

# Integrated economic valuation in coral reef management: Demonstration, appropriation and utilization of coral reef economic values for sustainability and conservation

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**Abstract** Underappreciation of the true economic value of coral reef resources is a major problem in developing countries like the Philippines leading to a lack of accounting and accountability in policy and development decision-making. This paper aims to highlight the vital need to integrate economic valuation in coral reef management and in integrated coastal zone management. It uses the total economic value framework, and argues that much of the economic values of coral reef resources have not been properly demonstrated and expressed in the market and policy making, thereby resulting to over exploitation, damage and decimation of coral reefs. Mechanisms on how to demonstrate such economic values (like entrance fees, conservation fees and others) and policies towards their capture are crucial aspects of integrated economic valuation. A few cases in the Philippines show that this is possible and can provide a good framework in helping attain sustainability and conservation of such national treasures.

**Key Words:** integrated economic valuation, coral reef management, economic values

## Introduction

Coral reefs are highly productive and valuable marine resources and home to thousands of species. They provide habitats and food sources for countless organisms and reef-based tourism/ ecotourism is a major source of livelihood for various coastal communities. Other benefits include coastal protection, biodiversity and the reefs' value as climate change indicators. The economic value of coral reefs is important, from direct use to indirect use and non use values (Table 1; Cesar 2000; Subade 2005).

However, coral reefs are threatened by over fishing, destructive fishing, coastal development, marine-based pollution, climate change impacts, and many other global and local factors. Philippine coral reefs cover an estimated area of 27,000 sq km, and are considered to under threat (BFAR-NFRDI-PAWB 2005). A large proportion of the impact stems from anthropogenic causes, caused by the very high population density of the country. Over-fishing, destructive fishing practices (blasting and the use of toxic substances) and sedimentation top the list of these impacts.

Thus, most of the country's coral reefs are in a degraded state, with over 70% with poor or fair

quality and quantity of coral cover; and only 5% in excellent condition (BFAR-NFRDI-PAWB 2005).

Most reef areas in the Visayan Sea Basin, and in gulfs and bays are heavily overfished. In the Visayan seas, particularly in protected areas, poaching and fishing-related threats are the worst threats to coral reefs, followed by sedimentation, tourism related-activities, crown-of-thorns starfish infestations, and coastal development. Fishing and gleaning on coral reef areas account for 10-15% of the country's total fish catch (BFAR-NFRDI-PAWB.2005).

Table 1. Economic Values of Coral Reefs

DIRECT USE VALUES	INDIRECT USE VALUES	NONUSE VALUES
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Direct benefits Goods & Services, Usually marketed values, like fish, sea cucumber, and scuba diving (with dive fees)	Functional benefits Environmental and ecosystem values - nutrient retention - flood control - storm/ coastal protection -external ecosystem support	Bequest Existence Option Quasi-option
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A recent compilation of studies through time by the Philippine Coral Reefs Information Network (Philreefs 2008), showed mixed trends on the country's coral reefs indicator such as hard coral cover, fish biomass and fish abundance. Generally marine protected areas (MPA) sites have had increasing or no net change trend, while most non-MPA sites have had decreasing or no net change trend.

### Usual Valuation Problem

Failure to account adequately for their economic values in development decision making could be considered a major reason for coral reef decline. Since natural and managed environmental/ marine resources are not bought and sold on markets, they are generally ignored in private and public development decisions. Coastal development is often preferred over pristine/preserved coastal habitats because only market values are considered. Inclusion of non-market values might have caused many coastal development projects appear less attractive investment options.

Reef fisheries are an over-capitalized sector where resources are invested to give lower net benefits. Because environmental/degradation costs are usually not included in cost/benefit calculations, the returns even from an over-fished fishery appear higher than they are in reality. Another undervaluation example is destructive fishing - fines and penalties are not based on economic values of damages caused, thus the activity persists.

### Need to Integrate Economic Valuation in Coral Reefs Management

Coral reefs management therefore should not be devoid of economic valuation. Moreover, coral reefs research needs to include economic valuation as an integrated component and not just an after thought.

Economic valuation involves three major phases (Fig. 1). First demonstration of coral reef economic values (Georgiou et al. 1997). Then appropriation, which is capture of coral reefs economic values through appropriate policies and mechanisms (Georgiou et al. 1997). Third is utilization, which

concerns the use of measured coral reef economic values and/or captured coral reefs economic values in IEC, decision making and in financing of conservation

The economic valuation of coral reefs, i.e. the demonstration, appropriation and utilization of their economic values is a crucial impetus to attaining their sustainability and conservation.

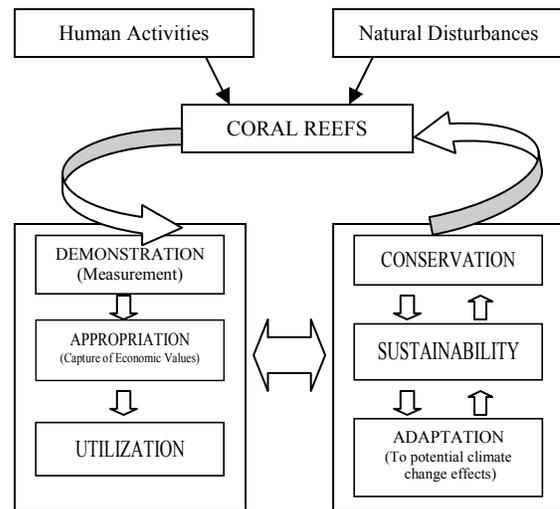


Figure 1. Integrated economic valuation in coral reefs management

### Integrated Economic Valuation of Coral Reefs

Improving coral reef management, in the context of Integrated Coastal Resource/Zone Management involves the integration of economic valuation and makes integrated economic valuation or (IEV) an inseparable part of sustainable ICZM or ICRM. IEV provides researched-based incentive/disincentive mechanisms to: (i) attain sustainability, and (ii) generate financing source for conservation and / or coastal resource management. IEV does not end at mere study/ measurement of economic values but provides mechanisms to capture or appropriate them. IEV transcends policy analysis towards policy advocacy.

In the ICZM or ICM developed at various sites by the UNDP-funded Partnership in Environmental Management of the Seas of East Asia (PEMSEA), economic valuations were embedded in various stages such as: preparing, initiating, developing, adopting, implementing, refining and consolidation of management plans ([www.pemsea.org](http://www.pemsea.org)).

### Examples of IEV in Coral Reef Management

The integration of economic valuation in coral reef management is evident in the examples of Mabini and Tingloy, Batangas and the Tubbataha Reefs

National Marine Park, a UNESCO World Heritage Site, where scuba diving tourism is a major activity.

Economic valuation was undertaken by a WWF-Philippines-led team to demonstrate and appropriate coral reef economic values mainly through divers' fees. A conservation fee surcharge or an annual diver's pass was collected from divers (Padilla et al. 2005). The IEV process framework involved: Project design, marketing the project to LGU officials & stake holders, research /surveys, sectoral briefings & consultations, drafting of ordinance, stakeholders consultations, refinement & finalization of draft ordinance, provincial approval of the ordinance, IRR formulation, implementation, monitoring & evaluation. Over a period of eight months (September 2003 to May 2004) a total of 1.3 million pesos was collected from conservation fees. Proceeds from the collection were used for incentive rebates to boatmen (who are fishers) and for financing law enforcement through the Bantay Dagat (Sea Watch) that protected coral reefs and other coastal resources.

At Tubbataha Reefs NMP, a similar process of economic valuation was also undertaken, though the implementing rule was for the Tubbataha Management Office (TMO) to collect the conservation fees both from the divers and the boat operators. A "willingness to pay" survey was undertaken that determined the entrance fees and conservation fees per diver as follows US\$50 for foreign divers and US\$ 25 for local divers : (Mejia et al. 2000; Tongson and Dygico 2007)

The realized revenue is allocated among a seed fund for conservation, core park administrative costs, and livelihood of adjacent communities in Gagayancillo, Palawan.

#### **Resource Rent for Resource Conservation**

Resource utilization generates resource rent (benefits or revenues less costs), alternatively called economic profit or profit. This rent rightfully belongs to the resource, and should be used to conserve it and allow it to replenish, thereby attaining sustainability.

ICZM should therefore incorporate IEV which is a major factor (perhaps "the key?") towards successful and sustainable ICZM (MPA). IEV can assure MPA sustainability and thereby provides sustainable financing mechanisms for marine conservation.

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