

What impacts to expect from economic valuation of coral reefs?

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Abstract.

Coral reefs face increasing challenges and their management is not yet adequate to ensure their conservation. In the South Pacific, as in other parts of the world and for other environmental issues, coral reef ecosystem valuation is seen by many as an essential instrument needing further development. We analysed five economic studies conducted on the management of coral reefs in the Pacific. These studies were conducted in response to specific requests from a diverse list of stakeholders from a range of countries (Fiji, French Polynesia, Kiribati, New Caledonia and Vanuatu); and they used a variety of economic approaches that range from total economic valuation of ecosystem services to ex-post cost-benefit analysis of MPA through economic assessments of impacts. For the South Pacific, our review has demonstrated that three types of ecosystem services constitute the major share of valued economic benefits: tourism, coastal protection and fisheries. The expected outcomes for these studies were to "inform & convince" the different types of stakeholders and to support decision making processes by providing economic comparisons of policy choices. We present the main challenges faced in conducting these studies in the context of the South Pacific and we highlight the importance of non-commercial fisheries, local culture and the place of the subsistence and community economy. We found that the effect on policy decisions was varied and, in general, lower than expected, although in some cases the time span may be too short to accurately evaluate the effectiveness of these studies. We recommend actions that improve this situation, which include better matching of economic studies to policy questions, improved valuation methods and improved methods to inform decision-makers about alternative policy scenarios. Priority must be given to strategies that more directly deal with positive and negative externalities, such as Payments for Ecosystem Services, taxes or compensations. For these strategies, specific valuations are used to "fine-tune" the economic tool.

Key words: Ecosystem services, Pacific, Coral reef, Economy.

Introduction

Economic valuation tools have been applied relatively sparingly to coral reefs and marine protected areas relative to their terrestrial counterparts. However, a significant case history has begun to emerge in recent years (Cesar and Chong, 2006). Like all cases of economic valuation, coral reef valuation is justified by market failure (Balmford et al., 2002). The sources of the market's failure to incorporate the value of ecosystem services from coral reefs include: coastal overfishing, uncompensated reef damage by tourists

or construction, negative externalities of terrestrial activities affecting water quality and reef health, unrecognized values of reefs for storm protection as costs avoided or economic opportunities foregone due to unenlightened reef management, traditional uses and cultural values, and other potential biodiversity and ecosystem service benefits or opportunities that are not accurately reflected in the marketplace.

Based on the results of an expert workshop titled "Investing in coral reefs: Is it worth it?" held in Nouméa in 2011, the objectives of this paper are: 1)

to report the results of recent economic valuation assessments of coastal marine management in the South Pacific region; 2) to discuss the dimensions of standard economic valuation techniques that require adaptation to the region; and 3) to enhance the communication between researchers and policy makers such that economic valuation research results are best suited for local policy decision-making.

Material and Methods

The contexts and results from a selection of total economic values studies in the South Pacific were analysed in the form of an abstract and a table summarising their main quantitative results. These results were then discussed regarding the relative importance of the various ecosystem services (ES) across South Pacific contexts, and compared with valuations of coral reef ecosystem services for other parts of the world. We studied the following values studies: The Total Economic Value (TEV) of a Fijian Locally-Managed Marine Area (O'Garra, 2012), the Economic Value of Coral reef ecosystem services of New Caledonia (Pascal, 2010), the Cost-Benefit Analysis of community managed MPA in Vanuatu (Pascal, 2011), the Total Economic Value of Hawaiian coral reefs (Cesar et al., 2003) and the Total Economic Value of the coral reefs of Saipan in the Commonwealth of the Northern Mariana Islands (Beukering et al., 2006).

Results

The analysis confirmed that three main ES, tourism, coastal protection and coral reef fisheries in their different forms, explain over 80% of the total estimated value and they represent the key ecosystem services generated by these reefs in the Pacific, regardless of social and ecological contexts. Table 1 summarises the main quantitative results of the selected studies.

<i>In int. Dollar Per hectare</i>	NC	Vanuatu	Fiji	Marianne Is.	Hawai
Subsistence fishing	46	147	336		
Commercial fishery	45	88	257	106	18
Recreational fishery	55	Non-existent	Negligible		72
Underwater and nautical tourism	20	Negligible	Non-existent	1 595	939
Associated tourism	42	179	2	13 045	1 889
Coastal protection	384	38	350	2 782	
Research and education	8			273	
Bequest value	-	207	26		20
Amenity values					282
Total	609	658	972	17 873	3 148

<i>In int. Dollar Per capita</i>	NC	Vanuatu	Fiji	Marianne Is.	Hawai
Subsistence fishing	92	113	1 037		
Commercial fishery	90	68	793	15	398
Recreational fishery	111	Non-existent	Negligible		23
Underwater and nautical tourism	124	Negligible	Non-existent		9
Associated tourism		137	7	1 913	
Coastal protection	792	29	1 081	408	
Research and education	15			40	
Bequest value	-	159	79		3
Amenity values					33
Total	1 224	505	2 997	2 409	

Table 1: Summary of South Pacific CRESVs

For commercial fishing, figures correspond to fishery industry added value or turn over based on market prices (production approach). For recreation/tourism, results correspond to producer surplus from several methodologies (travel costs, production approach). For coastal protection, values are the results of avoided damages and replacement costs valuation methods.

Discussion

Specificities of South Pacific contexts for applying ecosystem service valuation

The analysis of the recent CRESV results for South Pacific islands has shown, among other dimensions (i) the importance of subsistence fishery valuation, where usual proxies do not apply reliably; (ii) the customary tenure arrangements in the Pacific that significantly skew (constrain or enable) the influence of community in individual choice, clan, family, village, resource allocation decisions; (iii) methodological questions about whether TEV estimates should be calculated at observed values or at optimal values in the current time period and what assumptions should be made about potential values with appropriate management into the future. In estimating the value of coral reef management, fish harvest, often based on the concept of maximum sustainable yield is of concern, particularly when tourism is a potential non-consumptive use of the fish stock. The Sheraton paradox (David et al., 2007) describes how, for some economic valuation studies, the expected value of tourism services depends mainly on hotel room capacity (essentially the multiplier for per tourist day expenditure estimates) independent of the cumulative effect of increasing tourism pressure on the ecosystem through waste management, water use, infrastructure investments, congestion effects, etc.; (iv) many challenges remain in the spatial distribution of the valuation of the ecosystem services. The first question addresses the

choice of what is being assessed: the location and extent of ecosystem processes, the location and size of the affected human population, the location, size and extent of the transformation of ecosystem processes into services and then to values. Other challenges concern important knowledge gaps in the marine ecological processes and their spatial distribution.

These dimensions and the clear benefits of standardizing approaches to the extent practicable, the most appropriate means to use TEV and customize valuation techniques to best serve the Pacific were of high priority to the group.

Using CRESVs for policy-making in the South Pacific

TEVs and other economic valuations are increasingly attracting attention in the region, as shown by the recent development of valuations. Indeed, ecosystem valuations can be undertaken to address one or several objectives from among the following: (1) “decisive” ESVs are intended to allow an ex-ante choice over a given set of options by weighing the social and economic consequences of those options; (2) “technical” ESVs are designed to “fine tune” an economic instrument (such as establishing baselines for payment for ecosystem services, or environmental taxes); and (3) “informative” ESVs are intended to raise awareness among decision-makers and the public regarding the condition of environment. How do CRESVs stand in this typology? According to our review in section 1 and 2, they have been seen either as a way to support conservation (in the case of “the economics of degradation and of protection”), or to attract attention (in the case of “the economics of welfare”) (Seidl et al., 2011). They therefore fall in the third use category above (“informative” ESVs): and mostly intend to expose hidden values, are targeted at a non-defined audience and at raising its awareness of the coral reefs’ unique value, or intended to implicitly or explicitly justify conservation policies. In this effort to inform, South Pacific CRESVs have targeted a varied list of stakeholders: Development banks, Environmental agencies and conservation NGOs, Government planners, Environmental government agencies, local stakeholders such as customary chiefs or MPA managers. In that perspective, the effectiveness of CRESVs to convince stakeholders seems to have been somewhat uneven.

According to the conclusions of a recent meeting in the Pacific attended by more than a dozen economists, there is a perception that the influence of CRESV results in policy decisions and in practical implementation of measures is still low. Participants discussed the role of ESV in persuading local communities and institutional stakeholders to

establish or maintain a protected area, to establish networks of MPAs co-managed by communities at a large scale, to attract support from international donors who are sensitive to environmental and economic values, and to guarantee a form of accountability of their actions towards their board and contributors. Nonetheless, table 1 illustrates that CRESVs have mostly targeted an “informative” role rather than a specific decisive influence or a technical role. In the case of informing decision-making in general, influence is not easily measured, both because the processes involve multiple criteria, and because environmental decision-making as a whole is a diffuse process, from inter-governmental negotiations to individuals’ behaviour. Moreover, there may be a time gap between the economic assessment and the management decision. For example a CRESV study may influence public policy only several years after its publication.

Conclusions

For the South Pacific, our review of recent valuations has demonstrated that three types of ecosystem services constitute the major share of valued economic benefits: tourism, coastal protection and fisheries. CRESV in the South Pacific context are complex exercises, which face a series of specific challenges. This may explain why, up to now, CRESVs have mostly been used for “informative” purposes, and mostly been commissioned by public organisations. Only one case can be related to considering an ex-ante decision, where a CRESV was used to try and obtain a specific budget allotment in New Caledonia. No direct impact of CRESV on local choices has been recorded so far.

We found that the effect on policy decisions was varied and, in general, lower than expected, although in some cases the time span may be too short to accurately evaluate the effectiveness of these studies. We recommend actions to improve this situation, which include better matching of economic studies to policy questions, improved valuation methods and improved methods to inform decision-makers about alternative policy scenarios. Priority must be given to strategies that more directly deal with positive and negative externalities, such as Payments for Ecosystem Services, taxes or compensations. For these strategies, specific valuations are used to “fine-tune” the economic tool.

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