2020

IDB Inter-American Development Bank

Economic Valuation of Reef Ecosystems in the MAR region and the Goods and Services they Provide

Metroeconomica

The Ocean Foundation

WRI MEXICO

Executive summary

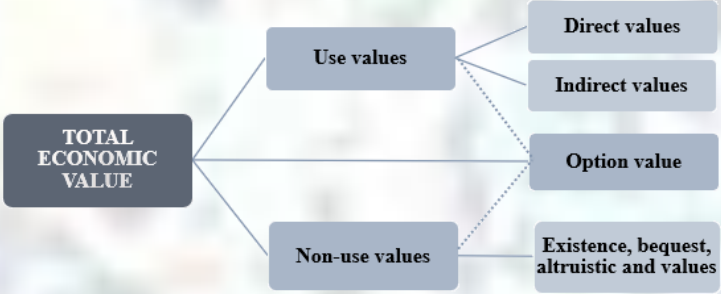
Coral reefs are one of the most diverse and valuable ecosystems on Earth. The Mesoamerican Reef contains the largest barrier reef in the Western Hemisphere. However, its health is threatened, so there is a need for a management and sustainable conservation. Key to this is knowing the economic value of the ecosystem.

"Mainstreaming the value of natural capital into policy decision-making is vital"

The value of environmental and natural resources reflects what society is willing to pay for a good or service or to conserve natural resources.

Conventional economic approaches tended to view value only in terms of the willingness to pay for raw materials and physical products generated for human production and consumption (e.g. fish, mining materials, pharmaceutical products, etc.). As recognition of the potential negative impacts of human activity on the environment became more widespread, economists began to understand that people might also be willing to pay for other reasons beyond the own current use of the service (e.g. to protect coral reefs from degradation or to know that coral reefs will remain intact in the future).

As a result of this debate, *Total Economic Value (TEV)* became the most widely used and commonly accepted framework for classifying economic benefits of ecosystems and for trying to integrate them into decision-making.

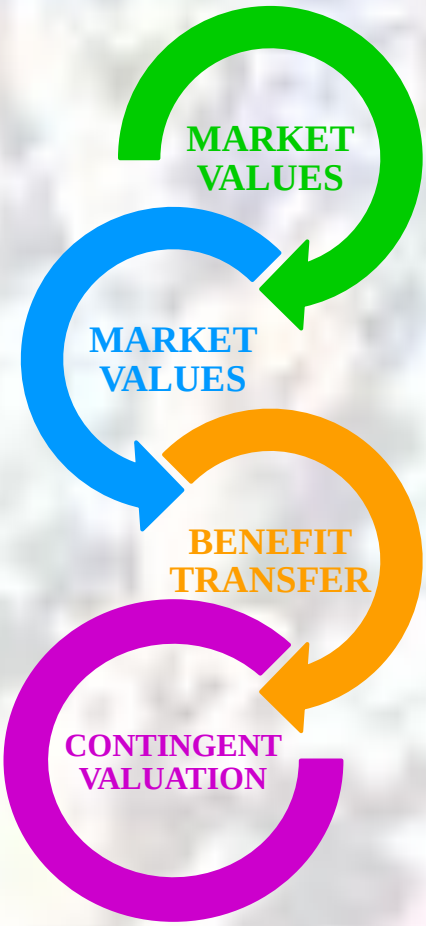


This report estimates the economic value of the following goods and services provided by the MAR's coral reefs:

- **USE VALUES**
  - **Tourism & Recreation**
  - **Fisheries**
  - **Shoreline protection**
- **NON-USE VALUES**

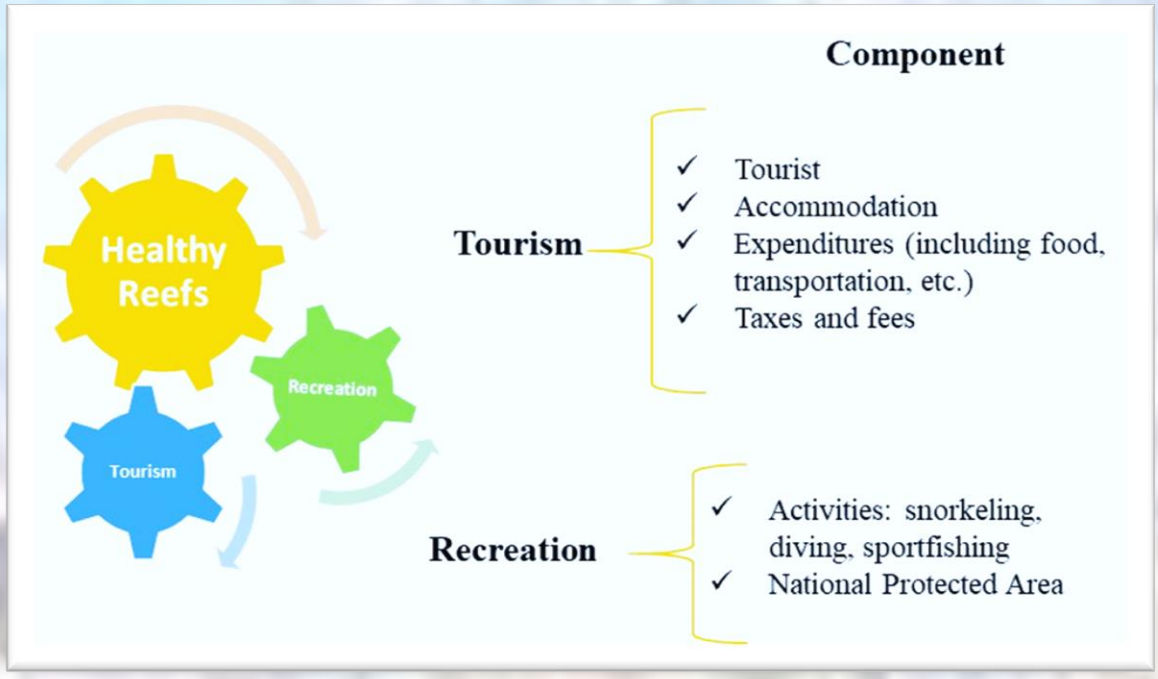
To our knowledge, the inclusion of non-use values in the economic valuation of the Mesoamerican Barrier Reef System is novel, which makes the study more comprehensive.

The methodologies applied are shown in the figure below:

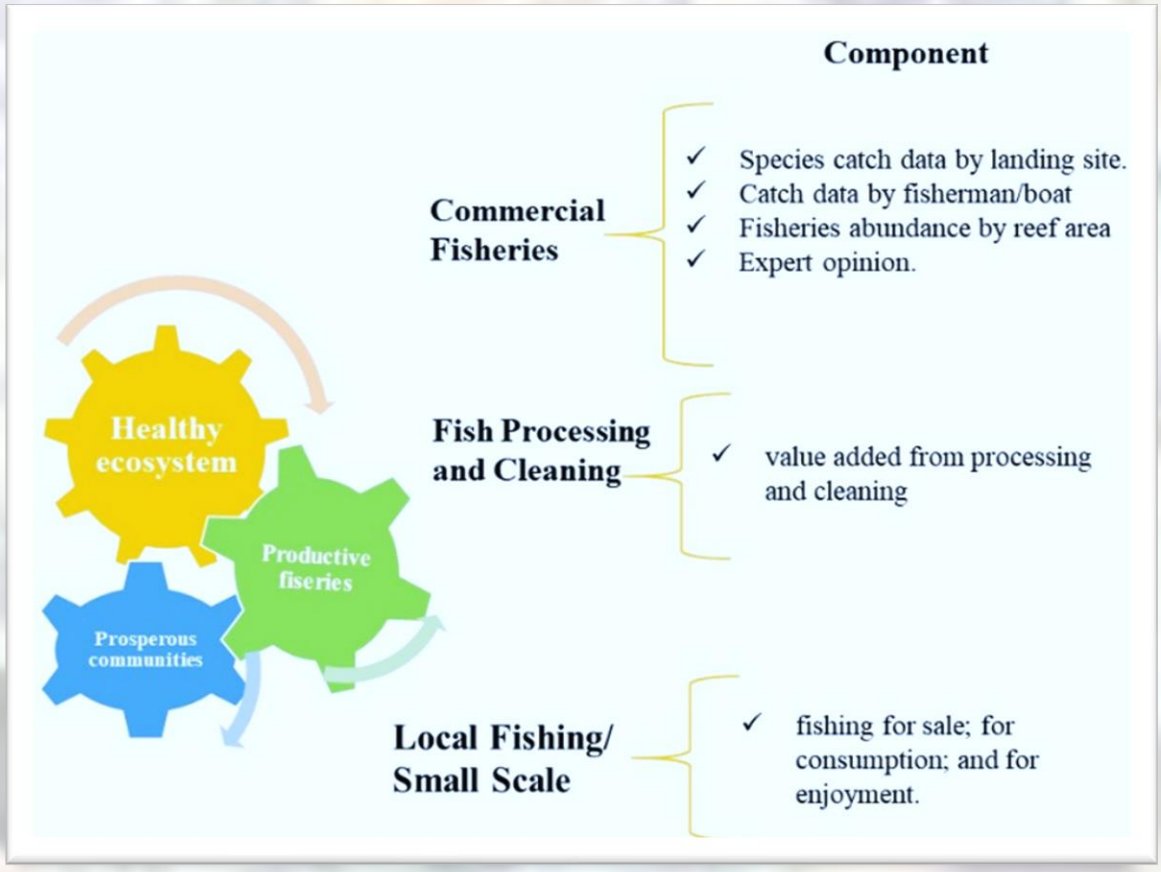


METHODOLOGY

TOURISM & RECREATION



FISHERIES



Source: Adapted from WRI (2009)

SHORELINE PROTECTION

Benefit Transfer:

- Environmental policy being evaluated: “policy site” (PS)
- Source of the values being used: “study site” (SS)

Unit value transfer with income adjustment: value of an ecosystem service in the SS is approximately equal to that in the PS (with adjustment for differences in income levels).

Beck, M. et al. (2018). The global flood protection savings provided by coral reefs. Nature 9: 2186.

Steps:

1. Identify the km of coastline of the MAR
2. Income adjustment
3. Adjust the values by the annual expected area flooded per km2
4. Calculate Net Present Value (30 years, discount rate 3 and 12%)

NON-USE VALUES

Contingent valuation: online questionnaire survey (adults aged 18)

- Resident population
  - Mexico: 1,015 surveys
  - Guatemala: 515 surveys
  - Honduras: 515 surveys
  - Belize: 105 surveys (face-to-face)
- Potential tourists
  - USA: 515 surveys
  - Canada: 415 surveys
  - Argentina: 415 surveys
  - UK: 415 surveys

Suppose that a “Coral Protection Fund” to ensure that the Mesoamerican Reef is protected and conserved is established. This fund would be managed by an independent agency which would be subject to government auditing. The money would only be allocated for the described purpose.

Q6. Would you be willing to contribute USD 8 to this fund (yearly)?

☐ Yes (go to question Q7)
☐ No (go to question Q8)

Q7. Would you be willing to contribute USD 14?

☐ Yes
☐ No

Q8. (If you answered NO to question 6) Would you be willing to contribute USD 4?

☐ Yes
☐ No

Q9. What would be the MAXIMUM AMOUNT of money you would be willing to contribute to the fund?

☐ USD
☐ N/A

<u>Econometric analysis</u>

Binary Discrete-Choice Format + Including Reported Open Bids

MAIN RESULTS

TOURISM & RECREATION (USD million)

MEXICO	GUATEMALA	HONDURAS	BELIZE
3,494	6.31 – 6.36	182.63	218.8

Mesoamerican Region
USD 3,902 million

FISHERIES (USD million)

MEXICO	GUATEMALA	HONDURAS	BELIZE
21.90	42.17	99.55	19.57

Mesoamerican Region
USD 183,2 million

Shoreline protection

Annual benefits

Mexico	USD 301 – 411 million
Guatemala	USD 1.94 – 4 million
Honduras	USD 7.9 – 10.7 million
Belize	USD 9 – 12.2 million

Mesoamerican region
USD 320 – 438 million

NPV – 30 years – Adjusted PPP
r=12%: USD 2,576 – 3,529 million
r=3%: USD 4,393 – 6,016 million

NON-USE VALUES

	WTP	Annual values
MEXICO	8- 8.56 USD	192.8 – 206.3 m. USD
GUATEMALA	7 – 7.03 USD	19.37 – 19.45 m. USD
HONDURAS	3.95 – 7 USD	2.8 – 5 m. USD
BELIZE	6.51 – 9.88 USD	0.25 – 0.42 m. USD

Total non-use value (NPV- 30 years – Adjusted PPP)

r = 12%	r =3%
1.99 – 2.16 b. USD	3.40 – 3.69 b. USD

STAKEHOLDER ENGAGEMENT

“Stakeholder involvement and engagement in an early stage of the process is the key to success of any economic valuation project”

Relevant stakeholders of the region were engaged through online working sessions. Four participatory workshops brought together a group of experts and were organized in order to involve them in the project development, particularly in the selection of sites and the identification of ecosystem services changes.

The main goals of this work session were:

a) Present the project and the valuation methods;
b) Explain the importance of the reef system in environmental, social and economic terms;
c) Present the ecosystem services provided by the system and the importance of monitoring on reef quality;
d) Expose the importance of assessment for decision-making;
e) Present the specific methodology to estimate use and non-use values;
f) Select the most appropriate sites based on a long list of potential sites prepared; and
g) Collect information and feedback to be able to identify the changes that will affect coral reefs.