

Island Systems Management: A New Concept of Coastal Zone Management for Small Islands

KEITH E. NICHOLS¹ and VASANTHA CHASE²

¹*Department of Fisheries, Ministry of Agriculture,
Lands Fisheries and Forestry, Castries, St. Lucia*

²*Organization of Eastern Caribbean States -
Natural Resources Management Unit (OECS-NRMU), Castries, St. Lucia*

ABSTRACT

Until recently the concept of Coastal Zone Management (CZM) for small islands has not really been considered in academia or in practical applications. Management programs under the banner of coastal zone management and more appropriately termed coastal area management have actually exercised resource management in localized areas.

Small islands are influenced by their surrounding marine environment and themselves impact the seas around them in a time frame much shorter than that for larger land masses. In fact definitions now being proposed suggest that the entire land mass and its juridical marine area constitute the coastal area of small islands. Any management framework must consider the intricate interactions and linkages between biological systems on small islands, in a system which becomes multisectoral in focus. The institutional and legal framework by which this is achieved is less difficult than that for larger territories.

The concept therefor of Islands Systems Management (ISM) best reflects the need for a revised management regime drawing on the experiences of other Coastal Zone Management initiatives, but with the necessary adaptations to meet the special requirements of small islands. This paper will explore this new concept as it is being developed by the OECS - NRMU.

Keywords: Island Systems Management, Coastal Zone Management, Interactions.

INTRODUCTION

The concept of *coastal zone management* traditionally recognizes and emphasizes the interdependence and interactions of terrestrial and marine ecosystems. The coastal zone therefor is seen as a recognition of a transition space between land and sea which is influenced by both, but is defined as a band of varying width along the shore. The width of this band is determined by administrative or physical (ecological) boundaries or purely arbitrary divisions along shores (Sorensen and McCreary, 1990). The concept of the "coast" in itself requires further refinement in definition if use of the term is to be standardized. This lack of standardization has given rise to a variety of terms used in the literature, such as coastal zone management, integrated coastal zone management, coastal area management, integrated coastal area management, integrated area development and coastal resources management.

This presents a number of difficulties when applied to islands. Islands are sufficiently different to continental land masses and therefore require customized and carefully adapted planning, development and management strategies. They have to be viewed as complete units characterized by a matrix of interactions between systems. There is no clearly defined "coastal zone" and it is impossible to manage the use of any individual part or parts of an island system without considering the ever present externalities. This has become even more important as development thrusts in many of the worlds small islands create increased demands on management structures and local resources for coping with the negative byproducts of economic growth. This trend has led to the deterioration of the quality of the physical environment, coupled also with the decline in the quality of life in certain sectors (Towle, 1985).

Management therefor must be based on a revision of the concept of the "coast" as it is applied to small islands. For all intents and purposes the "coastal area" of a small island is the entire land mass and its juridical marine area, which can be up to the limit of the Exclusive Economic Zone (EEZ), if it is a contracting party to the Law of the Sea Convention. This follows from the standard criteria defining the "area" as that region between "the landward limit of the extent of marine influences, and the seaward limit of the extent of human activities on land". This means the entire island and its juridical marine area.

The approach taken by the Organization of the Eastern Caribbean States - Natural Resources Management Unit (OECS-NRMU), recognizing the interactions and interdependent nature of the various systems on the island is based on this concept, . This "*Island System*" concept first described by Towle (1985), provides support for the "*Island Systems Management (ISM)*" philosophy and is based on a multidisciplinary integrated framework of management as in some CZM programs. Chase (1994) suggests that ISM "should be seen as an adaptive management strategy which addresses issues of resource use conflicts, and which provides the necessary policy orientation to control the impacts of human intervention on the environment". Chase further surmises that for ISM to be effective, it must be operationalized under a formal institutional and legal framework, focussing on the multisectoral integrated planning and management of the broader environment.

Island Systems Management (ISM) therefor presents a novel challenge for administrators and demands the development of new, more creative mechanisms for dealing with the management of all island resources, which in this perspective can be considered coastal. The Coastal Resources Management Initiative (CRMI) of the OECS-NRMU is thus seen as the action program of ISM, and the means by which the goals of that philosophy, the sustainable development of island resources, can be realized. CRM emphasizes the need for a comprehensive and holistic approach to the establishment of the management structure for island resources.

Traditional Coastal Zone Management

The absence of a standard defined coastal zone is evident in the wide variation in delimited boundaries between countries that have established them. An examination of the boundaries of thirteen programs, by Sorensen and McCreary (1990) reveals the inconsistencies possibly stemming from an absence of a defined purpose for their establishment. It is noted that the most common inland boundary is an arbitrary distance from the mean high tide line and the most common seaward boundary, that of State or provincial jurisdiction.

Inland boundaries can range from the mean low tide mark as is the case of Western Australia, and in others up to and including the inland limit of climatic influence. It was not determined what characterizes the inland limit of climatic influence. It is more common to establish inland limits which seek to incorporate those areas from which impacts are generated (Sorensen *et al*). Oceanward boundary options however range from the mean high tide as in the case of Costa Rica, to the limit of the Exclusive Economic Zone (EEZ) in others. The table below describes the various options used by countries for their oceanward and landward limits, with the recognition that any combination of these two limits are used.

It is clear that boundaries are determined by factors which might be deemed important to the State, such as the economic value of resources within the area,

Oceanward Boundary Options	Landward Boundary Options
Mean High Tide (MHT)	Arbitrary Distance from a Tidal Mark
Mean Low Tide (MLT)	Inland Boundary of Local Governments
Arbitrary Distance from a Tidal Mark	Inland Limits of Lands on Which Adverse Impacts May Be Generated
Boundary between Provincial or State Jurisdiction and National Jurisdiction	Inland Limit of Climatic Influence
Boundary of the Territorial Sea	
Edge of the Continental Margin	
Limit of the Exclusive Economic Zone	(Source. Sorensen and McCreary, 1990.)

jurisdictional limits, ecological, demographic or political issues, or simply no real reason for arbitrary limits. The administration of these areas is usually dependent on these considerations, but does not always reflect an integration of management strategies or collaboration between responsible authorities. In the large majority of these cases all set limits apply to continental land masses with each juridical area having its own prescription for its management. The recognition given to the importance of the integration of management of these areas is identified clearly by Sorensen *et al* (1990), and by Clarke (1992), who acknowledges that it is designed "to provide the best long-term and sustainable use of the coastal natural resources and for perpetual maintenance of the most beneficial natural environment".

The Island System

Designing for inland limits on an island while taking into consideration some of the previous factors can be problematic. We do not manage natural resources, rather we manage the use of resources by humans. It is important to understand this point when considering the complexities of the interactions of systems on an island. If all outputs are determined solely by the control of inputs as in the case of hydroponics or as in the case of aquaculture, then it might be said that those are managed. However when there is no control over the inputs it cannot be said that resources are managed. The concentration of ecosystems on an island and proximity to each other, means that each of these is linked to each other either through biological processes, ecological linkages or the impacts of human intervention of one or more on others.

In considering an *island system* attention must be paid to the following facts :-

- That an island, even if small, is a heterogeneous discrete entity, made up of an assemblage of diverse subaerial and subaqueous ecosystems in upland, littoral, sublittoral, and outer-shelf zones.

- That the interdependent linkages are important particularly when any impact on one will have repercussions on others, and that the size of these ecosystems do not readily conform to geographical, political or other ecological boundaries.

- Growth, development and the physical environment are all interlinked in a matrix which creates multiple feedback loops, but in which all are greatly influenced by changes in any one parameter.

- Islands are really an assemblage of ecosystems within a relatively confined space each having a strong influence on the other.

- The size of the EEZ is relatively much larger than that of the land mass itself.

- Small size usually means that important natural resources are limited and that the relatively higher population densities over that of continental land masses, means that greater pressure is put to bear on those resources.

- There is excessive dependence on international trade, hence vulnerability to global developments.
- Overuse and premature depletion of resources is common.
- Watersheds are usually small which could easily reach or be reduced below the critical minimum,
- Public administration and infrastructure are costly, which also includes transportation and communication.

The diminutive size of small islands means that development and the physical environment are closely related and interdependent. Management therefor must span the range of issues from protection of resources to infrastructural and economic development. The islands of the OECS subregion characteristically have high levels of endemism and biodiversity, but the relatively small numbers of species impose high risks of extinction and create a need for management leaning towards the total protection in these instances.

Climate change and sea-level rise are also issues of grave concern and must be considered in the management and development of shore areas. Tropical shore ecosystems have narrower tolerance limits to anthropogenic impacts than corresponding systems in other latitudes and are thus more susceptible to degradation also because the pressures of use are concentrated in this region. These areas tend to have limited carrying capacities which are often exceeded in the drive to secure economic stability.

It is the assemblage of "systems" which characterizes most islands, including those of the Organization of Eastern Caribbean States (OECS). The philosophy of Islands Systems Management (ISM) therefor hinges on the linkages between systems and the recognition that in order for management to be more effective, and to realize the sustainable development of the use of resources, it is essential that an integrative approach be used. This has to be implemented within a framework which allows for flexibility catering to the demands of social and economic development.

An island therefor is essentially all coastal if the definition of the landward limit of ocean influences is to be applied. The time frame within which an event at a point furthest from the sea impacts on shore areas and the marine environment is very short. It is with this consideration that an island can be considered a *Coastal Area*, and any subdivisions for purposes of management considered coastal zones.

Island Systems Management (ISM)

ISM can be described as a multidisciplinary, multisectoral, multifaceted mechanism aimed at rationalizing the use of island resources and the achievement of the goals of sustainable development. Chase describes it further as an adaptive management strategy which addresses the issue of resource-use conflicts, and which provides the necessary policy orientation to

control the impacts of human intervention on the physical environment. The process must be couched within an institutional and legal framework, coordinating the initiatives of all public and private sectors while ensuring through a unified approach that common goals are attained.

Management of the use of resources can be effected through a *spatial* or an *issue* approach. The *spatial* framework focuses on geographic regions, such as watersheds, estuaries, river basins or valleys at the upper end of the size spectrum, or seagrass beds, coral reefs, mangals or inland forests at the other end. This allows the authority to concentrate efforts on any particular area which might be determined to be requiring immediate attention. Management must therfor be multisectoral and multidisciplinary catering to all the elements contained within the area. This approach eliminates the need for physical boundaries which can only hinder the flexibility of the management authority.

The *issue* based approach essentially focuses on issues needing attention. These could range from deforestation, agrochemical pollution, beach sand mining, waste management, indiscriminate fishing and environmental degradation to harbor management, shipping, shoreline development, shore erosion, hazard mitigation, public health and others. In this way attention can be given to those areas requiring priority treatment as determined by the severity of the problem.

The system of management suggested above is already being designed through the Coastal Conservation Project of the northwest "coastal zone" of St. Lucia (Fournier *et al*, 1995). While this system does not seek to alter the sectoral approach to the management of the use of island resources, it does emphasize the need for intersectoral collaboration effected through a formal institutional network, the heart of the ISM operating mechanism.

Coastal Resources Management Initiative (CRMI)

The coastal areas of the member States of the OECS sub-region provide natural resources, economic welfare and quality of life benefits of major importance. Indeed the coastal environment of the islands of the eastern Caribbean contains a multitude of resources which are of significance to their national development. It could be said that the coastal area and its resources are the quintessence of the islands identity. Numerous activities, from economic and tourism, to recreational cultural and purely aesthetic are associated with the coastal area and its resources.

This mix of activities has contributed to the development of complex and often conflicting and competing issues for resource users and decision-makers. It is not surprising that many of the countries of the Eastern Caribbean are reporting signs of pollution of coastal waters, coral reef destruction, depletion of fish stock in the near shore areas, and beach and coastline erosion to mention a few. These environmental problems have been further exacerbated by

inadequate and weak management systems and strategies. Management of these coastal areas is sectoral and tends to create conflicts of use.

There is however now a growing awareness in the sub-region for better planning and management of the coastal resource systems because these systems generate natural goods and services for human welfare. Planners and resource managers alike now recognize the need for the establishment of an integrated planning and management program that will address not only the current environmental and developmental pressures, but also the long term restoration, protection, maintenance and sustainability of the natural, cultural and economic resources of their island states.

The Natural Resources Management Unit (NRMU) of the OECS has over the last few years played an important role in coastal resource management in the sub-region. With funding provided through the German Mission for Technical Cooperation (GTZ), the NRMU has developed a number of tools for coastal resource management. These tools which in the form of manuals relate to beach monitoring and mangrove management and set out procedures to be followed for the acquisition of data for the purposes of management of mangals and beaches in the OECS. A harmonized Draft Frame *Coast Management Act and Regulations* have also been developed by the NRMU through its GTZ program.

A recent survey conducted by the OECS-NRMU indicates that the level of attention paid to the issues is inadequate; planning mechanisms are generally weak, and the lack of coordination between sectors leads to inefficiencies in management. There is also no clear authority for Island Systems Management, although functions are ill-defined where lead agencies are identified as having the responsibility for *coastal zone management*. There is also an apparent lack of appreciation for the complexities of interactions between resources, particularly that of the dynamics of shore resources. Thus education programs targeted at the political directorate, public sectors and the grass roots level must be effected as a means to correcting the awareness problem.

As a response to the increasing demands for a harmonized policy framework for the management of the island states of the sub-region, the OECS-NRMU has developed the **Coastal Resources Management Initiative (CRMI)** which is defined as a participatory, interactive, multi-stakeholder, multidisciplinary, multi-sectoral approach aimed at achieving the sustainable use(s) of resources at local, national and regional levels. Coastal resources management then becomes an integral part of a broader framework of integrated development planning and management at the local, national and regional levels.

The **RESULTS/OUTPUTS** of the CRMI are:

1. Management, administrative, legislative and technical capacities for CRM, at national level are improved

2. Coordination of CRM activities among agencies/ organizations at national and sub- regional levels increased
3. Knowledge and understanding of the integrated nature of CRM issues and problems increased at all levels
4. Selected CRM issues/problems addressed/alleviated
5. Member States assisted in the development/implementation of policies which facilitate sustainable use of coastal resources

The CRMI will be implemented through two (2) phases:

Phase 1 will constitute the

- 1) Establishment of National Focal Points
- 2) Review of CRM activities in each of the Member States
- 3) Assessment of national technical capacity for CRM
- 4) Optimization of national financial resources for CRM support
- 5) Maximization of benefits from international/regional agreements, conventions and protocols for CRM
- 6) Development/implementation of public awareness programs to raise general awareness and consciousness on CRM issues,

while phase 2 will comprise the implementation of capital projects to mitigate the degradation of coastal resources in the Member States.

St.Lucia takes the lead in the establishment of Coastal Resources Management (CRM) through the Coastal Conservation Project for the north-west area, evolving along lines parallel to that of the CRMI, recognizing the need also for the establishment of a central coordinating mechanism. It is also based on a multisectoral formula which would allow for the effective participation of both public and private sectors. The CRMI becomes the operational mechanism by which ISM is achieved, initially limiting its scope to areas of highest priority in each of the territories of the OECS.

The OECS-NRMU has established National Focal Points in each of the members of the OECS, who in turn will be provided with the necessary tools, enabling them to function as catalysts towards the development of country specific ISM plans. An action plan has been developed based on an evaluation of the specific requirements of the region both in terms of capacity building and the provision of funds from support agencies.

A significant component of the CRMI is that of public education and information dissemination. It is envisaged that this will be effected through workshops and seminars, further empowering the general public to participate in the decision making process. The CRMI symbolizes a new approach to the management of the use of resources for small islands, creating a partnership in which all stakeholders will have the opportunity to participate in the management of their island.

CONCLUSION

Traditional approaches to CZM have focussed on bands along shores of continental land masses, but failed to consider the special nature of islands. The ad hoc approach to boundary determination of that zone in many instances does not reflect the true dynamics of these areas. Island systems are more complex because of the concentration of a wide variety of natural resources in a fairly limited area. This increases the linkages and interdependence between these systems, creating the need for a flexible system of management over that which presently obtains.

Management and regulatory regimes in the eastern Caribbean have not taken into account the dynamic and integrated nature of island systems. The sectoral approach which characterizes almost all management, is reflected in governmental planning and institutional make-up, and has proven inadequate in addressing a variety of vital issues, particularly those concerned with the ecological sustainability of small island States. It does not cater to other public or private sector involvement trivializing the role of communities in the decision planning process. This level of fragmentation of administrative responsibility in some cases has led to a lack of clarity of organizational jurisdiction over the management of the use of some resources and the eventual degradation of the of vital resources. In other words sectoral management is not sustainable.

The philosophy of ISM is based on a system without boundaries, focussing instead on issues and problems areas. It challenges the principle of administration within clearly defined legal, jurisdictional, political or ecological boundaries. The more precisely an area within an island is defined, the less the definition will encapsulate the intrinsic nature of the island. Indeed much of the literature on the subject of CZM reflects an unresolved struggle for the need for definitional flexibility catering to the inherent dynamic nature of island systems. The successful management of island resources is a mixture of science, policy, law and administration and is highly dependent on the social, economic, cultural, and political circumstances of each of the island States.

ISM also is not dependent on clear jurisdictional responsibility to be effective. The integrated approach effectively diminishes the importance of clear jurisdictional responsibility, because of the involvement of all pertinent stakeholders in the process of management. It must be emphasized that sectoral management will continue, but these lead authorities will instead operate through the assistance of committees set up to address each specific issue of island management. This has the effect of widening institutional responsibility, reducing territoriality and turf conflicts, increasing the availability of human resources while increasing the magnitude of management flexibility. ISM therefore is envisaged as the new frontier in the management of island resources which would auger well for the sustainable development of resources.

The scope of ISM activities can and should be broadened as it evolves, to include other aspects of the environment, such as the cultural, social and political. At present emphasis is on the economic and physical environments. However the development of societies hinges also on the former aspects of the environment and must be factored in the holistic framework if true growth is to be realized. It is only then can it be said that sustainable development of islands is effected, recognizing that it is a continuous process of growth.

LITERATURE CITED

- Chase, Vasantha. (1994) Principles of Coastal Management in the OECS Sub-region: A discussion Paper. OECS-NRMU. Paper presented at the Workshop on Integrated Coastal Zone Management, Jaycees center, St. Vincent and the Grenadines, December 3-7.
- Clarke, John R. (1992). Integrated Management of Coastal Zones. FAO Fisheries Technical Paper 327. FAO.
- Fournier, Charles P., Mark O. Kolberg, Peter O. Norville, Keith E. Nichols. (1995). A Coastal Zone Management Model for Small Island Developing States: The Case of St. Lucia. (In Press).
- Nichols, Keith E. (1994) Discussion Paper on Guidelines for Coastal Zone Management In the OECS. OECS/NRMU, ENCORE/WWF/USAID.
- Sorensen Jens C., Scott T. McCreary. (1990). Coasts. Institutional Arrangements for Managing Coastal Resources and Environments. Coastal Publication No.1, Renewable resources Information Series. National Park Service, U.S. Department of the Interior, U.S. Agency for International Development.
- Towle, Edward L., The Island Microcosm. in Clarke, John R.(ed). (1985) Coasts. Coastal Resources Management: Development Case Studies. Coastal publication No.3., Renewable Resources Information Series. National Park Service, U.S. Department of the Interior, U.S. Agency for International Development.