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Shortcomings in the European principles of Integrated Coastal Zone Management (ICZM): Assessing the implications for locally orientated coastal management using Biome Portfolio Analysis (BPA)

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ABSTRACT

EU policy geared towards the sustainable development of European coastal areas has incorporated Integrated Coastal Zone Management (ICZM) as one of its primary mechanisms to achieve its goal. However, critical shortcomings in the ICZM paradigm have emerged. In particular, incoherence in the European Commission's ICZM principles with respect to local and strategic objectives remains an issue. Additionally, a lack of scientific certainty about environmental processes when determining the environmental pros and cons of alternative coastal-management decisions undermines environmentally protective decisions that may otherwise hinder local regional development. With these issues in mind, a Biodiversity Portfolio Analysis (BPA) is applied to Iarras Aithneach, a peninsula on the west coast of Ireland, to test its suitability as tool for ICZM. In addition, the paper uses the BPA methodology to explore the contrast between scientific/strategic and local attitudes towards the management of a coastal area of environmental importance. Pronounced differences between the two are found and the implications for both BPA and ICZM are discussed. The spatial and participatory nature of the BPA process and the explicit treatment of risk the framework exhibits suggest there is scope for it to become a useful tool for ICZM. It also has the potential to act as a routine way of quantifying the "attitude gap" between the scientific community and the local community when managing a unique coastal area.

1. Introduction

Despite the initial incorporation of Integrated Coastal Zone Management (ICZM) as one of the primary mechanisms of environmental policy geared towards sustainable development of European coastal areas, further evaluations have lead to an awareness of the need for an updated ICZM initiative. In particular, the development of a Marine Strategy Framework Directive (MSFD) and an overarching Maritime Policy [1,2] is likely to assist in the European adoption of ICZM, since they may well provide the medium through which ICZM is shaped, implemented, and brought into legislation. The MSFD [3] in particular recommends environmental and ecological indicators as a means of assessing current environmental status and to track effectiveness of Directive's measures. The ability to update directive measures according to their performance across the marine regions is also outlined under the principles relating to adaptive management and spatial considerations. As such, the MFSD and the nature of the EU Commission's maritime policy very much reflect developments in the existing literature on what form ICZM should take and how it should be implemented [4–8]. In sum, what is emerging is the requirement of an integrated, spatially based form of coastal management which inherently addresses the issue of risk and uncertainty and is adaptive over time to allow for improvements which were not foreseeable in earlier versions of ICZM.

In this paper Biodiversity Portfolio Analysis (BPA) [9] is put forward as a management format which attempts to incorporate all of these requirements into its approach. At first glance, it may seem unusual for a methodology stemming from the management of financial assets to have an application in the field of biodiversity conservation, but in recent years, researchers in that field have highlighted the suitability of the concept, due to its explicit trade-off between expected payoffs and exposure to potential risks/losses [10]. Markowitz [11] developed a quantitative definition of the relationship between the riskiness of an investment, and the expected return. Asset managers compose portfolios of assets such that both objectives (minimising risk but achieving a desired level of expected return) can be optimised. In a similar way, society must balance between two alternative decisions. One of these is to ensure healthy environmental status allowing society to consume the wide array of services that flow from healthy ecosystems. The other is allowing human activities

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which are economically necessary, to proceed. Limiting one to promote the other is at the heart of all environmental decision making. As Figge [10] points out, 'the expected benefit which society derives from species, genes or ecosystems is uncertain, but this risk can be partially diversified away by combining various species, genes or ecosystems in a biodiversity portfolio'. In this way, rather than making isolated environmental management decisions, society's decisions between the two alternatives would focus on aggregate values of services and risks, aiding the decision making process and allowing for optimality in the tradeoff between the two societal goals.

Aside from the need to update ICZM and tailor it to recent policy recommendations, more critical problems exist for the ICZM paradigm as a whole. ICZM is steeped in the notion that stakeholder participation in environmental decision making can improve the effectiveness of environmental management initiatives. When the failure of environmental management initiatives is due to a lack of coordination between various stakeholders and centralised coastal managers, there is truth to this latter notion. However, there may be instances where a lack of coordination is not the source of the problem. Environmental problems, and the failure of management responses to solve them, may arise not out of poor coordination, but out of entirely contradictory environmental/societal and economic/stakeholder goals. Simply put, there may exist, economic incentives for stakeholders to act against the environmental goals of society. In such an instance, environmental problems may not be solvable by group discussion and consensus, but by prioritisation of, in all likelihood, centralised coastal management decisions. While management integration may be desirable, deciding between top-down (managerially centralised) and bottom-up (locally based) management decisions is not only a methodological issue, but a political, legislative and philosophical one. To explore this issue further, this paper analyses the differences in the attitudes of marine scientists and local stakeholders towards an environmentally sensitive area of the Irish/European coastline.

BPA is employed as the format through which to explore some of these problems in this study. In this way the validity of BPA as a tool for ICZM is tested (given the updated status of European maritime policy) but it also serves as a medium for highlighting the extent of the implications of having contradictory ICZM principles in EU policy recommendations. Section 2 discusses the emergence of ICZM and some of the literature which identifies specific problems with the concept. Section 3 outlines the BPA methodology. Section 4 presents the background to the case study and Section 5 presents the results. Section 6 includes a discussion and the conclusion of the paper.

2. Strategic versus local principles in ICZM

The concept of ICZM emerged in the scientific community of the 1970s, developed through the 1980s and entered the international political scene during the Rio Earth Summit of 1992 [12]. The European Union Recommendation of 2002 outlined 8 core principles which a European adoption of ICZM should include [13]. McKenna et al. [14] divide these principles into three distinct groups, listed here as they appear in the paper:

1. Two 'procedural' principles: support and involvement of relevant administrative bodies and use of a combination of instruments that are focused on the attributes of the methods and procedures that might be used to best advance ICZM.
2. Three 'strategic' principles: broad overall perspective, long-term perspective, and working with natural processes. These principles mainly focus attention on long-term goals, and fit easily into the sustainability ethos that dominates contemporary environmentalism.
3. Three essentially 'local' principles: local specificity, adaptive management during a gradual process, and involving all the parties concerned. These can be regarded as a balancing set to the second group, because they focus interest on specific areas and problems, encourage tailoring of management to local conditions and encourage the participation of the public in formulating management policy.

McKenna et al. [14] claim that because the principles are presented as a menu of free-standing options, with no prioritisation either within or between groups, irreconcilable differences in strategy arise. Billé [12] also argues that the idea that all conflicts can be resolved with a consensus agreement is a simplistic belief which arises out of three flawed assumptions; firstly, that environmental management is a problem of coordination, secondly, that consultation is the solution to this lack of coordination and thirdly, that consultation is inseparable from consensus. Billé [12] also raises a further criticism of ICZM which he refers to as the positivist illusion. Many calls for improved management of coastal areas stress the need to develop the scientific understanding of marine and coastal ecosystem processes [15–17]. However, many natural processes are (and will remain) far beyond the reach of scientific understanding. For example Johannes [18] demonstrates theoretically that the inception of a rational management of Indonesian coral reefs alone would require at least 400 person-years to collect the necessary data, a process which would have to be repeated annually.

Realistically, management of coastal areas involves making decisions under imperfect knowledge and uncertainty. Collating explanatory data about human and ecosystem processes until definite outcomes can be predicted (while something to be strived for) cannot realistically be the precursor to every management decision. The therefore subjective reality of management decisions, as opposed to the positivist illusion, can make management decisions affecting the economic, cultural and social goals of the local community controversial in nature. Examples of controversial environmental legislation are abundant; constraints on commercial fisheries such as catch quotas and marine protected areas have significant impacts on the livelihoods of fishing communities, input constraints on agricultural production, designed to attain set levels of environmental standards, reduce agricultural output and elsewhere, Hynes and Hanley [19] document the conflict between typical water use values and hydro-electric schemes on "wild" rivers. In any of these examples, scientific diagnosis about the environmentally damaging effect of the practice in question, and predictions about the subsequent benefits of said constraints, is subject to scientific uncertainty [20].

The reality then is that while scientific understanding about environmental processes may not be in a position to perfectly inform society and its policy makers on the optimal use of environmental resources, decisions still have to be made. The objective of any approach to environmental decision making then, must be to provide environmental manager's with the best information possible, and a feasible way of making decisions that can optimise resource use [21]. Since deciding between management alternatives will unavoidably involve qualitative, as well as quantitative distinctions, the decision making process requires a modelling framework which assists in this. Such assertions support the basis of using BPA, given its integrated, qualitative and spatial framework and the next section examines how such a technique might be used in practice.

3. Methodology

The Biodiversity Portfolio Analysis (BPA) as developed by Hills et al. [9], is a spatially orientated framework which marries the