The Economics of Ecosystems and Biodiversity in the Caribbean Netherlands

Benefits of valuing nature for the Caribbean Netherlands

TEEB
CARIBBEAN NETHERLANDS

Total Economic Value in the Caribbean Netherlands

The Natural Capital of the Caribbean Netherlands

Ongoing developmental pressures in a context of global environmental change and economic liberalization challenge the physical and economic security of the islands of the Caribbean Netherlands. These challenges require an integrated, multi-scale research approach that supports the development of a strong green economy of the islands. In the period 2012-2014, The Economics of Ecosystems and Biodiversity for the Netherlands (TEEB-NL) program supported multidisciplinary research in Bonaire, St Eustatius and Saba to study the economics of nature in the Caribbean Netherlands. The research generates relevant information for supporting green economic development of the islands in different ways.

The focus of the study is to value nature through the perspective of various stakeholders such as local residents, visitors, tourist industry and residents in the Netherlands' mainland. More than 1,500 local individuals and 2,000 Dutch respondents were interviewed to learn about their relationship with nature and extract information about their willingness to pay for nature management on the islands. Among others, the study concludes that the benefits of nature in the Caribbean Netherlands are not only enjoyed by local stakeholders but also to a large extent by citizens in the mainland of the Netherlands. By summing up the worth of the range of valued ecosystem services, the annual TEV of the natural environment of the Caribbean Netherlands is estimated to be $122 million. This is close to $5.800 per capita of residents in the Caribbean Netherlands and clearly demonstrates that the economies of the three islands are highly dependent on natural assets.[1]

The valuation results were used to develop several tools that can be easily applied to raise awareness, support decision-making, develop sustainable financing mechanisms or to serve as input for spatial planning. The study can also be used to assess the economic loss if natural assets are damaged by, for example, ship groundings, oil spills or other types of destruction. However, damage assessment studies have not yet been developed in this project. The tools answer questions relating to current environmental management issues. Stakeholders and local experts provided input to determine the most relevant management issues to investigate in the study. By increasing the information and transparency on issues that that are related to the natural environment of the Caribbean Netherlands more equitable decisions can be made.

[1] The TEV of nature in the Caribbean Netherlands differs from the sum of separate TEVs of the three islands. This difference is caused by a change in the non-use value of Bonaire since the study results were presented in 2012.

Overview Caribbean Netherlands

The Caribbean Netherlands consists of three islands, Bonaire, St Eustatius and Saba all located in the Caribbean Sea. Since 2010 each island is part of the Netherlands as a public entity. Bonaire is the largest island with 16,000 permanent residents, while only 4,000 people live in St Eustatius and approximately 2,000 in Saba. The total population of the Caribbean Netherlands is 22,000. All three islands are surrounded by living coral reefs and therefore attract many divers and snorkelers. Compared to other Dutch Caribbean islands such as Aruba and Curacao the Caribbean Netherlands are home to a great wealth of natural environment. Nature-based tourism on the Caribbean Netherlands is not limited to marine activities such as snorkelling and diving but also includes land-based activities that concern the natural landscape of the three islands. Unique features of the islands are the 'Saba Bank', one of the largest atolls in the world just a few miles of the Saba coast, the elfin forest on top of Mt Scenery or the coral reefs around Bonaire, which are considered among the most pristine coral reef of the whole Caribbean. On all three islands the coastal waters, containing the popular reefs, are officially marine protected areas and parts of the terrestrial natural environment are protected as National Parks. All the parks are actively managed by local nature conservation organizations. Five wetland areas on Bonaire are furthermore protected under the Ramsar convention.

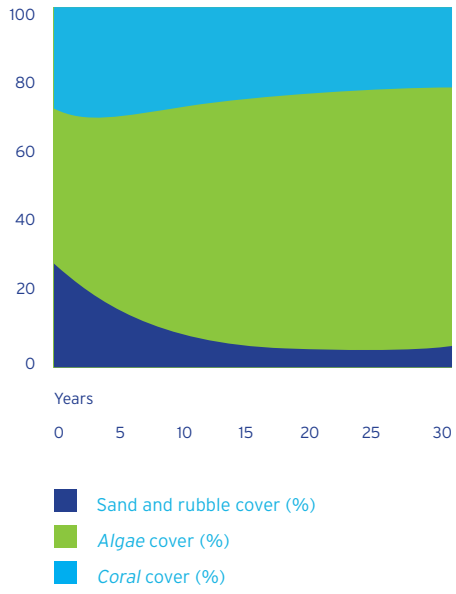
Awareness Raising

One of the key elements of the studies under the TEEB Caribbean Netherlands umbrella is to demonstrate the importance of healthy ecosystems for socio-economic prosperity. Dynamic economic-ecological simulation models are developed for all three studies to gain insight in the effects of current pressures on the health of ecosystems and thereby on the value of the ecosystem services provided. The big drop in the economic value of ecosystem services as a result of ecosystem degradation illustrates the urgency to manage the natural resources of the Caribbean Netherlands (Figure 1).

This scenario analysis raises awareness on a local and national level. The study on Bonaire was discussed in the Dutch Chamber of parliament. The state secretary of Economic Affairs uses the research to showcase the important link between nature and economic prosperity. Also, a nature policy plan was developed to secure the important ecosystem services that currently benefit a wide range of stakeholders in the Caribbean Netherlands.

Figure 1

Variation in Bentic Cover
% Coverage



TEV
in million US$

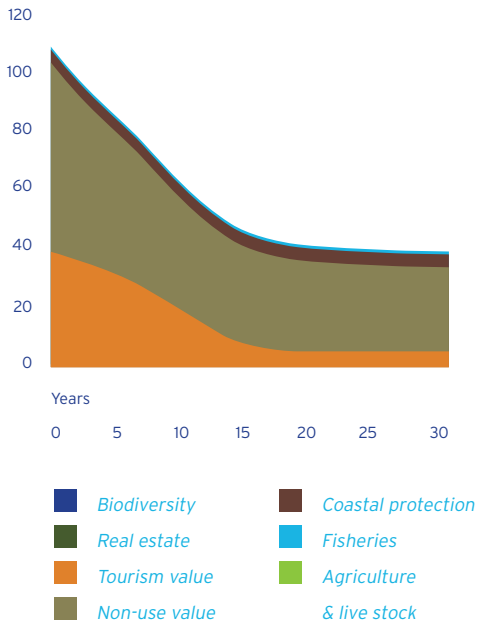


Figure 1
Results of the ecological-economic model developed on Bonaire. Degradation of the marine environment leads to decrease in the Total Economic Value (TEV) of ecosystems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Decision support

In order to influence policy, it is key to make sure valuation research answers clear and urgent policy questions. Local stakeholders and experts guided the TEEB Caribbean Netherlands research by identifying these priorities. With the ecological-economic simulation models, the pros and cons of different nature conservation strategies are analyzed. Cost-Benefit Analysis (CBA) is used to determine the most economic efficient strategies. The study results clearly indicate that "an ounce of prevention is worth a pound of cure". Based on the collected data, conservation efforts like managing invasive species, roaming livestock or nutrient control by investing in a sewage system are far more economically efficient than the restoration of degraded ecosystems while environmental threats remain uncontrolled.

On Bonaire, these results supported the much-debated development of the expensive sewerage system by showing that the investment is worthwhile. The local government took on the results to initiate active goat control measures and is currently investigating how to utilize wastewater sustainably in order to maximize benefits from the sewerage system. Furthermore, on the basis of the study results, the Ministry of Economic Affairs commissioned a study to assess the costs and benefits (including environmental ones) of a cruise tourism expansion.

Figure 2

Feasiblbility of nature investments
in million US$

	Restoration	Sewerage	Conservation
Benefits	35	147	135
Costs	39	51	29
B/C ratio	0.9	2.9	4.6

Figure 2 Cost-Benefit Analysis of environmental management strategies on Bonaire. A Benefit/Cost (B/C) ratio higher than one indicates that the benefits of an intervention exceed its costs. If the ratio is below zero, an intervention is not economically feasible

Figure 3
Total economic vs. total financial value of Saba

Sustainable financing

A lack of resources is very often a limiting factor for effective nature conservation. The studies conducted under the TEEB Caribbean Netherlands umbrella identify possible sources for additional funding. For example, by summing up the worth of the range of valued ecosystem services, the annual TEV of the natural environment of Saba is estimated to be $29 million. Although the TEV of nature on Saba is substantial, this aggregated value is composed of numerous welfare-related values that are not necessarily translated into actual financial flows.

As shown in figure 3, a little less than one-third of the TEV of $29 million (i.e. $7.3 million) is truly traceable to financial streams that depend on local ecosystems. For example, the value by Dutch mainland citizens for nature conservation in the Caribbean Netherlands is a genuine economic value, yet at the same time, this ecosystem service is predominantly a non-financial value (i.e. its value is not fully transferred financially to the economy of Saba). The research creates insight in the difference between the value of benefits that people derive from ecosystem services and the amounts they actually pay for these services. If stakeholders attach a high value to ecosystems but currently pay little to maintain them, there is an opportunity to develop a sustainable financing mechanism for nature conservation.

Insight in the discrepancy between willingness to pay of Dutch mainland citizens for nature conservation in the Caribbean Netherlands built an argument for securing €10 million investment for nature conservation on the three islands by the Ministry of Economic Affairs. Also WWF Netherlands used the study results to allocate a budget for conservation efforts in the Caribbean Netherlands. Results for Bonaire, St Eustatius and Saba indicate that contributions by tourists for nature conservation can be increased as well.

Figure 3

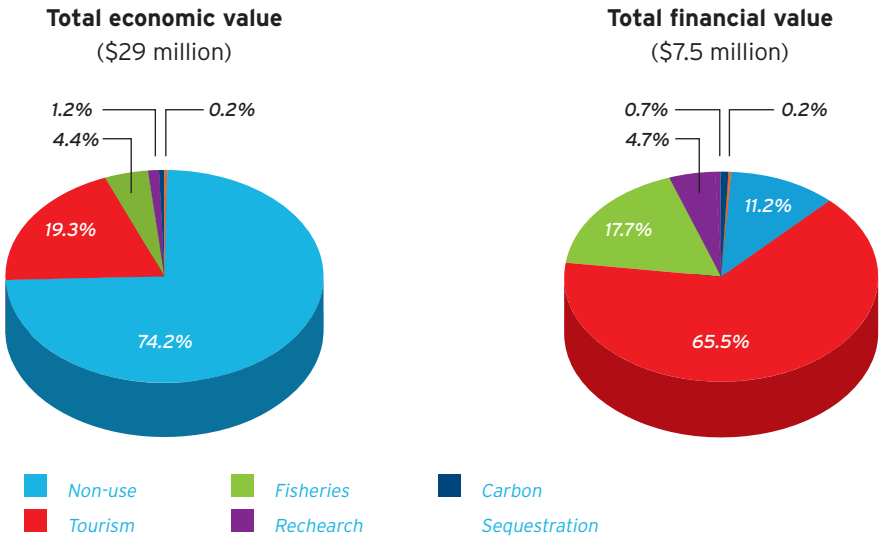


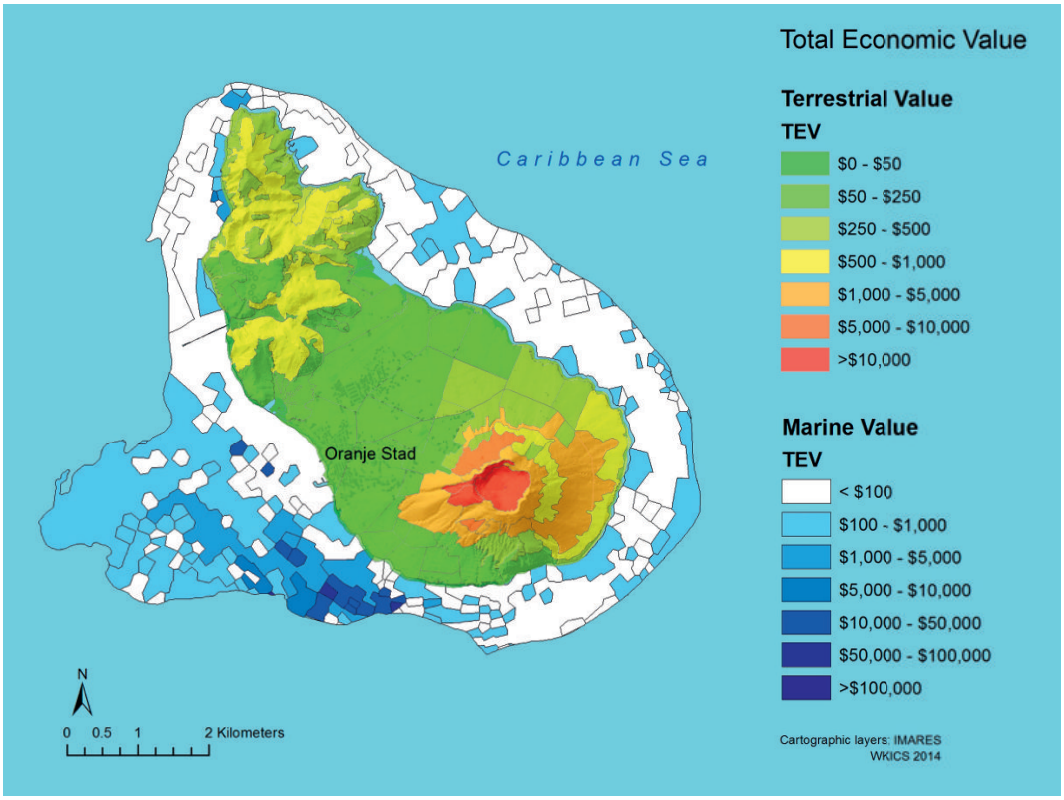
Figure 4
Total Economic Value (TEV) map of St Eustatius

Spatial planning

Value maps are created for the most important ecosystems services. Value maps indicate which are the most valuable ecosystems in the marine and terrestrial environment on the islands. By adding up the values for the various ecosystem services, these maps are combined to form the Total Economic Value (TEV) maps. The TEV map of St Eustatius (Figure 4) clearly shows that for the marine and the terrestrial ecosystems of St Eustatius, the economic value is highly concentrated on relatively small areas, also called "ecosystem service hotspots".

Insight in the value of different areas for different beneficiaries of ecosystem services can be very useful for spatial planning purposes. First, natural areas with higher values are more important to conserve. Second, different uses of ecosystem services might be in conflict with each other. For example, having fishermen and dive operators in the same area can cause friction that is more easily resolved by identification of the important parts of the marine environment for them. Third, the value maps can be combined with spatial information on environmental threats. Spatial analysis of threats and benefits enable conservationists with limited budgets to prioritize their efforts: areas with high values and high threat levels deserve the most urgent attention.

Figure 4



Successful ingredients

The contribution of knowledge and experience of local stakeholders and experts together with targeted communication of the study results contributed tremendously to the success of the study. This was done through various workshops and stakeholder consultation rounds. Representatives from the local governments were asked to contribute to the project by giving their support and presenting the results. Results were also communicated through easily accessible reports, which can all be found online. A documentary has been developed to communicate study results and illustrate how ecosystem services relate to everyday life in the Caribbean Netherlands. This film has already won a price for best nature documentary, and has been presented in several international conferences. Accessible policy briefs were developed to summarize the key findings from the 16 extensive TEEB Caribbean Netherlands reports. The research has been commissioned by the ministry of Economic Affairs and was realized by VU University in Amsterdam and Wolfs Company in cooperation with the Imares research institute of the Wageningen University.

Further Information

For further information about valuing Ecosystem Services in the Caribbean Netherlands, contact Esther Wolfs at esther@wkics.com or Pieter van Beukering at IVM pieter.van.beukering@vu.nl and the webpage www.wolfscompany.com

The natural capital of the Caribbean Netherlands is their strategic advantage

The Economics of Ecosystems and Biodiversity in the Caribbean Netherlands

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Ministry of Economic Affairs

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