Philippines, and Thailand.

***Growing Awareness (Stage 2).*** National conferences, workshops or hearings are usually the next step in program evolution. Such meetings or informal dialogues may be convened by government agencies, universities, industry associations or nongovernmental organizations.

During this stage, the specific issue(s) which will motivate the creation and implementation of a coastal resources management program are defined. Issues must be understood to ensure that the institutional arrangement fits the problems that the program is intended to solve. These issues drive coastal management in program design, program evaluation, information exchange, setting international assistance priorities, and defining the field of coastal zone management.

Generally, distinctions have been made between the following four issues:

- impacts of one coastal area activity (e.g., tourism development or filling wetlands) on others (e.g., decreased fishing yields);
- coastal hazards or impacts of natural forces (e.g., shore erosion, river flooding, ocean born storms) on coastal use activities;
- development needs or sectoral planning (e.g., fisheries development plan);
- organizational process problems, such as an inadequate data base or lack of coordination.

***National Study (Stage 3).*** Conferences, workshops, or visits by international assistance missions often lead to the preparation of national studies. Such studies typically analyze coastal resources, institutional arrangements, and management options.

***New Program Creation (Stage 4).*** The national studies in the previous stage lead to the initiation or revision of coastal management programs. It should be noted that ICZM may be initiated first at the subnational regional scale before going nation- or state-wide.

***Program Development, Implementation, and Evaluation (Stages 5 through 8).*** Solid information is available on ICZM programs implemented in eight nations including Australia, Costa Rica, Ecuador, the Philippines, Sri Lanka, Japan, the United Kingdom and the United States. The successes and failures of these initiatives are informative for coastal nations considering ICZM and to countries engaged in ICZM.

In addition to the above process, two other avenues to ICZM development have been identified. Ocean management programs spawned by the Convention on the Law of the Sea, such as Brazil's ocean resources planning programs, may spin off a coastal zone management component as a separate program. The second avenue is the evolution from a coastal and marine research coordination program, as was developed in Columbia.

## INSTITUTIONAL ARRANGEMENTS AND MANAGEMENT STRATEGIES

There is no shortage of departments and agencies, at all levels of government, with a mandate in the coastal zone. A broad range of institutional arrangements, policy instruments and management strategies exist to help allocate coastal resources among competing and conflicting interests. The problem is that the coastal area is the shared responsibility of many agencies and interests, but the sole responsibility of none. Further, while many separate laws and regulations concerning activities in coastal areas can be identified, there are most often no explicit management policies for coastal resources in existence at the national level.

In most nations, sectoral approaches have evolved to manage specific resources or activities in isolation. The problem is that the resources and systems being managed do not operate in isolation, but form part of an intricate web of ecological and human interactions.

Institutional arrangements are the composite of laws, customs and organizations established by society to allocate scarce resources and competing values. Every coastal nation has established its own institutional arrangement for managing coastal resources and environments. Five important components of a society's institutional arrangement are: (1) legal and administrative authorities, (2) customs and traditions, (3) governance arrangements, (4) nongovernmental organizations, and (5) management strategies.

As countries increase their level of socio-economic development, their arrangements for

national governance become more complex. This complexity is brought about by sectoral, functional and hierarchical differentiation in policy and planning activities. Government bureaucracies are established to meet specialized sector and functional responsibilities. In addition, most nations have three or more hierarchical levels of government: national, state or provincial, and local.

The interconnection of important coastal-dependent economic sectors is the central reason for integrated coastal management in developing nations. For example, integration of fisheries, tourism, oil and gas development, and coastal hazards regulation is essential because they share the same coastal zone as well as the same environmental and public service systems. Positive and negative consequences of these linkages demonstrate the need for integrated coastal management in developing nations (Sorensen and McCreary 1990).

There are several ways in which a nation can address the institutional arrangements for the management of the coastal zone. Coastal nations may act within their prevailing legal and organizational framework to improve the working of the resource management systems through the expansion of duties of an existing agency, as was done in the United States. Alternatively, they can concentrate authority in a new centralized agency, as was done in Australia and Sri Lanka. Or they can create a permanent interministerial council or network to coordinate program management, policy making, land use allocation, or development, as was done in the Philippines and Ecuador.

Still other supplemental arrangements are available to increase the responsiveness of sectoral agencies and expand participation in decision making. Such temporary strategies, usually invoked to set policy for specific issues or to resolve site-specific conflicts, include the following:

- create an ad hoc panel to guide policy or to organize a fact-finding process to clarify technical issues;
- engage a facilitator and convene a policy dialogue among key coastal actors to recommend specific policies or programs;
- engage a mediator to lead parties through a face-to-face negotiation of specific conflicts;
- engage a minister or other respected intervenor(s) (other than the courts) to arbitrate a dispute;
- finally, there is usually the option of seeking a legal remedy through the judicial system. However, the judicial system is unlikely to formulate a complex remedy such as a coastal zone management program (Hildebrand and Norrena 1992; Sorensen and McCreary 1990).

While a nation would normally have only one major institutional arrangement at a time, this would not necessarily preclude supplementary strategies.

The management strategies currently used to implement coastal resources management are numerous, but are heavily oriented toward regulations. Land use zoning is recognized as one of the major instruments for allocating coastal resources and uses. Economic instruments, such as user charges, the polluter-pays principle and the allocation of property rights are increasingly being used within a tight regulatory framework. Additional management strategies include: national economic planning, broad-scope sectoral planning of coastal uses or resources, regional seas, special area or regional plans, shoreland exclusion or restriction, critical area protection, environmental impact assessment, mandatory policies and advisory guidelines, acquisition programs, and coastal atlases and data banks (Sorensen and McCreary 1990).

These strategies are not mutually exclusive, but are usually mutually supportive. Sri Lanka uses nationwide land use planning and regulation as its principal strategy for coastal zone management supported by national economic planning and impact assessment. Indonesia depends heavily on environmental guidelines, reinforced with national economic planning, and is moving towards greater dependence on regional or specialized planning together with a national land use planning framework.

#### **LESSONS FOR INTEGRATED COASTAL ZONE MANAGEMENT: THE ASEAN/US COASTAL RESOURCES MANAGEMENT PROJECT**

The following sections are drawn from papers by Scura et al. 1992 and Chua 1992.

#### **Background of CRMP**

In 1986, against the backdrop of serious resource overexploitation, environmental degradation and escalating resource-use conflicts resulting from the sectoral orientation of development and management in coastal areas, the six members of the Association of Southeast Asian Nations (ASEAN) - Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore and Thailand - began a collaborative effort to develop integrated coastal resource management (CRM) plans in their respective countries. The six-year, US\$5.8 million effort - the ASEAN/US Coastal Resources Management Project (CRMP) - received financial support from the United States Agency for International Development (USAID) and the technical assistance and international coordination of the Coastal Area Management Program (CAMP) of the International Center for Living Aquatic Resources Management (ICLARM).

The CRMP was the first regional effort in coastal area management (CAM), and was organized by the ASEAN members themselves. While project management and coordination was provided by ICLARM, an independent international organization, the project coordinator was from one of the ASEAN members.

While the regional effort was designed and coordinated to address CAM problems common among the ASEAN members, it was necessary for each country to develop its own customized plan. Social and economic circumstances in each country determine to a large extent the occurrence of specific CRM issues. Similarly, the special political, cultural and other institutional conditions influence significantly the appropriate mix of management plan elements. In addition, likelihood of management plan implementation is increased significantly if the plan is developed from within.

In fact, the primary purpose of CRMP was to provide financial and technical assistance and to otherwise support and encourage the improvement of domestic abilities in technical, institutional and organizational approaches for managing coastal areas in the participants' countries. The CRMP was divided into two complementary components: Component 1 focused on management plan preparation, while Component 2 emphasized human resources development and creating a constituency for change through public education and information dissemination.

Pilot coastal sites were selected in the six countries and intensive, interdisciplinary planning programs were conducted, involving over 200 resource and scientific personnel from 49 institutions including universities, government agencies and nongovernmental organizations (NGOs). In addition, training courses, workshops and conferences were held, and publications and educational materials were disseminated as part of CRMP.

Pilot sites were chosen by the respective countries based on mutually agreed criteria:

- the presence of economically significant coastal fisheries, particularly small-scale capture fisheries and aquaculture;
- the coexistence of coastal development efforts that compete for limited resources;
- the direct relationship of management issues in the pilot coastal areas with national priorities for coastal development;
- the opportunity to cooperate with regional and local organizations in developing a comprehensive management and development plan for the coastal zone;
- complementarity/consonance with the development plans and projects of host country agencies, other donors and USAID.

The six participating nations chose the following sites as their project sites:

|                   |                              |
|-------------------|------------------------------|
| Brunei Darussalam | entire coastline             |
| Indonesia         | Segara Anakan-Cilacap        |
| Malaysia          | South Johore                 |
| Philippines       | Lingayen Gulf                |
| Singapore         | entire coastline             |
| Thailand          | Ban Don Bay and Phangnga Bay |

Also as part of CRMP, five regional workshops were conducted to address specific issues pertaining to CAM, and two major conferences were organized. Through these forums, CRMP was extremely successful in promoting awareness among policymakers and the general public in the region, as well as among the donor community and the media, of the rationale for and efficacy of CAM. The first multinational commitment to CAM - the Baguio Resolution - was adopted by participants at a project-sponsored policy conference, comprised of key policymakers from each ASEAN member, as well as extraregional participants including technical experts, and representatives of the media and donor agencies (Baguio Resolution 1990).

A direct result of the Baguio conference was heightened interest at the policy level in the pursuit of resolutions to specific CAM issues. One issue common to all ASEAN members, waste management in coastal areas, was the topic of another project-sponsored policy conference held in Singapore. Similar to the Baguio conference, the Singapore conference had the broad participation of ministerial and cabinet-level decisionmakers, as well as donor agencies and the private sector. The resolution of the conference participants - the Singapore Resolution - includes a series of formal recommendations for specific policies on waste management in the coastal areas of the ASEAN region (Singapore Resolution 1991).

The most tangible and enduring accomplishments of CRMP are, in fact, direct outputs of the two project components - a critical core of technically competent and experienced CRMP personnel in ASEAN countries, and pilot-site specific, implementable management plans accepted by their respective governments and implementing agencies. In fact, the CRMP integrated coastal zone management (CZM) plans are among the few good examples of their kind in developing country settings. There are even fewer models of successful implementation of CAM plans in developing countries. The CRMP has laid the groundwork for a significant contribution in the implementation arena as well, though full-scale implementation was not intended as part of the project. In most of the participating countries, the CAM plans have been officially accepted by the government to some degree and moves have been made toward implementation.

For example, in Indonesia, the plan has been approved by the relevant planning authority in the pilot-site area; a task force has been formed to coordinate implementation; and several



priority activities under the plan have begun to be implemented. Similarly, in Malaysia, the CAM plan has already been integrated into the state's town and country plans for implementation under the Sixth Malaysian Development Plan. In the Philippines, the CAM plan was recently endorsed by the Regional Development Council in the pilot-site area, and a technical secretariat to spearhead plan implementation has been formed. In Thailand, the plan, combined with other CAM efforts in the country, has received Cabinet approval, and funding has been appropriated for implementation.

Irrespective of the sizeable and palpable national and regional impacts of CRMP, ASEAN has not been its exclusive beneficiary. While ASEAN members share many common aspects and face similar issues, there is a great deal of sociopolitical and economic diversity, and differing resource endowments within the region. These differences significantly influence the appropriate composition of, as well as the nature of the need for, integrated CZM efforts. The CRMP created an unprecedented real-life laboratory for exploration of the complexities and subtleties of integrated CZM planning under diverse conditions. As a result, there are many generalizable lessons in the rich experience of CRMP.

The lessons from CRMP are of three major types: (1) management process-related; (2) development stage-related; and (3) institutional setting-related (Fig. 4).

The process-related lessons are relevant to the planning phase of the management process. These involve the general need for the essential mechanisms of integration and coordination in both planning and implementation of management actions, as well as the generally desirable characteristics of the major steps in planning, and the essential features of CAM plans.

There is certainly no single correct way to organize, plan and implement a CAM program. The plan must be tailored to fit into the institutional and organizational environments of the countries or regions involved, including political and administrative structures, cultural patterns and social traditions. Nevertheless, there are some generalizable features which encourage success.

Because of the multifaceted aspect of the coastal management issues and the multidisciplinary nature of the potential solutions, the traditional, disciplinary and sectoral planning and management approach has failed. It has become clear that effective management must embody two essential mechanisms: integration and coordination; that is, the planning process must be multidisciplinary and integrate all relevant issues. However, existing political and administrative realities make integrated implementation difficult, if not practically infeasible in some cases. Realistically, management actions will have to be implemented by various sectoral agencies. Therefore, coordination of these sectorally oriented agencies is essential to maintain the overall integrity of the management plan.

In addition, the management process must be organized and well structured to allow for periodic updating of the plan itself and adjustments to its implementation. The CRMP experience is drawn upon to illustrate the desirable characteristics of such a process, and the essential features of a good CAM plan.

The development stage-related lessons involve the likelihood of occurrence of specific management issues or problems created by transectoral effects of specific activities in coastal areas. The CRMP experience suggests a typology of coastal management issues which commonly occur with specific stages and levels of economic development, given resource endowments and the development directions being pursued in the planning area. This typology can be used as a heuristic tool to identify management issues likely to be encountered, given current stages of economic development, and to anticipate those likely to be manifested as economies diversify and evolve to be more complex. This typology allows planning to be more forward thinking, that is, proactive rather than reactive.

The institutional setting-related lessons focus on the opportunities for resolution of management issues. The choice of effective interventions is predicated on the existence of appropriate institutions and organizations. Again, the experience of CRMP suggests a typology which describes the influence of existing institutional and organizational arrangements on the right mix of management action elements. Initially, plans must be formulated in terms of an existing set of institutional and organizational arrangements. A major question is, however, the extent to which the existing arrangements provide adequate bases for management planning and implementation. Where these arrangements are found inadequate or constraining, the plan may propose changes. However, the reality that such arrangements are usually difficult to change in the short run restricts these adjustments. For practical purposes, management activities may have to be adapted to existing institutions and organizations initially, and desirable and feasible adjustments phased over the longer term.

### **Integrated Management**

CAM employs an integrated, multisectoral, strategic approach for the efficient allocation of scarce resources among competing uses, and minimizing unintended natural resource and environmental effects. The policy options and management strategies formulated within this framework are well founded on information on the natural function of ecosystems, the assimilative capability of the environment, the motivations of and incentives faced by people using the resources, the economic setting, and the ways and means to bring private behavior in line with social goals.

In this sense, CAM must be viewed as a system with three mutually supporting dimensions, graphically represented as a cube in Fig. 5. The dimensions of the cube are: (1) management process; (2) identified management issues; and (3) management actions. The cube is actually made up of a number of blocks fitted together. The base of the cube is formed by the planning blocks, which have both management issue and management action dimensions. The next layer of the management system cube is formed by the implementation blocks, and the final layer by the monitoring and evaluation (M&E) blocks, both of which also have management issue and action dimensions. All three dimensions of the management system are essential. If any of the dimensions is ignored, the system will eventually collapse or be rendered ineffective. The enlarged boxes in Fig. 4 illustrate the planning process and management actions related to a particular management issue, overfishing.

The management process is iterative and involves three main steps - planning, implementation and M&E. For ease of illustration, these steps can be viewed as sequential, but in reality they are often overlapping (Fig. 6).

The process is oriented toward identification and resolution of the management issues. In the context of CAM, these could include problems such as pollution, habitat degradation, nonoptimal resource exploitation, shoreline erosion and other resource-use conflicts.

The management issues are often grouped into general categories to be addressed by specific management action plans, such as water quality and habitat protection. These action plans are actually made up of a bundle of management actions, each of which addresses specific parts of the management issues. The general categories of management actions are **direct public involvements or investments; interventions directed at the modification of human behavior, including policy instruments such as regulations and market-based incentives; and the institutional and organizational arrangements needed to facilitate the accomplishment of the management activities.**

All three management system dimensions - process, issues and actions - will be discussed in more detail and illustrated by examples from ASEAN/US CRMP in the next section.

## **ASEAN/US CRMP**

### **Plan for Planning**

The planning process begins with an inception stage during which the geographic and temporal scopes of the plan are determined, planning objectives and evaluation criteria are defined, and a workplan elaborating the conditions for and approach to the studies and analyses is adopted. Under CRMP, guidance for this step was provided by ICLARM's CAMP in consultation with project and national steering committees.

***Establishment of Planning Goals and Objectives.*** The goals and objectives of CAM are influenced significantly by local, regional and national development agenda. Nevertheless, CAM should be envisioned as a way of integrating a blueprint for sustainable development into traditional economic development planning and management. This is done through promoting integration of sectoral policies, investment strategies and management arrangements to facilitate conditions under which coastal activities, including capture fisheries and aquaculture, can best contribute to sustainable development and the welfare of coastal communities.

The goal of sustainable development embodies multiple objectives - economic, social, environmental - and relies heavily on appropriate institutions and policies to help guide resource use. The CAM plans provide concrete courses of action, which when incorporated into national development plans provide appropriate management actions to help move toward the goal of sustainable development. A prerequisite for this, however, is the acceptance of the management plan by the government and its support by the stakeholders in coastal areas.

***Composition of Planning Team.*** To meet the broad mandate laid out in the goals and objectives, the CAM team should be composed of the right mix of experts who have experience in the integrated management of coastal areas.

It is important that the plan is largely developed by locals rather than expatriates; the prospects for implementation are much better if locals consider the plan as their own and not one that is forced on them by outsiders. One must recognize, however, that there is a scarcity of expertise in CAM in developing countries. Therefore, it may not always be possible to obtain the services of local experts with broad-based training and experience in resource planning and management. The next best option is for a multidisciplinary team to be formed to undertake the job.

The core experts should together provide a broad perspective. The combination of their disciplines, which range from sociology, economics and institutions, to ecology and engineering, is adequate for a comprehensive management view. In some cases, technical backstopping may be required from a broader group of disciplines.

Ideally, the leader of the planning team should be a professional planner, who can provide the overall planning direction. The coastal planner should focus on general land- and water-use issues, and the institutional and organizational arrangements governing coastal activities, as well as those for activities outside the coastal area which have coastal impacts.

The resource economist should concentrate on identifying policy and market failures; estimating current and future demands for coastal resources; and placing monetary values on natural resource and environmental impacts. Furthermore, the economist should conduct benefit-cost analyses of management options, and identify opportunities for the use of market-based incentives and regulations.

The ecologist's work should have two main thrusts. First, the focus should be on the definition of the carrying capacity of the coastal area. Second, the ecologist should identify and quantify the current and potential impacts of human activities on coastal areas.

The sociologist should closely examine social and cultural issues, and be the point person to encourage community consultation and participation in the planning process. Finally, the environmental engineer should work with the ecologist to define the carrying capacity of the coastal area. Furthermore, the engineer should identify opportunities for physical and technical interventions.

An essential ingredient to successful CAM is the employment of appropriate leadership both at the planning and implementation stages. Of course, CAM must be steered by people who are technically knowledgeable. More importantly, perhaps, the CAM leadership must be able to coordinate the work of scientists and organizations, which may have conflicting interests and disciplinary biases.

A full-time coordinator as well as a team of full-time CAM staff is crucial to ensure effective and timely execution of CAM. One problem encountered by CRMP was that the national project directors or national coordinators were not assigned full time to the project. Because of their part-time involvement, some critical project activities were hampered particularly when immediate actions were required.

The quality of the coordinator is essential. Strong interpersonal and organizational skills are vital, apart from technical competence in CAM. One of the coordinator's main functions is to bring various agencies to work together and maintain close links with concerned officials at different levels of the government. Hence, trust and confidence in the coordinator is of utmost importance.

***Pilot Site Selection.*** One of the initial tasks under Component 1 of CRMP was to select a pilot site in each of the ASEAN members. For large countries with no experience in integrated CZM, it is a formidable task to develop a national program. It is therefore advisable initially to select a pilot site of a manageable size within the existing legal and institutional framework, which can eventually serve as a working model for other parts of the region or nation. The working model can be duplicated in other parts of the country and a national coastal policy can be developed.

**Definition of Boundaries.** Ideally for management purposes, the boundaries of a coastal area should be defined by the extent of the area of relevant interaction, including biophysical, economic and other social factors. Islands or small nations, such as Singapore and Brunei Darussalam, can be practically managed in their entirety. Unfortunately, for most other countries, the scale puts a practical limit on the extent of a manageable area. In these cases, there is rarely a clearly defined physical boundary, either landward or seaward, which incorporates all the relevant factors.

As a result, coastal area boundaries typically are defined by use of proxy boundaries. For example, (1) prominent physical landmarks or other physical criteria; (2) political boundaries; (3) administrative boundaries; (4) arbitrary distances; or (5) selected environmental units are often used. These proxies can be used either individually or in combination, as they were in CRMP. In addition, each has advantages and disadvantages for use as a coastal area boundary.

Physical criteria are often used to delimit the seaward boundary of a coastal area. For example, in Segara Anakan, Indonesia, the seaward extent of the planning area is from the shore to the 200-m isobath. Alternatively, the edge of the continental platform or shelf may serve as the seaward boundary, as in the case of the pilot sites in Thailand. In either case, a local survey is required to delineate the exact boundary location. In the landward direction, the boundaries could also be based on physical criteria, as in Lingayen Gulf, Philippines, where five noncoastal municipalities with brackishwater fishponds are included in the planning area. While the use of physical criteria may be practical for the short term, it may prove unreliable in the long run due to the transitory nature of some physical landmarks.

Administrative boundaries relate to existing subdivisions such as municipal or provincial borders, as in the case of the landward limit of the Lingayen Gulf pilot site. Similarly, political boundaries, such as the territorial waters, were used as the seaward limit for Singapore's management area. These types of boundaries have the advantages of being easily understood, readily representable and legislatively viable. In some cases, such as that in Lingayen Gulf, it may be necessary to use administrative boundaries to ensure plan implementation. However, these types of boundaries have the limitation of rarely coinciding with biophysical phenomenon and therefore do not necessarily encompass all relevant interactions.

Arbitrary distances can be used to set boundaries for both landward and seaward directions. In CRMP, arbitrary distances are used for the landward boundary of the Brunei Darussalam coastal management area, and the seaward boundary of the coastal management area in South Johore, Malaysia. While boundaries that are set using arbitrary distances are easily defined, they may bear no relationship to the area containing the relevant interactions.

Coastal management areas may also be defined using selected environmental units. For example, part of the definition of the landward boundary of the management areas in Brunei Darussalam and Indonesia included tidally influenced rivers, streams and other areas. This type of boundary delineation has sound ecological and scientific basis. In other cases, the relevant watershed or river basin may serve as the landward boundary. Notwithstanding, environmental units are not easily understood and may require specialized surveys for precise definition.

A general rule for choice of planning area boundaries is, when administratively and politically feasible, the planning area should be coterminus with the area which includes all relevant interactions. Where this is not feasible, planning should at least take into account the linkages - biophysical, economic and social - with the outside.

## Research

***Profile Preparation.*** The success of the integrated CAM approach rests on the availability of baseline information and the understanding of the relationships among key factors in order to properly identify and prioritize management issues.

Baseline data gathering provides information on the coastal resource systems of the study area. This includes biophysical, sociocultural, economic, institutional and organizational data. Also included in this category are sectoral indicators such as optimum yield or target production rates used to make projections of the area's development trajectory.

For most coastal sites, there is a wealth of secondary information. In many instances, however, the information has not been fully analyzed or is scattered in unpublished reports. The first task in identifying and prioritizing management issues is to compile and synthesize into a readily usable form - a so-called coastal profile - all secondary information on the biophysical aspects of the area; socioeconomic features characterizing the nature and significance of resource-dependent activities in the area; and existing legal and institutional provisions for management of the site for which the management plan is to be prepared.

Resource planners and managers from relevant government agencies, concerned NGOs, and community representatives are invaluable sources of information. These sources should be tapped with respect to the identification of management issues, determination of causes, suggestion of management options, and identification of information gaps on which subsequent research will be focused.

The information collected is then analyzed to determine trends and relationships among key elements in the study area. In addition, impact assessment will generate information on the interactions of sectoral development activities with the environment. Both positive and negative impacts on the environment, as well as conflicts within and among sectoral activities can then be identified.

For CRMP, secondary information from diverse sources, ranging from annual reports to departmental documents, have been used in profile preparation. Many of these are largely unpublished, classified or restricted and were made available through multiagency involvement. Also, national workshops were organized to secure additional relevant and updated information about the pilot site, particularly on resource-use conflicts and management. Such workshops involved the participation of the project staff, resource managers, and community and government representatives to identify management issues, determine their causes, provide management options, and identify information gaps on which subsequent research was focused.

***Additional Studies.*** Where data gaps exist, primary data must be collected. Also, updating and/or verification is necessary to ensure reliability and viability of information required for decisionmaking.

In CRMP, the coastal environmental profiles and the national workshops provided the basis for the establishment of the research programs in each of the participating countries. Under the programs, multidisciplinary teams conducted research relevant to biological, physical and environmental aspects of the site; socioeconomic conditions; existing institutional governance of resource use; and organizational responsibility in resource management. The information needs for CAM are outlined in more detail in Fig. 7.

In particular, information is needed on estimates of the availability and quality of water

and related coastal land resources; estimates and projections of coastal activities, associated coastal resource demands, and problems and impacts; and identification of the need and opportunities for government intervention.

***Methods and Procedures. Conventional Methods vs. Rapid Appraisal of Coastal Environments (RACE).*** Rapid appraisal may provide a fast-track procedure for analyzing the socioeconomic and environmental conditions of a given coastal area. Rapid appraisal techniques utilize many research tools similar to those employed in conventional research. However, to speed the analysis, the focus of the appraisal is on a narrower set of characteristics or key indicators.

***Community Participation, Consultation and Involvement.*** Strong roles for local communities have been advocated for all forms of resource management, conservation and environmental protection. Advocates of this concept stress the importance of the involvement of community members in planning and managing the resources. The term community in this context is used synonymously with stakeholder - people who use and are dependent upon the resources in question.

A variety of possible roles could be played by communities in planning and management. Community consultation is the least involved; it is used merely to solicit preferences and attitudes. Alternatively, communities can be invited by the government to participate more substantively at various stages of the management process. However, in both these cases, control remains with the government.

While there is a growing awareness that real public participation often results in a more comprehensive, efficient and successful planning, it does not guarantee that all who get involved will be benefited. As Whitehead (1976) points out: "No single policy or proposal can equally advantage all the sectors and factions that make up the community; indeed what benefits one group can, and will, disadvantage others."

Considering the multiple resource-use characteristic of the resource system, all parties who have a stake should be consulted and preferably asked to participate in the planning for and management of coastal areas.

In contrast to community participation or consultation, community involvement (sometimes referred to as community-based management) is a somewhat different concept and may be more difficult to apply. Community involvement implies full and continuous participation in the management process from the beginning.

Successful community-based management has several prerequisites. First, communities must be empowered with rights and obligations; that is, there must be a legislative framework in which rights to a certain resource are allocated to a specific group of individuals in the community, and the obligations to manage these resources must also be clarified. To achieve this, legislative reform usually is necessary in most countries. Second, government agencies are still required to provide the community with assistance, including institutional and technical support, regulations and economic incentives. Third, communities need to develop the necessary skills and disciplines to organize and manage themselves to adopt sound management principles, rules and regulations. It must be stressed that the acquisition of such organizational and technical skills requires time. While some groups have traditional and customary management regimes, due to a number of factors such as restructuring for governmental institutions under colonization and modernization, these are now uncommon in most ASEAN countries.

In Southeast Asia, community participation and/or public consultation are more generally

acceptable to all sectors in CAM planning than community-based management. Although less rigorous than community participation, community consultation, if properly implemented, is a step in the right direction.

Community-based management is effective in a political climate that recognizes the right of a specific group to common property resources and when the group as a whole is ready, that is, has the organizational capabilities to take the lead role in management.

While it is unlikely that local communities can manage coastal resources on their own, neither can government accomplish it entirely through bureaucratic instruments. There must evolve a more dynamic partnership arrangement building from the existing capacities and interests of the local community and complemented by the ability of the national government to support the development of enabling legislation and institutions and to provide assistance. This partnership can be called co-management, where the national government and the community share authority for fisheries management. The amount of authority that the national government and the community have will differ and depend upon country and site specific conditions. It should be noted that not all elements of fisheries management authority can, or should, be allocated to the local community.

*Remote Sensing and Geographic Information Systems (GIS).* When used in combination, remote sensing and GIS are powerful tools for CAM. Remote sensing employs satellites to acquire information on the assessment of resources and human activities. This information provides a base for extrapolation and interpolation of field data gathered through traditional survey methods. However, these data are sometimes not readily accessible because they are considered highly classified in some countries, and are often rather expensive.

GIS are computer systems that can be used for storage, retrieval, analysis and display of geographically referenced information. These methods can be effectively used in combination to establish zonation schemes which consider coastal processes, land and water uses and environmental impacts of human activities.

*Economic Valuation.* Pollution of coastal waters and loss or degradation of critical habitats such as coral reefs and mangroves can impose real costs on societies. These costs are manifested in several forms: economic losses resulting from reduced productivity of resource-based activities and loss of biodiversity; medical expenses, loss of earnings, and human suffering caused by impairment of health; and reduced aesthetic appeal of coastal areas.

The costs of coastal environmental and natural resource problems are often not adequately reflected by markets. In fact, the existence of these issues can be traced to market failures and pervasive externalities. While escaping these costs would confer benefits on society, these problems persist due to the inadequacy of public intervention.

Evaluation of the appropriate role of governments in CAM requires an explicit examination of benefits and costs of management issues and interventions. Comparing the benefits of management with the costs of the preventive or remedial actions, and with the costs of inaction, helps policymakers make more informed decisions. Such an analysis will help to identify the most socially costly problems and suggest what would be the most cost-effective solutions.

Essential to these comparisons is economic valuation -placing costs on natural resource and environmental damage - so that the magnitudes may be compared with the costs of preventing or mitigating the damage.



New and fairly sophisticated techniques have been developed to place values on nonmarketed and less tangible benefits and costs, but they are not widely used in developing countries. As part of CRMP, several training courses were given on the basics of economic valuation techniques. However, no practical experience was gained by the in-country staff with these techniques.

### **Formulation of Management Strategies and Policy Options**

The outputs of the previous stages, namely, the results of the issue-focused research combined with the analysis and synthesis of secondary information provide the basis on which management policy options are formulated, and alternative strategies are developed to address specific management issues.

The process involves both top-down and bottom-up approaches to the formulation of policies, strategies and actions needed to resolve the problems. Plan formulation includes: (1) identification of specific interventions; and (2) preliminary screening of these candidate interventions based on multiple criteria, including economic efficiency, equity and environmental considerations. Economic valuation coupled with extended benefit-cost analysis provide a useful framework for the evaluation of the social, economic and environmental impacts of the alternative interventions.

The output of this stage is articulated as an integrated management plan for the study area. The management plan is comprised of management actions of three general types: (1) institutional and organizational arrangements; (2) public intervention to influence private behavior; and (3) direct government involvement or investment.

***Institutional and Organizational Arrangements.*** Management strategies pertaining to resource utilization, conservation and protection can only be effective if they are implemented within the existing legal framework. Therefore, government involvement is essential for CAM and planning. The CAM plans made without the concurrence of the government will not be implemented.

As far as possible, existing organizations should be tapped to implement CAM plans. The creation of a new institution or agency may not necessarily be conducive for plan implementation, at least in the short term. A new layer of bureaucracy often does more harm than good. Organizations which have been used to a sectoral orientation adjust very slowly to a new management and planning concept such as CAM unless there are very strong incentives for them to do otherwise. Thus, coordination of existing organizations is imperative.

The existing institutions which govern resource use in coastal areas are of vital interest for CAM. For good management, responsive and effective institutions well suited to local and national traditions are needed. If existing institutions are found inadequate, the appropriate institutional response is to clarify rights and obligations of individuals and government organizations with respect to resource use. This can be done by enacting legislation and developing detailed regulations, building effective administrative structures, appropriating funding and providing for skilled staff.

***Public Interventions to Influence Private Behavior.*** When markets fail, there is a role for government intervention to bring individual behavior in line with social goals. The range of policy instruments which can be used by the government to effect the desired changes in behavior falls into two general categories.

The first category includes market-based incentives, such as taxes, prices and subsidies,

used to affect the incentives faced by private agents and thus force desired behavioral modifications. The second general category covers the so-called command-and-control instruments, which directly regulate behavior through specification of the legality and illegality of specific actions.

Either of these categories can be targeted directly at environmentally damaging behavior or indirectly at behavior somewhat removed from environmental damage. Both categories require effective monitoring and enforcement capacities, which are often lacking in developing countries.

However, the policy alternatives differ with respect to cost and efficacy. The appropriate mix of these policy instruments - regulations and economic incentives - depend, therefore, on the relative costs of effective implementation. This in turn depends on the type of management issue and the organizational capabilities for implementation.

In theory, a mix of both regulatory and economic instruments are most often preferred. In practice, regulatory instruments often predominate, especially in developing country settings.

In the case of the management plans developed under CRMP, regulatory instruments are most common. For example, in the management plan for Ban Don and Phangnga bays in Thailand, regulation of various activities and direct public investment make up the bulk of the proposed actions.

***Direct Public Involvement or Investment.*** Direct public involvement or investment is a popular intervention in CAM. Included in this category are the necessary monitoring and enforcement responsibilities of resource-governing agencies. Direct public investment and involvement in these activities is a necessary complement to regulations and economic-based incentives.

Also included in this category are direct public investments in physical facilities such as water supply systems, sewage collection and treatment systems, parks and protected areas, and activities such as mangrove replanting, coral reef seeding, and placement of artificial reefs. The scale and scope of these types of public investments are constrained by budgetary limitations.

The three budgetary considerations for public investments in physical facilities are: (1) construction or installation of the facility; (2) operation; and (3) maintenance and management. These costs can become burdensome if users of the publicly provided goods and services do not cover their expenses. Nevertheless, recent studies suggest that people are willing to pay, at least in part, for publicly provided goods and services such as water supply, sewerage and use of marine parks (Whittington et al. 1991; Scura and van't Hof 1992). Therefore, cost recovery should be pursued to the extent feasible through the collection of user fees.

### **Evaluation, Decision and Adoption**

After plan formulation, a detailed review and evaluation of the alternative management plans is needed. This would entail an extended benefit-cost analysis using multiple-objective criteria, and sensitivity analysis. The results of this evaluation would then be presented to the decisionmakers charged with the selection of the preferred plan or strategy from among the alternatives. If decisionmakers reject all of the alternatives, the plans would be reformulated and resubmitted for subsequent consideration for adoption.

## **Implementation**

There are very few good examples of successful implementation of CAM plans in developing countries. However, in most of the participating countries - Brunei Darussalam, Indonesia, Malaysia, Thailand and the Philippines, the CRMP plans have been officially accepted partly or totally by the government and moves have been made toward implementation.

Within the next several years, these CAM efforts should provide good examples of CAM plan implementation. The management plans developed under CRMP include several aspects of special importance for implementation: (1) integration of essential issues and coordination of relevant actors; (2) local participation in implementation; and (3) mechanisms for monitoring, evaluation and updating of the plan.

## **Monitoring and Evaluation**

A feedback mechanism is necessary to monitor, validate and reassess the efficacy of the plan during and after implementation. This process will lead to the refinement of the plan so that it will be more practical, acceptable and effective.

In addition, M&E is a tool for dealing with unanticipated social, economic and environmental consequences of management actions. As such, evaluation measures should focus on the social and economic well-being of the people in the management area, and include any environmental impacts of the interventions.

## **LESSONS LEARNED**

### **Process-related Lessons**

*Desirable Characteristics of the Planning Phase of the Management Process.* The CAM process should have the following characteristics:

1. Management should be viewed as a long-term, iterative and continuous process.
2. It should be perceived as originating from within rather than from outside.
3. Integration with local, regional and national development agenda should be pursued.
4. Local participation by government and communities in policymaking, monitoring and enforcement should be encouraged.
5. Existing institutional and organizational arrangements must be fully considered.
6. Research should be oriented toward improved information and analysis useful for the identification of management priorities and formulation of management strategies.
7. Management actions must be matched with issues and goals.

CAM planning is dynamic and subject to periodic improvements. Once a management plan has been finalized and published, the next step is its adoption and legal sanction by the appropriate executive and/or legislative body. A management plan needs to be legitimized because it must be considered official to be assured the necessary financial allocation for implementation.

The legitimization process of any major government plan is often long and tedious. The plan is often passed back and forth among various government hierarchical levels - local, regional, central - and sometimes gets bogged down in the process. The time is further prolonged when various sectors and communities are consulted.

After plan legitimization, implementation follows. In this stage, resources (manpower, equipment, currency, etc.) are mobilized to execute the various tasks or activities laid out in the plan. This is often hampered by the state's bureaucratic procedures. It often takes time to hire people and procure equipment.

The time frame for each iteration of plan development or revision should be as short as possible, preferably within 2 years. There is considerable lag time between management plan formulation and implementation. In effect, there are two gap periods: between plan finalization and legitimization, and between legitimization and actual implementation. The CRMP experience shows that the total time lag can range from 1 to 2 years.

During this period, some activities can readily be implemented so that the concerned stakeholders and governments can begin to appreciate the results and impacts of plan implementation. It is important that people see something visible once the plan has been finalized. Good examples are the information dissemination activities. Indonesia has a good headstart on this. The technical refinement of its management plan was already accomplished in 1991. While undergoing formal legitimization, three projects under the plan were implemented early.

Sufficient funds should be allocated to undertake early implementation activities. Hence, the design of a CAM project or program should not stop with either plan finalization or legitimization. In effect, in some instances, management planning could be done simultaneously with the implementation of key projects or activities.

For a plan to be effective, it should be accepted by a majority of the stakeholders. Likewise, it is essential to ensure that the local authority, especially the local planning agency, is heavily involved in management plan formulation. Local identification with the plan increases its probability of being implemented compared with a plan by a consultant or an outside body. An accurate barometer of the degree of acceptance of a management plan is the willingness of the government to allocate financial resources for its implementation. Therefore, it is important that the budget for plan implementation is within the financial capability of the local government.

The planning process adopted by CRMP was very effective in these areas. The CRMP encouraged integration and elicited institutional collaboration; various sectoral agencies, both government and private, cooperated toward common objectives. Earlier planning activities had been highly sectoral. The CRMP also heightened public awareness and participation. The various workshops conducted and educational materials distributed under CRMP contributed to a growing public commitment in ASEAN to promote sustainable development in the coastal areas.

The CRMP utilized almost exclusively national and local research institutions. It proved that given the opportunity and adequate support, the in-country-based institutions could easily handle most of the research required for the CAM initiatives.

Furthermore, the use of local expertise enabled the planning team to keep in close touch with the resource-governing authority. They were therefore kept informed of the latest development or change with respect to new environmental or development legislation that could affect, positively or negatively, the implementation of the proposed CAM plans. For example, in the Philippines, the changes in local government codes toward decentralization accord greater power to the local government. This shift caused a host of local capability issues that resulted in the need for a major refocusing of priorities under the CAM plan to ensure its realistic implementation.

In other areas, the CRMP process was not as strong. Research for CAM in some countries was not adequately structured so that the outputs were not all directly relevant to the formulation of the management plans.

The CRMP planning process was unduly and unnecessarily long; collection of detailed data prolonged the profiling stage. While the extended planning process contributed to the development of local capability, a major focus of CRMP, it also caused the interest and enthusiasm of the policymakers and local government officials to wane due to loss of momentum. In addition, it resulted in the loss of community confidence in the attainment of project objectives due to unfulfilled expectations. The opportunities and constraints for the application of rapid appraisal techniques in CAM to shortcut the planning process are explored in another paper in this volume.

The CRMP research output provided substantiation and quantification of many problems and issues long identified with coastal areas. For example, while the issue of overfishing in Lingayen Gulf, Philippines, was identified during the initial phases of CRMP, further research provided a more detailed scientific and quantitative basis for management actions. The research undertaken showed that given the theoretical maximum sustainable yield (MSY) and the current extraction rate, the gulf is about three times overfished.

Nevertheless, planning must not be too problem-centered either. It must also identify opportunities which may be defined as "factors, conditions, or resources existing in a particular locality which are favorable for development or improvement of the locality" (Sajise et al. 1990). Given too much concentration on the problems, the inherent favorable factors will be largely ignored. A good management plan must have a balanced view of both problems (negative conditions) and opportunities (positive conditions).

One of the weaknesses of the CRMP planning process is the lack of clarity as to whether or not the various elements of the plan are clearly matched. Matching, in the context of management planning, is the strategic and interactive process of harmonizing the key components toward the development of programs and/or projects. In effect, the programs and/or projects are the "package" of things to be done in a plan.

Fig. 8 shows the four major elements of the management plan to be considered to come up with programs and/or projects. These are: (1) institutional capability; (2) CAM goal and objectives; (3) problems and opportunities identified; and (4) wants and preferences of beneficiaries. The process could not be categorized as absolutely objective because subjective judgments would inevitably come in. However, the programs and/or projects are more or less systematically arrived at when screened through these four elements.

The organizational capability element simply pertains to the implementing organizations' capability to undertake the programs and/or projects. Organizational capability includes present capacities indicated by existing manpower, equipment, and financial and/or technological resources including potential capacities that could be generated (Villacorta and Gaon 1986).

The second element is the CAM goal and objectives which must be correlated with the specific objectives of the management plan. The main goal is the promotion of sustainable development which ensures the attainment and continued satisfaction of human needs for present and future generations. The specific goals must take into account the wants and needs of the stakeholders in the management area. The objectives are centered on three

areas: strengthening multisectoral planning and management; promoting rational utilization of coastal resources and minimizing resource-use conflicts; and maintaining biological diversity, productivity of coastal species and habitats, and the proper functioning of the coastal environment. These must be matched with the issues and opportunities for management intervention.

***Essential Features of a Coastal Area Management Plan.*** In order to ensure that the CAM plan is accepted by the government and to facilitate adoption and effective implementation, the plan should preferably include the following essential features: (1) situation profile; (2) problems and opportunities; (3) philosophy, goals and objectives; (4) policies and strategies; (5) action programs and projects; (6) organization and management; (7) monitoring and evaluation system; and (8) financial and economic justification.

***Situation Profile.*** The situation profile presents a description of the current status of the coast, including biophysical, socioeconomic, organizational and institutional aspects. The situation profiles produced as part of CRMP were of good quality. However, considerable time was spent in collecting and compiling secondary data, a large portion of which was not needed for planning. While the data gathered enriched knowledge of the area, not all were essential for planning purposes. For example, information relating to demographic, cultural and political characteristics; types and levels of resource exploitation or use; and their contribution to the livelihood of the coastal communities are certainly needed. However, detailed information pertaining to the geology of the soil or the forms and functions of foodchains in the coastal waters were of less practical value for initial planning. Therefore, the types of information needed for a situation profile should be clearly identified before the task is undertaken.

***Problems and Opportunities.*** An important feature of a CAM plan is a section which provides an in-depth analysis of the current state of development and its trajectory in the coastal area, and the likely environmental impacts which may result from these activities. The impacts could include, inter alia, critical habitat degradation, resource depletion and injury to human health.

Information pertaining to quantification of these effects in physical terms - determination of the level of impacts on the functional integrity of resource systems, human health and productivity - is a necessary but not a sufficient input for the prioritization of the issues. For decisionmaking regarding adverse environmental consequences of human activities, values must be placed on the various impacts to identify which are the most socially costly problems. In short, three basic questions should be answered by this section: (1) What are the current and projected human activities in the area? (2) What are the resulting environmental and natural resource impacts? (3) What are the nature and magnitude of the costs imposed on society, particularly the coastal communities? These questions are often difficult to answer precisely.

In many management plans of CRMP, problems and opportunities were adequately quantified in a physical sense or assessed qualitatively. However, questions pertaining to environmental cost were not adequately addressed in many of the management plans.

***Philosophy, Goals and Objectives.*** While this feature is usually highlighted in all management plans, a usual weakness is the lack of an operational philosophy and of clearly stated goals and objectives. The philosophies of all CRMP management plans center on the concept of sustainable development. Unfortunately, this concept is not operational in the sense that it provides little guidance for policy.

Nevertheless, CAM provides a forum for the systematic evaluation of tradeoffs among

competing coastal activities, and therefore provides guidance for a course of action toward the goal of sustainable development. It is therefore essential in the planning phase to clearly outline the concept of CAM and understand the strength and weakness of its integrated approach. While CAM is not a panacea to the multifaceted problems and conflicts occurring in the coastal zone, it is a powerful planning and management tool, when effectively used, to formulate management actions to address issues of environmental degradation, resource depletion and other use conflicts.

Management measures should center on the promotion of sustainable development by cost-effectively addressing three concerns: (1) adverse environmental and natural resource impacts; (2) use conflicts; and (3) human welfare.

Similarly, goals and objectives should be clearly stated and understood by all parties concerned. The goal should state the broad, ultimate purpose of the plan, while objectives should outline its measurable and attainable ends in a defined area within a given time frame. Not all problems and issues can be solved by CAM in a relatively short time, and prioritization of the issues for management actions is essential. A common problem with CAM planning is the lack of clearly defined objectives. Very often too many objectives are listed, resulting in the dilution of focus away from the critical issues.

***Policies and Strategies.*** Policies are formal statements of intentions or general courses of action which support the goal and objectives of the management plan. Levy (1988) defines policy as a set of guiding procedures (e.g., legal) designed to influence the actions and decisions of individuals or groups. In most countries, policy reform is necessary to provide for organizational and institutional arrangements for management plan implementation. Policies for CAM must be formulated within the context of the overall national policy.

Strategies, on the other hand, may be described as specific approaches and actions employed in response to identified problems (Sajise et al. 1990). Strategies are usually articulated through detailed action plans.

***Programs and Projects.*** In a conventional sense, a program is hierarchically above a project. Archibald (1976), as cited in Roman (1986), defines a program as a long-term undertaking usually made up of more than one project, while a project is a set of interrelated tasks or activities with well-defined objectives, schedules and budget. A major task in CAM planning is the formulation of programs and projects designed to address critical management issues.

Fig. 9 presents a systems framework of programs designed to solve or mitigate certain problems in Lingayen Gulf, Philippines. Two programs may combine to mitigate a certain problem, e.g., the programs on fisheries management and rehabilitation of critical habitats would lessen the destruction of the latter. Alternatively, one problem may "spin-off" or accentuate other problems, e.g., open access contributes to both overfishing and destructive fishing.

Among the common programs of the six management plans, zonation is designed both to catalogue the available resources and to ensure their rational utilization to reduce multiple-use conflicts.

**Organization and Management.** The section on organization and management is often left out in management plans because of sheer planning ignorance, especially when the plan is written by nonplanners. It is an important part of a management plan as it outlines the administrative mechanism for effective implementation. Institutional and organizational arrangements are a major component, including the allocation of responsibilities and the legalization of authority, of implementing and coordinating agencies.

The key to successful execution of a CAM plan is the ability to coordinate various implementing agencies and to mobilize available government resources and support from the private sector and communities. Assistance from international bodies is likewise helpful.

Although single agencies exist for integrated management purposes in non-coastal settings, such as for river basin planning and management (e.g., Tennessee Valley Authority in the United States), these are not warranted in a coastal context. In practice, setting up a new agency usually takes time and large investments of public resources, and such agencies tend to be ineffective. As far as possible, existing government structures should be used to implement CAM plans. The organization and management structure adopted by CRMP in all participating countries was one lead coordinating agency with a number of executing or implementing agencies.

**M&E system.** The M&E section should form an integral part of the management plan. However, this feature is often ignored in plan preparation. The M&E should be conducted periodically throughout the management process, during both the planning and implementation stages. The M&E can also be used to assess the plan in general.

Monitoring is used to follow the progress of a project or program, and to determine specific changes needed to improve performance. In contrast, evaluation is intended to assess the impacts of the projects or programs (UNCRD 1980). The M&E involving information gathering about the performance and effectiveness of a program/project is conducted at different stages of the management process. CAM program evaluation can take place at the initial phase (similar to project appraisal), ongoing phase, terminal phase or a few years after the completion of the program.

The experience in CRMP showed that M&E, as a project management function, was poorly understood by the national coordinating agencies during the planning stage. As such, M&E was carried out in a rather ad hoc manner, although project progress was annually assessed at a regional meeting composed of various representatives of national coordinating agencies.

CAM plans with measurable objectives facilitate M&E exercises. M&Es normally follow standard procedures and time frames. The monitoring procedure (Saxena 1980) consists of four steps, viz: (1) establishing the level of the expected/desirable performance; (2) identifying and measuring the actual performance; (3) calculating variances between expectations and actual performance; and (4) acting on variances beyond acceptable or pre-established limits.

**Financial and Economic Justification.** Financial and economic justification is an essential feature in a CAM plan to provide an idea of its cost and benefits. This is of particular interest to decisionmakers because the plan will require public investments (in terms of cash, personnel, equipment, etc.) which have alternative uses. The implementation budget should be realistic and within the financial capability of the government.

Most participating countries gave estimated budgets for the implementation of the CRMP plans. However, except Indonesia, the other five countries did not come up with indicative economic or financial justification of the plans. This was a major shortcoming of CRMP.



***Essential Mechanism of Integration.*** Integration is an important mechanism in CAM planning and implementation. It allows a more comprehensive perspective of management issues, and concentrates the focus of the management process on the attainment of sustainable development goals. The CRMP experience clearly shows several types of integration appropriate for CAM.

***Systems integration*** pertains to the physical, social and economic linkages of land and water use patterns. It ensures that all relevant interactions and issues are considered.

***Functional integration*** refers to the principle that the programs and projects to be formulated must be internally consistent with CAM goals and objectives.

***Policy integration*** concerns the integration of management with development policies and initiatives. CAM plans should be integrated into local, state/provincial or central government economic development plans to ensure adequate financial allocation and comprehensive execution. As such, it is essential that: (1) the appropriate institution is involved in the planning process; and (2) the format of the CAM plan follows closely that used by the government.

Policy integration is the most difficult but essential aspect of CAM. Integration of management and development is crucial for sustainable development; that is, sustainable development is only possible in the long term if the objectives of both economic growth and environmental management are integrated into overall development plans. This is made possible with a clear government policy for sustainable development and timely adoption of the necessary institutional and organizational arrangements to enable implementation of CAM plans.

***Essential Mechanism of Coordination.*** Coordination is a very significant mechanism in CAM planning and implementation. It brings together various concerned government agencies, community groups, research institutions and NGOs to work toward common goals by following mutually agreed upon strategies.

Coordination functions include close interactions with national steering committees, resource managers in central and local governments, political and community leaders, as well as resource planners and scientists. Also a part of coordination is M&E in the planning and implementation.

Coordination is carried out at various levels. There is a need for vertical coordination, that is, management through close coordination among various hierarchical levels of the government: central, provincial, state, regional and local. The key implementor among these depends on the type of management intervention. Regional involvement includes mobilization of regional capabilities for strengthening national efforts in CAM activities, whereas local involvement is focused at the specific management area level.

Horizontal coordination, that is, within a specific level of hierarchy, is also important. For instance, at the local level, the local government coordinates the activities of the various stakeholders or sectors. In addition, temporal coordination is needed to ensure the alignment of various programs/projects over a common time frame. It may be viewed as the synchronization of the phasing of activities.

The multisectoral, interdisciplinary collaboration involving different line agencies of the central and local governments, universities and NGOs in CAM planning and implementation is possible and practically feasible. In CRMP, a large group of institutions and resource and scientific personnel were involved in the project. The highly diverse institutions and individuals somehow cooperated toward common objectives.

There are two important observations, though. First of all, institutions accustomed to sectoral orientation change or adjust very slowly within the framework of an integrated management initiative such as CAM (Tobin 1992). Second, formal institutional collaboration works well only within certain bounds. Beyond that, the leadership of the coordinating agency needs to provide considerable influence.

Selecting a coordinating agency, a crucial step, should be based on the following criteria: organizational mandate; experience in integrated planning; availability of multidisciplinary staff; rating with other institutions; and exposure to coastal communities.

An agency with a "neutral" character is preferred (e.g., an economic planning agency either at the central, state/provincial or local government level). Good examples from CRMP are the use of the National Economic and Development Authority (NEDA) in the Philippines and the Office of the National Environmental Board (ONEB) in Thailand.

Line agencies with major stakes in the management of coastal and marine resources can also perform the role of coordinating agency (e.g., Department of Fisheries in Brunei Darussalam). The main difficulty, however, lies in integration and implementation especially pertaining to other sectors. Line agencies, because of their inherent sectoral mandates, are likely to elicit organizational rivalry.

Sectoral line agencies with heavy involvement in coastal or marine areas have been playing a key role in coordinating and/or implementing CAM programs in ASEAN. Many of them have been able to obtain support from other agencies. Their main difficulty, however, lies in getting all the proposed sectoral action plans fully integrated into the government's development plans.

#### **Development Stage-related Lessons**

*Management Issues Considered.* There is little doubt that the continued productivity of natural resources and the maintenance of environmental quality in coastal areas are very important to the long-term (i.e., sustainable) economic development of ASEAN members. Management of coastal areas is thus very important. Nevertheless, the nature of the management problems to be addressed in a specific case depends on the characteristics of the coastal area to be managed.

The relative contribution - both current and future - of coastal resources to economic and social development in a particular coastal area depends on resource endowment, current state of economic development and ultimate development goals. These, in addition to the sociopolitical aspects of the planning area, have significant implications for management.

Coastal areas of ASEAN members typically are well endowed with economically important renewable and nonrenewable resources. In most of the ASEAN, these resources directly support such activities as fisheries, forestry, agriculture, mining, tourism and ocean transport. In some coastal areas, these are furthermore important inputs into a host of industrial, manufacturing and service activities.

Although the criteria for selection of the pilot sites differed among the countries in CRMP,

the sites chosen tended to be representative of the countries in general. Nevertheless, there are differences in the nature of the coastal problems at the various pilot sites. These differences are highly correlated with the stages of economic development of the areas.

Of the CRMP pilot sites, two are rural (Indonesia and the Philippines), two are urbanizing (Thailand and Malaysia), and the remaining two are urban (Brunei Darussalam and Singapore).

In general, the low- and lower middle-income economies in ASEAN - Indonesia, the Philippines, Thailand and Malaysia - can be classified as natural resource-dependent. That is, the direct contributions of primary producing sectors, such as agriculture (including forestry and fisheries), mining, and other directly resource-dependent sectors, such as tourism, are quite significant in terms of gross domestic product (GDP), export earnings and employment. For example, in 1990, the contribution of agriculture to GDP in these countries ranged from 12% in Thailand to 22% in Indonesia and the Philippines.

As coastal populations increase, a corresponding growth in demand is placed on coastal resources, both directly through a continuation of existing activities, and indirectly as the region's economies mature. The ASEAN economies, particularly the middle-income countries of Thailand and Malaysia, already have begun the process of diversification. As a normal part of this economic structural adjustment, natural resource-based sectors contribute a decreasing share to GNP as economies evolve to be more diversified. With the exception of the Philippines, the growth rate of the manufacturing and service sectors in these countries over the period 1980-1990 far exceeded growth in other, more directly resource-dependent sectors.

Nevertheless, while diversification may reduce direct dependence on natural resources in relative terms, indirect dependence will likely increase. First of all, structural transformation of developing economies is preferably financed through domestic investment. An important source of this much needed capital is the continued productivity of natural resource-based activities. Furthermore, as diversification progresses, natural resources become inputs into a variety of economic activities, in addition to being used as primary commodities, thus increasing the value added to the economy.

The types of management issues which predominate are a function of the mix of development activities in an area, and are therefore highly correlated with stages of economic development. Traditional management issues - those related to the rates of exploitation of natural resources - tend to be problems which predominate in undiversified economies, such as those which typify rural areas. Oftentimes, the solution to these problems, at least in part, is found in economic diversification which brings with it alternatives for those dependent on natural resource exploitation.

Therefore, as economic development progresses in a coastal area, there can be a management issue transition driven by economic diversification. The transition is from the traditional to the more modern management issues - those related to pollution - which tend to predominate in more diversified economies, such as those which typify urban and urbanizing areas.

The principal effect of environmental problems in rural and urban settings differs. Whereas in rural areas overexploitation or degradation of natural resources and the resulting loss of natural resource productivity are the primary concerns, by far the main costs of coastal mismanagement in urban areas are related to impacts on human health - particularly acute morbidity, increased risks of chronic diseases and of premature death - and productivity.

The main coastal problems in urban areas are related to pollution - degradation of water quality and, increasingly, inadequate disposal of solid and toxic wastes. While the same general categories of pollution problems can be found in rural and urbanizing settings, urban pollution differs both in scale and in scope from the rural one. The population density and concentration of production and consumption activities in urban areas combine to produce waste orders of magnitude more than could be handled by natural assimilative mechanisms. Also, concomitant with the industrialization trend that currently typifies economic growth in urban areas in ASEAN is the production of "modern" wastes, such as synthetic organic chemicals, which do not occur naturally and by their very nature are dangerously persistent.

Well-intended development efforts focused on diversification of economies - structural changes which create a new mix of economic activities - often inadvertently create problems for existing activities. For example, increased abstractive uses of river water, such as for irrigated agriculture, can cause significant salinity-related problems in estuarine areas due to reduced freshwater inflows. Similarly, improper siting of municipal and industrial development in coastal areas can cause loss of critical habitats, such as wetlands and mangroves. In addition, water pollution from domestic, industrial, agricultural and aquaculture sources is a typical result of unmanaged development. All of these, individually and collectively, can adversely affect the productivity of coastal resource-based activities, human health and the aesthetics of coastal areas.

In the transitional stages, there tend to be a dualism and synergism of management issues. In the absence of the management of coastal areas undergoing diversification, there tends to be a coexistence of traditional and modern management issues. Oftentimes, the traditional issues are exacerbated by the more modern ones. For instance, loss of fisheries productivity due to overfishing is aggravated by deteriorating water quality and conversion of a habitat into other uses.

In the low-income countries of the Philippines and Indonesia, rural sites were selected where classic problems of open access and overexploitation of natural resources predominate. Both Lingayen Gulf and Segara Anakan are characterized by intense exploitation of potentially renewable resources, particularly fisheries, coupled with very poor economic status of coastal communities and land-use problems.

In the middle-income countries of Thailand and Malaysia, urbanizing sites were chosen for CRMP where economic diversification is beginning to add complexity to coastal issues. Development activities in the coastal areas of Ban Don and Phangnga bays and South Johore, ranging from tourism through mining to industry, will exacerbate existing coastal resource-use problems unless adequate management measures are put in place.

In the high-income countries of Brunei Darussalam and Singapore, the CRMP sites are the entire countries which are predominantly urban. In comparison to other CRMP sites, the coastal issues are of a very different nature in these countries. For Brunei Darussalam, its coastal resources are currently among the least exploited in the region due to the economic

dominance of the oil and gas sector. However, government development plans focused on economic diversification could have a significant impact on these resources. In this case, the integration embodied in CAM provides a mechanism for the rational management of resources to ensure their contribution to sustainable development.

The development trajectory of Singapore over the past 26 years has been geared toward urbanization. Land scarcity in the island-nation, and the resulting high opportunity cost of land in natural uses, led to an aggressive coastal land reclamation program. Land reclamation activities significantly affected coastal areas and nearby waters. The main coastal issues in Singapore relate to coastal pollution, both deterioration of water quality and solid waste disposal, and loss of unique coastal areas of aesthetic value.

The CRMP experience suggests a typology of coastal management issues which commonly occur with specific stages and levels of development. This typology specifies that as countries become more urbanized and more economically diversified, that CAM issues move from the more traditional (e.g., levels and rates of resource exploitation), through a dualism or synergism, to the more modern (e.g., pollution). This typology allows for the identification of management issues likely to be encountered with current stages and levels of development. It also allows CAM planning to be more forward looking through the anticipation of management issues which will probably arise with economic diversification and urbanization.

#### **Institutional Setting-Related Lessons**

*Specific Resource Focus.* Clearly, a coastal resource systems approach has many advantages to planning and management of coastal areas. Rather than concentration on one resource or set of resources, such as fisheries, the focus is on the broader role of coastal resources generally in sustainable development. While fisheries might play a significant role now, this situation might change over time. No particular resource or economic activity is sacrosanct.

Nevertheless, throughout the region, the fisheries sector is a passive victim of many of the intersectoral effects on coastal areas, that is, negative externalities resulting from activities in other sectors. For instance, the problems of fisheries are often described as the double threat of excessive fishing pressure and degradation of the aquatic environment. These problems originate, by and large, outside the fisheries sector.

In developing countries, labor displaced from other sectors such as agriculture and industry, and with no other employment opportunities, is dumped into the small-scale fisheries sector as a result of open access.

Habitat degradation has multiple extra-sectoral causes. Some major causes of water quality problems include inadequate treatment of sewage and industrial effluents, improper disposal of solid waste, and reduction of freshwater flows into estuarine areas resulting from increased water withdrawals upstream. Similarly, the main causes of loss of critical habitat are conversions for use in other sectors, such as aquaculture and industry.

As a result, solutions to fisheries sector problems also have their origins, to a large extent, outside the sector. Nevertheless, fisheries is the single sector that has the most to gain if management is undertaken, and has the most to lose if it is not. Rather than passively accept these impacts from other sectors and expect that initiatives be taken by others to mitigate these effects, the fisheries sector has a vested interest in taking a leadership role in CAM.

***Bottom-up Vs. Top-down.*** The application of bottom-up or top-down approach in CAM planning depends on the political, cultural and socioeconomic conditions of the country concerned. While there is an increasing advocacy for the bottom-up approach, its total adoption in many Southeast Asian nations may not be politically or culturally acceptable.

The top-down approach, while maintaining sufficient public consultation, is suitable in Brunei Darussalam, Malaysia, Indonesia and Singapore (Chua 1989). However, the bottom-up approach is definitely feasible in the Philippines. In Thailand, a mixture of these approaches may be more appropriate.

The political climate in most Southeast Asian nations is favorable for people's consultation and involvement of public and private sectors in CAM. In fact, local participation in policymaking, monitoring and enforcement is desirable. However, the major decisionmaking authority still lies within the legislative right of the political leadership.

***Choice of Interventions.*** Of the available intervention instruments, most countries - developed as well as developing - typically use direct regulation to deal with natural resource and environmental management issues generally, and CAM issues specifically. This has also been the experience of ASEAN in CAM.

The CRMP experience suggests a typology which relates institutional and organizational considerations to the appropriate use of management actions (Fig. 10).

The use of direct regulations is a suitable strategy in many instances. For controlling management issues involving only a few resource users, direct regulations can work well because monitoring and enforcement of compliance are feasible. Direct regulations are, in fact, preferred in cases where the target resource users are insulated from competitive pressures and therefore would not readily respond to market-based incentives. Direct market-based incentives work best when targeted at only a few competitive resource users, as these interventions also require the capability to monitor and enforce compliance.

However, many coastal environmental issues are created by the activities of many small-scale resource users. As a result, compliance with direct regulations and direct market-based incentives are often difficult to monitor and enforce. This is especially relevant if financial and human resources in enforcement agencies are constrained as they typically are in developing countries. In these cases, indirect regulations and indirect market-based incentives, although theoretically less efficient, are preferable.

Direct policies target the management issue directly and therefore produce desirable and immediate results. In contrast, indirect policies are blunt instruments in the sense that they target factors which influence management issues, not the issues themselves.

For example, indirect market-based incentives, such as establishment of alternative livelihood programs, are focused on drawing excess effort away from open access resources by providing viable alternatives. If used in combination with the means to directly restrict effort over the long run, this indirect intervention can be very effective.

Indirect regulations can also work well. Zoning in coastal areas is used for two purposes: to protect unique coastal environments, such as mangroves, through a conservation designation; and to segregate disparate and conflicting land uses, thus reducing the likelihood of occurrence of negative spillover effects.

Direct public investments are also popular among the CRMP plans. Examples of these include mangrove replanting, placement of artificial reefs, establishment and operation of marine parks and protected areas, and educational and alternative livelihood programs.

## RESEARCH PRIORITIES

Further research is needed to improve information and analysis for a better input to priority setting and policy design. A wide range of information is required to promote conditions where sustainable coastal zone management can be achieved. An interdisciplinary approach is essential in the formulation and implementation of a research agenda to ensure cost-effectiveness in generating the right information needed for management of the resource(s).

In terms of information for priority setting, the biophysical, social and economic aspects of the coastal resource system are important, as are the interactions between these factors. First, a better understanding of human utilization of, and impact on, the resource(s) system(s). Second, a better understanding of the ecological function of resource(s) system(s) and their response to human uses and impacts. More specifically, natural resource and environmental impacts associated with coastal activities have to be quantified in a physical sense, and monetary values placed on these impacts. The trends in supply and demand for goods and services derived from coastal resources and habitats need to be identified, as well as the social and economic factors influencing these. The critical threshold levels and indices of carrying capacity or assimilative capacity of aquatic habitats or systems need to be identified and documented.

In terms of analysis for priority setting, the appropriate focus is the identification of the most socially costly management issues which need to be addressed. This will require explicit evaluation of the benefits and costs associated with the tradeoffs among and between alternative coastal activities. In addition, research is needed for: (1) identification of a general typology relating occurrence of specific management issues with biophysical, socioeconomic and institutional and organizational factors; (2) valuation of social and environmental benefits and costs of sectoral activities; and (3) identification of management priorities through evaluation of the sustainable level of output, adverse impacts, and associated net benefits and costs.

For policy design, further research is needed to provide guidance to developing country policymakers for establishing policies and programs and selecting policy instruments aimed at the resolution of specific CAM issues. This research should include studies on the appropriateness and efficacy of various management strategies and institutional arrangements, both traditional and contemporary, to mitigate impacts and maximize human welfare benefits, given conditions which typically predominate in developing country settings. The studies should focus on aspects related to the prerequisites for successful implementation of various instruments, the mix of instruments most appropriate under different developing country conditions, and the practicality and cost of implementation of the various instruments.

For both priority setting and policy design, existing analytical and planning/management tools and methods need to be refined and new techniques developed. Appropriate, cost-effective methodologies and techniques are needed to facilitate the inventory of resource distribution, utilization and impacts within the coastal resource system and to evaluate the benefits and costs of coastal activities and management interventions.

Analytical tools include resource assessment and monitoring techniques, economic valuation techniques, optimization techniques (e.g., decision analysis), and impact assessment techniques. Planning and management tools include GIS and remote sensing, rapid rural appraisal, computerized database programs, and resource rehabilitation techniques (e.g., zonation, reforestation, waste management).

Case/pilot studies are essential to develop, test, refine and share methods and approaches for integrated coastal zone management.

## CONCLUSION

A recent World Bank report (1992) on the subject of development and the environment provides a series of suggestions intended to guide the actions of national policymakers with regard to the environment. Among these are to:

1. build the environment into policymaking;
2. act first on local issues;
3. focus on prevention rather than cure;
4. assess tradeoffs and minimize them;
5. economize on administrative capacity by using, to the extent feasible, interventions that work with the market; and
6. support research, disseminate information and train staff.

The recent United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro was the expression of an unprecedented political constituency for addressing environmental issues. Chapter 17 of UNCED Agenda 21, which was adopted by the conference, calls for new approaches to development and management of coastal resources, that are "integrated in content, and precautionary and anticipatory in ambit." Explicitly included as a recommended program area is integrated management and sustainable development of coastal areas.

CAM provides a framework to operationalize the World Bank and UNCED recommendations in the context of coastal areas. The desirable characteristics and essential mechanisms of the CAM process are discussed in this paper. Integration and coordination ensure that the environmental consequences of activities are given full consideration in development planning and implementation. Local consultation and participation ensure that plans prioritize and address issues that are of local importance.

The experience of CRMP highlights the coastal resource system as the appropriate level of analysis and planning. From the coastal resource system perspective, transectoral effects can be identified and physically quantified, tradeoffs assessed in terms of impacts on human welfare, and these impacts minimized through appropriate institutional and organizational arrangements and management interventions.

The preliminary typology of management issues suggested by the CRMP experience will undoubtedly be expanded and refined through further CAM experiences. Nevertheless, the current typology provides a vision which should allow management to be proactive rather than reactive, and to focus on prevention rather than on cure.

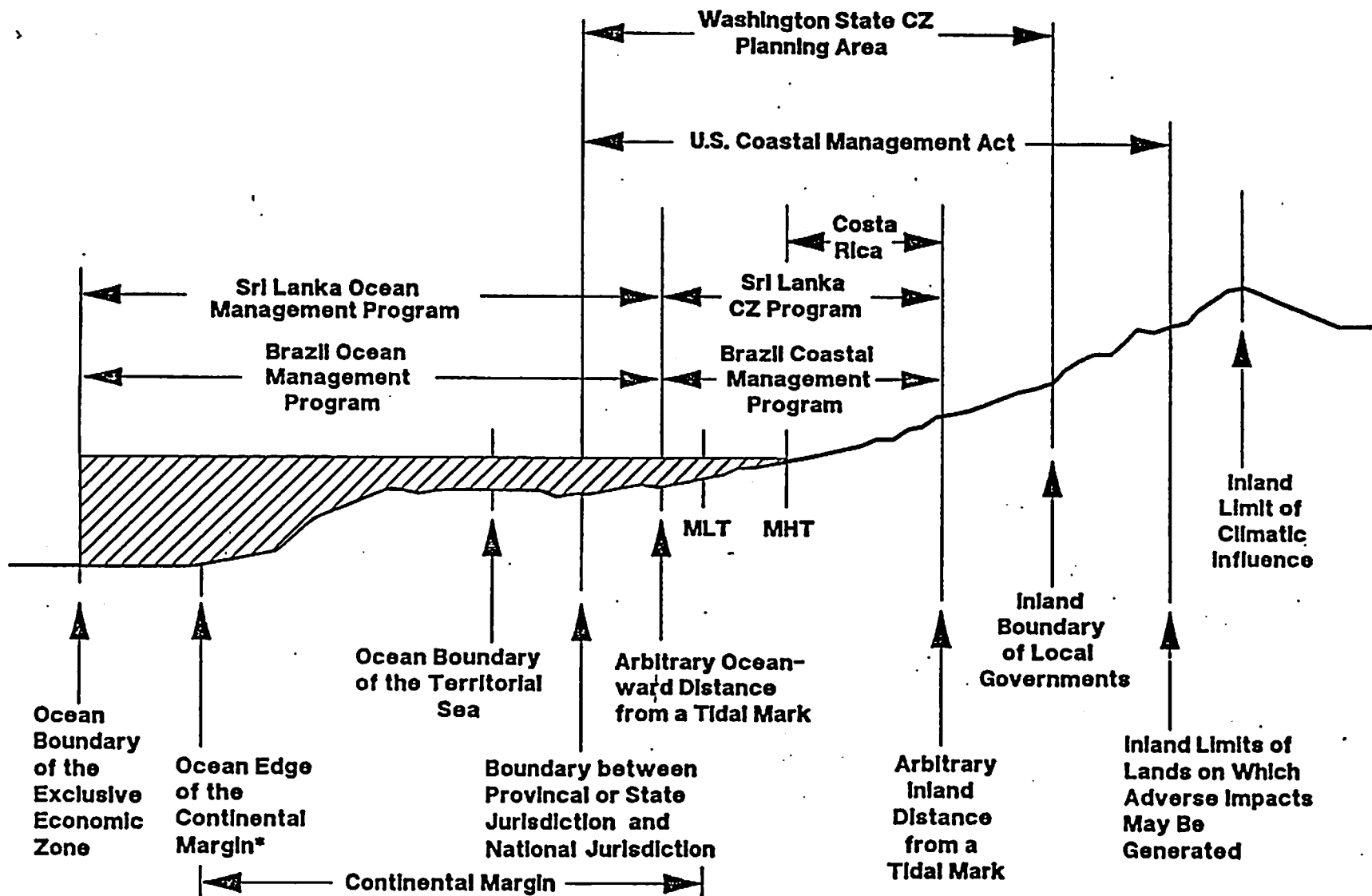
Similarly, the typology of institutional considerations suggested by the CRMP experience provides a preliminary assessment of the relative efficacy of alternative management interventions, including market-based incentives, regulations, and direct public investments such as research, information dissemination and training.



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\* In a number of places the Continental Margin extends oceanward beyond 200 nautical miles.

Fig. 1. Existing and potential boundaries of coastal zone management programs and ocean management programs. (Source: Sorensen and McCreary 1990)

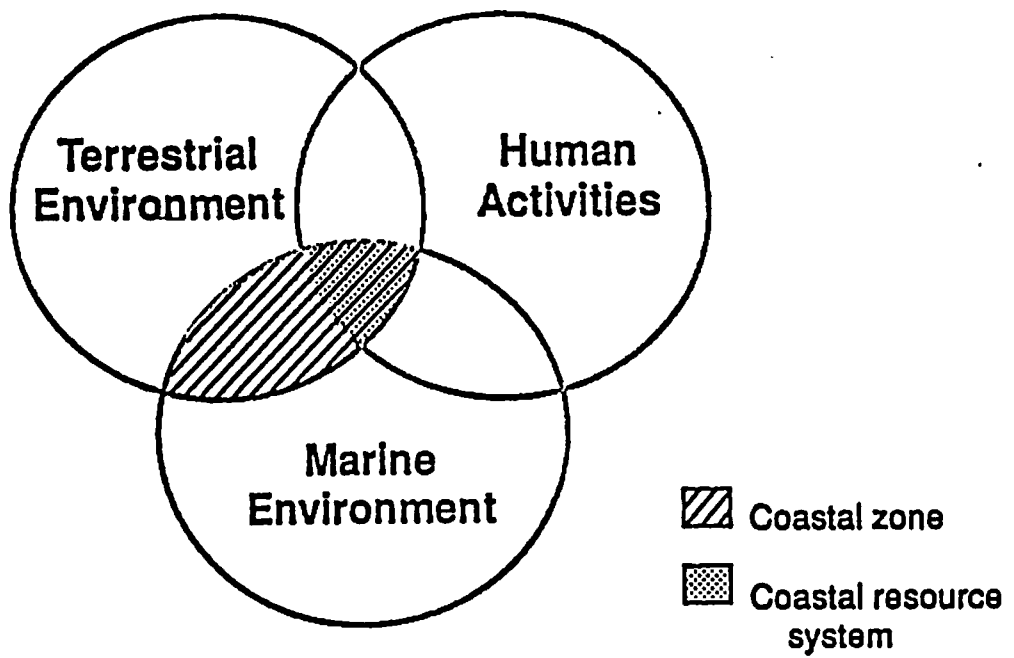


Fig. 2. Relationship between coastal zone and coastal resource system. (Source: Scura et al. 1992)

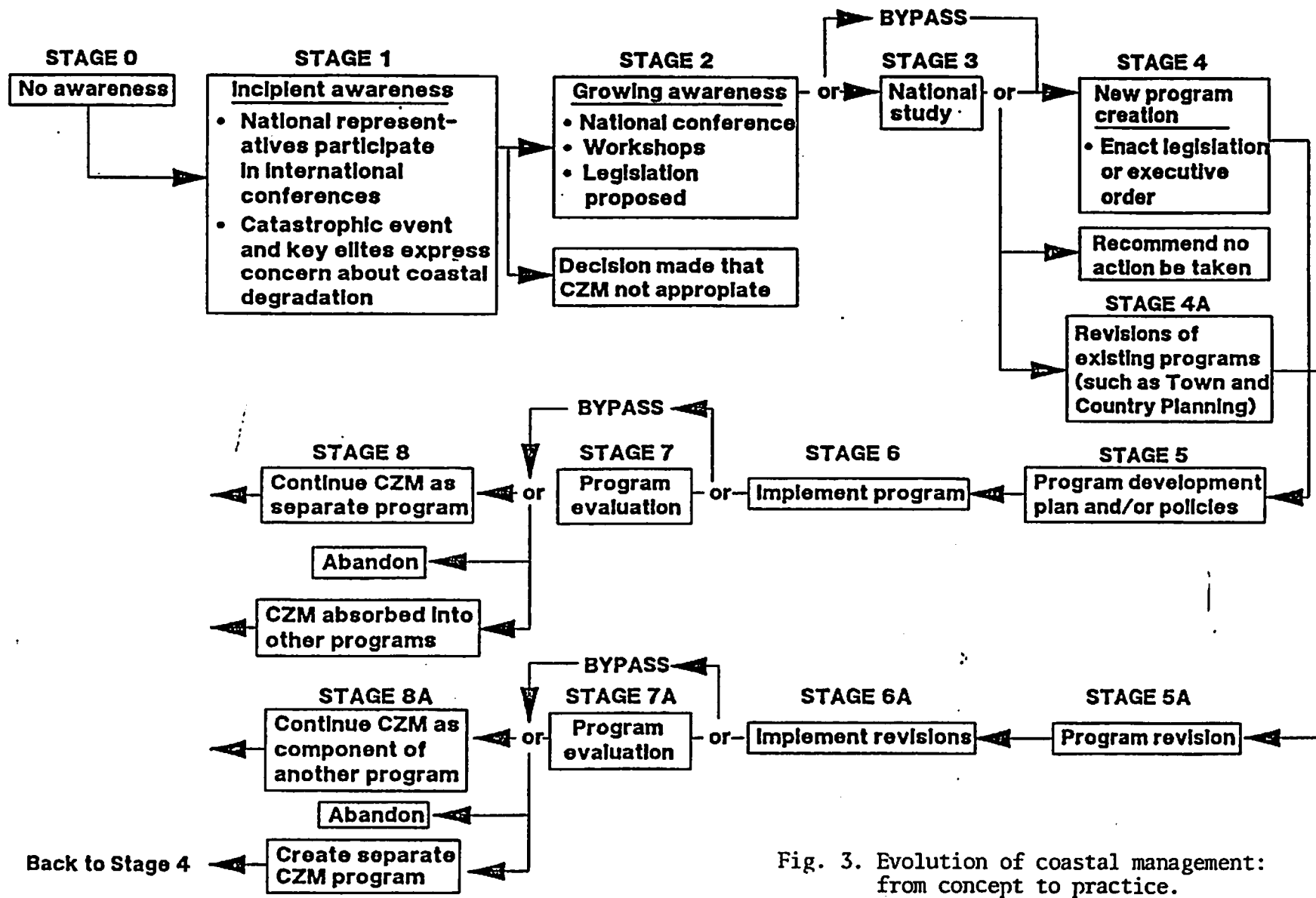


Fig. 3. Evolution of coastal management: from concept to practice.  
(Source: Sorensen and McCreary 1990)

**Fig. 4. Categories of lessons learned from ASEAN/US CRMP. (Source: Scura et al. 1992)**

The lessons learned through the experience of CRMP are related to:

**Process**

- **Desirable characteristics of the planning phase**
  - iterative process
  - originate from within
  - integrated with development agendas
  - local participation
  - full consideration of existing institutional and organizational arrangements
  - research focused on identification of management priorities and opportunities
  - management actions matched with management issues and goals
- **Essential features of management plans**
  - situation profile
  - problems and opportunities
  - philosophy, goals and objectives
  - policies and strategies
  - programs and projects
  - organization and management
  - monitoring and evaluation
  - financial and economic justification
- **Essential mechanisms**
  - integration
  - coordination

**Management Issues**

- **Traditional management issues**
  - predominate in undiversified economies typically dependent on natural resource-based activities
  - associated with mix of activities typical of rural areas
  - critical issues tend to be related to the rate of resource exploitation
  - pollution issues usually of lesser importance

- **Management issue transition**
  - driven by economic diversification
  - function of the mix of development activities
- **Modern management issues**
  - predominate in more diversified economies
  - associated with mix of activities typical of urbanizing and urban areas
  - critical issues tend to be related to pollution
  - issues of overexploitation of natural resources usually of lesser importance
- **Dualism and synergism**
  - coexistence of traditional and modern management issues
  - traditional issues exacerbated by modern issues

#### **Opportunities for Management Intervention**

- **Institutional and organizational arrangements**
  - clarification, monitoring and enforcement of rights and obligations needed for most interventions
- **Incentives and regulations to modify human behavior**
  - work with the market when possible
- **Direct public involvement and investment**
  - financial constraints limit coverage
  - cost recovery should be pursued when possible

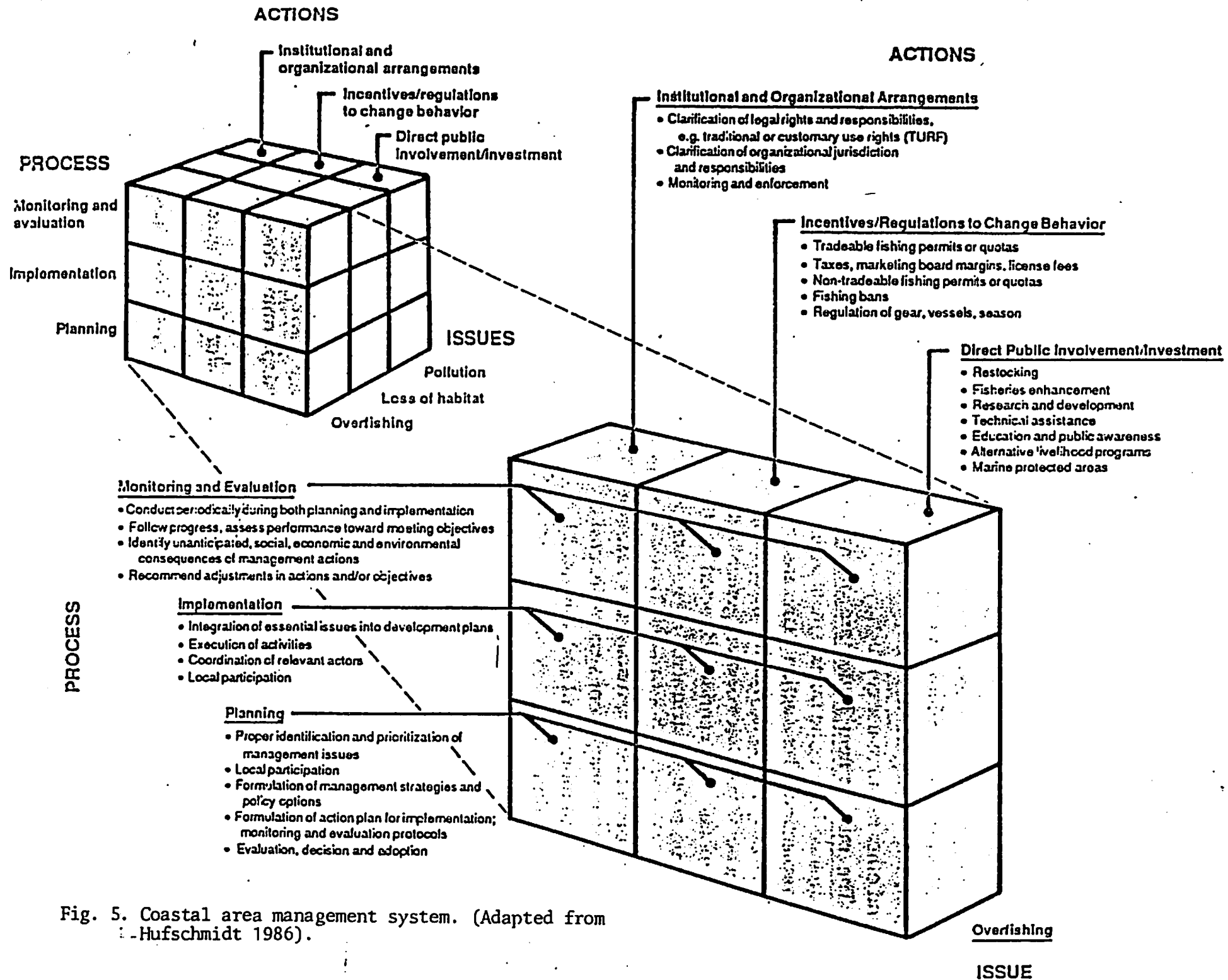
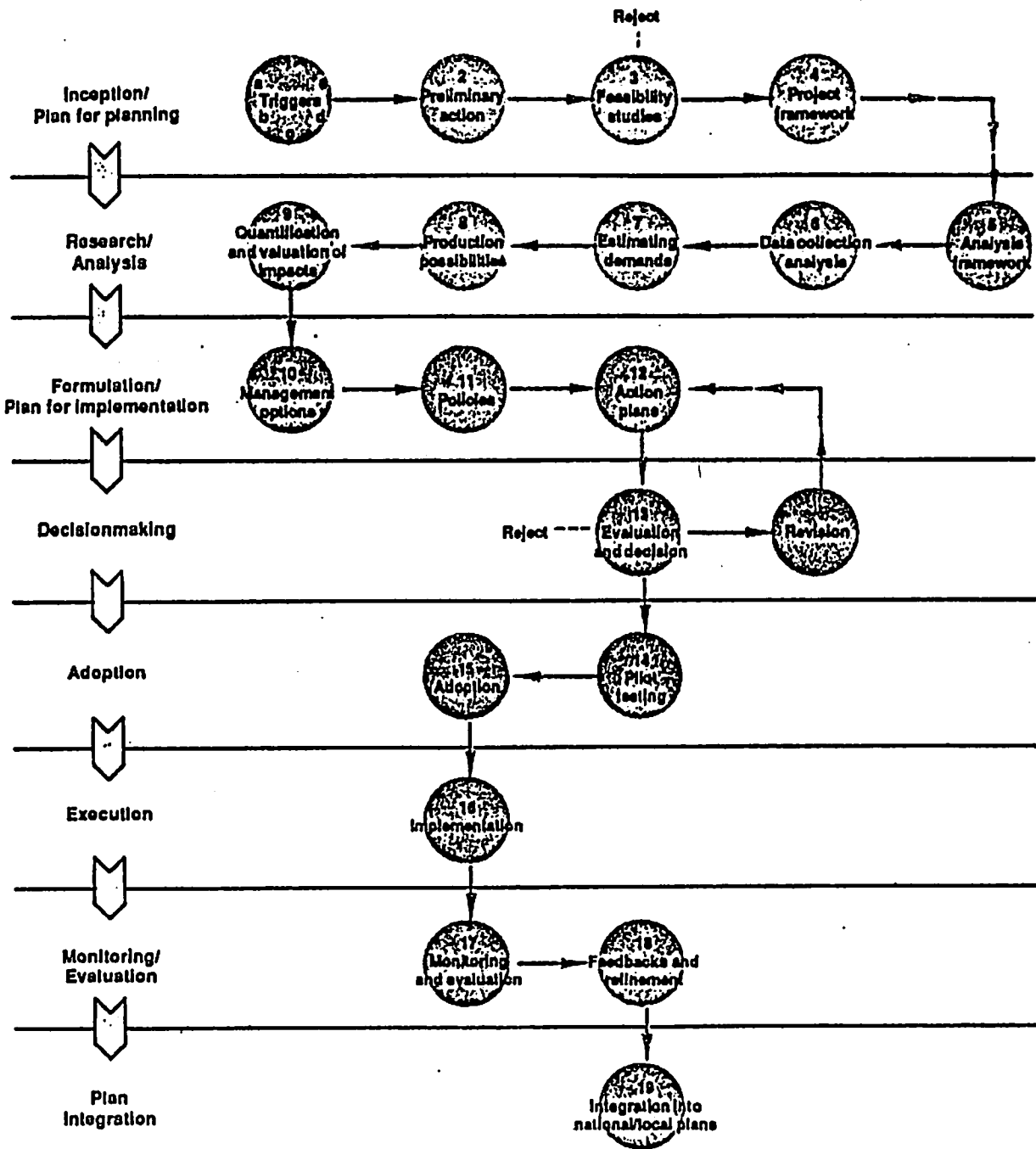


Fig. 5. Coastal area management system. (Adapted from Hufschmidt 1986).





1. Triggers of process by one or combination of factors: a. resource depletion; b. pollution; c. environment incident; d. concern for sustainable development, e. other factors.
2. Preliminary action: awareness of coastal issues and initiation of formal process.
3. Feasibility study: preliminary assessment of coastal issues, management needs.
4. Setting up the project framework: project formulation, determining coordinating institution, project document, work plan.
5. Setting up the analysis framework: coastal profile, goals/objectives, targets, time frame, boundaries, approaches/scenarios, criteria for evaluation/monitoring, legal/institutional framework.
6. Carrying out analysis: issues, causes, impacts, constraints.
7. Estimating demands for products/services: types of products and services generated; demand level.
8. Analyzing production possibilities: output estimate, strategies, attainments.
9. Quantification and valuation of impacts: present and future economic activities, ecological risks, sensitive areas.
10. Management options: conflict resolution, impacts.
11. Policy formulation: general and specific policies based on management options selected.
12. Action plans: finalizing specific activity with budget, manpower, institution involved; implementation strategies.
13. Evaluation and decisionmaking: management strategies by decisionmaking bodies, acceptance or rejection of proposal.
14. Pilot testing: pilot site selection, plan implementation, refinement.
15. Program adoption: acceptance for full implementation.
16. Implementation: implementing institution to carry out action.
17. Monitoring/evaluation: assessing attainment of objectives and impacts.
18. Feedbacks and refinement: setting up feedback mechanism, refinement needed.
19. Integration: integrating CAM into national/local government development plans.

Fig. 6. Coastal area management process (Chua 1989).

**Fig. 7. Information needs for CAM. (Source: Scura et al. 1992)**

**Biophysical and Environmental Aspects**

- Resource inventories
- Determination of environmental linkages and processes
- Identification, monitoring and evaluation of environmental change
- Physical quantification of environmental impacts

**Social and Economic Aspects**

- Social, cultural and economic characterization of coastal communities
- Estimation of demand and supply of coastal resources, and projection of future demand and supply
- Identification of current and potential future resource conflicts
- Identification of market and policy failures
- Economic valuation of coastal resources including nonmarket valuation
- Evaluation of alternative policy options and management strategies

**Institutional and Organizational Aspects**

- Rights and obligations with regard to coastal resource use
- Organizational jurisdiction, responsibilities, structure and coordination

**Opportunities for Management Interventions**

- Evaluation of opportunities for and efficacy of interventions to influence behavior
- Evaluation of opportunities for and efficacy of direct public involvement or investment

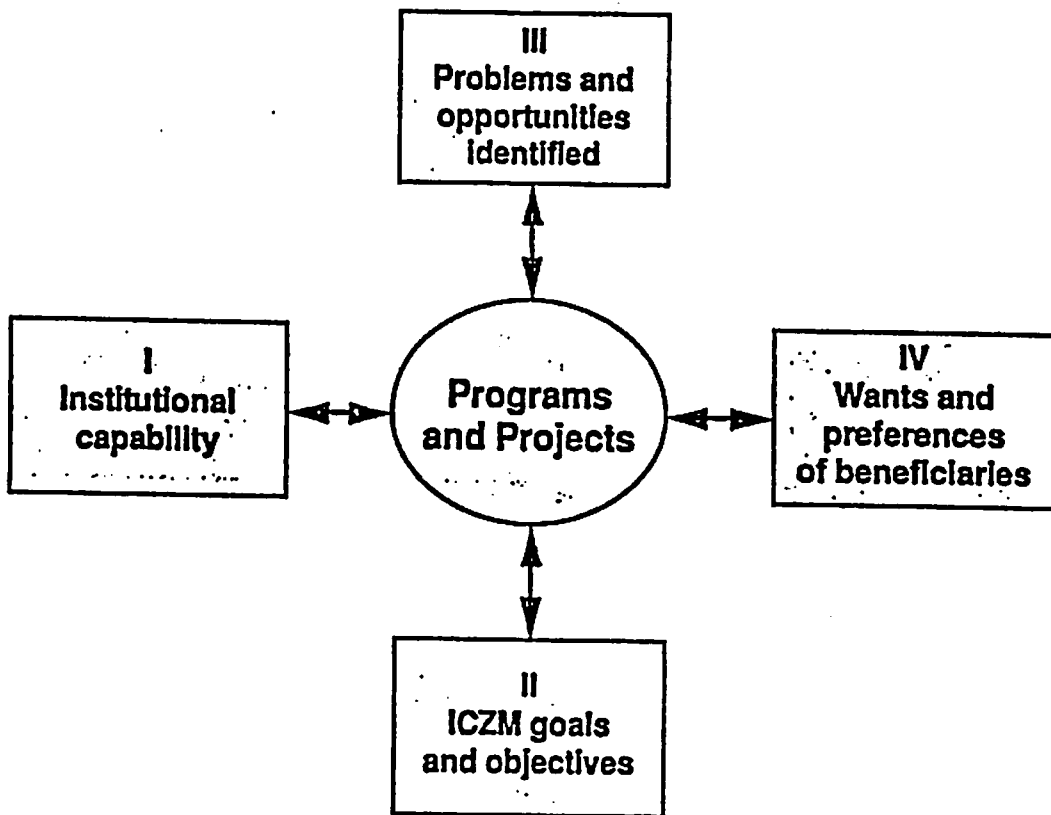


Fig. 8. Matching of four major plan elements to arrive at a set of programs and projects. (Source: Scura et al. 1992)

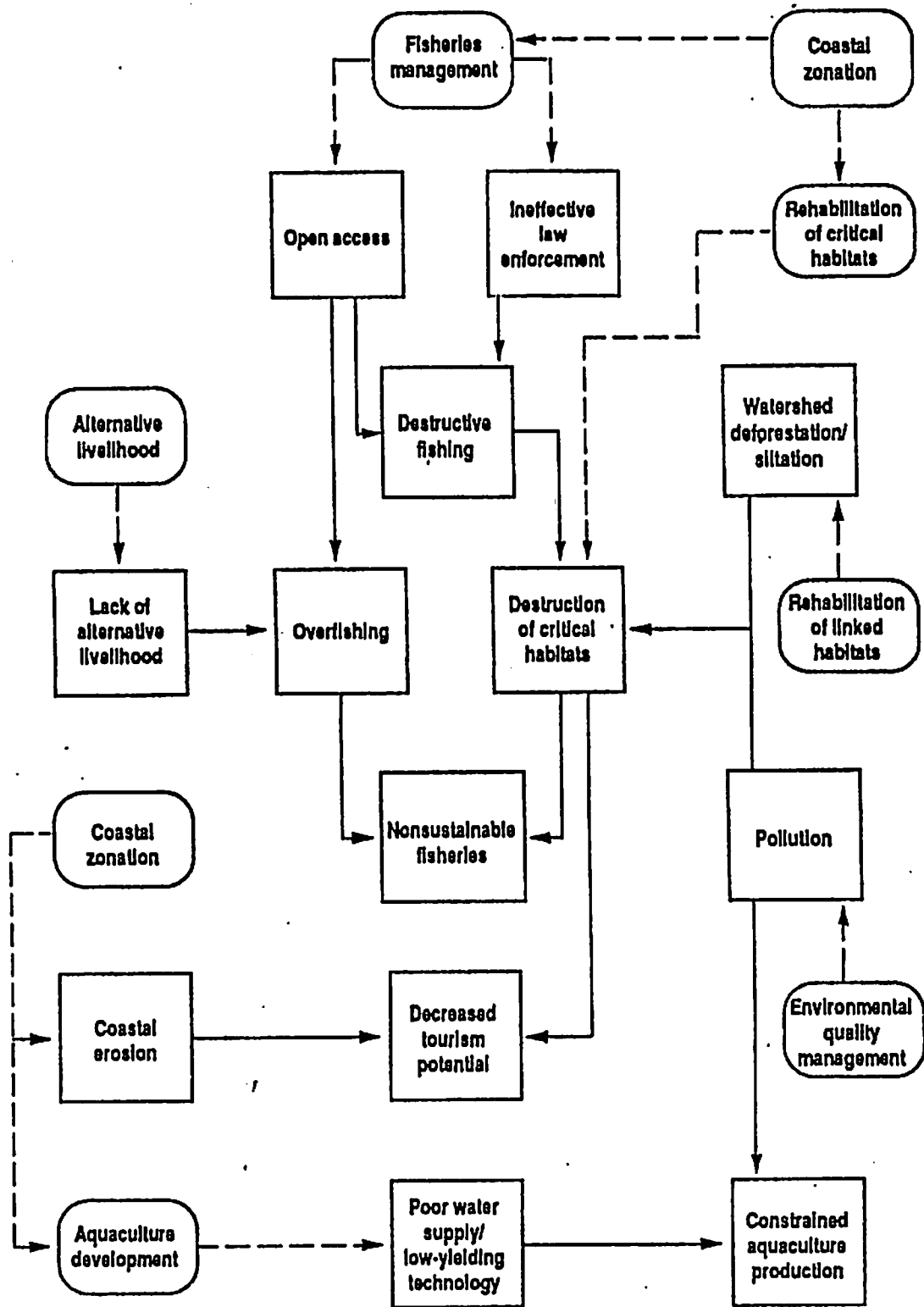


Fig. 9. The integrated approach of the Lingayen Gulf Coastal Area Management Plan (NEDA Region I 1992).

- Issues and problems
- Programs
- Links between problems
- - - Links between programs; between programs and problems addressed

Fig. 10. Institutional and organizational considerations for effective management actions. (Source: Scura et al. 1992)

| Consideration                                     | Direct              | Indirect    |
|---|---------------------|-------------|
| <b>Market-based incentives</b>                    |                     |             |
| Clarification of rights and obligations necessary | Yes                 | Yes         |
| Monitoring and enforcement requirements           | High                | Medium      |
| Financial commitment                              | High                | High        |
| Revenue generation/cost recovery possible         | Yes                 | Yes         |
| Maximum number of target resource users           | Small               | Large       |
| <b>Command-and-control regulations</b>            |                     |             |
| Clarification of rights and obligations necessary | Yes                 | Yes         |
| Monitoring and enforcement requirements           | High                | Medium      |
| Financial commitment                              | High                | High        |
| Revenue generation/cost recovery possible         | No                  | No          |
| Maximum number of target resource users           | Small               | Large       |
| <b>Direct public investment</b>                   |                     |             |
| Clarification of rights and obligations necessary | Yes                 | No          |
| Monitoring and enforcement requirements           | High                | Low to none |
| Financial commitment                              | High                | High        |
| Revenue generation/cost recovery possible         | Yes but not typical | No          |
| Maximum number of target resource users           | Small               | Large       |