VALUING MARINE PARKS
IN A DEVELOPING COUNTRY:
A CASE STUDY OF THE SEYCHELLES

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Abstract

A strategic issue facing many developing economies is the maintenance of natural resources, which are important in ecological terms as well as providing income from tourism. This paper presents an analysis of the economic value of marine protected areas in the Seychelles. The contingent valuation method (CVM) is used to determine tourists willingness to pay (WTP) for visits to Seychelles marine national parks, but in addition, attitudinal and motivational data are related to respondents' stated economic preferences. 300 interviews were conducted in the Seychelles during June 1998 and both tourists having visited a park and a more general population of tourists were surveyed. The results demonstrate that different economic values are predicted for respondents from different countries who display a range of both consumer and citizen behaviour in constructing their preferences. In addition, significantly different WTP amounts are predicted depending on which particular marine parks are visited. The discussion focuses on exploring how this information may be of use to policy makers in setting a realistic pricing policy for visitors to Marine National Parks in the Seychelles.

1.   Introduction

The designation of marine areas as marine reserves increased from about 140 worldwide in 1970 to 450 in 1986 (Hoagland *et al.*, 1995). Although the main reason for the continuing creation of marine protected areas is the protection of fragile and rare ecosystems, in many countries marine reserves are used to extract economic benefits through promotion of ecotourism, including snorkelling and scuba diving. Thus, national parks are necessary to protect biodiversity but can also be sources of direct and indirect revenues which enables countries to balance economic development with environmental protection (Dixon and Sherman, 1990).

In order to achieve both efficient resource management and sustainable economic development, an analysis of the flow of marine park benefits and costs is essential. Economic valuation techniques can be used to measure the benefits associated with environmental conservation projects and nature tourism activities. Net benefit evaluation of marine reserves can also be seen as a tool for decision-makers to aid natural resource decisions, such as marine reserve creation. Despite the fact that nature tourism activities are increasing, the application of economic analysis to marine protected areas is small, particularly in developing countries, and most studies only take into account park users (Hoagland *et al*., 1995). The objective of this study is therefore to include both park users and potential users in a contingent valuation survey to value marine resource conservation in the Seychelles.

According to Agenda 21 for Small Island Developing States, such as the Seychelles, 'the ocean and coastal environment is of strategic importance and constitutes a valuable development resource' (UNCED, 1993). Indeed, the Seychelles' economy is dominated by tourism and fisheries (Republic of Seychelles, 1997), which directly depend on coastal and marine biological resources and diversity. The presence of protected marine areas provides support to the tourism industry, which, by generating income, employment and foreign exchange, makes a contribution to national development goals and to economic growth. The use of a contingent valuation approach is important as marine resources produce benefits, which cannot be valued with traditional net revenue analysis. However, it is also vital to relate willingness to pay to the context in which values are allocated, as values can only have meaning when related to expectations and motivations for assigning particular values to a resource (Langford *et al*., 1999; 2000).

The paper is organised as follows. The economic background to the marine parks system operating in the Seychelles is described in Section 2. Section 3 presents the methods used to derive economic value of the marine parks in the

context of individual expectations and motivations, and in section 4 particular analyses of the data are presented and discussed in detail. Section 5 provides a general discussion of the results and section 6 assesses the policy implications of the study.

2.   Marine National Parks in the Seychelles

The Seychelles archipelago is located off the Southeast coast of Africa, in the Indian Ocean (Figure 1). It consists of an estimated 115 islands which occupy a land area of some 445 km². 90 percent of the 76 500 inhabitants live on the main island, Mahe. Most of the population (87 percent) and the bulk of production and consumption activities are concentrated in a small area in the Eastern and Northern regions of Mahe (Shah; cited in Lundin and Lindén, 1995). Seychelles has a per capita Growth Domestic Product (GDP) of US$6500[1] (Republic of Seychelles 1997), and can therefore be categorised as a middle-income developing country.

Seychelles is an important tourist destination with 130,955 visitors in 1996, and the Seychelles economy is dominated by tourism. In 1995, tourism was estimated to have generated approximately 18 percent of the GDP and over 60 percent of foreign exchange earnings (Republic of Seychelles, 1997). One fifth of the working population is employed in the tourism industry and the annual quantifiable value of tourism is in excess of 700 million Rupees (US$140 million), the bulk of which is accounted for by expenditures made on hotels and other purchases (Central Bank of Seychelles, 1997). Tourism in Seychelles is predominantly beach-based and thus directly depends on coastal and marine biological resources. Other aspects of biodiversity, including the presence of protected marine areas, also provide support to the tourism industry and 40,000 tourists visited the Seychelles marine parks in 1997.

In Seychelles, marine protected areas constitute a total area of 23,000 ha (Shah; cited in Lundin and Lindén, 1995), including the Marine National Parks managed by the Marine Parks Authority (Figure 2) and other marine reserves such as Aldabras, Aride and Cousin managed by private agencies. The Marine Parks Authority (MPA) of Seychelles was formed in 1996 as a parastatal body, constituted under the Environmental Protection Act of Seychelles 1994, and is responsible for managing the Marine National Parks of Seychelles listed in Table 1. The primary management goals are based on the principles of sustainable development and environmental conservation. The MPA employs 31 permanent staff and an additional 13 trainees[2]. All staff employed by the MPA are Seychellois.

Access to the parks is free for all Seychellois residents, including Seychellois nationals and non-Seychellois residents. Only persons who have a visitor permit (i.e. tourists) and who are over 12 years old are asked to pay a 50 Rupees ($10) per person per visit admission fee to enter a marine park. The system applies to

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[1] Figure for 1996.
[2] Figures for 1997.

all the marine parks managed by the MPA, except for Silhouette Marine National Park which has no entry charge, and is therefore considered a 'paper park' as it is designated but involves no administrative costs because it is not managed or monitored (Hoagland *et al.*, 1995). The revenue from the fees goes towards the costs of managing the marine parks system.

Figure 1:   The Seychelles Islands
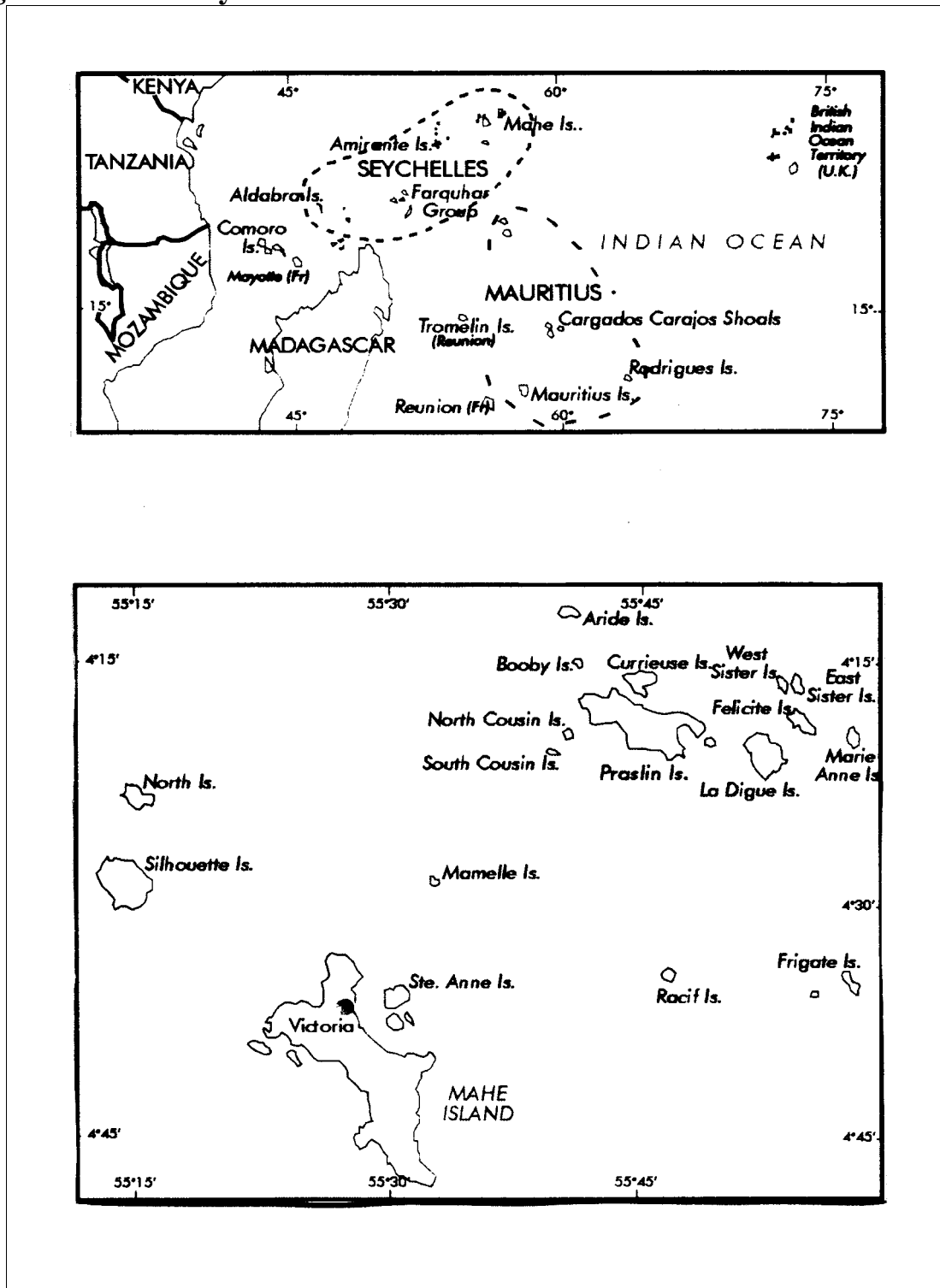
Figure 2: The Seychelles Marine National Parks

Mahe Island and its surroundings

(indicating the marine parks)
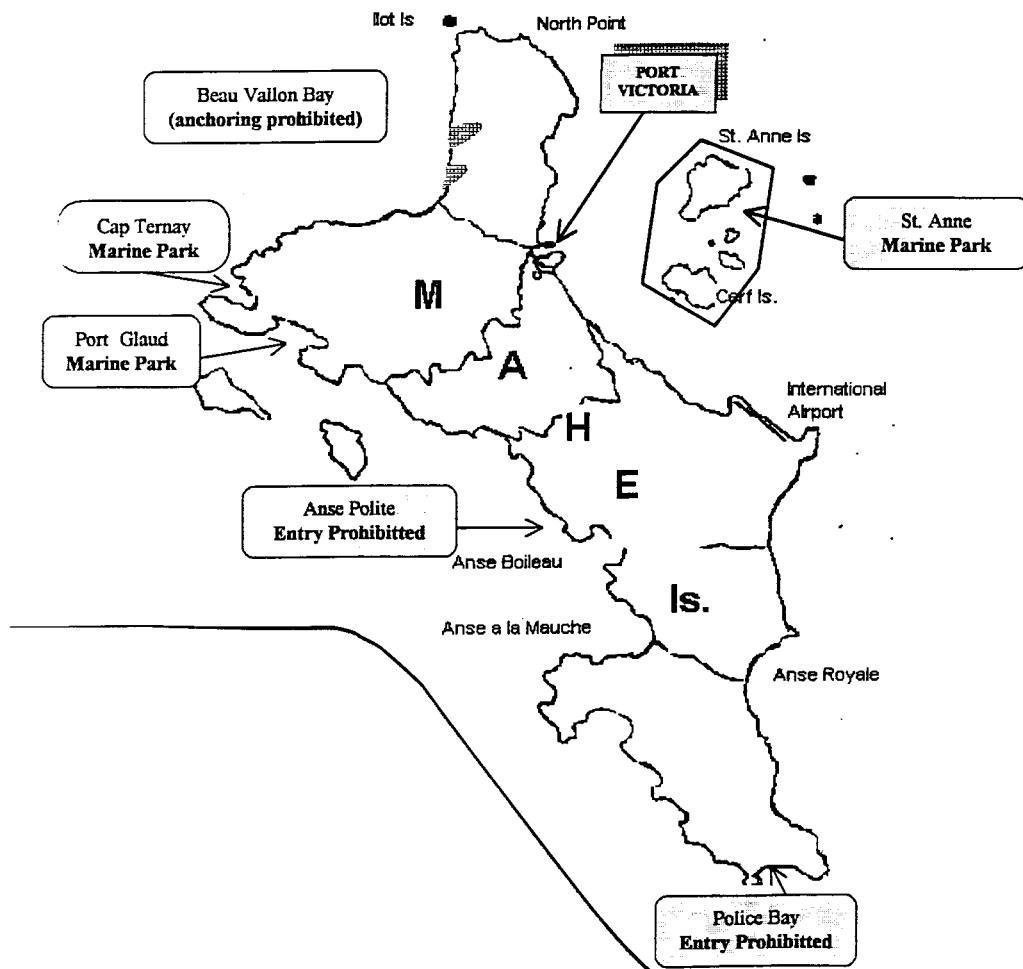
Table 1:   Summary of areas designated as Marine National Parks (MNPs)

Name of MNP	Date Designated	Land area (ha)*	Sea area (ha)*	Total Area (ha)*
Sainte Anne Marine National Park	19/03/73	388.71	996.04	1384.75
Baie Ternay Marine National Park	11/06/79	0.99	86.28	87.27
Curieuse Marine National Park	11/06/79	294.46	1283.69	1578.15
Port Launay Marine National Park	11/06/79	3.59	154.26	157.85
Silhouette Marine National Park	26/10/87	10.83	1988.31	1999.14
Ile Coco, Ile La Fouche, Ilot Platte National Park	19/02/97	5.05	165.48	170.53
Total		**703.63**	**4674.06**	**5377.69**

* 10,000m²: 1ha and 100ha: 1Km².

Source: adapted from Collie (1998).

Most tourists visit the parks in glass-bottom boats. They also snorkel and scuba dive and go to the beach within the parks. There are limits on boat movements and anchoring is not allowed on sensitive habitats such as coral within the parks. Activities such as recreational, artisanal and commercial fishing are not allowed within the Marine National Parks. Only holders of lands within, or adjacent to, the parks have limited reef gleaning and fishing rights within the parks and right of access to their land through the parks (Collie, 1998).

The sale of tickets to tourists for entry into Marine National Parks, as well as fees for the mooring of boats, filming fees, sale of coco-de-mer, sale of tortoises, and hiring of picnic facilities, represent the direct revenue generated by the marine parks. In 1997, this revenue amounted to a total of R1,990,058. Table 2 lists the direct revenues associated with the Seychelles marine parks for 1997.

Table 2:   Direct benefits associated with the Seychelles Marine Parks, 1997

Particulars of Revenue	Revenue Collected (in Rupee)
Sale of Marine Parks tickets:	
Sainte Anne	782,510.00
Port Launey	13,750.00
Baie Terney	18,000.00
Curieuse	564,300.00
Ile Coco	45,400.00
Mooring of Boats Fees	1,150.00
Hiring of Boats	2,503.35
Filming Fees	3,000.00
Hiring of Picnic Facilities	1,700.00
Miscellaneous	2,600.00
Refund of Expenses	555,144.35
Total Revenue	**1,990,057.70**

Source: pers. comm. Accouche, M. Marine Parks Authority 1998.

Revenues from the marine parks may be compared with the direct costs associated with them. The direct costs for 1997 are presented in Table 3. In 1997, the revenues from the marine parks exceeded the direct costs, however, estimates from the Seychelles MPA suggest that in 1998 the costs exceeded the revenues (Table 4). A Government subvention is therefore required to maintain the marine parks system.

Table 3:   Direct costs associated with the Seychelles Marine Parks, 1997

Particulars of Expenditure	Amount of Expenditure (in Rupee)
Total Personal Emoluments	985,101.23
Total Office Running Costs	407,603.02
Total Repairs and Maintenance	111,242.03
Total Transportation Costs	259,290.40
Total Other Costs	108,585.95
Total Expenditure	**1,850,703.50**

Source: pers. comm. Accouche, M. Marine Parks Authority 1998.

Table 4:   **Direct Revenues and Costs associated with the Seychelles Marine Parks, 1997-1998**

Year	Total Revenue (in rupee)	Total Expenditure (in rupee)	Surplus / (Deficit) (in rupee)
1997	1,990,057.70	1,850,703.50	139,354.20
1998	2,227,800.00*	4,055,300.00*	(1,827,500.00)*

* Estimate.

Source: pers. comm. Accouche, M. Marine Parks Authority 1998.

The Government subvention (of approximately 300,000 Rupees) is not sufficient to make good the deficit. This could impact on the effective management of the marine parks as budget constraints could hamper many of the MPA activities. Consequently, the parks would lack sufficient protection. The values that tourists might derive from visiting the parks are the use and non-use values. A measure of the use value might reveal that tourists are willing to pay higher entrance fees than those currently being charged. Consequently, an increase in fees could turn this value into money and increase the benefits that are currently realised. As a result, the deficit would be reduced or made good.

3.   Survey Design

The aim of this study is to estimate the difference between what people are willing to pay to visit the marine parks and what they actually pay (consumer surplus estimate). The consumers' surplus (CS) is defined as the difference between what people would be willing to pay for a good or a service and what they actually pay, an important economic value which is not observed in market transactions (Pearce and Turner, 1990). The method used to measure the amount people are willing to pay for visits to the Seychelles marine national parks is the contingent valuation method. In the absence of people's preferences as revealed in markets, the contingent valuation method tries to obtain information on consumer's preferences for public goods by posing direct questions about their willingness to pay (WTP) for specified improvements in the public good (Hanley and Spash, 1993). In the WTP format, survey respondents say what they would be willing to pay if a market existed for the good in question. A contingent market is taken to include the good itself (an improved view, better water quality, etc.), the institutional context in which it would be provided and the way in which it would be financed (Pearce and Turner, 1990).

In order to estimate tourists' willingness to pay for visiting a marine park in Seychelles, a survey was conducted on 3 different islands in the Seychelles during June 1998. The questionnaires were prepared and written in English and were administered to tourists in one of two languages, English or French. Tourists were asked their WTP to visit a marine park, as Seychelles residents do not have to pay to enter a marine park. The method of face-to-face interviews was chosen as it offers the greatest opportunity to motivate the respondent to answer and allows the interviewer to provide observational data (NOAA 1993). 300 interviews were completed with tourists who had visited a marine park or had not visited a marine park but participated in activities such as snorkelling or diving outside marine protected areas. Therefore, the tourists surveyed were on-site users whom Whitehead *et al.,* (1995) define as 'survey respondents who have been consumptive or nonconsumptive on-location users of the natural resource'.

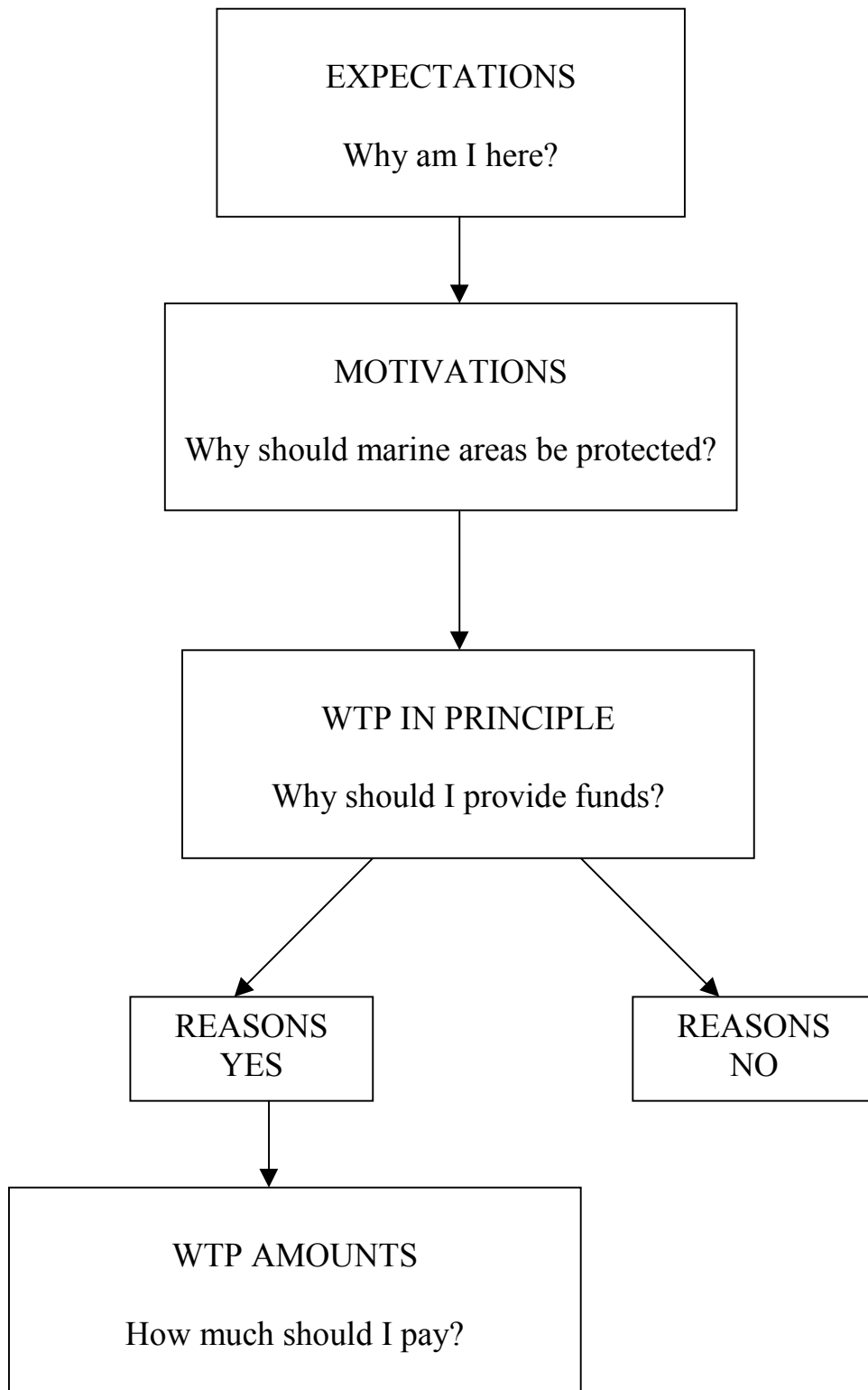Most of the interviews took place on Mahe, the main island, around which are the marine national parks of Ste Anne, Port Launey and Baie Terney, and the rest of the interviews were conducted on the islands of Curieuse and Coco both being part of marine national parks. On Mahe, tourists were interviewed randomly on the beach and on Curieuse and l'Ile Coco, the interviews took place during the visit to the parks.

The questionnaire was in three parts. The first part consisted of a series of questions aimed at obtaining information on the reasons why respondents chose Seychelles as a destination for their holiday and whether they were first-comers or repeated visitors, so that we could assess individual expectations of their holiday in the Seychelles. The second part consisted of eliciting information on why people thought it was a good idea (if they thought it was a good idea) to protect marine areas, so we could assess their motivations for protecting the parks.

The third part of the questionnaire consisted of asking whether they thought it was acceptable to have to pay a fee for visiting a marine park, requiring a yes/no answer, and a WTP amount was elicited from those who replied positively to the payment principle question. The WTP amount was chosen as an entrance fee of between 0 and 200 Rupees in a checklist format as a fee per person per visit they would be willing to pay to enter a marine park. The checklist method is similar to the payment card method (Mitchell and Carson, 1989), and uses a direct question approach to estimate the WTP of the respondents and provides them with potential WTP amounts as a visual aid. The upper limit was fixed at 200 Rupees as this represents a relatively high fee to enter only one park (e.g. it does not include the travel cost to the park, which is charged by the tour operators). The questions were phrased in terms of how much foreign tourists would have been willing to pay to visit Marine National Parks if the parks helped to protect marine resources and the revenues generated through the admission fees were only used to cover the costs of parks operations. Respondents were also asked to give a reason for their decision to pay or not pay to enter a park. This allowed us to link together expectations, motivations and WTP responses for each respondent as shown in Figure 3.

At the end of the survey, socio-economic data on age, income, education, membership of environmental groups were collected. The variables, which were constructed from the survey and used in the analysis, are given in Table 5. The data were analysed using the SPSS statistical package, using multiple linear and binary logistic regression analyses where appropriate. Goodness-of-fit measures were taken as the R^2 value adjusted for degrees of freedom for the linear regression models, and an approximate R^2 based on the likelihood ratio statistic for the binary regression models (Maddala, 1983; Langford *et al*., 1998).

Figure 3:   Linking expectations and motivations to WTP amounts

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                    ┌─────────────────────────────┐
                    │        EXPECTATIONS         │
                    │                             │
                    │       Why am I here?        │
                    └─────────────────────────────┘
                                  │
                                  ▼
              ┌─────────────────────────────────────┐
              │            MOTIVATIONS              │
              │                                     │
              │  Why should marine areas be protected? │
              └─────────────────────────────────────┘
                                  │
                                  ▼
              ┌─────────────────────────────────────┐
              │          WTP IN PRINCIPLE           │
              │                                     │
              │      Why should I provide funds?    │
              └─────────────────────────────────────┘
                    │                         │
                    ▼                         ▼
          ┌──────────────┐          ┌──────────────┐
          │   REASONS    │          │   REASONS    │
          │     YES      │          │     NO       │
          └──────────────┘          └──────────────┘
                    │
                    ▼
          ┌─────────────────────────┐
          │      WTP AMOUNTS        │
          │                         │
          │   How much should I pay? │
          └─────────────────────────┘
```

4.   Results from the Survey

4.1   Willingness to pay in principle
Only eleven of the 300 people interviewed responded negatively to the payment question, the other 289 being willing, in principle, to pay something to enter a marine park. We must remember that those interviewed were tourists, and local people may have given a much less positive response. The payment principle question was used as a binary response variable in logistic regression analyses using the groups of variables shown in Table 5. Expectations explained the most variation in the payment principle question, approximately 14 percent of the total variation. Table 6 shows results from the best fitting multiple regression equation including all the variables available. Being older, and visiting the Seychelles for beach activities or peace and quiet predicted a negative response, and people who refused to pay were more likely to come from Italy, or especially Yugoslavia. This is potentially interesting, as people visiting from Yugoslavia at the time of the survey were perhaps more used to public rather private funding of resources such as marine parks (see below). Of the 300 people sampled, 299 actually stated that they were in favour of protecting marine parks, but when asked a follow up question of why they were motivated to protect marine parks, 52 people could not provide a reason. These people were also less likely to give a positive response to the payment principle question.

The main reason for refusing to pay anything, in principle, was stating that the government should pay. The second column of Table 6 shows the results of a multiple logistic regression of this variable, with Yugoslavia being one of the most significant predictors. People from Yugoslavia more likely to mention tourist accessibility as a motivation for protecting marine parks, and the good weather in Seychelles as a reason for visiting. Older people were more likely to state that the government should pay, as were those who gave no specific motivation for protecting the marine parks. Interestingly, those who gave their primary motivation for protection as keeping the environment clean were also more likely to state that the government should pay, perhaps reflecting a feeling that government responsibility is more important or appropriate in managing the parks than private investment through entrance fees. An expectation of peace and quiet was associated with stating the government should pay, as was an interest in nature (which was highly correlated with beach-oriented activities) and the quality of the waters (which was correlated with culture as a reason for visiting). Visitors from France, and those visiting Curieuse MNP were also more likely to state that the government should pay.

Table 5:   Variables from the survey used in the analysis

Expectations (Reasons for Visit)	Variable Name
No answer	RNONE
Beaches	RBEACH
Nature	RNATURE
Marine resources	RMARINE
Visit someone	RVISIT
Weather	RWEATH
Diving / Snorkelling	RDIVING
Scenic beauty	RSCENIC
Vegetation	RVEGET
Quiet place (no mass tourism)	RQUIET
Protected areas	RPROTECT
Romanticism	RROMANT
Recommendation	RRECOM
Exoticism / Island	REXOTIC
Proximity	RPROXIM
Environment (unspoiled)	RENVIRON
Dream	RDREAM
Visit a new country	RNEWC
Culture	RCULTURE
Waters	RWATERS
Reputation	RREPUT

Motivations	
No answer	XNONE
Protection / conservation of marine resources	XMARPRO
Future generations	XFUTGEN
To see more species	XSPECIES
For tourists (accessibility)	XTOURIST
Unique resources	XUNIQUE
Important to protect the environment	XENVIR
Not many unspoiled places left	XNOTMAN
To prevent from development	XDEVT
To keep the place clean	XCLEAN
To prevent from resource over exploitation	XEXPLOIT
Only place where animals can live peacefully	XANIMAL
To prevent from resource destruction	XDESTRUC

WTP questions	
Paying a fee to enter park in principle	FEE
Natural logarithm of WTP amount	LNWTP
Residual WTP (see text for explanation)	RESIDWTP

Table 5:   continued…………

Reason for WTP in principle	
No answer	ZNONE
Seychelles Government / Hotels must pay	ZGOVT
Need money to manage a park	ZMANAGE
Don't have to pay elsewhere	ZNOPAY
Conservation / protection	ZCONS
To limit the number of entrance	ZLIMIT
Have to pay everywhere else	ZPAYELS
To participate to resource preservation	ZPRESER
Less chance for the resource to be damaged	ZDAMAGE
Only way to protect resources	ZPROTECT
For future generation	ZFUTGEN
To keep the parks clean	ZCLEAN
Maintenance	ZMAINT
Seychelles are too expensive	ZTOOEX

Country of Origin	
France	FRANCE
Germany	GERMANY
Switzerland	SWITZ
Italy	ITALY
La Reunion	REUNION
South Africa	SAFRICA
Yugoslavia	YUGO
Netherlands	NETH
Portugal	PORT
United Kingdom	UK
Russia	RUSSIA
Spain	SPAIN
Czech Republic	CZECH
Austria	AUSTRIA
Luxembourg	LUXEM
Ireland	IRELAND
Mauritius	MAURIT
Belgium	BELGIUM
Greece	GREECE
Other	COTHER

Table 5:   continued………….

Behaviour	
Snorkelling	BSNORK
Scuba diving	BSCUBA
Coral viewing in a glass bottom boat/sub-sea viewer	BCORAL
Other activities	BOTHER
Some activities in marine park	PARKYES
Ste Anne park	STEANNE
Port Launey park	PLAUNEY
Baie Terney park	BAIETERN
Curieuse park	CURIEUSE
Ile Coco park	ILECOCO
Socio-demographic information	
Return visit to Seychelles (i.e. not first visit)	RETURN
Sex (1=male)	SEX
Age in years	AGE
Younger people under 30 years	AGE<30
Older people over 60 years	AGE>60
Income	INCOME
Lower incomes < 100,000 FF per year	LOWINC
Higher incomes > 400,000 FF per year	HIGHINC
Low educational attainment (Brevet or less)	LOWED
Medium educational attainment (Baccalaureate)	MEDED
High educational attainment (Degree or more)	HIGHED
Member of environmental group	ENVGROUP

Table 6: **Multiple regression results for willingness to pay in principle and stating that the government should pay**

	FEE	ZGOVTPAY
Expectations		
RBEACH	- -	
RNATURE		+ + +
RQUIET	- - -	+ +
RWATERS		+ + +
Justifications		
XNONE	- - -	+ + +
XCLEAN		+ + +
Country of origin		
FRANCE		+ +
ITALY	- -	
YUGO	- - -	+ + +
Behaviour		
CURIEUSE		+
Socio-demographic information		
AGE	- - -	+ +
Approx. R²	0.199	0.206
Number of positive responses	289	11
Total number	300	300

Note: +/-: P≤0.1; + +/- -: P≤0.05; + + +/- - -: P≤0.01; + + + +/- - - -: P≤0.001

4.2 Willingness to pay amounts

Surveys which were incomplete, protest bids (those refusing to pay anything in principle) or outliers (greater than 3 standard deviations above the mean) were therefore been removed from the data set for the WTP amount analyses (Hanley and Spash, 1993; Mitchell and Carson, 1989; Langford *et al.*, 1996)). The 270 usable surveys yielded an average value for willingness to pay of 61 Rupees (US$12.20), which exceeds the R50 (US$10) fee instituted in 1997. The difference between these two amounts is the consumers' surplus (CS), representing the portion of the value of the visits that is above the market price. The average consumers' surplus per tourist is 11 Rupees (US$2.20), giving an estimate of the total consumer surplus of 440,000 Rupees (US$88,000), given that 40,000 tourists visited the Seychelles MNPs in 1997.

Multiple regression analyses were then performed using the stated WTP amounts of those who were willing to pay in principle as the dependent variable. Analysing the explanatory variables in groups, as for the payment principle questions, showed that the most variance was explained by respondents' expectations on arrival (adjusted $R^2 = 0.100$) and their country of origin (adjusted $R^2 = 0.153$). Table 7 presents the results of a multiple regression analysis containing all the explanatory variables measured in the study. The parameter estimates represent the mean amount in Rupees which a respondent with the characteristic would pay more or less compared to the baseline amount of 46 Rupees (the whole sample mean was 60 Rupees per person). Hence, visiting with the expectation of going diving results in a mean WTP amount of (46 + 53) = 99 Rupees per person, whilst visitors from South Africa would pay (46 – 34) = 12 Rupees per person on average. There were significant effects found for visiting four of the MNPs, with respondents being WTP more on average if they had visited Curieuse or Ile de Coco, and less if they had visited Baie Terney or Ste. Anne, suggesting that policy makers may need to charge different amounts for different parks for an optimal economic solution to be found. Those respondents who had gone on coral viewing boat trips were also more likely to state higher amounts. Interestingly, although income was significantly correlated with WTP amounts as expected (p < 0.01), it was not a predictor of WTP in the multiple regression, where other variables provided more statistically significant associations with WTP amounts, and in fact no other socio-demographic variable was significant either single or multiple regressions with WTP as the dependent variable. However, there were significant variations for country of origin, with respondents from the UK, La Reunion, Italy and Russia being willing to pay more, and those from South Africa willing to pay less, on average. These differences remained even when income was controlled for, suggesting that the effects are not due to different incomes of visitors from different countries.

Respondents who gave no specific motivation for protecting the marine parks were likely to pay less, on average, as were those who stated prevention of destruction of the resource and protection of environment in general as motivations, which will be discussed in the section below. However, preventing the specific resource of marine parks from being over-exploited was associated with higher WTP amounts. Giving reasons for willingness to pay in principle of conserving the resource in the present and for future generations were associated with higher WTP amounts. In single dependent variable regressions, higher WTP was also associated with the reasons of providing money for good management and to limit the number of people entering a park.

Table 7:   Multiple regression results for WTP amounts

	Parameter estimate	Standard error	Significance
Constant	46.011	3.064	+ + + +
Expectations			
RNONE	-21.952	8.962	- -
RWEATH	10.572	3.617	+ +
RDIVING	53.026	8.221	+ + + +
RPROTECT	102.306	16.362	+ + + +
RROMANT	17.316	8.314	+ +
RREPUT	-20.854	7.123	- -
Justification			
XNONE	-9.584	3.907	- -
XENVIR	-23.788	12.370	-
XEXPLOIT	33.401	13.687	+ +
XDESTRUCTION	-29.278	10.691	- - -
Reason for WTP in principle			
ZCONS	26.696	10.040	+ + +
ZFUTGEN	32.547	16.702	+
Country of origin			
ITALY	17.645	4.890	+ + + +
REUNION	74.022	16.358	+ + + +
SAFRICA	-34.207	16.454	- -
UK	16.683	3.947	+ + + +
RUSSIA	25.996	9.908	+ + +
Behaviour			
BCORAL	12.988	4.167	+ + +
STEANNE	-8.229	4.666	-
BAIETERN	-20.385	7.055	- -
CURIEUSE	17.571	4.634	+ + + +
ILECOCO	25.495	6.113	+ + + +
Adjusted R²	0.425		
Total number	270		

Note: +/-: $P \le 0.1$; + +/- -: $P \le 0.05$; + + +/- - -: $P \le 0.01$; + + + +/- - - -: $P \le 0.001$

18

Visiting with the expectations of going diving, good weather and visiting protected and romantic locations were associated with higher WTP amounts. Stating no specific reason for visiting was associated with lower WTP amounts, as was visiting because of the reputation of the Seychelles as a holiday location. The last result is interesting as in the particular year the study was conducted, a lot of the coral had been bleached and had died due to the El Niño event in 1998, and may not have looked as spectacular or appealing as people would have expected based on the experiences of people visiting in previous years.

4.3   Motivations for protecting marine areas

Not giving a motivation for protecting marine areas, which predicted a negative response to the payment principle question as well as lower WTP amounts amongst those who would pay something, was associated with lower income, and visiting for reasons of peace and quiet, a dream location and experiencing a different culture (see Table 8). Respondents from Germany, Italy and La Reunion were also less likely to state a specific motivation, although, as stated above, all but one of the 300 respondents stated that protection of marine areas was a good idea.

Those who specifically stated protection and conservation of marine resources as their primary motivation were more likely to be younger, and less likely to cite diving, spectacular scenery or a dream location as their reasons for visiting Seychelles. Interestingly, members of environmental groups were less likely to state this motivation, but more likely (in a single explanatory variable regressions) to state availability to future generations as their primary motive (p < 0.05). Respondents from several countries, namely the UK, Germany, Italy and South Africa were also less likely to give this motivation, as were respondents who had visited Seychelles because of its proximity and those who visited Ste. Anne and Port Launey MNPs. In contrast, those who gave availability to future generations as their primary motivation were more likely to be older, have higher incomes and give either no reason or spectacular scenery as reasons for visiting Seychelles. Visitors to Baie Terney MNP were more likely to state this motivation, whilst visitors from France were less likely to.

Table 8: **Multiple regression results for motivations to protect marine areas in Seychelles**

	XNONE	XMARPRO	XFUTGEN	XTOURIST	XDESTRUC
Expectations					
RNONE			+ +		
RMARINE					+ + +
RWEATH			- -	+ +	
RDIVING		- -		+ + +	
RSCENIC		- - -	+ + + +		
RQUIET	+ +				
RPROXIM		- -			+ +
RDREAM	+ +	- -			+ + +
RNEWC				+	
RCULTURE	+ +				
Country of origin					
FRANCE			- - -		
GERMANY	+ + + +	- - -			
ITALY	+ + + +	- - - -			
REUNION	+ +				
SAFRICA		- -			
UK		- -			
Behaviour					
STEANNE		- -		+ +	
PLAUNEY	+ +	- - -			
BAIETERN			+ +		
Socio-demographic information					
AGE		- - -	+ +		
INCOME	- -				
HIGHINC			+ + +		
ENVGROUP		- -			
Approx. R²	0.157	0.255	0.149	0.095	0.070
Number of positive responses	52	156	47	11	5
Total number	300	300	300	300	300

Note: +/-: P≤0.1; + +/- -: P≤0.05; + + +/- - -: P≤0.01; + + + +/- - - -: P≤0.001

20

A minority (n=11) gave the motivation of improving tourist accessibility for protecting marine parks. These people were more likely to come from Yugoslavia, be interested in the good weather and diving, and to have visited Ste. Anne MNP. This result seems to identify a small subset of people, mainly Yugoslavian, who are mainly motivated by self-interest within very limited sphere of provision of tourism resources. This also links to the previous results of being unwilling to pay in principle, and believing the government should pay – presumably as the government should provide MNPs as part of the 'tourist package' which people have already paid for by booking their holiday in Seychelles. A few people, in contrast, stated that their primary motivation for protecting marine parks was to save the resource from destruction, but this had a negative relationship with WTP amounts. These people were visiting because of an interest in marine resources, but also the possibility of a 'dream holiday' and the proximity of the Seychelles. Interestingly, the main predictors of being interested in marine resources were going scuba diving, and coming from La Reunion, which was also correlated with giving the reason for visiting as proximity.

4.4   Expectations and reasons for visiting Seychelles

The expectation of a 'dream holiday' as a reason for visiting Seychelles was associated with giving no specific motivation for protecting marine resources - however, it was positively associated with coming from France and visiting Curieuse MNP (Table 9). Being interested in beach-related activities was also associated with visiting Curieuse, as was coming from France in a single explanatory variable regression. Visiting from France was also negatively correlated with good weather and spectacular scenery as reasons for visiting, and this begins to build a profile of French visitors who are interested in a 'dream holiday' associated with beach-related activities, but who (in a single explanatory variable regression) have lower stated WTP amounts to protect marine parks.

In contrast, being interested in good weather was predicted by being younger and coming from the UK, Luxembourg, Ireland and Yugoslavia. Visitors from the UK were also more likely to state spectacular scenery as being a reason for visiting, and were willing to pay higher WTP amounts. Diving as a reason for visiting predicted higher WTP amounts, and was associated, in a single explanatory variable regression, with coming from the UK, although in the multiple regression it was predicted by higher income and education, as well as visiting Curieuse and Baie Terney MNPs and visiting from the Netherlands. Spectacular scenery as a reason for visiting was also associated with coming from Germany, Italy, and Spain, although it was not given as a reason by those on a return visit to Seychelles. Being interested in nature was associated with coming from

France, Germany, South Africa and the Netherlands, and not visiting a MNP whilst on holiday.

Visiting with the expectation of a romantic location, which also predicted higher WTP amounts was also associated with coming from the UK, as well as being young and of lower educational attainment. Interestingly, this expectation was negatively associated with visiting MNPs but positively associated with boat trips to view the coral. The expectation of peace and quiet, which was negatively associated with WTP in principle, was negatively associated with scuba diving as a holiday behaviour, but also positively associated with visiting from the UK, Netherlands and South Africa, and visiting Ste. Anne whilst on holiday.

Table 9: Multiple regression results for expectations and reasons for visiting Seychelles

	RBEACH	RNATURE	RWEATH	RDIVING	RSCENIC	RQUIET	RROMANT	RDREAM
Behaviour								
BSNORK	- - -							
BSCUBA				+ +		- - -		
BCORAL							+ +	
PARKYES		- - -					- - -	
STEANNE						+ + +		
BAIETERN				+ + +				
CURIEUSE	+ +			+ +				+ + +
Socio-demographic								
RETURN					- - -			
AGE			- - -				- - -	
INCOME				+ + +				
MEDED							+ +	
HIGHED				+ +				
Country								
FRANCE		+ +						+ + +
GERMANY		+ + + +			+ +			
ITALY					+ +			
SAFRICA		+ +				+ +		
YUGO			+ + +					
NETH		+ + +		+ +		+ +		
PORT							+ +	
UK			+ + + +		+ + + +	+ +	+ +	
SPAIN					+ + + +			
LUXEM			+ +					
Approx. R²	0.056	0.194	0.131	0.151	0.093	0.094	0.148	0.067
Number of positive responses	71	47	57	10	86	48	8	11
Total number	300	300	300	281	300	300	300	300

Note: +/-: P≤0.1; + +/- -: P≤0.05; + + +/- - -: P≤0.01; + + + +/- - - -: P≤0.001

5. Discussion

One interesting finding from the study is the relatively small amount of variation explained by socio-demographic factors, such as age, sex, education and income. These factors only accounted for 3.4% of the variation in responses to the payment principle question, and 6.0% of the variation in WTP amounts. Country of origin, expectations and reasons for visiting were more important in determining willingness to pay responses. A potential explanation for this can be found in Sagoff (1998), who claims that the economic concerns of individuals are influences by the communal or national values they share with their neighbours, and individual preferences emerge from, or are shaped by, dialogue between individuals within a society, and are then reinforced by this dialogue. In our study, 'dialogue' about environmental issues such as protection of marine parks would largely be confined to the country of origin of respondents, and therefore it is not surprising that nationality is an important predictor of willingness to pay in our study, independent of respondent's income or educational level. A similar result, showing differential attitudes toward protected areas among nationalities was found by Kramer *et al.,* (1995) in their study on the Mantadia National Park.

We can also determine from our results that individuals are acting both as consumers and citizens in stating their preferences (Brouwer *et al.*, 1999; Sagoff, 1988). Motivations such as preservation for future generations and improving tourist accessibility were significant in our study. Similarly, those who visited Seychelles for the beach or for peace and quiet were less likely to agree to pay to visit a marine park, and those who went for diving would pay more, which could be related to intended use of the resource, whilst those interested in protection of marine resources generally would also pay more. Further, different motivations as well as expectations were partly determined by country of origin. For example, Yugoslavian visitors were more likely to refuse to pay in principle, believe the government should pay, be motivated for preservation by availability to tourists, and have an expectation of good weather as a reason for visiting, perhaps reflecting cultural/national influences in attitudes and beliefs. In contrast, visitors from the UK were visiting for good weather, but also spectacular scenery, and were willing to pay higher amounts for visiting a marine park. It is also possible that respondents from different countries of origin represent different types of visitor, with different needs, depending on how the Seychelles are marketed as a tourist destination. For example, French people were particularly interested in 'dream holidays' and visited Curieuse MNP. However, differences in marketing may well reflect different national preferences, and definitions of 'holiday' or 'recreation' may vary between countries, and potentially the economic values placed on recreational activities by respondents from different countries. For example, UK

and Yugoslavian respondents were both interested in visiting the Seychelles for the good weather, but had very different preservation motivations and willingness to pay responses for the same good, namely marine parks.

Examining the WTP amounts, the relatively small value of the consumer surplus per tourist (11 Rupees) in comparison to the values obtained in other park-related studies, for example Shultz *et al.,* (1998), Kramer *et al.,* (1995) and Dixon *et al.,* (in Perrings *et al*., 1995) could be explained by the travel cost to each park, as they are remote from the tourist resorts. Respondents were also asked how much they would be willing to pay for a visit to one park only. The mean willingness to pay estimate is close to the current fee, therefore, it does not appear that foreign visitors are being uncharged, but that they would be prepared to be charged a little more. Further, the amounts were not distributed evenly between parks, as respondents were willing to pay significantly more for visiting Curieuse and Ile de Coco, but significantly less for visiting Baie Terney. These differences, and understanding the expectations and motivations to different parks could potentially be of great use to policy makers in setting realistic and flexible entrance fees, based on visitor profiles.

Conclusions

The main objective of this study was to identify the value of marine parks to the Seychelles economy through the calculation of the difference between what the Seychelles' visitors would be willing to pay to visit the marine parks and what they actually pay or consumer surplus estimate. In other words, this study looked at the use value of the marine national parks. This value represents easily realisable benefits, which are over and above those benefits that are currently realised, as willingness to pay values for visits to the parks are higher than the current 50 Rupees fee (both for people having visited a park and people having not visited any park). Therefore, the entrance fees could be increased without sharp reductions in visitation, which would result in an increase in the revenue from the fees and in a decrease of the deficit, based on 1997-8 figures. For example, if the amount of the entrance fee were to be increased to 60 Rupees, the direct benefits from the parks would increase from R2,227,800 to R2,627,800 and consequently the deficit would be reduced from R1,827,500 to R1,427,500. However, this shows that even with this extra revenue, the costs would still exceed the benefits, and here we must remember that the study only looked at the use value of the parks. If non use values of the parks were assessed, these might reveal that people are willing to contribute for preserving a portion of the world's marine resources, but it is difficult to see who should be included in such a valuation, and how funds should be collected and distributed. In this case, it is likely that such non use values can only be determined via national or perhaps international political efforts to subsidise the maintenance of the parks, as biological resource depletion and degradation in Seychelles are not just ecological issues affecting the marine parks, but have important economic and political impacts on the Seychelles, as tourism in Seychelles is predominantly beach-based, and thus directly depends on coastal and marine biological resources and diversity. In addition, there are important ethical and moral dimensions, which concern the whole of humanity. Nevertheless, results from a contingent valuation study of this kind, which includes assessment of visitor expectations, motivations and behaviour can easily and usefully be incorporated into benefits-cost analysis of projects, including conservation components, to determine the economic viability, and hence be invaluable to the Seychelles government providing guidance for choosing and implementing investments for natural resource conservation and development.

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