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A governance perspective on the large marine ecosystem approach

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ABSTRACT

The large marine ecosystem (LME) concept and approach has had a global impact on marine ecosystem-based management. The LME approach provides a framework for assessing and monitoring LMEs and is based on five modules: productivity, fish and fisheries, pollution and ecosystem health, socioeconomics, and governance. It appears that the LME approach is also being used to structure interventions to bring about change. Its appropriateness for the latter purpose is questioned. The major concerns are that the LME approach is not consistent with current thinking about enabling governance and its compartmentalized structure does not facilitate effective governance intervention. Current thinking on good governance suggests that it is more appropriate to approach governance interventions at the LME scale through multi-level governance policy cycles.

1. Large marine ecosystem (LME) concept and approach

LMEs have been defined as relatively large regions of coastal oceans on the order of 200,000 km^2 or greater, characterized by distinct bathymetry, hydrography, productivity, and trophically dependent populations [1]. The LME concept, used for 25 years to investigate the problems affecting the world's coastal marine ecosystems, has had a global impact on how projects to address these problems are developed and funded. The concept has focused attention worldwide on the need to address marine ecosystem issues at a geographical scale that is appropriate to major marine biophysical processes. Attention to LME processes has generated numerous books and articles reporting on studies of them. The LME concept has provided a rallying point for countries to cooperate in dealing with problems relating to the utilization of transboundary resources. This is supported financially by international funding mechanisms such as the Global Environment Fund (GEF).

This attention to LMEs has been underlain by the LME approach, which has major areas of concern based on five modules: productivity, fish and fisheries, pollution and ecosystem health, socioeconomics, and governance [2–5]. As usually presented, these modules provide a framework for an indicator-based approach to assessing and monitoring LMEs (Fig. 1). As pointed out by Sherman et al. [5], some modules have received more attention than others, with the socioeconomics and governance modules being the least well developed.

There has been the tendency to refer to the upper three modules as the science modules. They should perhaps be more correctly referred to as the natural science modules. It can be argued that the other two are also strongly science-based with an emphasis on the social sciences of economics, anthropology, sociology, and political science. There is also lack of clarity as to exactly what is contained in the modules. They appear to be mixed and have fuzzy boundaries. There are, for example, elements of governance in the 'fish and fisheries' and 'pollution and health' modules. Similarly, aspects of socioeconomic sustainability that are highly related to most of the governance issues mentioned above, are to be found in the 'socioeconomics' module.

This paper asks whether the LME approach was intended to be more than an assessment and monitoring framework within which to develop suites of indicators. It appears from the literature on LME projects that it is also being used as a framework within which to structure interventions to bring about change. This concerns governance. Its appropriateness for the latter purpose is questioned. While it is important in pursuing governance at the LME level to have a framework that is appropriate for structuring interventions, the major concern with the LME approach is that it is not consistent with current thinking about enabling governance. Additionally, its compartmentalized structure does not facilitate the types of integrated assessment and action that is required for effective interventions to improve governance of transboundary water bodies—a fundamental goal of GEF's International Waters Programme [6].

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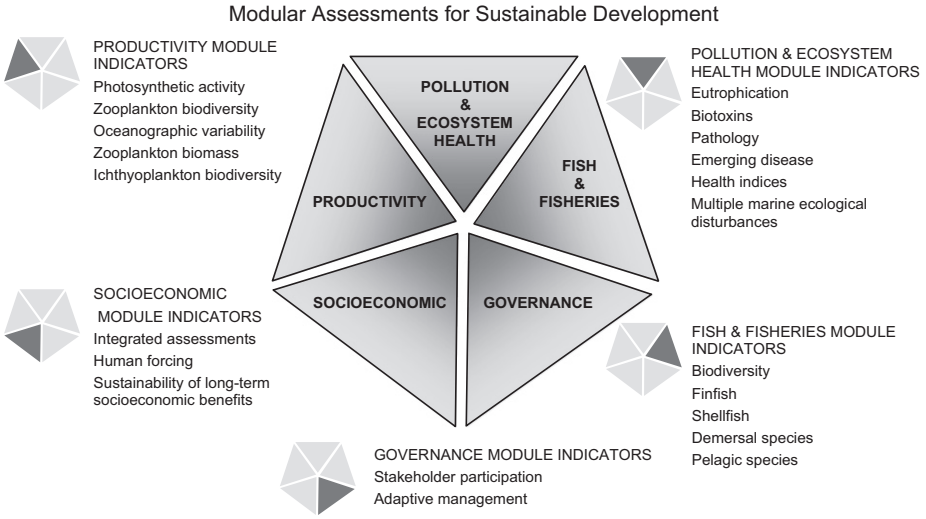

Fig. 1. The LME modules and the indicators associated with each.

It can be argued that on moving from investigation to intervention, the LME approach becomes less appropriate, and if successful informed intervention is the ultimate test of the usefulness of the approach, then the investigation must be designed and integrated to feed into the intervention. Current thinking on good governance, adaptive management, and policy formulation suggests that it is critical to design most LME investigation entirely within contexts of multi-level governance policy cycles and interventions rather than relegate governance to a weakly developed module.

2. State of the art governance

Recently, a considerable amount of conceptual and applied research attention has been paid to governance of natural resources. Some of this has focused on the nature of social-ecological systems and the conditions that affect resilience and transformability [7–9]. Others have explored the nature of these systems from the point of view of their complexity, diversity, vulnerability, and dynamics; the interactive governance approach [10,11]. They have sought to tease apart the components of governance with a view to defining governability and to explore the 'governing interactions' between the 'governing system' and the 'system to be governed'.

These developments in natural resource governance are broadening and deepening the ways in which the topic is treated [12]. The interactive governance approach finds it useful to recognize three different orders of governance: metagovernance which is about ideas and concepts relating to governance, including principles and values; second-order governance which is about instruments and institutions that are used to effect governance; and first-order governance which is about the actions and tools that implement governance. Most current approaches to governance also take a broad perspective on interactions. Juda and Hennesy [13, p. 44] with reference to LMEs defines governance as '…the formal and informal arrangements, institutions, and mores that structure: how resources or an environment are utilized, how problems and opportunities are evaluated and analyzed, what behavior is deemed acceptable or forbidden, and what rules and sanctions are applied to affect the pattern of use'. Other definitions similarly address the full range of stakeholders and their interactions, for example, Juda and Hennessey [13], also with reference to LMEs, note the roles of the three actor groups, government, private sector and civil society. They call for governance assessment. Although contributors to LME thinking in the area of governance are providing inputs that are consistent with current thinking [14], the compartmentalized approach persists. This modular way that governance is treated does not address or facilitate the accommodation of new concepts of network governance [12,15] or approaches to enabling governance in complex situations where command-and-control is unlikely to be possible [16,17].

Finally, notwithstanding the areas flagged as indicators in Fig. 1, it appears that in the LME approach, governance is often equated to government e.g. [18]. This is not consistent with current (or past) definitions, the simplest of which suggests governance as the ability to get things done without necessarily having the legal competence to command that they be done [19] or with many international instruments that speak to broader involvement of multiple stakeholders in governance, even to the level of delegating responsibility where possible [20].

3. Governance as encompassing

If the LME approach is to provide a basis for actual interventions aimed at achieving sustainability, rather than just assessing and monitoring it, it must be updated to take account of the emerging understanding of governance. The current perspective of governance defined above leads to the view governance is a contextual process within which science and technology have a role as input at several stages, for example in assessment and provision of advice or implementation of decisions through enforcement or other technical means.

The compartmentalization in the LME approach implies that the science activities, especially the productivity module, stand alone from governance, rather than in support of it. It perpetrates the perception that governance cannot take place without first carrying out a great deal of scientific research. It is widely accepted that governance of natural resource systems should be informed by science. However, there is often the need to get governance processes started with minimal science. There may be situations where the amount of science that can be afforded for a particular system may be so little as to be negligible, with little expectation of the situation changing in the near term. Indeed it

has been argued that there are instances where natural science may be of limited value and management can only be people based. It has been shown that there are options for improving governance even in data-limiting situations [21,22].

It has become evident that the science needed for effective ecosystem governance should be determined by the requirements for achieving the objectives set for the governance system. This is consistent with lessons shared at the recent conference on marine social ecological systems in which participants were warned that one of the major failures in marine-related interdisciplinary research is disciplinary experts using their knowledge to define the system as opposed to the system and the research objectives guiding what disciplinary expertise might be required [23]. According to FAO [24, p. 49], 'it should immediately be noted that attaining better knowledge in the fisheries sector has an almost limitless capacity to absorb skilled personnel and finance. The data and information sought and generated should be within the realm of what is realistic and attainable […]. It becomes important to develop the ability to define the dimensions or limits of what data and information is most needed, and to succinctly and cost-effectively produce this knowledge.' This calls for a continuing interplay between the actors and institutions involved in science and governance to the extent that scientists become an integral component of governance, advising the system on approaches that can serve to meet identified objectives. Economists and sociologists are an integral part of this process as

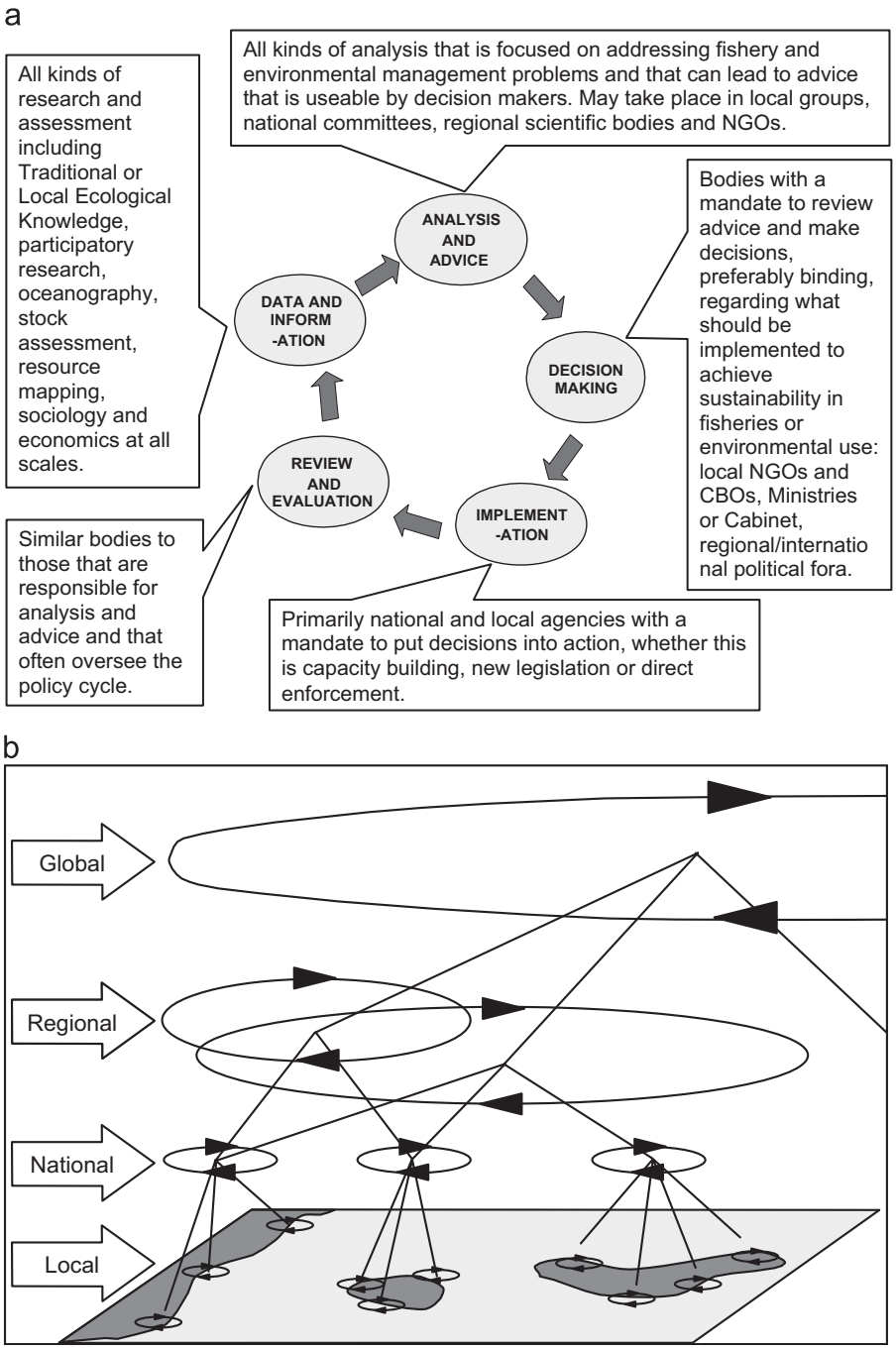

Fig. 2. (a) The basic policy cycle illustrating the iterative process that underlies adaptive governance and the variety of stakeholders, inputs and processes that may be involved depending on the purpose of the cycle and its context (b). The multi-level linked nature of the cycles comprising the LME governance framework (after Fanning et al. [15]).

ultimately, it is a perception of the value of goods and services (which include non-monetary social benefits) that determines what can be spent on the science that will guide management. This interaction does not mean that science outcomes are determined by political processes, but it does recognize that the role of natural and social science is negotiated within governance [25].

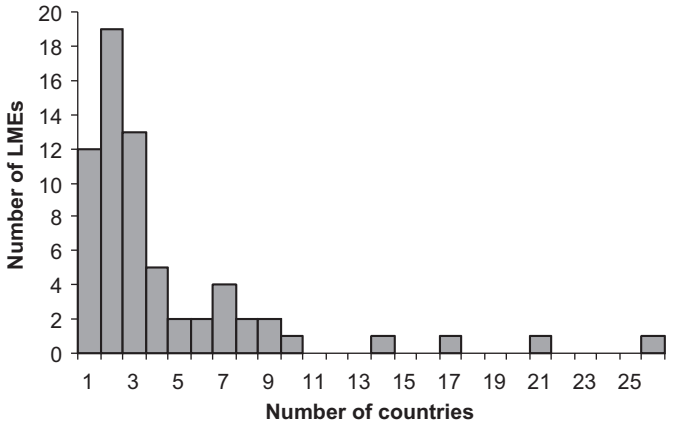

Fig. 3. The number of countries in LMEs.

4. An alternate perspective

For the reasons outlined above, it is proposed that governance is an encompassing process that is served by science, both natural and social, and technology. As such, the basic processes needed for governance in LMEs are cross-scale, multi-level, iterative cycles in which there is problem identification, problem analysis leading to advice, decision-making on what measures to implement, implementation of those measures, evaluation of the implementation against various criteria, leading back to problem refinement, incorporation of new information, refinement of advice, etc. (Fig. 2a) [14,15]. This overall iterative process may take place with internal loops and links that iterate on different temporal and other scales (Fig. 2b), and with different purposes ranging from day-to-day action to strategic reformulation [26].

What is critically important in moving towards good governance in the emerging sense is how the processes involved in these iterative cycles are formulated and implemented. Currently, there

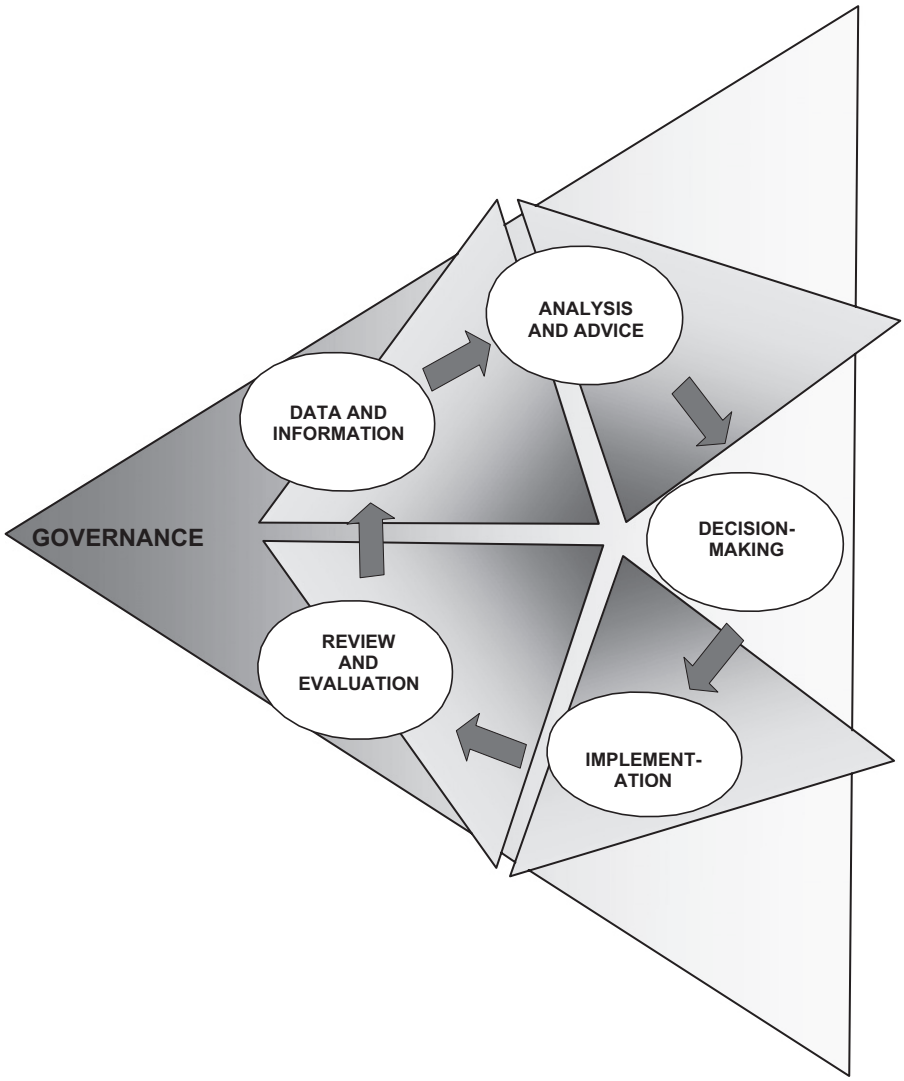

Fig. 4. Types of inputs from the science modules of the LME approach into a policy cycle, embedded within the governance module. This is repeated at multiple levels for sub-frameworks of the LME governance framework.

is emphasis on a wider range of principles than has been customary in the past. The previous emphasis on efficiency and optimization of outputs is being supplemented by attention to principles such as precaution, equity, and accountability [27]. This has brought in a wider range of actors and information needs and has made the process more complex. Thus, the cycles described above have become potentially more diverse and demanding of a wide variety of information inputs at various points in the cycle. They may also take a great variety of forms ranging from fully 'command and control' through collaborative on to self-governing. When the proportion of command and control is low the nature of governance may be largely to build capacity for self-organisation through enabling activities [17].

At the geographic scale of LMEs, it is likely that a network of these cycles will be required at multiple levels: local, national, and regional. The latter will often be required as more than half the LMEs include three or more countries (Fig. 3). The regional level cycles may include all or some of the countries depending on their purpose. The network described here has been further elaborated by Fanning et al. [15] and has been termed the LME governance framework. For such a networked approach to address all aspects of ecosystem-based management within an LME, it will have to consist of sub-networks. These are likely to be needed for areas such as fisheries, habitat degradation, land-based sources of pollution, but must also to be linked at critical points.

For those already invested in the conventional five-module LME approach, the transition to the LME governance framework should be relatively straightforward but will still require a fundamental, conceptual shift. Although the five-module LME approach should not, and practically cannot, be translated directly into the LME Governance Framework, one can envisage that what would typically be found in the conventional modules may appear in different components of policy cycles. Fig. 4 provides a much simplified example using only one policy cycle at one level. It shows conceptually how this policy cycle encompasses inputs with multiple entry points from productivity, pollution, and fish and fisheries indicator assessments while governance serves as the basis for the cycle. However, this scenario would only be one small part of a much more complex arrangement in any real situation.

In the authors' view, the LME governance framework, not only provides a better approach to LME governance than the modular LME approach, it also provides a rationale for determining the appropriate level of information on productivity, pollution and ecosystem health, fish and fisheries, and socioeconomics that is needed within a given LME context. Its advantages are that it places governance principles and processes at the forefront, with science and technology making inputs as needed, and these needs being determined by the iterative process rather than being guessed at *a priori*. It must be emphasized here that science is seen as an integral part of the process and as having a critical role in determining those needs. The Framework provides an analytical tool with which to examine the practice of governance within an LME and to plan and monitor interventions aimed at improving governance. The sub-frameworks within the overall LME framework can be defined and made the focus of analysis and planned intervention [28]. Cycles at any level can be examined against a range of institutional analysis methods to determine if they are complete and functional. Likewise, their linkages with other cycles in the sub-framework can be examined to determine the nature, quality, and effectiveness of the interactions. There is a variety of tools for such analysis as well, such as stakeholder analysis, assumptional analysis, social network analysis, etc. The facility to focus on sub-frameworks does not lose sight of their place in the LME level framework, or indeed of the place of the latter in the global framework.

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