IVM Institute for Environmental Studies

The Tourism Value of Nature on Saba

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Report R-14/08
17 March 2014

This report was commissioned by: Ministry of Economic Affairs, Netherlands

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List of abbreviations

CE	Choice Experiment
CI	Confidence Interval
CS	Consumer Surplus
CM	Choice Modelling
CVM	Contingent Valuation Method
IVM	Institute for Environmental Studies Amsterdam
PS	Producer Surplus
SCF	Saba Conservation Foundation
SIDS	Small Island Developing States
TEV	Total Economic Value
WTP	Willingness To Pay

Summary

Tourism is an important source of income for most Small Island Developing States (SIDS), including Saba. This study aims to value the services provided by nature to the tourism industry on Saba. The natural landscape, the coastal waters, the tranquillity and friendly local people are highly appreciated by tourists that visit the island. Healthy ecosystems are therefore crucial to the island. Human activities like development in the tourism industry are relevant to facilitate development of the island, on the other hand, have an impact on the natural environment. In order to fully understand this paradoxical relationship, the economic value of the cultural and recreational ecosystem services to tourists and the economic contribution of nature to the tourism sector on Saba are determined. Transparency about these values and the beneficiaries of ecosystem services can support the local and national government and other stakeholders in decision-making processes.

These values are retrieved using a Choice Modelling method. During six weeks, a total of 390 visitors on Saba and Statia have been interviewed. 200 of these respondents were interviewed during their stay on Saba. With the use of a choice experiment, the willingness to pay (WTP) of tourists for the maintenance or improvement of nature and other island aspects is determined. The results also show the preferences of tourists concerning the different ecosystems and other island aspects. Characteristics, expenditures and perceptions about Saban nature of visitors are retrieved through the complementary survey.

This study also made clear that next to ecosystem-based activities, tourists highly appreciate other island aspects such as the tranquillity, the friendly local people and visiting archaeological heritage. These aspects are part of the attractiveness of the islands and should be taken into account when growth in the tourism sector is desired. The total revenue by the tourism industry of Saba is estimated to be almost 6 million USD per year. The results from the survey demonstrate that tourists are willing to pay an additional amount of 1.6 million USD for extra nature conservation efforts on the island.

1 Introduction

Saba is a tropical island in the Dutch Caribbean with unique flora and fauna. Visitors from all over the world visit the island to experience the corals and the fish and the lush vegetation on the volcano slopes. Also the charming island village and the tranquillity on the island are characteristics that appeal to tourists.

Saba can be characterized as a Small Island Development State (SIDS)[1]. SIDS share specific characteristics limiting their socio-economic development due to remoteness and small capacity. In general, the island relies a lot on their natural resources. The natural beauty attracts a lot of tourism, which functions as an important source of income.

The value of services provided by ecosystems should not be taken for granted. Especially SIDS have fragile natural environments due to a variety of reasons; the impact of human activities, including tourism, is relatively large compared to other areas. This does not only threaten the natural environment itself, but also the main source of income for a small island that is reliant on the health of its natural wealth. Instead of taking the environment for granted, these socio-economic values of the ecosystem services should be determined and included in economic models and decision-making to make sure that 'all the goods and services provided by all affected ecosystems are taken into account when decisions are made about future developments on small islands' (van Beukering et al. 2007: 19).

Economic valuation of ecosystem services deals with this issue and aims to express the value of ecosystem services in monetary units, making it easy to communicate these values to stakeholders and include the values in decision support tools, such as cost-benefit analysis. With the economic valuation projects on Saba, the national government and the local island governments will be provided with transparent information on which environmental management or development decisions can be based, as well as decisions for the allocation of funds regarding the protection of nature (van Beukering et al. 2012; Min. van EZ, 2013).

The aim of this study is to value the ecosystem services that are relevant to tourists and thereby the tourism sector on Saba. In this study a survey with a choice model (CM) is used to determine the economic value of nature for tourism. This method aims to determine the willingness to pay (WTP) of tourists for additional environmental management. The questionnaire also investigates the current tourist expenditures that can be attributed to the local ecosystems and delivers insight in the perception of tourists regarding the natural environment on Saba.[2]

The report is structured as follows: Chapter 2 will explain the context of this study including a description of Saba. Chapter 3 will start with the theoretical background behind the concept of ecosystem service and will furthermore describe the research methodology and the design of the survey. In Chapter 4 the results of the questionnaire and the CE will be presented. The conclusions and the recommendations are presented in Chapter 5.

[1] http://sustainabledevelopment.un.org/index.php?menu=1520

[2] This study serves as input for the complementary study 'The total economic value of nature on Saba'. Both studies are part of the project 'What is Saba's Nature Worth?' and The Economics of Ecosystems and Biodiversity Caribbean Netherlands.

2 Context of this study

Need for valuation studies in Small Island Developing States (SIDS)

Saba is a Small Island Developing State (SIDS). This term applies to a category of islands in the Caribbean, the Pacific and the Indian Ocean that share specific characteristics and face similar challenges (van Beukering *et al.*, 2007). These characteristics are their small size, a small population, their remoteness, a lack of natural resources (like oil), their vulnerability to natural disasters and an economy which is dependent on a narrow range of products and therefore highly dependent on international trade which makes them vulnerable to external shocks (Ghina, 2003). A more extensive list of characteristics can be found in Figure 27 in Appendix D. These characteristics make the ecosystems on which the islands depend fragile and their economy very vulnerable (van Beukering *et al.*, 2007). These characteristics also form constraints for these islands to pursue economic development. Therefore, it is recognized that SIDS need special attention and support to be able to develop in a sustainable way (Ghina, 2003; Abeyratne, 1999). The most important environmental problems that SIDS face include for example climate change, sea level rises, pollution and tourism (Ghina, 2003).

SIDS and tourism

Many Caribbean islands used to depend economically on the export of primary agricultural products (Pantin, 1999). Nowadays, tourism has become one of the main sources of income for many SIDS, especially in the Caribbean (Thomas-Hope & Jardine-Comrie, 2007; Abeyratne, 1999). In fact, tourism has also been one of the only sectors that experienced growth in the recent years on small islands (Scheyvens & Momson, 2008). The remoteness and the presence of unique nature makes many SIDS attractive to foreign visitors (UNWTO, 2012). The environment can therefore be seen as key importance to tourism (Sinclair, 1998). A study by the World Resource Institute calculated that coral reef degradation by human activity and climate change can lead to a loss of USD 100 to USD 300 million from tourism in the Caribbean region by 2015 (WRI, 2004).

The impact of tourism on the islands can be problematic and more damaging than on the mainland because of the above mentioned characteristics of SIDS, including their fragile ecosystems the interrelatedness of the ecosystems and limited availability of land. Especially on these islands values have to be determined and included in decision-making on future development and nature conservation (van Beukering *et al.*, 2007). According to the World Tourism Organisation, tourism can be a sustainable source of income for small islands, especially compared to other practices like logging, mining or farming (UNWTO, 20120: 33). However, the environment should not be taken for granted and local stakeholders should be aware of the impact of human activity on the natural environment. Sustainable development should safeguard that future generations can benefit from the services that nature provides as well.

2.1 Project framework and funding

Since October 10, 2010, Bonaire, St Eustatius and Saba (BES-Islands) have taken on the status of special municipalities within the Netherlands. This constitutional change means that these islands, including the unique nature, are now officially part of the

Netherlands. They are referred to as the 'Caribbean Netherlands' but also known as the BES-islands. This constitutional change gives the Netherlands, next to the islands themselves, responsibility concerning the conservation of nature on the BES-islands.

Table 1gives an overview of the total area of nature parks in the Caribbean Netherlands (which is not to be confused with the total area of natural landscape) and species that officially became part of the Netherlands after October 10, 2010. The total area of nature parks on Saba specifically and a brief description of the nature parks is shown in Figure 26 in Appendix C.

This is an economic valuation study of the importance of ecosystems on Saba for the local tourism sector. The study is part of the larger project 'What is Saba's nature worth?' The respondents in the tourism survey conducted for this study are interviewed on both Saba and St Eustatius. Although some comparative insights are given between both islands, this report will mainly focus on the results that are based on the respondents from Saba. A similar report is written on the results for St Eustatius.
These studies are commissioned by the Ministry of Economic affairs and performed by the Institute for Environmental Studies in Amsterdam (IVM) in collaboration with the research firm Wolfs Company (former WKICS). Aiming at valuing nature across the Caribbean Netherlands, a similar economic valuation study has been performed on Bonaire[3] in 2012.

Table 1 Characteristics of nature in the Netherlands' Mainland and the Caribbean Netherlands (van Beukering et al., 2012)

Nature indicator	Netherlands Mainland	Caribbean Netherlands
Area of terrestrial nature parks	12,685 km2 (30% of total area)	49.4 km2 (15.7 % of total area)
Area of marine nature parks	2,330 km2 (4% of total area)***	75 km2 (0.3% of total area) with Sababank= 2,754 km2 (11% of total area)
Number of animal species*	27,000	2,831****
Number of endemic animal species	14**	85**** of which 25 in Caribbean Netherlands
Number of plant species*	3,900	1,259****
Number of endemic plant species	0	7****

Sources: Dutch Caribbean Nature Alliance (2012); Staatsbosbeheer (2012); WUR (2012).
* Note however not all species are known and new species are still being discovered.
** www.natuurinformatie.nl names 2 species of sponges and 10 ciliary worms and one mouse subspecie and a butterfly.
*** 3 protected areas in the North Sea are in the Exclusive Economic Zone; Vlakte van Raan (17,521 ha), Voordelta (92,367 ha) and North Sea Coastal Zone (123,134 ha). Total area Dutch North Sea is 57,000 km2.
**** Number of species in Dutch Caribbean (including Aruba, Curacao and St Maarten).

[3] The projects 'What is Bonaire's nature worth?', 'What is Saba's nature worth?' and 'What is St Eustatius' nature worth?' are part of The Economics of Ecosystems and Biodiversity Netherlands study (TEEB NL) (PBL, 2010) and are commissioned by the Ministry of Economic Affairs.

2.2 Saba

Geography and demographics

Saba is located in the Caribbean as shown in Figure 1. The island is part of the Lesser Antilles, which is a group of volcanic islands in the Caribbean Sea. Together with Bonaire and St Eustatius, the island is part of the Caribbean Netherlands. The Caribbean Netherlands is officially part of the Netherlands since 2010 as a 'public entity'.

Saba covers an area of 13 square kilometres. Being part of the Netherlands, Dutch is the official language on the island. However, English is spoken by the majority of the population on the island. Saba has almost 2,000 inhabitants according to the last census (CBS, 2013). A medical school is located that offers education to students that are mainly coming from the USA. Saba houses 500 students (CHL, 2011).

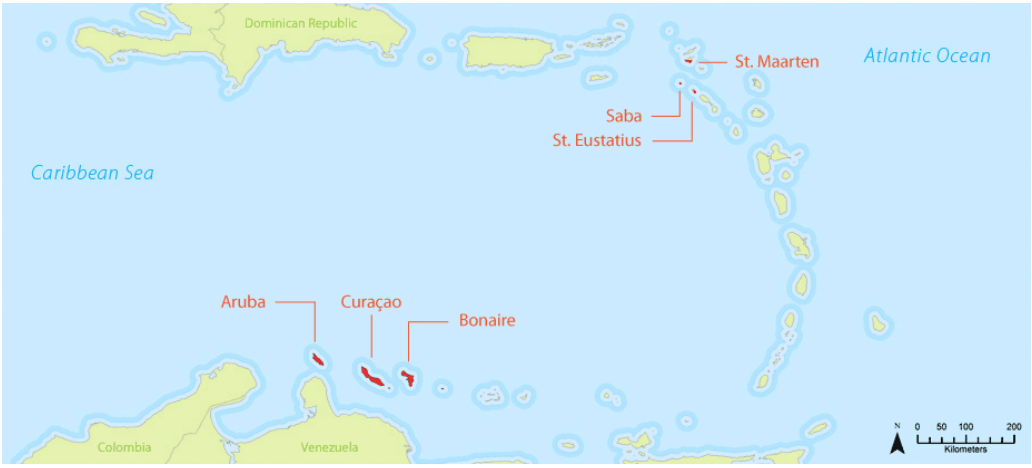

Figure 1 Geographical position of Saba (DCNA, 2012).

Economy

The most recent data on the economy of Saba dates from 2007. Based on this study, income from hotels and restaurants is the fourth biggest source of sales, (and third biggest source of profit) made on Saba (SESNA, 2007). But the sales from dive shops and other tourism related businesses is not included in the report, which makes it hard to estimate importance of the tourism industry.

According to the socio-economic study of Buchan, Framhein & Fernandes in 1997, tourism was the mainstay of the Saban economy at that time. In the Tourism Plan for Saba of 2011 it is also stated that tourism is the most important economic sector, followed by the medical school. The government is the biggest employer on the island. Unfortunately, there is a lack of data concerning the economy of Saba, which is also noted in the Tourism Plan for Saba (CHL, 2011). This means that the exact share of tourism as part of the Gross Domestic Product is not known. The employment per sector is known and is presented in Figure 2.

Tourism numbers

Although Saba is small island, it does attract a substantial number of visitors. In 2010, Saba received 22,500 visitors (CHL, 2011). It has to be noted that these numbers include people that visit the island for leisure or other reasons like work related purposes or visiting friends or family. It is hard to say something about the development of tourism in the last three years, since there is no recent data available

on tourism numbers. In general, the local stakeholders in the tourism sector on Saba indicated that they experienced a decline in tourists over the last years. The reason for this decline is not clear.

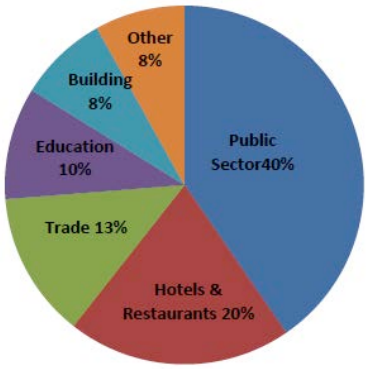

Figure 2 Sectoral employment distribution on Saba (CHL, 2011).

Tourism development

Saba has ambitious plans when it comes to tourism development. The Irish consultancy agency CHL Consulting Group developed Tourism Plan for Saba, which was commissioned by the executive council of Saba. The concern of the Executive Council of Saba is that the amount of tourists is currently the same as it was a decade ago, while they believe that they have the natural and cultural resources available to become a more attractive holiday destination (CHL, 2011). Hurricane damages, no budget for marketing and limited accommodations are put forward as the main reasons for a lack in tourism growth. Hurricanes have in the past damaged tourist facilities like hotels and hiking trails and during the hurricane season less tourists visit the island (CHL, 2011). The aim is to double tourism by 2020 on Saba and make tourism the 'growth engine of the economy' (CHL, 2011: 1).

Ecosystems and threats

Saba is a volcanic island with unique flora and fauna. The island is home to the highest mountain in the kingdom of the Netherlands, Mount Scenery at 877 metres. The top of Mount Scenery is covered with Elfin forest, which is also known as cloud forest. This is a unique ecosystem consisting of tropical rainforest with old mahogany trees, which is covered in clouds most of the time (DCNA, 2012). The natural environment of Saba furthermore provides habitat for some endangered species, of which the endemic the Saban Anole and the Saban Least Gecko. Because of the moisture, the vegetation in the cloud forest is very different from the rest of the island. The rest of the volcano slopes are covered with primary and secondary rainforest (DCNA, 2012).

The Saba marine park protects coral patches, sea grass beds and many underwater pinnacles around the island that rise from the ocean floor and which are covered with corals. The pinnacles are formed by past volcanic activity (Saba Marine Park, 2013). The Saba Bank, one of the largest atolls in the world with an area of 2,000 km2, is located approximately 3 to 5 km southwest of Saba. It contains rare and unique species such as turtles, sharks, lobsters, whales and different types of coral. Fish and lobster stocks on the Saba Bank are targeted by Saban fishermen.

Table 2 shows the different ecosystems on Saba that are being valued in this study. The ecosystem services that are provided to tourists and the possible threats to the ecosystems are also described in the table.

Table 2 Ecosystems, ecosystem services and threats to ecosystems on Saba

Ecosystem	Ecosystem services	Threats to ecosystem
Marine ecosystems		
Coral	Recreational: diving, snorkelling, fishing, aesthetic appreciation	Water sports, overfishing, oil spill, anchoring, invasive species (e.g. lionfish), climate change, erosion, nitrification
Coastal area (harbour & beaches)	Recreational: beach visit, swimming, hiking, boating	Littering, oil spill, erosion
Terrestrial ecosystems		
Elfin forest	Recreational: hiking, bird watching etc. Aesthetic, spiritual and artistic appreciation and inspiration Regulating: Carbon Sequestration	Roaming animals, construction activities, littering, invasive species (e.g. Coralita)
Rainforest	Recreational: hiking, bird watching etc. Aesthetic, spiritual and artistic appreciation and inspiration Regulating: Carbon Sequestration	Roaming animals, construction activities, littering, invasive species (e.g. Coralita)

2.3 Prior studies

There have been economic valuation studies performed before on Saba and other Caribbean islands. In 1997, a socio-economic study of the Saba Marine Park has been conducted (Buchan et al., 1997) and in 2010 the St Eustatius National Marine Park (STENAPA) determined the monetary value of the coral reefs (Bervoets, 2010). The STENAPA study from 2010 calculated that tourism related income from coral reefs on St Eustatius is 9 million USD. The study of Buchan et al. (1997) concluded that the contribution of the Saba Marine Park to the tourist sector of Saba's economy is 8.8 million USD. The yearly income from coral reefs for the whole Caribbean is estimated to be 3.1 to 4.6 billion USD, mainly from fishing and coastal tourism (Hoogenboezem-Lanslots et al., 2010).

These studies base their results on the total revenue that is generated by hotels, restaurants, dive shops and local fisherman. A novelty to earlier studies on Saba is that with this study also estimates the value of ecosystem services that are not traded in markets. By investigating the willingness to pay (WTP) of local residents and visitors for additional environmental management, the study also takes values of nature into account that are currently consumed for free. Furthermore, the study encompasses more than just information on the nature parks. It provides a rich source of information on preferences of tourists on a range of environmental aspects.

Although tourism is an important source of income for the island (and increasingly so according to the Tourism Strategic Plan) the dependence of the sector on the natural environment has never been quantified sufficiently. This study will provide information on the value of the natural environment for the tourism sector on Saba and is embedded in a project that aims to value other goods and services provided by ecosystems on the island. In the end, the Total Economic Value (TEV) of nature can be determined.

3 Methodology

This chapter provides the theoretical and procedural background on the research methods used in this study. The first paragraph starts with the description of the theory where economic valuation is based on and the application of this theory for small islands like Saba. The next paragraphs deal with the Choice Modelling method used in this study, including the design of the survey, the Choice Experiment and the procedure for data collection.

3.1 Theoretical background

Environmental economics

The principles, on which environmental economics are based, form the theoretical fundament of this study. Environmental economics helps to identify and clarify the circumstances or causes for the degradation of the environment (Tietenberg & Lewis, 2010). From an environmental economics point of view, natural resources are subject to market failure. Market failure is a situation where market prices do not reflect the full social costs and benefits associated with a good or service. This leads to an inefficient allocation of resources (TEEB, 2010). There are different sources of market failure. The market for natural resources often fails because externalities exist and most services provided by ecosystems are public goods or quasi-public goods. The issue with public goods is that people do not feel responsible to pay for the good a good that they consume, which leads to overexploitation and degradation of the good or a supply of the natural resource that is less than optimal (Tietenberg & Lewis, 2010).

The so-called 'tragedy of the commons' problem can occur when property rights for ecosystems services are not clearly defined. One of the consequences of ill-defined property rights is that people act only in their self-interest, overexploit and eventually deplete a natural resource. This is especially the case with open access resources that are finite (common-pool resources), like fish stocks or water in an aquifer (Tietenberg & Lewis, 2010). The recreational and cultural services provided by nature on Saba are either quasi-public goods or public goods since they are all non-rivalry and dependent on whether there is a fee charged, non-excludable or excludable. For example, a dive fee is charged to divers that enter the marine park (quasi-public good).

Valuing ecosystem services

Nature provides many benefits to society that range from provisioning food to recreational experiences. The benefits that people obtain from ecosystems are called ecosystem goods and services. If ecosystems change, for example through overexploitation by humans due to a market failure, this will affect human wellbeing (TEEB, 2010). In order to deal with market failures and accomplish an efficient allocation of resources, it is necessary to create insight in the full social costs of a decision or proposed action where natural resources are involved. Therefore, the values of the non-marketed ecosystem goods and services have to be determined in order to make well-informed decisions. The different sources of value that, combined, make up the TEV of an ecosystem are shown in Figure 3.

The concept of TEV is 'the sum of all marketed and non-marketed benefits associated with an ecosystem or environmental resource' (van Beukering *et al.*, 2007). Economic

valuation techniques retrieve the various values and express them in a monetary unit. This makes it possible to compare the benefits of various goods (TEEB, 2010). 'Willingness to pay' (WTP) is a widely used measure to determine the value of ecosystem goods and services (van Beukering *et al.*, 2007; Loomis, Kent, Strange, Fausch & Covich, 2000). Monetary valuation should be seen as

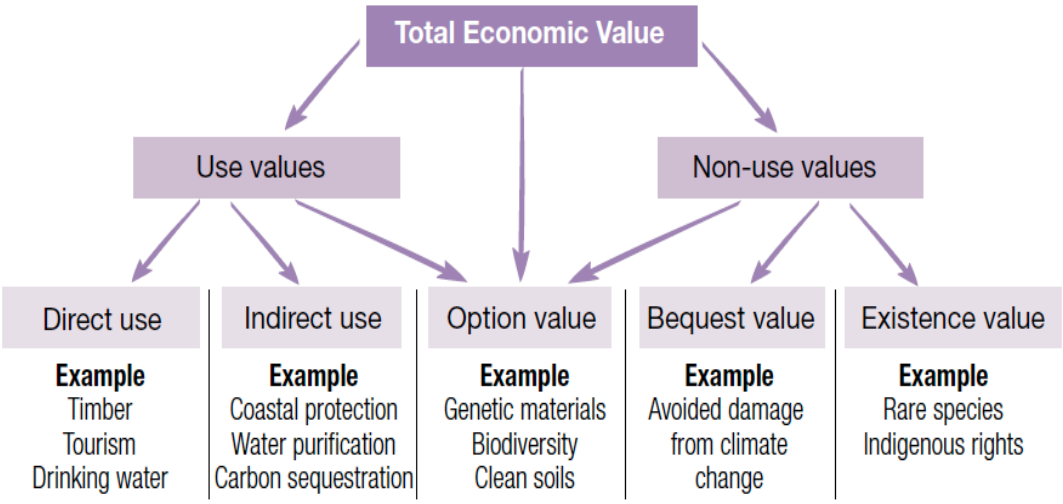

Figure 3 Total Economic Value (van Beukering et al., 2007).

a powerful instrument that can inform stakeholders and policymakers in a language everyone understands and everyone is used to (TEEB, 2010).

The focus of this study is on tourism and how tourists experience and value nature. Nature provides recreational services to tourists, like the opportunity to go hiking and diving, which is a direct use value, although resources are not extracted. Nature also provides cultural and aesthetic services, like beautiful views or inspiration for artistic expressions. Some of the values are not traded (e.g. hiking is free) or can be valued higher than prices indicate. Therefore, a non-market valuation techniques are used in this study (van Beukering *et al.*, 2007).

3.2 Research method

General

The method used for this study to determine the recreational and cultural value of nature to tourists is choice modelling (CM). A choice experiment (CE) is used with a complementary questionnaire. In the survey additional questions are asked to retrieve different characteristics of the respondents. This information can be used to determine whether these characteristics influence the values retrieved by the CE and expenditures are used to calculate the Consumer Surplus (CS). The information as such, gathered through the survey, is also interesting to local stakeholders since it shows what kind of tourists visit the island, what activities they engage in and how they appreciate what the island has to offer. Moreover, the survey gives insight in the dependence of activities on the local ecosystems and how sensitive tourists are to changes in local ecosystems.

Choice Modelling (CM)

Choice modelling (CM) is a stated preference method where respondents are indirectly asked for their WTP to preserve or enhance an ecosystem service. The method was developed in the field of marketing and psychology in the 1980's. The difference with the more familiar contingent valuation method CVM is that CM could measure how people value the different characteristics of a good instead of only the good itself (McCartney, 2011). CM was first applied in environmental evaluation in 1994 (Adamowicz, Louviere & Williams, 1994). CM is partly based on Lancaster's characteristic theory of value, which says that 'a good can be described as a bundle of attributes, or characteristics, and the levels that they take' (McCartney, 2011). It is also based on the Random Utility Theory, which explains how people make choices to maximize their utility. This is derived from general utility theory which describes that a respondent will select the scenario from a set of alternatives that provides him or her with the highest expected utility (Pearce & Ozdemiroglu, 2002).

The difference between what people are willing to pay for a good or service and what they are actually paying, is defined as the consumer surplus (McCartney, 2011). This economic value, which is not revealed in market prices, shows the value of the consumer for the provisioning of certain good (Laurence, Ian & Kenyon, 2003).

In this study, the WTP of respondents is derived through using the CE. The method can be seen in contrast to the contingent valuation method (CVM), which is also a stated preference method, where respondents are directly asked to state their WTP for a change in the provisioning of an ecosystem service. The CE consists of six cards that are shown to the respondent (for an example of a choice card see Figure 28 in Appendix E). With each card, respondents are asked to choose for a hypothetical scenario from a set of alternatives. Each scenario exists of different attributes of which one is the 'payment vehicle'. The payment vehicle is a monetary unit that is attached to a scenario, which makes it possible to retrieve the WTP per attribute.

The CE method can be used to determine use- and non-use values and is values different kinds of ecosystem services (van Beukering *et al.*, 2007). By estimating the WTP for a change in the provisioning of a good or service, policy makers are supported in deciding on marginal changes in the provisioning of a good (Hanley, Wright & Adamowicz, 1998). Next to these WTP values, results from a CE make it possible to compare the relative importance of the different attributes that determine environmental quality (van Beukering *et al.*, 2007; McCartney, 2011).

3.3 Choice experiment design

Selection of attributes

It was chosen to use the similar design for the choice experiments on Saba and St Eustatius to be able to compare results and increase the precision of the analysis. The five attributes for the CE were chosen after a first consultation visits to St Eustatius and Saba by Wolfs Company, where stakeholders were invited to give their input for the design of the CE. A second consultation of the stakeholders took place during a seminar where the final design of the attributes with corresponding levels was discussed. The attributes were decided upon based of their relevance to tourists visiting one of the two islands and because of the relevance to societal matters.

The attributes that are used in the CE that was conducted among tourists on Saba and St Eustatius are natural landscape, coastal waters, crowdedness, and archaeology. The

fifth attribute is a financial contribution, which is the monetary unit that is attached to each scenario. This is called the payment vehicle.

The different levels of the attributes in the CE are represented by drawings. The use of the drawings is a conscious choice since a CE is already quite complex and pictures can communicate a lot of information in an effective and efficient way (Mathews, Freeman & Desvousges, 2006).

Natural landscape
This attribute refers to the landscape beauty and the attractiveness of the natural landscape for recreational activities like hiking or an island tour. This takes into account the quality of the vegetation.

Coastal waters
This attribute refers to the quality of the coastal waters for recreation and tourist activities like diving, snorkeling and swimming. This takes into account reef quality (fish, algae and coral biodiversity) as well as water quality (clarity and pollution).

Crowdedness
This attribute refers to the number of fellow tourists on the island. It takes into account the crowdedness on the beaches, in the villages, on the trails as well as the vehicle traffic across the island.

Archaeology
This attribute refers to the possibility to visit historical sites and displayed artefacts. This takes into account the accessibility and maintenance of the site.

Contribution per day
This attribute is the payment vehicle and is a contribution that all tourists would pay, which would be used for environmental and heritage management on the island.

Payment vehicle

The choice for the payment vehicle was based on the fact that tourists on Saba and St Eustatius already pay different taxes, entrance fees and dive fees to finance environmental management. To avoid any confusion or overlap it was decided to use contribution as a payment vehicle. This also makes it clear that an additional payment is meant, making it an appropriate way to measure the consumer surplus (Schep et al. 2012).

Assignment of levels

Later on in the design process, when the attributes were defined, appropriate levels of the attributes and corresponding pictures had to be assigned. Especially for the pictures that represent the different levels, input was asked during a seminar for stakeholders on Saba and St Eustatius. This resulted for example in the addition of a

shark to the 'excellent' level of the coastal waters. According to the dive shop owners sharks are a big attraction to divers. The input from the stakeholders also led to a change in the levels of the attributes in the 'expected future scenario'. The levels for natural landscape and coastal waters were changed from 'poor' to 'moderate' since the stakeholders stated that 'poor' was not a realistic representation of the expected future scenario.

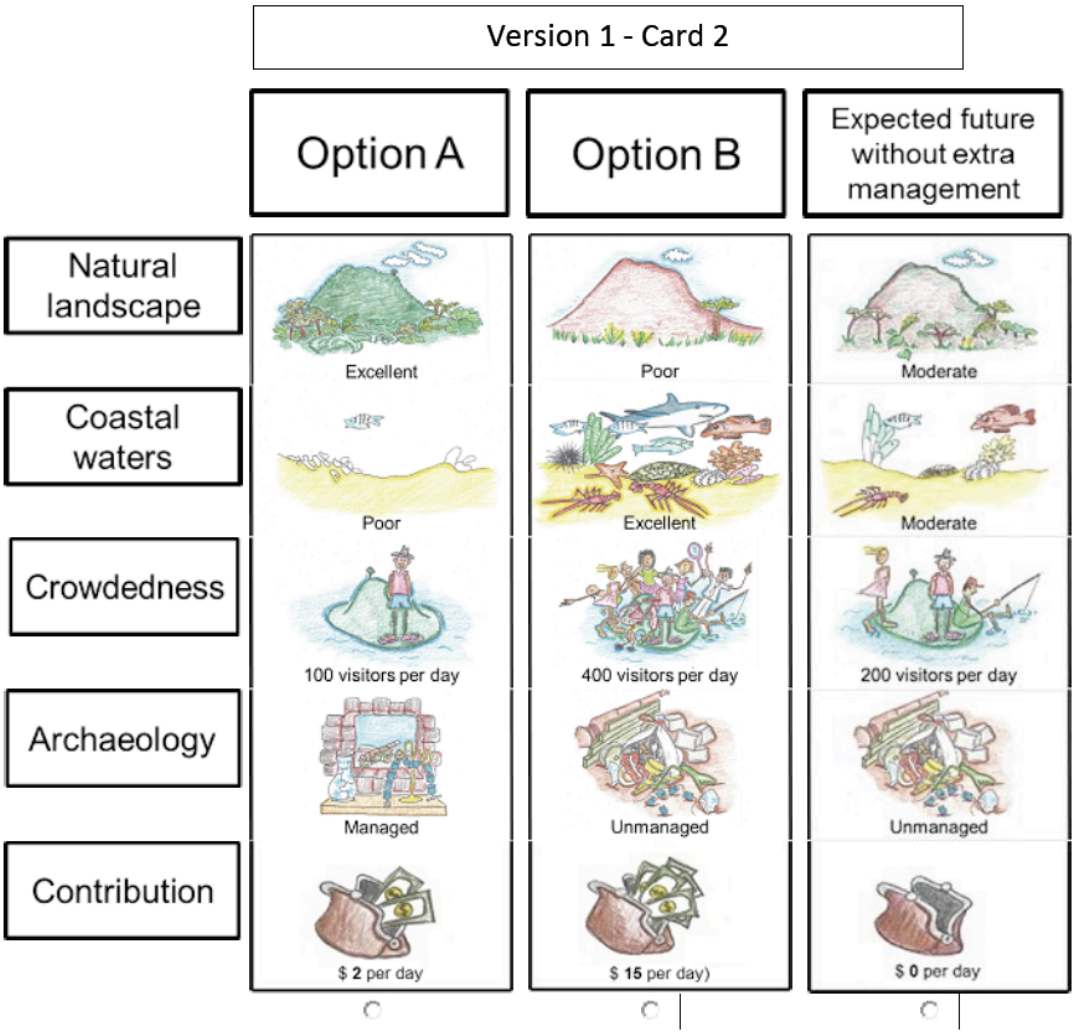

Figure 4 One of the choice cards used in the CE on Saba and St Eustatius. Respondents could choose between option A, option B or the 'Expected future without extra management'.

Experimental design

Once the attributes and corresponding levels and drawings are defined, the statistical software Sawtooth is used to design the choice sets. The software calculates the optimal design of the CE. In total, 48 different choice cards were created. From these choice cards, 8 different choice sets were selected. One choice set consists of 6 choice cards. Three alternatives (scenario's) are shown on each choice card. The last of the three alternatives stays the same on each choice card and for this alternative no payment is involved. This opt-out alternative is named 'expected future without extra management' and the levels of the attributes in this alternative are realistic for Saba and St Eustatius if there would be no environmental management from now on.

Every choice set contained an identical seventh card, which was an example card. This card was only used by the interviewer to explain the functioning of the CE and the respondent did not have to make any decision for this card yet. This example card was made to reduce an interviewer bias, which could occur if the interviewer would for example use the first real choice card to explain the CE.

Table 3 Attributes with corresponding levels

Attribute	Level 1	Level 2	Level 3	Level 4	Level 5
Natural landscape	Poor	Moderate	Excellent		
Coastal waters	Poor	Moderate	Good	Excellent	
Crowdedness	100 visitors per day	200 visitors per day	400 visitors per day		
Archaeology	Unmanaged	Managed			
Contribution	$0	$2 per day	$5 per day	$15 per day	$25 per day

3.4 Survey design

The CE is part of a survey where additional questions are asked to respondents. This is done to gather statistical information on the sample, for example to see if these factors can partly explain the WTP estimates from the CE and to create insight in the perception of tourists on the natural environment of Saba (McCartney, 2011; Lacle, 2012).

The first part of the survey contains questions on visitor characteristics like the purpose of the visit and for how long the respondent is staying on the island. Followed by questions on activities undertaken on the islands and the appreciation for these activities. The third part of the survey starts with questions on environmental awareness and is followed by the CE. After the CE, a question on perceived potential threats to the environment and statements specifically designed for Saba follows. The survey concludes with questions to gather demographical information of the respondents, including expenditures.

3.5 Procedure

Sample size

A sample size of roughly 400 respondents is necessary to successfully conduct a statistical analysis of the CE. When preparing this study it was clear that this amount of respondents could not be reached on each of the two islands because of time constraints and the fact that during the period of data collection it was low season on Saba and St Eustatius regarding tourism. Instead, it was decided to conduct 200 surveys on St Eustatius and 200 on Saba.

Sampling

The surveys were conducted from in April and May, 2013. Due to the scarcity of available tourists on Saba and St Eustatius, convenience sampling was used to reach the targeted number of respondents. Since the islands are so small and no database of respondents is available to take a sample from, convenience sampling seemed to be the most obvious sampling technique.

The sampling period was six weeks. An interview team consisting of four local residents on Saba and six local residents on St Eustatius were recruited and trained to conduct surveys on both island. The interviewers earned a monetary compensation of $10 for every completed interview. Beforehand the interviewers attended a training session in order to get familiar with the survey and the CE and get more information on the overall aims of this study.

3.6 Possible biases and challenges

With the use CM, several biases with respect to the actual WTP of respondents can occur. In the case of certain biases, the CM method has some advantages over the CVM. Strategic bias can arise when a respondent provides a biased answer to influence the outcome since that might positively benefit him or her. A respondent might also give a biased answer just to seem socially responsible and involved, also known as 'yeah-saying'. The CM method reduces strategic bias behaviour because respondents are asked to evaluate different attributes at the same time and also to repeatedly make these trade-offs (van Beukering *et al.*, 2007). The complexity of the CE makes it harder to behave strategically compared to some questions in the survey and the CVM.

There is still much debate on whether the hypothetical bias is a big problem with stated preference methods. The scenario's presented to respondents in a CE are hypothetical scenario's and the choices that respondents make in a CE might differ from choices made in real life situations Some sources say that WTP estimates from CV and CM studies are much higher than actual payments, while other sources contradict this (Hanley, Mourato and Wright, 2001; Kahneman & Knetsch, 1992; Arrow *et al.*, 1993; Tietenberg & Lewis, 2010). While this might raise questions about the validity of the results of the CE, stated preference methods are currently the only available to capture values that cannot be determined with revealed preference methods (McCartney, 2011: 17). Adding certainty scales after the choice questions can reduce the hypothetical bias (McCartney, 2011).

Since the CEs were conducted face-to-face, the chance of interviewer bias is present. The way an interviewer approaches a respondent and the way he or she poses the questions can influence the respondent's decisions. But conducting the survey face-to-face also has advantages since the interviewer can provide extra explanation when necessary (McCartney, 2011).

The complexity of a CE is one of the main 'weaknesses' of CM. There is a maximum amount of information that people can meaningfully handle when making decisions. Too much information and considering multiple attributes and multiple alternatives at a time can lead to cognitive burden (McCartney, 2011). A result of this cognitive complexity can be that respondents get tired after a few choice cards and start giving more random, irrational answers or more often chose the 'without management' option, thereby not necessarily making a conscious trade-off. To minimize the complexity aspect, the number of attributes, number of alternatives on a choice card and total amount of choice cards were limited in the survey.

4 Results

This chapter will start with a description of the visitor arrivals on Saba. Next, the general visitor characteristics will be discussed. Subsequently the experience of the island by respondents and the activities they participated in and their appreciation is discussed. This is followed by the environmental awareness and WTP preparedness of respondents, the perceived potential threats to the environment by respondents and statements about the island specifically. Statements on return visits will be presented. This chapter will end with an analysis of possible associations of variables with the WTP preparedness of respondents.

4.1 Visitor numbers

The Tourism Office on Saba collected the tourism numbers until 2010. After the constitutional change in 2010, CBS is in charge of collecting data on tourism numbers. Unfortunately the data for 2011-2013 are not yet available from the CBS. So the most recent data on tourism numbers for Saba is used for this report. Figure 5 shows the trend in visitor arrivals over the last years. It is clear that the amount of visitors did not change very much but the general tendency is a decline in visitor numbers which was also confirmed by people that work in the tourism sector on the island. What should be noted here is that the tourism numbers of Saba refers to arrival numbers. The number of 'foreigners' that arrives by airplane, by ferry or yacht, which includes everyone except local residents. These foreigners can have multiple purposes for visiting the island, not only leisure purposes. In our sample we also included visitors that are former residents or are visiting friends or family and people that visit the island for a combination of business or visiting friends and family and leisure. However, since there is no data available on this breakdown in total visitor numbers, it is hard to see whether our sample is representative in that case.

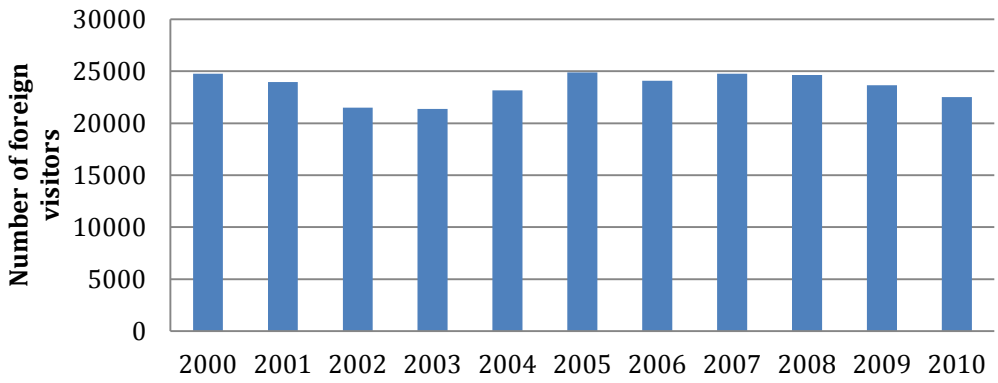

Figure 5 Total visitor arrivals for Saba (CHL, 2011; Hoogenboezem-Lanslots et al., 2010)

4.2 Representativeness

To check whether our sample is representative for a few demographical aspects, the most recent data on how many tourists and the composition of the tourists that visit Saba on a yearly basis is discussed here. The demographic aspects that can be compared are the proportion of day versus stay-over tourists and country of origin of visitors.

When comparing the proportion of day and stay-over tourists on Saba from our sample with the indication that is made by the tourism office on Saba in 2010, a big difference is observable, see Figure 6. Apparently the number of day tourists is much lower in our sample. An explanation for this difference could be that day tourists are harder to tackle for an interview since they will only be on the island for a few hours. During these hours they usually go hiking, sightseeing and sometime also diving or snorkelling. Their time is very precious and since the survey takes at least twenty minutes to complete, they might prefer not to participate. The difference can also be caused by seasonality; the share of day tourists might be different in the low season compared to the high season. Some of the survey results will be split into answers from day versus stay-over tourists. This will not be done in all cases since the amount of day tourists in our sample is very small (only 68 respondents) and will not always give a representative impression of this group.

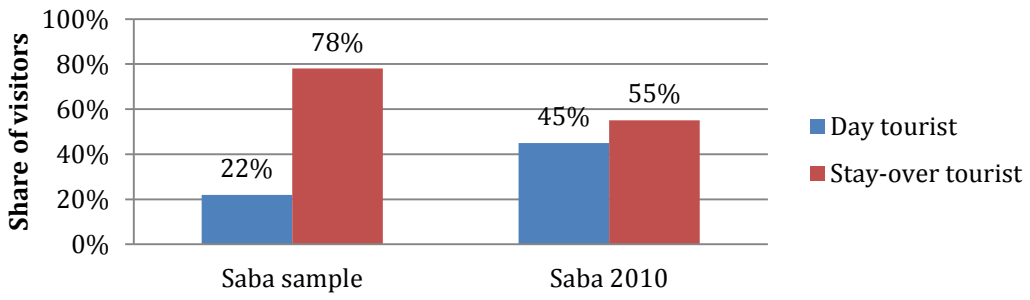

Figure 6 Proportion of day tourists and stay-over tourists in the sample and on Saba in 2010 (CHL, 2010)

As seen in Figure 7, the amount of tourists from the USA and Canada is overrepresented in our sample from Saba; the amount of Dutch visitors is underrepresented. Most of the tourists in our sample arrive from the USA, followed by the Netherlands and Canada. The data from CHL (2010) indicates that the group 'other' is on third place with quite a big share. It is unclear which countries are forming this category.

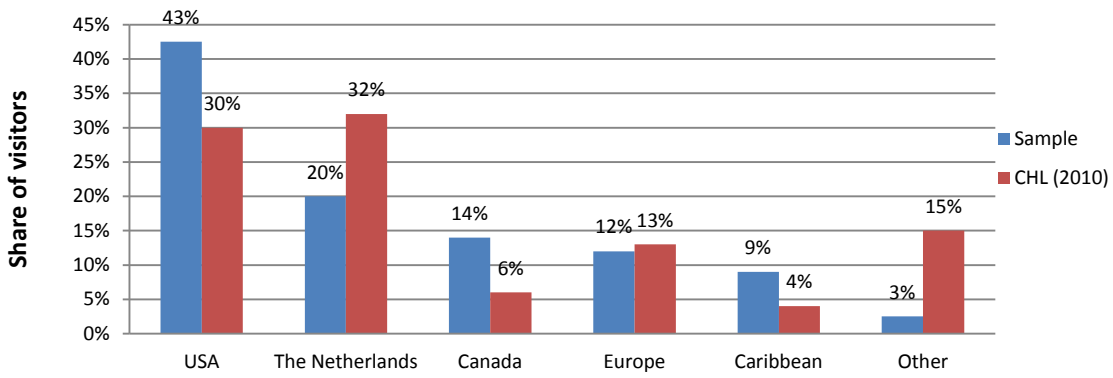

Figure 7 Comparison of country of origin of respondents on Saba in the sample with total visitor numbers on Saba in 2010 (CHL, 2010).[4]

[4] In the category Europe, the Netherlands is not included.

Because Saba is well known place for scuba diving, and this is where the island likes to advertise with as well. The representativeness of the amount of respondents that went diving in our sample is first compared to the total amount of divers on Saba in 2010. It is clear that the distribution in our sample is comparable with the number of divers on Saba in 2010. The amount of divers is slightly overrepresented in the sample. The amount of divers in the sample is made up of respondents that indicated that they had been diving and respondents that indicated that they are still planning to go diving.

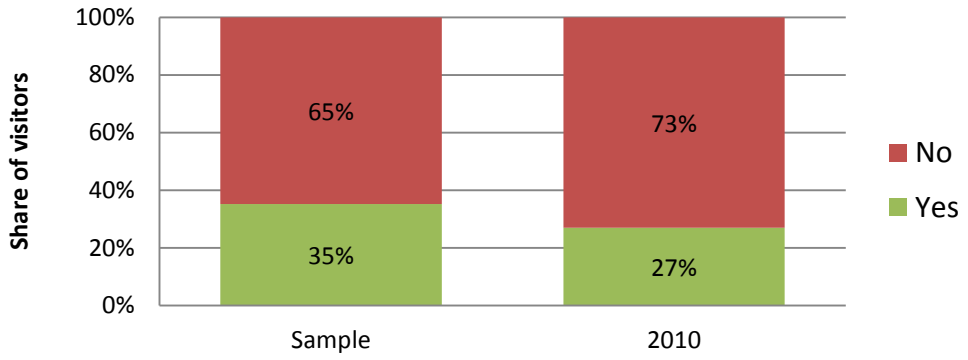

Figure 8 Proportion of divers in the sample and in 2010 (SCF, 2011) ('Yes' represents the percentage of divers)

4.3 Visitor characteristics

Figure 9 gives an overview of the different purposes of respondents to visit Saba. 73 percent of the tourists come for leisure, while 27 percent is either visiting friends or family or combining business and visiting friends or family with leisure. The largest share of leisure tourists is visiting from the United States.

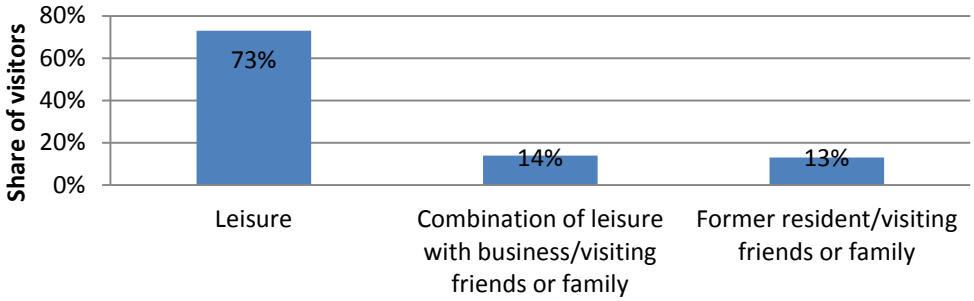

Figure 9 Purpose of visit of the respondents on Saba

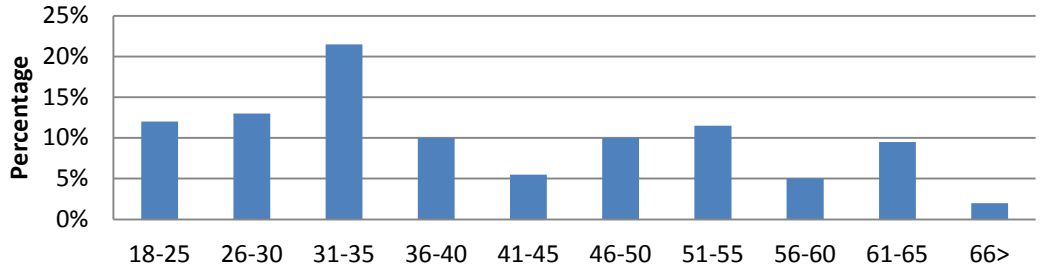

Figure 10 Division of respondents per age category

Figure 11 shows that most respondents on Saba travel with their partner. This can be explained by the purpose of their visit. This is tested with crosstabulations and it showed that most of the respondents that have pure leisure puposes travel with their partner. The sample contains many respondents with a pure leisure purpose of their visit (see Figure 9). Respondents that visit the island for a combination of leisure with business or visiting friends or family more often travel alone.

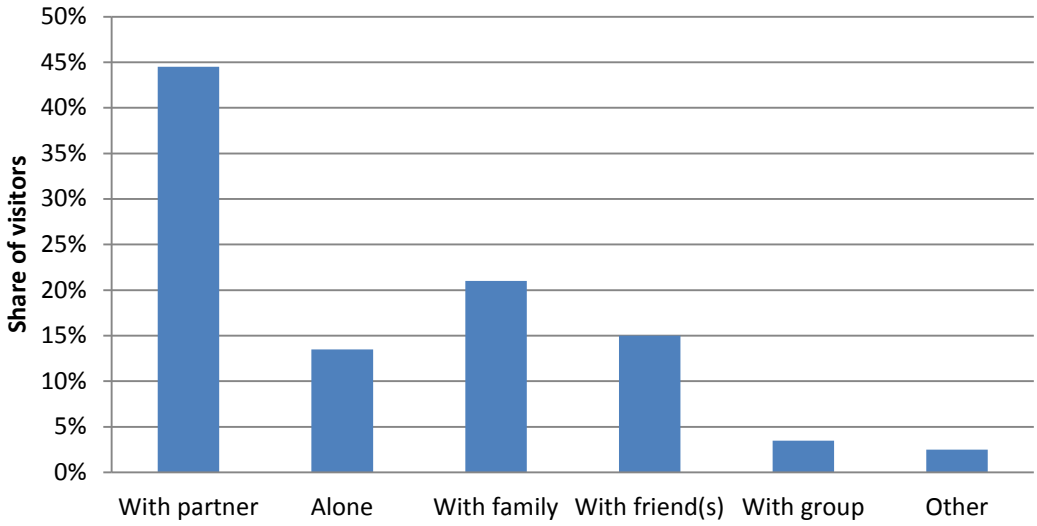

Figure 11 Travel composition of visitors of Saba.

Figure 12 presents the income distribution of the respondents in the sample for Saba. Most of the respondents earn between $2,000-2,999 and $5,000-7,999 per month. There is a sudden drop in the category $1,500-1,999 which can be explained by the fact that most respondents in the first category ($0-1,499) are students and most respondents that are employed earn $2,000 or more per month. That is why the gap between the first and the third category exists. There is also a small peak in the last two categories for respondents. This might be due to the fact that some respondents accidentally referred to their yearly income or to the fact that tourists that visit Saba are relatively wealthy.

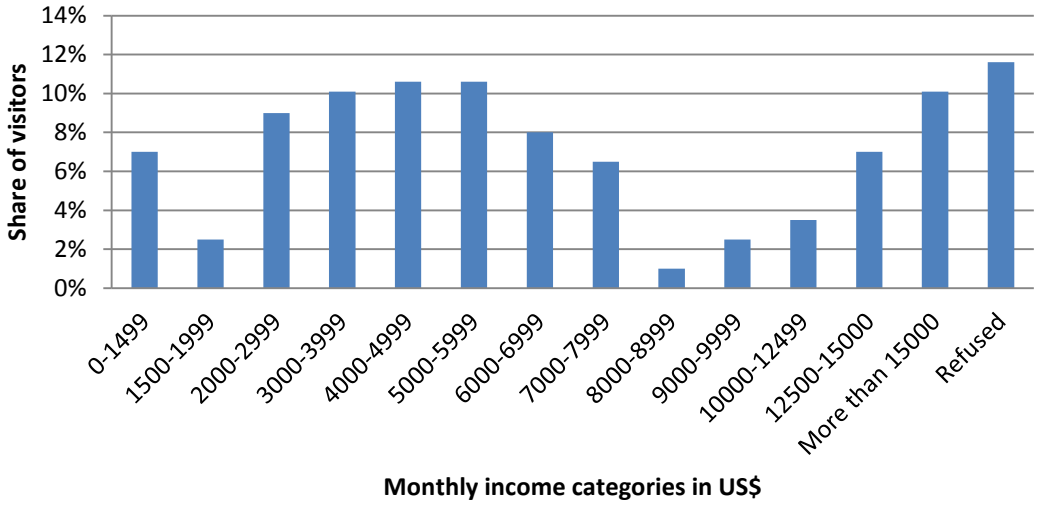

Figure 12 Monthly household income before taxes in USD of respondents on Saba

Most of the respondents in the sample are higher educated (i.e. Bachelors, University or Master degree), as shown in Figure 13. There are two factors that can explain this outcome: a selection bias can be present where mostly higher educated tourists are interviewed, or especially higher educated tourists visit Saba. The trip to and the stay on the island are both quite expensive which explains that mainly tourists with a higher income and also a higher education visit the island. However, we cannot check whether this distribution is representative for all tourists.

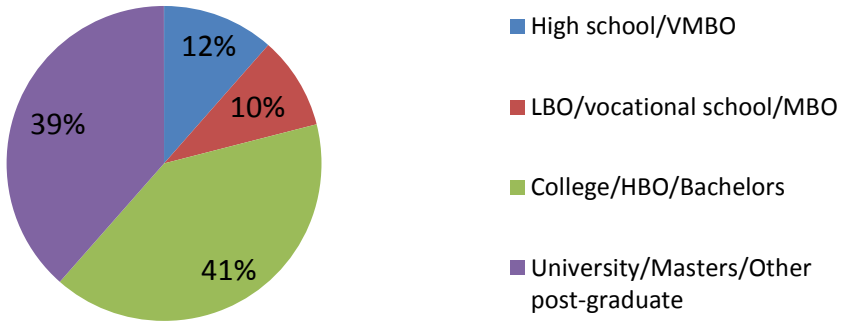

Figure 13 Highest completed level of education of respondent on Saba

Figure 14 demonstrates how many days a stay-over tourists on average stays on the island. Visitors from the Caribbean region stayed the shortest. Interesting is the difference between the visitors from Europe and the Netherlands. It is very well possible that the longer stays of the Dutch have to do with the large share of civil servants in the sample that combine business trips with leisure.

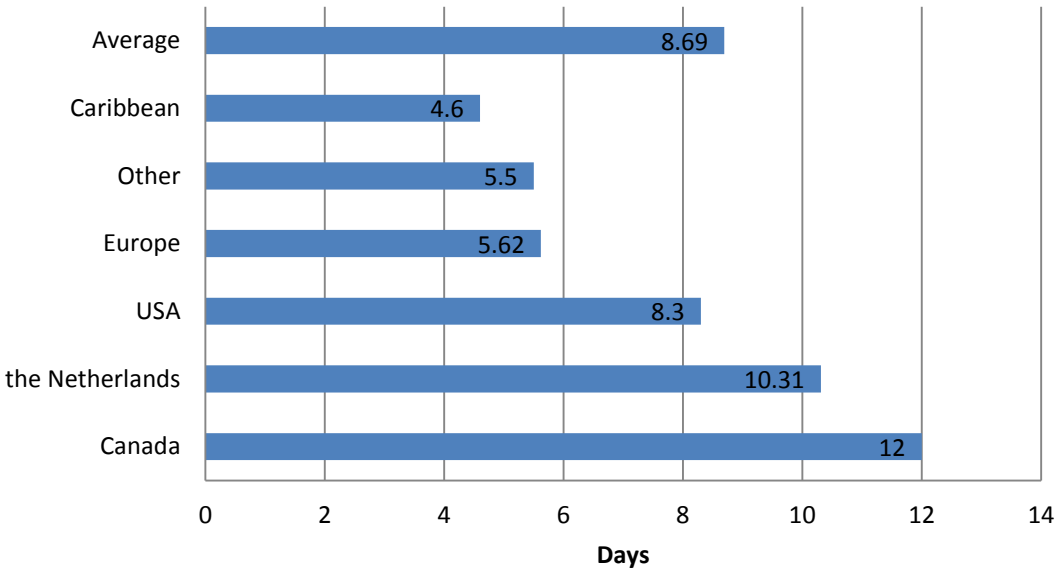

Figure 14 Average amount of days that stay-over tourist stay on Saba per nationality.

Almost half of the respondents on Saba and St Eustatius visited other islands as well during their trip. The top 3 of most other islands for the respondents on Saba are:

1. Anquilla (20%)
2. St Barths (18%)
3. St Eustatius(18%)

And the top 3 of other visited islands in the region on the same trip of respondents on St Eustatius is:

1. St Barths (37%)
2. St Kitts (33%)
3. Saba (30%)

St Maarten was not included in the top 3 of both islands. Reason for this is that it was hard to determine whether respondents stayed on St Maarten or were just using the island for transit. The results indicate that about half of the respondents visit the Saba and St Eustatius as part of a more extensive journey that includes other islands as well. While both Saba and St Eustatius market themselves as individual holliday destinations compete with other islands in the region, these results indicate that there might be a basis for cooperation based on a complementary factor between different islands.

4.4 Experience and activities

This section discusses the survey questions on how respondents experienced the island, whether they participated in activities and how they appreciated these activities.

Figure 15 presents the ranking of the different island aspects by the respondents. The top three most enjoyed island aspects consist of tranquility, natural landscape and friendly local people. Archaeological heritage and type of visitors are ranked lowest. Natural landscape is most often included in the ranking, followed by the tranquillity on the island.

Respondents were asked to make a top-4 ranking of the island aspects that were presented to them in the survey, with 1 being the most enjoyed aspect. The ranking was converted into a score between 1 and 4. If a respondent ranked an aspect on number 1, it was changed into 4 points, rank 2 got 3 points, rank 3 got 2 points and rank 4 got 1 point. The total amount of points per aspect was divided by the total amount of respondents. The result is a good reflection of how often an island aspect was included in the top-4 ranking. Diving is for example not often included in the top-4 ranking as presented in Figure 15. However, if it was included in the ranking, it was almost always ranked number one. Following this ranking, respondents were asked whether they participated in water and land-based activities. And if they participated, how they appreciated these activities on the island. The results are split in water-based and land-based activities.

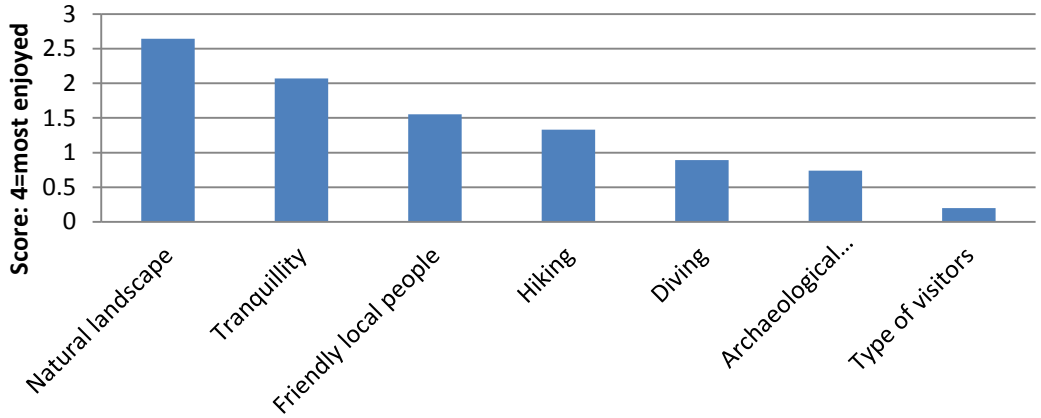

Figure 15 Ranking of the island aspects of Saba according to respondents.

Water-based activities

As mentioned earlier, many tourists visit Saba to go diving, but also to participate in other water-based activities, Figure 16**.** Compared to our sample in St Eustatius, the amount of beach visits is very low on Saba. The difference can be explained by the fact that the beach is very accessible on St Eustatius compared to Saba. On Saba only a small artificial beach and a seasonal beach is present which are hard to reach without a car.

Stay-over tourists participate more in every activity overall, except for yacht/boat charters because most day tourists on Saba arrive by ferry which is seen as a boat charter. Although this is not considered a charter, the confusion by respondents is easily made. The participation rates per activity are made up of respondents that participated in the activity and respondents indicated that they are planning to participate.

In general, most activities are highly appreciated (a score between 4 and 5). Diving received the highest appreciation, followed by snorkeling. The appreciation for deep-sea fishing is very low. This can be due to the rough waters surrounding the island during the period that the surveys were conducted.

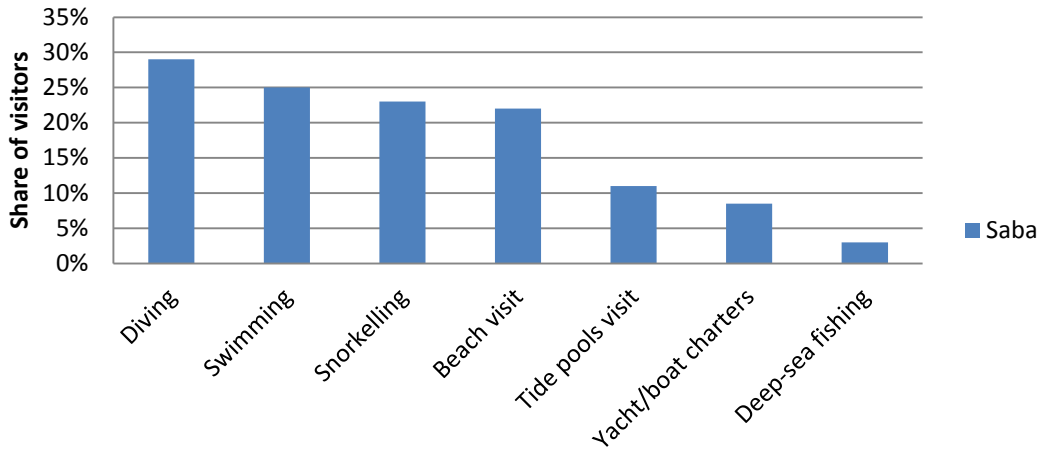

Figure 16 Participation in water-based activities on Saba.

Land-based activities

Figure 17 displays the participation in land-based activities. Land-based activities are especially popular compared to water-based activities like diving and snorkeling. A stunning 80 percent of the respondents on Saba participated in hiking.

If the results are also split between day and stay-over tourists, it is interesting to note that there is almost no difference in participation in hiking and island tours with car between day and stay-over tourists. The other activities are typically more popular among stay-over tourists. Most land-based activities are highly appreciated. Shopping is not seen as very enjoyable on the island according to the respondents. This can be explained by the limited opportunities.

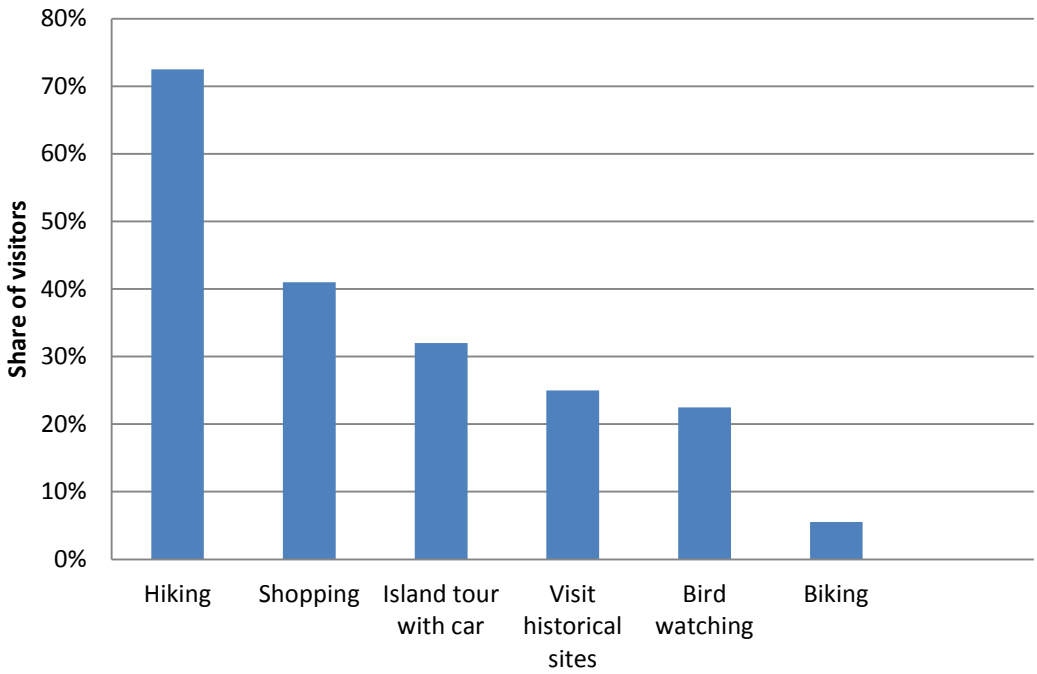

Figure 17 Participation in land-based activities on Saba.

4.5 Perceived potential threats

As Figure 18 indicates, the top 3 most important perceived potential threats is: oil spills, solid waste and coral bleaching. The oil spills likely refer to the presences of the oil transshipment company NuStar on the neigbouring island of St Eustatius. Free roaming animals are perceived as the least important threat, Although there are quite some goats that eat a lot of the vegetation, which can cause erosion. Another example is feral cats that target the nesting tropic birds. There is a range of additional invasive species. However, these are not seen as a threat by the respondents.

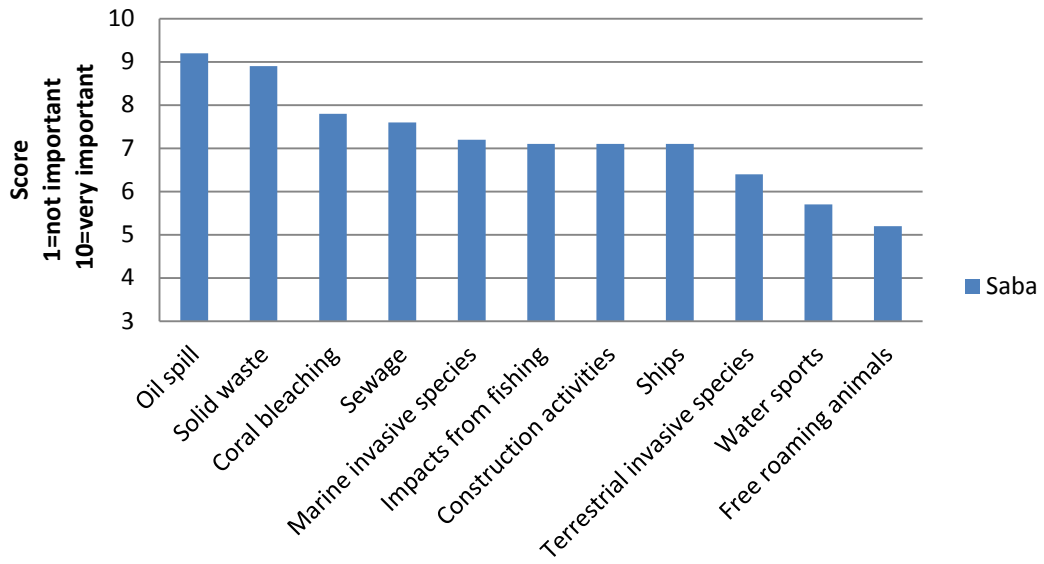

Figure 18 Perceived potential threats to the marine and terrestrial environment as perceived by the respondents on Saba.

4.6 Statements

In cooperation with stakeholders, a couple of context specific statements were prepared on environmental management subjects. The statements for are shown in Figure 19. Overall, the respondents indicate that Saba does not need better tourist facilities or a more comfortable flight. Most respondents totally agree that degraded nature spoils their holiday and that Saba should prohibit products that harm the island's environment, these statements are somehow correlated to each other. This is also the case for the question whether Saba should promote archaeological heritage more and whether respondents are willing to pay more for their holiday if Saba would be a UNESCO World Heritage site. Both statements received were moderately agreed upon.

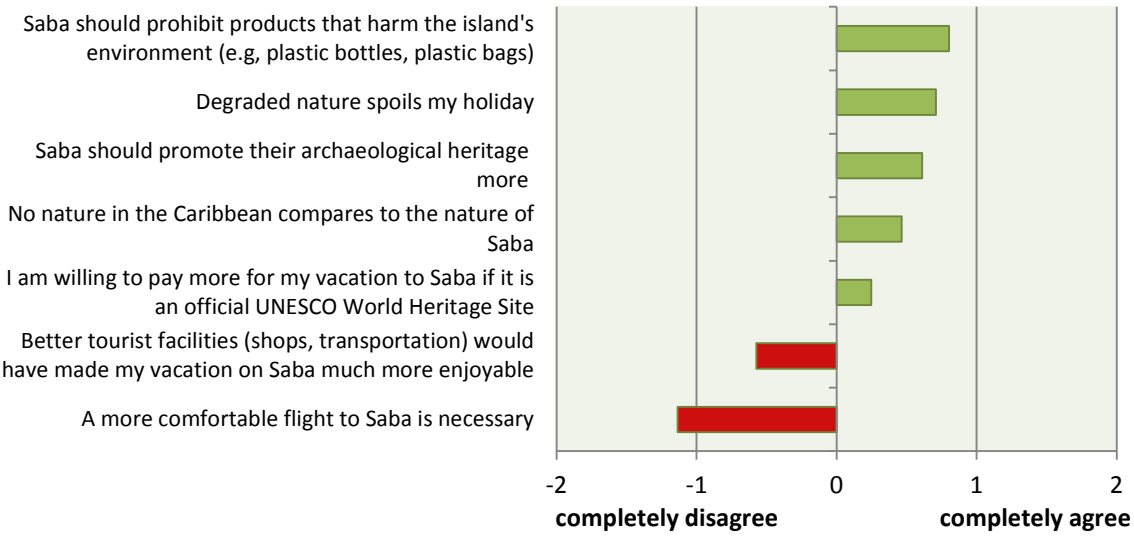

Figure 19 Responses to statements in the survey.

Return visit statements

Returning visitors are important for the tourism industry. Attracting new visitors requires higher investments in marketing, while returning visitors already know about the island. The rate of returning visitors is an indicatior that gives an idea about whether visitors appreciate the island as a holiday destination. A higher return rate also makes it more likely that visitors will recommend the island as a holliday destination to family and friends.20 percent of the visitors on Saba have visited the island before.

Does a potential change in characteristics of the island affect the decision of respondents to return? The answers to the next statements indicate whether respondents will return if certain environmental or cultural assets change. Focus is on the leisure tourists, since business visitors and people that visit friends or family are not influenced as by changes in the characteristcs of the island. Figure 20 indicates that that 26 percent of the respondents would come back to Saba if the marine environment would be 50 percent less healthy, while in the current situation 62 percent of the respondents would come back.

Detailed analysis indicates that especially respondents that did not dive would still come back if the quality of the marine environment has decreased. The amount of respondents that answered 'maybe' increased a lot for this return statement and is made up of a relatively equal amount of divers as non-divers. The respondents on Saba are equally sensitive for changes in the crowdedness on the island as for changes in the quality of the marine environment.

An additional statement was presented to respondents on changes in the cultural landscape on Saba. 50 percent less cultural landscape does affect whether respondents would return, but not in the same magnitude as changes in crowdedness or in quality of the marine environment.

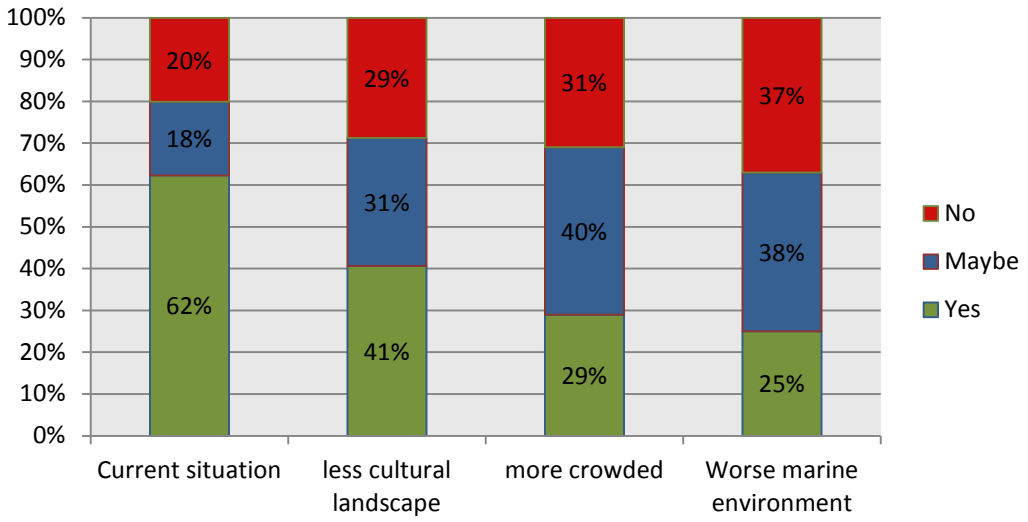

Figure 20 Responses to the questions: Suppose you were planning to return to Saba for another vacation, would you still return if: 1) the island would have less cultural landscape than it currently has? 2) the island were more crowded than it currently is (i.e. 50% more buildings and people)? 3) the marine environment were in a worse state than it currently is? (i.e. 50% less healthy).

When respondents are confronted with the question would not return to Saba, vairous motives come up. Figure 21 demonstrates that a quarter of the respondents thinks that there is 'not enough to do' on the island to return for a another vacation. Other respondents were apparently planning to visit the island only once. 'I rarely return twice' is by far the most indicated reason to not return. 'Corals or the natural landscape are becoming less beautifull' is not chosen very often as the main reason to not return, which indicates that the state of the environment did not dissappoint the respondents.

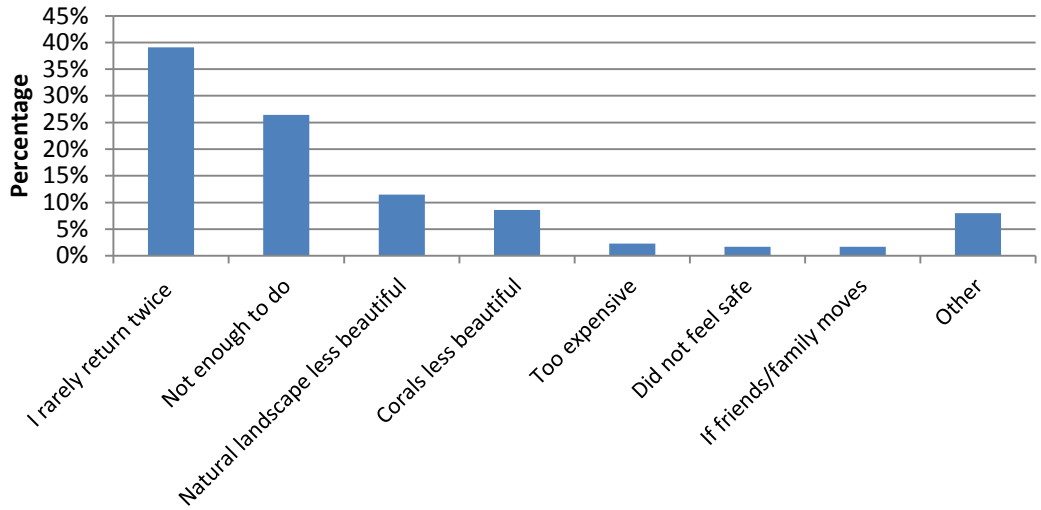

Figure 21 The main reason for respondents not to return to Saba.

4.7 Who is 'in principle' willing to pay for conservation?

An important question in the light of this study, the economic valuation of ecosystem services, is whether respondents are in principle willing to pay a contribution to improve the environment of Saba. Of the sample, 78 percent of the respondents is willing to pay for conserving the natural environment. Most respondents indicated that they would like SCF to manage the funds for environmental management, as presented in Figure 22.

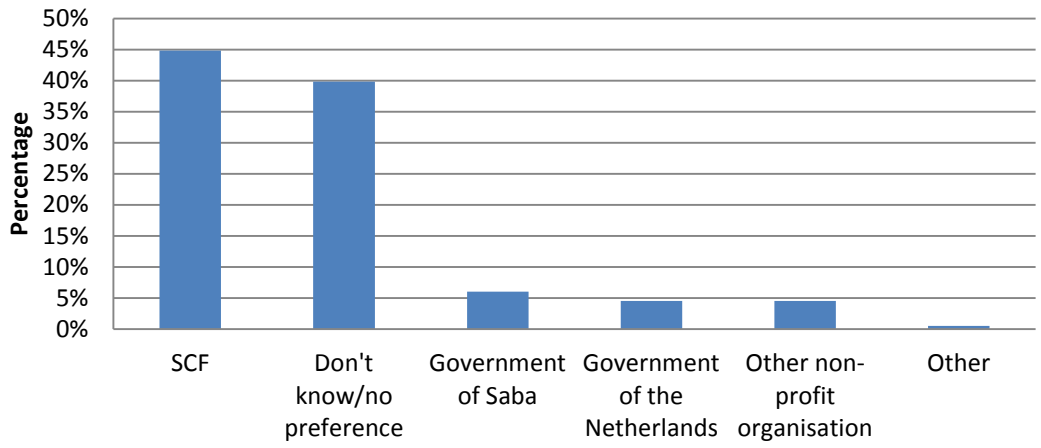

Figure 22 Organizations that should manage the collected funds according to the respondents.

The main reason of respondents for not have a WTP for environmental improvements is not straight forward. The majority response to the question that informed why a respondent is not willing to pay is 'don't know'. The top two main reasons given by respondents that indicate a reason, are 'conservation is the responsibility of the island' and 'I cannot afford it'.

To check which of the variables might influence the WTP preparedness of respondents, crosstabulations in SPSS are used to check for an association between WTP and another variable from the survey. Pearson's Chi square test is used to see if the association is significant and the Phi and Cramer's V test is used to measure the strenght of the association. These tests are specifically useful for variables on a nominal or ordinal measurement level and for tables of 2x2 (De Vocht, 2009). The two most important associations are investigated further.

The association between 'self perceived environmental awareness' and the 'WTP in principle' is quite straightforward (Figure 23). Of these two variables it is clear that the more someone is environmentally aware, the more often the respondent is willing to pay for nature improvement.

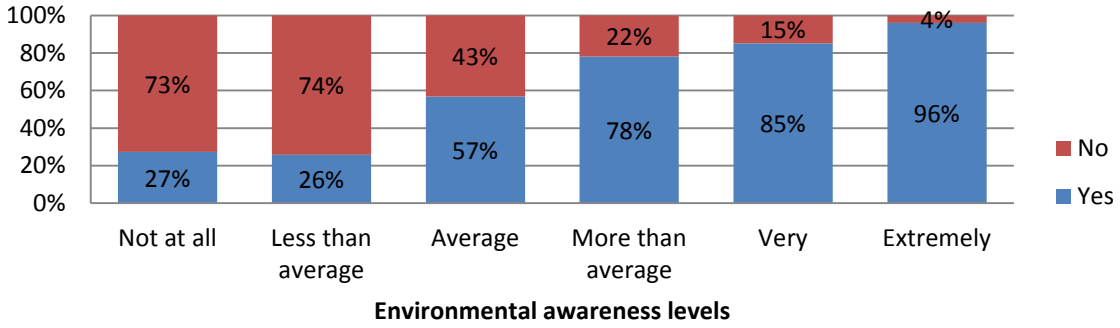

Figure 23 Relation between 'self-perceived environmental awareness' and the 'WTP in principle'.

The other variable with a high association is country of origin and WTP. In Figure 24 this association is examined. It shows that especially respondents from Europe, the Netherlands and the USA are more often willing to pay for nature improvements than respondents from other countries.

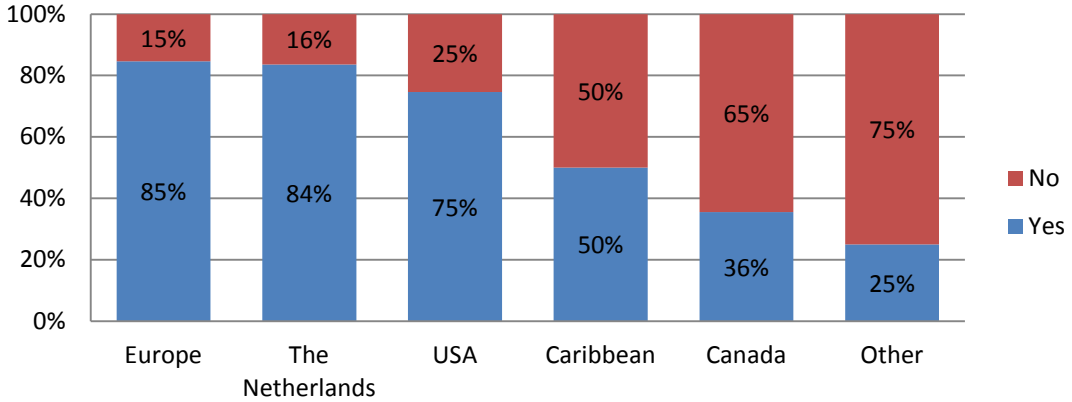

Figure 24 Percentage of respondents that are in principle willing to pay for nature conservation for different regions.

4.8 Choice experiment results

A multi-nomial regression model on the attributes is used to calculate the WTP per attribute of the CE. Initial analysis of the sample showed that all attributes for the sub-sample of Saba are significant, except for crowdedness and the payment vehicle. The initial analysis of the CE for the entire sample of Saba and St Eustatius is presented in Annex A. The results of the initial analysis using the multi-nomial regression model are suspected to suffer from a hypothetical bias, which is indicated by the insignificance of the payment vehicle and causes WTP estimates to be unrealistically high. Therefore, an extended methodology is used to fine tune WTP estimates. This methodology is based on the coefficients in combination with average WTP. See Annex A for further explanation.

Results of the analysis are presented in Table 4. The WTP estimates reflect how much an average respondent is willing to pay per day during his stay to go from the lowest level of the attribute (the omitted level), to the other levels of the attributes. For example, the average respondent is willing to pay 3.90 USD to move from the poor natural landscape level to excellent natural landscape level.

The first row in Table 4 presents the results for the alternative specific constant (ASC), which is the scenario that stayed the same on each choice card and was named 'the expected future without extra management'. The WTP estimate associated with the ASC is the amount of money that respondents are willing to pay to avoid this scenario and to choose between one of the two other scenario's on the choice card. The fact that this value is positive implicates that tourists on Saba have a positive WTP for nature management that is not explained by any of the attributes.

Table 4 Absolute WTP per attribute based on the average WTP for nature conservation including all attributes.

	Coefficient	Relative WTP	Absolute WTP Per Tourist per day
ASC	0.996	0.258835759	$2.47
Natural landscape: excellent	1.576	0.40956341	$3.90
Coastal waters: excellent	1.687	0.43841	$4.18
Crowdedness: 400 visitors per day	-0.781	-0.20296	$-1.93
Archaeology: managed	0.370	0.096154	$0.92
Total excellent	**3.848**	**1.0000**	**$9.53**

The WTP for the natural landscape attribute is presented in Table 5, while respondents are willing to pay 3.90 USD per day to go from poor to the excellent level. The WTP for moderate natural landscape is calculated by using the relative WTP between the different attribute levels. It is calculated that respondents are willing to pay on average

3.25 USD to move from 'poor' to 'moderate'. The estimate indicates that there is a decreasing marginal utility for natural landscape quality. Or, in other words, people are willing to pay less to move from 'moderate' to 'excellent' compared to what people are willing to pay to move from 'poor' to 'moderate'.

Table 5 TP estimates for different levels of the natural landscape attribute

	Coefficient	Absolute WTP Per Tourist per day
Natural landscape: moderate	1.312	$3.25
Natural landscape: excellent	1.576	$3.90

The WTP for the attribute coastal waters is calculated similar to the WTP for the natural landscape attribute in Table 6. The coastal water attribute is overall the attribute for which the respondents are willing to pay the highest amount of money to conserve. Again, a decreasing marginal utility is derived for the coastal waters quality. Especially moving from the level 'good' to the level 'excellent' is similar (even lower, although not significantly)

Table 6 TP Estimates for different levels of the coastal waters attribute

	Coefficient	Absolute WTP Per Tourist per day
Coastal waters: moderate	1.169	$2.89
Coastal waters: good	1.857	$4.60
Coastal waters: excellent	1.687	$4.18

Table 7 presents the CE results for the crowdedness attribute. The fact that the moderate crowdedness attribute is not significant, tells us that the respondents have no specific preference for 100 visitors per day or 200 visitors a day, they seem indifferent between low crowdedness and moderate crowdedness. The WTP estimate for a high level of crowdedness (400 visitors per day) is negative, which should be interpreted as a WTP to avoid this level of crowdedness. So respondents are willing to pay 1.93 USD per day to avoid an increase in crowdedness from 100 visitors to 400 visitors per day.

Table 7 TP estimates for different levels of crowdedness

	Coefficient	Absolute WTP Per Tourist per day
Crowdedness: 200 visitors per day	0.074	$-
Crowdedness: 400 visitors per day	-0.781	$-1.93

The archaeology attribute only has two levels: unmanaged and managed. The WTP to go from unmanaged to managed is positive. So, respondents are in favour of managing archaeology and are willing to pay 0.92 USD per day to improve the quality of the archaeological heritage on Saba.

Main reason to opt-out

Figure 25 presents the main reasons of respondents to choose the expected future scenario (where no contribution is paid) more than two times or to refuse the CE. Respondents mainly indicated that the costs are too high or that they are against an additional contribution. A quarter of respondents indicated that the 'expected future scenario' represented the best alternative in the sense that the combination of the levels of the attributes in this scenario was well balanced, better than in the other two scenario's on the choice card.

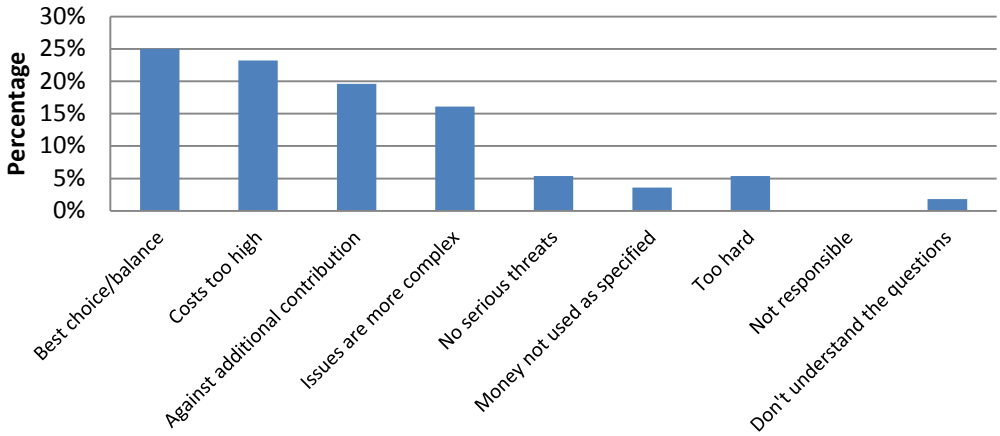

Figure 25 Main reason to choose the 'expected future scenario' three or more than three times or to refuse the CE.

4.9 Total tourism value

The total tourism value of nature on Saba is made up of the producer surplus and the consumer surplus. The producer surplus is calculated by using the net factor income method and the producer surplus is calculated by using the CE.

Producer surplus

The producer surplus in this study is based on the direct and indirect benefits from local ecosystems for the tourism sector. With the net factor income method, the producer surplus is calculated by determining the revenues made in the tourism sector, reduced by the costs to the producer for offering the goods to tourists (van Beukering *et al.*, 2007). To calculate the revenues made in the tourism sector, the expenditures that tourists filled in, in the survey per activity or good are used. Around a fourth of the respondents indicated that they booked a travel package. However, since only the total package costs are known and not the breakdown of the cost for the different categories, it is impossible to include these expenditures into the calculation of the average expenditure per category. Therefore, the producer surplus calculated in this study will be an underestimate. What was included in the packages is demonstrated in Figure 29 in Appendix F. In Table 15 and Table 16 in Appendix G, the mean daily expenditures for day and stay-over tourists can be found. This difference in expenditures is not used for the calculation of the producer surplus, because the actual share of day tourists is not known. Not all the expenditures and goods are directly dependent on local ecosystems and since we are valuing nature, the share of dependence on the local ecosystem is determined per activity. Later on, the expenditures are adjusted based on this calculation. First, all the expenditures are divided into direct and indirect values.

Direct values

The direct activities depend directly on the local ecosystems. The expenditure categories for this applies are diving, snorkelling, yacht/boat rental and island tours. These expenditures are directly dependent on the quality of the local ecosystem and are direct values. If the local ecosystem degrades, revenues made from these activities are directly affected. Not all these activities depend on the ecosystems for the full 100 percent. Diving and snorkelling do, but yacht/boat rental and island tours do to a certain extent, because a less healthy ecosystem will still provide some of the values that a healthy ecosystem will. In Table 8, the dependence of an activity on the local ecosystems is defined.

Indirect values

Indirect values refer to revenues from good and activities that do not directly depend on local ecosystems but do so in an indirect way (e.g. hotels and restaurants). Local ecosystems are not needed to provide these goods but if ecosystems degrade, fewer will visit the island and hotels and restaurants will be affected. In order to calculate the benefits that ecosystem provide to these indirectly dependent suppliers of goods and activities, the information from Table 8 is used. In this case, the factor for ecosystem dependence is used to calculate per island how dependent the average tourist is on the local ecosystems. This is done by calculating the ecosystem-dependence per tourist, after which the ecosystem-dependence for the entire group of visitors is calculated.

Table 8 Ecosystem dependence per activity on Saba.

Water-based activities	Factor for local ecosystem dependence (FED)	Land-based activities	Factor for local ecosystem dependence (FED)
Diving	1	Hiking	0.75
Snorkeling	1	Biking	0.25
Swimming	0.5	Bird watching	1
Beach visit	0.5	Island tour with car	0.5
Yacht/boat charters	0.25	Visit historical sites	0
Deep sea fishing	0.5	Shopping	0
Tide pools visit	0.75		

FED level	Motivation for FED levels
0	These activities are not dependent on any of the local ecosystems.
0.25	These activities are for a small part dependent on local ecosystems, but degradation of the local ecoystem would not affect the experience of these activities very much.
0.50	These activities are for 50% dependent on local ecosystem. For example a beach visit for relaxation where the sand and the water is enjoyed. The presence of the sand and opportunity to swim is dependent on the local ecosystem but relaxation is also part of the experience, which can also take place on other locations.
0.75	These activities have a very high level of interaction with the natural environment and the experience of the activity is almost fully dependent on the local ecosystem. Degradation of the local ecosystem would have a great affect on the experience of the activity.
1	These activities are for 100% dependent on the local ecosystem, for example: diving and snorkeling are totally dependent on the local coral ecosystem, without a healthy coral ecosystem the activity will not take place.

Calculations

Unfortunately there is no data available on the cost of producing goods and services in the tourism sector on the island. Due to this lack of data it is assumed that the average expenditures per good account for 25 percent of the added value of the good (Schep *et al*, 2012). The next step is to get from the average expenditures per day to the net ecosystem benefit.

The following two steps are performed to calculate the net factor ecosystem benefit per good or activity:

Step 1: Added value (%)*Average expenditure per day = Added value

Step 2: Added value*Local ecosystem dependence = Net ecosystem dependence

Table 9 Calculation of net factor ecosystem benefits for tourists on Saba.

Direct values	Added value (%)	Local ecosystem dependence	Average expenditure per day	St. Deviation expenditures	Added value	Net ecosystem benefit
Diving	25%	100%	$15.44	48.20	$3.86	$3.86
Snorkelling	25%	100%	$6.50	27.92	$1.63	$1.63
Island tours	25%	50%	$2.33	7.35	$0.58	$0.29
Boat rental	25%	25%	$3.40	26.44	$0.85	$0.21
Indirect values						
Harbour fees	25%	70%	$0.41	2.02	$0.10	$0.07
Airport fee ($5)	25%	70%	$2.04	-	$0.51	$0.21
Food & beverages	25%	70%	$36.23	33.70	$9.06	$6.34
Shopping	25%	70%	$17.95	37.33	$4.49	$3.14
Local transport	25%	70%	$9.26	11.88	$2.32	$1.62
Accommodation	25%	70%	$64.54	89.38	$16.14	$11.30
Car/scooter rental	25%	70%	$2.60	8.80	$0.65	$0.46
Donations	100%	70%	$2.16	21.33	$2.16	$1.51
Total p.p./p.d.			$162.86		$42.35	$30.64
Total per year (x22,500 visitors; x 8.7 days)			**$31,711,500**		**$8,290,000**	**$5,997,800**

Consumer surplus

The consumer surplus is determined with WTP estimates from the CE. The WTP estimates indicate what respondents are willing to pay for a change in the levels of the attributes. This sometimes means an improvement and sometimes maintaining the current state. The WTP estimates reflect the value that people assign to the attributes or the utility that they gain per attribute, also if they did not directly 'use' the attributes in the sense of paying for an environmental related activity.

Table 10 presents the total WTP per attribute level for Saba based on the WTP estimates from the CE and the visitor numbers 2010. The total WTP for the excellent quality of the coastal waters is left out since it is lower than the WTP for the good quality evel. The total WTP for environmental maintenance is calculated by adding up the total WTP for natural landscape and the total WTP for coastal waters. Based on the excellent attribute levels of the natural landscape and coastal water quality, the total

WTP for additional management of the natural environment on Saba is estimated to be almost 1.6 million USD. Tourists are willing to pay an additional total amount of 180,000 USD per year for the management of the island's archeaological heritage.

Table 10 Total annual WTP for nature conservation on Saba.

Total WTP	Total WTP Saba*
Natural landscape excellent	$764,000
Coastal waters excellent	$818,000
Total annual WTP for nature conservation	**$1,582,000**

* Based on 22.500 visitors on Saba.

Total tourism value

The consumer and producer surpluses can be aggregated to calculate the total tourism value of the natural environment on Saba. The value represents the welfare that is created in the tourism industry that is attributable to the natural environment.

Table 11 Total tourism value that is attributable to the natural environment of Saba

Total WTP	Total WTP Saba*
Total WTP for conserving the natural environment	$1,582,000
Total producer surplus attributable to the natural environment	$5,997,800
Total annual WTP for nature conservation	**$7,579,800**

5 Conclusions and recommendations

5.1 Conclusions

The aim of this study is to *determine the value of nature to tourists on Saba*. This is done by determining how much revenue is earned in the tourism sector is attributable to the local ecosystems and by determining the WTP of tourists for additional environmental management. A Choice Experiment (CE) and complementary questionnaire are used to answer this research question.

From the results of the CE it is clear that there is a positive preference for additional environmental management and the management of Saba's archaeological heritage among tourists. Which demonstrates that most of the respondents on Saba would like to see archaeological heritage be more actively managed on the island than it currently is.

Diving is the most appreciated water-based activity. About 35 percent of the respondents on Saba participated in diving. Hiking is the most appreciated land-based activity. Land based activities are the most important The most appreciated island aspects of Saba are its natural landscape and the tranquillity. The total value of the natural environment for tourism on Saba (producer surplus plus WTP for environmental management) is calculated to be 7.5 million USD per year. The high WTP values from the CE for an increase in quality for both coastal waters and natural landscape, indicate that increasing fees for diving or installing fees for hiking (which can be used for environmental management purposes) is unlikely to affect the amount of tourists that visit the island very much.

Respondents from Saba are practically just as sensitive to changes in the quality of the marine environment as to changes in crowdedness on the island. In the current situation, 62 percent of the visitors want to return to Saba. This percentage decreases to respectively 26 and 29 percent if the quality of the marine environment decreases or if the island would get more crowded. This demonstrates that the natural capital of Saba is of great importance to the tourism sector and therefore to the economy of the island.

Acknowledgements

This study would not have been possible without the support of numerous people and organizations on Saba. It was great to start our visit with a discussion with the Executive Council, government officials of the Saba government and employees of SCF. We would like to express our gratitude to governor Jonathan Johnson and the Executive Council for their hospitality and the time mister Johnson took to share his vision.

Moreover, we like to thank all the people who attended the workshop on valuing the natural environment of Saba and others who gave us valuable information on Saba; especially Kai Wulf, James Johnsson, Johan Scheaffer (SCF), Glenn Holm (Saba Tourist Bureau), Lynn Costenaro (Sea Saba), Cherie van Wyke & Tony Waterfield (Saba Deep), Tommy Wescott (airport), Tom van 't Hof, Vito Charles, Will Johnson and many others, we thank you for your expert opinion and the data you provided. Your contribution was crucial for the success of this study

This study could not be possible without the help of our interview team on Saba: Kathy Samuel, Samar Ghazi, Jenna MacDonald and Fred Bower.

IMARES was of great assistance and provided us with local data and model suggestions to further improve this research. Thank you Ingrid van Beek, Bert Brinkman, Martin de Graaf and Erik Meesters for your expertise and discussions.

The employees of the RCN (Rijksdienst Caribisch Nederland) on Saba, Bastiaan Janssens and Voltaire Simmons, were great to us by providing us a workplace and a place to print all our interviews and CE cards. Next to that they were always willing to help us out with any problems we encountered.

Special thanks go to Marjolijn Staarink for the laborious task of editing the layout of the report.

References

Abeyratne, R.I.R. (1999). Management of the environmental impact of tourism and air transport on small island developing states. Journal of Air Transport Management, 5, 31-37.

Adamowicz, W., Louviere, J. & Williams, M. (1994). Combining Revealed and Stated Preference Methods for Valuing Environmental Amenities. Journal of Environmental Economics and Management, 26 (3), 271-292.

Arrow, K., Solow, R., Portney, P.R., Leamer, E.E., Radner, R. & Schuman, H. (1993). Report of the NOAA Panel on Contingen Valuation. Retrieved from: *http://www.darrp.noaa.gov/economics/studies.html*.

Balmford, A., Fisher, B., Green, R., Naidoo, R., Strassburg, B., Turner, R.K., & Rodrigues, A.S.L. (2011). Bringing Ecosystem Services into the RealWorld: An Operational Framework for Assessing the Economic Consequences of Losing Wild Nature. Journal of Environmental Resource Economics, 48, 161-175.

Bervoets, T. (2010). Report on the Economic Valuation of St. Eustatius' Coral Reef Resources. STENAPA National Parks, St. Eustatius.

Brouwer, R., van Beukering, P. & Sultanian, E. (2008). The impact of the bird flu on public willingness to pay for the protection of migratory birds. Ecological Economics, 64 (3), 575-585.

Buchan, K, Framhein, R. & Fernandes, L. (1997). An Economic and Social Study of the Saba Marine Park, Saba, Netherlands Antilles. Retrieved from http://www.canari.org/buchan.pdf.

Carson, R.T., Flores, N.E. & Meade, N.F. (2001). Contingen Valuation: Controversies and Evidence. Environmental and Resource Economics, 19, 173-210.

CBS. (2010). Relative price levels of Saba and Statia compared to Bonaire. Retrieved from the Central Bureau of Statistics the Netherlands: *http://www.cbs.nl/nl-NL/menu/themas/dossiers/nederland-regionaal/publicaties/artikelen/archief/2010/2010-3229-wm.htm*.

CBS. (2013). Bevolking Caribisch Nederland (1 januari). Retrieved from the Central Bureau of Statistics the Netherlands http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=80534ned&D1=0&D2=0&D3=0&D4=a&D5=l&HD=111214-1546&HDR=T&STB=G1,G2,G3,G4.

CHL Consulting Company. (2011). 'Tourism Strategic plan for Saba 2011-2014'. Retrieved from www.Sabatourism.com/pdf/Tplan2011.pdf.

CNN. (2013). Thailand oil spill: Tourists abandon blackened Koh Samet beach. retrieved from: http://edition.cnn.com/2013/07/31/world/asia/thailand-beach-oil-spill/.

DCNA (Dutch Caribbean Nature Alliance). (2012). Retrieved from www.dcnanature.org.

De Vocht, A. (2009). Basishandboek SPSS 16 voor Windows. Utrecht: Bijleveld Press.

ECORYS Research and Consulting. (2010). St. Eustatius Strategic Development Plan: Background report Quick Scan Economy.

Ghina, F. (2003). Sustainable Development in Small Island Developing States: The case of the Maldives. Environment, Development and Sustainability, 5, 139-165.

Hanley, N., Mourato, S. & Wright, R.E. (2001). Choice Modelling approaches: A superior alternative for environmental valuation? Journal of economic surveys 15 (3).

Hanley, N., Wright, R. & Adamowicz, V. (1998). Using Choice Experiments to Value the Environment. Environmental and Resource Economics, 11 (3-4), 413-428.

Hoogenboezem-Lanslots, K.M.A., Schenau, Y.M., van Leeuwen, R.J., Briene, M.F.M. & de Freitas, J.A. (2010). St. Eustatius: Strategic Development Plan. RBOI: adviseurs ruimtelijke ordening.

Kahneman, D. & Knetsch, J.L. (1992). Valuing public goods: The purchase of moral statisfaction. Journal of Environmental Economics and Management, 22 (1), 57-70.

Lacle, F.A. (2012). Recreational and cultural value of Bonaire's nature to its inhabitants. Masters's thesis. Vrije Universiteit Amsterdam / Facutlty of Earth and Life Sciences.

Laurence, F.M., Ian, H.L. & Kenyon, W. (2003). Valuing marine parks in a developing country: a case study of the Seychelles. Environment and Development Economics, 8 (2), 373-390.

Leiden University. (2013). Report of visit of minister Plasterk to Saba. Retrieved from the website of Leiden University: http://www.archaeology.leiden.edu/news-agenda/minister-plasterk-opens-exhibition-on-the-work-of-corinne-hofman-and-menno-hoogland-on-Saba.html.

Loomis, J., Kent, P., Strange, L., Fausch, K. & Covich, A. (2000). Measuring the total economic value of restoring ecosystem services in an impaired river basin: results from a contingent valuation survey. Ecological economics 33, 103-117.

Mathews, K., Freeman, M.L. & Desvousges, W.H. (2006). How and how much?: The role of information in Stated Choice Questionnaires. In: Valuing environmental amenities using stated choice studies. Springer, 111-133.

McCartney, A.A. (2011). The policy relevance of Choice Modelling: An application to the Ningaloo and proposed Capes Marine Parks. Dissertation. University of Western Australia / Faculty of Natural and Agricultural Sciences.

Millenium Ecosystem Assesment. (2005). Millennium Ecosystem Assessment: Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC.

Ministerie van Economische Zaken. (2013). 'Natuurbeleidsplan Caribisch Nederland 2013-2017'. http://www.rijksoverheid.nl/bestanden/documenten-en-publicaties/rapporten/2013/04/24/natuurbeleidsplan-caribisch-nederland-2013-2017/natuurbeleidsplan-caribisch-nederland-2013-2017-1.pdf

Nationale Postcode Loterij. (2013). Dutch lotery that donates part of the revenue to charities. information on donations to DCNA retrieved from: http://www.postcodeloterij.nl/Goede-Doelen.htm in august 2013.

Pantin, D.A. (1999). The challenge of sustainable development in small island developing states: case study on tourism in the Caribbean. Natural resources forum, 23, 221-233.

Pearce, D. & Ozdemiroglu, E. (2002). Economic Valuation with Stated Preference Techniques: Summary guide. Department for Transport, Local Government and the Regions: London.

Planbureau voor de leefomgeving. (2010). 'De betekenis van TEEB voor Nederland: discussienotitie voor the Taskforce Biodiversiteit en natuurlijke hulpbronnen.' http://www.pbl.nl/sites/default/files/cms/publicaties/de_betekenis_van_teeb_voor_nederland.pdf.

Saba Marine Park. (2013). Nature park on Saba managed by the Saba Conservation Foundation. Information on dive sites retrieved from: http://www.Sabapark.org/marine_park/diving/ in august 2013.

Sabanews. (2012). 'Statia's oil spill has impacted Saba'. Retreived from: www.Sabanews.nl.

SCF. (2010). Saba Conservation Foundation Annual Report 2010. Retreived from: http://www.Sabapark.org/news/downloads_links/.

SCF. (2011) & STENAPA. (2010). Dive statistics Saba and Statia in 2010. Excel files with number of dives and number of divers received from SCF and STENAPA.

Schep, S., van Beukering, P., Brander, L. & Wolfs, E. (2012). The Tourism value of nature on Bonaire: Using choice modelling and value mapping. IVM Institute for Environmental Studies.

Scheyvens, R. & Momson, J.H. (2008). Tourism and Poverty Reduction: Issues for Small Island States. Tourism Geographies: An International Journal of Tourism Space, Place and Environment, 10 (1), 22-41.

SESNA (Small Enterprises Stimulation Programme Netherlands Antilles). (2007). 'Pies to the Road Map'. Received from Glenn Holm, tourist office Saba.

Sinclair, M.T. (1998). Tourism and economic development: A survey. The Journal of Development Studies, 34 (5), 1-51.

STENAPA. (2009). St. Eustatius National Parks Foundation Annual Report 2009. Retrieved from: http://www.Statiapark.org/downloads/index.html.

STENAPA. (2013). Website of St Eustatius nature parks. Information on marine environment retrieved from: http://www.Statiapark.org/nature/index.html.

TEEB. (2010). The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations. Earthscan, London.

Thomas-hope, E. & Jardine-Comrie, A. (2007). Valuation of environmental resources for tourism in small island developing states: implications for planning in Jamaica. International Development Planning Review, 29 (1).

Tietenberg, T. & Lewis, L. (2010). Environmental Economics & Policy. Addison-Wesley/Pearson Education.

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. IVM Institute for Environmental Studies.

Van Beukering, P., Brander, L., Tompkins, E. & McKenzie, E., (2007), Valuing the Environment in Small Islands - An Environmental Economics Toolkit. Retrieved from Joint Nature Conservation Committee (JNCC) website: *http://jncc.defra.gov.uk/page-4065*.

World Resources Institute. (2004). Reefs at Risk in the Caribbean - executive summary. WRI, Washington. Retrieved from: http://www.wri.org/publication/reefs-risk-caribbean.

World Tourism Organization. (2012). Challenges and Opportunities for Tourism Development in Small Island Developing States. UNWTO, Madrid.

Annex A Initial results Choice Experiment for the entire sample of Saba and St Eustatius

The results of a multi-nomial logit regression model on the main effects (attributes) are presented in Table 11. The effects are all dummy coded except for the payment vehicle attribute, which is coded as a continuous variable. The estimated coefficients on the attributes are all statistically significant at the 1% level except for the estimated coefficient on the dummy variable indicating moderate crowdedness (indicating no statistically significant difference in preferences between low and moderate crowdedness) and the payment vehicle.

The estimated coefficients are used to calculate mean household willingness to pay (WTP) for each change implied by the attribute levels. The WTP amounts should be interpreted as the average WTP to move from the omitted category attribute level (the lowest category in each case) to the attribute level listed in the table. For example, mean household WTP to move from a situation with poor quality natural landscape (the omitted category) to a situation with moderate quality natural landscape is estimated to be 48 USD per day.

The Krinsky and Robb (1986) procedure is used to estimate 95% confidence intervals (CI) for each WTP estimate. This indicates the range within which we can be 95% certain that mean WTP falls, given the variation in responses observed in the data. For example, we can be 95% certain that mean annual household WTP to move from a situation with poor quality natural landscape to a situation with moderate quality natural landscape falls within the range 27 USD – 60 USD per day.

The alternative specific constant (ASC) estimated in the model represents the preference of respondents to avoid the 'expected future without extra management' scenario and opt for one of the alternative management scenarios. This preference is over and above the differences between scenarios that are represented by the attributes, i.e. there is apparently a positive and statistically significant preference for additional environmental management on the part of tourists to Saba and St Eustatius.

A further analysis of the choice data was conducted to identify whether there are any significant differences in preferences between different groups within the sample of visitors. In other words, we try to identify whether some visitors have higher or lower WTP for changes in environmental/management attributes. This analysis was implemented by introducing interaction terms into the estimated multi-nomial logit regression between the fee attribute and a set of variables describing visitor characteristics.

The visitor characteristics that were tested are: income, education, age, gender, place of origin, mode of transport to reach Saba and St Eustatius (ferry, aeroplane or yacht), whether the respondent was on a package holiday, purpose of the visit (whether for leisure or not), whether travelling with children, intention to return to Saba and St Eustatius, level of environmental awareness, whether willing to pay for improved environmental management in principle, level of certainty when choosing between options in the CE, and the choice process used when making choices in the CE. We also included an interaction term between the fee attribute and a variable indicating whether the respondent was visiting Saba or St Eustatius in order to identify whether WTP differs between visitors to each island. From this set of interaction variables, only those for place of origin, purpose of trip, package holiday, gender, and island proved

to be statistically significant (i.e., the other indicators of differences between visitors did not reveal any differences in WTP for improved management).

Table 12 Multi-nomial logit regression results, willingness to pay with 95% confidence intervals

	Coefficient	SE	P	WTP	Lower CI	Upper CI
ASC	0.732	0.104	0.000	38.16	26.50	60.20
Natural landscape: moderate	0.955	0.081	0.000	47.98	34.01	77.71
Natural landscape: excellent	1.257	0.089	0.000	63.70	46.25	101.31
Coastal waters: moderate	0.968	0.110	0.000	49.91	34.65	79.96
Coastal waters: good	1.606	0.108	0.000	79.83	58.38	126.13
Coastal waters: excellent	1.591	0.113	0.000	79.32	58.88	123.09
Crowdedness: 200 visitors per day	0.009	0.073	0.900		-	-
Crowdedness: 400 visitors per day	-0.559	0.079	0.000	-29.84	-50.11	-19.66
Archaeology: managed	0.389	0.058	0.000	18.45	12.05	29.88
Contribution: US$ per day	-0.022	0.004	0.000	-	-	-
N	2174					
R^2 Pseudo	0.0717					

The implications of the statistically significant interaction effects in terms of differences in WTP from the sample average are calculated and presented in Table 13. Place of origin appears to have a large influence on stated WTP for environmental management. Respondents from the USA and Canada have substantially lower WTP. By implication, the omitted category of visitors (those from European countries other than the Netherlands) have relatively high WTP.

The purpose of the visit also has an important bearing on the WTP of respondents. Those that are visiting Saba and St Eustatius for leisure are willing to pay considerably more than other types of visitors. Visitors that are on package tours, however, are found to have significantly lower WTP than the sample average. WTP by package tourists is 41% lower than average, possibly reflecting their expectation that the cost of their package should also include fees for environmental management.

The most striking result that we obtain from the analysis with interaction effects is that visitors to Saba are found to have considerably higher WTP (over four times higher) than those on St Eustatius. In order to examine the differences in preferences between respondents on each island further, we estimate separate models using the subsamples from each island. The results are presented in Table 12. We find that the estimated coefficient on the fee attribute in the Saba model is not statistically significant, and therefore the calculated WTP amounts need to be treated with high

caution. It appears that respondents in the Saba subsample did not take account of the fee attribute when making their choices. This has large implications for the calculated WTP amounts since respondents are effectively stating a very low preference for money and high preference for the environmental attributes. The estimated coefficient on the fee attribute in the St Eustatius model is statistically significant and larger than in the estimated model using the full sample combined (as expected given that the Saba respondents that ignore the fee attribute are excluded). The computed WTP amounts for the St Eustatius model are therefore substantially lower (approximately half the WTP amounts derived from the full sample model).

It is notable that the relative preferences for the environmental attributes are robust in the two subsamples, i.e. for both islands improvements in coastal water quality are considered to be of greatest importance, followed by natural landscape, and finally crowdedness (with moderate crowdedness not considered to be a problem on both islands.

Table 13 Multi-nomial logit regression results and willingness to pay for sub-samples for Saba and St Eustatius

	Saba				**St. Eustatius**			
	Coefficient	SE	P	WTP	Coefficient	SE	P	WTP
ASC	0.996	0.151	0.000	261.41	0.607	0.153	0.000	16.11
Natural landscape: moderate	1.312	0.120	0.000	344.28	0.621	0.115	0.000	16.48
Natural landscape: excellent	1.576	0.129	0.000	413.53	0.927	0.129	0.000	24.60
Coastal waters: moderate	1.169	0.158	0.000	306.75	0.800	0.159	0.000	21.22
Coastal waters: good	1.857	0.156	0.000	487.38	1.301	0.157	0.000	34.52
Coastal waters: excellent	1.687	0.162	0.000	442.89	1.406	0.163	0.000	37.32
Crowdedness: 200 visitors per day	0.074	0.103	0.475		0.004	0.108	0.974	
Crowdedness: 400 visitors per day	-0.781	0.114	0.000	-204.91	-0.427	0.115	0.000	-11.33
Archaeology: managed	0.370	0.083	0.000	97.15	0.376	0.085	0.000	9.97
Contribution: US$ per day	-0.004	0.005	0.470		-0.038	0.006	0.000	
N	1147				1027			
R^2 Pseudo	0.119				0.036			

Table 14 WTP for sub-groups of visitors:

	All	USA	Canada	Caribbean	Nether-lands	RoW	Leisure	Package	Male	Saba
ASC	38.16	3.32	1.21	24.52	22.02	17.08	64.74	22.44	27.15	159.76
Natural landscape: moderate	47.98	4.15	1.51	30.24	27.98	21.45	80.02	28.62	34.08	89.89
Natural landscape: excellent	63.70	5.54	2.01	40.12	37.19	28.46	105.72	37.92	45.15	250.24
Coastal waters: moderate	49.91	4.26	1.55	31.61	28.90	22.28	82.94	29.44	35.38	97.19
Coastal waters: good	79.83	6.85	2.49	50.30	46.45	35.61	132.59	47.52	56.67	313.03
Coastal waters: excellent	79.32	6.83	2.48	50.00	46.23	35.44	131.64	47.13	56.15	310.09
Crowdedness: 200 visitors per day	-	-	-	-	-	-	-	-	-	-
Crowdedness: 400 visitors per day	-29.84	-2.62	-0.95	-18.96	-17.36	-13.31	-49.82	-17.72	-21.23	-120.17
Archaeology: managed	18.45	1.62	0.59	11.58	10.82	8.20	30.67	11.13	13.09	72.43

Additional analysis

Due to the high expected hypothetical bias in the choice experiment, the following analysis has been performed to finalize the results. The coefficients calculated for each attribute with the multi-nominal model are still valid, which means that the relative WTP for different attributes in the CE is deployed. To estimate the total WTP for nature conservation the payment vehicle is used. Therefore, the average WTP is calculated based on the different levels of the payment vehicle that were chosen by the respondents. This average is assumed to represent the maximum WTP for nature conservation per respondent. Based on the relative WTP for the scenario that includes the highest attribute levels, the average WTP is divided among the different attributes of the choice experiment. Because the relative WTP for different attribute levels is still valid, the absolute WTP for the highest level of each attribute is then determined.

Table 15 Absolute WTP per attribute based on the average WTP for nature conservation including all attributes.

	Coefficient	Relative WTP	Absolute WTP Per Tourist per day
ASC	0.996	0.258835759	$2.47
Natural landscape: excellent	1.576	0.40956341	$3.90
Coastal waters: excellent	1.687	0.43841	$4.18
Crowdedness: 400 visitors per day	-0.781	-0.20296	$-1.93
Archaeology: managed	0.370	0.096154	$0.92
Total excellent	**3.848**	**1.0000**	**$9.53**

Annex B Questionnaire Tourist Survey Saba

TO BE FILLED BY THE INTERVIEWER:		Weather: (circle one(s) that apply)
Interviewer name:		*1.Sunny, 2. overcast, 3.rainy*
Date (m/d/y):	Time:	Location:
Questionnaire #		

SABA TOURISM SURVEY

0 Introduction

Good morning/afternoon/evening, my name is _____. I am working for the VU University in the Netherlands. We are researching how tourists value Saba's environment. For this we would like to ask a few questions about your motivation to visit Saba and your activities while being on Saba. Would you like to participate? It will only take approximately **20** minutes and it is completely confidential. Note that there are no wrong answers to the questions - we only want your honest opinion.

0.1 Are you 18 years or older?

1. Yes CONTINUE QUESTIONNAIRE	☐
2. No THANK PERSON AND TERMINATE INTERVIEW	☐

0.2 Where do you live?

1. Here on Saba: THANK AND TERMINATE •	☐
2. USA: specify state: _____	☐
3. Canada: specify province/territory: _____	☐
4. Other Caribbean: specify territory/country_____	☐
5. The Netherlands mainland	☐
6. Europe: specify country: _____	☐
7. Other: specify country: _____	☐

0.3 What is the **purpose** of your visit?

1. Leisure	☐
2. Former residents/ visiting friends or family	☐
3. Combination of leisure with either business or visiting friends/family (only if you spend one day or more on leisure activities)	☐
4. Business – THANK AND TERMINATE •	☐

<u>Part 1: Your visit to Saba</u>

1.1 How many **days** are you staying on Saba? [ ] days

1.2 In which **accommodation** are you staying on Saba?

1. The Cottage Club	☐	6. Shearwater Resort	☐
2. Ecolodge Rendez-Vous	☐	7. El Momo	☐
3. Scout's Place	☐	8. Juliana's Hotel	☐
4. Queens Garden Resort	☐	9. Cottage, specify name…….	☐
5. The Gate House	☐	10. Other, specify:	☐

1.3 Was your most recent **visit to Saba by** ferry, by airplane or did you arrive by yacht?

1. Ferry	☐	2. Airplane	☐	3. Yacht	☐

1.4 How many **times** have you visited Saba (*including current visit*)?

1. 1 time	☐	5. 5 times	☐
2. 2 times	☐	6. 6 times	☐
3. 3 times	☐	7. 7 times	☐
4. 4 times	☐	8. More than 7 times	☐

1.5 Have you visited, or are you planning to visit any of the following islands in the **region** during your holiday?

1. St Maarten	☐	6. St Kitts	☐
2. St Barths (St Barthelemy)	☐	7. Anguilla	☐
3. Nevis	☐	8. BVI	☐
4. Antigua	☐	9. Other, specify	☐
5. St Eustatius	☐	10. None	☐

Part 2: Your experience of Saba

2.1 Indicate the top-4 aspects that you **enjoyed most** on the island so far (*1 is most enjoyed, and rank up till 4 aspects*)

1. Tranquillity	☐	5. Archaeological heritage (charming island villages)	☐
2. Hiking	☐	6. Natural landscape	☐
3. Diving	☐	7. Friendly local people	☐
4. Type of visitors	☐	8. Other, specify	☐

2.2 Which **water-based activities** have you participated in on Saba? Please indicate how much you enjoyed them. You do not need to answer if you didn't participate in an activity (*1 = not enjoyable; 5 = very enjoyable*).

	Not enjoyable		←→		Very enjoyable	6.Did not do this	7.Still planning to do this
1 Diving	1	2	3	4	5	☐	☐
2 Snorkelling	1	2	3	4	5	☐	☐
3 Swimming	1	2	3	4	5	☐	☐
4 Beach visit	1	2	3	4	5	☐	☐
5 Yacht/boat charters	1	2	3	4	5	☐	☐
6 Deep-sea fishing	1	2	3	4	5	☐	☐
7 Tide pools visit	1	2	3	4	5	☐	☐
8 Other, specify	1	2	3	4	5		☐

2.3 Roughly how many **dives** have you had in your **lifetime**?

1. none	☐	4. 26 - 50 times	☐
2. 1 - 10 times	☐	5. 51 - 100 times	☐
3. 11 - 25 times	☐	6. > 100 times	☐

SKIP 2.4 AND 2.5 IF RESPONDENT DID NOT DIVE OR SNORKEL

2.4 Indicate how many dives and snorkelling trips you did during your stay on **Saba**

1. # _____ dives	2. # _____ snorkelling trips

2.5 Indicate the **locations** you have visited for diving and snorkelling (SHOW MAP)

1. Pinnacles	5. Windwardside
2. Wells Bay (shallow dive)	6. Rare location dives
3. Ladder Bay	7. Other, specify:
4. Tent Bay	

2.6 Which **land-based activities** have you participated in on Saba? Please indicate how much you enjoyed them. You do not need to answer if you didn't participate in an activity (*1 = not enjoyable; 5 = very enjoyable*).

	Not enjoyable ←→ Very enjoyable					6.Did not do this	7.Still planning to do this
1. Hiking	1	2	3	4	5	☐	☐
2. Biking	1	2	3	4	5	☐	☐
3. Bird watching	1	2	3	4	5	☐	☐
4. Island tour with car	1	2	3	4	5	☐	☐
5. Visit historical sites (incl. Museum)	1	2	3	4	5	☐	☐
6. Shopping	1	2	3	4	5	☐	☐
7. Other, specify:	1	2	3	4	5		☐

[SKIP 2.7 IF RESPONDENT DID NOT HIKE]

2.7 Indicate on the map which trail(s) you have **hiked** or are planning to **hike** during your stay on Saba [SHOW MAP]

1. Mount Scenery Trail	☐	7. Sandy Cruz Trail	☐
2. Bud's Mountain Trail	☐	8. North Coast Trail	☐
3. Crispeen Trail	☐	9. All Too Far Trail	☐
4. Bottom Mountain Trail	☐	10. Old Sulphur Mine Trail	☐
5. Paris Hill Trail	☐	11. Flat Point (Tidepools) Trail	☐
6. The Ladder Trail	☐	12. Spring Bay Trail	☐

2.8 Indicate how many times you visited the following **beaches** during your stay on Saba

1. Well's Bay - Seasonal beach _____ times
2. Cove Bay/Flat Point _____ times

Part 3: Environmental Awareness & choice questions

3.1 To what extent do you consider yourself **environmentally aware**?

1. Not at all	☐	4. More than average	☐
2. Less than average	☐	5. Very	☐
3. Average	☐	6. Extremely	☐

SMALL TROPICAL ISLANDS FACE SEVERE ENVIRONMENTAL PRESSURES CAUSED BY, AMONGST OTHER THINGS, CONSTRUCTION ACTIVITIES, FREE ROAMING ANIMALS AND THE EFFECTS OF CLIMATE CHANGE. THIS GOES FOR SABA AS WELL.

3.2 Are you in principle **willing to pay** a contribution to improve the environment of Saba?

1. Yes [next question]	☐	2. No [skip next question]	☐

3.3 Would you have a preference for one of the following **organizations** to manage the collected funds?

1. Saba Conservation Foundation	☐	4. Other non-profit organization	☐
2. The Government of Saba	☐	5. Other, specify:	☐
3. The Government of the Netherlands	☐	6. Don't know / no preference	☐

3.4 What is the main reason you **would not be willing to pay** to improve the environment of Saba (check one)?

1. No need for management of nature	☐	5. I cannot afford it	☐
2. Conservation is responsibility of Saba	☐	6. Other: ...	☐
3. My activities have no impact on nature	☐		
4. This program would not be effective	☐	7. Don't know/refused	☐

SHOW THE EXAMPLE CHOICE CARD HERE, AND READ THE FOLLOWING TEXT

The following questions ask you to make a choice between three scenarios for the future state of the environment and atmosphere on Saba. The scenarios are described in terms of the following aspects:

1. Quality of the natural landscape refers to the landscape beauty and the attractiveness for recreational activities (hiking, beach visit). This takes into account the vegetation quality.
2. Quality of the coastal waters for recreation and tourist activities (diving, snorkelling, swimming). This takes into account reef quality (fish, algae and coral biodiversity) as well as water quality (clarity, pollution…).
3. Crowdedness in terms of the number of fellow tourists on the island. It takes into account the crowdedness on the beaches, as well as the vehicle traffic across the island.
4. Archaeology this refers to the possibility to visit historical sites and displayed artefacts. This takes into account the management and maintenance of the site, accessibility etc.
5. The contribution per day is a fee that all tourists would pay, which would be used for environmental and historical management on the island. This contribution would act as a package deal, and would enable tourists to have access to every beach and national park.

You will be asked to make a choice **six times**. In each question, the options on offer will be different. Try to imagine in which situation you would prefer to be, taking into account the payment, and then choose that option. [SHOW ON THE EXAMPLE CHOICE CARD THAT THE ITEMS FOR ONE SCENARIO BELONG TOGETHER AND INDICATE HE /SHE SHOULD CHOOSE ONE OF THE THREE SCENARIOS]. Be aware that none of the choices has a clear-cut best scenario and that you will need to make trade-offs between the different aspects. There are no wrong answers - we are only interested in your opinion!

Please look at the 3 options shown in the example card. To make a choice between the 3 options you should look at all of the items that shape the option (quality of marine environment, archaeology management, contribution, etc.).

- In **Option A** the quality of the natural landscape is excellent, the quality of the coastal waters is excellent, there are 100 visitors per day, archaeology is managed, and you pay $25 per person per day.

- In **Option B** the quality of the natural landscape is moderate, the quality of the coastal waters is good, there are 200 visitors per day, archaeology is managed, and you pay $15 per person per day.

- In the **third option**, the "Expected future without extra management" option, means the threats to the environment are not dealt with and so the situation has deteriorated compared with today. The quality of the natural landscape is moderate, the quality of the coastal waters is moderate, there are 200 visitors per day, archaeology is not managed, but there is no need to pay an additional contribution. This option will remain the same in all 6 choice questions that you will be asked.

Options A and B are different in each question. Please note that none of the options will be perfect from your point of view and that some decisions may be difficult. Every card represents a new choice and has nothing to do with the previous choice.

[FOR THE FIRST CHOICE CARD TRY NOT TO HELP THE RESPONDENT TOO MUCH, UNLESS HE REALLY DOESN'T UNDERSTAND. JUST BRIEFLY POINT OUT THE DIFFERENCES BETWEEN THE OPTIONS IF NECESSARY BUT TRY TO GIVE A BALANCED PRESENTATION. DO NOT LET YOUR VALUES AND PREFERENCES INFLUENCE THE RESPONDENT'S CHOICE!! AFTER ALL CHOICES ARE MADE, ASK THE RESPONDENT THE FOLLOW UP QUESTIONS. IF THE RESPONDENT REFUSES TO MAKE A CHOICE, TRY TO FIND OUT WHY.]

Record the respondent's **answers to each choice question** in the table below.

3.5 FILL CHOICE SET NUMBER HERE	1. Option A	2. Option B	3. Option C	4. Refused
3.6 Choice card 1	☐	☐	☐	☐
3.7 Choice card 2	☐	☐	☐	☐
3.8 Choice card 3	☐	☐	☐	☐
3.9 Choice card 4	☐	☐	☐	☐
3.10 Choice card 5	☐	☐	☐	☐
3.11 Choice card 6	☐	☐	☐	☐

3.12 Indicate on a scale of 1 to 10 how **certain** you are about your choices in the choice experiment: 1 means "not certain at all" and 10 "fully certain".

Uncertain					←→				Certain
1	2	3	4	5	6	7	8	9	10

3.13 If you chose 'Without management' in each card or refused to choose, explain **why**:

1. The **costs were too high**	☐
2. I am **against additional contribution,** no matter what it is used for	☐
3. I think that the **money will not be used as specified**	☐
4. I am **not responsible** for the damage to the environment	☐
5. There are **no serious threats** to the environment of Saba	☐
6. The **issues are more complex** than these questions suggest	☐
7. I **couldn't understand** the questions	☐
8. **Too hard** to make choices	☐
9. **Other,** specify	☐

3.14 How did you make your **choices**? Did you:

1. Consider all aspects simultaneously	☐	4. Use your intuition	☐
2. Consider a few aspects	☐	5. Make a random choice	☐
3. Only consider one aspect	☐	6. Don't know	☐

3.15 In making your choices, how important were the following **items** to you?

	Not important ←→				Very important
	1	2	3	4	5
1. Natural landscape	☐	☐	☐	☐	☐
2. Coastal waters	☐	☐	☐	☐	☐
3. Crowdedness	☐	☐	☐	☐	☐
4. Archaeology	☐	☐	☐	☐	☐
5. Contribution	☐	☐	☐	☐	☐

PART 4: Threats to tourism of Saba

4.1 How important do you consider the following **potential threats** to the marine environment and the natural landscape of Saba?

	Not at all important	Not important	Don't know/ neutral	Somewhat important	Very important
1. Coral bleaching	☐	☐	☐	☐	☐
2. Impacts from fishing	☐	☐	☐	☐	☐
3. Construction activities (building hotels, roads etc.)	☐	☐	☐	☐	☐
4. Sewage	☐	☐	☐	☐	☐
5. Solid waste (plastic bottles etc.)	☐	☐	☐	☐	☐
6. Ships (anchoring, grounding etc.)	☐	☐	☐	☐	☐
7. Water sports (diving)	☐	☐	☐	☐	☐
8. Marine invasive species (e.g. lionfish)	☐	☐	☐	☐	☐
9. Roaming animals (e.g. goats & cats)	☐	☐	☐	☐	☐
10. Terrestrial invasive species (e.g. Coralita)	☐	☐	☐	☐	☐
11. Oil spills	☐	☐	☐	☐	☐
12. Other, specify…	☐	☐	☐	☐	☐

4.2 Please indicate the extent to which you agree with the following **statements** (*1 = completely disagree; 5 = completely agree*)

	Fully disagree ←→ Fully agree				
	1	2	3	4	5
1. No nature in the Caribbean compares to the nature of Saba	☐	☐	☐	☐	☐
2. Better tourist facilities (shops, transportation) would have made my vacation on Saba much more enjoyable	☐	☐	☐	☐	☐
3. Degraded nature spoils my holiday	☐	☐	☐	☐	☐
4. Saba should prohibit products that harm the island's environment (e.g, plastic bottles, plastic bags)	☐	☐	☐	☐	☐
5. I am willing to pay more for my vacation to Saba if it is an official UNESCO World Heritage Site	☐	☐	☐	☐	☐
6. A more comfortable flight to Saba is necessary	☐	☐	☐	☐	☐
7. Saba should promote their archaeological heritage more than it does now	☐	☐	☐	☐	☐

4.3 Will you **return** to Saba for another vacation?

1. Yes, definitely	☐	4. No, probably not	☐
2. Yes, most probably	☐	5. No, definitely not	☐
3. Not sure	☐	6. Don't know	☐

4.4 If there would be a **reason not to return** to Saba, what would be the main reason?

1. Corals are becoming less beautiful	☐	4. Did not feel safe	☐
2. Natural landscape becoming less beautiful	☐	5. I rarely return to a vacation destination twice	☐
3. Not enough to do	☐	6. Other, specify:	☐

4.5 Suppose you were planning to return to Saba for another vacation, would you still return if the **marine environment** were in a worse state than it currently is? (*i.e. 50% less healthy*)

1. Yes, the quality of the marine environment does not affect my decision	☐
2. Maybe, I am sensitive to the quality of marine environment but do not know how much	☐
3. No, without a healthy marine environment I would not visit Saba	☐

4.6 Suppose you were planning to return to Saba for another vacation, would you still return if the island were **more crowded** than it currently is (*i.e. 50% more buildings and people*)?

1. Yes, crowdedness of the island does not affect my decision	☐
2. Maybe, I am sensitive to crowdedness but do not know how much	☐
3. No, without the current tranquillity and space I would not visit Saba	☐

Saba is nominated to become a UNESCO World Heritage site, which means that it is internationally recognized as a special cultural landscape (e.g. traditional houses) to be protected.

4.7 Suppose you were planning to return to Saba for another vacation, would you still return if the island would have less cultural landscape than it currently has (*i.e. 50% more non-traditional buildings and people*)?

1. Yes, less cultural landscape on Saba (or not having a World Unesco Heritage status) does not affect my decision	☐
2. Maybe, I am sensitive to World UNESCO Heritage status but do not know how much	☐
3. No, without the current cultural landscape, I would not visit Saba	☐

Part 5: Personal and household information

Finally I would like to ask you some questions about your expenditures and your personal situation. Please note that this information is strictly used for scientific purposes only.

5.1 In what kind of **group** are you travelling on Saba?

1. Alone	☐	4. With family member(s), specify # …...	☐
2. With my partner	☐	5. With an organised group, specify # …...	☐
3. With a friend, specify # …	☐	6. Other, specify:	☐

5.2 Who do you **share** your all your expenses with (*including yourself*)?

1. # _____ Adults	2. # _____ Children

5.3 What kind of **travel arrangement** did you book?

1. Travel package	☐	2. Separately arranged	☐

CONTINUE WITH 5.6 IF RESPONDENT DID NOT BOOK TRAVEL PACKAGE

5.4 What was **included** in the package?

1. Flight from home to St Maarten	☐	6. Dinner	☐
2. Flight from St Maarten to Saba	☐	7. Car	☐
3. Accommodation	☐	8. Diving/Snorkelling	☐
4. Breakfast	☐	9. Other activities (tours, etc.)	☐
5. Lunch	☐	10. Other, specify …….	☐

5.5 How much did you approximately pay in total for this **package** (*Fill for most convenient unit: per person or per group indicated in question 5.1*)?

1. US$ _____ per person	**or**	2. US$ _____ per group

5.6 Please indicate the expenditures (**excluding package costs**) on the following items. The amounts should be given as expenditures **per person** during your stay on Saba (*a **rough estimation** is sufficient and choose your preferred column for each item*).

	a. US$ per person per day	b. US$ per person per stay
1. Accommodation		
2. Car or scooter rental		
3. Local transportation (taxis)		
4. Tours on the island		
5. Diving		
6. Snorkelling		
7. Boat / yacht rental		
8. Harbour fees		
9. Food and beverages		
10. Shopping		
11. Donations		
12. Other, specify		

5.7 What is your **gender?**

1. Female	☐	2. Male	☐

5.8 What is your **age?**

1. 18 - 25	☐	6. 46 - 50	☐
2. 26 - 30	☐	7. 51 - 55	☐
3. 31 - 35	☐	8. 56 - 60	☐
4. 36 - 40	☐	9. 61 - 65	☐
5. 41 - 45	☐	10. 66 years and older	☐

5.9 How many **children** do you have? _____ *children*

5.10 What is the highest level of **education** you have completed?

1. None	☐	5. MBO	☐
2. Primary school	☐	6. College/HBO/ Bachelors	☐
3. High school / VMBO	☐	7. University/Masters degree / other post-graduate	☐
4. LBO, vocational school	☐	8. Don't know/refused	☐

5.11 Which **employment** category applies to you?

1. Student	☐	4. Unemployed/seeking work	☐
2. Employed	☐	5. Retired	☐
3. Self-employed / Entrepreneur	☐	6. Not in the work force	☐

5.12 What was your monthly total **Household Income before taxes in US$?**

1. $0 to $1,499	☐	6. $5,000 to $5,999	☐	11. $10,000 to $12,499	☐
2. $1,500 to $1,999	☐	7. $6,000 to $6,999	☐	12. $12,500 to $15,000	☐
3. $2,000 to $2,999	☐	8. $7,000 to $7,999	☐	13. More than $15,000	☐
4. $3,000 to $3,999	☐	9. $8,000 to $8,999	☐	14. Prefer not to answer	☐
5. $4,000 to $4,999	☐	10. $9,000 to $9,999	☐		

Annex C Nature parks and management bodies

Saba	Saba Conservation Foundation	Saba National Marine Park	The Saba National Marine Park was established in 1987. It surrounds the island stretching from the high-water mark to a depth of 60m and includes coral pinnacles, the seabed and overlying waters. It covers 820 hectares.
		Saba's Hiking Trail system and Muriel Thissel Nature Park	Saba's terrestrial park is comprised of 35 Ha of land donated to the SCF by the Thissell family in 1999. This area is locally refered to as the sulphur mine. Other protected areas include the portion of Mt. Scenery above 550m (no dwellings can be constructed) and the 14 trails (public easments on private property).
St Eustatius	St Eustatius National Parks Foundation (STENAPA)	Statia National Marine Park	The St. Eustatius National Marine Park includes the waters around the island from the high water mark to the 30m depth contour. It was designated in 1996 and is approximately 4,700 hectares including two actively managed no fishing zones.
		Quill and Boven National Park	Comprises a dormant volcano, the Quill, and Boven, an area of hills on the northern tip of St. Eustatius. The trails to, in and around the Quill have been open since 2000. It was established in 1997 and covers 540 hectares including lush secondary rain forest and almost all of the 482 wild plant species found on the island.
		Botanical Gardens	The Botanical Gardens cover an area of 5.3 hectares

Figure 26 Nature parks on Saba and Statia with corresponding management bodies (STENAPA, 2009).

Annex D List of SIDS characteristics

Box 2. Characteristics of SIDS leading to their vulnerability.

- Geographical isolation
- Small physical size
- Ecological uniqueness and fragility
- Rapid human population growth and high densities
- Limited natural resources
- High dependence on marine resources
- Sensitivity and exposure to extremely damaging natural disasters
- Susceptibility to climate change and sea-level rise
- Small domestic market and high dependence of exports
- Limited terrestrial natural resource endowments and high import content
- Small economies with limited diversification possibilities
- Inability to influence international prices
- Peripherality (related to remoteness and isolation): high per unit transport costs, marginalisation, uncertainties of supply, need to keep large quantities of stocks)
- Trade vulnerability: High dependence on trade taxes, vulnerability of domestic industries, dependence on trade preferences, inability to utilise the TRIPS agreement (Agreement on trade-related aspects of intellectual property rights), dispute settlement mechanism or accession
- Limited ability to exploit economies of scale
- Limitations on domestic competition
- Difficulties in absorbing FDI (foreign direct investment)
- Limited investment opportunities, including in communication services
- Problems of public administration
- Dependence on external finance
- Remittances

(List compiled from various sources: Kaly et al. (2002), UWICED (2002), Barbados Program of Action (1994), Witter et al. (2002))

Figure 27 List with characteristics of SIDS (Ghina, 2003: 144).

Annex E Example Choice Card used in tourist survey

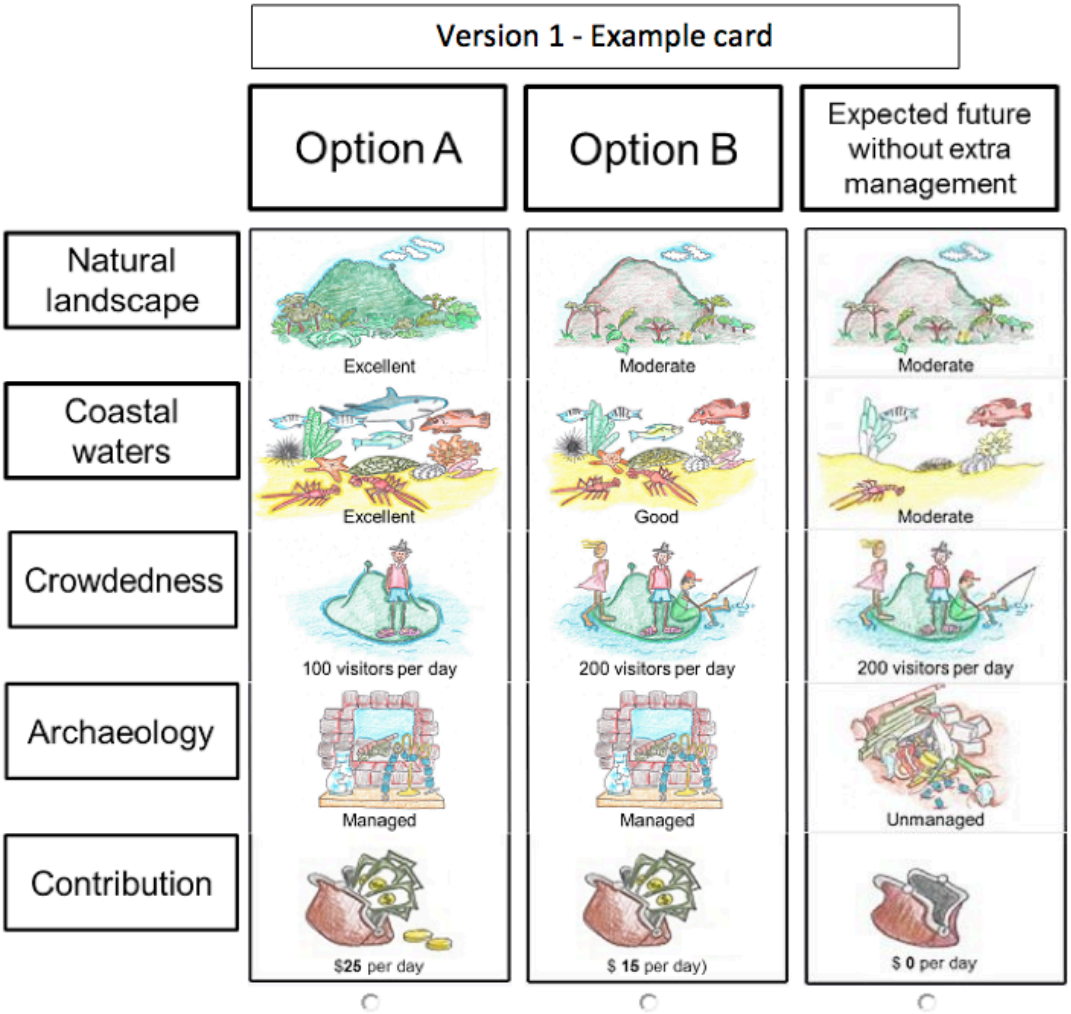

Figure 28 Example card used in the tourism CE on Saba and Statia.

Annex F Travel packages

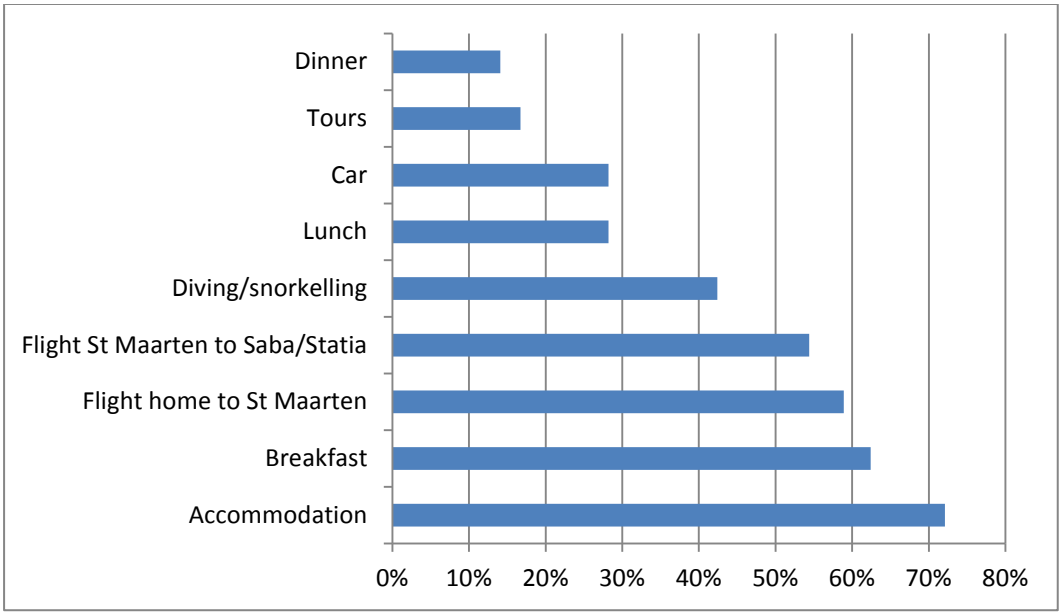

Figure 29 From the respondents that bought a package, the percentages are shown per item that was included in the package of the respondents.

25 percent of the respondents bought a travel package and 78.7 percent (74 respondents) of these respondents that bought a package, filled in how much the package had costed. The mean package cost is $1439.61, but the standard deviation is very high, namely $1325.60.

Annex G Mean daily expenditures day and stay-over tourists

Table 16 Mean daily expenditures of day tourists and stay-over tourists.

	Mean daily expenditures	N	St. deviation
Day tourists	$54.46	65	75.56
Stay-over tourists	$146.73	326	183.11

Table 17 Mean expenditures per category of day tourists and stay-over tourists.

Day tourists		**Stay-over tourists**	
	Average expenditure per day		Average expenditure per day
Diving	$3.92	Diving	$13.36
Snorkeling	$0	Snorkeling	$4.12
Island tours	$1.62	Island tours	$1.40
Boat rental	$15.62 (ferry)	Boat rental	$6.61
Harbour fees	$0.89	Harbour fees	$0.39
Food & beverages	$17.43	Food & beverages	$35.88
Shopping	$10.31	Shopping	$14.61
Local transport	$4.22	Local transport	$5.32
Accommodation	$0	Accommodation	$59.5
Car/scooter rental	$0	Car/scooter rental	$3.89
Donations	$0.46	Donations	$1.38
Total p.p./p.d	**$54.46**	**Total p.p./p.d.**	**$146.73**