



The Economics
of Ecosystems
and Biodiversity
on Bonaire

The value of citizens in the Netherlands for nature in the Caribbean



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This study is part of the “Economics of Ecosystems and Biodiversity Netherlands” (TEEB NL) study. It is being conducted for the Caribbean Netherlands on behalf of the Dutch Ministry of Economic Affairs.

The Challenge

How important is the unique Caribbean environment for the Dutch citizen? How does one value the worth of these islands’ ecosystems to citizens of the Dutch mainland, even if these people will never visit these beautiful islands? Does the fact that the Caribbean Netherlands islands recently became special Dutch municipalities, while having to manage a huge nature area, create a sense of solidarity among the population of the Netherlands? These questions are addressed in an extensive case study with the aim to advice policy makers in the Netherlands about the level of public support for assisting the Caribbean Netherlands in their effort to sustainably manage their ecosystems.

The Approach

This study applied the contingent valuation method and choice experiments to determine the willingness-to-pay (WTP) for the nature conservation on the mainland and on the islands. Over 800 face-to-face interviews of people living in the Netherlands were conducted, and additional 500 respondents filled out an online survey.

Results & Recommendations

The most notable result is that Dutch mainland citizens have a positive WTP for protecting nature on both sides of the ocean. Individual’s initial value on the environment as a whole and their level of consumer confidence in economy were strong explanatory variables in deriving their WTP. Despite a negative perception of Dutch economic prospects, respondents nonetheless placed significant emphasis on environmental protection. After adjusting for preference and payment uncertainty of the respondent, the aggregated monthly amount for the non-use value of nature protection in the mainland Netherlands and the Caribbean Netherlands is estimated at €34 million and €17 million, respectively. Raising awareness that 20,000 inhabitants of the Caribbean Netherlands are in no position to fundamentally support the level of nature conservation that is needed is an important first step to take.



The Challenge

In the current era of financial insecurity and environmental degradation it becomes clear that classical investments in a strong economy are not always contributing to a healthy environment. In reaction, a growing minority is working to show that the two are strongly interlinked, and that in fact a healthy environment is critical to human as well as financial wellbeing, especially in the longer run. The challenge is to find methods to accurately measure and value these ecosystem services, such as public spaces, access to waters and fish and healthy ecosystems.

To value ecosystem services is even more challenging when these goods and services benefit non-local or international groups of people. Finding non-market valuation techniques for this international public or quasi-public goods is one way to bring ecosystems into our decision-making system, however several challenges to implementation remain.

The Approach

'Ecosystem services' is a fairly new term, and are defined as "the benefits that people obtain from ecosystems" (MEA, 2005). The goal of this study is to value ecosystem services with a comprehensive indicator (i.e. a monetary unit) by individuals on their value of ecosystem services.

This study applied a household survey to determine the WTP of Dutch residents for the protection of both Dutch nature, and the nature of the Caribbean Netherlands. The research used a combination of survey modes (face-to-face and online surveying) and valuation techniques (contingent valuation methods [CVM] and choice modelling [CM]).

A recent innovation in stated preference methods asks respondents to select between a set of alternative scenarios possessing different attributes. By having a payment vehicle, like a tax, as one of these attributes, the values of each attribute can be indirectly derived.


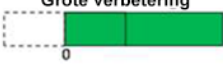



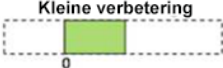

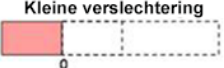

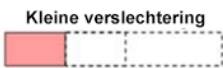

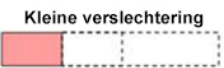


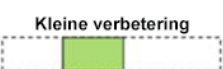
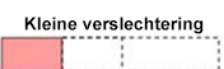
Figure 1:
Example card

Respondents' choices between the scenarios reflect the trade-offs they are willing to make, and ultimately, the values they assign to the ecosystems. CM gives insight in trade-offs that individuals are willing to make. Choice modelling indirectly measures the WTP for conservation of respondents through a controlled survey.

This research created an experiment for the respondents to determine preferences of nature conservation close to home as well as nature conservation further away from home (i.e. Caribbean Netherlands, worldwide). The choice card shown in Figure 1 illustrates the example of the experiment.

Over 800 respondents living in the Netherlands were given the face-to-face survey, and over 500 conducted an online survey. Three different versions were used. Version 1 asked if respondents would be willing to pay for protection (and what levels of protection) of Dutch nature and then the Caribbean Netherlands Islands, in that order. Version 2 reversed the order, and included attributes of protecting nature worldwide, not just in the Netherlands. Version 3 combined the WTP for protection of Dutch and Caribbean Netherlands nature as one. The surveys also questioned respondents on several subjective topics related to their concern for the environment versus other issues.

Figure 1

Example Card	Optie A.	Optie B.	Huidige situatie
 Nederlandse Natuur	Grote verbetering 	Kleine verslechtering 	Kleine verslechtering 
 Natuur in de BES eilanden	Kleine verbetering 	Grote verbetering 	Kleine verslechtering 
 Wereldwijde NATuur	Kleine verslechtering 	Geen verandering 	Kleine verslechtering 
 Extra Belasting	Geen verandering 	Kleine verbetering 	Kleine verslechtering 
	€40 per maand (€480 per jaar)	€25 per maand (€300 per jaar)	€0 per maand (€0 per jaar)
Kies 1 van de 3 opties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Country Overview.

Bonaire is a Caribbean island of approximately 288 km², with circa 16,000 permanent inhabitants. Bonaire is a 'special municipality' of the Netherlands. The entire coastline of the island is designated as a marine sanctuary in an effort to protect what are considered to be some of the most pristine coral reefs in the Caribbean. Tourism accounts for the majority of economic activity on the island and fishery hold significant economic and cultural influence. Much of Bonaire's economy and many of its residents rely on the quality of the island's ecosystems. Bonaire currently has two protected natural areas: the Bonaire National Marine Park (BNMP) set up in 1979 and the Washington Slagbaai National Park (WSNP) set up in 1969. The national marine protected areas include five Ramsar areas - Lac, Gotomeer, Pekelmeer, Slagbaai and Klein Bonaire.



Results & Recommendations

The results of the surveys demonstrate that despite the current economic crises, Dutch citizens rank the environment as an important issue only slightly behind healthcare, education, and crime (see Figure 2). Air and water pollution were seen as the largest threats facing Dutch natural systems. After adjusting for preference and payment uncertainty of the respondent, the aggregated monthly amount for the non-use value of nature protection in the mainland Netherlands and the Caribbean Netherlands is estimated at € 34 million and € 17 million, respectively. Nationality influences the valuation of nature: Dutch citizens tend to value their community’s environment more than nature in the Netherlands, Caribbean Netherlands or worldwide, and more so than foreigners living in the Netherlands.

As expected, those expressing an overall smaller concern for natural environments had a lower WTP to protect them. Table 1 shows the overall aggregated value of nature in the Netherlands versus the Caribbean Netherlands.

Consumer confidence was found to be an important explanatory variable in determining respondents’ WTP. Expected, Dutch consumers take a bleak view of economic prospects. Being Dutch, however, they still scored on average 6+ on a 1-10 happiness scale.

Political party membership also affected WTP, the left-leaning respondents expressing more concern over environmental issues and having a higher willingness-to-pay than their more conservative brethren.

Dutch citizens rank the environment as an important issue only slightly behind healthcare, education, and crime

Table 1. Overall aggregated value of Dutch mainland citizens for nature protection

Number of households	7.5 million households
Value for Dutch Nature	€18 million per month
Value for Dutch Caribbean nature	€34 million per month

Figure 2

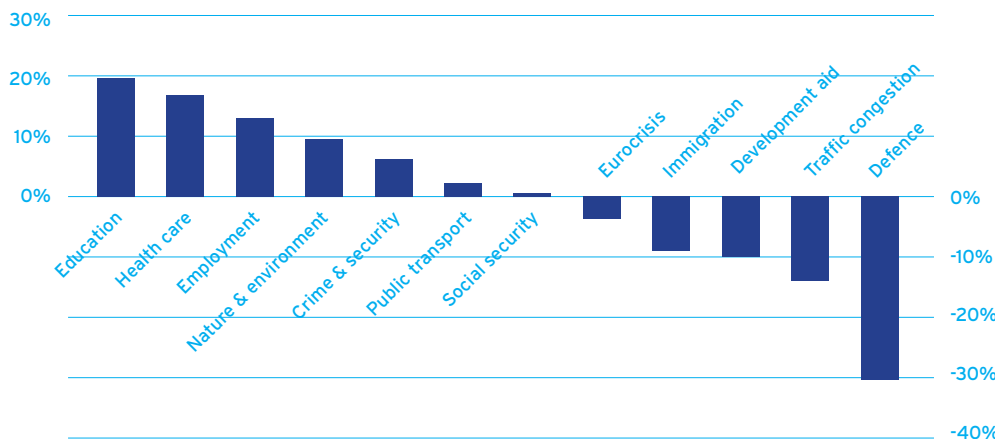


Figure 2: Relative importance of societal issues

Advancing age also seems to reduce the WTP value people place on environmental improvement. Overall, respondents indicated there was a need for extra management to avoid further environmental degradation in the Netherlands, even outside the mainland.

Typically, by making the respondents aware of the financial incapability of the 20,000 inhabitants of the islands to protect such unique biodiversity, the willingness of Dutch mainland citizens to contribute to nature protection in the Caribbean increased considerably. This highlights the solidarity of the respondents to the nature and the population of the Caribbean Netherlands.

A significant share of respondents in all versions demonstrated a higher WTP for nature conservation in the Netherlands. However a considerable percentage is willing to pay for nature conservation in the Caribbean Netherlands as well. Dutch nature is valued higher by those born in the Netherlands. In addition, university education and higher incomes are positively correlated with WTP in general. WTP for the protection of Caribbean Netherlands' nature is furthermore positively related to the general importance individuals attach to the natural environment, and the perceived threat to nature of climate change and urbanization. WTP is positively related to the likelihood that an individual will visit the Dutch Caribbean in the future, but this effect is only statistically significant for the highest category of this variable. Awareness of alleged corruption in the Dutch Caribbean and feelings of disconnectedness with the Dutch Caribbean negatively influenced WTP for nature protection in the Caribbean Netherlands.

The results of the research demonstrate the strong connection of Dutch citizens with nature in the Caribbean Netherlands. The levels of support exceed by far the actual funds that flow from the Netherlands to the Caribbean Netherlands.

This study convincingly shows that the Dutch population support the expansion of funding for protection of the unique nature of the islands in Bonaire, St Eustatius and Saba.

Furthermore the awareness of Dutch mainland citizens that only 20,000 inhabitants of Bonaire are in no position to support financially or in any other way, the necessary protection and conservation of this unique biodiversity creates for an important part this high WTP.

The main challenge of policy makers in both the Netherlands and the Caribbean Netherlands is how the estimated amount of €17 million per month can be captured from the Dutch population in real money terms. The most common way to do this is by reserving a larger amount of the tax payments by Dutch citizens for the purpose of protecting nature in the Dutch islands. Whether this is politically feasible remains another question. In any case has the study shown that the majority of the electorate in the Netherlands supports increased funding for additional nature protection of the unique nature in the Caribbean Netherlands?

Further Information

For further information about valuing Ecosystem Services on the island of Bonaire, contact Esther Wolfs (esther@wkics.com) or Pieter van Beukering at IVM (pieter.van.beukering@vu.nl) and the webpage www.ivm.vu.nl/en/projects/Projects/economics/Bonaire

The levels of support exceed by far the actual funds that flow from the Netherlands to the Caribbean Netherlands

References

Van Beukering P, Botzen W, Wolfs E, (2012) The non-use value of nature in the Netherlands and the Caribbean Netherlands. Applying and comparing contingent valuation and choice modelling approaches for the Ministry of Economic Affairs the Netherlands

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