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Frameworks and indicators for assessing progress in integrated coastal management initiatives

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Abstract

The fundamental purpose of all integrated coastal management (ICM) initiatives is to maintain, restore or improve specified qualities of coastal ecosystems and their associated human societies. A defining feature of ICM is that it addresses needs for both development and conservation in geographically specific places—be they a single community, an estuary or the coast of an entire nation. The times required to achieve these fundamental goals at significant spatial scales far exceed those of the usual 4–6-year project, the dominant ICM modality in developing nations. This paper offers two simple, but elastic frameworks for assessing progress over the extended time periods involved. The first is the four Orders of Outcomes that group together the sequences of institutional, behavioral and social/environmental changes that can lead to more sustainable forms of coastal development. The second framework is a version of the more familiar ICM policy cycle. These conceptually simple frameworks are making it possible to unbundle and organize into consistent formats the usually implicit assumptions that underpin project and program designs and then group activities and outcomes along a critical path that leads—or is presumed to lead—to the desired outcomes. Each step in the ICM policy cycle and each Order of Outcomes suggest the indicators by which progress and learning can be assessed. The application of these frameworks to a diversity of ICM initiatives is proving useful in assessing progress across portfolios of ICM initiatives, extracting good practices and teasing out how different governance contexts effect the forces that shape the evolution of ICM initiatives.

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1. The fundamental goals of integrated coastal management

A review of the tangle of forces that are producing losses in the qualities of coastal regions reaffirms that attempts to reverse or decelerate the negative direction of the

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trends are small and fragile compared to the destructive forces at work. Yet the fundamental purpose of all coastal management efforts is to do just this. Since the 1992 United Nations Conference on Environment and Development such efforts typically couch their goals as progress towards sustainable forms of coastal development. This translates [1] into project and program goals that are commonly expressed as:

1. Specific improvements in the bio-physical environment (for example, the condition or aerial extent of mangroves or coral reefs, the control of coastal erosion or improvements in water quality).
2. Specific improvements in the quality of life of the human population in the area of concern (for example, greater equity in how coastal resources are allocated, improved livelihoods, reduced conflicts among user groups, control of destructive forms of behavior).

ICM initiatives designed to advance specific places towards the dual goals of coastal management must be designed to (1) be sustainable over long periods of time, often several decades, (2) be capable of being adapted to often rapidly changing conditions and (3) provide the mechanisms to encourage or require particular forms of resource use and collaborative behaviors among institutions and user groups. A major feature of instruments and indicators used to track progress in ICM initiatives is that they must be designed to transcend the scope of the 4–6-year projects that are currently the dominant vehicle by which investments in coastal management are being made in the tropics. The methods presented here place such short-term infusions within the trajectory of social and environmental change in a given place.

A framework for grouping the outcomes of ICM initiatives is given in Fig. 1. The framework recognizes that ICM is a process for negotiating and implementing public policy to achieve sustainable coastal development goals. It highlights the importance of changes in state (such as the abundance of fish or quality of life) but also recognizes that for each change in state there are correlated changes in the behavior of key partners and stakeholders within the sphere of influence of the management activity.

First Order outcomes are the societal actions that are required when it commits to a plan of action designed to modify the course of events in a coastal ecosystem. At the national level, First Order outcomes are expressed as a formalized commitment to an ICM program and putting in place the “enabling conditions” that are required if ICM policies, plans and actions are to be successfully implemented. First Order outcomes require building the constituencies and the institutional capacity to undertake integrated coastal planning and decision making as well as the authority, funding and other resources that make it feasible to implement ICM policies and actions. The setting of goals is another essential element of the enabling conditions that together set the stage for the successful implementation of an ICM policy and plan of action.

Second Order outcomes are evidence of successful implementation of an ICM program. This includes evidence of new forms of collaborative action among institutions, the actions of state–civil society partnerships, and the behavioral

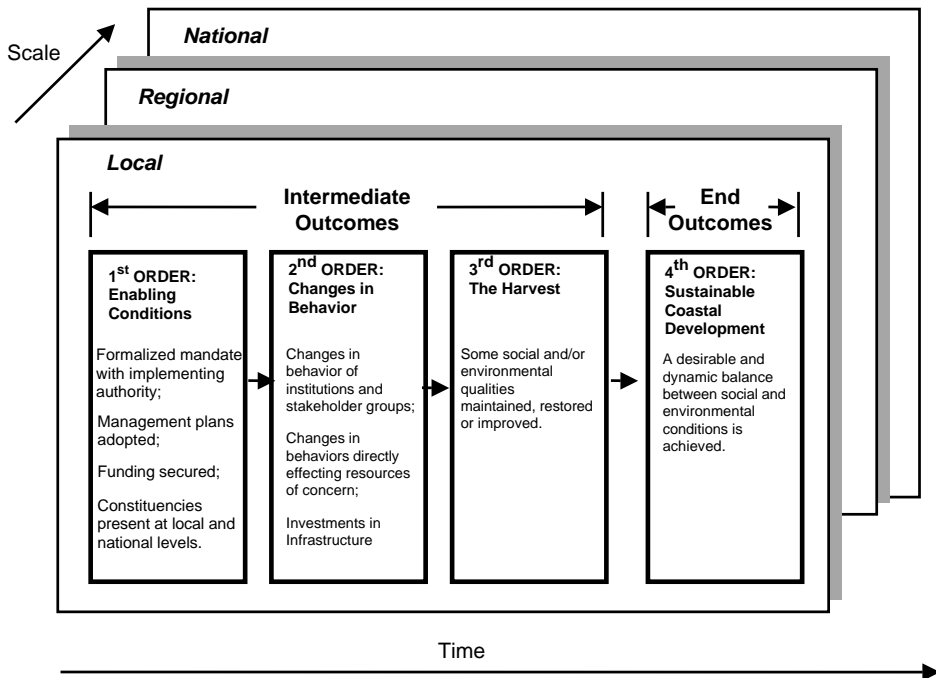


Fig. 1. The four orders of coastal governance outcomes. Adapted from [2].

changes of resource users. Second Order changes in the behavior of organizations and user groups are the precursors to Third Order socio-economic and environmental outcomes that mark physical evidence of progress towards sustainable forms of coastal development.

Today the results of the ICM initiatives in 95 nations and semi-sovereign states identified by Sorensen [3] lie primarily in First Order outcomes. Many of those involved in funding and administering ICM programs in developing nations see the challenge as one of better coordination among governmental institutions and smoothing the path so that contemporary development can occur more efficiently. The assumption is that adjustments to the processes of planning and decision making will produce progress towards the fundamental goals of ICM—sustained or improved societal and environmental qualities. The reality is that there is a wide “implementation gap” and that many laws, policies regulations, plans exists only on paper. Experience is demonstrating repeatedly that even when the financial resources are assembled and spent to implement a plan of action the results are often disappointing. In developing nations, there is only modest evidence of sustained progress in the Second Order behavioral changes that mark successful implementation. The cutting edge of ICM practice in this next decade lies in learning how to effectively and efficiently instigate these behavioral changes in specific institutions and groups. This is illustrated graphically in Fig. 2. Reversing the predominantly negative trends in the qualities of coastal ecosystems at significant spatial scales and

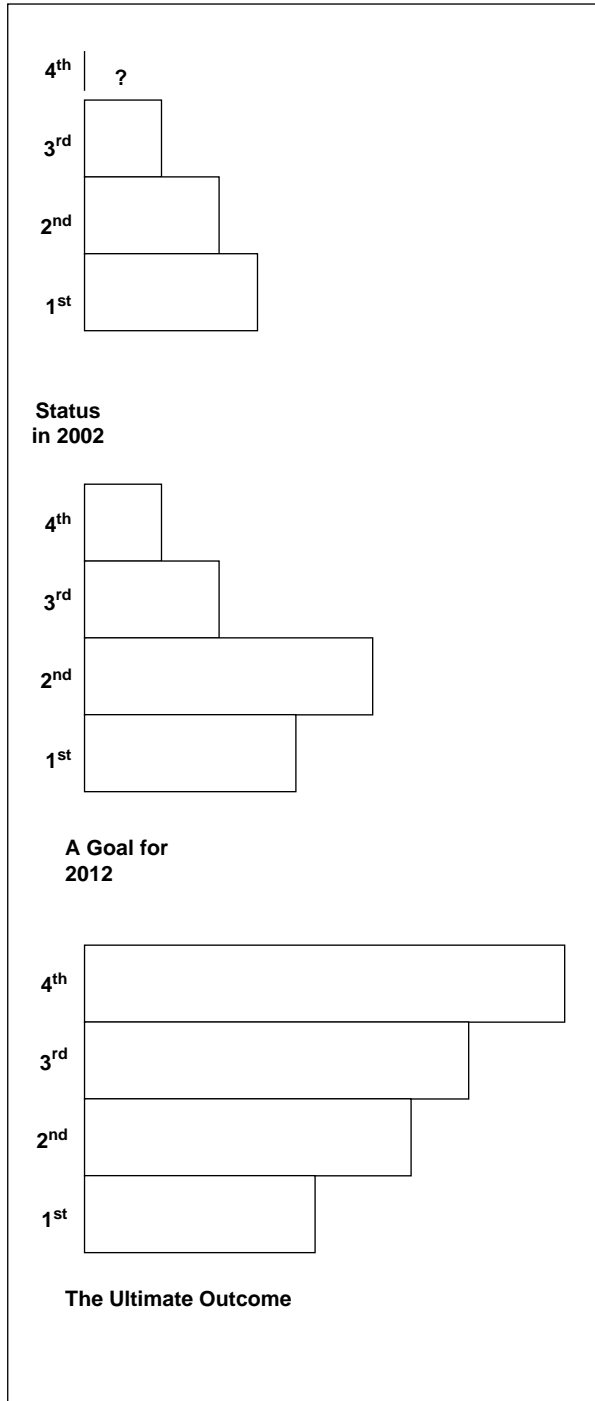


Fig. 2. Orders of outcomes as a critical path to sustainable coastal.

thereby achieving the Third Order outcomes that are the justification for investments in ICM lie further off in the future.

The ultimate goal of sustainable forms of coastal development (Fourth Order outcomes) is today an undefined ideal. If we are to make sustained positive progress it will be necessary to think through how human needs can be balanced with the necessary qualities of the coastal ecosystems of which human societies are but one element. Thus, the bottom graphic in Fig. 2 suggests that as experience and success accumulates we shall be capable of defining for increasing numbers of areas what this balance is and how it can be sustained. However, the sustainable coastal development that so many plans and programs have adopted as their ultimate goal will not be a static condition. Maintaining such equilibria will require a far more sophisticated understanding on the linkages and interdependencies between societal and ecosystem well being than we possess today.

2. The features of each order of outcomes and indicators for their accomplishment

It is important to recognize that some expressions of First, Second and Third Order outcomes should accumulate concurrently within a given time period. While there are causal relationships between the three orders they are not, and should not, be achieved in a strictly sequential progression. For example, many successful programs experiment at a small geographic scale before attempting to apply new management practices at the national scale. Thus the First Order threshold may only be achieved at the national scale when Second and Third Order outcomes have accumulated at one or more demonstration sites.

2.1. Indicators of First Order outcomes

First Order outcomes are concerned with the construction of the enabling conditions that set the stage for the implementation of an ICM initiative. This, however, can only be the initial goal for investments whose purpose is to instigate the concepts and practices of ICM in a place where sector-by-sector development has been the norm. There are two thrusts to this challenge. One is to secure formal commitments to a plan of action and the institutional structures by which it will be implemented. The second and equally important priority is to create a demand for the services that a coastal management program can provide. This is the mobilization of the constituencies that will actively support the program and hold it accountable to its stated goals. Both need to be operationally viable within the existing power structure (in most cases government and key interest groups) and among those who will be affected by the program.

At the heart of the challenge in First Order outcomes is a reallocation of authority. New laws, programs and procedures provide the legal, administrative and management potential for achieving the desired changes in societal behavior. How such authority is used will eventually determine the power of the coastal program.

Improved stewardship, participatory decision making and greater equity in the allocation of goods and benefits that flow from coastal ecosystems invariably require adjustments to the existing power structure.

At a national scale, indicators of First Order outcomes can be grouped into the following categories:

1. Constituencies that actively support the ICM initiative.
 - Within the user groups that will be most affected by the ICM program.
 - Within the governmental institutions involved in the program.
 - Within the general public.
2. A formal governmental mandate for the program with the authority necessary to implement a course of action. This may take the form of:
 - A law, decree or other high level administrative decision creating an ICM program as a permanent feature of the governance structure.
 - The creation of commissions, working groups, user organizations and non-governmental organizations (NGOs) dedicated to the advancement of an ICM agenda.
 - The designation of protected areas and the enactment of land and water use zoning schemes.
3. Resources, including sustained annual funding, adequate to implement the plan of action.
4. A plan of action constructed around unambiguous goals.
5. The institutional capacity necessary to implement the plan of action.

A key feature of the First Order threshold is to grant the institution or institutions responsible for the ICM initiative with sufficient authority and resources to implement its plan of action. The process may require a sequence of decisions. For example, in Sri Lanka, commitments contributing to the First Order began with the creation of the Coast Conservation Department (CCD) in 1978. Five years later this was followed by passage of the Coastal Zone Management Act by the legislature. The Act provided the CCD with the necessary mandate and authority to formulate a National Coastal Management Plan that was approved by cabinet in 1990 and thereby put in place a formal framework of policies and procedures for an initial phase of program implementation.

The complexity of negotiating legally binding commitments to ICM increases as one progresses up a governance hierarchy. At the community level, a commitment may need no more than a motion by a village council, the passage of a municipal ordinance or even a commitment from one or more user groups to abide by a defined set of rules. Typically, much of the energy of national ICM programs initially goes to creating the enabling conditions so that local level ICM initiatives can proceed legally and be nested within the preexisting governance hierarchy. In federal systems like the United States and Mexico authority over coastal activities and resources is allocated among federal, state and municipal governments. In the US, federal legislation in 1972 created a system of voluntary state coastal management incentives and performance standards. By 2000 all but two US coastal states had negotiated coastal management programs that were signed by the respective state governors and

approved by the lead federal agency. Mexico is currently initiating a parallel process structured around Ecological Ordinances.

2.2. *Indicators of Second Order outcomes*

Second Order outcomes are the changes in human behavior that that is required to achieve desired social and environmental improvements. These fall into three large categories. First are changes to how institutions and groups relate to one another as an integrated, rather than a sectoral approach to coastal management takes hold. Evidence of such change may be seen in the deliberations of a Commission, new procedures for granting permits, more transparent and inclusive planning, the successful application of conflict resolution techniques etc. In a young program operating at a national scale it is these changes in the behavior of governmental institutions that mark the first stages of successful implementation of an ICM program. Equally important, but usually occurring initially at a localized scale, are changes in how user groups relate to their ecosystem. Here we look for evidence that good practices in the siting of shorefront structures or shrimp ponds are being followed, that dynamite fishing or other destructive practices have halted or declined, that the flows of pollutants into estuaries have been checked. Second Order outcomes also include investment in such physical infrastructure as sewage treatment plants, solid waste disposal sites, and the construction of breakwaters and dams.

In summary, examples of each category of indicators of Second Order outcomes are:

1. Changes in the behavior of institutions and interest groups.
 - Collaborative planning and decision making through task forces, commissions, civic associations and the like.
 - Successful application of conflict mediation activities.
 - Evidence of functional public-private partnerships.
 - Collaborative actions by user groups.
 - Use of new school curricula on ICM topics.
2. Changes in behaviors directly affecting resources of concern.
 - Elimination of destructive fishing practices and over-harvesting.
 - Land use practices that reduce contamination of water, sustain fresh water inflows to estuaries.
3. Investments in Infrastructure Supportive of ICM Policies and Plans.
 - Construction and maintenance of shoreline protection works.
 - Construction of port facilities and other transportation related infrastructure.
 - Waste disposal and pollution reduction infrastructure including sewage treatment facilities, sanitary landfills, runoff retention basins.
 - Infrastructure to enhance and protect public access to the shore including rights of way, boardwalks, signage programs.
 - Investments in habitat protection and restoration including purchase of protected areas and conservation easements, construction of artificial reefs, installation of mooring buoys.

The outcome mapping technique [4] disseminated by the International Development Research Center (IDRC) is a powerful means for defining and then documenting and analyzing the behavioral changes associated with the Second Order. The technique calls for identifying the “boundary partners” that a program selects to work with directly in order to instigate the societal change required to attain its Third Order goals. The changes in relationships, activities, actions or behaviors of boundary partners that can be logically linked to the ICM program’s activities are specified. A graduated set of indicators of changed behaviors are then developed and monitored. Periodic self-assessments provide the feedback loops that encourage the program and its partners to learn and adapt as the program proceeds.

2.3. *Indicators of Third Order outcomes*

Third Order outcomes are expressions of the harvest that is the reward for adequate and sustained achievements in institutional and behavioral change. Water quality improves, there are more fish, and indicators for the quality of life, income or engagement in alternative livelihoods within target communities stabilize or improve.

The changes that constitute Third Order outcome indicators are invariably the result multiple events and forces. Only occasionally can an ICM program confidently claim at anything larger than a local scale that it alone was responsible for a positive change in the environment or social well being. The more complex the program, the more difficult it is to establish valid cause and effect relationships. A second difficulty is that the benefits of Third Order changes in behavior may be reflected in improvements in coastal conditions over the long-term, but not in the short-term. A third difficulty in documenting Third Order outcomes is that ICM programs often prohibit inappropriate development or modulate forms of development that have negative impacts on coastal conditions. These are difficult to quantify and place on a balance sheet.

Greater equity and social welfare is one of the important socioeconomic outcomes of ICM. ICM strengthens systems of participatory democracy and brings order, transparency, and equity to decision-making and to the manner in which resources are allocated. By modeling standards of participatory democracy, ICM programs bring hope, a greater sense of security and belief that the governance system can respond to public needs. ICM induced changes in behavior can increase the standard of living of coastal residents by improving food security and improving opportunities to generate income through traditional and alternative employment. Properly managed, alternative income generating activities that improve economic welfare can be related to improvements in the condition of the environment.

In summary, Third Order outcomes fall into two broad categories:

1. Improvements in some coastal ecosystem qualities.
 - Sustained conservation of desired qualities with the areas subject to ICM.
 - Halting or slowing undesired trends such as overfishing, sand and coral mining, eutrophication.

- Restoration of lost qualities, for example, through re-establishment of water flows to wetlands, sufficient diminution of sediment or nutrient loads to permit light penetration to corals or sea grass beds, control of over-exploitation of living resources.
2. Improvements in some societal qualities, including for example:
- Increases in indices of quality of life, such as the Human Development Index.
 - Reduced poverty, greater life expectancy, better employment opportunities.
 - Greater equity in access to coastal resources and the distribution of benefits from their use.
 - Greater order, transparency and accountability in how planning and decision making processes occur.
 - Greater security, including food security.
 - Greater confidence in the future and hope.

It is within Third Order outcomes that the wisdom of Second Order investments in physical infrastructure can be assessed. Sometimes the results are disappointing. Often failures are attributable to an absence of the governance capacity required to successfully administer the facilities that have been built. The case can often be made that this translates into inadequate investments in building the base of First Order outcomes required to sustain the Third Order prize.

By far more effort has gone into developing and refining and monitoring Third Order outcomes than either First or Second Order outcomes. This has contributed to a very major problem with the designs of most ICM initiatives in developing nations. This is that most investments in ICM set their “bottom line” targets primarily in Third Order terms even when experience should have made it abundantly clear that these lie beyond the time scales of the usual donor or development bank funded “project”. Developing country programs are more realistic. The more successful, such as the Chesapeake Bay Program, and the Great Barrier Reef Authority, set their Third Order goals within time frames of one or two decades. In developing nations in the tropics most Third Order outcomes that are attributable at least in part to ICM initiatives are currently limited to demonstration sites. In the US the documentation of Third Order achievements potentially attributable to the Coastal Zone Management Programs of coastal states has been frustrated by an absence of baselines and adequate monitoring protocols [5].

2.4. *A defining feature of Fourth Order outcomes*

The difference between Third and Fourth Order outcomes is that sustainable development requires achieving yet to be defined equilibria among *both* social and environmental qualities. Sustainable development has not been achieved if, for example, the condition of the coral reefs of a place are sustained or improved but the people associated with them continue to live in poverty. Similarly, sustainable development has not been achieved if some measures of quality of life are high but such achievements are eroding the resource base or require the exploitation of other

social groups. The challenge is vastly complicated by the imperative of defining an acceptable balance in terms of both intergenerational equity and a planetary perspective on both societal and environmental conditions and trends.

ICM currently tackles issues in a sequential manner. We are a long way from defining in specific terms what balance among societal and environmental qualities may be considered sustainable in given coastal places. We must also recognize that all living systems are in a constant process of change. Sustainable forms of development will be dynamic, not static, and capable of responding to the surprises that Mother Nature delivers.

3. A framework and indicators for tracing the processes by which ICM initiatives evolve

The Orders of outcomes framework but does not help trace how ICM negotiates and implements the cycles of planning and decision making that can produce such results. Since the Rio conference, the features of ICM as a distinct practice have become increasingly well defined. This section describes the fundamental features of ICM practice and suggests the indicators that can be used to assess progress and learning.

ICM operates through a series of steps and actions in a policy process that must be tailored to the needs and capacity of individual places. In successful programs a limited number of management issues are selected strategically in light of the dimensions of the existing institutional capacity and the complexity of the issues. Thus strategies to cope with problems are reviewed in light of political realities, the resources available to achieve goals, and other constraints. ICM programs that persist over decades maintain their strategic focus by defining and redefining the issues—the problems and opportunities, which are the management focus—with sustained input from those, affected.

As described by Torell [6] the policy cycle framework has its roots in Lasswell's [7] approach to making good governance operational by grouping the process by which public policy evolves into a sequence of functional phases. This approach was further developed by others including Brewer [8] and DeLeon [9]. GESAMP [10] offered a version of the public policy cycle as a framework for grouping the activities associated with five phases within a “generation” of coastal management.

There are many variations to how the policy cycle model can be adapted to ICM, but the central idea of a multiple step cycle of planning-commitment-implementation-evaluation remains constant. The ICM policy cycle developed by GESAMP [10] is shown in Fig. 3. It visualizes a sequence of interconnected completions of a five-step cycle, where each cycle is termed a “generation” of ICM. Successive generations of ICM address an expanding agenda of issues and/or a larger geographic area. Indeed, review of long established and successful ICM initiatives in both developed and developing country contexts shows that they have expanded in scope and scale over time.

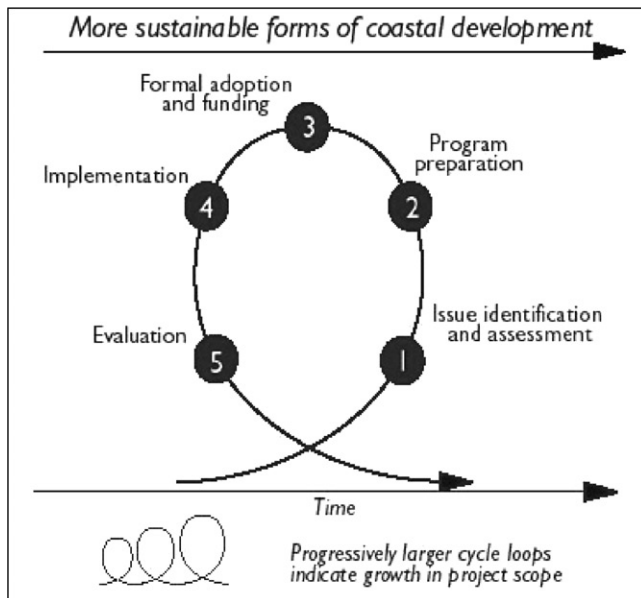


Fig. 3. The ICM policy cycle. Adapted from [10].

The policy cycle framework places the many actions of policy making, implementation and evaluation into a sequence and stresses the interconnections and interdependencies between different groups of activities. The emphasis on sequence does not imply a blueprint that can be imposed on any situation but rather a codification of good practice that builds on the central reality that governance capacity is the primary factor limiting forward progress. This means that sustained advances will be achieved through a sequence of connected efforts, not by the construction of a turnkey operation that once in place will transform unsustainable practices into sustainable development.

Organizing the many actions undertaken to advance a coastal management initiative around the policy cycle emphasizes that successful initiatives link the steps within a generation of management—particularly the need to bridge between steps devoted primarily to planning (Steps 1, 2 and 3) and a period of policy implementation (Step 4). Progress is further enhanced when completed cycles of management build upon each other and are expressions of purposeful learning. In many places where contemporary coastal management is being initiated there is a pre-existing body of experience in coping with the issues that need to be addressed. This may be in the form of “traditional” practices and the informal rules recognized as important by the Ostrom school of institutional analysis [11]. It is important to link such experience to new initiatives and build upon them. The diagramming of generations of management is a visual prompt that reinforces the importance of this overt dedication to a learning-based approach.

A *Manual for Assessing Progress in Coastal Management* [12] offers a set of “priority actions” for each of the five steps (Box 2) and then poses questions that are designed to probe how these steps and actions are being adapted to a given situation and whether they are being strategically linked as a program evolves. Table 1 presents the actions associated with each Step in the ICM cycle as clusters of indicators.

As with the Orders of Outcomes, the steps in the ICM cycle are not and should not be followed mechanically. Depending upon the capacities of those involved and the conditions prevailing in a given place, steps may be combined, and their order may be changed. There are, however, predictable consequences of changing the order in which the steps are taken. For example, formalizing the objectives of a management effort and the institutional structure by which those objectives will be met through a law or decree (Step 3) before making a thorough assessment of the issues in consultation with those who will be most affected (Steps 1 and 2) is an option with predictable risks. This does not mean that this is not a good strategy in some situations. The policy cycle applies a problem solving perspective to policy development and calls for multidisciplinary, interactive responses that recognize the roles of social norms and personal values in the management process. The priority actions and the good practices associated with them are rebuttable presumptions that should be tested, rejected or refined as the practice evolves.

4. Conclusions

Taken together the two frameworks allow us to tease out the logic in a given project or program in a manner that can set the stage of comparisons across initiatives in a given place or across portfolios of projects undertaken in different locales. They provide a means for sorting coastal management efforts into groupings that highlight the pre-existing governance experience and capacity, the scale and scope of efforts and the outcomes that are desired. The frameworks are also proving useful as a guide to program and project design and as a tool for organizing periodic self-assessments or peer reviews of an ongoing initiative.

The experience of the evaluating the results of ICM initiatives sponsored by a variety of international donors including the United States Agency for International Development [13], the Global Environmental Facility [1], the Inter American Development Bank [14] and the Swedish Foreign Assistance Program [15] in a wide diversity of settings in Latin America, East Africa and Southeast Asia suggests that the primary factor limiting progress in coastal management is not the availability of funding or knowledge of the social and ecosystem process at work, but the capacity of the institutions most directly involved to instigate and sustain integrated and adaptive forms of management [15]. Matching the governance capacity that can be created or strengthened within a given time period with given resources to the complexity of the issues to be addressed lies at the heart of good practice. The methods presented here are therefore directed at assessing the adequacy of management structures and governance processes as these relate to generally

Table 1
Indicators for the five steps of the ICM cycle

Step	Indicators
Step 1: Issue identification and assessment	<ul style="list-style-type: none"> ● An assessment of the principal environmental, social and institutional issues and their implications. ● Identification of the major stakeholders and their interests. ● Selection of the issues upon which the ICM initiative will focus its efforts. ● Definition of the goals of the ICM initiative. ● Active involvement of stakeholders in the assessment and goal setting process.
Step 2: Preparation of the plan	<ul style="list-style-type: none"> ● Scientific research on selected management questions. ● Boundaries of the areas to be managed defined. ● Documentation of baseline conditions. ● Definition of the action plan and the institutional framework by which it will be implemented. ● Development of institutional capacity for implementation. ● Testing of Second Order behavioral change strategies at pilot scales. ● Active involvement of stakeholders in planning and pilot project activities.
Step 3: Formal adoption and funding	<ul style="list-style-type: none"> ● Formal endorsement of the policies/plan and provision of the authorities necessary for their implementation. ● Funding required for program implementation obtained.
Step 4: Implementation	<ul style="list-style-type: none"> ● Behaviors of strategic partners monitored, strategies adjusted. ● Societal/ecosystem trends monitored and interpreted. ● Investments in necessary physical infrastructure made. ● Progress and attainment of Third Order goals documented. ● Sustained participation of major stakeholder groups. ● Constituencies, funding and authorities sustained. ● Program learning and adaptations documented.
Step 5: Self-assessment and external evaluation	<ul style="list-style-type: none"> ● Program outcomes documented. ● Management issues reassessed. ● Priorities and policies adjusted to reflect experience and changing social/environmental conditions. ● External evaluations conducted at junctures in the program's evolution. ● New issues or areas identified for inclusion in the program.

Source: Adapted from [10,12].

accepted international standards and experience. Their primary purpose is to find ways to improve program design and implementation, assess the effectiveness of the coastal management strategies that are being promoted and to make administrative

adjustments in response to what is being learned. Such *governance capacity assessments* examine these issues not only from the perspective of a given project but in light of the course of events and experience of the place where a coastal management initiative is being undertaken. There is an emphasis upon the linkages among past and present coastal governance initiatives in the place. Their purpose, therefore, differs from those of most performance evaluations which focus on judging the quality of project execution and the degree to which project or program outputs and activities have been achieved as these relate to the project or program objectives as defined by an individual initiative.

The initial applications of these methods demonstrates that their sustained application requires a high degree of trust among those participating. These typically include those funding and administering the initiative, political leaders and, most importantly the stakeholders most directly affected by the program's actions. Too often some of these relationships are colored by adversarial tensions and the instinct to behave in a less than transparent manner. However, a culture of learning with high standards of accountability and professional excellence predominate in such fields as public health. A similar culture must be fostered within the emerging profession of coastal ecosystem governance.

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