

---

# Workshop report: ecosystem services valuation on Curacao

21-22 of January 2015 by Wolfs Company

---



**Contact:**

Ministerie Gezondheid, Milieu en  
Natuur  
Beleidsorganisatie  
Klein Kwartier 33  
Curaçao



## Table of content

<b>Introduction: workshop on the valuation of ecosystems of Curaçao</b>	<b>3</b>
<b>Objectives of the workshop</b>	<b>3</b>
<b>Structure</b>	<b>3</b>
<b>Schedule</b>	<b>4</b>
<b>Content day one</b>	<b>7</b>
<i>Morning session and assignment 1: Ecosystems, ecosystem services and stakeholders on Curaçao</i>	7
<i>Assignment 2: developing scenarios for economic analysis on Curaçao</i>	8
<b>Content day two</b>	<b>10</b>
<i>Assignment 3: specifying values of ecosystems, valuation techniques and potential data sources</i>	10
	11
<i>Assignment 4: Using environmental economics to communicate pressing issues to decision-makers</i>	11
<b>Evaluation by participants</b>	<b>12</b>
<b>Trainers</b>	<b>14</b>
Esther Wolfs, MBA, MSc	14
Stijn Schep, MSc.	14
<b>Participants</b>	<b>15</b>
<b>References</b>	<b>16</b>
Websites:	16

## Introduction: workshop on the valuation of ecosystems of Curaçao

On the 21th and 22st of January 2015, a 2-day workshop was held on Curacao. The workshop was intended to build knowledge and share experiences between different stakeholders involved in policy, management and/or investments in nature conservation or from the private sector with regard to the economic valuation of nature on Curaçao.

The workshop focussed on raising awareness about the mutual interdependency of nature and the economy as a result of socio-economic valuation studies and these studies provide a tool to mainstream nature management within all social, environmental and economic sectors on Curaçao. During the workshop the research steps for a total economic valuation (TEV) study for Curaçao were developed based on various practical exercises. In a TEV study, all the important ecosystems and ecosystem services are investigated.

## Objectives of the workshop

“Increase the understanding about why a study on the socio-economic value of nature is useful for Curaçao, how to develop such an assessment, and which tools to use”

The sub-objectives of the workshop were:

- Training on defining objectives, approaches and scope of economic valuation of ecosystem services based on The Economics of Ecosystems and Biodiversity (TEEB)<sup>1</sup>.
- Identify and discuss policy issues that should be addressed by a total ecosystem services valuation study.
- Training on the available ecosystem valuation methods and techniques.
- Present experience and knowledge on valuation of ecosystem goods and services studies, the actual influence on nature conservation, management, investments and policies in the Caribbean. Factors that enable the effectiveness of a valuation study will also be discussed.
- Discuss recommendations to implement and communicate the outcome of the potential study to the relevant decision-makers and actors in the private sector.

The idea is to have several theoretical sessions combined with interactive discussions and exercises. Working groups are assigned to develop cases based on identified policy questions to which economic valuation research on Curaçao can be applied. Finally, the participants identify approaches and a strategy to communicate expected results.

## Structure

The set-up of the workshop was based on the different steps that are part economic analysis of ecosystem services. The framework for these different steps is presented in Figure 1 "backbone" of economic analysis of ecosystem services

---

<sup>1</sup> See website [www.teebweb.org](http://www.teebweb.org) for more information.

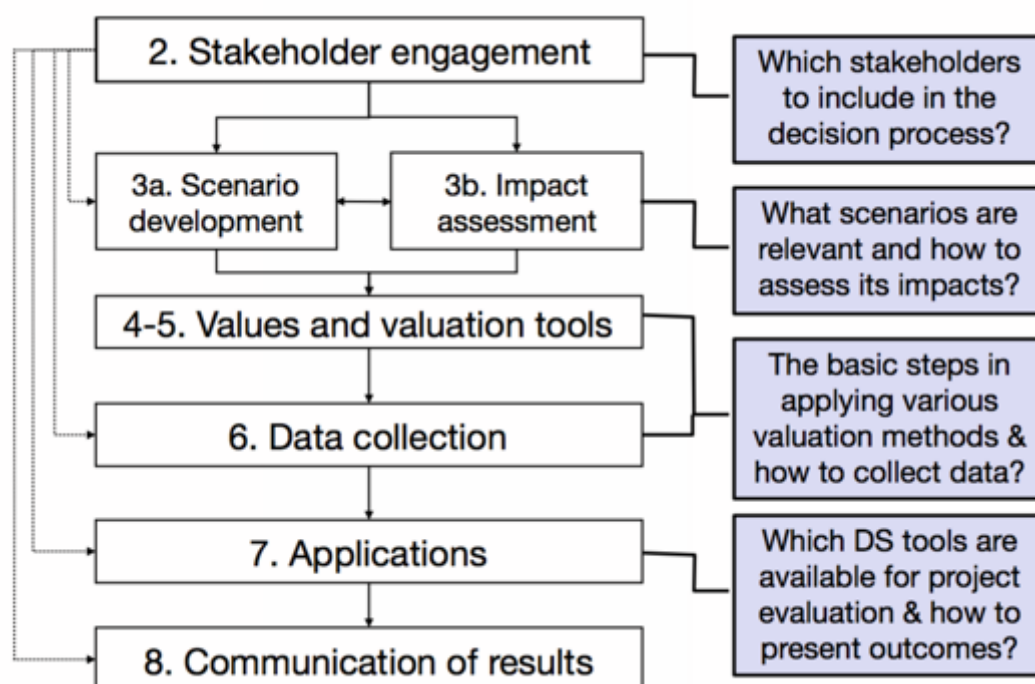


Figure 1 "backbone" of economic analysis of ecosystem services

## Schedule

The following schedule provides an overview of the activities of the workshop. Each section is provided with a short description of the content. For the full presentations please see the USB -Workshop Ecosystem Service Valuation 21 - 22 January 2015 distributed during the afternoon of the second day of the workshop.

Start	End	DAY 1
9.00	9.45	Opening
9.45	10.30	<b>1. Introduction TEEB</b> The role of environmental economics is explained. This session provided a framework to formulate the specific needs, challenges and environmental issues a potential ecosystem valuation study could address.
10.30	10.45	<i>Coffee break</i>
10.45	11.30	<b>2. Ecosystems, ecosystem services and stakeholders</b> During this session the most relevant ecosystems of Curaçao were identified. The Millennium Ecosystem Assessment has been used to present and identify ecosystem services and goods. The relevant stakeholders for an ecosystem valuation research have been identified.
11.30	12.30	<u>Assignment 1:</u> The group was subdivided into smaller groups and participants identified their relevant ecosystems, services and beneficiaries on Curacao. 3 groups presented their findings.
12.30	13.30	<i>Lunch Break</i>

13.30	14.15	<b>3. Threats, scenarios and impact assessment</b> During this session scenarios were discussed, which can be developed by looking at threats to ecosystems and ecosystem services. An example of a scenario analysis was given in which impacts are analysed.
14.15	15.15	<u>Assignment 2:</u> Based on the ecosystems discussed in assignment 1, the participants developed scenarios for ecosystems and threats on Curacao. The impact on stakeholders and possible interventions were taken into account
15.15	15.30	<i>Break</i>
15.30	16.30	<b>4. Values &amp; externalities</b> This session presented the different values from ecosystem services and identified externalities of economic processes that impact the quality and value of ecosystem services.
16.30	16.45	<u>Documentary:</u> The natural treasures of Bonaire <a href="https://www.youtube.com/watch?v=zEiPFO8kWKc">https://www.youtube.com/watch?v=zEiPFO8kWKc</a>
16.45	17.00	Plenary debrief & wrap-up

Start	End	DAY 2
9.00	9.10	Summary of previous day and structure of day 2
9.15	10.30	<b>5. Valuation techniques</b> The different types of valuation techniques and methods were presented and explained. Special attention was given to non-monetary approaches.
10.30	10.45	<i>Coffee break</i>
10.45	11.00	<b>6. Data collection</b> During this session the different types of data and data collection were discussed. Focus was on collecting data via surveys with specific techniques, such as choice modelling.
11.00	12.15	<u>Assignment:</u> Valuation techniques Based on the output of day 1 groups now identified a selection of valuation techniques and methods they would like to use to value the most relevant identified ecosystem services and goods. They, furthermore, identified the data that needs to be collected and how.
12.15	13.15	<i>Lunch Break</i>
13.15	14.15	<b>7. Application of ecosystem services and goods values</b> This session elaborated on the applications of ecosystem service values. The main applications that were discussed were awareness raising, decision support, spatial planning, damage assessments, and sustainable financing.
14.15	14.30	<b>8. Impact decision making</b> Different decision-makers need to be addressed differently. This session was about approaching different stakeholders when communicating results of a study.

14.30	14.45	<i>Break</i>
14.45	16.30	<u>Assignment 4</u> : Influencing policy Based on various practical problems on Curacao, participants identified Decision-Making Units and developed a communication strategy with the use of ecosystem valuation applications.
16.30	17.00	Plenary debrief & wrap-up



Figure 2 - left: presentation of the first assignment; right: prioritization of most relevant ecosystems for the next assignments.

## Content day one

### Morning session and assignment 1: Ecosystems, ecosystem services and stakeholders on Curaçao

The morning session on day one consisted of an introduction to the concept of The Economics of Ecosystems and Biodiversity (TEEB) and discussing the possible applications of environmental economics research. After the introduction the concepts “ecosystems, ecosystem services and stakeholders” were discussed. The ecosystem service framework of the Millennium Ecosystem Assessment (2005) was used as the basis of the presentation. Furthermore, the relevance of stakeholder engagement throughout the process of economic analysis was discussed.

After the presentations and discussions, the participants were divided over five groups. Each group created an overview of the most important ecosystems, ecosystem services and relevant beneficiaries/stakeholders on Curaçao. Two groups presented their overview. The results of all five groups are summarized in Figure 3.

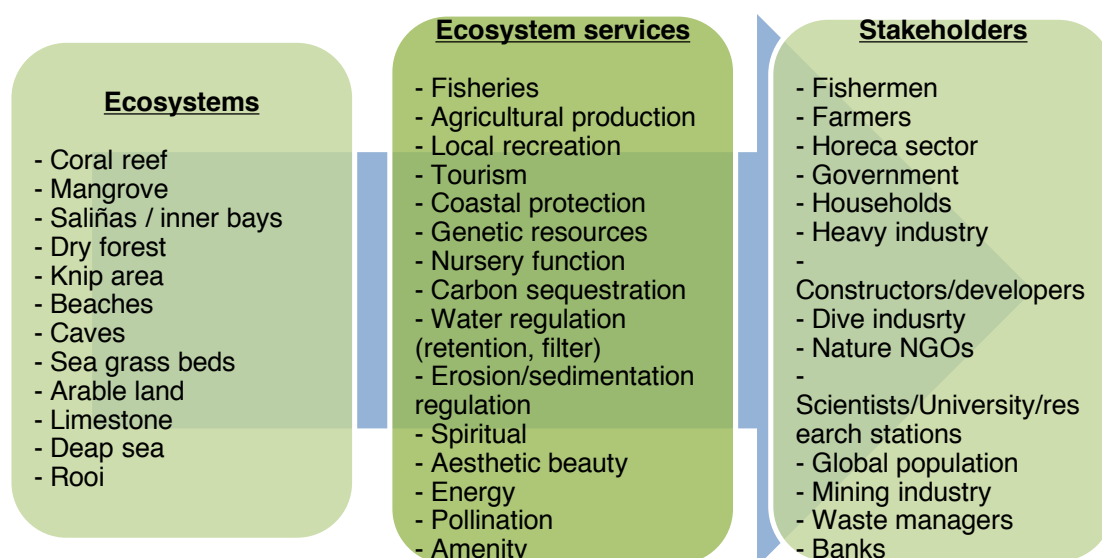


Figure 3 - identifying relevant ecosystems, ecosystem services and stakeholders on Curaçao.



## Assignment 2: developing scenarios for economic analysis on Curaçao

During the first session environmental threats on Curaçao were discussed. Next, the trainers presented how environmental threats can be used to develop scenarios for economic analysis and conducting impact assessments. As an example, a scenario analysis of the Leuser rainforest ecosystem on Sumatra was presented.

Participants built upon the morning exercise after the presentation. The five groups were given one of the ecosystems that were listed as a priority ecosystem after the first assignment. Based on the ecosystem that was given, groups had to define threats, the subsequent change in the state of the ecosystem, the economic impact and possible interventions. Figure 4 provides the structure of the second assignment.

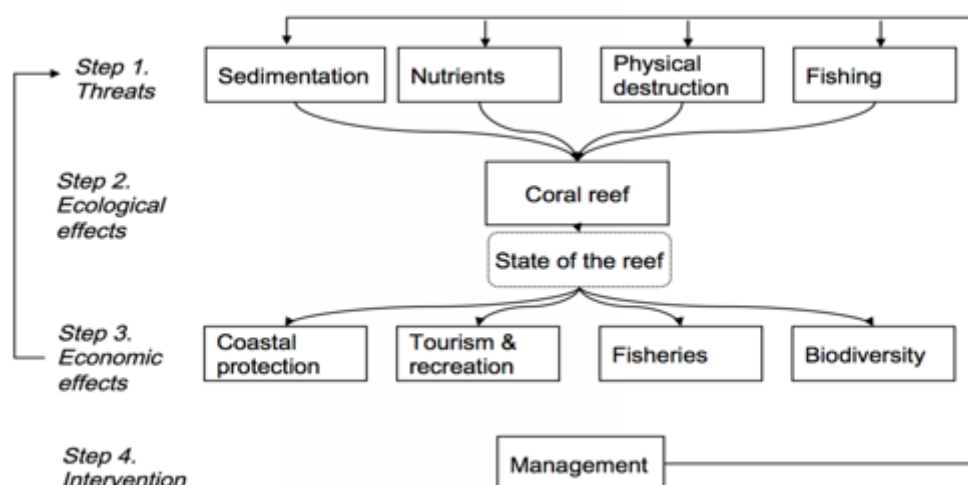


Figure 4 – Assignment 2: developing scenarios based on threats on Curaçao.

### Saliñas and inner bays

Two groups assessed the impact of threats to inner bays and Saliñas and specified possible interventions to tackle these threats.

Threats	Impacts	Interventions
<ul style="list-style-type: none"> <li>• Urbanisation</li> <li>• Deforestation</li> <li>• Pollution</li> <li>• Non-natural erosion/sedimentation/runoff</li> <li>• Recreational activities</li> <li>• Illegal fishing</li> <li>• Global warming</li> <li>• Poaching</li> <li>• Sewage</li> </ul>	<ul style="list-style-type: none"> <li>• Short-term gains by marina developments</li> <li>• High residential amenities</li> <li>• Decline of fisheries and coral reef ecosystem services</li> <li>• Limited accessibility for tourism and recreation</li> </ul>	<ul style="list-style-type: none"> <li>• Protection of water dams</li> <li>• Incorporate protection in zoning plan</li> <li>• Mandatory sewage systems</li> <li>• Mangrove protection</li> <li>• Waste management improvement</li> <li>• Enforcement of regulation</li> <li>• Education</li> <li>• Ban on gill net import and sales</li> </ul>



### *Dry forest*

Threats	Impacts	Interventions
<ul style="list-style-type: none"><li>• Excessive groundwater use</li><li>• Habitat fragmentation</li><li>• Illegal waste dumping</li><li>• Illegal construction</li><li>• Illegal logging</li><li>• Land excavation</li></ul>	<ul style="list-style-type: none"><li>• Health issues</li><li>• Decreased recreation</li><li>• Urban sprawl</li><li>• Decrease of other ecosystem services values</li></ul>	<ul style="list-style-type: none"><li>• Enforce spatial planning (EOP)</li><li>• Improve spatial planning</li><li>• Awareness raising</li><li>• Waste management</li></ul>

### *Coral reefs*

Threats	Impacts	Interventions
<ul style="list-style-type: none"><li>• Global warming/bleaching</li><li>• Overfishing</li><li>• Coastal development</li><li>• Pollution (pesticides)</li><li>• Runoff/nutrient loading (fertilizers, sewage, sediment)</li><li>• Invasive species</li></ul>	<ul style="list-style-type: none"><li>• Decreased recreation and tourism</li><li>• Decrease fish catch</li><li>• Increased scarcity of financial resources</li></ul>	<ul style="list-style-type: none"><li>• Fishing regulation</li><li>• Functioning sewage system</li><li>• Coastal management</li><li>• Spatial planning</li><li>• Culling invasive species</li></ul>

### *Mangroves*

Threats	Impacts	Interventions
<ul style="list-style-type: none"><li>• Coastal development</li><li>• Pollution</li><li>• Sewage</li><li>• Recreational activities</li></ul>	<ul style="list-style-type: none"><li>• Decrease fisheries</li><li>• Decreased public health</li><li>• Decreased tourism</li><li>• More damage though less coastal protection</li><li>• Loss of certification</li><li>• Increased economic activities on short term</li></ul>	<ul style="list-style-type: none"><li>• Improve legislation</li><li>• Enforcement</li><li>• Education</li><li>• Improve waste management</li><li>• Reforestation</li><li>• Active gully management</li></ul>

## Content day two

### Assignment 3: specifying values of ecosystems, valuation techniques and potential data sources

After day one, where the conceptual framework of economic analysis was extensively laid out, it was time to tackle the theory behind the actual valuation of ecosystem services. First, the various valuation techniques for different types of ecosystem service values were discussed. Thereafter, possible sources for data and means of collection were discussed. The difference between primary and secondary data sources was emphasized.

Based on the ecosystem services specified and prioritized during day one, participants set out to specify the specific values of ecosystem services and the possible valuation techniques. Also, potential sources of data for the valuation techniques for Curaçao were specified. The guidebook by Waite et al. (2014) was used for this exercise.

Data sources	
<u>Secondary data:</u> <ul style="list-style-type: none"><li>• Consumentenbond</li><li>• LVV</li><li>• Tourism organisations (CTB, CHATA)</li><li>• Utility companies</li><li>• (Scientific) literature</li><li>• Carmabi</li><li>• Insurance companies</li><li>• CBS</li><li>• FAO</li><li>• Real estate companies</li></ul>	<u>Primary data:</u> <ul style="list-style-type: none"><li>• Household surveys</li><li>• Tourism surveys</li></ul>



Figure 5 – Upper left: 5 types of applications of environmental economic research; lower left: communication of environmental economics in practice during the workshop. Right: groups working on final assignment 4

## Assignment 4: Using environmental economics to communicate pressing issues to decision-makers

The last two presentations were dealing with the applying the results of valuation of ecosystem service and how to optimize impact. First the ways of presenting results were discussed based on the objectives of the study. In general, environmental economic research creates information and transparency by raising awareness of the value of nature for human wellbeing; supporting decision-makers through scenario analysis, thereby creating insight in short and long term effects of policy decisions; supporting spatial planning through the spatial allocation of ecosystem services; identifying possible structures for sustainable financing of nature management; and providing a tool to assess damage done to ecosystems.



Finally, how the implementation of the results of the study of *TEEB Caribbean Netherlands were presented*.<sup>3</sup> By giving examples of how the different applications appeal to different stakeholders, the participants were encouraged to develop a communication strategy for the most pressing issues on Curaçao. By first specifying the decision-makers that need to be influenced, participants were, thereafter, able to choose appropriate applications of the research. Also, means of communication were specified. The following table provides an overview of the issues that were

<sup>2</sup> For the interview: <https://www.youtube.com/watch?v=ZSvdtX1L8pQ&feature=youtu.be>

<sup>3</sup> For more information visit: [http://www.wolfscompany.com/?page\\_id=2036](http://www.wolfscompany.com/?page_id=2036)

considered most pressing by the participants, the stakeholders that need to be convinced and potential application to do so.

We learned during this exercise that there is a large availability of existing data on curacao on various environmental issues. Participants raised the urgency to collect this data and structure it in order to facilitate sharing of information.

Most important threats to ecosystem services on Curaçao	Relevant stakeholders affected by the issue	Effective applications of ecosystem services valuation:
<b><i>EOP (spatial plan):</i></b> <i>- Is out-dated and needs an update</i> <i>- Lack of enforcement of EOP</i>	<ul style="list-style-type: none"> <li>• ROP</li> <li>• Police</li> <li>• Domeinbeheer</li> <li>• Government</li> <li>• NGOs</li> <li>• Population</li> <li>• Developers</li> <li>• FKP</li> <li>• Industry</li> </ul>	<ul style="list-style-type: none"> <li>• Value maps highlight economically valuable natural areas on Curacao</li> <li>• Cost-benefit analysis of investment in enforcement of the EOPs</li> </ul>
		
<b><i>Solid waste management is an island-wide issue</i></b>	<ul style="list-style-type: none"> <li>• General public</li> <li>• Policymakers: ministries GMN/MNO</li> <li>• Business community</li> <li>• Waste managers</li> </ul>	<ul style="list-style-type: none"> <li>• Scenario analysis to demonstrate the impact of solid waste on ecosystem services</li> <li>• Value/threat maps showing the spatial impact of solid waste to high value areas for ecosystem services</li> <li>• Willingness to pay for waste management by local residents</li> </ul>
		
<b><i>Poor wastewater management</i></b>	<ul style="list-style-type: none"> <li>• Government (ministers)</li> <li>• Households</li> <li>• Companies</li> <li>• Wastewater transportation companies</li> <li>• Tourism sector</li> <li>• Fisheries</li> </ul>	<ul style="list-style-type: none"> <li>• Raise awareness of the impact of untreated waste water to the ecosystem services on Curacao</li> <li>• Cost-benefit analysis including investment in waste water treatment and the economic gains of an intervention</li> </ul>

## Evaluation

The workshop has been well received by all participants, which is also caused by the active participation and openness during discussions by the participants. The change in theory and exercises has been appreciated. The participants indicated that ecosystem valuation could contribute to tackling nature conservation issues on Curacao. Especially the added value was seen in being able to develop a common language through ecosystem valuation between the different stakeholders. Participants indicated there is already a lot of data, however, these should be structured and made more easily available. See for more information the evaluation forms.

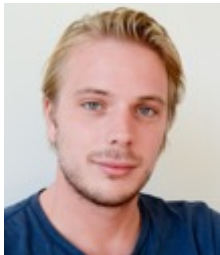
## Trainers



**Esther Wolfs, MBA, MSc**

As the director of a commercial company ([www.wolfscompany.com](http://www.wolfscompany.com)) based in the Caribbean with a focus on integrating nature and economics Esther knows how strongly these two fields are intertwined. Previous experience in the private sector and thereafter working at Dutch nature conservation NGOs provided her with a lot of knowledge on sustainable financing, fund raising, project managing and intermediating between the private sector and nature conservation organisations. Her company initiated and managed TEEB studies that were (and are currently) financed amongst others by the Dutch ministry of Economic Affairs, WWF-Ecuador and the Cayman Islands Government. In these studies, all relevant stakeholders are included by organizing workshops, conduct expert interviews and surveys and communicate the status and results of the projects frequently. This enables a complete assessment of the ecosystem services at hand.

Next to her experience in environmental programs, she has extensive working experience in the commercial sector, which helps to clearly identify the specific criteria that make companies participate in a TEEB programs, she believes that this participation of the private sector is crucial for sustainability and success of TEEB projects.



**Stijn Schep, MSc.**

As an environmental economist, Stijn has the skills to incorporate the value of nature in economic methodology. He strongly beliefs that current economic processes do not incorporate natural capital sufficiently, thereby leading to suboptimal levels of wellbeing. Since his start at Wolfs Company in 2012, he has been working to bring environmental economic theory into practice.

As part of the company, Stijn has been involved in TEEB studies in Bonaire, Saba, St Eustatius, the Cayman Islands, Galapagos and the British Virgin Islands. He has been involved in the organization of workshops on environmental economics within the light of these studies and on several other occasions.

## Participants

<u>Organisatie</u>	<u>Naam</u>	<u>E-mail</u>
<b>Amigu di Tera</b>	Lloyd Narain	amiguditera@gmail.com
<b>Aqualectra</b>	Karel Tujeehut	ktujeehut@aqualectra.com
<b>Artutrust N.V.</b>	Simon Wolfson	simonwol@yahoo.com
<b>Carmabi</b>	Clifford de Lannoy	c.delannoy@carmabi.org
<b>Carmabi</b>	John de Freitas	j.defreitas@carmabi.org
<b>CBS</b>	Chris Jager	Chris.Jager@curacao-gov.an
<b>Curaçao Footprint Foundation</b>	Michelle Da Gosta Gomez	michelle.dacostagomez@gmail.com
<b>Ecovision</b>	Rob Kelder	consultants@ecovisionnv.com
<b>Ecovision</b>	Tim van den Brink	consultants@ecovisionnv.com
<b>Green Force</b>	Timo Brouwer	timoatwork@hotmail.com
<b>Korpodeko</b>	Aissa Henriquez	aissa.henriquez@korpodeko.cw
<b>Ministerie Gezondheid, Milieu en Natuur</b>	Eric Newton	eric@newton.ac
<b>Ministerie Gezondheid, Milieu en Natuur</b>	Faisal Dilrosun	faisal.dilrosun@gobiernu.cw
<b>Ministerie Gezondheid, Milieu en Natuur</b>	Jacinto Ras	jacinto.ras@gobiernu.cw
<b>Ministerie Gezondheid, Milieu en Natuur</b>	Murray Joubert	murray.joubert@gobiernu.cw
<b>Ministerie Gezondheid, Milieu en Natuur</b>	Rignald Adamus	rignald.adamus@gobiernu.cw
<b>Ministerie Verkeer, Vervoer Ruimtelijke Ordening</b>	Miriam Jonker	miriam.jonker@gobiernu.cw
<b>Ministerie VVRP</b>	Benjamin Allee	benjamin.allee@gmail.com
<b>Refineria Isla B.V.</b>	Valentino Chance	VChance@refineriaisla.com
<b>Refineria Isla B.V.</b>	Shamily Koots	SKoots@refineriaisla.com
<b>Refineria Isla B.V.</b>	Peter Jonker	PJonker@refineriaisla.com
<b>Selikor</b>	John Amarica	jamarica@selikor.com
<b>Stichting Uniek Curaçao</b>	Frensel Mercelina	uniekcuracao@gmail.com



## References

Millennium Ecosystem Assessment (2005) *Ecosystems and human well-being : synthesis*. Washington, DC: Island Press. ISBN 1-59726-040-1.

Richard Waite, Laretta Burke, Erin Gray, Pieter van Beukering, Luke Brander, Emily McKenzie, Linwood Pendleton, Peter Schuhmann and Emma Tompkins (2014) *Coastal Capital: Ecosystem Valuation for Decision Making in the Caribbean*, World Resource Insitute. Download: <http://www.wri.org/publication/coastal-capital-guidebook>

## Websites:

[www.teebweb.org](http://www.teebweb.org)

[www.wolfscompany.com](http://www.wolfscompany.com)