Environmental Valuation of the Menai Bay Conservation Area

A Minor Field Study

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Abstract

The purpose of this minor field study is to determine the revenue-maximizing entrance fee and Zanzibar tourists’ valuation of the Menai Bay Conservation Area (MBCA), Tanzania. The Contingent Valuation Method is used to determine tourists’ willingness to pay (WTP) in entrance fee to visit the MBCA. The sample consists of 399 respondents (visitors and non-visitors). The analysis is made through the OLS- and the Tobit-approach. The result indicates that the WTP is higher than the current entrance fee of 3 USD, suggesting an increased entrance fee in order to maximize the revenue. This minor field study demonstrates that an entrance fee of 5 USD is an optimal level. Furthermore the consumer surplus is determined and the total value of the MBCA is calculated in order to contribute to further research and future policy-decision making concerning the MBCA.

**Keyword:** Menai Bay, Zanzibar, Contingent Valuation Method, Tobit, OLS, consumer surplus.
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1. Introduction

On the world’s political agenda, there is currently a focus on environmental changes due to human activity. In a world with limited environmental resources, it is essential to have methods to determine the best allocation of resources amongst competing alternative uses. Due to the public goods nature of many environmental resources, the market is unable to solve the allocation of environmental resources in an efficient manner. However, by observing individuals preferences it is theoretically possible to reveal a value on environmental goods. This, in turn, can help policy makers to make critical decisions for present and future generations (Perman & Ma, 2003:124). The purpose of this minor field study is to determine the revenue-maximizing entrance fee, and further, determine Zanzibar tourists’ total value of the Menai Bay Conservation Area (MBCA), given the current environmental quality. In order to estimate the willingness to pay, the Contingent Valuation Method (CVM) is used.

MBCA, outside Zanzibar’s coast, is a natural reserve and a popular destination and recreational area for tourists. Today visitors pay an entrance fee of 3 USD to visit MBCA. The collected entrance fees are intended to fund the natural reserve and support the 19 villages in the surrounding area. However, the current entrance fee (and revenue) has proven insufficient to fund the area. Therefore, MBCA is facing an uncertain future. The price of 3 USD is set by the local government, and not by the market. Hence, it may be that the current fee is not optimal.

Tourism is an important source for economic development in many poor countries. Generally, tourism has become one of the major trade categories; the overall export income generated by inbound tourism in the world exceeded USD one trillion in 2009, and tourism export stands for 30 per cent of the world’s exports of commercials services (Lwoga, 2011:108). In developing countries tourism is today one of the most promising ways out of poverty and is often an important source of economic growth (Gössling, 2000:410-412). Tourism is expected, in 2020, to employ approximately 328 million people in the world, and the tourism sector is likely to grow and develop more rapidly and dynamically than many other sectors in the future (Lwoga, 2011:109). Ecosystems and unique environments, can enable poor countries to develop a tourism sector. It can be a source of both direct and indirect economic
revenues since recreational activities, sightseeing and other experiences are a significant part of the demand for tourism.

1.1 Purpose
The purpose of this minor field study is to determine the revenue-maximizing entrance fee, given the current environmental quality, and further, determine Zanzibar tourists’ total value of the Menai Bay Conservation Area.

1.2 Research questions
The following research questions have been derived in order to satisfy the purpose of the minor field study:

- What are visitors willing to pay in entrance fee to visit MBCA?
- What are non-visitors willing to pay in entrance fee to visit MBCA?
- Which variables affect the WTP for visitors and non-visitors?
- How large is the current consumer surplus, and, is it possible to calculate the change in revenue from the hypothetical change in entrance fee?
- What is the total value of the MBCA measured in Zanzibar tourists’ WTP in entrance fee?

1.3 Demarcation
Due to financial and time constraints, the present minor field study is restricted to the MBCA in Zanzibar. Hence, the conclusions drawn are mainly for this area, and are not generalizable to other conservation areas.

There are two major starting points to enter the MBCA (Kizimkazi Mkunguni and Kizimkazi Dimbani), due to the time limit of this minor field study we have only used Kizimkazi Mkunguni as our starting point. Consequently, potential respondents from Kizimkazi Dimbani are not a part of the case study. It should also be noted that there are different entrance fees for residents and non-residents. We have limited the minor field study to examine non-residents over 18 years old. Another aspect to consider in the minor field study is corruption, Tanzania is ranked, 116 of total 178 countries, with Corruption Perception Index of 2.7 (where 10 stands for a very clean system and 0 stands for a high corrupt system) (Transparency International, 2010). This may affect the respondent’s final answer, but due to
time, the minor field study does not take account of corruption. Furthermore the total value of the MBCA cannot be determined through our sample of visitors and non-visitors WTP, other aspects to consider might be, for example, the fishermen’s value of the MBCA, i.e. the local populations’ valuation of the conservation area.

1.4 Previous Research

For many developing countries, the tourism sector is an important resource for economic growth. Therefore, a sustainable environment is of importance in order to promote economic growth (Gössling, 2000:410-412). To manage natural resources efficiently it is necessary to achieve a proper valuation of the resources when making decisions. For example, it is important to estimate the environmental impacts of any project and compare the costs to the benefits. Theories and methods to measure environmental changes in monetary terms have, during the last decades, developed and is now established as an important part of the policy-making process (Georgiou & Whittington, 1997:2). The most common method for valuation of natural resources is the contingent valuation method (described in detail in section 4.1).

Mathieu (2003) argues that the CVM can provide values that traditional net revenue analysis cannot. Mathieu uses the method to determine the willingness to pay for visiting the Seychelles, where the economy is dominated by tourism. The study highlights what visitors are willing to pay and what they actually pay in entrance fee by measuring the recreational use-value of the environmental good in terms of consumer surplus. The sample consists of three hundred tourists that had visited a marine park but also tourists who had participated in activities outside the protected areas. The findings from the study is that tourists WTP in entrance fee is higher than the current entrance fee for visiting the Seychelles marine parks, which leads to a consumer surplus equal to the difference between the tourist are willing to pay and what they actually pay. Mathieu highlights that the result from a CVM-study can be used as a guideline, especially in cost and benefit analysis, in the Seychelles government decision making process.

Ransom (2009) focuses on the Mombasa Marine National Park and Reserve (MMNPR) and the possible effect on MMNPR revenue due to an increased entrance fee. The value of recreational benefits is estimated through the CVM to determine visitors WTP in entrance fee. 285 adult visitors (including Kenyan citizens, Kenyan residents and foreign tourists) whom had visit MMNRP, are included in the sample. By calculating the overall mean of the
maximum entrance fee, applied to the number of visitors in MMNPR, the total revenue is determined due to the increased entrance fee. The findings from the study are that an increase in the entrance fee is possible if it is demonstrated that the environmental quality is improved by investing in a management plan. A potential reduction in the number of visitors could diminish the impact of tourism. The study highlights that the valuation demonstrates that stakeholders and decision makers can justify the sustainable use and management of the marine park.

Seenprachawong (2003) uses the CVM and the travel cost method (TCM) to estimate benefits from coral reefs in the Phi Phi Islands. TCM is used to estimate use-values, and CVM is used in order to determine the non-use values, option, existence and bequest value (see section 3.2. for a description). The survey contains 400 domestic visitors and 128 international visitors. The total sum of recreational benefits from the TCM survey added to the total sum from the CVM survey (use and non-use value) is the benefit values of Phi Phi’s coral reefs. The result shows that the coral reefs, in Phi Phi Islands, generates substantial great economic returns to the economy. The findings from the study show that visitors are willing to pay for conservation methods which both TCM and CVM illuminated. The CVM implies that the entrance fee could increase, which gives revenues to park authorities to improve the recreational sites in the area.

1.4.1 Our contribution
In our minor field study, the intention is to highlight the individuals’ valuation of environmental goods, without a market, by observing a marine conservation area in Zanzibar, Tanzania. As mentioned above, previous research has shown that CVM is a useful method to determine both use and non-use values and individual preferences. Our contribution is twofold; 1) no one, has to our knowledge, analyzed the total value of the MBCA before, and 2) the current entrance fee is not based on the valuation of the area. Therefore, this minor field study presents a valuation of the MBCA for future decision making and a discussion of an increased entrance fee to keep the current environmental quality in the area.

1.5 Disposition
The next chapter contains a brief background to economic growth, tourism and environment in Africa, Tanzania and Zanzibar, but also, history and a problem background to the MBCA. Chapter 3 presents the theoretical framework. In chapter 4, the empirical approach, CVM,
operationalization and the descriptive statistics is described and discussed. In chapter 5 the estimations and results from the Tobit- and OLS-model is presented. Furthermore the consumer surplus, the revenue maximizing entrance fee and tourists’ total value of the MBCA are calculated. Finally, chapter 6 presents the discussion and suggestions for further research.

2. Background

In this chapter, we give a brief introduction to economic theories related to economic growth, tourism and environment, and the specific case of Tanzania and Zanzibar. Furthermore, the history and problem background to the MBCA are presented.

2.1 Economic growth, tourism and the environment

Africa has a relative low share of the global tourism market but the numbers of destinations in the continent have increased during the last decades, and the tourism sector has brought socio-economic development in forms of; employment opportunities, foreign exchanges earnings, infrastructure enforcements, development of rural areas and conservation of biodiversity (Lwoga, 2011:110). However, the tourism does not only contribute to economic growth, it also provides financing for nature reserves. In many cases, the financing of protected areas entirely depends on the income from tourism. For example, most of the national parks in Africa would no longer persist without tourism (Gössling, 2000:412). However, developing countries generally capture a low share of the earnings/income from international tourism, the greatest part ends up in foreign ownership, foreign tour operators and foreign employees. Negative economic impacts of tourism are that the seasonal nature of tourism leads to more casual labour, for example tour organizing, which creates economic problems in low season, compared to permanent employment in sectors such as hotels. Other negative side effects of tourism are that the overexploitation destroys ecosystems and diminish the environmental quality. Finally, although tourism stimulates investments in infrastructures, which in turn may boost economic growth, infrastructure also affects the landscapes aesthetics and might result in deforestation. The dilemma of maintaining the income from tourism without reducing the environmental quality is an act of balance, therefore it might be difficult to find a win-win situation in all cases (Lwoga, 2011:32).
2.2 The Tanzanian case

Tanzania is one of the poorest countries in the world (CIA Factbook, 2012). Tanzania’s economy is characterized by a large traditional rural sector and a small urban sector. Agriculture is the primary economic income source, with almost 50 per cent of GDP and 80 per cent of the export earnings (Kweka et al., 2003:337).

The country’s abundant natural resources make tourism a sector with great growth potential. However, it is important to find a balance between a continued growth in the tourist sector and preserving the unique environment (Kent, 2011:5). Tourism offers a diversified source of foreign exchange earnings for an economy that originally depends on a few agricultural exports (Kweka et al., 2003:338). In 2010, Tanzania earned approximately USD 950 million from 750,000 international tourists (approximately 1300 USD per tourist). Tourism is therefore becoming the leading share in the Tanzanian economy and in 2012, 1.2 million tourists are estimated to visit Tanzania (Lwoga, 2011:136-140).

Tanzania is endowed with several unique and diverse natural and cultural tourist attractions, mostly concentrated in the Northern Wildlife Areas, Dar es Salaam and Zanzibar. During the 1990s, after the halt in 1977 when the border to Kenya was closed, tourism became a major part of the economic growth. The government made an effort through various economic policies to support it, mainly by allocating almost a third of the land area to national parks, which forms different types of tourist attractions (Kweka et al., 2003:337-338). In 1999, Tanzania implemented a policy promoting sustainable and high quality tourism. During that time, conservation areas (both land based and at sea), were created together with different types of cultural programs to enrich the environment and society (Lwoga, 2011:136-140).

2.2.1 Zanzibar

Zanzibar is an archipelago outside Tanzania’s coast. It consists of two major islands: Unguja and Pemba. The island is rich in coral reefs, mangrove forest, tropical fish and sea grasses. Due to destructive fishing methods such as fishing with dynamite, cyanide and beach seine nets the coral reefs have suffered an environmental deterioration. As in many other countries, these methods are illegal in Tanzania. However, as a result of the lack of enforcement and limited finance and infrastructures, some methods are still used despite the ban of the methods in 1993s “Fisheries Principal Regulations” (Tyler et al., 2011:232-233).
Zanzibar has a growing tourist sector and the numbers of tourists visiting Zanzibar have increased during 1990 to 2008 by almost 332 per cent. Approximately 45 000 people (≈3.5 per cent of the population) work directly or indirectly with tourism, and it is likely that the tourist sector will surpass agriculture as the leading revenue of Zanzibar in the near future. As a result of the expansion, 35 percent of the GDP is contributed by tourism in this region (MACEMP, 2009:80-82). In 2008-2010 approximately 132 000 tourists (on average per year) visited Zanzibar, and the top three countries of origin were Italy (26.3%), United Kingdom (15.0%) and Germany (7.9%) (MNRT, 2011:11). However, the increase in tourism has led to a negative development for the environment, especially on the coral reefs along the coastline of Zanzibar which is the main attraction for tourism, involving sport fishing, diving, snorkeling, dolphin safari and boat excursions. Although tourism contributes exclusively to GDP in Zanzibar, the sector is also associated with problems in terms of environmental degradation, mainly in terms of increased pressure on the coral reefs (MACEMP, 2009:59).

Projects and management initiatives to provide a sustainable tourism, resource use (sustainable fishing) and conserve biodiversity have started as a result of the increase in tourism (McClanahan, 2000:193). Partially protected areas are popular in Tanzania and Zanzibar, and there are currently six protected marine areas whose common purpose are to sustain coral reef fisheries, protect biodiversity and secure the livelihoods of local communities.

2.3 Menai Bay Conservation Area

Menai Bay Conservation Area (MBCA), situated in the southwest of Unguja (illustrated as the hatched area in the picture below), is the largest of six marine protected areas in Tanzania and covers an area of 467 square kilometers including six islands. The tropical marine environment is rich in coral reefs, tropical fish, sea grasses and mangrove forest but also known as an important breeding area for sea turtles and dolphins. MBCA is surrounded by 19 villages where fishing is the major economic activity, acting as a revenue source for households (therefore the residents are heavily dependent on the marine environment for their daily needs).
In the beginning of the 1980s, the numbers of visiting fishermen and their use of illegal methods drastically increased in the area, leading to an increased fishing pressure and lower fish catches (Torell, 2006:6). However, in 1992, the Commission of Fisheries and Department of Environment introduced a management plan and started to cooperate with the villages in the area. The villagers volunteered to manage the program plans by controlling the area and taking offenders to the local authorities. However, the program has been hampered by insufficient knowledge among the local population and authorities. In 1994, World Wide Fund for nature (WWF) therefore began to provide technical and financial support for the
management of the area (Torell 2006:9). Menai Bay became a conserved area in August 1997 when the government of Zanzibar officially designated it as a conservation area. The response to making Menai Bay to a conservation area with no exclusion zones for fishing, was both positive and negative. The local communities were positive but visiting fishermen, especially from Dar es Salaam, felt discriminated because of the slightly stricter fishing regulations than in other areas around Zanzibar (Torell 2006:9-10). The main goal of the MBCA “…is to provide regionally significant opportunities for public enrichment through recreational activity, education and scenic enjoyment while conserving the areas marine resources and other natural and cultural resources.” (Ministry of Agriculture, Livestock and Environment, 2010). The purpose of the project is to:

- Engage local communities in implementation, planning and monitoring of the natural resources of Menai Bay.
- Increase awareness of conservation through educational and public awareness programs.
- Support socio-economic and biological research and monitoring to provide the basis for rational management.
- Protect the marine ecosystem and improve resource yields through management systems, including active local community involvement (Torell 2006:9-10).

Furthermore a committee was set up in the villages in Menai Bay, supervised by a village’s headmen and MBCAs project staff. To protect MBCA, the local fishermen and the government anti smuggling unit patrol the area to prevent and stop illegal fishing methods. In order to fund the project, tourists are allowed to enter the area for an entrance fee. Thirty per cent of the collected entrance fees are intended to go directly back to the villages in the area, and the main beneficiaries are fishermen who are the primary stakeholders of the fund. The entrance fee is collected from tour operators, who have to have a permit for tourist excursions. From July 2008 to March 2010, approximately 17 500 permits (where one permit is equal to one tourist) were sold per year on average (Torell, 2006:11).

In 2004, the MBCA project began collecting an entry fee of 5 USD per person to generate funds for conservation, community development programs and management. In 2005, the Department of Fisheries and Marine Resources in Zanzibar reduced the entrance fee to 3
USD, because of the fear that a higher entrance fee would decrease the number of visitors and revenue (Gautam, 2010:10). However, in spite of the effort to increase knowledge and raise revenues, the area still lacks both sufficient funds and support to successfully support the work that is needed to fulfill program expectations and achieving a sustainable income (in order to preserve and conserve the area) of revenue from the entrance fee (Levine, 2007:577-582). A concerning problem is that villages situated far away from the main offices feel deserted and do not see the Menai Bay program as useful because it has not provided sufficient alternative economic sources compared to when illegal fishing gears were used (Torell 2006:10). Local officials hope that the collected entrance fee from tourist visiting the area will provide a sustainable source of revenue because:

Without sufficient, sustainable finance, MBCA is at risk of becoming a ‘paper conservation area’ where management agreements for the area marine resources may turn out to be little more than statements of good intentions. The establishment of sustainable fees system has already been investigated with a literature study, information sharing with Department of Fisheries and Marine Resource and the Conservation Areas Management Team. There is an urgent need to establish a sustainable financing mechanism for MBCA… (Ministry of Agriculture, Livestock and Environment (2010), “Draft General Management Plan: Menai Bay Conservation Area.” p.48, 63).

The lack of evaluation and information about visitors’ valuation of the Menai Bay gives reason to suspect that the current entrance fee does not correspond to an optimal level of entrance fee. Therefore it is important to reveal visitors willingness to pay and non-visitors willingness to pay to be able to estimate a revenue-maximization entrance fee and determine the total value of the Menai Bay.

3. Theoretical approach

In this chapter we first briefly discuss economic theories related to externalities and public goods. We then present the theory behind environmental valuation, and the theory of Marshallian and Hicksian demand and the equivalent variation. Finally, the application of theory for this minor field study is presented.
3.1 Externalities and public goods

In a perfect market situation the allocation of resources is Pareto efficient; the utility of one individual cannot increase without decreasing the utility of one other individual. The Pareto optimality is a central part of the resource allocation theory (Brännlund & Kriström 1998:40-41). Furthermore, a competitive market is always efficient and the Pareto optimum can always be achieved by transferring income among individuals in an appropriate way. However, externalities (for example pollution) are a problem in a market economy (Kolstad, 2011:81).

An externality can be defined as; when the production or consumption choices of one individual enter the production or consumption function of another individual without that individual’s permission or compensation (Kolstad, 2011:92). There are four assumptions for a competitive market; complete property rights, complete information, no transaction costs and atomistic participants. Externalities such as pollution clearly violate the first condition. The decision about emission level will not be Pareto optimal, because the emitter will never bear the total cost of the pollution as long as the air is defined as a public good and the property right is undefined (Kolstad, 2011:69-82). There are two major problems with a Pareto optimal allocation of environmental goods; the open access and externalities. Environmental goods can be defined as a public good. Public goods are defined by the characteristics of non-exclusion and non-rivalry (Kolstad, 2011:94-95). Open access resources, for example fishing in MBCA, exhibit rivalry but not exclusion. In other words, fishermen can not be excluded from fishing in the MBCA. However, in absence of quantifies laws or other forms of laws there is a competition among the fishermen and if one fisherman catches one unit of fish all the other fishermen’s catch are potentially reduced (Perman & Ma, 2003: 126-127).

However, external effects can both be positive and negative depending on the scenario. The market will produce more of the good than efficiency requires in terms of a harmful externality, while in terms of a beneficial externality, the market will produce too little of the good in relation to the requirements of allocation efficiency. A main relevance of externalities is the connection of welfare economics to environmental problems. To solve the market failure environmental valuation is used to price public goods, and environmental goods, to avoid these negative externalities (Perman & Ma, 2003:135-137).
3.2 Environmental valuation

Economics is about making choices with limited resources. While it is less complex to make choices about private goods and services (priced goods) it is more complex to make choices concerning public goods (unpriced goods) such as the environment. The importance to value environmental goods and make choices to avoid external effects and misallocation of resources is crucial in the economy. Environmental valuation is relevant at all stages when making decisions, for example it is important to calculate the environmental impacts of any project and then compare the costs to the benefits. Theories and methods to measure environmental changes in monetary terms, have during the last decades developed and established as an important part of the decision-making process (Georgiou & Whittington, 1997:1-2).

The total value of an environmental good can be divided into four groups of benefits: 1) Use Values (UV) which contains both direct and indirect values. Direct values includes the extractive industry (outputs) and non-extractive industry (services), while indirect use values estimate the indirect functional benefits, 2) Existence Value (EV) is based on the knowledge that the good or service will continue to exist, independent of other individuals future use, 3) Option Value (OV) is a value that relates to the amount that an individual is willing to pay to preserve an environmental quality for future use (Georgiou & Whittington, 1997:8), and 4) Quasi-Option Value (QOV) values the WTP for an irreversible commitment. Non-Use Value (NUV) is the sum of EV, OV and QOV. This measure is easier to use due to the aggregated form. The OV and QOV are only relevant where there is incomplete knowledge of future conditions, which is usually the case. By assuming complete knowledge for future conditions we can focus on UV and EV. The total value of the environmental good or service is defined as the sum of UV and NUV (Perman & Ma, 2003:402);

\[ \text{NUV} = \text{EV} + \text{OV} + \text{QOV} \]  
(\text{eq. 1})

\[ \text{TV} = \text{UV} + \text{NUV} \]  
(\text{eq. 2})

There are several techniques to value environmental goods in monetary terms, divided in revealed preferences techniques and stated preferences techniques. One way of obtaining the value of an environmental good via revealed preferences is to use the Hedonic Pricing Method. This method is based on the assumption that an individual’s utility for a good is based on the attributes which the good possesses. For example, if we want to obtain the value
of a real estate it depends on a number of aspects; structural factors, number of rooms, and plot size and environmental factors of the neighborhood, which increase the value of the real estate if the environment improves (Brännlund & Kriström, 1998:94). Stated preferences, on the other hand, are measured by the individual’s preferences for the goods relative to their demand for goods and other services (Garrod & Willis 1999:7). However, since environmental goods are seldom traded at the market, stated preferences are not suited for a valuation of such goods. The Contingent Valuation Method (CVM) is a method to reveal behavior and preferences in the market place, due to the market failure and the non-market situation for environmental goods. The CVM simulates a hypothetical market situation and by measuring the income and substitution effects enables a valuation (Brännlund & Kriström, 1998:101-102). The approach of the CVM will be further exemplified and described in chapter 4.

3.3 Marshallian and Hicksian demand

Standard economic theory, and theory of environmental valuation, assume that the consumer have a utility function. The income and substitution effect demonstrates the impacts of a price change and measures the utility change for the individual (Perman & Ma, 2003:404). The two Hicksian monetary measures of the utility change are compensating variation (CV) and equivalent variation (EV). Depending on whether there is a decrease or increase in the price, the Marshallian and Hicksian demand function take different approaches when they deal with the income and substitution effect. The Marshallian demand holds the consumer’s income and all other prices constant. Point A and B in figure 3.3.1(b) are points on the Marshallian demand function. A reduction in the price of good Z from $P_1''$ to $P_1'''$ results in an increase in the consumption of Z from $C_1'$ to $C_1''$. The Hicksian demand function shows the relationship between the price on the particular good and the demand of the same good, holding utility and other prices constant. The movement from point A and D in figure 3.3.1(a) is caused by a decreased price, $P_1'$ to $P_1''$. Point A ($P_1';C_1'$) and D ($P_1'';C_1'''$), points F ($P_1';C_1'''$) and B ($P_1'';C_1''$), determine the Hicksian demand curves, illustrated in figure 3.3.1(b). In terms of CV and EV, CV is the area to the left of Hicksian $U_0$, between the prices $P_1'$ and $P_1'''$, illustrated in figure 3.3.1(b) as the sum of the shaded area. EV is the area to the left of Hicksian $U_1$, between the prices $P_1'$ and $P_1'''$, illustrated in figure 3.3.1(b) as the sum of the shaded and hatched area.
Figure 3.3.1.; (a) Compensating variation of a decreased price, and, (b) Marshallian and Hicksian demand curves (Perman & Ma, 2003:406)

The Marshallian consumer surplus (MCS), the area to the left of the Marshallian demand curve in figure 3.3.1(b), is not equal to the two Hicksian measure of utility change (Perman & Ma, 2003:405-407).
There are two monetary measures for an environmental quality change in consumer surplus, willingness to pay (WTP) and willingness to accept (WTA). The utility effects of a price change for an individual can provide a proper monetary measure, if it is possible to determine WTP or WTA. In the case were this is impossible, but the individuals uncompensated Marshallian demand function is known, the MCS can be used (Perman & Ma, 2003:407-408). In terms of EV, environmental improvement and environmental deterioration can be measured in either WTA or WTP. In this minor field study EV is used to measure an environmental deterioration not occurring in the MBCA. Therefore the WTP is used to determine the consumer surplus, illustrated in figure 3.3.2. The movement from point A to point B, U₀ to U₁, illustrates an environmental change that affects the society negatively. The negative environmental impact leads to a decrease in Z from Z₀ to Z₁. Therefore the budget constraint rotates clockwise and tangent the utility level U₁, in point B. The difference between point A and C is the amount of money the consumers are willing to pay for the environmental change not to occur (Perman & Ma, 2003:408-409).

Figure 3.3.2 – The EV surplus for an environmental deterioration
(Perman & Ma, 2003:408).
3.4 Application of the theory to the MBCA
To determine the revenue-maximizing entrance fee, and the total value of the Menai Bay Conservation Area, the use value and non-use value (see eq. 1) of the conservation area will be measured. The use values characterize visitor’s value of the MBCA while the non-use value is defined as non-visitor’s existence value of MBCA. Since the minor field study aims to determine the consumer surplus for an environmental deterioration not occurring in the MBCA, the Hicksian monetary measure, EV, will be used. Therefore the WTP will be used to determine visitors’ and non-visitors’ maximum willingness to pay in entrance fee for visiting MBCA. The current entrance fee of 3 USD is illustrated in point A in figure 3.3.2.

4. Empirical approach
In this chapter we first describe the CVM, followed by a section with method criticism. We then discuss the sampling before presenting the operationalization. Finally, the descriptive statistics are presented and the empirical specification is derived.

4.1 Contingent Valuation Method
The CVM is the only method which can be used to estimate both use values and non-use values of environmental and public goods. The method was proposed during the 1940s, by the American economist Ciriacy-Wantrup. The breakthrough begun in the end of 1980s and in the 1990s the method was used to a greater range of problems especially the development in the health sector of the third world (Brännlund & Kriström, 1998:101-102). A central part in a CVM-study is to describe the scenario and the environmental non-priced good for the respondent to evaluate. Through a questionnaire a respondent is presented with a hypothetical scenario which may, or may not, occur. Pictures and sketches can simplify to understand the scenario (Garrod & Willis, 1999:125)

In our minor field study, visitors’ and non-visitors’ WTP are estimated by the use of the CVM to determine the total value of the MBCA. Visitors’ WTP is estimated to determine the revenue-maximizing entrance fee and the consumer surplus (use value). Non-visitors’ WTP is estimated to determine the existence value for MBCA (non-use value). The structure of a CVM-study is described by Charles D. Kolstad (2011) in six phases, which have been the basis of this minor field study (Kolstad, 2011:204-208).
4.1.1 The market scenario
The main part in this phase is to be sure what to measure, and to construct a scenario with a payment mechanism, which the respondent can easily understand and relate to. The market scenario must be routed in a real experience and policy-relevant and reliable. To ensure that the respondent understands the problem, the questionnaires may contain pictures and sketches that illustrates how a project affects the resource allocation (Kolstad, 2011:204).

It is important for the respondents to fully understand the goal of the scenario, otherwise they may think of an alternative scenario, or not take the questionnaire seriously. When the scenario is illustrated, a WTP or a WTA question is created to estimate a welfare change, caused by the scenario. The respondent should be aware of the underlying environmental change that occurs for providing the environmental good and how the payment is to be implemented. In our minor field study, we thoroughly described the problems facing the MBCA for the respondent. In addition, a map was attached to the questionnaire. The welfare change for an environmental deterioration not to occur, in terms of EV, is determined by a WTP question. We described that the authority that manages the MBCA will be in charge of collecting the entrance fee.

4.1.2 Choosing elicitation method
The next phase is to choose the best way to obtain the correct valuation response. The four most common payment vehicles are; direct question, bidding game, discrete choice, and payment card. Direct question allows the respondents to choose their WTP freely. However, since WTP inherently deals with non-market goods, there is a risk that respondents give extreme responses due to lack of information in direct question. A bidding game seeks to find the WTP by using “yes” and “no” responses, were the amount gradually increases until the respondent answers no (and vice versa). The difficulty of using bids is where to start the bidding, to not over or under value the good. Discrete choice asks the respondents their WTP, with a given value, in a yes or no question. Using this method, it may be difficult to determine and choose the given WTP-value. The payment card method allows the respondents to choose a value freely from an interval. This method gives the respondents an idea of the value of the good. The challenge of the payment card method is to determine a proper interval; if the respondents’ WTP are underestimated from the start, the result will not reflect the true maximum WTP (Kolstad, 2011:205).
In our minor field study, the payment card method will be used since the current entrance fee of 3 USD will act as a starting point. The entrance fee gives us, and the respondents, a realistic idea for the limits of the interval. Due to the current entrance fee, our interval offers 20 alternatives; from 1 USD up to 20 USD. However, if the respondents’ answered that they were willing to pay “20 USD or more” they were given a separate paper with interval values from 21 USD up to 170 USD.

4.1.3 Design market administration

There are four main approaches of survey administration; mail survey, internet survey, phone survey and in person survey. Mail survey is considered to be the cheapest method to administrate. However, the non-response rate tends to be high when the respondent can choose not to participate. Similarly, although internet surveys are an easy way of collecting data and reach out to different types of target groups, the non-response rate tends to be high. Phone surveys are considered to be relatively cheap to administrate. However, for this method infrastructure might be a primary problem associated in poor countries. Furthermore, using this method it is difficult to get a representative sample of the population, and also to illustrate the scenario. In person survey might be an expensive method to administrate depending on the structure and aim of the study. A primary problem might be the interview effect, which can create a biased result (Kolstad, 2011:206).

In our case study, the in-person-survey is the only alternative due to the infrastructure on Zanzibar and our target group (tourists). Hence, mail survey, internet survey and phone survey could not be used.

4.1.4 Sample design

The ideal sample should reflect the reality where, for example age, income, gender, education level, nationality is represented in the sample. Therefore it is important to choose target group and to define a geographical area to get a sample that reflects the reality (Kolstad, 2011:207).

In our minor field study, non-resident adult tourists visiting Zanzibar constructs the target group. We divide this group into visitors and non-visitors. Visitors are tourists that has personal experience of MBCA at the time of the interview. Non-visitors are tourists interviewed in different locations in Zanzibar (without personal experience of the MBCA), mainly in the north and east coast where most tourists are situated. By including visitors and
non-visitors the minor field study aims to observe the use-value (UV) and non-use value (NUV), in order to analyze possible differences in WTP for visitors use value and non-visitors existence value. To estimate the total value of the MBCA; the locals WTP for the area should be included. However, due to our time and financial restrictions this estimation could not be implemented.

4.1.5 Experimental design and design of questionnaire

Once the most convenient method to test the WTP for a hypothetical market situation have been found, it is important to construct the questionnaire carefully to avoid that the answers are biased. When respondents are asked to vote “yes” or “no” for environmental goods, it is essential for the result how these values are presented to the respondent. Therefore it is imperative to be clear and have a theme running through the questionnaire/interview (Kolstad, 2011:207).

In our case the questionnaire was made up of four parts; the first part consisted of a series of questions aimed to obtain information about of the reasons for why visitors and non-visitors choose Tanzania and Zanzibar as a destination, and if they were first-comers or repeated visitors. The second part consisted of questions related to visitor’s and non-visitor’s moral positions. This section for example asked where the respondent thought the responsibility for the environment lies, and if they are engaged in any environmental organization. The third part of the questionnaire consisted of an introduction to the MBCA. The respondent got an introduction with general questions regarding the problems in the area, followed by a WTP-question where respondents had to state if they were willing to pay an entrance fee for visiting the area or not (a yes/no answer). A WTP-amount was elicited from those who answered positively to the entrance fee question. Those who answered negatively were asked to state the purpose behind the answer. The last part consisted of socio-economic information such as the respondent’s gender, age, country of origin, income, nationality and education level. The questionnaire for visitors is attached in Appendix A, and the questionnaire for non-visitors is attached in Appendix B.

4.1.6 WTP function

The estimation of the WTP function must be considered during the development of the study. Otherwise, important information can be forgotten or incomplete and therefore incapable of
using in estimation. A flawed experimental design can lead to an undesirable outcome and a WTP function that is impossible to estimate (Kolstad, 2011:207).

In our minor field study, we have considered the estimation of the WTP-function and carefully followed every step in order to reduce the chance to have a function that is impossible to estimate caused by a flawed experimental design. The WTP-function will be presented in section 4.4 (operationalization).

4.2 Method criticism
A primary criticism of the CVM is that it is not based on actual payments but rather hypothetical scenarios. Therefore, it has been argued that without an actual payment, the response to the WTP-question will be ineffective. For example, a hypothetical question will result in a hypothetical answer. Another way to highlight the problems is that there is no budget constraint in a hypothetical study, making it problematic in the sense that the respondents have no relationship to their willingness to pay. A further issue is if the individual cares about the scenario or just states a moral position when answering the WTP-question. An example is a study from Norway (Seip & Strand, 1992), where the individuals who answered positively to the WTP-question were afterwards contacted and asked to pay the stated amount (which only 10 per cent of the respondents did). Another problem with the CVM is for example that individuals evaluate more than one park and not a specific park. Therefore individuals may have a common value for one park compared to several parks. Existence Value is also a primary problem. Another problem is when individuals value something they do not have any relationship to, a connection to an actual transaction is therefore unrealistic. Still, the CVM is the only method which can be used to estimate both use values (visitors of the MBCA) and non-use values (non-visitors) of environmental and public good such as Menai Bay Conservation Area (Kolstad, 2011:207-208); (Perman & Ma, 2003:434-435).

4.3 Sampling
The sample for this minor field study is a convenience sample. This means that our sample is a non-random sample. A non-random sample may increase the risk of systematic bias since relevant groups might be partially or completely excluded. It is therefore difficult to draw general conclusions from non-random sample and it is impossible to conduct a failure analysis due to lack of information (Jacobsen, 2007:223; De Veaux & Velleman, 2008:301-302). However, although the convenience sample might not be the ideal sample we employ this
sampling strategy due to the difficulties to draw a random sample from an unknown population.

The survey was conducted between late August to early October 2011, the end of high season and the beginning of low season. The interviews for respondents who had visited the MBCA, for diving, snorkelling, fishing, and dolphin watching were held in connection to Kizimikazi Mkunguni. As mentioned before, there are other ways to reach the MBCA, but the other starting points were not representative because of the lack of tourists. Interviews with non-visitors were held in the main tourist areas in Zanzibar; the North and the East Coast, and in Stone Town. The survey consists of 399 respondents, of which 201 are visitors and 198 are non-visitors.

4.4 Operationalization
In this section the WTP function, for visitors (see eq. 4) and non-visitors (see eq. 5) is presented. Furthermore, the dependent variable and a number of independent variables are presented.

\[
WTP_{\text{VISITOR}} = f(V_Z, D_Z, NP, R_i, R_G, R_B, EO, K_{EF}, G, \text{Age}, N, y, Edu, K_{MB}, C_{MB}, \text{Exp}) \quad \text{(eq. 4)}
\]

\[
WTP_{\text{NON-VISITOR}} = f(V_Z, D_Z, NP, R_i, R_G, R_B, EO, K_{MB}, G, \text{Age}, N, y, Edu) \quad \text{(eq. 5)}
\]

In our choice of variables, we have considered variables from previous research to explain and determine a consumer surplus from a WTP-question (see section 1.4 Previous Research). The independent variables are determinants, assumed to affect the WTP, and might differ, depending on whether the WTP is measured and estimated for visitors or non-visitors.

4.4.1 The dependent variable
The willingness to pay in entrance fee to visit the MBCA is the dependent variable for both visitors and non-visitors. The WTP function is chosen because previous research (see section 1.4) has shown that a revealed willingness to pay can help to evaluate a non-priced good, and demonstrate a valuation of the MBCA.

4.4.2 The independent variables
The following independent variables are used in the WTP-function;
Visit Zanzibar before ($V_{Z}$, dummy variable), measures if the respondent has ever visited Zanzibar before. The WTP might be affected due to the possible skepticism towards the political system and authorities, or positive past experience of their visit.

Length of Stay in Zanzibar ($D_{Z}$, continuous variable), measures how many days the respondents had spent on Zanzibar at the time they were interviewed. The variable is included in the regression since it might be interesting to observe how many days non-visitors have been on Zanzibar when involving them in our study, in order to later analyze any differences in WTP for example due to adaptation and expectations of the new culture experience.

Visit national park in Tanzania (NP, dummy variable), measures if the respondent has ever visited a national park in Tanzania/Zanzibar before. An assumption might be that respondents that have visited a national park before are more aware of the management and the importance of funding for national parks. This variable is included since respondents with past experience of national parks may have more information (or may have stronger preferences or a personal interest in environmental goods such as wildlife and parks), than respondents with no experience.

Individual responsibility ($R_{I}$, continuous variable), measures the degree of responsibility for the environment of the world held by the individuals. The respondent was asked to state the responsibility on a scale from 0 to 100. This variable was included since individuals with a relative high sense of responsibility can be assumed to have a higher WTP.

Government responsibility ($R_{G}$, continuous variable), measures the degree of responsibility for the environment of the world held by the governments. The respondent was asked to state the responsibility on a scale from 0 to 100. The variable was included due to the assumption that a relatively high stated degree of responsibility for the government may indicate a lower WTP for the individual.

Business responsibility ($R_{B}$, continuous variable), asked the respondents to state to what degree private businesses hold the responsibility for the environment of the world, on a scale from 0 to 100. The variable was included due to the assumption that a relatively high stated degree of responsibility for the private business may indicate a lower WTP for the individual.
Member in an environmental organization (EO, dummy variable), measures if the respondent is a member in an environmental organization today. This variable is included due the assumption that an engagement may be associated with a higher presumed responsibility for the environment and therefore a higher WTP.

Knowledge about MBCA (KMB, dummy variable), measures if the respondents have ever heard of the MBCA. The WTP might differ whether the respondents have heard of it before or not. Suppose that the respondents have no knowledge about MBCA, it can be difficult to assimilate the information given in the questionnaire and therefore affect the WTP. Another possible outcome might be that the respondents already have knowledge about MBCA and therefore the WTP can vary depending if the respondents value the project positively or not.

Gender (G, dummy variable), measures the respondent’s gender. This variable is included to observe if there are any gender differences regarding to a correlation between gender and WTP.

Age (Age, continuous variable), asking the respondent to state the age.

Nationality (N, multi-dummy variable), measures the country in which the respondent holds citizenship. The variable is included to analyze possible differences in WTP due to country of origin. First, our aim was to divide the respondents into groups from each continent. However, since the distribution of respondents was very skewed, the nationalities were divided into five different groups; Italy, United Kingdom, Germany, Rest of Europe and Rest of the World. The categorization was derived based both on the distributions of visitors to Zanzibar and on the model of fit.

Income (y, continuous variable), measures the respondent’s monthly income after tax in USD during an average month. A basic assumption in the valuation theory is that a higher income generates a higher willingness to pay. Respondents with a high income might be more willing to pay a higher entrance fee. In order to stabilize the model, a logarithmic transformation on income is applied.

Education (Edu, dummy variable), measures the respondents education level. The respondents were given three alternatives (elementary, high school, university/higher education).
However, due to the fact that few of the respondents answered “Elementary” the variable is estimated as “high education” or “low education”. Assuming that different level of education affect the knowledge and therefore it might have an effect on the WTP.

Cost for trip to MBCA (C_{MB}, continuous variable), measures the respondents’ total cost of the trip to MBCA in USD. Regarding to the respondents’ total cost of trip, the WTP might vary due to the respondent’s willingness to pay for an extra charge in entrance fee.

MBCAs share of total experience (Exp, continuous variable), measures MBCA’s share, stated by the respondent, of the total experience of the trip to Zanzibar, as a percentage. An assumption is that a high share of the total experience correlates with a higher WTP.

Knowledge about entrance fee (K_{EF}, dummy variable), asked the respondent about the awareness of the entrance fee to visit MBCA. Respondents that are aware about the entrance fee prior to their visit, are likely to have a positive attitude to the entrance fee and therefore possibly a higher WTP.

### 4.5 Descriptive statistics

Before presenting the results of the empirical analysis, the descriptive statistics is illustrated in table 4.5.1, for visitors and non-visitors, followed by a brief discussion of the results.

#### Table 4.5.1 Descriptive statistics for visitors and non-visitors

<table>
<thead>
<tr>
<th>Sample Size</th>
<th>N</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitors</td>
<td>201</td>
<td>98</td>
<td>103</td>
</tr>
<tr>
<td>Non-visitors</td>
<td>198</td>
<td>89</td>
<td>109</td>
</tr>
<tr>
<td>Education Level</td>
<td>n</td>
<td>Elementary</td>
<td>High School</td>
</tr>
<tr>
<td>Visitors</td>
<td>201</td>
<td>5</td>
<td>59</td>
</tr>
<tr>
<td>Non-visitors</td>
<td>198</td>
<td>2</td>
<td>53</td>
</tr>
<tr>
<td>Variable</td>
<td></td>
<td>n</td>
<td>Min</td>
</tr>
<tr>
<td>WTP in USD</td>
<td>Visitors</td>
<td>190</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-visitors</td>
<td>188</td>
<td>1</td>
</tr>
<tr>
<td>Income*</td>
<td>Visitors</td>
<td>177</td>
<td>330</td>
</tr>
<tr>
<td></td>
<td>Non-visitors</td>
<td>175</td>
<td>300</td>
</tr>
<tr>
<td>Age</td>
<td>Visitors</td>
<td>201</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Non-visitors</td>
<td>198</td>
<td>18</td>
</tr>
<tr>
<td>Lenght of stay in Zanzibar**</td>
<td>Visitors</td>
<td>201</td>
<td>1</td>
</tr>
</tbody>
</table>
The sample size for visitors is 201, where 98 are male respondents and 103 are female respondents. For non-visitors the sample size is 198, where 91 are male respondents and 109 are female respondents, shown in table 4.5.1.

In the sample for visitors and non-visitors, figure 4.5.1 and figure 4.5.2 illustrate that tourism is the major purpose for visiting Zanzibar. It is not surprising that the majority of visitors are tourists since Zanzibar is a popular tourist destination and the survey was conducted in popular tourist areas.
Figure 4.5.3 illustrates country of origin for visitors and non-visitors. The top three countries are Italy, Germany and the UK. It is reasonable that the majority are Italians caused by the expanding tourism sector where a large amount of hotels and business are run by Italian entrepreneurs.
Figure 4.5.4 illustrates non-visitors statements regarding the importance to keep the current environmental quality in MBCA. The majority, 61 per cent of 195 respondents, thought that the area has a value as a natural resource. 18 per cent per cent thought it is important for future generations and 12 and per cent thought it is important for present generations.

**Income.** Table 4.5.1 demonstrates how 177 visitors and 175 non-visitors stated their income. On average, visitors income were 4095.87 USD with a maximum value of 45 000 USD and a minimum value of 330 USD. The median is 3300 USD which differs from the mean value. This is caused by two outliers with a high income (45 000 USD) and therefore the median describes the income distribution in a more nuanced way compared to the mean value. On average, non-visitors income were 3778.28 USD with a maximum value of 17 200 USD and a minimum value of 300 USD. The median is 3300 USD. The relative high income is expected considering Zanzibar is a long distance destination for a majority of the visitors and offers a more luxurious vacation. However, since the minimum value is 330 USD we can presume that Zanzibar may also be a destination for volunteers and backpackers.

**Education level.** The education level for visitors and non-visitors (see table 4.5.1) shows that 137 of 201 (68.1 %) visitors and 143 of 198 (72.2 %) non visitors had completed a higher education/university.
**Age**, table 4.5.1 shows the age for visitors and non-visitors. The age range for visitors is 18 to 65 with a mean value of 34.17. For non-visitors the age range is 18 to 75 with a mean value of 32.86.

**Length of Stay Zanzibar**, the mean value of numbers of day’s visitors had spent on Zanzibar before visiting the MBCA were 6 days, with a maximum of 56 days, minimum of 1 day and median of 4 days, demonstrated in table 4.5.1. Non-visitors (see Table 4.5.1) had on average spent about 9 days at Zanzibar with the median value 5 days. The maximum length of stay was 250 days and minimum 1 day. An explanation to the maximum length of stay is that 7% of both visitors and non-visitors were voluntary workers, illustrated in figure 4.5.1 and figure 4.5.2.

**Responsibility**, a majority of visitors and non-visitors (see Table 4.5.1) considered that individuals, governments and private businesses have a comparatively great responsibility for the environment in the world (expressed as a percentage).

**Cost of Trip and Experience**, In table 4.5.1 visitor’s total cost of the trip to MBCA (including entrance fee) were, on average, 40.79 USD with a maximum of 100 USD and minimum of 3 USD. Visitor’s experience of the trip to the MBCA expressed as the total experience of the stay at Zanzibar were, on average, 46.26 with a maximum value of 100 and minimum value of 2 (expressed as a percentage). The majority of visitors that visited MBCA went on a dolphin excursion, followed by a small number of visitors that went snorkeling and diving, as can be seen below in figure 4.5.5. 199 respondents answered the question in the questionnaire.

![Figure 4.5.5. The main purpose of the trip to the MBCA.](image)
4.5.1 WTP

The WTP for visitors (see Table 4.5.1) shows how 190 respondents of 201 revealed their willingness to pay. On average, visitors were willing to pay 7.54 USD with a maximum value of 35 USD and a minimum value of 3 USD. The median is 6 USD which does not differ in any great amount from the mean value. 11 respondents answered an unknown WTP (WTP ≤ 0) in entrance fee, six respondents stated that they had already paid enough for the trip, three respondents stated that they did not know where the money goes, and two respondents stated that they needed more information about the MBCA. The WTP for non-visitors (see Table 4.5.1) shows how 188 respondents of 198 stated their willingness to pay. On average, non-visitors were willing to pay 10.61 USD, with a maximum value of 50 USD and a minimum value of 1 USD. The median is 10 USD. The difference between the visitors WTP and non-visitors WTP is expected, since non-visitors have less information due to the hypothetical situation and therefore might have a higher WTP. There is a significant difference between visitors and non-visitors WTP; an assumption might be that non-visitors existence value generates in a higher WTP. Ten respondents stated an unknown WTP (WTP ≤ 0). Of those, seven respondents stated that their unknown WTP was due to the lack of knowledge of where the money goes. Two respondents stated that they had already paid enough for the trip, and one respondent stated that he or she needed more information about the MBCA.

In table 4.5.2 nationality and WTP is presented to illustrate five groups of nationalities WTP divided into visitor and non-visitors. The three countries with most respondents were divided in separate groups. The remaining respondents from Europe were divided into the group “Rest of Europe”, and, the remaining respondents were divided into the group “Rest of the World”.

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visitors</td>
<td>48</td>
<td>3</td>
<td>10</td>
<td>6.06</td>
<td>1.94</td>
</tr>
<tr>
<td>Non-visitors</td>
<td>48</td>
<td>1</td>
<td>20</td>
<td>10.52</td>
<td>4.65</td>
</tr>
<tr>
<td>United Kingdom</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visitors</td>
<td>27</td>
<td>5</td>
<td>15</td>
<td>7.74</td>
<td>2.64</td>
</tr>
<tr>
<td>Non-visitors</td>
<td>17</td>
<td>5</td>
<td>20</td>
<td>10.71</td>
<td>5.16</td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visitors</td>
<td>29</td>
<td>3</td>
<td>10</td>
<td>6.96</td>
<td>2.72</td>
</tr>
<tr>
<td>Non-visitors</td>
<td>31</td>
<td>3</td>
<td>20</td>
<td>8.93</td>
<td>4.07</td>
</tr>
<tr>
<td>Rest of Europe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visitors</td>
<td>43</td>
<td>3</td>
<td>20</td>
<td>8.53</td>
<td>3.82</td>
</tr>
<tr>
<td>Non-visitors</td>
<td>51</td>
<td>4</td>
<td>25</td>
<td>9.84</td>
<td>4.79</td>
</tr>
<tr>
<td>Rest of the World</td>
<td>43</td>
<td>3</td>
<td>35</td>
<td>8.44</td>
<td>5.78</td>
</tr>
<tr>
<td></td>
<td>41</td>
<td>2</td>
<td>50</td>
<td>12.90</td>
<td>11.73</td>
</tr>
</tbody>
</table>
For visitors, respondents from Italy had the lowest WTP mean-value, 6.06 USD, while respondents from Rest of Europe had the highest WTP mean-value, 8.53 USD. For non-visitors, respondents from Germany had the lowest WTP mean-value, 8.93 USD, while respondents from Rest of the World had the highest WTP mean-value, 12.90 USD. The median (6.00 USD and 10.00 USD) are lower due to the fact that a few number of outliers cause a higher mean value.

4.6 Empirical specification

The empirical specification is defined according to the standard assumptions of the Ordinary Least Square (OLS). However, since some of the respondents have an unknown WTP the OLS-model might have a problem to estimate a proper regression line. Therefore, estimation of both Tobit- and OLS-model have been implemented due to the fact that the dependent variable can be expressed as the value 0, which is misleading when the actual payment can be negative. The Tobit-approach deals with the value of the unobservable dependent variable (the unknown WTP) and the observed known values of the independent variables.

The data was analyzed in the statistical package Stata, for both OLS and Tobit. The standard assumption for OLS was tested; multicollinearity, heteroskedasticity and normality. The independent variable Income (y) was not normally distributed, therefore a logarithmic approach was used to satisfy the standard assumption for OLS.

4.6.1 The Tobit-model

The Tobit-model is a type of censored regression model assuming that there is an unobservable variable which is linear in the independent variable. In the most common variant of the model, the observable variable Y is defined to be equal to the unobservable variable when it is greater than zero (see eq. 6). The function of the Tobit-model in terms of the latent variable is as follows:

\[
\begin{align*}
    y_i^* &= x_i^\prime \beta + \varepsilon_i \\
    y_i &= 0 \text{ if } y_i^* \leq 0 \\
    y_i &= y_i^* \text{ if } y_i^* > 0
\end{align*}
\]  

(eq. 6)

The error term, \( u_i \), is assumed to be homoscedastic, independent and follow a normal distribution. Furthermore, the Tobit-model is estimated with maximum likelihood estimation.
(MLE) (Greene, 2008:871-875). The MLE of a vector of parameter values \( \beta \) is basically the particular vector \( \beta \) of MLE that gives the greatest probability of obtaining the observed data (Wooldrigde, 2010:23).

The estimated Tobit coefficients are the marginal effects of a change in \( x'_{i} \) on \( y^*_{i} \), the unobservable latent variable can be interpreted in the same way as in a linear regression model. However, that interpretation may not be useful since we are interested in the effect of \( x \) on the observable \( y \). The change in \( y \) can be found by multiplying the coefficient with the probability of being uncensored (see eq. 7).

\[
\frac{\partial E [y|x]}{\partial x} = \beta \cdot \text{Prob}(a < y^* < b) \quad \text{(eq. 7)}
\]

\[
\frac{\partial E [y_i|x_i]}{\partial x_i} = \beta \cdot \varphi \left( \frac{x'_i \cdot \beta}{\sigma} \right) \quad \text{(eq. 8)}
\]

In equation 7, \( a \) and \( b \) is the lower and upper censoring points. In our case we have a left censoring, in other words, \( a=0 \) and \( b=+\infty \). In a normal case were the censoring point is zero, and we assume a normally distribution, the result suggest that OLS estimates of the coefficient in a Tobit model generally resemble the MLE times the proportion of non-limit observations, or dividing the OLS estimates with the same proportion of non-limit observations (see eq. 8) (Greene, 2008:872-875).

4.6.2 Empirical models

The empirical specification (see eq. 9) for the OLS-model is as follow;

\[
WTP = \beta_0 + \beta_1 \cdot X_1 + \ldots + \beta_n \cdot X_n + \varepsilon \quad \text{(eq. 9)}
\]

WTP is the dependent variable, the vector \( X \) consist of the independent variables, the vector \( \beta \) is the coefficients and \( \varepsilon \) is the error term (Studenmund, 2006:36-40).

The empirical specification (see eq. 10) for the Tobit-model is as follow;

\[
WTP = \beta_1 \cdot X_1 + \ldots + \beta_n \cdot X_n + \varepsilon_n \quad \text{(eq. 10)}
\]
WTP is the dependent variable, the vector X consists of the independent variables, the vector β is the coefficients. The error term (εn ~ N(0,σ²)) is normally distributed to capture random influences on this relationship, between the vector X and the latent variable WTP (Greene, 2008:881-882).

5. Results and analysis

In this chapter, we first present the estimation for the Tobit-model and the OLS-model, followed by an analysis of the variables for both visitors and non-visitors. Finally, we determine the consumer surplus, revenue-maximizing and the total value of the MBCA.

5.1 Tobit and OLS estimations

In table 5.1.1 OLS and Tobit estimations are included for both visitors and non-visitors. As can be seen in table 5.1.1 the coefficients in the Tobit and OLS estimations are very similar. This is probably due to the few observation of the unobservable dependent variable. Since OLS coefficients are easier to interpret in terms of marginal effects, we will rely our analysis of these coefficients in all cases where the coefficients are similar.

Table 5.1.1 Tobit and OLS estimations

<table>
<thead>
<tr>
<th>Measures of fit</th>
<th>Visitors</th>
<th></th>
<th>Non-visitors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tobit</td>
<td>OLS</td>
<td>Tobit</td>
<td>OLS</td>
</tr>
<tr>
<td>Sample Size (N)</td>
<td>177</td>
<td>177</td>
<td>175</td>
<td>175</td>
</tr>
<tr>
<td>Chi-squared</td>
<td>61.828**</td>
<td>.</td>
<td>49.223***</td>
<td>.</td>
</tr>
<tr>
<td>R-squared</td>
<td>.</td>
<td>0.3001247</td>
<td>.</td>
<td>0.2464794</td>
</tr>
<tr>
<td>Adj R-squared</td>
<td>.</td>
<td>0.2154</td>
<td>.</td>
<td>0.1702</td>
</tr>
<tr>
<td>F-test</td>
<td>.</td>
<td>3.54***</td>
<td>.</td>
<td>3.23***</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Visitors</th>
<th></th>
<th>Non-visitors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Coefficients</td>
<td></td>
<td>Coefficients</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.468</td>
<td>(3.801)</td>
<td>-2.371</td>
<td>(3.852)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.744</td>
<td>(5.847)</td>
<td>-1.148</td>
</tr>
<tr>
<td>Visit Zanzibar</td>
<td>-2.319**</td>
<td>(1.101)</td>
<td>-2.249**</td>
<td>(1.117)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-7.206***</td>
<td>(1.969)</td>
<td>-6.925***</td>
</tr>
<tr>
<td>Days Zanzibar</td>
<td>0.044</td>
<td>(0.074)</td>
<td>0.038</td>
<td>(0.075)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.016</td>
<td>(0.020)</td>
<td>-0.019</td>
</tr>
<tr>
<td>Visit National Park</td>
<td>1.929**</td>
<td>(0.772)</td>
<td>1.874**</td>
<td>(0.784)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.819</td>
<td>(1.099)</td>
<td>-0.859</td>
</tr>
<tr>
<td>Responsibility Individual</td>
<td>-0.022</td>
<td>(0.017)</td>
<td>-0.021</td>
<td>(0.017)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.008</td>
<td>(0.026)</td>
<td>0.012</td>
</tr>
<tr>
<td>Responsibility Government</td>
<td>-0.004</td>
<td>-0.004</td>
<td>-0.072**</td>
<td>-0.069**</td>
</tr>
<tr>
<td>Variable</td>
<td>Coefficient 1 (SE)</td>
<td>Coefficient 2 (SE)</td>
<td>Coefficient 3 (SE)</td>
<td>Coefficient 4 (SE)</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------------</td>
<td>--------------------</td>
<td>--------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Responsibility Business</td>
<td>0.009 (0.015)</td>
<td>0.009 (0.015)</td>
<td>0.061** (0.029)</td>
<td>0.057** (0.029)</td>
</tr>
<tr>
<td>Member in Environmental Organization</td>
<td>1.597 (1.425)</td>
<td>1.422 (1.446)</td>
<td>5.043*** (1.429)</td>
<td>4.836*** (1.449)</td>
</tr>
<tr>
<td>Knowledge of the MBCA</td>
<td>1.183 (0.951)</td>
<td>1.039 (0.964)</td>
<td>2.158 (1.833)</td>
<td>2.292 (1.863)</td>
</tr>
<tr>
<td>Gender</td>
<td>1.472** (0.588)</td>
<td>1.336** (0.595)</td>
<td>-0.042 (1.018)</td>
<td>0.006 (1.032)</td>
</tr>
<tr>
<td>Education</td>
<td>1.204* (0.642)</td>
<td>1.134* (0.649)</td>
<td>0.830 (1.221)</td>
<td>0.493 (1.232)</td>
</tr>
<tr>
<td>Total Income in USD</td>
<td>1.279*** (0.425)</td>
<td>1.281*** (0.431)</td>
<td>2.275*** (0.700)</td>
<td>2.294*** (0.712)</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-1.089 (1.050)</td>
<td>-1.029 (1.066)</td>
<td>-2.013 (2.239)</td>
<td>-2.146 (2.279)</td>
</tr>
<tr>
<td>Germany</td>
<td>-1.870 (1.290)</td>
<td>-1.659 (1.305)</td>
<td>-3.582** (1.800)</td>
<td>-3.479* (1.830)</td>
</tr>
<tr>
<td>Italy</td>
<td>-3.014*** (1.065)</td>
<td>-2.798*** (1.078)</td>
<td>-1.843 (1.641)</td>
<td>-1.962 (1.671)</td>
</tr>
<tr>
<td>Rest of Europe</td>
<td>-0.385 (0.908)</td>
<td>-0.227 (0.920)</td>
<td>-4.290*** (1.519)</td>
<td>-4.259*** (1.544)</td>
</tr>
<tr>
<td>Rest of the World</td>
<td>omitted</td>
<td>omitted</td>
<td>omitted</td>
<td>omitted</td>
</tr>
<tr>
<td>Cost of Trip in USD</td>
<td>0.032** (0.014)</td>
<td>0.032** (0.014)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Share of Experience</td>
<td>-0.028** (0.014)</td>
<td>-0.028** (0.014)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Knowledge of Entrance Fee</td>
<td>-1.702** (0.854)</td>
<td>-1.600* (0.865)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* p<0.10, ** p<0.05, *** p<0.01, (Standard deviation).

The sample size for visitors, 177, and non-visitors, 175, have been reduced by the statistical package, Stata, due to missing information on income in the observations. The F-test and the chi-squared test indicate that at least one of the independent variables can explain the dependent variable.

The data analysis for visitors indicates that nine variables; “Visit Zanzibar”, “Visit National Park”, “Gender”, “Education”, “Total Income”, “Italy”, “Cost of Trip”, “Total Share of Experience” and “Knowledge of Entrance Fee”, have a significant effect on the dependent variable. For non-visitors the data analysis indicates that eight variables, ”Visit Zanzibar”,
“Responsibility Government”, “Responsibility Business”, “Member in Environmental Organization”, “Age”, “Total Income”, “Germany” and “rest of Europe”, have a significant effect on the dependent variable. The strongest correlation for both visitors and non-visitors are the “Total Income”, which is significant at a 1%-level for both the Tobit- and OLS-model. In the below, we will discuss the results for variables with significant coefficients. For variables with insignificant coefficients, the null hypothesis of the correlation can not be rejected.

Visit Zanzibar, the coefficients for visitors and non-visitors indicates that there is a negative correlation between WTP and if the respondent had visit Zanzibar before. The significance for visitors is at a 5%-level. For non-visitors the significance is at a 1%-level. The result may indicate that our assumption, that a respondent who visited Zanzibar before may have a lower willingness to pay, holds. However, if this is due to our assumption about the awareness of corruption in the political system and government authorities is not possible to determine.

Visit National Park, the coefficients indicate that respondents with previous experience of national parks have a higher WTP for the MBCA. Hence, we can not reject the assumption that past experience and more awareness of the management but also the importance of funding for national parks can lead to a higher WTP. For the Tobit-model, the coefficient is 1,929, and for the OLS-model the WTP is affected by 1,874 USD. The results are significant at 5%-level. The coefficients for non-visitors indicate a negative correlation between WTP and if the respondent has ever visited a national park, however the result is insignificant.

Responsibility Government, the coefficient for non-visitors indicates that individuals who thinks that the government hold a relatively high degree of responsibility have a relatively lower WTP than individuals that thinks that the government has a low responsibility (the coefficient for the Tobit-model is -0,072, and -0,069 USD for the OLS-model). The assumption that a relatively high stated degree of responsibility for the government may indicate a lower WTP for the individual is significant at a 5%-level for both Tobit- and OLS-model.

Responsibility Business, the coefficient for both visitors and non-visitors indicates that there is a slightly positive correlation between WTP and if the respondent holds the private business responsible for the environment of the world. However, the result for visitors is not
significant. For non-visitors the result is significant at a 5%-level, for the Tobit-model the coefficient is 0,061 and for the OLS-model the coefficient is 0,057 USD. The result does not indicate that the assumption of a relatively high stated degree of responsibility for the private business may indicate a lower WTP for the individual holds.

Member in Environmental Organization, the coefficient for both visitors and non-visitors indicates that there is a positive correlation between WTP and membership in an environmental organization. For visitors, the result is not significant at any probability level. For non-visitors the result is significant at a 1%-level, the coefficient for the Tobit-model is 5,043 and for the OLS-model 4,836 USD. The assumption that a membership in an environmental organization might result in a higher responsibility for the environment and therefore a higher WTP holds. For non-visitors the null hypothesis can be rejected.

Gender, the coefficient for visitors indicates that women have a higher WTP compared to men. The result is significant at a 5%-level, the coefficient for the Tobit-model is 1,472 and for the OLS-model 1,336 USD, i.e. women are on average willing to pay 1,34 USD more than men. For non-visitors the coefficient is not significant at any probability level.

Age, the coefficient for visitors and non-visitors indicates that there is negative correlation between age and WTP. However, for visitors the result is not significant at any probability level. For non-visitors the result is significant at a 5%-level, the coefficient for the Tobit-model is -0,132 and for the OLS-model -0,119 USD. Younger respondents have, on average, a higher WTP than older respondents.

Education, the coefficient for visitors and non-visitors indicates that there is a positive correlation between a higher education and WTP. However, for non-visitors the result is not significant at any probability level. The assumption that a higher education might result in a higher WTP is significant to a 10%-level holds for visitors.

Total income in USD, the coefficient for both visitors and non-visitors indicates that there is a strong positive correlation between WTP and total income (log). The assumption that a higher income generates in a higher WTP, holds since the results are significant to a 1%-level.
Groups of Nationality. For visitors and non-visitors the variable “Rest of the World” is used as a reference to compare with the other groups of nationalities. For visitors the result indicates that a respondent from “Rest of the World” have a higher WTP compared to a respondent from Italy, significant at a 1%-level for the Tobit-model and at a 5%-level for the OLS-model. The coefficients of the other groups of nationalities are not significant at any probability level. For non-visitors the result indicates that a respondent from “Rest of the World” have a higher WTP compared to a respondent from Germany and “Rest of Europe”. The significance for the coefficient is 5% for the Tobit-model and 10% for the OLS-model. For “Rest of the Europe” the significance is at a 1%-level for both the Tobit-model and the OLS-model.

Cost of Trip in USD, the coefficient indicates that there is a positive correlation between the cost of trip to MBCA and WTP. The assumption that the WTP might vary due to an extra charge in entrance fee holds; a possible higher entrance fee is significant to a 5%-level. If the cost of trip increases with 1 USD the WTP will increase by 0.032 USD in the OLS-model.

Total Share of Experience, the coefficient indicates that there is a negative correlation between the total share of experience to the trip to MBCA and WTP: if the total share of experience increases one unit the WTP will be affected with -0.028 USD, in the OLS-model. The result is significant to a 5%-level. The assumption that a high share of the total experience correlates with a high WTP can not be drawn. The null hypothesis can not be rejected.

Knowledge of Entrance Fee, the coefficient indicates that there is a negative correlation between knowledge of entrance fee to visit MBCA and WTP. The result in the Tobit-model is significant at a 5%-level, and for the OLS-model at a 10%-level. The assumption that awareness of the entrance fee prior to the visit correlates with a positive WTP can not be drawn. The OLS-model -1.600 USD when the knowledge of entrance fee increases with one unit.

5.2 Consumer surplus and revenue-maximization

In order to calculate and determine the consumer surplus and revenue maximization we assume that the MBCA is a monopoly and profit maximizes where the marginal revenue is equal to the marginal cost (MR=MC, where MR=MR(p)). The total cost of the MBCA is unknown, however, in this minor field study we have to assume that the entrance fee of 3
USD covers the total cost of the MBCA in order to calculate consumer surplus and the revenue maximizing entrance fee. In figure 5.2.1 the consumer surplus and consumer maximizing are illustrated based on number of visitors and their WTP. However, in order to derive a demand curve for a real market situation the 201 visitors and their WTP from our minor field study are applied to the real number of visitors, on average 17 500, in 2008-2010 in the MBCA. For example, in our sample 190 visitors (87,57 per cent) are willing to pay 3 USD or more, which corresponds to the real number of visitor, 17 500 (visitors that have accepted the current entrance fee of 3 USD), in 2008-2010. In our sample the total number of visitors that are willing to pay more than 5 USD are 109 visitors (54,25 per cent). Applied to the real number of visitors, 10 841 are willing to pay more than 5 USD, \((17500/87,57) \cdot 54,25 = 10 841\). The interval is 3 USD to 10 USD, which represent approximately 95 per cent of the observed WTP. The highest levels of WTP observations are seen as outliers and are therefore excluded. The demand curve is derived from the willingness to pay for visitors, and the straight line is the trend line for the demand curve. The trend line is used as a reference in order to calculate consumer surplus and revenue-maximization. The equation of the trend line is;

\[
p = (-4,24 \cdot 10^{-4}) \cdot q + 10,6 \quad \text{(eq. 11)}
\]

*Figure 5.2.1 Consumer surplus and revenue-maximizing.*

*) WTP from our minor field study. **) Number of visitors on average in 2008-2010 in the MBCA.
In order to calculate the consumer surplus we assume that the current entrance fee of 3 USD correspond to 18 000 visitors (see the trend line in figure 5.2.1) resulting in a revenue of 54 000 USD \((3 \cdot 18 000)\). The cost of the MBCA is unknown, therefore, in this case we assume that the entrance fee of 3 USD is the optimal entrance fee when the monopoly of MBCA profit maximize. In other words, 3 USD is determined by where the marginal cost is equal to the marginal revenue. Therefore the current consumer surplus is the area above the current entrance fee of 3 USD and below the trend line, illustrated as the shaded area in figure 5.2.1. The total current consumer surplus, for visitors, is 68 400 USD \((7,6 \cdot 18 000) / 2\).

Due to the unknown cost of the MBCA, we will maximize the total revenue (TR) rather than the profit \((\pi)\). To calculate and determine the revenue-maximizing entrance fee it is necessary to relate it to the number of visitors in 2008-2010. Revenue and number of visitors depends on the level of the entrance fee, therefore a higher entrance fee result in a decreased number of visitors but increased revenue. The price elasticity is illustrated as; \(\varepsilon = \frac{dp}{dq} \cdot \frac{q}{p}\). TR is maximized when the marginal revenue \((\text{MR}(p))\) is equal to 0 and the price elasticity is equal to 1 \((\text{MR}(p) = 0 \text{ when } \varepsilon = 1 \rightarrow \text{TR}_{\text{max}})\). The total revenue is calculated by the price times the quantity, with respect to the price \((\text{TR} = p \cdot \text{q}(p))\).

\[
\text{Max TR} = \frac{d\text{TR}}{dp} = \text{MR} = p \cdot \frac{dq(p)}{dp} + q(p) = 0
\]

Given eq. 11 \(\rightarrow p^* = 5,3\) and \(q^* = 12 500\)

The revenue-maximizing entrance fee \((p^*)\) is 5,3 USD which corresponds to \((q^*)\) 12 500 visitors. The revenue at \(\text{TR}_{\text{max}}\) \((q^*,p^*)\) is 12 500 \(\cdot 5,3 = 66 250\) USD. Although an entrance fee of 5 USD might be reasonable since it is less complex, 5 USD corresponds to 13 200 visitors, which gives a total revenue of 13 200 \(\cdot 5 = 66 000\) USD. Still, the revenue-maximizing entrance fee is 5,3 USD, illustrated in figure 5.2.1 as the area within the dashed lines (the rectangle area).

### 5.3 Total Value of the MBCA

To determine the total value of the MBCA, the use value and non-use value needs to be known. The total value is the sum of the use value, existence value, option value and quasi-option value. By assuming complete knowledge for future conditions we can focus on use value and existence value (non-use value). The total value of the MBCA is defined as the sum of use value and non-use value.
Total value of the MBCA = \underbrace{\text{entrance fee} + \text{consumer surplus}}_{\text{Use value}} + \underbrace{\text{existence value}}_{\text{Non-use value}} \right \} \quad \text{(eq. 12)}

Given the current entrance fee of 3 USD and the calculated consumer surplus, the use value can be determined (see eq. 12). The average consumer surplus per tourist is 3,8 USD, given an estimation of the total consumer surplus of 68 400 USD, based on the average of 18 000 visitors that visited the MBCA during 2008-2010. Therefore the use value for the MBCA is 6,8 USD per visitor (3 + 3,8), and the total use value for the MBCA is 122 400 USD \((6,8 \cdot 18 000)\). A demarcation in our minor field study is that the total value of the MBCA can not fully be determined through our sample of visitors and non-visitors WTP, other aspects to consider might be, for example, the fishermen’s value of the MBCA, i.e. the local populations’ valuation of the conservation area. In table 5.3.1 the total sum of non-visitors WTP, based on the number of visitors in our sample and the total number of visitors to Zanzibar on average in 2008-2010, is presented.

<table>
<thead>
<tr>
<th>WTP</th>
<th>Number of visitors in our sample</th>
<th>Total number of visitors on average, 2008-2010</th>
<th>(\sum WTP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
<td>6670</td>
<td>0,0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>667</td>
<td>667,0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>667</td>
<td>1334,0</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>4002</td>
<td>12005,9</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>1334</td>
<td>5336,0</td>
</tr>
<tr>
<td>5</td>
<td>42</td>
<td>28013</td>
<td>140068,9</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>3335</td>
<td>20009,8</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>667</td>
<td>4669,0</td>
</tr>
<tr>
<td>8</td>
<td>12</td>
<td>8004</td>
<td>64031,5</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0,0</td>
</tr>
<tr>
<td>10</td>
<td>69</td>
<td>46023</td>
<td>460227</td>
</tr>
<tr>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0,0</td>
</tr>
<tr>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0,0</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>667</td>
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</tr>
<tr>
<td>15</td>
<td>28</td>
<td>18676</td>
<td>280137,9</td>
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<tr>
<td>16</td>
<td>2</td>
<td>1334</td>
<td>21343,8</td>
</tr>
<tr>
<td>17</td>
<td>0</td>
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<td>18</td>
<td>1</td>
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<td>12005,9</td>
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<td>19</td>
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<tr>
<td>20</td>
<td>11</td>
<td>7337</td>
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</tr>
<tr>
<td>25</td>
<td>1</td>
<td>667</td>
<td>16674,9</td>
</tr>
</tbody>
</table>
The existence value is the sum of all non-visitors WTP (see eq.12). Since the existence value have all individuals in the world as a possible target group, we assume a population based on tourist arrivals in Zanzibar, as our target group. On average, the number of tourist arrivals in Zanzibar, 2008-2010, were 132,065 tourist. Therefore the total sum of non-visitors WTP, due to the target group, is 1,330,655 USD which illustrates the existence value.

The Zanzibar tourists’ total value of the MBCA is therefore 1,453,055 USD (122,400 + 1,330,655 = 1,453,055).

6. Discussion

This chapter first presents the purpose and research question to remind and apply these to the discussion and conclusions. Followed by a discussion concerning further research.

6.1 Purpose and research questions

The purpose of this minor field study is to determine the revenue-maximizing entrance fee, given the current environmental quality, and further, determine Zanzibar tourists’ total value of the Menai Bay Conservation Area. The following five research questions were constrained:

- What are visitors willing to pay in entrance fee to visit MBCA?
- What are non-visitors willing to pay in entrance fee to visit MBCA?
- What variables affect the WTP for visitors and non-visitors?
- How large is the current consumer surplus, and, is it possible to calculate the change in revenue from the hypothetical change in the entrance fee?
- What is the total value of the MBCA measured in Zanzibar tourists’ WTP in entrance fee?

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*) in USD
6.2 Discussion

The descriptive statistics shows that eleven visitors, and ten non-visitors, have an unknown WTP for visiting Menai Bay Conservation Area. Due to the current entrance fee of 3 USD visitors stated an average WTP of 7,54 USD and non-visitors 10,61 USD. The difference between visitors and non-visitors WTP is significant; non-visitors have a higher WTP compared to visitors. It is not surprising that there is a significant difference in WTP due to the use value and non-use value/existence value. The use value for the MBCA is 122 400 USD which includes the current entrance fee of 3 USD and visitors current consumer surplus. The non-use value is 1 330 655 USD which describes non-visitors existence value. The total value is expressed as visitors use value and non-visitors (tourists in Zanzibar) non-use value, equal to 1 453 055 USD. From our findings the revenue-maximizing entrance fee is 5,3 USD, and the current consumer surplus is 68 400 USD.

The results indicate that a higher entrance fee is possible due to the visitors WTP. An entrance fee of 5 USD would result in greater revenues and a decreased number of visitors. Our findings show that an entrance fee of 5,3 USD is the revenue-maximizing entrance fee which would increase the revenue with 12 500 USD and decrease the number of visitors with 5 000 visitors. It is intuitively to assume that if the numbers of visitors are decreased it may result in a less environmental impact for the MBCA, however this minor field study can not provide evidence for this statement.

The results from the Tobit and OLS estimations indicate that the model is not fully explained by the selected variables; the independent variables can not fully explain the dependent variable. However some of the independent variables have significant result and can explain the dependent variable, which still make them relevant despite the low R-squared and Adjusted R-squared. Even though some coefficients are insignificant and the model's coefficient of determination is low to determine visitors and non-visitors WTP, a rejection of the contingent valuation method is not justified. The sample is both insufficient and a convenience sample, which can result in bias and other limitations for this minor field study. The bias could have been avoided or at least reduced if it would be possible to face an accurate population. However, the limitation of this minor field study was to get an accurate population of visitors of Zanzibar and the MBCA, which resulted in the convenience sample. Given the known information about the population, in terms of groups of nationalities, the sample was conducted due to this knowledge to reduce the bias.
The result from our stated preference survey shows that an increased entrance fee is possible for the MBCA. The majority of visitors and non-visitors are willing to pay a higher entrance fee, therefore it is possible to increase the entrance fee which results in a higher revenue in order to prevent further environmental deterioration. The findings confirm that there is a trade-off between revenue, number of visitors and environmental quality. The outcome will differ depending on the alternative cost, however this minor field study does not state an opinion about the alternative cost. The contribution from this minor field study to further research is the estimated and calculated revenue maximizing entrance fee and the total value of the Menai Bay Conservation Area.

6.3 Further research
An alternative approach for future research could potentially be a cost and benefit analysis to ensure economic, ecological and social revenues. The advantages compared to the cost and disadvantages, could contribute in a more nuanced way to understand the future that the MBCA is facing. Due to the time limit for this minor field study a cost and benefit analysis was not an option. For future valuation of the MBCA it is important to define the total cost of the area. However our minor field study contributes with the Zanzibar tourists’ total value of the MBCA.
References


MACEMP (Marine and Coastal Environment Project), (2009), “The status of Zanzibar coastal resources”, *Department of environment (Zanzibar).*


Transparency International (2010), Corruption Perceptions Index 2010, Berlin, Germany.


Hello!

We are two students from Umeå University, (in the northern part of) Sweden. We are currently here at Zanzibar to collect data for our bachelor thesis in economics. The purpose of the thesis relates to how tourists value the nature reserve of Menai Bay. The thesis is sponsored by the Swedish International Development Cooperation Agency (SIDA). To aid us in our research it would be very helpful if you could answer the questions in the questionnaire below. It is for academic purpose only and the information elicited from the questionnaire will be anonymous.

Thank you for your time!
Ulrika Gustafsson & Johan Frisk

General information

1) Have you ever visited Tanzania before?  
   □ Yes □ No

2) What is the main purpose of your visit to Tanzania? (mark one of the alternatives)  
   □ Tourism  
   □ Business  
   □ Voluntary work  
   □ Academic/student  
   □ Visit family/Family relations

3) Have you ever visited Zanzibar before?  
   □ Yes □ No

4) What is the main purpose of your visit to Zanzibar? (mark one of the alternatives)  
   □ Tourism  
   □ Business  
   □ Voluntary work  
   □ Academic/student  
   □ Visit family/Family relations
5) Which date did you arrived to Tanzania? .................................................................

5.1) Which date did you arrived to Zanzibar? .........................................................

6) Which date do you plan to depart from Tanzania? .............................................

6.1) Which date do you plan to depart from Zanzibar? .......................................... 

7) Have you ever visited a national park in Tanzania before?
   □ Yes □ No

7.1) If “Yes”, which one? .........................................................................................

8) There is currently much talk about the global warming and reduction in biodiversity due to human activity. The opinions about where the responsibility to address these problems lies differ, what do you think? Below there are three groups, please mark to what degree you think individuals, the government, and private business hold responsibility for addressing the problems with cross on the line.

(0%=no responsibility, 100%=full responsibility, mark 0% if you think that climate change or losses in biodiversity is not a problem).

   Individual
   0% - 100%

   Governments/politicians
   0% - 100%

   Private businesses
   0% - 100%

9) Are you engaged in any environmental organization today?
   (example Greenpeace)
   □ Yes □ No
**Menai Bay Conservation Area**

The Menai Bay Conservation Area (MBCA) became a conserved area in 1997 because of the high pressure of fishing and fishing associated with dynamite. It is the largest marine conservation area in Zanzibar, managed locally by the community and government officials with technical support by the World Wildlife Fund (WWF). Today the area is visited by many tourists and the main purpose is recreational activities. In 2004 the MBCA-project began collecting an entry fee and the current fee is 3$ (USD) per person, but there is a problem with a lack of funding and achieving sustainable revenues from the entrance fees.
10) Have you heard of the Menai Bay Conservation Area and the purpose of making it a reserve before?

☐ Yes ☐ No

11) What is the main purpose for your trip to Menai Bay?

(rank up to three of the alternatives with 1, 2, 3, where 1 is the first main purpose)

☐ Snorkeling/diving
☐ Dolphin excursion
☐ Hiking
☐ Visit an unexploited area
☐ Sunbathing
☐ Sightseeing
☐ Boat trip
☐ Unique nature

12) How much have you paid for the trip to Menai Bay? (per person)

Amount: ..............................................

Currency: ..............................................

13) What is Menai Bay’s share of the total experience of your trip to Zanzibar?

State the share with a cross on the line. (0%=no share, 100%=all share)

0% 100%

14) Did you know before you came to Menai Bay that you had to pay an entrance fee for your visit?

☐ Yes ☐ No
15) If you had an option; would you pay an entrance fee for your visit?

☐ Yes  ☐ No

15.1) If your answer is “Yes”:
What is your maximum amount that you would be willing to pay in entrance fee given the current environmental quality of the area if the alternative is to not visit the area at all?

☐ 1$  ☐ 8$  ☐ 15$
☐ 2$  ☐ 9$  ☐ 16$
☐ 3$  ☐ 10$  ☐ 17$
☐ 4$  ☐ 11$  ☐ 18$
☐ 5$  ☐ 12$  ☐ 19$
☐ 6$  ☐ 13$  ☐ 20$
☐ 7$  ☐ 14$  ☐ above 20$ *

15.2) If your answer is “No”:
Please state the main reason for your answer on the previous question:
(rank up to three of the alternatives with 1,2,3, where 1 is the first main reason)

☐ I am already paying enough for the trip
☐ I have no personal responsibility for the environment
☐ I have no personal interest in the Menai Bay project
☐ I need more information about the Menai Bay project
☐ There is no problem with the environment in Menai Bay
☐ I don’t know where the money goes
Socioeconomic information

16) Gender:
   □ Male  □ Female

17) Age: .................................................................

18) Country of origin: ............................................................

19) What is your monthly income after tax during an average month?
   (Answer in home currency)
   .....................................................................................

20) What is your highest education completed?
   □ Elementary
   □ High School
   □ University/higher education
*If you stated that you are willing to pay more than 20$, how much are you willing to pay?

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Appendix B
Questionnaire for non-visitors

Hello!

We are two students from Umeå University, (in the northern part of) Sweden. We are currently here at Zanzibar to collect data for our bachelor thesis in economics. The purpose of the thesis relates to how tourists value the nature reserve of Menai Bay. The thesis is sponsored by the Swedish International Development Cooperation Agency (SIDA). To aid us in our research it would be very helpful if you could answer the questions in the questionnaire below. It is for academic purpose only and the information elicited from the questionnaire will be anonymous.

Thank you for your time!
Ulrika Gustafsson & Johan Frisk

General information

1) Have you ever visited Tanzania before?
   □ Yes  □ No

2) What is the main purpose of your visit to Tanzania? (mark one of the alternatives)
   □ Tourism
   □ Business
   □ Voluntary work
   □ Academic/student
   □ Visit family/Family relations

3) Have you ever visited Zanzibar before?
   □ Yes  □ No

4) What is the main purpose of your visit to Zanzibar? (mark one of the alternatives)
   □ Tourism
   □ Business
   □ Voluntary work
   □ Academic/student
   □ Visit family/Family relations
5) Which date did you arrived to Tanzania? ..................................................

5.2) Which date did you arrived to Zanzibar? ...........................................

6) Which date do you plan to depart from Tanzania? ..............................

6.2) Which date do you plan to depart from Zanzibar? ............................

7) Have you ever visited a national park in Tanzania before?
   □ Yes □ No

7.1) If “Yes”, which one? ............................................................................

8) There is currently much talk about the global warming and reduction in
   biodiversity due to human activity. The opinions about where the responsibility
   to address these problems lies differ, what do you think? Below there are three
   groups, please mark to what degree you think individuals, the government, and
   private business hold responsibility for addressing the problems with cross on the
   line.
   (0%=no responsibility, 100%=full responsibility, mark 0% if you think that climate
   change or losses in biodiversity is not a problem).

   Individual
   0% .................................................. 100%

   Governments/politicians
   0% .................................................. 100%

   Private businesses
   0% .................................................. 100%

9) Are you engaged in any environmental organization today?
   (example Greenpeace)
   □ Yes □ No
Menai Bay Conservation Area

The Menai Bay Conservation Area (MBCA) became a conserved area in 1997 because of the high pressure of fishing and fishing associated with dynamite. It is the largest marine conservation area in Zanzibar, managed locally by the community and government officials with technical support by the World Wildlife Fund (WWF). Today the area is visited by many tourists and the main purpose is recreational activities. In 2004 the MBCA-project began collecting an entry fee and the current fee is 3$ (USD) per person, but there is a problem with a lack of funding and achieving sustainable revenues from the entrance fees.
10) Have you heard of the Menai Bay Conservation Area and the purpose of making it a reserve before?

☐ Yes  ☐ No

11) Is it important to keep the current environmental quality of the Menai Bay?

☐ Yes  ☐ No

11.1) If "Yes"; why is it important?

(Rank up to three alternatives with 1, 2, 3, where 1 is the most important of the three)

☐ The area has a value in itself as a natural resource
☐ A value for others
☐ It is important for the present generations
☐ The existence value
☐ It is important for the future generations
☐ Other reason: ........................................................................................................

12) Would you be willing to pay an entrance fee to keep the current environmental quality of the Menai Bay for present and future generations?

(Note that this fee would be on top of the charge for the trip itself)

☐ Yes  ☐ No

12.1) If your answer is “Yes”:

What is your maximum amount that you would be willing to pay to maintain the current environmental quality of the area for present and future generations?

☐ 1$  ☐ 8$  ☐ 15$
☐ 2$  ☐ 9$  ☐ 16$
☐ 3$  ☐ 10$  ☐ 17$
☐ 4$  ☐ 11$  ☐ 18$
☐ 5$  ☐ 12$  ☐ 19$
☐ 6$  ☐ 13$  ☐ 20$
☐ 7$  ☐ 14$  ☐ above 20$ *
12.2) **If your answer is “No”:**

**Please state the main reason for your answer on the previous question:**

(rank up to three alternatives with 1, 2, 3, where 1 is first main reason of the three)

- [ ] I am already paying enough for the trip
- [ ] I have no personal responsibility for the environment
- [ ] I have no personal interest in the Menai Bay project
- [ ] I need more information about the Menai Bay project
- [ ] There is no problem with the environment in Menai Bay
- [ ] I don’t know where the money goes

**Socioeconomic information**

13) **Gender:**

- [ ] Male
- [ ] Female

14) **Age:** ………………………………………………………………………………………………………………………………………

15) **Country of origin:** ………………………………………………………………………………………………………………………

16) **What is your monthly income after tax during an average month?**

   (Answer in home currency)

   …………………………………………………………………………………………………………………………………………………

17) **What is your highest education completed?**

- [ ] Elementary
- [ ] High School
- [ ] University/ higher education
*) If you stated that you are willing to pay more than 20$, how much are you willing to pay?

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