Mapping of Ecosystem Goods and Services

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Expert Group Meeting on Valuation of Ecosystem Goods and Services in the Pacific
Table of content

1. Scope of the mapping exercise
2. Overview of the ecosystem valuation initiatives reviewed
2. Observation on the existing initiatives in light of existing or potential policy applications
3. Talanoa – (Any critical examples missing? Any feedback and additional views on the existing initiatives)?
Geographic scope

Developing Pacific Island Forum Countries (and other countries)
Environmental asset

Coastal and marine resources including

- Mangroves
- Seagrass
- Coral reefs
- Lagoons
- Estuaries
- The open sea and
- The ocean floor (including minerals).
<table>
<thead>
<tr>
<th>Provisioning services</th>
<th>Regulating services</th>
<th>Cultural services</th>
<th>Supporting services</th>
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<tbody>
<tr>
<td>Seafood e.g. fish, crustaceans</td>
<td>Coastal/Shoreline Protection</td>
<td>Tourism and leisure</td>
<td>Nutrient cycling</td>
</tr>
<tr>
<td>Marine culture</td>
<td>Prevention of saltwater intrusion</td>
<td>Aesthetic and artistic values</td>
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<tr>
<td>Firewood</td>
<td>Carbon Sequestration</td>
<td>Cultural Identity</td>
<td>Photosynthesis</td>
</tr>
<tr>
<td>Building Materials e.g. timber</td>
<td>Water purification</td>
<td>Spiritual/Religious/Moral values</td>
<td>Wildlife habitat</td>
</tr>
<tr>
<td>Minerals and mining</td>
<td>Sediment trap</td>
<td>Indigenous value</td>
<td>Biodiversity</td>
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<tr>
<td>Transport</td>
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<td>Lifestyle</td>
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<td>Education and research</td>
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Total economic value of marine and coastal ecosystem services benefits
Valuation methods

- Total economic value
  - Use value
    - Travel cost
    - Hedonic pricing
    - Avoided cost
    - Market pricing
    - Replacement cost
  - Non-use value
  - Benefit transfer

- Revealed preference
- Stated preference
Literature review

- Scopus search for literature from 2014 onwards
  - N=86 (Removed=53, Relevant=12 (dollar value=6), TBC=21)
Why we need valuation?

1. Define the problem
2. Identify alternatives (baseline vs alternative)
3. Calculate benefits and costs of each option
4. Choose the best alternative
5. Apply findings in decision making

Ecosystem services value

Uncertainty
Mapping

• What goods and services were being valued?
• Where are these values?
• To whom do these values belong?
• Which valuation method was method?
• How were the values (or intended to be) used?
How ESVs can be used in decision-making

- BASIS FOR DISCUSSIONS DURING MANAGEMENT DECISION-MAKING PROCESSES
- TO COMMUNICATE, ADVOCATE OR RAISE AWARENESS ABOUT THE CONTRIBUTION OF ESVS TO PEOPLE
- A WAY TO INCLUDE ECOLOGICAL COSTS AND BENEFITS IN THE MONETARY EVALUATIONS SUPPORTING MANAGEMENT DECISIONS E.G. SETTING QUOTAS OR RESTRICTIONS
- A BASIS FOR IMPLEMENTING FINANCIAL INSTRUMENTS SUCH AS SUBSIDIES, TAXES OR FEES
- A BASIS FOR ESTABLISHING LEVELS OF MONETARY COMPENSATION FOR ECOLOGICAL DAMAGE OR RESOURCE CONSERVATION

Source: Marre et al., 2016
Overview of the ecosystem valuation initiatives reviewed

Photo: pixabay.com
### Which services were valued?

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Where are these values from?

Fiji
- Coastal and marine resources (MACBIO)
- Mud crabs in Bua Province
- Subsistence and commercial fishery Nakasaleka district, Kadavu

Kiribati
- Coastal and marine resources (MACBIO)

New Caledonia
- Coral reefs

Samoa
- Mangroves of the Safata District

Solomon Islands
- Coastal and marine resources (MACBIO)
- Fishery in Malaita province, Solomon Islands
- Subsistence fishery in the coral reefs of Coral Triangle
- Shells in Langalanga

Tonga
- Coastal and marine resources (MACBIO)

Vanuatu
- Coastal and marine resources (MACBIO)
To whom do these value belong?

Provisioning services
- Subsistence fishery
- Commercial fishery
- Shell trading
- Bêche-de-mer
- Trochus
- Coral mining
- Offshore tuna
- Deep-slope demersal
- Deep sea minerals
- Aquarium trade

Local households

Local businesses

International companies
To whom do these value belong?

Regulating services

- Coastal/Shoreline Protection
- Prevention of saltwater intrusion
- Storm/flood control
- Water purification
- Sediment trap
- Carbon Sequestration

Local homes, business, and government property

Citizens of the country

Global population
To whom do these value belong?

- Cultural services
- Research and education
- Tourism and recreation

Local business and universities

Government revenue

Local tourists, international tourists
Which valuation methods were used?

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Market value
Government revenue
Benefit transfer

Avoided damage cost
Replacement cost
Benefit transfer

Tourism spending
Government revenue
Donor money
Research money
Benefit transfer
Observation on the existing initiatives in light of existing or potential policy applications
Legal recognition and protection

International laws and agreements
- Convention on Wetlands (‘Ramsar Convention’)
- Convention Concerning the Protection of the World Cultural and Natural Heritage (‘World Heritage Convention’)
- International Convention for the Prevention of Pollution from Ships (‘MARPOL’)
- Biological Diversity (‘CBD’)
- Convention on International Trade in Endangered Species (‘CITES’)
- United Nations Framework Convention on Climate Change
  - Paris Agreement
  - *ratified by Indo-Pacific countries as highlighted

Regional governance
- IUCN Pacific Mangrove Initiative works with SPREP, UNDP, and Fiji, Vanuatu, Papua New Guinea, Samoa, Solomon Islands, and Tonga
- Mangrove Ecosystem for Sustainable Climate Change Adaptation and Livelihoods project (‘MESCAL’)- Fiji, Samoa, Solomon Islands, Tonga, and Vanuatu (2009-2013)
- Mangrove Rehabilitation for Sustainably-Managed Forest project (‘MARSH’)- Papua New Guinea, Solomon Islands, and Vanuatu

National governance
- Fijian Fisheries Act 1942
- Papua New Guinea’s Fisheries Management Act 1998
- FSM Marine Resources Act 2002

Natural Resources Law and Species-Based Legislation
- Protected Area Laws
- Planning and Environment Laws
- Biodiversity and Conservation Laws
- Climate Change Laws
- Integrated governance (ICZM)

Source: Tachera (2020)
How were the values (or intended to be) used?

- **Basis for discussions during management decision-making processes**
- **To communicate, advocate or raise awareness about the contribution of ESVs to people**
- **A way to include ecological costs and benefits in the monetary evaluations supporting management decisions e.g. setting quotas or restrictions**
- **A basis for implementing financial instruments such as subsidies, taxes or fees**
- **A basis for establishing levels of monetary compensation for ecological damage or resource conservation**
How were the values (or intended to be) used?

- **Basis for discussions during management decision-making processes**
  - Paris Agreement
  - Ramsar Convention
  - Convention concerning World Heritage
  - Convention on International Trade of Endangered Species (CITES)
  - International Convention for the Prevention of Pollution from Ships (MARPOL)

- **To communicate, advocate or raise awareness about the contribution of ESVs to people**
  - Tourism fee
  - Congestion fee
  - User fee
  - Compensation payments to fisherman, landowners.
  - Payment to manage resources (PES, REDD+)

- **A way to include ecological costs and benefits in the monetary evaluations supporting management decisions e.g. setting quotas or restrictions**
  - Fishing quotas
  - MPAs

- **A basis for implementing financial instruments such as subsidies, taxes or fees**

- **A basis for establishing levels of monetary compensation for ecological damage or resource conservation**
Why we need valuation?

1. Define the problem
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Ecosystem services value

Uncertainty
MACBIO Project

Kiribati

2014
Introduction of the Marine Spatial Planning process and discussion with government representatives

2015
Analysis of existing user-based marine management tools completed

2015
Follow-up discussions on the Marine Spatial Planning process held

2016
Marine ecosystem services valuation published

2017
Dialogue between government agencies on ocean governance, Marine Spatial Planning and voluntary commitments; ahead of the UN Ocean Conference conducted

2017
First Marine Spatial Planning workshop and GIS capacity training for key government officials in Tairua and Kirimiti Island

2017
Cabinet memorandum on facilitating the Marine Spatial Planning process for Tairua and Kirimiti Island submitted and approved by the Cabinet

2018
Initiation of the spatial planning process in Kirimiti

2016
Conducting training on open source software for Geographic Information Systems (GIS)

2016
Open marine spatial datasets and customized maps made available and distributed to key stakeholders and ministries

2015
Over

100

Tonga

2015
Cabinet decides to introduce cross-sectoral, natural marine spatial planning

2015
In its first meeting, the technical working group Oceania agrees on terms of reference, vision and goals for Tonga’s Marine Spatial Planning and a work plan until 2020

2015

2016
Marine ecosystem services valuation published

2016
Tonga’s voluntary commitments to the UN Ocean Conference include Marine spatial planning and a network of 30 percent of the MSZ as Marine Protected Areas by 2020

2016
Analyzing of ocean management areas for Tonga is defined

2017
Deputy Prime Minister presented Report, defining 38 biophysically, Special and Unique Marine Areas

2018
Communication material for national consultations on Marine Spatial Planning drafted

2016
Report on the 15 marine bioregions, which describe Tonga’s entire marine environment, published

2018
Placement guidelines for ocean management areas drafted

2016
Types of ocean management areas for Tonga is defined

2016
Marine ecosystem services valuation published

2016
Instruments for assessing the legal basis of Marine Spatial Planning

140
special datasets, including environmental, usage and risk data

91
Unvalued (and difficult to value) ES

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Limits to ESVs

- Value not suitable for the decision-making.
- Validity – value not accepted by all parties.
- Value creates more conflict between the stakeholders.
- Problem too complex for ESVs.
- Limitations to the valuation method – unreliable ESVs.
- Not enough money to pay for a valuation study.
- Valued used incorrectly resulting in perverse outcomes.
- Moral or ethical concerns surround the value.

Source: Marre et al., 2016
What to do with no ESVs?

- Are all benefits and costs in monetary units? 
  - Yes
  - Apply benefit-cost analysis (BCA)
  - No
- Is environmental valuation feasible, reliable, and affordable? 
  - Yes
  - Apply valuation techniques
  - No
- Are costs available in monetary units and benefits adequately measure by a single unit? 
  - Yes
  - Identify a single unit
  - No
- Are costs available in monetary terms? 
  - Yes
  - Define the utility function
  - No
- Apply cost-effectiveness analysis (CEA)
- Apply cost-utility analysis (CUA)
- Apply multi-criteria analysis (MCA)

Source: Hajkowicz, 2008
How to value difficult values better

1) understanding the purpose of the NMV study, for example, the purpose could be for compensation payment;

2) incorporating local people or indigenous knowledge in the design of the NMV study;

3) articulating the expected change that is going to occur from the environmental change, as well as the baseline condition before any changes occur.

4) identifying who is going to benefit or lose from the environmental change i.e. would the impacted party be indigenous or local people or residents of the country in general?

5) specifying whose values are being considered i.e. indigenous peoples, local residents or the general population.

6) choosing an ethical framework to follow when conducting NMVs and engaging with local communities,

7) clarifying how the limitations are going to be handled so that decision makers would know how to appropriately apply these values.

Source: Manero et al. (2022)
Next steps

• Incorporate findings from EGM into report
• Complete review of literature from Scopus
• Search for examples in other countries
• Finalise report
Any critical examples missing?

Any feedback on existing initiatives?
Thank you

Contact: sorada.tapsuwan@gmail.com