



A common framework for learning from ICM experience

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1. INTRODUCTION

There are a growing number of integrated coastal management (ICM) initiatives worldwide—some 140 ICM efforts in 56 coastal nations can be identified¹—but at present the lessons learned from these initiatives are generally undocumented and the efficiency and effectiveness of learning from ICM is being compromised. We have very little information that demonstrates the success of ICM efforts and how the process of ICM has influenced outcomes. Many descriptions of ICM experience are anecdotal and, to date, no hypotheses about ICM design and practice have been systematically tested across the diverse spectrum of coastal nations.

At its 1996 meeting, the international Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) identified this as a priority ‘emerging issue’:

there is an urgent need for an accepted evaluation methodology for assessing the changes identified and implemented. When an evaluative framework is in place it will be possible to document trends, identify their likely causes and objectively estimate the relative contributions of ICM programs to observed social and environmental change.

The challenge is to develop and standardize methodologies and indicators by which the impacts of the rapidly expanding number of integrated coastal management initiatives can be analyzed, and by which the collective learning process can be improved. An activity at the global level that clearly measures progress (or lack thereof) towards ICM goals, and disseminates the results widely offers great opportunity for increasing the efficiency of the collective learning process for how to make ICM an

effective response to the challenges of sustainable coastal development. Such an activity could stimulate national actions and provide guidance to donors.

Why is this an urgent need? First, because the transformation of coastal regions is of vital importance to our species. Approximately half of humanity is already concentrated in a narrow ribbon of land around the planet's oceans, seas and great lakes. These coastal regions encompass less than 10% of the inhabited land space.² The proportion of the world's population that is coastal will increase as the population swells during the next century: two-thirds of the human population is projected to be concentrated in coastal regions by 2025.³ With this population comes at least half of the infrastructure for the manufacturing, transportation, energy processing, and consumption that these populations require, as well as more than half of the waste products and tourism.

A second reason to systematically evaluate ICM initiatives is that global trends show a decline in the qualities of coastal regions that support sustainable human societies. The pressures produced by a growing population will increase from a global perspective, and the expressions of overuse and misuse of the coastal life support systems are mounting. ICM practitioners are all familiar with the symptoms of declining water quality, degradation or destruction of critical habitats, decline and collapse of fisheries, and losses in biodiversity. We are also aware that these problems bring mounting user conflicts and that governments are often unable to avoid these adverse effects even when they are predictable and lead us away from sustainable forms of development.

A third reason to systematically evaluate and learn from ICM initiatives is that the existing successes are as yet puny compared with the forces worldwide causing coastal degradation. If integrated coastal management is to have a significant global impact on the condition of coastal ecosystems we must quickly scale up endeavors that are now largely conceived and implemented as a scattering of pilot projects.

These realities are important because selecting indicators, monitoring, self-assessment, and evaluation are all activities that have seldom invoked enthusiasm among either the coastal managers attempting to move programs forward, or among the politicians and bureaucrats who fund such initiatives. Monitoring consumes resources and seldom produces a quick return on investment. It requires repetitive, painstaking work, and the analysis of the data generated is time consuming, technically challenging, and often yields controversial conclusions. Periodic, internal self-assessment, and external evaluation, requires careful preparation and, if they are to be meaningful, will sometimes require painful internal adjustments to an on-going program's objectives and design. The response

to these realities can be seen in projects that protect themselves from potentially damaging evaluations by:

- adopting vague goals;
- selecting objectives that defy measurement;
- selecting indicators that measure effort rather than results;
- adhering blindly to the project's original objectives and strategies while refusing to adapt to changing conditions;
- skipping formal evaluation entirely or leaving them to the end of the project when they will have no impact on the design or operation of the original project and only marginally influence future projects.

There are, of course some notable exceptions. Furthermore, it is now widely recognized that more effective monitoring and evaluation must be built into all programs and projects funded by development banks and international donors. In the United States, performance evaluation is now mandated by the 1993 Government Performance and Results Act. This recent interest in evaluation offers the opportunity to rise to the challenge and to develop consistent evaluation methodologies and indicators that can be applied to all ICM initiatives.

2. WHAT IS ICM?

At the root of any discussion of learning methodology is the definition of ICM. There has been considerable progress in recent years on defining the major characteristics of ICM.⁴⁻⁸ There appears to be growing consensus on the outlines of a general model. All definitions stress the dynamic nature of the ICM process and its emphasis upon sectoral integration. A recent report⁹ defines ICM as:

a continuous and dynamic process that unites government and the community, science and management, sectoral and public interests in preparing and implementing an integrated plan for the protection and development of coastal ecosystems and resources.

So defined, ICM belongs to the family of initiatives that are working towards a better balance between human societies and the ecosystems of which they are but one element. ICM, like some forms of watershed planning and development, holds the promise of being a vehicle for progressing towards sustainable development. Achieving ICM is especially complex because of the superposition of many human activities along coastlines, and the many dimensions of integration that need to be addressed. In this paper we propose that the governance process itself must be a central focus of learning and evaluation. The term governance,

as used here, refers to the method of coastal management, and includes the laws, institutions, policies and process that affect how coastal resources are utilized and allocated. The governance process is the means by which we test and improve ICM strategies in order to move away from socially and environmentally unsustainable forms of development and toward more sustainable forms of development. Some of the strategies and principles that support the ICM process include:

- work at both the national and local levels with strong linkages between levels (the 'two-track' approach)
- build programs around issues that have been identified through a participatory process
- build constituencies and political support for resource management through public education programs
- develop mechanisms for sustained learning on how to improve the efficiency and effectiveness of integrated coastal management
- develop an open, participatory and democratic process, involving all stakeholders in planning and implementation
- build capacity at the national, regional, and local levels to practice integrated, community-based management of coastal resources through training, learning-by-doing and cultivating host country colleagues who can forge long-term partnerships based on shared values
- complete the loop between planning and implementation as quickly and frequently as possible, using small projects that demonstrate the effectiveness of innovative policies
- adopt policies that lead to economically and ecologically sustainable and equitable resource management
- strengthen or introduce mechanisms for cross-sectoral action
- adopt an incremental, adaptive, and long-term approach to integrated coastal management, recognizing that programs undergo cycles of development, implementation and refinement, building on prior success and adapting and expanding to address new or more complex issues

These principles are frequently identified as important in the literature on policy implementation and ICM program assessment.¹⁰⁻¹⁴

In ICM, the governance process is continuous and dynamic, and is therefore predicated upon learning and adaptation. The assumption is that ICM does not offer a blueprint that merely needs to be applied and will then produce known results. If this were the case, monitoring and evaluation would be superfluous. Adaptive management calls for learning by doing. The experiential learning cycle¹⁵ is well known to those who study organizations and management. In its simplest form it is expressed as continuing cycles of action and reflection (Fig. 1).

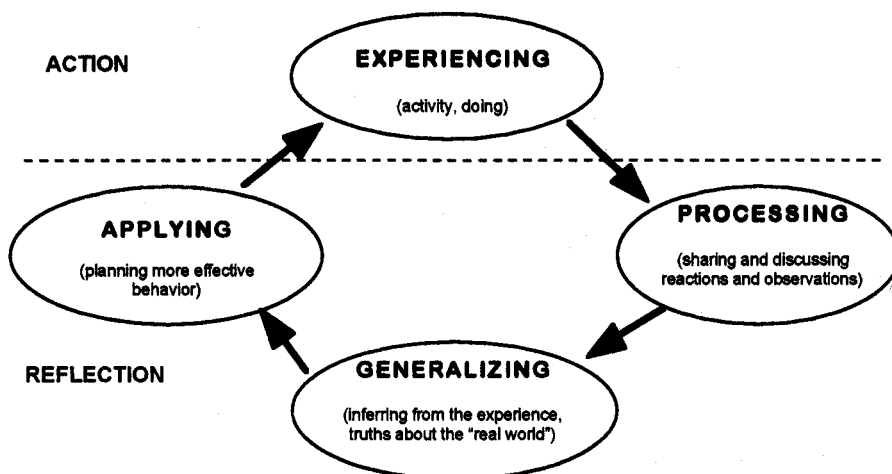


Fig. 1. The learning cycle.

The most critical step in the learning process is reflection on concrete experience and the formulation of new concepts. This is where we draw conclusions and may reconfigure our understanding of ICM issues. A commitment to a thoughtful and objectively rigorous evaluative process therefore promises to increase the efficiency of learning to make ICM programs more effective.

3. THE GOAL OF ICM

There have been many attempts to state simply and forcefully the goal of ICM. One recent version¹⁶ states:

The goal of ICM is to improve the quality of life of human communities who depend on coastal resources while maintaining the biological diversity and productivity of coastal ecosystems.

This statement captures the central idea that ICM is first and foremost about people and attempting to define a dynamic balance between people and the qualities of our coastal environments.

From the point of view of learning, however, the lofty nature of the goal, and the great scope of the endeavor poses formidable challenges. How do we design a methodology and select indicators for such a complex and protracted effort that are simple enough to be cost effective but sufficiently rigorous to produce useful results? Knecht *et al.*¹⁷ address the issue of measuring ICM program impacts. In the absence of substantive indicators of program performance, the authors rely on the indirect approach of soliciting perceptions of performance from samples of individuals knowledgeable of the programs being studied. Unlike business

ventures, the 'bottom line' of human and capital investment in ICM is not easily quantifiable. The challenge for evaluating ICM is inherently complex since we must make judgments on a 'process' that is designed to avoid conflicts and ecosystem degradation by identifying problems and opportunities proactively and acting upon them.

Medium-term outcomes, both material (e.g. mangrove planting, building a dock, installing mooring buoys) and non-material (e.g. training, institution building), are more tangible and easier to track. The timeframe for achieving the ultimate goals of ICM is long, it is therefore essential that any methodology for learning from experience address the governance process itself and progress towards medium-term objectives.

4. THE ICM POLICY CYCLE

There are many descriptions of the process by which ICM programs evolve.¹⁸⁻²³ In its most essential and stripped-down form, however, most would agree that the process can be described as a cycle with the same features of other institutional endeavors. The process begins (step 1) by identifying and analyzing the issues in the stretch of coast in question, and then proceeds to set objectives and prepares a plan of policies and actions (step 2). Next comes step 3 of formalization through a law, decree or interagency agreement and the securing of funds for implementation of some selected set of actions. Policy implementation (step 4) is the step in which procedures and actions planned in the policy formulation stage are made operational. Mechanisms may include public meetings, conflict resolution, and enforcement procedures, while actions span the building of physical infrastructure, the strengthening of institutions and dissemination of appropriate forms of resource use. Step 5, too often ignored or poorly executed, is formal evaluation. In this step, the results of the policy-making process are compared with the desired outcome(s).

This process has been recently described in a report²⁴ that details the contributions of the social and natural sciences to each of the five steps. Table 1 identifies priority actions associated with each step. When ICM programs build constituencies and earn support they combine a concern for a sustained and responsive governance process with tangible achievements. Thus successful programs negotiate early on (step 1) an agreement among stakeholders both in and out of government on the major issues that require improved management and the specific objectives of the program—in itself often a major accomplishment—and then test new management techniques and procedures during the planning stage (step 2). Such pilot scale actions can bring considerable attention and credibility to a program when they demonstrate that meaningful action is

indeed possible. The formalized acceptance of a plan and/or law and/or funding for a stage of full scale implementation (step 3) can attract attention at a larger scale and constitute a major achievement that brings significant change to the people and the resources affected. Such tangible achievements are essential to sustained progress.

Coastal management programs in a range of developed and developing nations suggest that completion of an initial cycle typically requires 8–15 years. Each cycle may be termed a 'generation' of an ICM program (Fig. 2).

5. INTERMEDIATE AND FINAL OUTCOMES OF THE ICM POLICY CYCLE

In designing a framework for learning from ICM experience it is essential to recognize the time that it takes to complete a sequence of policy cycles

TABLE 1
Essential actions associated with each step of the ICM policy cycle

<i>Step</i>	<i>Priority actions</i>
<i>Stage 1: Issue identification and assessment</i>	<ul style="list-style-type: none"> • Rapidly assess existing conditions • Consult key stakeholders and identify priority issues
<i>Step 2: Program preparation</i>	<ul style="list-style-type: none"> • Select issues to be addressed and geographic focus • Conduct sustained public education program • Define boundaries of management area • Define management objectives, strategies, and actions
<i>Step 3: Formal adoption and funding</i>	<ul style="list-style-type: none"> • Carry out early implementation actions • Adopt formal management plan and governance process • Secure adequate funding for implementation
<i>Step 4: Implementation</i>	<ul style="list-style-type: none"> • Construction/operation of infrastructure • Promote compliance to regulations and agreements • Implementation of sustainable development practices
<i>Step 5: Evaluation</i>	<ul style="list-style-type: none"> • Evaluation of governance process and outcomes • Reassess issues and strategies • Select adjustments to plan and governance process

to achieve the ultimate goals of (1) sustainable quality of life in coastal communities, and (2) sustainable well-being of coastal ecosystems. Mature ICM programs make it very clear that it takes a sustained effort measured in decades and spanning several generations of a given program, to achieve tangible expression of the end goal at a significant scale. This time scale is beyond the duration of the vast majority of projects currently funded by development banks or international donors. This means that such projects typically will not encompass a single full generation of an ICM program, and highlights the importance of identifying a sequence of intermediate outcomes. The sequence may be visualized as first-, second- and third-order intermediate outcomes as shown in Fig. 3.

The 'generations' of an ICM policy cycle follow this sequence of intermediate and end outcomes at different scales. If a program is strategic, it will define in general terms an end goal and then carefully and pragmatically define its intermediate objectives (quantified and time

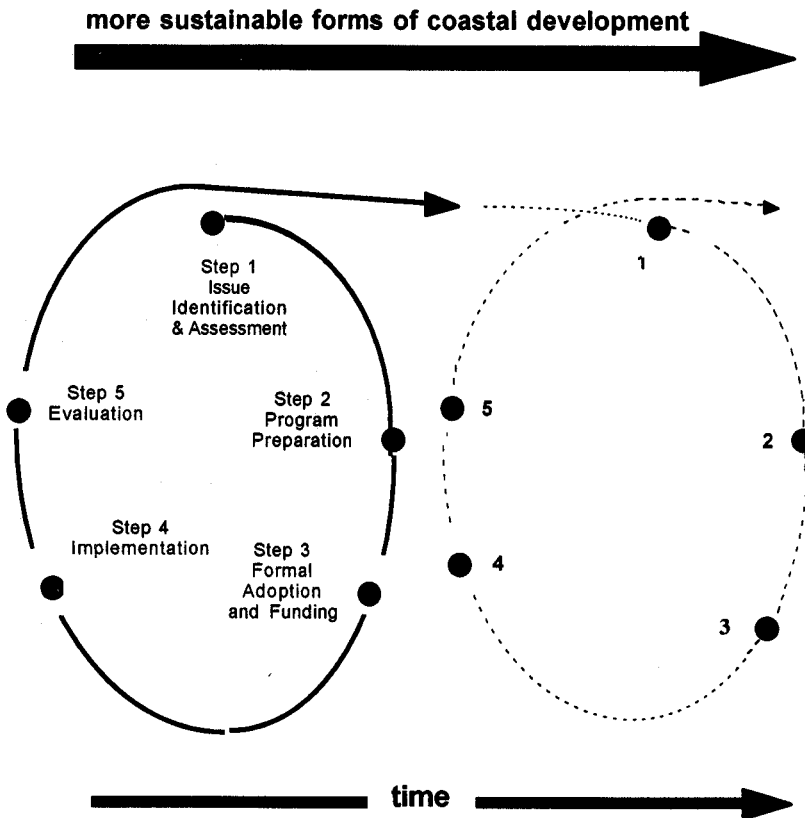


Fig. 2. The steps of the ICM policy cycle. The dynamic nature of ICM requires feedback among the steps and may alter the sequence, or require repetition of some steps (from Ref. 9).

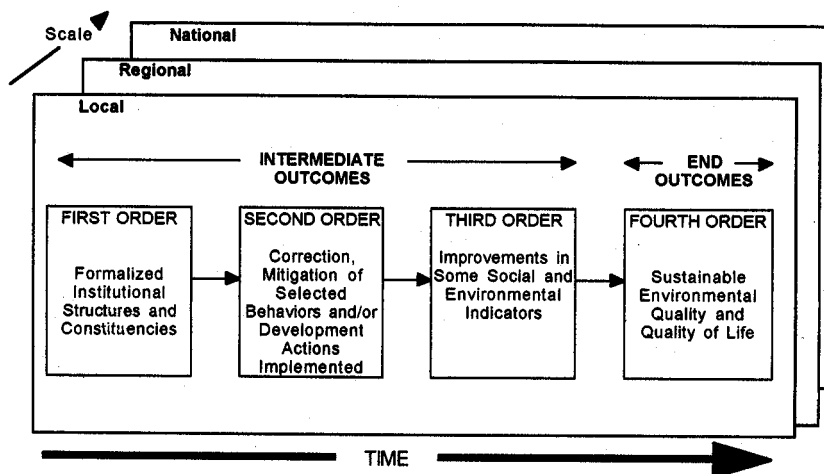


Fig. 3. Ordering coastal governance outcomes (adapted from USEPA, 1994)³³.

bounded) for a given generation of the ICM policy cycle. The importance of clear, specific, objectives that are amenable to objective analysis cannot be overstated. Underlying project objectives are invariably a set of ideas, beliefs, or assumptions about what constitutes integrated coastal management and what constitutes effective strategies for coastal management. These should be stated explicitly; only by being explicit and adopting an essentially scientific and objective approach to articulating hypotheses will our collective learning process be improved.

In developing nations, a first generation ICM program will typically focus its objectives on one or more pilot sites and on a limited set of issues. It is far better to do a few things well than many things poorly. A pilot project may achieve improvements in reef fisheries and the qualities of life of a small community at a pilot site within a single generation, but may require several generations to achieve similar results for an entire region or nation. At the same time, building capacity and linkages at the national level should be a key element of the pilot site initiative

5.1. First order: Formalized institutional structures and constituencies for ICM

For many programs, the first priority is to create a program that has the mandate, the human and financial resources and the political backing to begin practicing integrated resource management. Where institutional capacity is lacking and inter-agency conflicts dominate, this is in itself a major undertaking. We have learned that this cannot be achieved only by 'coordinating' or reallocating power and responsibility among the many

agencies of government with significant roles in the management of coastal ecosystems.

To make the description of intermediate outcomes more concrete we refer to the experience in Sri Lanka. Tangible first-order outcomes in Sri Lanka include establishment of a national Coast Conservation Division in 1978 that was converted in 1983 to Department status.²⁵ The Coast Conservation Act, which regulates all development activity within a narrowly defined coastal zone, was passed in 1981, and a coastal management plan was formally adopted in 1990. Following passage of the Coast Conservation Act, permits were granted, training was undertaken to build a cadre of ICM professionals, and professional relationships were developed with coordinating agencies and stakeholders at sites along the coast where conflicts were most acute.

From the outset, an ICM program must also be doing things that are tangible, that build credibility and that attract constituencies among the people affected as well as the elements of government concerned. However, such actions in first generation programs usually only set the stage and begin to build the body of experience for making a sustained and effective thrust towards the end goal. If an ICM initiative is narrowly defined to focus on a small group of communities, or limited portion of a coast as is appropriate for pilot scale projects, the chances for short-term (5- to 10-year) measurable impacts may be good. Usually, however, such efforts are undertaken, and justified, as 'demonstrations' that are designed to subsequently instigate ICM on a larger scale (a region, watershed, province, or nation). In such cases judgments must be made as to whether, and how, such demonstrations lead to progress on a larger scale. Thus, clearly differentiating between the ultimate goal and project objectives becomes critical.

Tangible actions in Sri Lanka have from the beginning focused on shoreline protection structures to address severe problems of shore erosion.

5.2. Second order: Correction, mitigation of selected behaviors and/or development actions implemented

Once the ICM program is in place and capable of functioning, it can expect to produce measurable impacts on the human behaviors selected as the focus for that generation. Here again, scale is of critical strategic importance. An ICM program must walk before it can run. The most successful and sustainable programs make good judgments of what they can reasonably hope to accomplish in any particular generation. Usually the limiting factor is institutional capacity.

Reduction in coral mining is an important second-order outcome in Sri Lanka. With multiple strategies, there has been a noticeable reduction in coral mining, even in a context of strong demand for coral lime, used in construction, and high economic returns to those engaged in this activity. Pilot-scale projects designed as demonstrations for community-based coastal management were initiated in Hikkaduwa and Rekawa in 1991. In these demonstration sites, coral mining has been reduced by about 95%; and in Rekawa, over 75 illegal coral lime kilns have been voluntarily demolished.²⁶

5.3. Third order: Specific improvements in quality of life and the condition of target environmental qualities

There is usually a lag between modifying a behavior and the effect on society and the ecosystem. The achievement of measurable improvements in selected indicators of quality of life and the environment, such as fish stocks, water quality, and income, are major accomplishments that bring credit to ICM programs and justify the process by which they were achieved. In Sri Lanka, measurable improvements in shrimp harvests in the Rekawa lagoon as a result of reseeded and improvements in water circulation is a tangible third-order outcome of that pilot-scale coastal management project.

Once a body of experience and capacity is in place, replication and advances towards the goals of ICM are likely to occur with increasing frequency and often independently. Thus, in Sri Lanka, major advances towards effective lagoon management in Negumbo and Puttalam lagoons have recently been made through programs loosely linked to the Coast Conservation Department.

Problems that were important a decade ago may be irrelevant today. Both problems and opportunities both evolve and change. The objectives and priorities of a vigorous ICM program therefore shift over time as they adapt to changing circumstances. The end goal of sustainable coastal development, however, remains constant.

5.4. Fourth order: Sustainable environmental quality and quality of life

Pragmatically, it is unlikely that we will see, in our lifetimes, the achievement of sustainable forms of coastal development at significant scales. What matters to us now, and matters urgently, is rather the direction of the development trajectory. Are we, as human societies, moving towards sustainable forms of coastal development, or are the actions of the societies of which we today are a part, compromising the ability of our

children and their children to meet their needs? ICM programs must pose these questions in honest and realistic terms and attempt to answer them. ICM offers a framework for addressing such questions in the context of a holistic, long-term and scientifically rigorous approach to the challenges of development and the environment. This is why the endorsement of ICM was one of the features of the 1992 United Nations UNCED Conference in Rio.

5.5. Correctly matching the ICM policy cycle with intermediate objectives

It is very important to define the relationship between a given generation of an ICM program and the sequence of intermediate outcomes that must be achieved before the ultimate goal. For example, Sri Lanka's first generation program focused on the management of shoreline erosion along the southwest coast, and postponed other intermediate outcomes to its second generation. In Ecuador, an achievable first generation objective in Ecuador was to formally create and obtain funding to implement a national ICM program while building the institutional capability and the constituencies for improved management in that country.²⁷ A major issue in Ecuador is the accelerating destruction of mangrove wetlands. Mangrove cutting has slowed, and some replanting has occurred in pilot sites. Halting all mangrove destruction along a 1600 km coast was not judged to be a realistic objective for a first generation ICM program that had to be built from the ground up. Practical exercises conducted during the planning stage, which experimented with the feasibility of a broad range of ideas for actions that promoted more sustainable forms of development, were the basis for all the activities now funded for implementation by a loan from the Inter-American Bank. These activities will continue to occur at a pilot project scale in this first generation program.

Matching the scale and the objectives of a given ICM generation to the capacity of the institutions involved and the strength of the constituencies affected is crucial but often misjudged. For example, in the 1970s the coastal management program for the State of Rhode Island in the US initially failed to scale its legislative objectives in a manner that was politically acceptable. Subsequently, the first plan drafted after that legislation proved to be not implementable—in large part because its scope and complexity surpassed the capacity of the implementing agency. A second generation effort, after a difficult internal evaluation, scaled back and simplified the scope of the regulatory program and has now been successfully implemented for 10 years.

An evaluative process that is successful in promoting learning within and across ICM programs must be designed to address the success with

which each step of the policy cycle is undertaken. It should also be able to evaluate the impact of changing the order of the steps and the hypotheses and strategies—too often unstated—that drive how each generation is designed and executed.

6. THE PRESSURES OF COASTAL CHANGE

A major challenge for learning from ICM experience lies in confidently identifying cause and effect relationships—the attribution problem. The causal relationship between the efforts of an ICM program and the impacts of the program on quality of life and the condition of coastal ecosystems are often tenuous. An ICM program is usually, and at larger scales always, one among many forces acting upon society and the environment. The pressures that influence, and sometimes drive, both the intermediate and final outcomes that an ICM program is striving to achieve are numerous and complex. They include:

- demographic pressures; in many tropical nations the numbers of people in coastal regions double every 30 to 40 years and in some coastal cities every 10 to 15 years;
- economic pressures; these can shift rapidly and often are more powerful than population pressures in driving coastal change;
- institutional and political pressures; these lie at the heart of how a governance process plays out in a given setting;
- social pressures (including conflicts among ethnic and stakeholder groups); these are powerful and volatile forces of coastal ecosystem change;
- external pressures of ecosystem change (such as global warming, acid precipitation, and ozone depletion); these are an increasing global concern.

These pressures must be assessed and monitored, not only to understand the sources of coastal change in a given place, but to enable reasonable comparisons among ICM initiatives in different settings. Progress in one setting that can be achieved quite readily may be a major accomplishment elsewhere. For example, where robust and capable institutions are in place, it may be possible to adopt and enforce a new control over a class of industrial pollutants discharges quite quickly. In other settings, this same measure may require major institution building and training, which addresses deep-rooted corruption and inefficiency. In some settings, such a technically simple and even economically cost-effective measure may be beyond the capacity of a first-generation ICM program.

Such external pressures invariably overshadow the efforts of a program and require rethinking of the fundamental strategies, and even the objectives for a generation of a program. A cholera outbreak, civil war, a major flood or cyclone, or a sudden change in the price of an important commodity can radically change the short-term prospects for the success of an ICM program. Some of these changes offer opportunities that an intelligent and agile ICM program should grasp. It is always essential that such external forces are understood and are factored into any ICM evaluative process.

7. THE PRESSURE-STATE-RESPONSE FRAMEWORK

When we assemble the three major components of an ICM learning methodology we see the central features of the Pressure-State-Response (PSR) framework that has been widely applied to a variety of environmental quality issues.²⁸ Human activities create the pressures that affect the ability of ICM programs to achieve intermediate objectives, and change the quality of the environment and human life. These qualities or 'state' conditions can in turn be influenced by the governance process throughout the ICM program cycle. The PSR framework unites the three elements in a cycle of causality whereby the responses of an ICM program form a feedback loop to the pressures created by human activities. These basic relationships are shown in Fig. 4. The large arrow illustrates that through ICM governance (represented by the 'response' box) progress towards the goals of ICM (the 'state' box) may be achieved. Other arrows illustrate the influence of outside influences (represented by the 'pressures' box) on the governance process and the achievement of ICM goals.

8. INDICATORS OF ICM GOVERNANCE

There is an extensive and rapidly growing number of efforts aimed at developing environmental indicators, including coastal environmental indicators.²⁹ Unfortunately, the great majority of monitoring and research efforts on environmental state variables do not attempt to link change in ecosystem qualities with societal behaviors and management. An exception is the ReefBase Project led by the International Center for Living Aquatic Resource Management (ICLARM) that develops a cohesive methodology for assessing and monitoring the condition of coral reefs worldwide. ReefBase is unusual in that it includes social and governance indicators as well as environmental indicators.³⁰ The Global

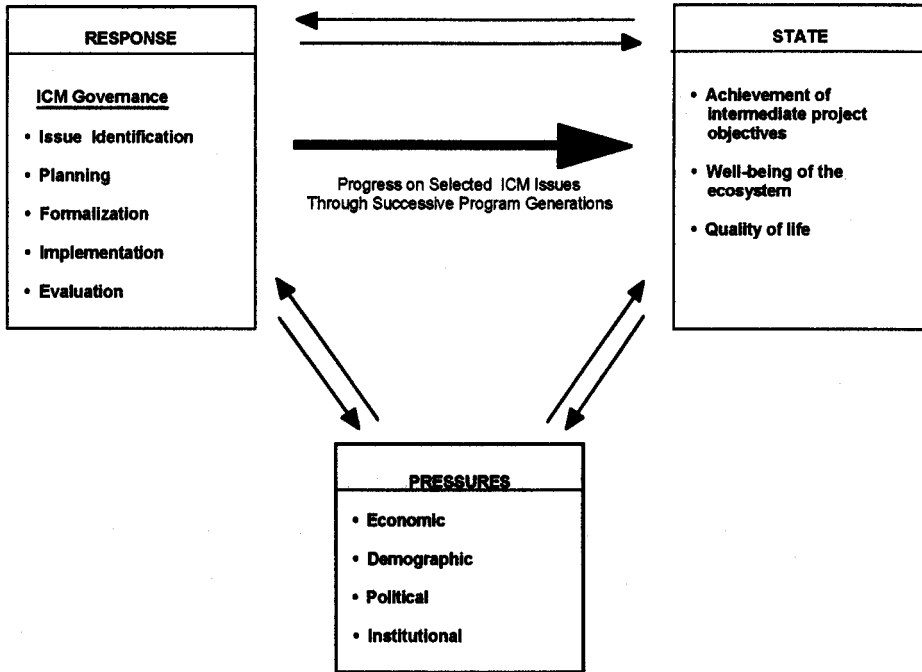


Fig. 4. PSR Framework applied to coastal management.

Coral Reef Monitoring Network (GCRMN) is further developing the social and governance aspects of monitoring coral reef management projects.

The response indicators, or governance component of the PSR framework as it applies to ICM, is the least developed leg of the PSR tripod. Yet, thorough understanding of the elements of governance and the public and private institutions that implement or manage coastal management programs in a specific country is essential. These institutions are more likely to be the source of program debate and conflict than are purely technical matters. Governance capacity is vital to sustained action on coastal resource issues.

The University of Rhode Island's Coastal Resources Center has been developing instruments that gauge the maturity of an ICM program through sets of indicators for each of the major program components.^{31,32} The instruments rank the degree to which the stages of the policy cycle have been achieved. A number of indicators for each of the five components of the ICM policy cycle described earlier have been developed. Each indicator can be ranked from 0, representing no effort, to 3, representing a high level of program effort. The methodology is

designed to be as simple as possible so that it might be administered by a professional ICM manager or social scientist, with interviews with knowledgeable in-country sources. To illustrate how the ordinal ranking system is applied, Table 2 is an example of three indicators to measure ICM implementation.

A composite measure of governance capacity could be formulated by summing the values across the five steps. Alternatively, some steps might be considered more crucial than others, which could be addressed with a system of weighting. What may have been a decisive factor in one country or site, may have played a less significant role in another. As more data are accumulated, we will be better able to determine the relative weight of the indicators on an international basis. This instrument is currently a first version of a tool that must be revised and improved.

It is important to recognize that this instrument does not assess the impact of the program. It is a tool for assessing the condition, or maturity of the ICM governance institutions and process. By combining instruments such as this that measure ICM program activities, with information on state and pressure variables, we can assemble an objective basis to:

1. assess trends and progress in specific ICM programs over time;
2. compare the status and trends in different countries over time; and
3. assist in the design of a balanced set of ICM activities in a given setting, and in identifying the levels of financial commitment in ICM that may be appropriate in a given country at a given time.

9. INCREASING THE EFFICIENCY OF LEARNING FROM ICM INITIATIVES

This paper addresses the need for analytical approaches to improve our learning capacity from the experience of ICM initiatives worldwide. One of the keys to success will be to conduct the requisite learning in the right areas so as to anticipate emerging management needs. It is essential that any methodology for learning should address (1) the governance process itself; (2) progress towards intermediate project objectives and the specific social and environmental qualities ICM programs are attempting to attain; and (3) the pressures that are affecting those qualities.

To advance comparative analysis of ICM experience at the international level it is essential that we progress toward a common methodology for learning from ICM experience, and that we assess the impacts of coastal management upon the quality of life in coastal communities, and the condition of the natural environment. We must identify specific indicators and information that should be monitored across ICM projects worldwide.

TABLE 2
Assessing ICM governance: Implementation

<i>Component</i>	<i>Description</i>	<i>Rank: 0</i>	<i>1</i>	<i>2</i>	<i>3</i>
Public investment	Degree to which there is direct public investment in essential physical facilities (water, sewerage, artificial reefs, etc.)	No investment	Limited investment and construction; no cost recovery	Significant construction; major problems with operation, maintenance and cost recovery	Significant continuing construction, operation and maintenance; established cost-recovery mechanisms
Issuing of fines and permits	Extent to which fines and permits are issued for an illegal activity	No laws and/or permits and fines are never or rarely issued	Many fines and permits issued	Declining numbers of permits and fines	Clear evidence that the activity has ceased
Conflict resolution	Extent to which there are mechanisms for successful conflict resolution at the local and national level	No mechanisms established	Attempts being made to establish mechanisms	Mechanisms established; often they succeed	Mechanisms established; usually they succeed

Once a common methodology and indicators are applied across a large number of diverse settings, it will be possible to systematically test hypotheses about what works, doesn't work, and why. Such a common methodology and indicators are urgently needed to increase the efficiency by which the widening community of ICM initiatives learn from one another and make ICM an effective response to the challenges of sustainable coastal development.

REFERENCES

1. Sorensen, J. The international proliferation of integrated coastal zone management efforts. *Ocean and Coastal Management* 1993, **21**, 1-3 45-80.
2. Pernetta, J. and Elder, D., *Cross-Sectoral, Integrated Coastal Area Planning (CICAP): Guidelines and Principles for Coastal Area Development*. IUCN, Gland, Switzerland, 1993.
3. UNCED, Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their living resources, Ch. 17, Agenda 21, United Nations Conference on Environment and Development, 1992.
4. Chua, T. Essential elements of integrated coastal management. *Ocean and Coastal Management* 1993, **21**, 81-108.
5. Clark, J. *The Coastal Zone Management Handbook*. Lewis Publishers, 1996.
6. OECD, *Coastal Zone Management: Integrated Policies*. Organization for Economic Co-operation and Development, Paris, 1993.
7. Post, J. and Lundin, C. (eds), *Guidelines for Integrated Coastal Zone Management*, Environmentally Sustainable Development Studies and Monographs Series No. 9. The World Bank, Washington, DC, 1996.
8. Pernetta and Elder, *op. cit.* reference 2.
9. GESAMP (IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection), The Contributions of Science to Integrated Coastal Management. GESAMP Reports and Studies No. 61, 1996.
10. Hennessey, T. Governance and adaptive management for estuarine ecosystems: The case of Chesapeake Bay. *Coastal Management* 1994, **22**, 119-145.
11. Olsen, S., Tobey, J., Robadue, D. and Ochoa, E., Coastal management in Latin America and the Caribbean. Draft report submitted to the Inter-American Development Bank, Washington, DC, December 1996.
12. Pomeroy, R. Community-based and co-management institutions for sustainable coastal fisheries management in Southeast Asia. *Ocean and Coastal Management* 1995, **27**, 3 143-162.
13. Sabatier, P. and Mazmanian, D. The conditions of effective implementation: A guide to accomplishing policy objectives. *Policy Analysis* 1979, **5**, Fall 481-504.
14. White, A., Hale, L., Renard, Y. and Cortesi, L., *Collaborative and Community-Based Management of Coral Reefs: Lessons from Experience*. Kumarian Press, Connecticut, 1995.
15. Kolb, D., Rubin, I. and McIntyre, J., *Organizational Psychology*, 2nd edn. Prentice-Hall, Englewood Cliffs, NJ, 1974, pp. 27-42.

16. GESAMP, *op. cit.* reference 9.
17. Knecht, R., Cicin-Sain, B. and Fisk, G. Perceptions of the performance of state coastal zone management programs in the United States. *Coastal Management* 1996, **24**, 141–163.
18. Chua, T. and Scura, L. (eds), Integrative framework and methods for coastal area management. In *ICLARM Conference Proceedings*, 37, 1992.
19. Intergovernmental Panel on Climate Change (IPCC), *Preparing to Meet the Coastal Challenges of the 21st Century*. Conference Report, World Coast Conference, 1993. The Hague, Netherlands, National Institute for Coastal and Marine Management (RIKZ), Coastal Zone Management Centre, 1994.
20. Knecht, R., On the role of sciences in the implementation of national coastal management programs. In *Improving Interactions Between Coastal Science and Policy: Proceedings of the Gulf of Maine Symposium*. National Academy Press, Washington, DC, 1995.
21. Pernetta and Elder, *op. cit.* reference 2.
22. UNEP, *Guidelines for Integrated Management of Coastal and Marine Areas with Special Reference to the Mediterranean Basin*, United Nations Environment Program, UNEP Reg. Seas Rep. Stud., 161, 1995.
23. World Bank, The Noordwijk guidelines for integrated coastal zone management. Paper presented by the Environment Department, World Bank, at the World Coast Conference, 1–5 November 1993, Noordwijk, the Netherlands, 1993.
24. GESAMP, *op. cit.* reference 9.
25. Olsen, S., Sadacharan, D., Samarakoon, J., White, A., Wickremeratne, H. and Wijeratne, M., *Coastal 2000: Recommendations for a Resource Management Strategy for Sri Lanka's Coastal Region*, Vol. I. The Coastal Resources Management Projects, Sri Lanka, and the Coastal Resources Center, The University of Rhode Island, 1992.
26. Hale, L., Halting coral mining in Sri Lanka...a hard-won success story. *People and the Planet*, Special International Year of the Reef Issue 1997, **16**.
27. Robadue, D. (ed.), *Eight Years in Ecuador: The Road to Integrated Coastal Management*. Technical Report No. 2088, Coastal Resources Center, University of Rhode Island, September 1995.
28. OECD *Environmental Indicators: OECD Core Set*. Organization for Economic Cooperation and Development, Paris, 1994.
29. Lourens, J. and Cardoso da Silva, M., Indicators for coastal zone management and characterization. Report prepared for the European Environment Agency, Topic Centre on Marine and Coastal Environment, November 1996.
30. Pollnac, R., Rapid assessment of management parameters for coral reefs. RAMP Final Report, Coastal Resources Center, University of Rhode Island, 1996.
31. Cobb, L. and Olsen, S. *International Coastal Resource Management Program Effort: Tools for Assessment, Planning, Monitoring and Evaluation*. Manuscript, Coastal Resources Center, University of Rhode Island, Kingston, RI, June 1994.
32. Olsen, S. and Tobey, J., Final evaluation: Patagonian coastal zone management plan. Draft report submitted by the Coastal Resources Center, the University of Rhode Island, to the United Nations Development Programme, January, 1997.

33. USEPA, 1994. USEPA, *Measuring Progress of Estuary Programs*. US Environmental Protection Agency, Office of Water, Doc 842-B-94-008, Washington, DC, 1994, 267 pp.