



Universiti Malaya

INAUGURAL LECTURE

TOWARDS SUSTAINABLE MANAGEMENT OF THE
COASTAL ZONE : GETTING OUR ACT TOGETHER



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SYARAHAN PERDANA

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Profile in Brief

Professor Dr. Jahara Yahaya

Academic Qualifications: B.Econs (Hons), University of Malaya, 1971
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Career:

1. External Tutor, Faculty of Economics and Administration, University of Malaya, 1971/72.
2. Lecturer, Faculty of Economics and Administration, University of Malaya, 1972 - 1984.
3. Associate Professor, Faculty of Economics and Administration, University of Malaya, 1984 -1994.
4. Professor, Faculty of Economics and Administration, University of Malaya, 1994 - present.
5. Dean, Faculty of Economics and Administration, University of Malaya, 1998 - present.
6. Director, Center for Economic Development and Ethnic Relations, (CEDER), University of Malaya, 2000 - present.

Dr. Jahara Yahaya is the Dean of the Faculty of Economics and Administration, University of Malaya since 1998. Before her present appointment, she was the Head of the Department of Development Studies at the same Faculty and, prior to that, was the Deputy Dean, Institute of Advance Studies, University of Malaya. She is also currently the Director, Centre for Economic Development and Ethnic Relations (CEDER), a research center at the University of Malaya focusing on issues related to economic development, race relations and national integration.

Besides being at the helm of the Faculty of Economics and Administration as its Dean, Dr. Jahara Yahaya is an active member of several University-level committees and boards, such as the International Institute of Public Policy and Management (INPUMA), Unit Perundingan Universiti Malaya (UPUM) and Akademi Pengajian Melayu (APM) and the Tun Ismail Ali Chair Council. She has been Senate representative (alternate) for the Jawatankuasa Kenaikan Pangkat ke Profesor from 2001 until 2003.

Dr. Jahara Yahaya teaches Environmental Economics, Sustainable Development and Research Methodology in Development Studies to the undergraduates at the Faculty. She has published a number of books, book chapters and journal articles, both at the national and international levels. Among the journals in which her articles have been published include International Journal of Marine Resource Economics, International Journal of Marine Policy, Journal of Developing Economies, Malaysian Journal of Economic Studies, Kajian Ekonomi Malaysia and Development Forum.

Dr. Jahara has undertaken several research and consultancy projects on fisheries economics, environmental impact assessment and environmental management and monitoring. She has coordinated a number of consultancy projects

involving members of the Faculty. These include studies on the Economic Evaluation of the PETRONAS Malaysian Grand Prix 1999; Remuneration System for the Plantation Workers; the New Economic Policy (NEP) Revisited – One Decade Later; *Kajian Ke Atas Pemberian Geran Tahunan Berasaskan Kaedah Keseimbangan (GTBKK)*; and Knowledge, Attitude and Practice (KAP) Survey on Financial Planning in Kuala Lumpur and Petaling Jaya.

Dr. Jahara has served as consultant to several international agencies including Asian Development Bank (ADB), Food and Agriculture Organization (FAO), United Nations Development Programme (UNDP) and United Nations Environmental Programme (UNEP). She was a member of the Scientific Steering Committee of the Land-Ocean Interactions in the Coastal Zone (LOICZ), a core programme of the International Geosphere Biosphere Programme (IGBP). Dr. Jahara was the President of the Agricultural Economics Society of South East Asia (AESSEA) and Secretary of the Asian Fisheries Society (AFS). She is a Life Member of the Malaysian Economic Association in which she now serves as one of its Vice Presidents.

At the national level, Dr. Jahara Yahaya has been appointed to a number of government advisory committees and panels such as the Panel of Reviewers of the Environment Impact Assessment (EIA), Department of Environment; Evaluation Panel for the IGS Project, Ministry of Science, Technology and Environment; Technical Committee, National IGBP, Malaysia; Advisory Committee for Modernizing the Agricultural Sector, Prime Minister's Department; and Advisory Committee on the National Agricultural Policy, Ministry of Agriculture. She is also a member of the National Consumers' Advisory Council, Ministry of Domestic Trade and Consumers Affairs since August 2000. In recognition of her vast experience as an academic administra-

tor, Dr. Jahara Yahaya has, on several occasions, been invited by the Public Service Department (Jabatan Perkhidmatan Awam) to serve the Department's Adhoc Committee to evaluate new degree programmes offered by public universities such as Universiti Malaysia Sabah (UMS) and the University College of Science and Technology, Malaysia (KUSTEM).

University of Malaya

TOWARDS SUSTAINABLE MANAGEMENT OF THE COASTAL ZONE: GETTING OUR ACT TOGETHER

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Synopsis

Malaysia has a long coastline of about 4800 km characterized distinctly by mangrove-fringed mudflats and sandy beaches. The coastal zone of Malaysia is socio-economically significant, being a centre of population concentration and economic activities. About 70% of Malaysia's 18 million population live in the coastal zone. It supports a range of highly diversified economic activities including urban development, industries, agriculture, fisheries, aquaculture, oil and gas exploitation, tourism, marine transportation and port development. In the last three decades, unsustainable development in the coastal zone, induced primarily by externally-driven economic stimuli, has resulted in serious degradation of the natural coastal environment and coastal ecosystems. Whilst the government has not erred in taking remedial measures to arrest this problem, these measures are often insufficient and inappropriate to provide long-term solutions for the sustainable management of the coastal zone. This lecture offers "snapshots" of some of the critical issues faced by the coastal zone, including vulnerability of the coastal resources, market failure, policy failure, information failure, and inadequate enforcement and monitoring. Realising the severity of these issues and problems, we provide a review of remedial measures and policy-recommendations towards sustainable management of the coastal zone. These measures and recommendations include instituting the enabling framework for the integrated management of the coastal zone; setting up a single coastal management authority; developing and amending legislation and other legislative instruments related to coastal management; developing participatory planning and consensus; pricing the coastal resources appropriately; forging smart partnership amongst all the stakeholders; and bridging science and coastal zone management.



The rapid pace of development activities, poor siting, planning and design of coastal development projects, however, has begun to give rise to problems. Economic pressures have led to the indiscriminate cutting of mangrove forest for aquaculture, agriculture and tourist development projects and to the exploitation of coastal resources above sustainable level, especially along the west coast of Peninsular Malaysia. In addition, rapid development of the hinterland has increased the organic and inorganic pollution to rivers and coastal waters. The loss of mangrove and other wetland forests, which function as breeding grounds for a large variety of fish and prawn species, has resulted in a decline in fisheries resources. (Seventh Malaysia Plan, 1991-95).

Introduction

The coastal zone supports a range of biologically-diverse productive ecosystems such as mangroves, mudflats, coral reefs, sea grass beds, sandy beaches and rocky shores where an abundance of flora and fauna flourish. It also provides space and habitats to varied human activities such as agriculture, fisheries, aquaculture, residential development, maritime trade, tourism, construction of port and harbor, land reclamation and energy production facilities.

It has been estimated that some 60 percent of the world's population live in the coastal zone. About 60 to 70 percent of the

world's cities with population of over 1.6 million are located in the coastal zone. It also supplies about 90 percent of the world fish supply.

In the last three decades, unfettered development in the coastal zone, primarily induced by outside economic stimuli, has resulted in serious degradation of the natural coastal environment if not its complete breakdown in the more extreme cases. Whilst the government of most coastal states have not erred in taking remedial measures to arrest the problems, these measures are often insufficient and inappropriate to provide long-term solutions for sustainable management of the coastal zone. The end result is a serious deterioration in the socio-economic welfare of the coastal population and communities.

What are the issues in today's coastal zones

Vulnerability of the coastal resources

Given a coastline extending some 4,800 km. long, sustainable management of its coastal zone is indeed of significance interest to Malaysia. The coastal zone of Malaysia supports a wide variety of economic activities including aquaculture, fishing, marine transportation, sand-mining, tourism, agriculture, industries and urban development. Historically, the coastal zone has been the major focus of development for the coastal communities. The availability of abundance of food from the coastal waters and the use of sea for transportation and trade have attracted early settlement in the coastal areas. Today, it is estimated that approximately 70 percent of Malaysia's 22 million population live in the coastal zone. The coastal lagoons, tidal inlets and estuaries serve as abundant sources of food production through fishing and aquaculture activities. More than 80 percent of the fish catch in the country comes from the coastal waters. Sandy beaches coupled with pleasing landscape and sceneries also support flourishing tourism, leisure-related and recreational industries, all of which provide sources of income and employment to the coastal communities.

Malaysia, like its neighbors in the ASEAN region, faces similar coastal environmental issues of grave concern to coastal planners and managers. These issues and concerns have been sufficiently addressed and highlighted by previous studies (USAID, 1990; DANCED, 2001). Over the last one decade, the issues and concerns which seemed to have the most severe impact on the coastal and marine environment in the country are summarized in Table 1.

Table 1. Coastal Environmental Issues By Order of Priority and Urgency Categories, Malaysia

Issues and Problems	Immediate	Short-term	Long-term
Habitat destruction (mangroves, wetlands, coral reefs, mudflats, seagrass)	1	1	1
Sewage pollution	2	2	2
Industrial/agricultural pollution	3	3	3
Fisheries overexploitation	4	4	6
Coastal erosion	5	5	4
Siltation/sedimentation	6	6	5
Oil pollution	7	7	7
Hazardous waste	8	8	8
Red tides	9	9	11
Natural hazards	10	10	10
Sea level rise	11	11	9

Source: Adapted from UNEP (1990)

Note: Urgency categories

Immediate Short-term (within next 5 years)

Long-term (within next 10 years or more)

The above issues are, to a large extent, triggered off by the high rates of changes and subsequent pressures on the coastal resources, most of which are human - driven. . Owing to rapid migratory movement coupled with natural high population growth, an increasing percentage of the world population, including Malaysia, now lives in the coastal zone. This has led to serious destruction of coastal ecosystems caused by development construction, other economic activities and solid waste disposal. Increased urbanization and rapid industrial development have also caused pollution of surface and groundwater , especially in areas adjacent to major industrial areas and urban settlements.

Coastal zones are generally characterized by riverine systems such as deltas and river basins. Developments in these upstream areas have direct impact on the environmental quality of the coastal zones. For example, activities such as irrigation, deforestation, agriculture and building activities undertaken in the upper regions of the river basins have adverse impacts on the riverine systems and invariably cause major pollution to the marine environment .

Mangroves dominate the coastal ecosystems of the world's tropical and subtropical countries. About one-third, or some 63,000 sq. km., of the world's mangroves are found in South-East Asia. They have not only traditionally been a source of income and employment to the coastal communities but also provide important ecological functions and services. Mangroves act as a shoreline protector and stabilizer against inundation and coastal erosion ; provide a buffer protecting populated coastal areas from natural hazards such as storm, flooding and coastal erosion; assists in waste assimilation ; and act as an important breeding grounds for fish and crustaceans.

The mangrove forest of Malaysia covers a total area of some 641,000 ha , about half of which is found in eastern Sabah.

Between 1980 and 1990, approximately 59,000 ha. of mangrove forest in Malaysia had been cleared, representing a decline of about 12 percent in just over a decade (Chan et.al., 1993). This decline is primarily caused by the development of intensive shrimp farming along the coasts. Unlike the traditional form of small-scale aquaculture, intensive aquaculture practices have serious adverse impact on the coastal environment. The use of chemicals , antibiotics and processed feeds caused severe marine pollution. Moreover, the clearing of large spanse of mangroves coupled with river pollution caused by aquaculture ponds are partly responsible for dwindling catches of the inshore fishermen .

Another activity identified as having drastic adverse impact on the coastal environment is land reclamation. An outstanding example is the Singapore's land reclamation projects in the Tebrau Straits. Studies have shown that land reclamation activities at Pulau Tekong off the eastern shore of Singapore and at Tuas on the southwestern tip of Singapore would result in increased sedimentation and erosion , deterioration of water quality , increase in salinity and pollution , and loss of coastal habitats such as mangroves . Increased sedimentation, as indicated by these studies, would cause some of the coastal areas off the Johor Straits to turn to muddy beaches.

Market failure

One of the main reasons for environmental damage is the failure of markets to send the right signals. The market often has no way of putting a proper price on the coastal ecosystems and the resources and services they generate. For example, it is easy to put a price on a mangrove tree as poles. But that price does not take into account the value of the mangroves as a coastline protector , or as a waste assimilator. Because the market does not set prices on these environmental services

provided by the mangroves, they tend to be overexploited. Underpricing of the mangroves has often resulted in the rapid conversion of mangroves forest into other competing uses such as for shrimp farming and for industrial and residential development.

Another typical market failure is in the form of pollution "externalities". Waste assimilation function of the ambients (rivers, seas) has often been taken for granted and considered to be " free of charge" in the absence of market prices. This has inevitably led to waste generation from land-based sources (residential, industries, agriculture) far exceeding the assimilative capacities of the environment . The end result is heavily polluted coastal environment and serious deterioration in the water quality off the coasts.

The most glaring example of sheer abuse and ignorance of the environmental functions provided by the coastal ecosystems is the uncontrolled development in the Juru River Basin in the Seberang Prai Central District in Penang. Previous studies have shown that increased urbanization and changes in the land-use patterns from agriculture and wetlands to urban built up areas have caused hydrological changes to the Juru River resulting in fresh occurrences of flash floods in the inland areas, sedimentation at the Juru River mouth , concentration of toxic waste discharged by industrial activities upstream , and occurrence of mudflats caused by dredging activities with the construction of ports and its ancillary facilities in Butterworth (Ahmad Sanusi Hassan et.al. , 2002).

Policy failure

Government intervention through sound policies should extend to the coastal environment. Just as government is duty bound to ensure the stability of our economy, it is also ethically responsible

to take care of the environment. Unfortunately, as in other developing countries in the world, up until the 1970's, coastal zone received minimal or no attention from the Malaysian policymakers. The lack of government intervention and policies in the past has been partly blamed for the unsustainable use of resources and space in the coastal zone.

Current legislations pertaining to coastal zone management are uncoordinated and sectorally-biased. The two legislations that have significance influence on coastal zone management are the *Environmental Quality Act, 1985* and the *Environmental Impact Assessment Order, 1987*. There is a noticeable absence of a broad, comprehensive and integrated legislative framework within which proper planning, policies and programs can be effectively instituted and implemented for the sustainable management of the coastal zone. The proposed *National Coastal Zone Policy*, initiated since 1992, is long overdue. In the absence of such comprehensive legislative framework, inappropriate and isolated sectoral planning have often undermined the long-term interests of sustainable use of the coastal resources. This is further aggravated by insufficient coordination of planning and decision-making by coastal planners and managers at federal, state and local levels. Effective implementation of coastal zone management at the national, state and local levels requires a comprehensive and coherent legislative system and an effective institutional mechanism for the planning, control and regulation of current and new developments in the coastal zone.

Inadequate enforcement and monitoring

Another area of contention with regards to sustainable management of the coastal zone is inadequate enforcement and monitoring. Generally, enforcement is the most problematic in terms of inter-agency coordination. This could be attributed to lack of coordination and joint programs between enforcement

agencies, ambiguous procedures and shortage of staff, equipment and financial resources. There is also a general absence of a developed and coordinated system of enforcement and monitoring to ensure that sectoral responsibilities are effectively carried out as well as support the formulation of joint or common enforcement programs. A good case in point is the uncoordinated enforcement programs between the Department of Environment and state agencies and local authorities.

Information failure

It is widely recognized that scientific information and knowledge on coastal ecosystems and habitats are seriously lacking. There is a dearth of data on the current status of coastal resources: their overall coverage, geographical distribution, density, growth patterns, responses to perturbations (human and natural), and use patterns. Even if data exist, they are scattered and inconclusive to provide sufficient details for the development of parameters which could guide and monitor sustainable use of the resources. In the absence of such scientific data and information, planning and decision-making for the management of the coastal zone are often made without a sound understanding of the characteristics and dynamics of the coastal ecosystems, and more importantly, the pressures and driving forces influencing the dynamics

Another manifestation of the information "failure" is the lack of effective linkages between science (information production) and management (information application.). More specifically, output of scientific research have been isolated from end-users, particularly coastal planners and managers. Communication and flow of information are also ineffective between coastal managers and coastal stakeholders including resource users, local population and local authorities.

Getting our act together

This section contains recommendations or measures to be undertaken in order to address environmental degradation and destruction of the coastal ecosystems and habitats of Malaysia. Central to these recommendations is seeing to it that the coastal zone gets the policy attention it deserves and increasing awareness amongst all stakeholders of the critical importance of sustainably managing this sector.

Sustainable management of the coastal zone, from the Malaysian perspective, incorporates the principle that economic well-being, social equity and environmental protection are inherently interdependent in the long-run. It aims at not only maximizing long-term societal benefits while taking into consideration economic, socio-cultural and environmental factors but also ensuring that social equity is achieved through equitable distribution of opportunities both amongst the present generation, and between present and future generations. Hence, an implicit objective of sustainable management of the coastal zone is "to determine a socially desirable mix of coastal zone products and services which can be sustained over time" (Turner and Adger, 1995). It is firmly believed that this social mix can be most efficiently achieved through an integrated approach to coastal zone planning and management. In a nutshell, such approach offers maximum benefits, intra and inter-generational, from coastal resources and services while minimizing environmental cost to society.

The National Coastal Zone Policy

A national policy on the coastal zone that prescribes clear principles and guidelines on the use and management of coastal resources is essential. Towards this end, the Economic Planning Unit (EPU), has embarked upon the tedious task of

developing the National Coastal Zone Policy. Under the Seventh Malaysia Plan (1995-2000), the initiative to implement the National Coastal Zone Policy was indicated , emphasizing the need to provide principles and guidelines to resolve multiple-use conflicts among coastal users. . Efforts to facilitate the full implementation of the National Coastal Zone Policy are continued under the Eighth Malaysia Plan (2001-2005).

Malaysia's initiative to develop and implement a national coastal policy is indeed timely and wanting. The policy development process, however, will undoubtedly entail a comprehensive review, assessment and even restructuring of existing legislations and institutional mechanisms. In this regards, the functions and institutional capacities of all coastal-related ministries and agencies need to be coordinated and integrated. A single management agency is thus needed to assume the task of promoting sustainable development of the country's coastal areas

The Enabling Framework-Integrated Coastal Zone Management (ICZM)

ICZM is " a dynamic , continuous and interactive process designed to promote sustainable management of the coastal zones " (EU, 1999). The word 'integrated " incorporates the following elements:

- < integration of objectives and the various instruments to meet these objectives;
- < integration of all sectors within the economy, policies , programs and different administrative levels related to coastal management; and
- < integration of the terrestrial and marine components of the targeted area

There is no commonly accepted and correct approach to ICZM even in countries already practising it. The choice of approach is determined by a host of interrelated factors including historical, cultural, social and economic, as well as by the natural conditions and local problems and issues in the targeted area. These diversities and complexities make it difficult to determine which ICZM approach might be the most workable in any given area.

As for Malaysia, it cannot be expected that ICZM approaches in other countries can be easily transposed to the local setting. Malaysia must learn from the other countries experiences and improvised its own approaches and strategies accordingly. Formulation of ICZM for Malaysia should logically begin with a commitment by the government to the goals and objectives of ICZM. The National ICZM Plan , spearheaded by the Economic Planning Unit (EPU) of the Prime Minister's Department in 1993, serves as the over-arching framework for implementing ICZM in Malaysia. The status of Malaysia's ICZM vis-à-vis other countries is shown in Table 2.

Table 2: The Status of National ICZM Programmes – Selected Countries

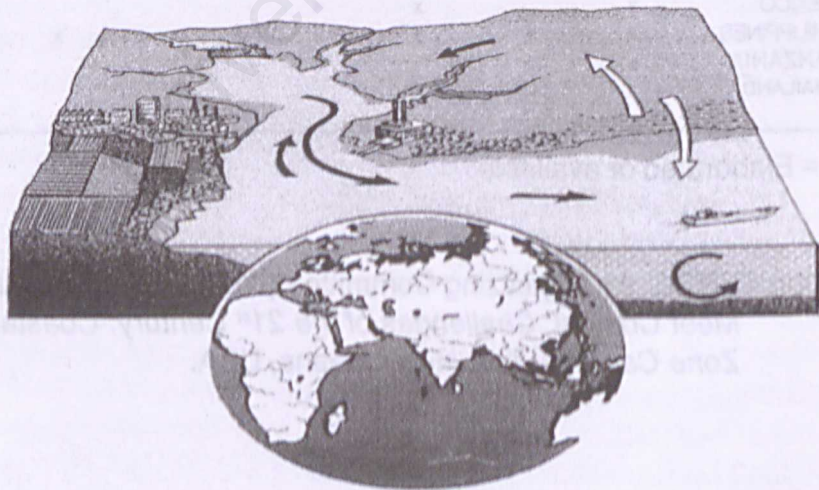
Country	Research inventory	CZM authority, linkages between departments	Sectoral plan	ICZM planning	Implementation in progress	Evaluation and feedback
BANGLADESH	x		x			
BARBADOS	x	x		x		
BELIZE	x	x	x	x		
CHINA	x	x	x	x		
ECUADOR	x	x	x	x	x	x
EGYPT	x	x				
ISRAEL	x		x	x	x	x
NETHERLANDS	x	x	x	x	x	x
NEW ZEALAND	x	x		x	x	x
SRI LANKA	x	x	x	x	x	x
SYRIA	x	x	x	x	x	x
USA	x	x	x		x	x
CHILE	x	x		x	x	
CROATIE	x		x		x	
TURKEY	x		x	x		x
GERMANY	x					
GREECE	x			x	x	
INDONESIA	x	x	x			
MALAYSIA	x	x	x	x		
MEXICO	x		x	x		
PHILIPPINES	x	x	x	x	x	x
TANZANIA	x	x		x		
THAILAND	x	x	x		x	

x = Elaborated or available

Source: WCC '93 Organizing Committee (1993c). *Preparing to Meet Coastal Challenges of the 21st Century: Coastal Zone Case Studies*, New Orleans, USA.

The World Coastal Conference 1993 (WWC 93) recognized that “ a national ICZM program should facilitate integrated decision-making through a continuous and evolutionary process for cooperation and coordination among sectors, integrating national and local interests in the management of activities concerning the environment and development .To achieve an implementable ICZM, coastal planners and managers should take into consideration the followings :

1. *Establishing and adopting a national definition of the “ coastal zone “*. Physically, the coastal zone is defined as “ extending from the coastal plains to the outer edge of the continental shelves, approximately matching the region that has been alternately flooded and exposed during the sea-level fluctuations “ (Holligan and de Boois, 1993). This coastal domain is broadly considered to range from 200 meters above to 200 meters below sea-level. The coastal zone also include all the catchment basins of rivers draining to the coast and sea floor out to the edge of the continental shelf (See Diagram 1).



2. *Determining the ICZM boundaries* .Universally, the ICZM boundaries are spatially determined as specified by the physical definition of coastal zones. A broad definition of the coastal zone would include all the catchment basins of rivers draining to the coast and the sea and the sea floors out to the edge of the continental shelf. For management purposes , the ICZM boundaries in the Malaysian context include both privately- and publicly-owned land and resources , the utilization of which is of concern to federal, state and local coastal authorities
- 3 *Setting up a single coastal management authority* .This authority will be responsible to the federal government while also serving the state and local governments. This may imply merging and displacing existing agencies which have overlapping interests and jurisdiction over the coastal zone. The agencies concerned include those dealing with coastal erosion, beach management, land and water use, recreation and tourism, port, urban and industrial development, fisheries, forestry, mining and quarrying, land reclamation, water supply, waste disposal, pollution, nature conservation and military defence . Finally, it is important that there should be a clear delineation and delegation of functions and responsibilities between the federal and state administration and between state and local administration. Hence, proper coordination and mutually reinforcing linkages and actions between the different levels of administration is essential.
4. *Developing and amending legislation and other legislative instruments related to coastal zone management*. This is to enable better cooperation and coordination between different levels of administration

(cross-federal, federal and state and inter-agency). Existing legal framework has to be assessed while the compatibility of legislative instruments need to be evaluated. Amending legal framework and legislative instruments which allow absolute delegation and devolution of functions and responsibilities to state and local authorities, however, are not politically feasible in the Malaysian context.

5. *Developing participatory planning and consensus to include all stakeholders.* Collaborative involvement of all relevant stakeholders in the planning process right from the beginning is essential. It not only helps to build trust and commitments but also develops shared responsibilities, enhances local knowledge and ensures identification of real issues. This will provide a sound basis for the formulation and implementation of feasible solutions. Moreover, participatory planning reduces conflicts and builds consensus among stakeholders. Through participatory planning, stakeholders understand the wider long-term perspective and benefit of focusing on common interest while minimizing conflict and competition.

6. *Ensuring strong institutional support by all relevant agencies.* Experiences in other countries have shown that sustainable coastal zone management is ineffective if it is not supported by all levels of administration as well as by all the relevant sectoral agencies concerned with the target area. While it is important to engage the local authorities as the major implementers there is also a need for all levels of administration and agencies to provide continuous support to ensure effective implementation of plans and decisions . Inter-agency coordination is essential to avoid duplication of functions and efforts , thus preventing wastage of public funds, public dissatisfaction and mismanagement of the coastal resources.

Pricing the resources

Realising that environmental damage typically resulted from market failure to send the right signals, it is therefore extremely important to undertake a systematic and comprehensive inventory of the monetary value of all the goods and services provided by the coastal ecosystems. As succinctly pointed out by F. Cairncross (1991) "in a world economy where money talks, the environment needs value to give it a voice". At first glance, this is indeed seen as a daunting task by most environmentalists, especially setting values for environmental goods and services that do not have market prices.

Economists use a variety of monetary valuation techniques to set values on non-market environmental resources. The most common is the *contingent valuation method* (CVM) by asking people the value they place on something (Cummings et. Al, 1986 ; Lesser et.al., 1997). At its simplest, CVM ask people, through direct questionnaires or survey, what they are willing to pay for an environmental benefit or what they are willing to accept to tolerate an environmental cost. In the coastal zone context, examples of CVM studies that can be carried out are putting value on improvements in marine water quality for recreational purposes ; putting value on preservation of endangered species found in coastal forests; and putting value on mangroves to prevent coastal erosion.

Another method often used by economists is the indirect approach whereby a real-world market is used as proxy for capturing the value of non-monetary environmental assets. This "proxy price" may be reflected in what people pay to visit, for example, a particular mangrove reserve or marine park. If visiting the reserve or park is free in that it does not have an entrance fee, then the cost of travelling to the reserve will give an idea of the value people put on it. In some instances, the cost of

repairing an environmental damage is used as proxy to value environmental assets. For example, when stone embankment is constructed along the coastline to prevent erosion, the cost of construction, which is easily measurable, is one way to get at the value of the beaches. When swimming in polluted seas caused the swimmers to contact a skin disease, the medical bill for treating the disease can be used to put a value to cleaner water.

Smart partnership

To accomplish sustainable management of the coastal zone, we need to forge synergetic partnership among environmental agencies at international, national, state and local levels, and between these agencies and the private sector. Examples of international – Malaysian government partnership include the ASEAN/USAID Coastal Resources Management Project, 1992, and more recently the Danish-Malaysian Country Program for Environmental Assistance, 1999-2001. Such collaborative partnerships should initiate the process of developing coordinated strategies and designing best management practices for the Malaysian coastal zone.

To increase public awareness of the importance of coastal resources, workshops and dialogue sessions should be held regularly involving the government, the private sector and the local communities. NGO groups can also play their role in educating the coastal communities and increasing their awareness on their obligation to promote sustainable use of the resources and the importance of conservation.

Community and NGO groups should also engage in dialogue with both the government and the private sector to initiate and develop a platform of action for the sustainable management of the coastal resources in their areas. Such platform of action

should include recommendations and guidelines which will not only meet developmental goals but at the same time ensure sustainable use and conservation of the coastal resources.

Priority research on coastal resources

Current management strategies and practices for our coastal zone, more often than not, are reactive rather than proactive. Policy goals and decisions are made in the absence of sound scientific basis. Sound scientific basis for management strategies and practices is essential to provide basic understanding of the feedback between environmental and socio-economic changes. There is an urgent need, therefore, to conduct priority research with the overall objective of improving the scientific basis for integrated management of use of coastal space and resources. This includes research on issues such as management and recovery of degraded coastal ecosystems ; impacts of land-based developments on the coastal environment ; evaluation of past successes and failures in coastal zone management; and cost-benefit analyses of alternative forms of management interventions in addressing coastal degradation.

Policies to ensure sustainable management of the coastal resources can benefit from utilizing research data and information. The ASEAN/ USAID Coastal Resource Management Project (1985-92), for example, was formulated to address management issues and the use of the scientific database for policy decision-making. The Project, which focused on Lingayen Bay in Philippines, Segara Anakan in Indonesia, Malacca Straits in Malaysia, Bandar Seri Bagawan in Brunei and the coastal waters of Singapore, succeeded in producing a wealth of information and database on the status, distribution and dynamics of coastal ecosystems (coral reefs, mangroves, seagrass beds and fisheries) throughout the ASEAN region.

Information repositories

As in most developing countries, researched –based knowledge and information are not or only marginally utilized in the management and decision-making process in Malaysia .To make informed policy and management decisions, it is important that the relevant up-to-date research data and information should be made readily available to all parties concerned in the process of coastal zone management.

There is a wealth of research information available in the scientific literature and databases that are not formally documented and are therefore not readily available. These data and information could be extremely useful in the formulation of plans and strategies related to coastal zone management. Steps should be taken to develop repositories of literature on coastal resources and coastal ecosystems . These repositories should be easily accessible via on-line electronic information and its contents continuously increased and updated.

Bridging science and management

It is pertinent that Malaysia positions its science and technology more centrally in its mainstream development. In the coastal zone context, science should be at the core of each management strategy. Coastal zone science should be more context-oriented and should focus on research problems identified by the stakeholders. Alliance between scientific institutions, business enterprises, universities and the Government should be intensified.

Programs should be initiated to focus on developing and enhancing information network to link institutions and existing networks, thereby promoting information sharing, human resource development and technology transfer. The underlying

philosophy is that integrated coastal management not only unite government and people but also science and management in the planning and implementation of policies and programs for the conservation and development of the coastal ecosystems and resources.

Concluding thoughts

The preceding discussion has explored a number of issues and concerns about the natural coastal environment. In the light of these issues and concerns, one need to ask oneself what kind of coastal development does Malaysia want ? What social , cultural and environmental qualities does the Malaysians want to preserve or strive for ? These should be determined after taking into consideration the broad and multiple interests of the coastal stakeholders with diverse economic, social and cultural backgrounds.

Plans for coastal management must be sufficiently comprehensive and broad-based, to incorporate inputs from all interests groups . Planning for management programs should not be exclusively top-down but should involve community groups and NGO's. There should be avenues and platforms where these groups are allowed to engage in dialogues with the Government and the private sector. In essence, sound management of the coastal zone is based on the principle of *consensus or participatory planning* .

Given the limited regenerative capacities of the resource base coupled by the limited carrying capacities of the coastal environment but unlimited and competitive demands for its uses, sound management of the coastal zone must be both economically and ecologically feasible. Hence balancing the ecological sustainability of our environment and managing the relatively scarce resources poses a big challenge to coastal

planners and managers. In this regard, natural and social scientists as well as engineers must fulfill their social obligation in seeking feasible solutions and options.

Science and technology alone is not sufficient to guide us in managing our natural resources but must be complemented by a strong sense of ethical responsibility by all users of the resources.

Finally, in the long-term, sound management of the coastal zone would require the commitment of an *educated public* who understands the significance of balancing conservation and development. The public should develop and nurture the ethic that human beings are merely custodians of resources blessed upon us and give the assurance these resources are still available to our future generations. Public participation and support will certainly determine the sustainability of our environment and its availability in the future. As the saying goes “ we should not bite the hands that feed us “

REFERENCES

Chia , L.S. (1998). *Coastal Management in Singapore: Institutional Arrangements and Implementation*. Ocean and Coastal Management 38 : pp.111-118.

Chou, L.M., T.E. Chua et.al. (1991). Towards An Integrated Management of Tropical Resources. Proceedings of the ASEAN/ US Technical Workshop on Integrated Tropical Coastal Zone Management. ICLARM Conference Proceedings No. 22. National University of Singapore , National Science and Technology Board and international center for Living Aquatic Resources Management (ICLARM), Manila, Philippines.

Chua, T.E. (1991). "Managing Coastal Resources for Sustainable Development : the ASEAN Initiative " in Chua T.E and L.F. Scura (eds.) *Managing ASEAN Coastal Resources for Sustainable Development : Roles of Policymakers, Scientists, Donors, Media and Communities*. ICLARM Conference Proceedings 30, Manila, Philippines

Chua, T.E. (1998). *Lessons Learned from Practising Integrated Coastal Management in South-East Asia*. *Ambio* 27 (8): pp. 599-610.

Cicin-Sain and Knecht R. (1998). *Integrated Coastal and Ocean Management, Concepts and Practices*. Island Press, Washington D.C.

Clark, J.R. (1989). *Management of the Coastal Zone for Sustainable Development* in Dames and Moore International , Louis Berger International Inc., and Institute for Development Anthropology, Sustainable Natural Resources Assessment, United States Agency for International Development, Manila , Philippines.

DANCED (1997). *Inception Report for the Project Preparation of An Integrated Management Plan for Sustainable Use of the Johore Mangrove Forests in Peninsular Malaysi .*, DANCED/ EPU , Prime Minister's Department, Kuala Lumpur.

Economic Planning Unit (1993). *Malaysian National Conservation Strategy: Towards Sustainable Development : Critical Area*, Vol. 3 , Prime Minister's Department, Malaysia.

_____ (1996), *Seventh Malaysia Plan 1996-2000*. Prime Minister's Department, Percetakan Malaysia Bhd., Kuala Lumpur.

Economic and Social Commission for Asia and the Pacific (ESCAP) and Asian Development Bank (ADB) , 1995. 1995: *State of the Environment in Asia and the Pacific* , United Nations, New York, USA.

European Economic Commission (1999). *Towards A European Integrated Coastal Zone Management (ICZM) Strategy; General Principles and Policy Options*. EU Demonstration Program on Integrated Management of Coastal Zone, 1997-99.

Fallon, L.A. and T.E. Chua (1990). *Towards Srengthening Policy and Strategic Orientation for Fisheries Resource Management: The Role of Coastal Area Management*. *Tropical Coastal Area Management* 5 (3): pp.1-5.

Fortes, M.D. (1995). *Seagrasses of East Asia : Environment and Management Perspectives*. RU/EAS Technical Report No. 110. United Nations Environmental program (UNEP).

Fortes, M.D. and L.T. McManus (1994). *Issues and Challenges in Coastal Zone Development in South-East Asia*. Paper presented at the Regional Workshop on Planning and

Management of Coastal Resources, Sabah, Malaysia, 8-9 November 1994.

Jahara Yahaya (1991). "An Economic Analysis of Brackishwater Shrimp Pond Culture in Johore, Peninsular Malaysia" in Chou L.M. et. Al. (eds.) *Integrated Management of Tropical Coastal Resources*, Proceedings of the ASEAN/US Tech. Workshop on Integrated Tropical Coastal Zone Management, 28-31 Oct. 1988, Singapore.

Jahara Yahaya and Nik Mustapha Raja Abdullah (1993) . " Fisheries Resources under Stress- the Malaysian Experience" Paper presented at the Fourth international Conference of the International Association for the Study of Common Property, 16-19 June 1993, Manila, Philippines.

Jahara Yahaya (1999). "Coastal Zone Management in Malaysia- Challenges and Prospects," Proceedings of the International Symposium and Exposition on *Coastal Environment and Management – Challenges in the New Millenium*, Vol. 1, 13-15, October 1999, Kuala Lumpur .

Jahara Yahaya and Santha C. Ramu (2003). *Coastal Resources Development in Asia- Is There a Need for Sustainable Mangrove Forest Management ?*. FEA Working Paper Series No. 2003-2, Faculty of Economics and Administration, University of Malaya , Kuala Lumpur.

Kam, S.P., Paw, J.N. and Loo M.(1992). The Use of Remote Sensing and Geographic Information Systems in Coastal Zone Management in Scura, L.F. and Chua, T.E. (eds.) *Integrative Framework and Methods for Coastal Area Management*. ICLARM, ASEAN/USA Coastal Resources Mangement Project, Conference Proceedings No.12, Manila Philippines.

Ministry of Science, Technology and Environment (1992). *The Coastal Resources Management Plan for South Johore, Malaysia*. ASEAN/US Coastal Resources Management Project, Technical Publications Series 11, ICLARM, Manila, Philippines.

National Hydraulic Research Institute (1999). Proposal for Integrated Coastal Zone Management: Federal Component. Economic Planning Unit, Prime Minister Department, Kuala Lumpur.

Turner, R.K. and W.N. Adger (1995). Coastal Zone Resources Assessment Guidelines. Land-Ocean Interaction in the Coastal Zone (LOICZ) Reports and Studies Series No. 4, LOICZ International Project Office, Texel, Netherlands.

Turner, R.K. , Adger W.N. and I. Lorenzoni (1998). Towards Integrated Modelling and Analysis in Coastal Zones : Principles and Practices, LOICZ Report and Studies No 11 , LOICZ International Project Office, Texel, Netherlands.

WCC '93 Organizing Committee (1993c). *Preparing to Meet Coastal Challenges of the 21st Century: Coastal Zone Case Studies*, New Orleans, USA.

World Resources Institute (1990). *World Resources, 1990-95*. Oxford University Press, New York, USA.