

# What is the monetary value of a clean environment in The Himalayas?

*Victor Grossman*



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# Abstract

The Himalayas is the world highest mountain system containing famous mountains such as Mt. Everest, Lhotse and K2. Ever since Sir Edmund Hillary and Tenzing Norgay climbed Mt. Everest in 1953 the numbers of tourists has grown over the years, both climbers and regular tourists going for hiking trips and other outdoors activities.

With increasing number of visitors the peoples of the mountains called Sherpas became professional guides since they had local knowledge about the mountains and were very strong and more acclimatised than normal people to the extreme altitude in the Himalayas. The growing tourist industry made the Sherpas richer but the tourism also had negative effect such as increasing the waste generation of the region. Since there were no properly working waste management system waste was disposed into the wild.

Environmental valuation is becoming more important in the process of making society more sustainable and environmental friendly. With an assigned monetary value for an environmental resource it will become harder to pollute and over utilize the resource.

In this thesis a field study was performed where the monetary value of a clean environment in Sagarmantha national park were investigated. The research was performed through personal interviews with tourists and the local people of Sagarmantha national park.

To derive this value this thesis will use the Contingent Valuation Method which is a direct method of environmental valuation which asks the respondents about their willingness to pay or willingness to accept a change in the environmental resource.

The respondents were divided into two groups, local people and tourists because of the big socio-economic differences between these two groups. The result from the research does however prove that the two respondent groups almost stated equal WTP levels although the aggregated values turned out to be greater for the tourist since their population is larger than the local peoples. The derived aggregated value for a clean environment in Sagarmantha national park is 42 400 USD per year.

Before the research was performed the author expected the local people to be unaware of the dangers with polluting the environment and that there would be no consistent waste management system currently working in the studied area. This was however proven wrong on several occasions and also in the result from the research.

When the result from the research is analyzed it is difficult to determine if the result is realistic since there are no related studies. The author does however suggest that further valuation studies should be performed since the result from these could be compared with this study to determine whether or not it is realistic and valid.

# Abbreviations

Contingent Valuation Method (CVM) is a method for deriving a monetary value of an environmental resource or the monetary value of a change in the environmental resource.

Willingness to Accept (WTA) is the amount of money a consumer wants to receive if the proposed change in the environmental resource will be done.

Willingness to Pay (WTP) the amount of money a consumer is willing to pay to prevent the proposed change in the environmental resource will be done.

User Value (UV) is the part of the total environmental value which corresponds to activities such as recreation, planting crops etc.

Existence Value (EV) is the part of the total environmental value which corresponds to consumers addressed value of the environmental resource mere existence.

Option Value (OV) is the part of the total environmental value which corresponds to the consumer's valuation of having the potential to use the environmental resource whenever they would want to.

Nepali Rupees (NPR)



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# 1 Introduction

In this chapter the problem that this study addresses will be described thoroughly. It will also address which limitations and boundaries that have been set up for this study.

## 1.1 Problem background

The federal Democratic republic of Nepal is located in south Asia. The north borders faces China and the south, east and west borders Nepal faces India. (NE, 2009) The topography of Nepal is various, to the north the Himalayas is located with the world's highest mountain system. In the south the high mountains turns into the Kathmandu valley which lead to the flatlands that continue all the way into India. Nepal inhabits approximately 27.5 million people. The largest ethnic group in Nepal is Hindus with 81 percent, the remaining 11 per cent is dominated by Tibetan ethnic groups.

Nepal is one of the world's poorest countries with a GDP per capita of \$ 1 200. (2009, NE) It is also one of the least developed countries in the world. Agriculture employs 75 % of the workforce, services employs 18 % and craft-based industry 6%. The growing tourism and foreign support are of great importance for the survival of Nepal.

The political climate of Nepal has been through many changes the last 20 years. (2009, NE) Between 1962 and 1990 Nepal was a monarchy. In the year of 1990 a new parliament was founded and governed to the year of 2002. Under these years corruption was a big issue and the people mistrusted the government since they didn't live up to the promises made. In 2002 King Gyanendra Bir Bikram dissolved the parliament and governed Nepal under a Monarchy. In 2008 a new parliament was formed with the objective to form and implement a permanent constitution.

The Himalayas are the world's highest mountain system (4 000 – 8 484 meters above sea level) with nine of the world's highest mountains such as Everest, K2 etc. This is one of the main reasons why the Himalayas are such a popular travel destination. The Himalayas are divided among seven countries; one of these countries is Nepal. Every year nearly 1 million tourists visit the whole of the Himalayas. Because of the difficult terrain and the lacking infrastructure in the Himalayas, transportation is often limited to pack animals and porters. (National Park Museum, Namche, 2011)

In the year of 1953 sir Edmund Hillary and Tenzing Norgay Sherpa were the first to ascend the summit of Mt. Everest the world's highest mountain peak located in Sagarmatha National Park (WWF, Sir Edmund Hillary Foundation, 2011). After years of many unsuccessful attempts to summit Mt. Everest this was regarded as one of the century's greatest achievements.

Sagarmatha National Park is located in the east of Nepal (National Park Museum, Namche, 2011). Before 20<sup>th</sup> century the valley were inhabited by the Sherpa people who has lived there since the 17<sup>th</sup> century where they emigrated from Tibet which lies to the north east of the park. The Sherpa people were simple people of the mountains living on planting crops and herding cattle. Through the years of living in the mountains, the Sherpa people evolved and adjusted to the extreme altitude. So when Hillary decided to try and summit Mt. Everest in 1953 it would without a doubt be with the help of the Sherpas. Today, thirty thousand tourists

visit the park every year and almost six thousand Sherpas and Nepali people live within the park.

When Hillary and Norgay had been successful in climbing the mountain it started a new era in the Himalayas and especially Sagarmatha National Park (National Park Museum, Namche, 2011). The tourism in the valley grew fast and the Sherpa people were frequently hired to help tourists with climbs and eventually trekking. The growing tourism in the region made the Sherpa people wealthier and many foreign governments and non-governmental organizations got involved with the Sherpas and tried to enhance the life situation for the people of the Mountains.

It was however not only benefits that arose from this development (National Park Museum, Namche, 2011). With rapidly growing tourism the waste generation and the pollution of the environment increased exponentially.

In the beginning the Sherpas were totally unaware of the affect their new lifestyle had on the environment. There were no actions undertaken to save the environment by the Sherpas, tourists and other institutions active in the park.

In one of the articles in the “Journal of Sustainable Tourism” by Kuniyal, Jagdish C. a study of how much waste a visitor to the Valley of Flowers generates per day was performed. The result and conclusion of the study was that 29 tons of waste is generated in one season (from the last week of May to the end of September). 58, 7 % of the waste generated in this period was plastic bottles.<sup>4</sup>

The waste that people carry with them into Himalaya is often disposed into landfills or burned both of these methods may result in pollution of the environment in the Himalayas (WWW, HKR, 2011). Incinerators can be found along the trails and cabins of the Himalayas. They are often used without any thought about the pollution they cause.

The need for technical solutions in Nepal is grave (Ibidem). But it is not only the technique that is needed, it is also the “know how capital” that is important. This in combination with knowledge about the environment and how it is affected by humans is necessary if any solution is to be reached. The tourists in the Himalayas also need to take responsibility and share their knowledge and behavior with the local people

There have been several “cleaning” expeditions which serve to remove garbage from Mt. Everest (WWW, WWF, 2011). The latest one was arranged in the spring of 2011 and was called the Saving Mount Everest expedition. These serve a great purpose but are often arranged by organizations and are not continuous which means that they don’t reoccur every year. This is no long-term solution since it can create free-rider behavior.

With a monetary valuation of a clean environment in Sagarmatha National Park it would be easier to argue for efforts being made to preserve the environment and also to decide how big the effort should be. A Monetary value would also be helpful in the construction process of policies and decisions about governmental involvement.

## 1.2 Problem

By reading the information presented in the previous chapter we learn that there is no efficient waste disposal system in Sagarmatha National park. It is also apparent that the current state

with waste in the open wild is unwanted and solutions to take care of this problem have been undertaken. The most obvious problem is of course the “how”, which method should be used to clean the environment. This is however not the problem this thesis will focus on. This thesis will focus on the problem of valuating a clean environment since this monetary measure could be the big factor which may change the work undertaken to change the current situation. Therefore this thesis has the two following question formulations:

- What is the monetary value of a clean environment in Sagarmantha National Park?
- Which method is the best method for deriving such a value?
- Are the monetary values different for Tourists and Local people?
- What may cause the respondents to state higher WTP levels?

### 1.3 Objective and delimitations

The objective of this study is to investigate the monetary value of a clean environment in the Himalayas. The study will be limited to Sagarmantha National Park which is located in eastern Nepal. Sagarmantha National Park is best suited for this study since it is one of the most popular travel destinations in the Himalayas and therefore one of the most developed and polluted.

Because of the socio economic differences between tourists in the Himalayas and the local people of the Himalayas there will be two separate surveys distributed from the results given from these two groups.

### 1.4 Outline

In the introduction chapter the reader will get an understanding about Nepal and Sagarmantha National Park. The chapter continues with an introduction to the current waste problem in the Himalayas. The method chapter explains how this thesis has proceeded in gathering and working the data collected. In the theory chapter links between theories about environmental valuation will be described and the theories which this thesis will rely on will be presented. Chapter four describes how the research in this thesis was performed and constructed. In chapter five previous studies which relied on the theories used in this thesis are presented. In chapter six and seven the data collected from the surveys of this study will be presented.

In chapter eight and nine further analysis of the collected data will be performed. Statistical and non-statistical analysis will be performed and conclusions from these chapters are made in chapter ten where the author also proposes subjects for further studies.

# 2 Theoretical perspective and literature review

This chapter will explain the main theories which this thesis is based upon.

## 2.1 Public goods & Market failure

Public goods are goods which has the three following main characteristics (Bannock, 1998, p. 339). First of they are non-rivalries which means that one individuals usage of the good won't interfere another individuals usage of the good. Second, the good is non-excludable which means that it is impossible to exclude another individual to use the good. Third, the good is non-reject able which means that no individual can refuse to use the good. Examples of public goods are national defence, clean air and clean environment.

	<b>Excludable</b>	<b>Non-Excludable</b>
<b>Rivalry</b>	<ul style="list-style-type: none"> <li>• Food</li> <li>• Clothing</li> </ul>	<ul style="list-style-type: none"> <li>• Fishery</li> <li>• Motorways</li> </ul>
<b>Non-rivalry</b>	<ul style="list-style-type: none"> <li>• Cable TV</li> <li>• Electricity</li> </ul>	<ul style="list-style-type: none"> <li>• National Defence</li> <li>• Clean Air</li> <li>• Clean Environment</li> </ul>

Figure 3.1 Public Good Matrix (Brännlund & Kriström 1998, s. 47)

One of the problems which may occur in the process of estimating a value on them is called the free rider theorem (Perman 2003, p. 132-133). The free rider theorem states that consumers may hide their true level of willingness to pay for the public good. This will result in an incorrect valuation of the public good. This will result in an inefficient market and therefore market failure.

Within a market so called “market failures” occur (Bannock, 1998, p. 262). Market failure is an economic state which is not efficient. It is caused by the behaviour of maximizing the individual utility without taking care to the collective utility. This behaviour can be caused by different reasons such as asymmetric information or the fact that there are no well-defined property rights of the good.

## 2.2 Economic value & valuation

The economic value of common goods exists and is created on different markets (Bannock, 1998, p. 262). These markets are implemented when the seller of one good gets in contact with a buyer of the same good. Between these two stakeholders an agreement is reached and an exchange takes place often with money and the specific good. This is also known as the mechanisms of supply and demand.

When we talk about the monetary value of an environmental resource it is often referred to as total value or sometimes environmental cost which often is the same (Perman 2003, p. 402). In this thesis we will mention it as total value (TV). Since there is no standard expression for the total value we will make use of the following expression:

$$TV = UV + EV + OV$$

Whereas UV is the user value, EV is the existence value and OV is the option value. Sometimes it can also be expressed as following:

$$TV = UV + NUV$$

Whereas UV still is the user value but NUV stands for non-user values which contain both EV and OV.

User value is the value the consumer gets from using the environmental resource (Brännlund & Kriström 1998, p. 75). In the example of Sagaramantha National Park we can find several different user values such as: recreation, climbing, planting crops, water production and so on. For some of these activities we know the value since they are represented on a market.

There is also a second level of user value which is divided into direct and indirect user values (Brännlund & Kriström 1998, p. 75). The direct user value is as mentioned above: climbing, recreation, planting crops and so on. Whereas the indirect user value is when the consumer reads a book about the subject or watch TV-programs about the subject.

The idea of an existence value for an environmental resource was from the beginning that economist had a hard time accepting (Brännlund & Kriström 1998, pp. 76-77). How could an economical value be assigned to some kind of resource which is not directly used?

In the year of 1967 an economist named John Krutilla wrote the following about existence value in *The American Economic Review*:

”There are many persons who obtains satisfaction from mere knowledge that part of wilderness of North America remains even though they would be appalled by the prospect of being exposed to it” (Krutilla 1967, p. 781).

Existence value is the amount of money consumers would be willing to pay for the environmental resource to merely exist without directly using the resource. This existence value is often motivated by the consideration of current and upcoming generations and their possibility to use the resource (Brännlund & Kriström 1998, p. 76-77).

In 1964 an Economist named Burton Weisbrod criticized the ways of valuating a National park in the paper “Collective-Consumption Services of Individual-Consumption Goods”. (Weisbrod 1964, p. 472-473) He writes that if the value of the National park is to be estimated from the number of purchased admission fees, then the estimated value will not be representative. Weisbrod argues that there are consumers who are willing to pay for the option to consume the resource. This option he states can be for a life time and may never be used. But they would however be willing to pay for the option to consume it. This type of value is therefore called option value.

## 2.3 Methods of valuating environmental resources

Generally speaking there are two different types of methods in the field of environmental evaluation, the direct methods and the indirect methods (Brännlund & Kriström 1998, s. 78). The direct methods are based on interviews where the consumers’ willingness to pay is investigated whereas the indirect method studies the correlation between environment and a private good. For an example travel cost method where the consumers cost of travel to the environmental resource will be studied and evaluated.

### 2.3.1 Travel cost method

In the year of 1947 an economist named Harold Hotelling proposed that the monetary value of an environmental resource could be derived through the consumers travel costs to get to the environmental resource (Brännlund & Kriström 1998, s. 84). The method is based on the idea that the minimum amounts of money which consumer are willing to pay for the environmental resource are the travel costs; otherwise the consumer would not go through with the trip. This method is one of the oldest methods for environmental evaluation.

Even though Hotelling was the first one to propose this method some might say that it was formally introduced by the economists Wood & Trice in 1958 and furthermore by Clawson and Knetsch in 1966 (Hanley & Spash 1993, p. 83).

The travel cost method falls under the category indirect methods since it doesn’t aim to directly ask the consumers about their willingness to pay. In the book “Miljöekonomi” Bengt kriström writes that when we use indirect methods we look at the relationship between a product and an environmental resource under the condition that the environmental resource is improving in some way (Brännlund & Kriström 1998, p. 84).

### 2.3.2 Restoration cost method

The restoration cost method is an indirect method for environmental evaluation (Brännlund & Kriström 1998, p. 78). With this method the aim is to investigate what the cost would be to restore the environmental resource to the state it was in before it was exploited. This method can be easy to use when there is technology that allows restoration of the environmental resource. It is however not very well suited for evaluation of resources which yet cannot be restored and the evaluation of resources which has certain thresholds at which they can’t be restored.

### 2.3.3 Contingent valuation method

Contingent valuation method (CVM) is a direct method of evaluating an environmental resource. The basic idea of the method is that consumers are asked through interviews about their willingness to pay for a change in the environmental resource (Perman 2003, p. 420).

CVM was first suggested by the economist Ciriacy Wantrup in the year of 1940. After Wantrups proposition the method became quite popular and was developed by other economists through the years. In the 1980s and the 1990s CVM was the most used method in the field of environmental valuation which will be presented later on in this thesis (Brännlund & Kriström 1998, p. 102).

The working process of a CVM study is often divided into the following six steps (Perman 2003, p. 420):

1. Development of the scenario and change in the environmental resource.
2. Interview and collection of data
3. a) Calculation of the data and estimation of the WTP  
b) Performing an regressions analysis of the data and an demand curve
4. Calculation of the aggregated value of the resource
5. Evaluation and conclusion

One of the benefits with using CVM is that the result will show the total value of the resource and not as in TCM just the user value. CVM has been up to discussion several times mostly because of its hypothetical approach. Criticizers of the CVM method point out that there is a big risk of a free rider dilemma or strategic answers when the consumers are asked about their WTP. There can also be problems with the questionnaires and the construction of these since it can turn out to influence the respondents in some way or that the chosen price range is wrong etc.

### 2.3.4 Choice of Method

This thesis will make use of the CVM method. This is mostly because the scenario that will be studied is an environmental change in the resource which is easy to combine with WTP/WTA questions.

## 3. Method

In this chapter the methods used by the author will be presented. A general overview of the thesis will be presented. The theories that will be used will be presented and the interview methods that will be applied will also be presented.

### 3.1 General information

This thesis can be divided into two parts. The first part which contains the first five chapters is of a theoretical nature. And the second part contains the research performed within this thesis, which is based on interviews with local people and tourist in Sagarmantha national park, Nepal April-May 2011.

In the thesis we can find both primary and secondary data. Secondary data is data that already exist about the subject before this thesis was performed (Patel, 1994, pp. 54-56). When the secondary data is collected it will be done so that all aspects are taken into account. Primary data is data that will be collected for the particular objective of a thesis. When primary data is collected it is important that the reliability and validity is high.

The literature that was used in the work with this thesis can be divided into three main categories; Literature about national economics, other papers written about environmental valuation and literature about econometrics and statistics. The Biggest efforts have been undertaken in the gathering of information about environmental valuation. The two books that were most relevant and therefore mainly used are “Cost-Benefit Analysis and the Environment” by Hanley & Spash and “Miljöekonomi” by Brännlund and Kriström.

Since there are no directly related studies this thesis has only been influenced by other papers in matters of disposition and the choice of relevant literature. These papers can however not be viewed as related to this thesis since this thesis is the only of its nature.

All the literature that has been used in the theory and the method chapter has been thoroughly evaluated as trustworthy by comparing it to several other sources. Most of the literature about environmental evaluation is the original references in the respective subjects as long as those were possible to retrieve.

### 3.2 Contingent Valuation Method

Contingent Valuation Method (CVM) is a direct method to evaluate the economic value of an environmental resource (Perman 2003, p. 420). It was first introduced in the 1940s by Ciriacy Wantrup and was most used in the 1980s and the 1990s. CVM is probably most famous as the method that was used to put a value on the environment after the big oil spill with Exxon Valdez in Alaska.

The name refers to the contingency between the described scenario and the WTP.

When using CVM the consumers are asked about either their willingness to pay (WTP) for preventing a change in the environmental resource or their willingness to accept (WTA) the change in the environmental resource. The information can be gathered in different ways such as personal interviews, telephone interviews or mail surveys.

The choice between WTA and WTP has been discussed over the years (Hanley & Spash 1993, p. 63-65). In the year of 1976 Robert Willig showed that WTP and WTA would gather the same information as long as the consumer's surplus to income was small enough, and the income elasticity of the demand for the environmental resource also was low. Most of the early studies argued that the same result would be gathered regardless the choice between WTA and WTP.

Empirical studies have however shown that studies which use WTA gives more protest bids than WTP studies. It has also been shown that stated WTP was significantly lower than stated WTA. There are three main reasons why WTA tend to be greater than WTP:

1. WTA tend to be greater than WTP because of "loss aversion". A reduction in entitlements contains a higher value to consumers than an equivalent increase in entitlements.
2. The stated WTP levels are constrained by the income level whereas the stated WTA levels are unconstrained.
3. Risk averse consumers who only get one opportunity to value the good may overstate WTA and understate WTP since they are unsure about the true value.

It has also been shown that WTA studies may receive more outliers and protest bids because of ethical grounds which can cause people to be unwilling to accept any kind of monetary compensation for the loss in the environmental resource.

### 3.3 The process of making an CVM study

In this chapter we will look into the six steps of performing CVM study mentioned in 2.3.3 and describe them more thoroughly.

#### 3.3.1 Development of the scenario and change in the environmental resource.

In the first step of making a CVM study the chosen environmental resource and change in this resource is planned, observed and described (Brännlund & Kriström 1998, p. 102-119). The planned change in the scenario allows us to ask the consumers about their WTP or their WTA. There are infinite numbers of variables in the making of the scenario and the questions that will be asked. However it is important to narrow the variables that have the biggest impact on the WTP for consumers.

For an example: if the WTP for shutting down an airport is to be studied, the WTP among the people living in an area of 3 kilometres around the airport will presumably be higher than the WTP for people living further the kilometres.

Another important part of the scenario is to present how the hypothetical payment shall undergo (Brännlund & Kriström 1998, p. 102-119). It could be included in a tax or it could be done with yearly payments, monthly or payments upon use of the environmental resource. This is of course highly dependent of the respondents that the study is aimed against.

This brings us to the way of selecting respondents, which is of grave importance if the study is going to be representative or not (Brännlund & Kriström 1998, p. 102-119). Depending on what kind of value you want to derive there can be different choices of respondents for the study. Therefore it is important to narrow down which respondents that uses the resource in the way that is supposed to be studied.

In the beginning of the interview/questionnaire the hypothetical change in the environmental resource is described (Brännlund & Kriström 1998, s. 102-119). Information that is presented here can influence the respondent in different ways, therefore it is important to keep the information consistent and easily understood for the respondent. The scenario that is presented must be somewhat realistic; otherwise the respondent may not answer honestly.

Kriström presents the following criteria's for the construction of the scenario:

- Theoretical consistent
- Relevant to the respondents
- Realistic and possible to go through with
- Easily understood

When the respondents are asked about their WTP or WTA levels there are several ways to do it (Brännlund & Kriström 1998, p. 102-119). One way is to use a binary question and a given amount. Another option is to use an open question which the respondents fill in. It is however always hard to find the relevant levels when using binary questions and it is hard to know if the numbers showing in open questions are representative.

The WTP and WTA can also be derived using a bidding game where the respondent will continuously be presented with different options until he/she accepts. This thesis will although use a pay card method. The pay card shows several different options of payments from which the respondent may choose one.

### 3.3.2 Interview and collection of data

Before the data collection starts it can be good to try the questionnaire and the data collecting methods on smaller groups of respondents called focus groups (Brännlund & Kriström 1998, pp. 102-119). These focus groups will meet and discuss the above mentioned and give feedback. When the questionnaire and the collection methods give the desired information the study can move on and begin to collect data.

As mentioned above there are several ways to gather the data, the most popular methods are personal interviews and questionnaires sent by mail. All methods have their pros and cons which must be evaluated for each study.

### 3.3.3 Calculation of the data and estimation of the WTP

When the collection of data is finished it is time to estimate the total WTP and the average WTP (Brännlund & Kriström 1998, p. 102-119). If the study used binary question or binary/bivariate this process can be harder since the entire respondent maybe didn't reveal their level of WTP/WTA. The value can however be narrowed down by analysing the different answers and price ranges.

With an open question these estimations is just a matter of basic mathematics (Brännlund & Kriström 1998, p. 102-119). As soon as the aggregated value is derived it can be divided to get the average WTP/WTA.

When the average WTP/WTA is calculated it can be done with either mean or median values (Hanley & Spash 1998, pp. 55-56). Median values are sometimes a better choice since it doesn't get influenced by protest bids and outliers as much as a mean value. In this step it is also time to decide what to do with outliers and protest bids, shall they be included or not?

### 3.3.4 Performing an regressions analysis of the data and an demand curve

In this step it is time to use econometrics to see the correlation between the different variables and the level of WTP/WTA obtained in the data collection. By performing a regression where the WTP is the dependent variable we can exclude the variables which are not correlated with the level of WTP. When this process is finished the variables that are highly correlated with the WTP/WTA and/or affect the level of WTP/WTA is discovered. This can be very helpful when decisions concerning the environmental resource are discussed.

Källa

$$WTP_i = f(Y_i, E_i, A_i, I_{ni})$$

### 3.3.5 Calculation of the aggregated value

Now it is time to calculate the user value of the resource for the whole population. Before the aggregation can be done there are three choices to be made (Hanley & Spash 1993, p.56-57). First of is the decision about which population that the value shall represent and therefore be aggregated with. This is often decided before the sample for the study is selected.

The second choice for deriving the aggregated value is to choose which figure to calculate it from (Hanley & Spash 1993, p.56-57). When the sample mean is realistic and representative for the rest of the population it is suitable to multiply it with the number of households in the population. When the sample mean is unrepresentative for the population calculations must be done to estimate a more representative figure.

Step three is about the choice and time period (Hanley & Spash 1993, p.56-57).

This depends on the value which is under study. It is also dependent on the environmental resource and how it develops over time.

### 3.3.6 Evaluation and conclusion

At this point several problems and revelations may already have occurred. The important things to discuss are if any of these unexpected events has affected the study in any way. It is also important to discuss how these problems were handled and how it can be done differently the next time. Further questions and thoughts about the method can also be included in this step.

## 3.4 Problems associated with CVM

Here we will discuss the problems that can occur when performing a CVM study. Hanley & Spash write about the CVM studies and how they can be biased in two main categories: Strategic bias and Design bias both will be furthered discussed in this chapter.

### 3.4.1 Strategic Bias

Strategic bias can be when the consumers believe that their answers will become a real payment or new policy they may understate their WTP or overstate their WTA for the environmental resource. This is called the free rider theorem since by acting this way the

respondent can still use the environmental resource since it is non-excludable and end up paying less than the value it generates. The rest of the cost will be carried by the other users of the resource. There can also be problems with protest answers when people overstate or understate their answers for other reasons than the actual value it generates for them.

The phenomenon of over and understated WTP and WTA can also be caused by the fact that CVM studies relies on hypothetical scenarios which the respondents doesn't take seriously and therefore gives an unrepresentative answer, this is called Hypothetical bias.

In the year of 1989 Mitchell and Carson suggested four steps that could help in the process of minimizing strategic bias. The steps are as following:

- Removing all the outliers
- Guarantee the payment by others
- Conceal the bids from other people
- Construct the scenario so that the environmental change won't happen unless the payments are made.

### 3.4.2 Design Bias

The design bias is about how the respondents reacts because of the studies design in matters of how the information is presented and what information that is presented.

How the bid is presented is also important, if they proposed bid is supposed to be included in a tax the answers may be different from a proposition with a higher entrance fee. There can also be a starting point bias which means that the starting bid in a bidding game may affect the respondents in what is an appropriate bid in the process.

How the information is presented and what information that is presented may change the respondent's way of thinking about the environmental resource and therefore affect their WTP/WTA levels. This type of biased has been discussed over the years. Hanley & Spash writes in their book that information that improves the knowledge of a respondent may not be considered as information bias instead it should be viewed as informing a consumption decision.

### 3.4.3 Mental Account Bias

When a CVM study asks for the respondent's income levels the answers may differ in a wide range. The level of income does not always correspond to how much that is spent on preserving the environment. The Mental account bias suggests that each respondent has a certain environmental budget which they spend on preserving the environment. Therefore the respondents may spend their budgets on saving one specie and be left with no money for saving another specie although it is of grave importance for them.

Some might argue that a CVM study should investigate the respondent's environmental budget and not the level of income.

## 4. Applying CVM on this thesis

This chapter will describe the CVM study that was performed in my thesis. I will describe the process of making and performing the study. The result and calculations of the results will be done in the result chapter.

### 4.1 Development of the scenario

Once it was decided that the subject of my thesis were to be the environment in the Himalayas and how it is struggling to stay clean and healthy it was quite clear that what I was going to write about is the waste disposal system. I am also very fortunate to be able to do personal interviews on site which made it possible for me to exclude the part of presenting information about the current status of the environment in the Himalayas.

Since it is a well-known fact that garbage has become a common thing to see in the open wild of the Himalayas I soon decided that a suitable scenario for a CVM study would be a scenario where the environment is totally clean and no pollution exists. This is a scenario may not be the most realistic one since it would be hard to clean the whole of the Himalayas. I choose to see pass this criteria since it still set up a reason for the users to pay for the service I offered. In my CVM studies I choose to use ask the respondents for their WTP and not WTA. This is because I offer a service which improves the environment and therefore gives incentives to pay for.

The respondents included in my study were roughly divided into two groups. The first group was the local people which in other words are the Nepalese people and mainly the Sherpa people. The second group was the tourist that visits the Himalayas which can be any person with citizenship outside of Nepal. The reason for the division of these two groups is because of the big socio economic differences and will probably give to different levels of WTP.

For the two groups there will also be two different questionnaires. Both of them will consist of binary/bivariate questions to make the regression later on easier. When it comes to the question of how the hypothetical payment will be done it differs between the two groups. The tourist's scenario states that the payment will be included with the park entrance fee and for the local people it will be in form of a tax.

When I was deciding about the relevant price levels my first thought was that I was going to have two different price levels presented for the two groups. But when I started with my interviews I quickly understood that it would be best to use the same price levels for both of the groups. The price levels I decided upon were presented as a payment card from which the consumers choose the preferable level of payment.

The CVM study performed within this thesis will only calculate the user value of the resource since all the respondents interviewed in this research are "using" the resource during the interview. The aggregated value which will be calculated will however include small parts of existence value which won't be separated in the calculations because this value is assumed as a trivial figure.

## 4.2 Interview and collection of data

As I mentioned above I was able to travel to the Himalayas and perform personal interviews with both Nepalese people and tourists. The spread of nations included in my research may not be totally representative for the yearly tourist flow. This is because of the language barrier which I was not able to overcome with Koreans, Russians and Japanese people which is all countries with a big tourist flow to the Himalayas.

The number of respondents in my studies is 100 which are divided in to 50 local people and 50 tourists. All the interviews went as planned and the WTP levels could be gathered for all the respondents. The selection of respondent will be randomized since the research will be a field study without any scheduled interviews.

## 4.3 Construction and using Questionnaires

Under this section the questionnaires in Appendix A and B will be described and discussed thoroughly. Both of the questionnaires use binary questions which makes it possible to include all the questions as variables in the regression analysis. It is also easier to summarize all the information gathered compared to open questions which may cover more different aspects but can be harder to summarize.

In this section I will discuss if the questions gave the desired information and how the respondents responded to the study and the questions.

### 4.3.1 Questionnaires for the Local people

The first four “questions” is about the respondents Gender, Age, Nationality and Ethnicity. All of these are basic information which was easily answered by the respondent. The Ethnicity question was however changed to the question: are you Sherpa? Since this was the information which I wanted to achieve.

Question number one ask the respondent if he or she is employed and what kind of employment it is. This may be an important variable with high correlation to the level of WTP and WTA. This question was easily understood worked as planned.

In question number two the respondents are asked about their profession. In the beginning I planned to have all kinds of professions dependent on what my interviews gathered. I soon understood that this would give me too many variables, therefore I decided upon three categories: Guide, Entrepreneur and Other job.

The same thing happened with question number three in which the respondent is asked about their level of education, from the beginning I also planned to ask the respondents about what program they studied. This also gave me a wide range of answers and therefore that part of the question was excluded.

Question number four asks the respondent about their income which is a very important variable and probably strongly correlated with the stated WTP level. This question was easily understood by the respondent but sometimes sensitive to the respondents which resulted in some false answers.

The next Question asked the respondent about how long they had lived in the Himalayas. The answers from this question have been divided into four categories: 0-65 years, 6-10 years, 11-15 years, 16-20 years and 21 or more years.

In Question number six and seven the respondents are asked if they live in houses and plant crops and whether or not they own the land and or the house. I choose these questions since it may be a very important variable with high correlation to the WTP levels since there is a higher profit for land owners if the environment would become cleaner.

Question number eight asks the respondent how they dispose of their waste. This may not be the most deciding variable for the WTP level but it gives an indicator about the knowledge level among the local people when it comes to waste and the pollution it can cause. This question was not always answered correctly.

Question number nine is a ranking question where the respondent is asked to rank the four main categories of waste which can be found along the trails and paths of the national park. This question was easily understood and it may be a high correlation between the different categories and the WTP levels.

In question number ten the respondents are asked about how much they find that garbage in the park affect their experience of the Himalayas. This question should be highly correlated with the WTP levels. The question was however not always understood correctly and may have been too difficult due to the language barrier.

The next three questions are the WTP questions in this study. The first question asks the respondent about their WTP for the environment to be totally clean from garbage. Whereas the two other questions asks the respondents about their WTP levels for the most disturbing waste and second most disturbing waste which were ranked in question number nine. These questions were easily understood and it seemed like the local people already reasoned about this subject before my arrival.

The last question which is more a valuation from my part is about the respondent's language skills in English. I choose to add this variable as a control variable to see if outliers and "protest bids" are caused because of misunderstanding.

#### 4.3.2 Questionnaire for the Tourists

The first three questions are almost the same as in the questionnaire for local people. They ask the respondents about their Gender, Age and Nationality. Nationality has been divided into continents and therefore it can be hard to see the correlation between different countries and the WTP levels. This was done since my sample is too small to be divided into country categories.

The upcoming questions is about the respondents profession and education which almost look they same as in the questionnaire for the locals. The only thing that has been change is the categories of professions which been changed to three different categories: Expedition member, Entrepreneur, Other job. This was done since it showed that there were too many different types of professions for my sample size. I also decided the same thing about the College programs since I would end up with one category for each respondent and therefore not be able to see any correlation.

Question number three asks the respondents about their income and the only thing that is different from the locals corresponding question is the levels which are higher and stated in USD.

In question number four and five the respondents are asked if they have visited the Himalayas before and if the Nepalese parts of the Himalayas are the only destination of their trip. These questions may be relevant since previous visits or visits to other countries may strongly affect the WTP levels.

Question six to ten are all questions which are included to see if there are connections between certain consumer behaviour and the stated WTP levels. They are all questions that in different ways investigate if the respondents think in an environmental friendly way. Some of the respondents became upset when they were pictured as non-environmental friendly. Sadly it is hard to ask the simple question: do you consider yourself environmental friendly since probably everyone would say yes.

The next two questions, number eleven and twelve are the same as in the local's questionnaires. They asks the respondents to rank the most and second most disturbing waste type and question number twelve asks the consumer about what impact the garbage has on the experience.

In the last three questions (question number 13-15) the respondents are asked about their WTP for total clean environment, removal of the most disturbing waste and the second most disturbing waste. All of these are the same as in the local's questionnaire except for the bid vehicle which is included in the park fee instead of a tax.

## 5 Previous CVM-Studies

Within this chapter previous studies which have applied CVM will be presented. The studies that will be presented are studies which have played a role in the development of the CVM method.

### 5.1 Exxon Valdez

The CVM method is probably most famous for being the method that was used when the oil tanker Exxon Valdez spilled its cargo in coastline of Alaska in the year of 1989 (Brännlund & Kriström 1998, pp. 119-120). This is one of the first big cases where CVM was used to derive the value of the environmental resource.

The study was performed as a reaction to Exxon's offer of compensation to the local people (Brännlund & Kriström 1998, pp. 119-120). Interviews were performed and the respondents were asked about their valuation of a clean coastline was in monetary measures. The result from this study was calculated to 2.8 billion USD which was substantially greater than the tens of millions USD which Exxon valued the damages to. The scientists of Exxon argued that existence value should not be included in these types of cases.

After the Exxon Valdez accident National Oceanic and Atmospheric Administration (NOAA) created a panel which purpose where to create guidelines of how the valuation of environmental resources should be done (Brännlund & Kriström 1998, pp. 119-120). One of the task this panel were given was to determine the usability of CVM and especially the methods possibility to derive the existence value. The panels final judgement of CVM was that it was suitable to use in as a starting point in the juridical process given the study fulfilled some criteria's. The effect of the panel's verdict is that CVM studies have become more expensive if the criteria's are to be followed to the letter.

### 5.3 Applying CVM outside of environmental studies

In the year of 1997 there was a thesis presented by Bengt Liljas at Lunds University in Sweden that discussed how CVM studies could be used in the combined science of health and economics (Liljas 1998). This thesis also put light on the importance of follow-up questions to the stated WTP or WTA levels which may lower the risk of understated and overstated WTP or WTA levels.

# 6 Summary of the Interview Results

In this chapter the results from the interviews will be presented. In 6.1 the results from questions which exist in both of the questionnaires will be presented together. In 6.2 and 6.3 the results from the results from the profile questions of each questionnaire will be presented.

## 6.1 Summary of the mutual questions

Table 6.1 Summary of the results from mutual questions

	Tourists	Local People	Total
<b>Gender</b>			
Male	29	27	56
Female	21	23	44
<b>Age</b>			
16-35	27	26	53
36-45	10	14	24
46-55	8	2	10
56-65	4	5	9
65<	1	3	4
<b>Employment type</b>			
Full time	34	36	70
Part time	4	4	8
Unemployed	8	10	18
Retired	4	0	4
<b>Level of Education</b>			
Elementary	50	41	91
Middle school	50	32	82
High school	50	29	79
College	43	15	58
<b>Waste Effect</b>			
1	6	20	26
2	16	8	24
3	12	17	29
4	9	1	10
5	7	4	11

## **Distribution of Gender and Age**

All of the interviews were performed in the end of April to the end of May. The distribution of age and gender among the respondents may not be statistically perfect. This was hard to fulfil since the desired respondent doesn't always want to participate.

As we can see in table 6.1 the distribution of gender did come out pretty good even though no big efforts were undertaken to affect the outcome. Both of the groups have an equal distribution between females and males, both have slightly more males in the sample.

## **Distribution of Age**

The distribution of age in the sample is also very alike between the two groups. Both of these variables are also determined by my features to a certain degree. If we look at the gender table we can see that the sample contains slightly more men than women. We can also see in age distribution table that the majority of the respondents are within the age span 16-35 which is the age where I belong. What we also can see from this table is that tourist with an age of sixty five and older are not very common to find in the Himalayas, this is quite expected since the climate can be very dangerous for that age-group.

## **Distribution of Employment type**

Table 6.1 shows that a majority of the sample for both groups are full time employed. This is very reasonable when we look at the biggest age group for the sample which is 16-35, an age group which probably is the age group that contains the biggest group of work capable respondents. Another interesting is the distribution of retired respondents. Although there were 60% more respondent with an age over 55 among the local people none of them are retired. This is of course because of the differences between developing and industrial countries.

## **Level of Education**

In table 6.1 we can see that the level of education is clearly higher among the tourists than the local people. Almost 100 percent more finished High School among the tourists than among the local people. This is no surprise since Nepal is a developing country where the school system still is under construction and very underdeveloped.

## **How the garbage affect the experience**

The scale used in this question is between one and five. Where one is a very big effect and five is a very small effect. We can clearly see that the local people believe that the garbage has a bigger effect on the experience than the tourists. This can be because of the language barrier or simply because of that the tourist are too busy admiring the surrounding to be bothered as much as the local people by garbage lying open in the environment.

## Most and second most disturbing waste

Table 6.2 shows us that plastic is definitely considered as the most disturbing waste by both of the groups. The local people do however consider glass to most and second most disturbing. This is probably because glass was a big problem in Sagaramanta before they prohibited it and this memory still lives in the local people minds. The tourists probably don't think of the glass as very disturbing since they don't see it in the environment today. Otherwise the distribution among the different categories is quite alike.

**Table 6.2 Respondent's ranking of the most and second most disturbing**

	Tourists		Local people	
	Most disturbing	Second most disturbing	Most disturbing	Second most disturbing
Paper	7	8	4	11
Plastic	36	11	27	9
Metal	4	16	3	8
Glass	3	15	16	22
Total	50	50	50	50

## Distribution of Income

The income ranges that were used in the study are completely estimates from my own judgement. Therefore it may not be relevant to analyse them as below. It is however interesting to see that the income is more evenly distributed among the tourists than it is among the local people. Then again this is no surprise since Nepal is a developing country and the allocation of money is not adjusted as much as in industrial countries.

Of the nine respondents who stated the highest level of income six of them are men.

**Table 6.3 Distribution of income**

Local			Tourists		
0-10 000 NPR	10 000-25 000 NPR	25 000 NPR <	0-3000	\$3000-6000	\$6000<
27	14	9	18	20	12

## 6.2 Summary of the Tourist Questionnaire

In this chapter a summary of the results from the questions which were only included in the tourist questionnaire will be presented and analysed.

**Table 6.4 Summary of the tourist's questions**

<b>Nationality</b>	
Asian	2
European	27
North American	14
South American	0
African	2
Oceanien	5
<b>Profession</b>	
Expedition member	9
Entrepreneur	6
Other job	35
<b>Other destination</b>	
Yes	17
No	33
Arrival by flight	49
Co2 compensating	2
<b>Preferred travel method</b>	
Car	10
Airplane	10
Boat	0
Train	30
<b>Most hazardous energy production method</b>	
Hydropower	5
Nuclear	44
Solar	0
Wind	1
<b>Preferable attributes of groceries</b>	
Organic Produced	13
Locally Produced	15
Fair Trade	8
Price	14

## **Nationality**

My sample was dominated by Europeans and North Americans. This may not be the most representative sample of the tourist population each season. As I mentioned before in 4.2 it was very hard to make the sample representative because of the language barrier when it comes to Japanese, Koreans and Russians which are big tourist groups in the Himalayas. Otherwise the distribution may give a pretty good picture about where the tourists come from.

## **Profession**

Question number one asks the respondent about their type of employment and what their line of profession is. As I mentioned in 4.3.2 this question gave a wide spread of answers. Therefore I limited it to three different categories. We can see that almost 20% of the respondents are there on some kind of expedition. This may be a variable which has a big impact on the stated WTP levels.

## **Other destination**

This question was also meant to contain more options about where the respondent had been more than Nepal. I soon decided that this would give me a wide spread of answers here to. A part from this we can see that almost 40 % of the respondents are travelling to other destination than Nepal on this trip. This can also depend on the largest age group of my sample which was 16-35 which is the age of most of the backpackers.

## **Flight arrival and carbon compensation**

When the respondents were asked about how they travelled to Nepal almost every one of the respondents except one flew in. The last one arrived by bus from India. Of these forty-nine only two carbon compensated for their flight trip. Most of the respondents didn't even know what carbon compensation was and didn't know how it could be done. Carbon compensation is sometimes often by the travel agencies when the flight tickets are purchased the travel agency offer you an opportunity to compensate for you Co<sup>2</sup> emissions during the flight through offers such as emission rights or funding tree plants.

## **Favourite transportation**

This question is included to see if there is any correlation between respondent that prefer environmental friendly transportation methods and higher WTP levels. Train is without a doubt the most popular transportation method and one of the most environmental friendly.

## **Most hazardous**

On the question of the most hazardous or the most non-environmental friendly energy production method there was no surprise that nuclear power would dominate. This is probably because of the big accident with a nuclear reactor in Japan just two months before my interviews were performed.

## Preferred preferences

This question was also a way to investigate if the respondents are environmental responsible. And of course to see if a certain consumer behaviour causes a higher or lower WTP level. The distribution among the different preferences is very equal so there is nothing out of the ordinary to get from the table.

## 6.3 Summary of the Locals Questionnaire

In this section a summary of the result from the questions which were only in the tourist questionnaire will be done.

Table 6.5 Summary of the local's questions

<b>Ethnicity</b>	
Sherpa	35
Other	15
<b>Profession</b>	
Unemployed	10
Guide	8
Entrepreneur	19
Other job	13
<b>Time of Living in Sagarmatha</b>	
20<	33
House	38
Own House	32
Own land	31
Plant crops	35
<b>Waste disposal</b>	
Water/Rivers	0
ground	11
incinerators	41
recycle	6
SPCC	38
<b>Level of English</b>	
1	9
2	9
3	11
4	6
5	15

## **Ethnicity**

A majority of the respondents are Sherpas which is no surprise since they are the native people of the mountains. It is also not a surprise that there are 15 respondents who are not Sherpas. The tourism in the Himalayas is very lucrative and therefore other people from within Nepal tend to move to the mountains.

## **Profession**

From table 6.5 we can clearly see that almost 40 % of the respondents have their own business. This is of course highly correlated with the tourism.

## **How long have you lived in the Himalayas?**

With the result from this question and the question about ethnicity we get a better picture of the reality. Seventy percent of the respondent are Sherpas, from the graph below we can see that 33 of the respondents has lived in the Himalayas for 20 years, all of them are most likely Sherpas. The second big group which is the respondents that answered zero to five years is most likely not Sherpas since there were 15 respondents that belonged to the non-Sherpa group.

## **House and Land**

This question was constructed since it can be a variable which is highly correlated with the stated WTP levels. The result from these questions can also be connected with the ethnicity of the respondents. We can presume that the land and house owners are Sherpas.

## **Disposal of Waste**

This question did not turn out as I wanted since I didn't know about Sagaramantha Pollution Control Committee who works with waste management in the national park. From the beginning this question was introduced to see if there were any correlations between certain ways of waste disposal and WTP levels. Now it is hard to derive this since almost eighty percent lets SPCC take care of the waste and burn it.

## **Language skills**

This question was introduced to see if the respondents understood the questions. One is the highest grade on the scale which means that the respondent is fluent in English. Five on the other hand means that the respondent can't speak or understand English. These interviews were of course performed with the help of an interpreter. We can see that the language skills are equally distributed over the scale. I do believe that all respondents understood the questions with help from surrounding people and interpreters.

# 7. Total User Value of a clean environment in Sagaramantha National Park

Chapter six presents the calculations made in the process of deriving the total user value. As mentioned in section 4.1 this thesis will calculate the total user value which may include a small part of existence value which will be view as a trivial figure. Calculations of the WTP levels for the most disturbing and second most disturbing waste will also be shown. The calculations are made in Nepali Rupees (NPR) as long as nothing else is mentioned.

## 7.1 Calculations of the user value

**Table 7.1 User value calculations**

	<b>Local People</b>	<b>Tourists</b>
Total WTP Men	117 000	112 000
Total WTP Woman	87 000	94 000
Total WTP (Sample)	204 000	206 000
Average WTP Men	4 333	3 862
Average WTP Woman	3 782	4 476
Overall average WTP	4 080	4 120
Agg. Total user value (Average)	24 480 000	123 600 000

Table 7.1 shows us the total WTP derived from the two respondent groups. We can clearly see that the two groups included in this sample have equal aggregated WTP. This was not expected before the research was undertaken, my pre assumption was that the tourists would be stating greater levels of WTP than the local people because of the socio economic differences and the fact that Nepal is a developing country and therefore not as environmental caring as industrial countries. When we look at the figures for the total WTP among women and men it looks like the men are stating higher levels of WTP. This is however not true since the sample doesn't provide an equal distribution of men and women among the respondents.

Among the local people twenty three of the respondents were women and twenty seven of the respondents were men. Among the tourists twenty one of the respondents were women and twenty nine were men.

Table 7.1 shows us that the women among tourists have stated the highest WTP levels. In this table we can see that the average WTP level among local men which are almost as high as the tourist women. It can also be said that it is logical that the local men may state higher WTP since we learned in 5.1 that men earn more money than the women among local people.

When we calculate the aggregated value by multiplying the average value of the respective groups with the population of each group we get the values below. The tourist value is of course bigger since we multiply it with the thirty thousand visitors per year compared to the

six thousand which we used in the local peoples calculations. The value in table 7.1 is the total user value for a clean environment in Sagaramantha each year.

## 7.2 Demand curves of WTP levels

In the following figures demand curves will be derived for the information gathered about the respondents WTP levels for a total clean environment and the most/second most disturbing waste.

These illustrations may not be the best statistical way of showing the collected data but it shows a distribution among the WTP levels which the authors view as realistic one.

### 7.2.1 Demand curves for the local people

When we look at the graph in figure 7.1 we can see that the intercept is slightly below ten thousand and that the coefficient is very low which means that the stated WTP levels are very low and that the differences in the stated WTP levels within this respondent group are very big. By looking at the scatter plot we can tell that most of the respondents stated WTP levels are somewhere between two thousand and six thousand NPR.

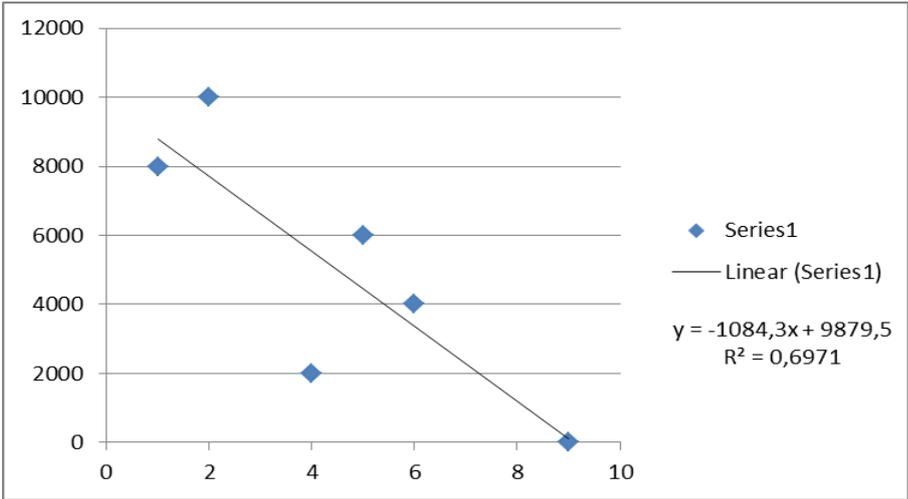
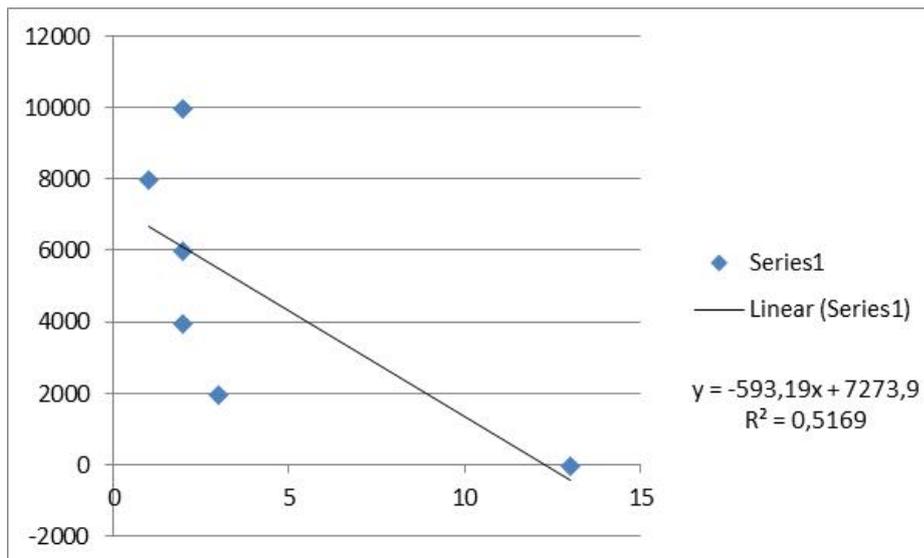


Figure 7.1 Local peoples demand curve for the removal of Plastic waste

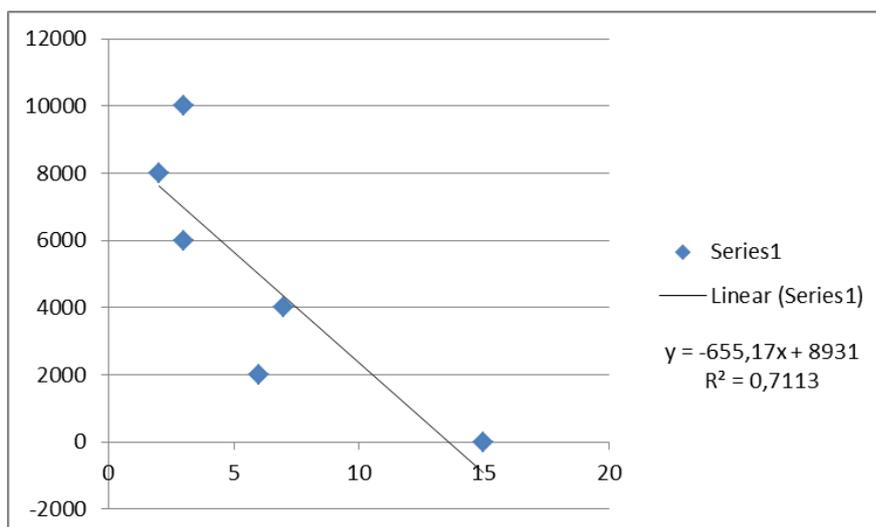
The graph in figure 7.2 illustrates the demand curve among local people for the removal of all the glass waste. This sample was however smaller than the sample for the demand cure for the removal of plastics. The coefficient is half as small as in the plastic case but the R<sup>2</sup> value is a bit lower but still very high. It does however illustrate the stated WTP levels well and we can see that the stated WTP levels has a bigger spread than the distribution for plastics, we can also see that a majority are not willing to pay at all.



**Figure 7.2 Local peoples demand curve for the removal of Glass waste**

### 7.2.2 Demand curves for the Tourists

The demand curve in figure 7.2 shows the tourists demand curve for the most disturbing waste which is plastic. We can see that the intercept for this demand curve is slightly smaller than the intercept derived for the local people. The local people did however have a smaller coefficient which gives a steeper trend line it may also tell us that the demand curve for the tourists are more representative and does not contain as many outliers/protest bids as the local people's demand curve.. The  $R^2$  Value of the tourists demand curve is slightly higher. We cannot derive a clear WTP interval which we could see by merely looking at the demand curve for the tourists.



**Figure 7.3 Tourists demand curve for the removal of Plastic waste**

Figure 7.3 shows the tourists demand curve for the removal of the second most disturbing waste. Since the two different respondent groups gave different answers on the question on which waste that is the second most disturbing waste. The tourists answered metal as the second most disturbing waste whereas the local people answered Glass on the question about

the second most disturbing waste. The coefficient here is smaller than the coefficient for the local people's second most disturbing waste. The  $R^2$  value is lower than the  $R^2$  value for the local peoples demand curve of the second most disturbing waste. We can clearly see this in the graph since there are many outliers which may not be represented by the estimated line. The intercept is almost the same as in figure 2 which seems reasonable since they both represent the demand curve for the second most disturbing waste.

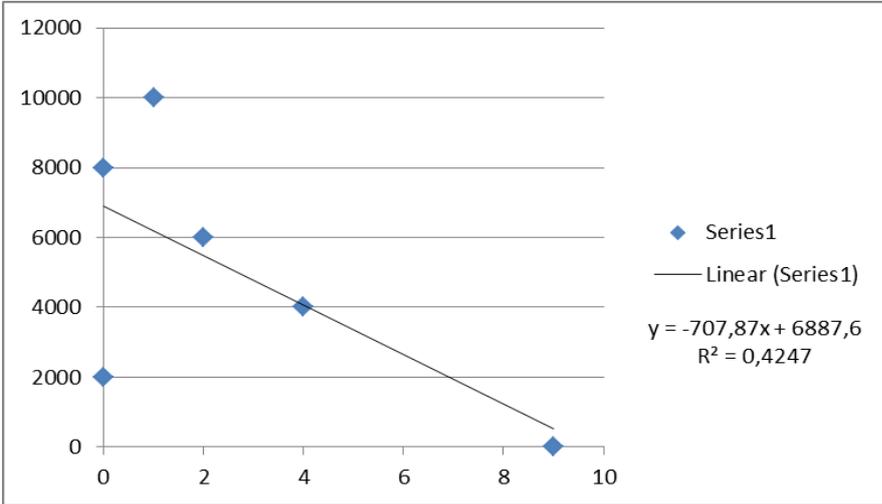


Figure 7.4 Tourists demand curve for the removal of Metal waste

# 8 Econometric Analysis

This chapter will present the results from the econometric analysis of the gathered information. First off the history of econometrics will be described. Furthermore the ordinary least squares model will be described since we will make use of this type of regression. A review of the explanatory variables will follow.

## 8.1 Econometrics

Econometrics is a discipline within the economics field where statistical models are used to study economic problems and relationships (NE 1989, p. 345). The econometric science was founded in the 1930s. The Norwegian economist Ragnar Frisch is commonly viewed as the founder of econometrics. In the years between 1940-1960 econometrics was used to solve problems with the economical balance and growth problems. But in the 1970s the confidence in the macro econometrics decreased and in the 1980s econometrics became more popular in the microeconomic science where it was used to investigate consumer behaviour and the consequences of economical distribution policies.

Econometrics can be defined as following:

Methods within national economics which aims to precise the correlation between different factors within the economy with help of mathematical-statistical instruments (NE 2009, s. 49).

### 8.1.1 Ordinary Least Squares (OLS)

There are many different methods to estimate a relationship between a dependent variable and several explanatory variables (STOCK 2007, pp. 118-135). In our linear regression model we will make use of the Ordinary Least Squares (OLS) method. OLS aims to minimize the distance between the estimated regression line and the actual observations. The non-linear logistic regression would also be a good model for this type of regression if the dependent variable would be stated as a binary variable.

The OLS regression line looks as following:

$$Y_i = b_0 + b_1X_i$$

Where  $b_0$  and  $b_1$  are estimates of the coefficients  $\beta_0$  and  $\beta_1$ . In these regressions we want to investigate the coefficient of the explanatory variable  $\beta_1$  in matters of how big effect the explanatory variables presented 8.2 has on the stated WTP levels.

The regression will be performed in GRETL which is a statistics computer program. When the program runs the model we will look at the p-value and t-ratio to see if the studied variable is significant. The p-value should be smaller than 0, 1 and the t-ratio should smaller than negative two or greater than positive two as following:

$$2 < t < -2$$

. We will also look into the regression data to see if the derived coefficients are realistic and somewhat logical. If the variables do not turn out to be significant we can't decide if there is

any relationship between the variable and the dependent variable or if the observed relationship is the product of pure chance.

## 8.2 Explanatory Variables

This chapter will describe the explanatory variables which have been used in the regressions. Most of these variables have been chosen since they were significant. Some of the variables may not be significant but has been included of other reasons.

### 8.2.1 Explanatory Variables for the Tourists

**Other destination:** This variable is a dummy variable which means that it takes the value of one or zero. If the value is one it means that the respondent travelled to at least one more destination than Nepal. This variable was included since it had a p-value which is significant.

**Waste Effect:** This variable corresponds to the respondent's answer of how much the waste affects their experience of the Himalayas. The variable takes a value between one and five where five is a very big effect and one is no effect at all. Since the p-value value of this variable was better than the majority of the other variables it was included in the regression analysis.

**Expedition member:** This variable is also a dummy variable. If the value is one it means that the respondent is visiting Sagaramantha national park as a part of an expedition. If the value is zero it means that the respondent is not part of an expedition. This variable was also included due to its significant p-value.

**Education:** This variable takes a value between zero and four. If the value is zero it means that the respondent has no education at all. If the value is one the respondent has a degree from elementary school. If the value is two the respondent has a degree from middle school, three corresponds to high school and four correspond to College/University. This variable is included since it traditionally is when this type of studies is made.

**Income:** This variable shows the level of income for the respondents. The variable takes a value between one and three where one corresponds to an income between zero and three thousand USD. If the value takes the value of two it corresponds to an income between three thousand and six thousand USD. If the variable takes the value of three the income is somewhere above six thousand USD. This variable is included since it is interesting to see if there are any correlations between WTP levels and income which are worth mentioning.

### 8.2.1 Explanatory Variables for the Local People

**Education:** This variable takes a value between zero and four. If the value is zero it means that the respondent has no education at all. If the value is one the respondent has a degree from elementary school. If the value is two the respondent has a degree from middle school, three corresponds to high school and four correspond to College/University. This variable is included because of the significant p-value.

**Income:** This variable shows the level of income for the respondents. The variable takes a value between one and three where one corresponds to an income between zero and ten thousand rupees. If the value takes the value of two it correspond to an income between ten

thousand and twenty-five thousand rupees. If the variable takes the value of three the income is somewhere above twenty-five thousand rupees. Since the p-value was significant this variable will be included in the regression.

**Ground:** This variable is also a dummy variable. The value one means that the respondent disposes his/her waste on the ground. This variable also had a significant p-value and where therefore included.

**Language skills:** This variable takes a value between one and five where a five corresponds to the respondent being fluent in English and one corresponds to the respondent not being able to speak English.

## 8.3 Regressions analysis for the Tourists

### 8.3.1 Regression analysis Tourists

In table 8.1 the results from the tourist's regression model is shown. The model contains five explanatory variables which are explained more thoroughly in 8.2 above. The variables are other destinations, Waste effect and Expedition member, Income and Education.

We can see that all of the variables except Income and Education have good p-values which are below 0, 01 and the t-ratios which are good enough. Now that we know that all the variables are significant we look at the coefficient for each variable.

We can see that respondents that have visited other destinations than Nepal on this trip has stated lower WTP levels. Which can be quite realistic since the Nepal is a much cleaner country than some of its neighbours such as India which is a quite common travel destination in combination with Nepal.

Furthermore we can see that with an increasing disturbing effect from the waste to the respondents and their experience of the Himalayas causes an increase in stated WTP levels. This is realistic since a person who is more disturbed of certain pollution probably is more eager to decrease that certain pollution.

When it comes to the relationship between expedition member and stated WTP levels we see that the coefficient is a large negative number. This may seem strange but it can also be explained. Some of the expedition members don't pay their own park and climbing fees and are therefore unaware of the current levels and may therefore state WTP levels without the knowledge about what is a reasonable amount. The expedition members who pay their own fees may feel that they already paid enough since these fees are very high.

**Table 8.1 Regressions analysis for the tourist sample**

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	245,121	4406,34	0,0556	0,95591	
Education	1056,6	1090,36	0,9690	0,33821	
Income	-396,868	510,871	-0,7768	0,44171	
Expedition_memb	-2228,15	1060,87	-2,1003	0,04190	**
Waste_effect	605,652	319,532	1,8954	0,06510	*
Other_destinati	-2287,82	850,982	-2,6884	0,01033	**

We can clearly tell that none of the variables Education or Income are significant enough to be used properly. Although it can be interesting to note that with a higher education the respondents stated higher WTP levels. This can be interesting to compare the coefficient with the local people's regression results for income and education. We can still look at the coefficient for these two variables. Income has a negative coefficient which does not seem very logical. Some might say that western capitalist does not care for much but themselves, if this is true then the coefficient would be somewhat logical and realistic.

The coefficient for Education does seem more logical and realistic than the coefficient for Income. Higher education causes higher WTP levels. This is a very common assumption that higher knowledge causes greater responsibility.

### 8.3 Regressions analysis for the Local People

#### 8.3.1 Regression analysis 1 Local People

In table 8.2 we can see that both the p-value and the t-ratio are significant enough for the variable ground. This means that the respondents that dispose of their waste into landfills or on the open ground have decreasing WTP levels. Somehow the coefficient leave me thinking that either these respondent does not think of the waste in the Himalayas as a big problem or either they think that they dispose of their waste in a good way. These respondents are most certainly not willing to pay since they are pretty satisfied with their current waste disposal and waste levels.

**Table 8.2 Regression model 1 for the local sample**

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	5205,88	547,249	9,5128	<0,00001	***
ground	-2505,88	1147,92	-2,1830	0,03468	**

#### 8.3.2 Regression analysis 2 for the Local People

In table 8.3 we can see the results from the regression model with language skills as the explanatory variable. The results tell us that the variable is significant enough and that higher language skills causes higher WTP levels. This relationship seems reasonable since I believe that it was a language barrier in some of the interviews where the respondents didn't fully understand the questions. It can also be that with better language skills the respondent understood me fully and the fact that I described a hypothetical scenario.

**Table 8.3 Regression model 2 for the local's sample**

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	2637,98	1045,79	2,5225	0,01553	**
Engelska__5__bra	697,848	324,144	2,1529	0,03712	**

### 8.3.3 Regression analysis 3 for the Local People

In table 8.4 the results from the regression model with the variable Income is shown. The p-value is significant but the t-ratio is slightly lower than desired. It is still good enough to be a significant and quite reliable variable. We can see that higher income also causes higher levels of WTP. This is very reasonable since the respondents with more money can pay more for cleaning up the environment. The coefficient for the local people seems more logical and realistic than the derived coefficient for the tourist's income variable.

**Table 8.4 Regression model 3 for the local sample**

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
Const	2586,96	1197,02	2,1612	0,03643	**
Income	1326,09	707,366	1,8747	0,06780	*

### 8.3.4 Regression analysis 4 Local People

In table 8.5 we can see the results from the regression with education as the explanatory variable. As in table 8.4 we can see that the p-value is significant but the t-ratio is a bit small but still good enough. The model is significant, which means that we can tell from it that higher level of education also causes higher WTP levels. This is reasonable and also gives hope about the future.

Maybe the problem is that the local people don't know how dangerous it is to pollute the environment and therefore it increases as shown. It is also reasonable that this is a big reason for higher WTP levels. More knowledge about the dangers gives more incentives for action. It is also satisfying to see that the coefficient for the tourist's education variable also is positive and therefore strengthen the assumptions discussed above.

**Table 8.5 Regression model 4 for the local sample**

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	3283,56	898,789	3,6533	0,00071	***
Education	583,562	325,248	1,7942	0,07998	*

### 8.3.5 Regression analysis 5 for the Local People

When a regression for the local people is performed with all the variables we can see that only the Income and ground Variables are significant which tells us that correlation exists between the other variables. This means that we can't trust the results for the single regressions of these variables and must treat them carefully.

**Table 8.6 Regression model 5 for the local sample**

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	2178,14	1467,01	1,4848	0,14565	
Education	92,3981	503,148	0,1836	0,85525	
Income	1225,04	699,642	1,7510	0,08782	*
ground	-2107,63	1225,02	-1,7205	0,09327	*
Engelska__5_bra	289,766	532,861	0,5438	0,58968	

### 8.3.6 Correlation Analysis

By performing a correlation matrix we can check if there is any existing correlation. When reading results from a correlation matrix the desired values should be between + 0,7 and – 0,7 for there to be no correlation to care about. In table 8.7 it is shown that we have correlation between language skills( Engelska\_\_5\_bra ) and education since the value is larger than + 0,7.

**Table 8.7 Correlation Matrix**

	Education	Income	Ground	Engelska__5_bra	WTP_total_clean
Education	1	0,26	-0,216	0,7644	0,2076
Income		1	-0,025	0,247	0,1664
ground			1	-0,3271	-0,2514
Engelska__5_bra				1	0,3021
WTP_total_clean					1

## 9 Analysis

This chapter will discuss the results from the research and analyse them to see if the objectives presented in 1.3 are achieved within this thesis.

### 9.1 Environmental valuation

Environmental resources are often measured in monetary terms through using indirect or direct valuation methods which were described more thoroughly in chapter three. This thesis aimed to investigate the monetary value of a clean environment in the Himalayas. The study was delimited to Sagarmantha national park in eastern Nepal. This thesis used a direct valuation method called Contingent Valuation Method (CVM). This method has been widely used in the field of environmental valuation but also in other field such as health care and other public goods.

The research was divided into two groups, local people and tourists. This was done due to the big socio economic differences between the two groups. The two samples may not be fully representative in matters of nationality, ethnicity and income for the total population of each group. This would be impossible since there is no observation data with such information about the national park. The problem with having a wide spread of nationalities in the tourist sample was of course language related. Tourists from countries where English is not common tongue was not represented in my sample.

The making process of this CVM study followed the steps for creating such a study. Creating the scenario was not hard since all of the respondents were already well aware of the current situation and therefore it was just matter of words to make them understand what I offered, a clean environment. The only problem was that the studied scenario may not have been very realistic but my impression was that the majority of the respondent's definitely took it seriously.

The scenario may somewhat be strange since it asks the local people about their yearly WTP and it asks the tourist about their WTP for a higher park fee which for some of the tourist includes their lifetime value for the park since they may not return. But since the aggregated total value was calculated from figure of visitors per year the values for tourists and local people can be compared.

I do however believe that this study did not suffer any strong effects from protest bids and such. Overall the respondents seemed to have a good picture about what was going on and what they thought about it.

Some of the questions regarding the tourist's behaviour did not work as planned. This part should have been more thoroughly tested before it was used in the interviews. Some of the tourist respondents were quite upset with the binary question system since they felt that this did not get the whole picture of their attitude towards the problem. This could of course be solved with the use of open questions but would also be harder to summarize and the risk of gathering more protest bids would be greater.

They pay card system with several different WTP suggestions worked well for both of the respondents and there was no need for replacing the question to an open question when the interviews were undertaken.

When it comes to the calculations there have been no problems whatsoever. The results did however surprise me and then I realised that having the same price range on the payment card may have affected the outcome. Although this may have changed the outcome it can also be that these results actually are correct and representative. This is motivated with the reason that the local people spend much more time in Sagarmantha national park and therefore wants to pay more if you calculate the derived values divided over one year or a lifetime.

## 9.2 Monetary value of a clean environment in Sagaramantha national park.

The total user value for the two sample groups turned out to be almost the same as we can see in table 7.1. This was as mentioned before surprising because of the big socio-economic differences between the two groups one would expect the tourists having a greater total WTP than the local people.

The aggregated user value that was calculated for the two populations in chapter seven seem quite reasonable since we don't know anything about the real value. This is although the first study of its kind as far as the author knows. Therefore it is not possible to compare the derived value with other related studies to see if it is a realistic figure.

## 9.3 Variables that affect the respondents stated WTP levels

This chapter will present the different variables that influence the respondent's stated WTP levels.

### 9.3.1 Variables that affect the environmental valuation of the Sagarmantha national park among the tourist

The regressions made for the tourists showed that there were only three variables which were significant enough to discuss. The waste effect variable were not very surprising since it is very logical that the more disturbed you get from waste laying on the ground the more you are willing to pay for it to be cleaner. It was also very expected that the respondents who had travelled to other destinations than Nepal also was more used to polluted environments and therefore not as sensitive as other respondents.

But the Expedition member variable did somehow shock me since the problems with waste higher up on the mountains cause's dangers for the climbers and people who spend time there. Therefore I expected this variable to cause higher WTP levels. Maybe the member of the different cleaning expeditions does not influence their fellow climber and expedition members as much as they believe.

The income and education variables were insignificant which may have been unexpected since it would be of my impression that they probably are an important factor in the stated

WTP levels. The matter of their insignificance does however depend on how the study was performed. Here it may have been more interesting and fitting to investigate the environmental budget mentioned in 3.4.3.

### 9.3.2 Variables that affect the environmental valuation of the Sagarmantha national park among the local people

The variables which turned out to be significant in the local people's regressions were rather expected. Income and education makes bigger differences in the knowledge and the ability to pay for environmental related problems. And the language skills variable is of course very expected to be important since this study was performed with personal interviews and there were sometimes no interpreters to be found for the interviews.

The Ground variable was however unexpected and somewhat hard to interpret. Why it would strongly decrease the stated WTP levels is a question to me since this type of waste disposal is the most dangerous and disturbing type.

# 10 Conclusion

This chapter will try to answer the questions presented in 1.3 by using the results from this thesis. It will also suggest how further studies should undergo in this field.

## 10.1 The authors reflections and conclusions

In section 1.3 the following questions were presented:

- What is the monetary value of a clean environment in Sagarmantha National Park?
- Which method is the best method for deriving such a value?
- Are the monetary values different for Tourists and Local people?
- What may cause the respondents to state higher WTP levels?

When it comes to the question about the monetary value of a clean environment in Sagarmantha National Park I can gladly say that this thesis was successful in deriving such a figure. However it is harder to say if the derived value of 286 080 000 NPR per year is a realistic figure at all since there are no related studies which this figure can be compared with. 286 080 000 NPR correspond to about 42 400 USD.

This problem was of course something known before the study was made and something which future studies may experience easier since the result from this study will be available.

The derived total user value for the respondent groups didn't turn out as predicted. Before the research was undertaken I was certain that the tourists would state much higher WTP levels than the local people. This may be because of how the study was performed and other implications related to the constructed scenario. Therefore I believe that if a similar study would be undertaken it should make more use of focus groups before the real interviews are made to make sure that the scenario work as planned.

This valuation was made with the CVM method which worked well and gave a satisfying result. It would be interesting to see if a study with the travel cost method would be derive a different result since there is such a big mixture of nationalities among the respondents.

One problem which is related to CVM studies is the fact that the scenario is hypothetical which may cause the respondent to give answers which does not correspond to reality. Although this problem may have caused my study to be biased and being unrepresentative I am very pleased to have used CVM. The alternative methods which were up for discussion were no better options since they needed more information and time which I would not have been able to get. It is impossible to say which method that is the best one for deriving an environmental value but for this study CVM was the obvious choice.

When the regression analysis was made I was disappointed when I only found a total of seven variables which were significant enough for being used. I was surprised when I found out that the variables income and education in the tourists regression was not significant enough, before I performed the regression I was certain that these would be very important and significant. As mentioned in 9.3.1 it may have been better to study the respondent's

environmental budget and use this in a regression model for the tourist to see if it would be more significant than the variable income.

It was on the other hand no surprise that the income, education and language skill variables were significant in the regression analysis for the local people. But the variable ground was unexpected and does not strike me as a certain relationship. It is not clear if these respondents also had less knowledge about their pollution of the environment.

The results from the calculations of the average wtp levels in table 7.1 are interesting since we can see that among tourists women stated higher levels than men and the opposite among locals. This may however be because of higher income among the men of the local people. But what implies the result of the tourists? Maybe women generally care more for the environment or that the female respondents turned in more protest bids.

I believe that an efficient way to make the environment cleaner in the Himalayas would be as my scenario for the respondents, through higher taxes and park fees. Systems with recycle payments would probably not be efficient since this would probably end up in people fooling and exploiting such system.

Before my field work I expected the local people to be more unaware of the dangers related to pollution and that I would not find any kind of consistent waste management. After my field work I realize that I underestimated the local people and their knowledge in such matters. Therefore I think that my research could have used more questions regarding local people's behaviour and knowledge concerning the environment. I also learned that Sagaramantha Pollution Control Committee offered waste management services in the area around Namche bazaar.

Although my research was performed on short time I am happy with the experience and have learned that in the future I would spend more time planning the scenario to make sure that I receive the desired results.

It can also be said that when it comes to the three types of bias discussed in 3.4 it is hard to tell if the research performed within this thesis was victims of strategic or design bias. I would however say that since the variable income turned out to be insignificant one could think that this research had problems with mental account bias, therefore my conclusion is that when CVM studies are performed it will be better to derive the environmental of the respondent

## 10.2 Further research

Since this study is the first of its kind it would be interesting to see other studies in the same field. This study gives a result which other studies can relate to and further refine. It would also be interesting to see the results from valuation studies in the same area using other methods such as TCM and restoration cost method.

Studies have been performed where the behaviour of the local people in Sagaramantha national park was described. Further qualitative studies which describe the knowledge among local people would be important for the process of making the environment better in the Area.

These studies would be of great help in the making of environmental valuation studies. Other methods like the restoration cost method would also be possible to perform since information about the cost for waste management in the area can be found.

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# Appendix 1: Questionnaire for the local people

## Questionnaire for the study: *“What is the monetary value on a clean environment in the Himalayas”*

Gender : \_\_\_\_\_

Age : \_\_\_\_\_

Nationality : \_\_\_\_\_

Ethnicity : \_\_\_\_\_

### 1. Are you currently employed?

- A) Yes
- B) No

### What kind of employment?

- Full time
- Part time

### 2. What is your profession?

- Entrepreneur
- Guide
- Other job

### 3. Education

- Elementary school (5-11 years old)
- Middle School (11-14 years old)
- High school (14-18 years old)
- College or University

**4. What is your level of income after tax?**

- a. 0-10 000 NPR / month
- b. 10 000 – 25 000 NPR / month
- c. 25 000 – more NPR / month

**5. For how long have you lived in the Himalayas?**

**6. Are you living in a house if “Yes” do you own it yourself?**

- a. Yes
- b. No

**7. Do you own any land or do you plant any crops?**

- a. Yes
- b. No

**8. How do you dispose of your own waste?**

- B) Water / rivers
- C) Open ground
- D) Incinerators
- E) Recycled
- F) Sagarmantha pollution control Comitte

**9. Arrange the following categories of waste where 1 is the most disturbing**

**Type of waste and 4 is the least disturbing**

- A) Soft drink bottles (GLAS)
- B) Gas bottles (Metal)
- C) Plastic bags and plastic packaging (Plastic)
- D) Metal cans and metal waste

**10. Are the littering and the disposal of waste into the wild affected your experience of the Himalayas where “5” is no impact and “1” is very big impact ?**

**11. Would you be willing to pay NPR to the government if the environment in the Himalayas would be totally clean ?**

**E) YES**   
**F) NO**

**0      1000      2000      3000      4000      5000**  
**6000    7000      8000      9000      10 000**

**12. Would you be willing to pay ... NPR to the government if the environment in the Himalayas would be clean from the most disturbing waste?**

**0 / 2000    0 / 4000    0 / 6000    0 / 8000    0 / 10 000**

**13. Would you be willing to pay 1000 NPR to the government if the environment in the Himalayas would be clean from the second most disturbing waste?**

**0 / 2000    0 / 4000    0 / 6000    0 / 8000    0 / 10 000**

**14. English skills 1-5 own judgement?**

## Appendix 2: Questionnaire for the Tourists

### Questionnaire for the study: *“What is the monetary value on a clean environment in the Himalayas”*

Gender : \_\_\_\_\_

Age : \_\_\_\_\_

Nationality : \_\_\_\_\_

**1.**

- Part time employed**
- Full time employed**
- Unemployed**

#### **Profession**

- Entrepreneur**
- Adventurer / Expedition member**
- Other job**

**2.**

- Elementary school (5-11 years old)**
- Middle School (11-14 years old)**
- High school (14-18 years old)**
- College or University**

**3. What is your level of income after tax?**

**C) 0 - 3 000 USD / month**

**D) 3 000 – 6 000 USD / month**

**E) 6 000 – more USD / month**

**4. Have you visited the Himalayas before? If “Yes” How many times have you visited the Himalayas?**

**a. Yes**

**b. No**

**5. Are the Himalayas your only travel destination on this vacation/trip? If “NO”, which are the other travel destinations?**

**a. Yes**

**b. No**

**6. Did you fly into the Himalayas?**

**a. Yes**

**b. No**

**7. If “Yes” did you compensate for the carbon dioxide emissions Related to the flight?**

**a. Yes**

**b. No**

**8. If you are going to travel 700 kilometres, which one of the following Travel methods would you choose?**

**a. Car**

**b. Airplane**

**c. Train**

**d. Boat**

**9. Which of the following options would you consider to be the most Non-Environmental friendly?**

**a. Hydro Power**

**b. Nuclear Power**

**c. Solar Power**

**d. Wind Power**

**10. When you are buying groceries which one of the following attributes**

**Of a good affects your choice most?**

- a. Organic produced**
- b. Locally produced**
- c. Fair trade marked**
- d. Price**

**11. Arrange the following categories of waste where 1 is the most disturbing type of waste and 4 is the least disturbing type of waste**

- a. (GLAS)/bottles**
- b. Gas bottles (Metal)**
- c. (Plastic)/ bottles**
- d. Paper**

**12. Are the littering and the disposal of waste into the wild affected your Experience of the Himalayas where “1” is no impact and “5” is very big impact?**

**13. How much more in park fee would you be willing to pay if the environment in the Himalayas would be totally clean upon your arrival here?**

**0    1000    2000    3000    4000    5000**  
**6000    7000    8000    9000    10 000**

**14. How much more in park fee would you be willing to pay if the environment in the Himalayas would be clean from the most disturbing waste?**

**0 / 2000    0 / 4000    0 / 6000    0 / 8000    0 / 10 000**

**15. How much more in park fee would you be willing to pay if the environment in the Himalayas would be clean from the second most disturbing waste?**

**0 / 2000    0 / 4000    0 / 6000    0 / 8000    0 / 10 000**