Analysis of Visitors Willingness to Pay for Recreational Use Value of ''Menagesha Suba'' Forest Park: Application of Contingent Valuation Method

Mekdes Tadesse

A Thesis submitted to

The Department on Economics

Presented in Fulfillment of the Requirement of the Degree of Masters of Science (Resource and Environmental Economics)

Addis Ababa University

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SCHOOL OF GRADUATE STUDIES

This is to certify that the thesis paper Prepared by Mekdes Tadesse entitled: Analysis of Visitors Willingness to Pay for the Recreational use Value of "Menagesha Suba" Forest Park: Application of Contingent Valuation Method and submitted in partial fulfillment of the requirements for the Degree of Master of Science (Resource and Environmental Economics) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Mekdes Tadesse, 2014

Abstract

Ecosystem service valuation is being developed as a vehicle to integrate ecological understanding and economic considerations to redress the traditional neglect of ecosystem services in policy decisions. One of the benefit that could be generated from ecosystem is recreational service .The Menagesha Suba forest Park, which was found by Emperor Ze'ra Yacob in the 17 th century, located in Oromia regional state 30 KM east of the capital city Addis Ababa, with its natural and cultural values is one of the distinguished potential areas where recreation and tourism activities can be carried out. This study has been undertaken with the objective of determining the recreational and tourism use value of Menagesha Suba Park with using contingent valuation method and examining effective factors affecting users' willingness to pay at the current Condition and for proposed future improvement. The study was aimed at estimating recreational benefits (direct service values) of the park using primary data collected from onsite visitors . A total of 165 usable data were collected from recreationalist using the double bounded dichotomous choice contingency valuation survey using a simple random sampling technique from onsite visitors. After that, the recreational and tourism use values (willingness to pay) for the Park were calculated after doing necessary statistical analysis. According to survey results which conducted in Menagesha Suba Park, the mean willingness to pay recreational use value per visit per person for current situation was estimated to be ETB 46.2 and recreational value after improvement was estimated to be ETB 91.9. The maximum willingness to pay per visit was estimated to be ETB 44.63 per visit for current condition and ETB72.1 for proposed improvement. From the results of the survey ,Initial bide level, income level, being an Ecologist, Quality of the recreational site, age of the respondent and sex of the respondent were found to affect visitors willingness to pay significantly. Furthermore visitors have high willingness to

pay for improvement than the current status quo. In conclusion visitors of Menagesha Suba Park are willing to pay higher amount than they are charged currently. The implication is that any policy direction towards the provision of effective recreational service and natural resource conservation should incorporate demand side information.

Key words: Tourism, recreation, Menagesha Suba Park, contingent valuation method.

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Finally, the contribution of my family and friends has been enormous.

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List of acronyms

AIC - Akakiya information criteria

BIC - Bayesian information criteria

BVPM - Bivariate probit model

CA - conjoint Analysis

CBA - Cost Benefit Analysis

CI - Confidence interval

CV - Contingent valuation

CVM - Contingent valuation method

ETHB - Ethiopian birr

DBDC - Double Bounded Dichotomies Choice

DBM - Double Bounded Model

IDLM - Interval data logit model

LB - Lower bound

Max WTP - Maximum willingness to pay

MLE - Maximum Likely Hood Estimation

NOAA - National Oceanic and Atmospheric Administration

SUBVPM - Seemingly unrelated bivariate probit model

UB - Upper bound

WTP - Willingness to pay

WTA - Willingness to accept

Chapter 1

Introduction

1.1Background of the study

Many conventional commodities that are considered as a private good are generally traded in the market. The quantities and prices of these goods are determined through the interaction of supply and demand. The value of such commodities are there for determined in the market according to the buyers willingness to pay and sellers willingness to supply ,therefore no problem exist in valuing private goods .However most environmental goods and services such as clean air and water, ecotourism ,healthy fishing and wild life population are not traded in the market ,this is due to the difficulties in assigning economic value to such commodities or to the attitude that they are free goods .Hence a way must be found to put monetary value on environmental benefit and cost. Thus, valuation of environmental resource refers to putting monetary value to improvement or damage of the resources (kolstad, 2000).

Protected Forest areas are increasingly recognized for the myriad benefit that they provide, the uniqueness of this forests makes them a prime attraction for recreational and nature based tourism. These forests also perform significant ecological function such as providing shelter for many species of animals and bird species and storing carbon and for ecological sustainability. These protected forest parks also help to enhance precious foreign currency to the national economy (Mesfin Geremew, 2010).

Theoretically the utilitarian approach allows value to arise in a number of ways depending on how individuals use ecosystem .Hence forth; the recreational economic value of an ecosystem is economically defined as the sum of the net discounted value of a stream of recreational service it offers (Isabella Mendez, 2007). Depending on the use society makes of ecosystem economics have settled for a total ecosystem value taxonomy interpreted as total economic value (TEV),that distinguish between direct use value and passive (non-use) values (OECO;1999 cited in Solomon Jebesa,2004).

In the past decision on natural resource use and management have been based on traditional economic theory in which only market cost and benefits are considered ,under this system natural resource are deemed as free .With regard to recreational service the economic value allowed to this type of service is not known as the quantifying process is not straight forward. In some countries entry fee may play the role of valuation of non marketed goods .In this case valuing forest park can help provide a step towards a better informed decision making ,this requires evaluating these natural resources in monetary terms.

Description of the Study Area

Menagesha Suba Forest Park

Menagesha Suba Forest makes the oldest park in Africa. The giant trees are said to have over 500 years of age. History refers Emperor Zera Yacob (1434-1468) as the one to first assign the area to be a "crown forest." That time, the area was planted with seedlings of junipers taken from the "Wef - Washa" forest found in Ankober and Debre Sina, small towns some 200 k.ms north of Addis Ababa (Hans Larson, 2007). The park is located in central part of the country 30 km from Addis Ababa. It is found between of $38^0$31´ and $38^0$35´ E and 9^0 89´ and 9^0 00´ N in Oromia National Regional State .Several rivers flow from the mountain, including the Akaki River that runs through Addis Ababa. Annual rainfall is around 1100 mm with the rains mainly falling from June to September. The temperature of the surrounding area is 16^0C with a mean maximum of 22.5^0C and mean minimum of 9.5^0C. In the forest, overall temperatures are cooler with an average of 11^0C in the upper parts. Frost is common on the mountain outside the forest (MOARD, 2002 sited by abate welide 2009).

The Menagesha - Suba natural forest, which started to exist in the 17th century, had defiantly passed through such a long period of time and still exists well protected and preserved. The forest itself has "responsibly" been a sanctuary for wild life including those rarest ones. The forest is still sheltering a number of wildlife amazingly including those endemic ones, which are unthinkable to be found within the vicinity of Addis Ababa. The forest eases the burdens of visitors from flying hours or driving hundreds of miles to remote parts of Ethiopia to see some of the endemic animals that make Ethiopia famous in the world.

There are old trees as tall as over 50 meters and as thick as eight meters. The state forest covers a total area of some 3,500 hectares. It is one of the best remaining examples of dry afro-montane forests. Some 2,500 hectares of the area is covered with the original natural forest while the remaining 1000 hectares is still under plantation. The high forest at the Menagesha - Suba State Forest is dominated by the African Pencil Cedar, locally known as Tid trees. The biggest trees have over 50 meters height and two meters width with a single trunk of a single tree. The other long-standing big trees that have equally enjoyed old life in this part of the forest are African Podo and Red Stink wood or Iron wood trees, other young trees have also significantly increased the natural beauty of the park.

What is more important in terms of attracting visitors to the place is the presence of various wildlife found besides the age old trees in the park. A survey made in 2001 has proved the presence of 32 species of mammals and 186 species of birds in the forest. Further, to the wonders of visitors, two of the wild mammals as well as four of the birds are endemic. The mammals and the birds make the place an ideal place of recreation and even a compelling miss-not-area hardly possible to think in a vicinity of a capital city, Addis Ababa. The endemic mammals are Menelik's Bush-buck and white-footed rat. The endemic birds that are compelling visitors to stream into the forest are Abyssinian Catbird, Abyssinian Woodpecker; Black - headed Siskin and Yellow-fronted Parrot. There are also other interesting birds, which are not found everywhere except in Ethiopia and neighboring Eritrea. Though not endemic, other bird species are also residents of the forest and its surroundings significantly contribute to the sight-seeing and the melody of the old life in the living forest of the past. Wild animals including three members of cat family Caracal, Leopard and Serval Cat are found in the den in large numbers. Other

interesting animals such as Abyssinian Black and White Colobus, Abyssinian Hare and Bush Pig and Klipspinger are also among those frequently seen by visitors (Hans Larson ,2007).

Despite these historical facts, however, the status of conservation being rendered to this forest is becoming weaker and weaker from time to time. One of the reasons for the weakening of the conservation status is believed to be the expansion of towns, as the forest is found just a few kilometers away from the capital Addis Ababa, and the erosion of cultural values accorded to the forest and trees as a consequence .

1.2, Statement of the problem

Forest parks provide a variety of important service including flood control ,biodiversity, recreational opportunity and consumption goods ,because most of this service are public goods the value of the forest for providing this service cannot be directly obtained. We cannot rely on market value to estimate total benefit from this commodities ,for these goods are public goods and are not produced and distributed in accordance with the market mechanism;- hence we need to put value that reflect the true social value and thus measurement of this value is the key.

Failure to incorporate the true social value of such kind of resource services in decision making process may lead to under estimation of net conservation benefit if the estimated value is less than the true social value or over estimate net development benefit if the estimated value is greater than the true social value, which in turn might lead to wrong decision making in the development of the natural resources or in transferring resource in developing and expanding other sectors. To make the necessary development and allocation decision regarding this resource to the users the benefit they generate must be estimated using appropriate techniques.

Although Menagesha Suba Forest Park has the potential to attract many visitors due to its rich and diverse ecological compositions, there has been no improvement in the recreational and amenity services ever since its establishment as a national park in 1955. According to the 1990 report the original Menagesha State Forest which use to covers 9,248 ha of natural forest is left only with plantation forest comprised 1,316 ha and natural forest 2,720 ha, the remainder being open farmland, grazing and bare land. In

addition the repeated attack of the localities on the forest which is usually done at night is endangering the most precious indigenous trees. A study by Lalisa Alemayehu et,al(2012) found that there is disagreement between the forest managers and the surrounding, community. As a result, illegal interventions like cutting of trees, grazing, and farming in the forest area are expanding, and together are retarding the development and conservation of the state forest. The mountain areas which once have been covered with dense forest and were in rich with biodiversity with indigenous plants are now turning in to open land

As a reflection of the poor recognition of the role that ecosystem services play to society, forest resource management in Ethiopia is characterized by insufficient funding to the sector. Although, in recent years encouraging steps have been taken at the national level such as formulating forest policy and decentralizing forest administration to the regional states, at the practical level this brought little change to the ongoing alarming forest destruction (Million, 2001). Among the reasons that may contribute to the discrepancy between the level of ecosystems service enjoyed by people and the low value /attention attributed to them is primarily because these ecosystem services are not traded in the market and their economic value are not readily known. This under valuation could lead to inefficient allocation of the resource stock .Its depreciation unaccounted and uncompensated for those affected ultimately resulting in loss of welfare to forest dependent community at large (Mogaka *et,al*, 2001; sited in Mesfin Geremew, 2010).So far no attempt was made as to how individual visitors value the recreational service that this ecosystem provides. A comprehensive investment in development and improvement of the park's recreational services should integrate people's preferences; willingness to

pay for using the site as a recreational place and improvement in different attributes of the area which contribute to the improvement of the welfare of the society. Therefore, this study aims to estimate the recreational value of Menagesha Suba Forest Park for using the Park with contingent valuation (CVM) value elicitation method.

1.3, Objective of the study

The general objective of the study is to estimate the recreational use value of Menagesha Suba Forest Park.

1.3.1, Specific objectives of the study are

i, To determine factors that affect visitors willingness to pay (WTP) for recreational service of the park.

ii, To estimate the consumer surplus and recreational value (benefit)of the site.

iii, To find out whether improvement in the recreational benefit of the park will lead to increase visitors willingness to pay to visit the site.

iv, To suggest policy recommendation as to how over all benefit of the park could be improved.

1.4, Significance of the study

Despite the important role recreational areas of our protected forest parks played in their contribution to tourism industries of Ethiopia, there is no much research under taken to measure their benefit to the economy. So far there is no study that employ contingent valuation techniques in estimating individuals willingness to pay for the recreational value of parks for Ethiopia in general and Menagesha-Suba forest park in particular This research work will be help full to estimate the recreational use value of Menagesha Suba Forest Park and to elicit visitors preference for improvement of different services in the park and that it will provide information for the management concerning the change in service of the site. In doing so the research work will contribute to the existing limited literature for Ethiopia in this area of environmental amenity service valuation.

1.5, Limitation of the study

This study is subject to time and financial constraint; due to small visitation rate of foreign visitors combined with time constraint make it hard to get a significant sample size to make a separate analysis for both foreign visitors and domestic visitors. Thus the idea of estimating mean willingness to pay for foreign visitors was dropped .In addition due to the significant proportion of group visitation combined with first time visitation rate it has been difficult to make comparison between results of contingent valuation survey with travel cost method .Due to the mentioned constraint the study is restricted to the application of only contingent valuation method, further more a sample is drawn only from current visitors.

1.6, Organization of the Study

Chapter two presents the theoretical background of environmental valuation and the literature on various methods of valuation techniques, followed by the review of previous studies particularly empirical literature related to the method of contingent valuation are presented. The methodological framework of contingent valuation method, the development of contingent valuation survey, the data collection and survey design issue are described in detail in chapter three. In chapter four samples descriptive are provided and the results from contingent valuation survey are presented and analyzed. Finally in chapter five the main findings of the study are summarized and some important policy implications are discussed.

Chapter 2

Literature Review

2.1, Theoretical Literature

2.1.1, The Economic approach of Ecosystem valuation

By quantifying the contributions of ecosystem services to human welfare as well as changes in environmental quality, ecosystem valuation has become a valuable tool in determining environmental policy. There are market and non-market values associated with ecosystem services. A market value is the price that a consumer would pay for a good or service that is being bought or sold as a commodity. It is the dollar amount that is paid for a good. A non-market value is one that cannot be traded directly in markets and there are not market prices to evaluate. Within non-market values, there are use and non-use values.

Use values include activities that are not sold or traded in markets, but are taken directly from the ecosystem services. When people valuate ecosystems they take into account non-use values as well as use-values. Non-use values include option value, existence value, bequest value, and altruistic value.

i, Option value refers to the value that people place on having the option to use the resources derived from that ecosystem at a later point in time.

ii, Existence value refers to the value of knowing that something merely exists even though there may be no desire to ever go see it, just knowing that it is there is important.

iii, Bequest value is the value of preserving something for generations yet to come.

iv, Altruistic value is the value that an individual places on an ecosystem good or Service solely because they know that others enjoy it.

It is important to have the ability to value the psychological enjoyment that people get from ecosystem goods and services as well as the goods and services themselves. Although sometimes it seems as though things such as ecosystems should not be evaluated because it turns them into commodities, it is necessary to give them a common currency with other marketed goods so that ecosystems are not underrepresented in governmental policy making (John C. Bergstrom,1990).

There are several methods for valuating ecosystems. Each one has strengths and weaknesses, and certain methods are most appropriate for specific situations depending on the type of information that is desired.

There are revealed preference approaches and stated preference approaches. The revealed preference approaches extrapolate the individual's willingness to pay or except by examining the choices that he or she makes within a market. The choices are distinguishable only by the quality of the environment or by the goods and services that the ecosystem provides; hence the different choices reveal the value of those attributes.

Use value can be estimated by using both techniques; however non-use values can only be estimated by stated preference method. Reveled preference method is exercised when the preference of the individuals is revealed by their purchasing habit in the actual market, which is usually price-based. On the other hand, stated preference measures the demand of goods and services which do not have market price as they are not directly sold. This can be assessed by using individuals stated behavior in a hypothetical setting (Alpizar, *et,al* ,2003).The revealed preference approaches are: market price method,

productivity method, hedonic pricing method, travel cost method, substitute cost method, replacement cost method, and damage cost avoidance method.

The stated preference approaches of ecosystem valuation survey individuals to find out what they state as their value of the ecosystem attributes, good, and services. The most common measures of value in the stated preference approach are willingness to pay and willingness to accept (John C. Bergstrom and R. M. Carson; 2003). The stated preference approaches are: contingent valuation, conjoint analysis, and the contingent choice method.

2.1.2, Revealed Preference Approaches

2.1.2.1, Productivity Method

The productivity method measures the contribution that a non-market ecosystem service has on a marketed commodity. This method is most useful in cases where a resource is a perfect substitute for another input for production and in cases where the producers are the only ones to benefit from changes in quantity or quality of the resource, and consumers are not affected (Dennis M. and Marisa J.;2000). To measure this contribution, the production function for the commodity needs to be established, then the changes to the function must be observed after a change in the ecosystem service, and the economics changes must be measured. Changes in the quality or the quantity of the ecosystem services will change the cost of the inputs and alter the production function of the commodity. The changes can be seen through shifts in the consumer or producer surplus.

2.1.2.2, Hedonic pricing method

Hedonic pricing (Hp) derives from the characteristic theory of value developed by Lancaster (1966), Grilich (1971) and Rose in (1974) (cited in Hanley and Spash (1993)).The essence of hedonic modeling is to use the systematic variation in price of goods that can be attributed to the characteristics of goods to impute the willingness to pay for the characteristics (Timothy C .Haab and Kenneth McConnell, 2002). The hedonic pricing method estimates the non-market values for ecosystem characteristics and services by comparing the market prices of two goods or services that only differ by the ecosystem characteristics and services (R.S. de Groot *et al,* 2002). If the only difference between the goods or services is the ecosystem characteristic, then it is extrapolated that the difference in the prices must be the value of that ecosystem characteristic or service. The hedonic pricing method is a concretely observable valuation method, but it has some weaknesses as well. It is very difficult to find two sites that are exactly the same except for the single specific ecosystem characteristic. Ecosystem services often overlap with each one affecting the other, so it may not be possible to isolate a single characteristic.

2.1.2.3, Travel cost method

The travel cost method is used to estimate economic use values associated with ecosystems or sites that are used for recreation. The method can be used to estimate the economic benefits or costs resulting from: changes in access costs for a recreational site, elimination of an existing recreational site, addition of a new recreational site and changes in environmental quality at a recreational site.

The basic premise of the travel cost method is that the time and travel cost expenses that people incur to visit a site represent the "price" of access to the site. Thus, peoples' willingness to pay to visit the site can be estimated based on the number of trips that they make at different travel costs. This is analogous to estimating peoples' willingness to pay for a marketed good based on the quantity demanded at different prices. There are several ways to approach the problem, using variations of the travel cost method. These include:

i, Zonal Travel Cost Approach : The zonal travel cost method is the simplest and least expensive approach. It will estimate a value for recreational services of the site as a whole. It cannot easily be used to value a change in quality of recreation for a site, and may not consider some of the factors that may be important determinants of value. The zonal travel cost method is applied by collecting information on the number of visits to the site from different distances. Because the travel and time costs will increase with distance, this information allows the researcher to calculate the number of visits "purchased" at different "prices." This information is used to construct the demand function for the site, and estimate the consumer surplus , or economic benefits, for the recreational services of the site (Dennis M. King et,al, 2000).

ii, Individual Travel Cost Approach: The individual travel cost approach is similar to the zonal approach, but uses survey data from individual visitors in the statistical analysis, rather than data from each zone. This method thus requires more data collection and slightly more complicated analysis, but will give more precise results .This time, the researcher would use individual data, rather than data for each zone. The regression equation gives us the demand function for the "average" visitor to the site, and the area below this demand curve gives the average consumer surplus. This is multiplied by the

total relevant population (the population in the region where visitors come from) to estimate the total consumer surplus for the site (Dennis M. King et,al, 2000).

iii, Random Utility Approach: The random utility approach is the most complicated and expensive of the travel cost approaches. It is also the "state of the art" approach, because it allows for much more flexibility in calculating benefits. It is the best approach to use to estimate benefits for specific characteristics, or quality changes, of sites, rather than for the site as a whole. It is also the most appropriate approach when there are many substitute sites. The random utility approach assumes that individuals will pick the site that they prefer, out of all possible recreational sites. Individuals make tradeoffs between site quality and the price of travel to the site. Hence, this model requires information on all possible sites that a visitor might select, their quality characteristics, and the travel costs to each site (Dennis M. King *et,al*, 2000).

2.1.2.3.1, Advantages of the Travel Cost Method:

Travel cost method is based on actual behavior—what people actually do—rather than stated willingness to pay—what people say they would do in a hypothetical situation .It is relatively inexpensive to apply. On-site surveys provide opportunities for large sample sizes, as visitors tend to be interested in participating and the results are relatively easy to interpret and explain.

2.1.2.3.2, Issues and Limitations of the Travel Cost Method

The travel cost method assumes that people perceive and respond to changes in travel costs the same way that they would respond to changes in admission price. The simplest

models assume that individuals take a trip for a single purpose – to visit a specific recreational site, thus, if a trip has more than one purpose, the value of the site may be overestimated. It can be difficult to apportion the travel costs among the various purposes. Defining and measuring the opportunity cost of time, or the value of time spent traveling, can be problematic. Because the time spent traveling could have been used in other ways, it has an "opportunity cost." This should be added to the travel cost, or the value of the site will be underestimated. However, there is no strong consensus on the appropriate measure—the person's wage rate, or some fraction of the wage rate—and the value chosen can have a large effect on benefit estimates. In addition, if people enjoy the travel itself, then travel time becomes a benefit, not a cost, and the value of the site will be overestimated.

The availability of substitute sites will affect values. For example, if two people travel the same distance, they are assumed to have the same value. However, if one person has several substitutes available but travels to this site because it is preferred, this person's value is actually higher. Some of the more complicated models account for the availability of substitutes. Those who value certain sites may choose to live nearby. If this is the case, they will have low travel costs, but high values for the site that are not captured by the method .Interviewing visitors on site can introduce sampling biases to the analysis.

Measuring recreational quality and relating recreational quality to environmental quality can be difficult. Standard travel cost approaches provides information about current conditions, but not about gains or losses from anticipated changes in resource conditions. In order to estimate the demand function, there needs to be enough difference between

distances traveled to affect travel costs and for differences in travel costs to affect the number of trips made. Thus, it is not well suited for sites near major population centers where many visitations may be from "origin zones" that are quite close to one another.

The travel cost method is limited in its scope of application because it requires user participation. It cannot be used to assign values to on-site environmental features and functions that users of the site do not find valuable. It cannot be used to value off-site values supported by the site. Most importantly, it cannot be used to measure nonuse values. Thus, sites that have unique qualities that are valued by non-users will be undervalued. As in all statistical methods, certain statistical problems can affect the results. These include choice of the functional form used to estimate the demand curve, choice of the estimating method, and choice of variables included in the model (Dennis M. and Marisa J., 2000).

2.1.3. Sated preference method

2.1.3.1. Contingent choice method

The contingent choice method is similar to contingent valuation, in that it can be used to estimate economic values for virtually any ecosystem or environmental service and can be used to estimate non-use as well as use values. Like contingent valuation, it is a hypothetical method, it asks people to make choices based on a hypothetical scenario. However, it differs from contingent valuation because it does not directly ask people to state their values in dollars; instead, values are inferred from the hypothetical choices or tradeoffs that people make.

The contingent choice method asks the respondent to state a preference between one group of environmental services or characteristics, at a given price or cost to the individual and another group of environmental characteristics at a different price or cost. Because it focuses on tradeoffs among scenarios with different characteristics, contingent choice is especially suited to policy decisions where a set of possible actions might result in different impacts on natural resources or environmental services. In addition, while contingent choice can be used to estimate dollar values, the results may also be used to simply rank options, without focusing on dollar values.

2.1.3.2, Contingent valuation method

The contingent valuation method (CVM) is used to estimate economic values for all kinds of ecosystem and environmental services. It can be used to estimate both use and non use values and it is the most widely used method for estimating non-use values. It is also the most controversial of the non-market valuation methods.

The contingent valuation method involves directly asking people, in a survey, how much they would be willing to pay for specific environmental services. In some cases, people are asked for the amount of compensation they would be willing to accept to give up specific environmental services. It is called “contingent” valuation, because people are asked to state their willingness to pay, contingent on a specific hypothetical scenario and description of the environmental service. The contingent valuation method is referred to as a “stated preference” method, because it asks people to directly state their values, rather than inferring values from actual choices, as the “revealed preference” methods

do. The CV is based on what people say they would do, as opposed to what people are observed to do, and is the source of its greatest strengths and its greatest weaknesses.

It is clear that people are willing to pay for non-use, or passive use, environmental benefits. However, these benefits are likely to be implicitly treated as zero unless their dollar value is somehow estimated. So, how much are they worth? Since people do not reveal their willingness to pay for them through their purchases or by their behavior, the only option for estimating a value is by asking them questions. However, the fact that the contingent valuation method is based on asking people questions, as opposed to observing their actual behavior, is the source of enormous controversy. The conceptual, empirical, and practical problems associated with developing dollar estimates of economic value on the basis of how people respond to hypothetical questions about hypothetical market situations are debated constantly in the economics literature (Dennis M. and Marisa J., 2000).

In Contingent Valuation (CV) method the researchers ask hypothetical questions to elicit the amount the respondents are willing to pay for the improvement in the quality of service or commodity they are receiving. Other alternative approach is to ask the amount the respondents are willing to accept to forego the existing service that they are enjoying currently. The first approach is called willingness to pay (WTP) approach and the second is called willingness to accept (WTA). Since CV creates hypothetical market to non-marketed goods, from the past several years it is being successfully used to measure the value of the environmental amenities under consideration. CV surveys have become a

popular way of placing a monetary value on various aspects of the environment (Spash, 2000).

CVM is a survey approach designed to create the missing market for public goods by determining what people would be willing to pay (WTP) for specified changes in the quantity or quality of such goods, or more rarely, what they would be willing to accept (WTA) in compensation for well-specified degradations in the provision of these goods (Hanemann ,1994).

CV method first came into use in the early 1960's when Davis (1963) used questionnaires to estimate the benefits of outdoor recreation in Maine backwoods area, which is one of the earliest practical applications of the contingent valuation method to elicit the market valuation for nonmarket goods, where he estimated the value that hunters and tourists placed on a particular wilderness area. In his study, he found a significant correlation survey result using estimation on the travel cost method. The importance of valuing nonmarket goods was brought to light with the Exxon Valdez oil spill in Prince William Sound. Carson et al., (1994) used CVM in a quantitative assessment of damages for the Exxon Valdez oil spill in Prince William Sound case. This case used the most carefully developed CVM questionnaires at that time. Another significant case of CVM application is valuing the preservation of Australia's Kakadu Conservation Zone conducted by Carson et al., (1994). Both of the studies were funded by their government respectively and both studies also involved a great and in-depth exploring of the CVM application on these projects. These studies give a great insight to CVM especially in their step-by-step approach and the development of the hypothetical scenarios to represent the assessment of environmental amenities.

The stated preference technique is commonly regarded as superior to the others in terms of its validity and reliability for valuation of the environment .One of the strengths of the technique is that it measures both use and non-use values of an environmental resource. It involves providing a description of the existing situation and the possible changes to the environment which are expected to result from proposed changes in management or use to a sample of the population and then directly asking about how much they are willing to pay or willing to accept to prevent the proposed change in the environment. The payment vehicle is important as respondents could register a protest bid if they object to the method by which the payment would be made. The CV technique has been used for twenty years or so to estimate passive-use values. In the last five years, however, there has been a dramatic increase in the number of academic papers and presentations related to the CV technique (Arow *et.al*, 1993).

2.1.3.2.1, Advantage of contingent valuation method

Contingent valuation is enormously flexible in that it can be used to estimate the economic value of virtually anything. However, it is best able to estimate values for goods and services that are easily identified and understood by users and that are consumed in discrete units (e.g., user days of recreation), even if there is no observable behavior available to deduce values through other means. CV is the most widely accepted method for estimating total economic value , including all types of non-use, or "passive use," values. CV can estimate use values , as well as existence values , option values , and bequest values .Though the technique requires competent survey analysts to achieve defensible estimates, the nature of CV studies and the results of CV studies are not

difficult to analyze and describe. Dollar values can be presented in terms of a mean or median value per capita or per household, or as an aggregate value for the affected population.

2.1.3.2.2, Issues and limitations of Contingent valuation method

Although the contingent valuation method has been widely used for the past two decades, there is considerable controversy over whether it adequately measures people's willingness to pay for environmental quality. People have practice making choices with market goods, so their purchasing decisions in markets are likely to reflect their true willingness to pay. CV assumes that people understand the good in question and will reveal their preferences in the contingent market just as they would in a real market. However, most people are unfamiliar with placing dollar values on environmental goods and services. Therefore, they may not have an adequate basis for stating their true value.

The expressed answers to a willingness to pay question in a contingent valuation format may be biased because the respondent is actually answering a different question than the surveyor had intended. Rather than expressing value for the good, the respondent might actually be expressing their feelings about the scenario or the valuation exercise itself. Respondents may state a positive willingness to pay in order to signal that they place importance on improved environmental quality in general. Alternatively, some respondents may value the good, but state that they are not willing to pay for it, because they are protesting some aspect of the scenario, such as increased taxes or the means of providing the good. Respondents may make associations among environmental goods that the researcher had not intended.

Some researchers argue that there is a fundamental difference in the way that people make hypothetical decisions relative to the way they make actual decisions. The payment question can either be phrased as the conventional 'What are you willing to pay (WTP) to receive this environmental asset?', or in the less usual form, 'What are you willing to accept (WTA) in compensation for giving up this environmental asset?' In theory, the results should be very close. However, when the two formats have been compared, WTA very significantly exceeds WTP. Critics have claimed that this result invalidates the CVM approach, showing responses to be expressions of what individuals would like to have happen rather than true valuations. If people are first asked for their willingness to pay for one part of an environmental asset (e.g. one lake in an entire system of lakes) and then asked to value the whole asset (e.g. the whole lake system), the amounts stated may be similar. This is referred to as the "embedding effect." Respondents may give different willingness to pay amounts, depending on the specific payment vehicle chosen.

Many early studies attempted to prompt respondents by suggesting a starting bid and then increasing or decreasing this bid based upon whether the respondent agreed or refused to pay proposed amount. However, it has been shown that the choice of starting bid affects respondents' final willingness to pay response. Strategic bias arises when the respondent provides a biased answer in order to influence a particular outcome. Information bias may arise whenever respondents are forced to value attributes with which they have little or no experience. In such cases, the amount and type of information presented to respondents may affect their answers .Non-response bias is a concern when sampling respondents, since individuals who do not respond are likely to have, on average, different values than individuals who do respond.

Estimates of nonuse values are difficult to validate externally. When conducted to the exacting standards of the profession, contingent valuation methods can be very expensive and time-consuming, because of the extensive pre-testing and survey work (Dennis M. and Marisa J., 2000).

2.1.4, Modeling the demand for recreation

2.1.4.1, Travel cost method Vs Contingent valuation

As a method used to value non market resource the travel cost method is a good deal older than contingent valuation. The essence of the travel cost model stems from the need to travel to a site to enjoy its service.

For CV given the data the measure of WTP are not grossly sensitive to the collection of data in particular to the formulation of scenario and the central dichotomous willingness to pay question and while different methods of gathering travel cost data including different formulation of questions can lead to different estimates of willingness to pay, the method is severely sensitive to specification and estimation decisions given the data .The different sensitivity of the travel cost model and CV approach stem from the essences of the model.`

In the application of discrete choice contingent valuation bides are chosen independently of other exogenous variables so that other regresses in discrete choice CV models are likely to have very low correlation with the bid, hence the coefficients on the bid will not be sensitive to the set of other covariates included in the model. On the other hand in TCM the travel cost serve as a proxy for price, the basis for welfare measurement and

because the travel cost among different sites tend to be highly correlated welfare measurement from different model specification will be quite different because the travel cost coefficient will be different .This problem is exacerbated by the need to account for the value of time, which also tends to be highly correlated with travel cost, which is not so easy to measure. This interpretation of the relative reliability of CV and TCM of valuing resource contrasts sharply with historic debate about revealed versus stated preference method .All methods have their strengths and weakness and it is the care and quality in execution of the particular method itself that determine the reliability of welfare measurement (Haab and .McConnell, 2002).

2.2. Empirical Literature

There is a growing body of literature that focuses on valuing ecotourism and wilderness areas in developing countries. The primary approaches used in these studies - Contingent Valuation (CV) and Travel Cost (TC) Method - were both pioneered in the United States and have only recently been applied in developing countries (Khan,2006) .

S. Ahimed (2009) studied the Recreational values of mangrove forest in Larut Matang, Perak. The study used CVM method to estimate the recreational value of the forest. The study was aimed at estimating recreational benefits (direct service values) of the mangrove ecosystem. A total of 331 local recreationists were interviewed using the contingency valuation method (CVM). The mean willingness to pay (WTP) per recreationist was RM44.58 per visit while the estimated value was RM41.18 per visit.

Dehghani, M.*et,al* (2009) estimated the recreation Value of Hara Biosphere Reserve Using Willingness-To-Pay Method .In their research they attempted to determine recreational value of Mangrove forests and willingness of the tourists to pay for ecotourism areas using Contingent Valuation Method using dichotomous choice questionnaire. Socio-economic assessment of the study area was carried out through the analysis of the tourist filled questionnaires. Logit model was used to determine the willingness of individuals, because the model's parameters are based on methods of maximum likelihood. Results show that 81.2 % of the individuals are willing to pay for recreational value forms of Mangrove forests. The annual average willingness-to-Pay for this region is US $5 per visit. Moreover, the annual economic value of Mangrove forests

was estimated to be US $97.5 per acre which shows existence values of these kinds of forests.

Kramer et al. (1995) estimated the partial value of the Mantadia National Park in Madagascar. The study used the contingent valuation method to determine the willingness to pay of visitors to visit the parks to set an appropriate level of user fees. The study generated estimates of the value of the park under two different scenarios based on the willingness-to-pay if tourists were able to see the same number of birds and lemurs as they currently were able to view at the Perinet Park. This estimate, aggregated over all tourists, annually amounted to US$253,000.

Sergio Alvarez in 2006 estimated the Ecological Restoration and Recreational Benefits in a Mountain Protected Area in Colombia .The study uses travel cost and contingent valuation methods to derive estimates of economic value for recreational use of Los Nevada's National Park in the Andean region of Colombia. Park visitors were surveyed regarding their travel costs and willingness-to-pay (WTP) for ecological restoration of areas affected by wildfires .The travel cost data was analyzed using a zonal travel cost model. The contingent valuation experiment used a dichotomous choice format followed by an open-ended question asking for their maximum WTP for restoration. Consumer surplus for recreational use of the park was found to be large relative to the budget of the Colombian Parks Service, which justifies continued funding. Respondents' WTP for ecological restoration was modest and possibly influenced by bequest values, but unaffected by potential information bias.

Khan (2001) examines the willingness to pay (WTP) for recreational services of two parks in Northern Pakistan with the Application of Multivariate Analysis. The study

seeks to answer: What factors determine visitors' WTP? Whether improvement in recreational benefits would lead to a higher demand for park visitation with people willing to pay a higher price for better quality of environmental services? In order to understand the determinants of the visitors' WTP responses and to see whether these determinants are consistent with economic theory, a series of multivariate analyses were performed to explore variation in various measures of the respondents' WTP. Travel cost, income, distance, education, and quality of recreational services were significant determinants of WTP. Own-price elasticity of demand was negative in all cases. Cross price elasticity were positive and significant for both parks showing substitute relationship. Park demand visitation was found to be significantly income elastic for both parks.

M. Reza Ghanbar, (2010) estimated visitors' Willingness to Pay for visiting the Baba Amman Recreational Park in Iran. The recreational value of Baba Amman Park has been analyzed using a contingent valuation method. For this purpose, 201 on-site questionnaires were administered. Visitor's willingness to pay (WTP) for Baba Amman recreational park has been estimated for future entrance fees associated with two scenarios including current conditions and proposed improvements of the recreational services in the park. Average WTP was estimated to be 1.5 and 2 times more than the current entrance fee, considering two scenarios. These amounts are insignificant when compared to the cost of improving the recreational services of the area. The results from statistical analysis have revealed that the monthly income and level of education have significant effects on WTP amounts.

Mohd Rusli et,al (2007) under take a survey to estimate the recreational value of marine park in Malaysian using a Contingent Valuation method. They applied dichotomous choice survey design-contingent valuation method (CVM) to investigate empirically the willingness to pay (WTP) of the visitors for ecotourism resources in two selected marine parks in Peninsular Malaysia. In analyzing the data Logit and Probit models were used to estimate the visitor's WTP responses for conservation of the marine parks for ecotourism. The studies are based on a sample of 215 respondents in Pulau Redang and 153 respondents in Pulau Payar that were randomly interviewed for data collection for both islands. The results in Pulau Redang indicate that visitors are willing to pay for conservation about RM7.8 and RM10.6 per year for local and international visitors. Meanwhile, in Pulau Payar, the result has shown that local and international visitors are willing to pay about RM7.30 and RM8 respectively.

Nur Belkayali et,al (2007) tried to determine the economic value of Göreme Historical national park in turkey using contingent valuation method. According to survey results which conducted in Göreme Historical National Park, annual willingness to pay value for current situation was estimated to be $ 8.672.788 and according to survey results which conducted out of Göreme Historical National Park, annual willingness to pay value for current situation was estimated to be $ 7.347.404 by using Contingent Valuation Method. Bidding game method was used to determine the highest willingness to pay value. The entry fee for the area used as a starting point for the survey and willingness to pay value has been determined accordingly. Surveys applied to persons who already had visited the area and to persons who don't know the area, so differences has been formed in function. Because of this, independent variables for two groups showed differences. According to

the results of field surveys, average entrance fee willingness to pay of visitors is 15.00 $. In case the development of the current situation by maintaining, average willingness to pay value of the visitors increased to $ 19.75 and recreational use value for the current situation was calculated as $ 8.672.788.00. According to the survey conducted outside the area, average willingness to pay of people is $ 12.71. In case the development of the current situation by maintaining, average willingness to pay value increased to $ 13.58. According to the survey conducted outside the area, total payment trend calculated $ 7.347.404.00 for the current situation of the study area, in the context of conservation and development status of the area, total payment trend increased to $ 7.848.276.00 .It is examined that payment trend of the people who did not visit the area is lower than the people who know the area, visitors who have high income level tend to pay more entry fee than visitors who have low-income level. Same situation is valid for the education level. Payment trend increases accordingly to education level.

John Rolfe (2007) estimated the value of recreational fishing in queens land Australia using both travel cost and contingent valuation method. In this paper, estimates of value for recreational fishing are reported for three major freshwater impoundments in Queensland, Australia. Different forms of the travel cost method were used to estimate separate consumer surpluses associated with two key subgroups of recreational anglers: frequent and occasional anglers. A contingent valuation study was used to estimate the marginal values associated with a potential improvement in fishing experience. The results of the travel cost analysis provide strong evidence that recreational values vary between different groups of anglers and across sites, while the contingent valuation estimates provide values for additional marginal benefits of recreational angling.

The results allow four broad conclusions to be drawn. First, the results of the travel cost analysis provide strong evidence that recreational values vary, in these case studies between two different groups of anglers: regular visitors to the sites, and single trip visitors (tourists). Second, the results demonstrate that the value of recreational fishing varied across sites. The third conclusion to be noted is there appears to be declining marginal values associated with catching additional fish, indicating that the benefits of improving the fishing experience may be limited. A fourth conclusion is that different non-market valuation techniques may be appropriate for different components of a valuation exercise. In this study, ZTCMs were used to assess benefits accruing to single trip anglers, ITCMs were used for multiple trip anglers, and a stated preference technique used to assess values for potential improvements in fishing experience.

Sergio Alvarez (2008) Valued Recreational Benefits of a National Park in Andean Columbia .Total and individual consumer surplus accruing to Colombian visitors to LNNP was estimated using a zonal travel cost method, and park visitor's willingness to pay for ecosystem restoration was analyzed using a contingent valuation method. The total consumer surplus was found to be in excess of 2.7 billion Colombian pesos or 1.3 million USD. The individual consumer surplus was found to be 87 Colombian pesos. The average willingness to pay for restoration of the areas damaged by the 2006 wildfires ranged between 3,969 and 6,742 pesos for the closed ended and open ended experiments, respectively. If parks' management were to actually increase the entrance fee by this amount, they would be able to rise between $232.8 million and $395.5 million pesos, the equivalent of between $116,408 and $197,739 USD for restoration of the areas affected by the wildfires.

These findings show the economic significance and potential of Los Nevada National Park in particular and of protected areas in the developing world in general. Furthermore, these findings demonstrate that a protected area in developing countries could be a source of public welfare for the citizens of the country rather than a financial burden for the government. The study could also show that under innovative management, some protected areas have the potential to cover their own costs, that is, conservation can pay for itself.

John B. Loomis (2010) try to look on to, if the welfare estimates suffer from on site sampling bias in contingent valuation survey method using a comparison of On-Site and Household Visitor Surveys. The problem of endogenous stratification associated with on-site sampling has been overlooked in the Contingent Valuation Method (CVM). The finding suggest that using on-site samples of visitors overstates visitor willingness to pay (WTP) estimates relative to a household sample of visitors, and substantially overstates the unconditional population values. The uncorrected on-site model yields a mean WTP per trip of $131.89, which is about double the mean WTP per trip estimated from the sample of visitors within the household survey ($66.49). This large difference between on-site model WTP and the WTP of visitors obtained within the household survey suggest the presence of endogenous stratification in the naïve on-site dichotomous choice CVM WTP estimates. The uncorrected naïve onsite model estimate of WTP ($131.89) is more than triple the unconditional WTP obtained from the household survey ($42.50). To correct the naïve on-site WTP estimate, they used visitor participation rate of 48.67 percent obtained from the household survey. The resulting expected WTP drops to $64.19 per trip. This corrected estimate became nearly identical to the $66.49 per trip

from the visitor data obtained from the household survey. Such endogenous stratification in the naïve model related to on-site sampling would undermine benefit transfer since the WTP estimates would depend on how the data was collected. They provide two methods of correcting WTP of on-site samples. The uncorrected on-site sample CVM yields WTP of $132 per trip, while visitor WTP obtained from a random sample of households had a value of $66 per trip. Adaptation of choice-based sampling correction estimator to the on-site CVM data yields $73 per trip, not statistically different from the visitor value from the household survey, but significantly different from the uncorrected on-site sample value.

Amir Hosein (2012) estimated the recreational value of Lahijan forest using contingent valuation method considering numerous functions and services provided by forests and forest parks and also forest destruction trend in the world and Iran. To do this, WTP of the park visitors were estimated using contingent valuation method thorough dichotomous choice questionnaire. To calculate WTP the model used was Logit. The result from the statistical analysis showed that average WTP of the visitors for the park recreational value was 8,216 Rials per visitor and its total annual value was 123 billion Rials. From the total respondents of the survey 90% believed that the forest environment was attractive; however, 10% found it inappropriate due to safety and health reasons. Estimated coefficient of offer variable that was the major descriptive variable of WTP probability was meaningful by -1%. This reveals that the more the offer, the less the WTP. Education coefficient was positively meaningful. In other words, the more educated the respondent, the more the probability of WTP acceptance. The household dimension was negatively meaningful. That is to say as the household dimension grows,

the WTP decreases. The marginal impact of the descriptive variable of income was found to be 0.000033. This means that provided that other variables are fixed, one unit increase in bid would lead to a 23-percent decrease in WTP probability. The marginal impact of virtual variable of forest attraction amounted to 47%, meaning that if other variable are fixed and the forest attraction increases, WTP probability would increase by 47%. The expected mean WTP of recreational value of Lahijan Forest, after calculation by Logit model using maximum likelihood, and integrating between 0 and the highest bid was estimated to be 8 .216 Rials per visitor. As a result, recreational value of Lhijan Forest per hectare was estimated to be 123, 240, 000 Ria, The results showed that visitors were willing to pay for using the park and environmental conservation. The mean WTP for entrance fees was calculated to be 8 216 Rials, and maximum WTP 40 000 Rials. This reveals how much the visitors valued natural resources. According to the results, the variables income and bid played the most important roles in WTP.

Chapter 3

Data and Methodology

3.1, Data source and Sampling technique

The data source for this study was based on the primary data collected from 175 randomly selected on site visitors of the park. The sample population includes domestic visitors and foreign visitors. The criteria for selecting foreign visitors is based on their years of residence in Ethiopia, foreign visitors who lived in Ethiopia for more than three years were treated as domestic visitors. The study adopted a simple random sampling framework. To avoid bias in sampling procedure the next person available was approached and asked to collaborate for interview. The survey was administered using a face to face in person interview .The data were collected by two hired data collectors and the researcher, further more for the respondent to have a good understanding about the issue under study all interviews were undertaken on site in the park after visitors finished their tour, so that they could better understand the existing situation in the park and the scenario presented.

Of all the 175 questioners collected only 165 of them were found to be use full for the study with five of them being protest response and the remaining response were zero responses. Though it is advisable to consider more sample size to increase the quality of CV data (Mitchell and Carson 1989), given the average monthly visitation rate which fall between 1500 and 500 per month (except for the month July and august with almost no visitation) the researcher found that the sample population is representative of the total visitor population.

The study mostly relies on primary cross-sectional data that is obtained from a contingent valuation survey questioner .The double bounded dichotomies choice format was applied for the elicitation part, as it is the most widely used elicitation method for estimation of recreational use value for contingent valuation survey in different countries. Using double bounded dichotomies choice elicitation format has the advantage of giving better and efficient estimation result and information on maximum willingness to pay than other elicitation formats (Arrow .K. *et,al* (1993).

3.2, Value elicitation format and Questioner design

3.2.1, Value elicitation format

The double bounded dichotomies choice approach which is proposed by Carson, Hanneman and Michel (1988) was applied in this study. In this approach the respondent is asked question requiring a yes or no answer about whether they would be willing to pay a specified price. If the respondent say "Yes" another WTP question will be asked using a higher price randomly chosen from a pre specified list, if the answer is "No" the follow up question propose a randomly chosen lower price (Michel and Carson ,1989).

Before going to the fieldwork the questionnaire was translated in to local language to give better understanding for domestic visitors .Two interviewers who serve as a tour guyed and a ticket officer in the park were employed for data collection and the researcher serve as a supervisor, which both of them were college graduates have a long year previous experiences working on the park. A pilot study was made for eight consecutive days and 30 respondents were interviewed. In this phase all the pre-test has a paramount significance in making appropriate modifications in the content of the

questionnaire. In addition, the main purpose of the pilot survey was to set the starting price of the bidding game in the elicitation part of the questionnaire. During the pilot survey, the willingness to pay part was open ended. Of the observed different answers, by classifying the pre test response we took the mean of first group, second group and third group as starting points of the willingness-to-pay bidding game. The observed prices in group (1st , 2nd , 3rd) for the corresponding scenarios were (25,36,60) for the status quo and (36,50 100) for improvement per visit as an entrance fee .

After carefully observing the trend of the data obtained from the pilot study, a double amount of the starting price was made to increase or decrease .This was again tested on ten respondents and it was found to be reasonable and not shocking. The questionnaire was finalized with only a few modifications in the other parts. The three starting points were randomly distributed on equal basis , those respondents who have been interviewed in the pilot survey were not included in the final work; the data was coded and prepared for analyses using STATA statistical software.

3.2.2, Questionnaire Design

The survey questioner was designed as follows; it has four parts. The first part contains information about the description of the study area, it also contains a guideline for the enumerator as to how they introduce themselves for the respondents and how they should explain about the purpose of the study .The second part contain the valuation scenario, the scenario tries to give as much information as possible for the respondent about the hypothetical market. Important points which are suggested by Michel and Carson (1989) and the NOAA panale guyed line (1993) to be considered in the CV scenario are

incorporated as much as possible. Three starting point bide were identified from a pilot survey ,the scenario has two parts the first is the hypothetical market for the current status quo and the second one is hypothetical market scenario for proposed future improvement in the park. The double bounded dichotomies choice question was also followed by an open ended question and if the willingness to pay in the latter is less than the already agreed amount in the double bounded dichotomies choice we ask the reason why? .Part three of the questioner is designed to know about the attitude and the perception of the respondent about the study areas different environmental, recreational and different amenity service aspect of the park .part four consider the socio economic and the demographic characteristics of the respondent visitors.

3.3, Contingent Valuation Model Specification

3.3.1, Model specification

The notion of site- specific service flow help to define the welfare measures whose estimation is a principal objective. Two definitions are needed one for access to a site and one for the change in the quality of a site.

Let the utility function be $U(x, q)$ where x is n- dimensional vector of service flows and q is n- dimensional vector of attributes of service vectors .The service flow themselves, x, may be marketed commodities as well as recreational service. The attribute of the service flows, q, are specific that is, it is assumed that each element q_j modifies only on x_i. To complete the definition of welfare measure the consumer must be endowed with income and a given set of prices .let y be income and p be n- dimensional vector of price such that p_i is the price of good x_i. The welfare measures of neoclassical economics are

strongly dependant on these prices being exogenous to the consumer. Welfare measures are based on minimum cost function (expenditure function):

$$e(p, q, u)=min[xp \mid u(x, q)=u] \quad \text{.....1}$$

The benefit or losses of a change in the state of the world are represented by the change in the value of this expenditure function. The expenditure function is a function of parameters exogenous to the individual and, thus the value of the elimination from using the site must be reflected in terms of change in the parameters. The common convention is to equate elimination of access to a price changes for the good sufficiently high to cause the individual to exit the market of his or her own accord. Let x_i be the service flow to the site which is of interest, and let p_i be the price of access to the site. The first welfare measure, w_1, is simply the value of access which is given by:

$$w_1=e(\tilde{p}, q, u) - e(p^O, q, u) \quad \text{.....2}$$

Where $\tilde{p} = (\tilde{p}_1, p^O_2, P^O_3, \ldots\ldots p^O_n)$ is the vector of prices that includes $\tilde{p}_1$ the choke price of x_i ,the price high enough to eliminate the service flow from the site of concern and

$\mathbf{p^0=(p^o_1, p^o_2, \ldots\ldots\ldots\ldots p^o_n)}$ is the vector of current prices.

The second welfare measure w_2 is the value of the individual of change in an attribute of the site .Let q_1 be the original level of a particular attribute at the site and let q_1^* be its new level, the welfare effect of this change is w_2**:**

$$w_2=e(p^o, q, u) - e(p^o, q^*, u) \quad \text{.....3}$$

where $q^*=(q^*_1, q_2, \ldots q_n)$.This also may be compensating variation or equivalent variation depending on the reference utility chosen ,when q_1 is a "good" attributes and if

it increase from q_1 to q^*_1, w_2 will be positive (N.E Bock stale *et,al* sited in John B. Brand and Charld D. Kolsatd ,1991).

Suppose that the indirect utility of an individual ***i*** depends on visiting a recreational site and on income *y*. Let q^1 and q^0 represent the level of utility associated with and without visiting a recreational site respectively. WTP is the amount of money an individual is willing to pay as a premium, X represents the vector of other factors (such as age, sex, education, distance, etc.) that may affect the preferences of individuals, and ε captures other factors that are unobservable to the researcher .The WTP that equates the two indirect utility functions with and without visiting a recreational site can be written as:

$$v[(q^1, y\_WTP, x) + \varepsilon_1] = v[(q^0, y, x) + \varepsilon_0 \quad \text{.....4}$$

Where ε1 and ε_0 are assumed to be i.i.d. with zero mean. Therefore:

$$WTP = f(q^1, q^0, y, x, \varepsilon)$$

is the maximum value individuals are willing to forgo to visit the recreational site, therefore, individuals will pay for visiting the site if :

$$v[(q^1, y-WTP, X); \varepsilon_1] \geq v[(q^0, y, x); \varepsilon_0] \quad \text{.....5}$$

and will not otherwise. This is based on the assumption that the individuals compare their utility from the proposed recreation service with the current situation and decide whether to accept or reject the offered bid levels. This implies that the probability that individuals will be willing to visit the recreational site can be expressed as the difference of their utility functions with and without the proposed service. Then, assume that the true willingness to pay of individual ***i*** for visiting the recreational site is given by:

$$WTP_i^* = Xi\beta + \varepsilon i \quad \text{.....6}$$

Where ***X*** is a vector of explanatory variables, ***β*** is a vector of coefficients to be estimated, ***ε*** is a random error term assumed to be randomly and independently distributed with mean zero and constant variance, σ^2**.**The same theory applies to the improvement in the recreational site quality and service . In dichotomous choice specification, the ***WTP**** value is not directly observed. However, we observe a range of ***WTP*** values from the survey response. As we have shown above, we use double bounded dichotomous choice elicitation method. Under this method, each respondent is given two bids, the first bid ***(P^f)*** and the second higher ***(P^H)*** or the second lower ***(P^L)*** bids, depending whether the individual responds 'YES' or 'NO' to the first bid ,this means that we have the following four possible outcomes for each respondent:

$D_i^{11} = 1$ if respondent ***i*** say 'yes' and 'yes' to the 1st and 2nd higher bids, respectively

D_i^{10} = 1 if respondent ***i*** say 'yes' and 'no' to the 1st and 2nd higher bids, respectively

D_i^{01} = 1 if respondent ***i*** say 'no' and 'yes' to the 1st and 2nd lower bids, respectively and

D_i^{00} = 1 if respondent ***i*** say 'no' and 'no' to the 1st and 2nd lower bids, respectively.

Under the assumption of utility maximizing respondent the formula for the likely hood are as follows. In the first case we have ($P^H > P^f$) and

$D^{11}(P^{f,} P^H)$ =pr{ $P^f \leq$ MaxWTP and $P^H \leq$MaxWTP}

$= pr\{ P^f \leq MaxWTP/P^H \leq MaxWTP\} pr(P^H \leq MaxWTP)$

$=pr \{P^H \leq MaxWTP\} =1- G (P^H, \theta)$

since with $P^H > P^f$, $pr\{ P^f \leq MaxWTP/P^H \leq MaxWTP\} \equiv 1$,similarly with $P^L < P^f$

$pr\{ P^L \leq Max\ WTP/ P^f \leq MaxWTP\} \equiv 1$

$D^{00}(P^f, P^L)= pr\{ P^f > Max\ WTP \text{ and } P^L > Max\ WTP\}=G(P^L, \theta)$

When a "Yes" is followed by "No" we have $P^H > P^f$ and

$D^{10} (P^f, P^H) =pr\{ P^f \leq Max\ WTP \leq P^H\}=G(P^H; \theta) - G (P^f; \theta)$ and when a no is followed by yes we have

$P^L < P^f$ and

$D^{01}(P^f, P^L)= pr\{ P^f \geq Max\ WTP \geq P^L \}=G(P^f, \theta)-G(P^L, \theta)$

Where G ( ) is some statistical distribution function with parameter vector θ. As pointed out in Hanemann (1984), this statistical model can be interpreted as a utility-maximization response within a random utility context, where G ( ) is the cumulative density function (cdf) of the individual's true maximum WTP. Then, the mean WTP is estimated by maximizing the following log likelihood function (Cameron and Quiggin(1994).

$$\ln L = \{\sum_{i=1}^{N} D_i^{11} \ln\left[1-\Phi(\frac{P_i^H - X_i^{'}}{\mathsf{a}})\right]$$
$$+D_i^{10} \ln\left[(\frac{P_i^H - X_i^{'}}{\mathsf{a}}) - \Phi(\frac{P_i - X_i^{'}}{\mathsf{a}})\right]$$
$$+D_i^{01} \ln\left[\Phi(\frac{P_i - X_i^{'}}{\mathsf{a}}) - \Phi(\frac{P_i^L - X_i^{'}}{\mathsf{a}})\right]$$
$$+D_i^{00} \ln\left[\Phi(\frac{P_i^L - X_i^{'}}{\mathsf{a}}\right]\} \quad \textbf{.....7}$$

Where Φ (.) is the standard normal cumulative distribution function and β and λ are parameters to be estimated.

From equation (5) we can derive that

$\varepsilon_0 - \varepsilon_1 < v[(q^1, y- WTP, X) - V[(q^o, y-WTP, X)]$ 8

Define $£ = £^0 - £^1$ and assume p represents the ***WTP*** variable, ***X*** collect all the variables in equation (8), and $\Delta V\ (Z, P) \equiv v\ [(q^1, y- WTP, X) - V\ [(q^o, y-WTP, X)]$. Then, assume that y=1 if the respondent is willing to pay ***p*** and **0** otherwise. The probability of agreement is therefore given by ***Pr(y=1) = Ω [Δv (Z, p)]*** where ***Ω*** is the distribution of ***ε***. As shown by Hanemann and Kanninen (1999) and Richard, et al. (1997), mean ***WTP*** conditional on W is given by $MWTP / z = \int_0^{\infty} \Omega\left[\Delta v(z, p)\right] dp$ which is equivalent to $\int_0^{p^*} \Omega\left[\Delta v(z, p)\right] dp$ where p* is some value that makes $\Omega\left[\Delta v(z, p^*)\right] = 0$. The unconditional mean WTP can also be calculated as $MWTP = \int_z (\int_0^{\infty} \Omega\left[\Delta v(z, p)\right] dp)\, fz(s) ds$ where $fz(.)$ is the joint density function of z.

We use double-bounded elicitation method instead of triple or quadruple methods because the additional efficiency gain from adding third or fourth follow up question is relatively small and it can increase the chance of inducing response effects (Hanemann and Kanninen, 1999).This model can be estimated using standard econometrics packaged bivariate probit algorithms such as those offered in the LIMDEP software or STATA.

3. 3.2, Variable Definitions and Expected Signs

Willingness-to-pay [WTP*];* Dependent variable in the model is the people's WTP, which is expressed as 1 if respondents are willing to pay the pre specified amount and other wise 0. Whenever a respondent answers "yes" to a threshold value, the value will be 1, and 0 otherwise.

Individual income level (IN) ; One of the variables expected to influence an individual's willingness-to pay for visiting the park is the level of income. Other things remaining constant, the higher the respondent's income, the more he/she is willing to pay.

Educational level (ED)*;* Education is supposed to have positive impact on an individual's willingness-to-pay. The reason is that the higher the educational attainment of the person, the higher his/her awareness about environmental resources benefits .It is measured by the extent of the formal education the individual attained in his/her lifetime.

Dependency Ratio (FAM) ; This variable is expected to be negatively related with WTP because the higher the number of dependents relative to the economically active members of the family, the less willing the individual will be to pay for recreational site and vice versa. It is calculated as the ratio of the number of dependents (age less than 13 or above 60) to economically active members of the family (age between 14 and 59).

Distance from the park (D); other things remaining constant; it is expected that the farther the respondent is from the park, the less willing he/she is to pay for visiting the park. The negative relation between the two variables is explained by the substitution with visiting other alternative nearby parks or recreational areas.

Offered amount (BID); the higher the threshold value proposed, the less willing the respondent is to pay. So it is expected to have negative sign.

Quality of the recreational service (QU) ; This variable is expected to have positive relation with willingness to pay, the higher the quality of the recreational site visitors assume the higher individual will be willing to pay to visit the site.

ECOLOGIST (E); A dummy variable that takes a value of one if the individual stated that he belonged to an ecologist group and zero otherwise. This variable is expected to have positive relationship with the willingness to pay.

Employment Characteristics (EM); It is expressed as 1, if respondent is government organization employee and zero otherwise. It is expected to have negative relationship with willingness to pay as financial freedom is less in government organization than other sectors.

Cost of visit (C); It is expected to have a positive relationship with willingness to pay.

Rate of visit (R); It is expected to affect willingness to pay positively as high visitation rate may represent the high preference of visitors to the park.

Marital status (MS); It is expressed as 1, if respondent is married, 0, otherwise. It is expected to affect willingness to pay negatively.

Sex (SEX); The sex of the respondent visitors may assume either sign.

Age (AGE); The age of the respondent visitors is expected to have either sign.

The general model assume the following form

WTP=f (inc, bud, age, edu, fam, sex, dis, qua, c,eme*)*.....9

WTP=$\alpha+\beta_{i1}$INC+β_{i2}BID+β_{i3}AGE+β_{i4}EDU+β_{i5}FAM+β^{i6}SEX+β_{i7}DIS+β_{i8} QU+ β_{i9}C β_{i10} EM+ β_{i11}E+ β_{i12}R +β_{i13}MS $_{+}\mu$.....10

LnWTP$_i$=$\alpha+\beta_{i1}$LNINC+Lnβ_{i2}LNBID+β_{i3}LNAGE+β_{i4}LNEDU+β_{i5}LNFAM+β_{i6}LNSEX+β_{i7}LNDIS+β_{i8}LN QU+ β_{i9}LNC β_{i10}LN EM+ β_{i11}LNE+ β_{i12}LNR +β_{i13}LNMS]$_{+}\mu$ 11

Chapter 4

Result and Discussion

4.1, Descriptive Analysis

From the total of 175 survey responses only 165 responses were usable. Of the total 165 sample respondents 150 were domestic visitors and the remaining respondents were foreigners .When we see the sex range 25.7% were female visitors and 74. 3% were male respondent visitors. The respondent's age ranges from a maximum 64 years to a minimum of 18 years with an average age of 31.78 years, this proportion shows that more adults and youngsters tend to cover the majority of visitor group in terms of age proportion and this is expected to have an impact on willingness to pay. .

The education level of the respondent ranges from grade 5 to 25 years of education with a mean value of 14.96 years of education with a standard deviation of 2.93 years, from this result we can generally concluded that most of the respondents were educated at collage level or above .About 1.96% of the respondent attended primary education, 20.9% attended secondary school and the remaining 85.6% attended higher level education program either in college or university.

Table 4.1; sample distribution

variable	Description of variables	mean	Std.dev
HH code	House hold code	80.5	46.33
Max wtp	Maximum willingness to pay	46.8875	35.77
wtp1	1 = WTP > 0; and 0 otherwise (i.e., 1 = yes to the stated starting bid; 0 otherwise)	.56875	.4968
wtp2	1 = WTP > 0; and 0 otherwise (i.e., 1 = yes to the stated starting bid; 0 otherwise)	.5	.5015
Age	Age of respondent in years	31.78125	9.857
Sex	Gender of respondent (1 = female; 0 otherwise)	.74375	.4520
Marital status	Marital status of respondent (1 = married;0 otherwise)	.41875	.4949
Family size	Dependency rate	2.86875	2.195
employment	Job characteristics(1=government organization employee;0 otherwise)	.41875	.608
Yrs of educ	Years of schooling	14.9625	2.939
Income	Average monthly income	8393.438	1613
Distance in km	Distance covered from starting point to the destination	31.6875	26.53
Cost of visit	Total visitation expenditure	294.85	477.2
Quality	Quality of recreational site(1=good;0 otherwise)	.5125	.5014
Rate of visit	Number of trips to the park	1.775	1.689
Ecologist	Preference for natural areas,(1=if concerned for nature ,0 otherwise)	.8	.4012

Source: computed from survey data.2013

The dependency rate ranges from 1 to 11 person per visitor, with a mean of 2.868 person and standard deviation of 2.19 .The fact that some of the respondents family size is 1 is that, they are only supporting themselves. Distance traveled from their starting place to their destination ranges from a minimum of 8 KM to a maximum of 312 KM, with a mean value of 31.68 KM and standard deviation of 26.53KM. From the distribution result it can be concluded that the majority of visitors came from the nearby cities .When we see the job distribution of the respondent 41.8% of respondents were government organization employees, the remaining were either non government organization employees privet organization workers ,self employed ,students or temporarily unemployed.

Of the total of 165 samples respondent 41.87% of them were found to be married, and the remaining were either married or divorced. This disparity in marital status is expected to influence the willingness to pay of the respondent, as married people tend to have more responsibility in supporting their family in terms of financial and other resources than single persons .In addition respondents were asked about how they describe themselves concerning the nature. 60.62% describe themselves as very concerned person for the environment, 19.56% described as somewhat interested about the environment, 5.88% thought of themselves as less interested for the environment and the remaining 13.9% were indifferent about the environment, taking in to consideration the behavior of the respondent concerning the environment will help to see if there is a significant relationship between willingness to pay and being an environmentalist.

In the survey question visitors were asked to rate the current recreational, environmental and amenity service qualities of the park. 12.1% rate it as it is very good, 38.5% say it is

good ,16.3% of respondents rate it as satisfactory and the remaining 32.9% commented that it is bad .The fact that average percent of the respondent argue that the recreational, environmental and amenity service qualities of the park is not good implies that there is a room for better improvement of the quality .As far as better improvement in different aspect of the park is mended the park could increase its potential of attracting more visitors than it is doing currently .

Respondents were also asked if they have experienced visiting other parks and natural forests and ecotourism areas and 120 of the respondents found to have history of visiting other sites and in the follow up question they were asked to compare the quality of Menagesha Suba park with those of other parks which they have visited previously, 20% of the respondent rate it as it is very good, 33.3%respond as good, 31.67% say its satisfactory and 17.5%rate it as bad. Again this response proportion implies that half of respondent visitors prefer their previous visitation of other parks than there visitation to Menagesha Suba Park and this will remind that there should be further improvement and development to attract more visitors and to be competitive with other recreational sites or parks .Respondent were also asked their visitation rate to the park. 62.7% state that it's their first trip, 23.5 % tend to visit the park twice, 5.2% visited the park three times and the remaining 8.45% of respondents found to have history of visiting the park more than three times. This means of all 165 respondents 62 of them visited the park more than one time .In the frequently asked question respondents who tend to visit more than one time were asked to state if they have observed any kind of improvement or deterioration after their last visit, 46.6%of the respondent reported that they have seen some deterioration in some aspect of the park but have seen no improvement ,25% of the respondent state that

they have seen some improvement but no deterioration and the remaining 28.3% state that they have seen neither improvement nor deterioration since their last visit to the park ,from this response it can easily be seen that respondent tend to observe much deterioration than improvement.(appendix 1)

Of all the attraction sites respondents visited, they were asked to rank part of the park they enjoyed the most, since visitors may enjoy more than one aspect at most they were allowed to choose more than one aspect, thus the summation of each percentile is greater than 100%.From there response 26.8% say they enjoyed visiting old trees the most,24.57% enjoyed the landscape and hiking ,14.85% enjoyed the weather ,48.8% prefer the natural forest,18.8%mostly enjoyed animal view the most and 31.4% say they enjoyed all aspect of the park. The remaining 5%comprise the enjoyment form bird view, water fall and the mouezium ,from this distribution it can be seen easily that the beauty of natural forest has the power of attracting visitors compared to other sites and views .

Table 4.2, Aspect of the park mostly enjoyed by visitors

Which part of the park did you enjoy the most in your visitation of the park	Frequency	%
Old threes	47	26.8%
Landscape	43	24.5%
Weather	26	4.85%
the forest	85	48.8%
Animal view	33	18.8%
Bird view	15	8.75%
Water fall	3	1.7%
mouezium	7	4%
Over all the park	55	31.4%
None	0	0%

obs=observation

Source: computed from survey data.2013

In the contrary respondents were also asked to rate the part of the parks aspect which they didn't enjoy .20 % of the respondents states that they have seen deforestation in some part of the park ,17.7 % respond by saying the road, 4,5% responded the quality of the park . 14.6% state that they have seen settlement inside the park, 13.4% state that there is lack of information everywhere inside the park, shortage of maps showing location ,signs to show directions and locations of animals, birds and other places inside the park , 23.3% say lack of trained tour guyed and 26.2% responded saying they enjoyed every aspect of the park .From this response distribution most of the recreational activities that were expected to attract visitors is not enjoyed by most of visitors and this result shows a lot has to be done to increase the attraction of the site.

Table 4.3.Aspect of the park not enjoyed by visitors

Which part of the park didn't you enjoy the most while you visited the park	Frequency	%
Bird view	5	3%
Deforestation	35	21.2%
Animal view	6	3.6%
The road	31	18.78%
Quality	8	4.8%
Settlement	26	15.7%
Water fall	5	3%
Mouezium	6	3.6%
Information	23	13.9%
Recreation services	66	40%
Tour guide	41	24.84%
None	46	27.87%
All	0	0

Source: computed from survey data. (2013)

visitors also recommended improvement in the park service areas, such as in guest house and the bed room ,better improvement of the road, the cafeteria service , more guards for the protection of the park and for the well being of visitors to protect them from animal attack ,more trained tour guyed ,availability of light transport ,more indoor and outdoor recreational activities ,well organized information service, and improvement in the amenity service were suggested .Some of the respondents think that the park is in danger and the preservation and protection of the park should be given a due attention and they think that it is very hard to recall any service that didn't need

improvement and the improvement should be in every aspect. Finally respondents were asked if they would be willing to visit the park after improvements had been made and all respondents agreed that they are willing to visit for the future except one.

4.2, WTP and Starting Bids

This section discusses the WTP stated by the respondents. The analysis uses the dichotomous choice CVM, in the dichotomous choice CVM each respondent is asked whether they would be willing to pay a particular price for the entrance fee to visit Menagesha Suba park at the current situation and after improvement has been done in the future, letting them answer with 'yes' or 'no' to the price of entrance fee offered (bid). Three starting bid prices for each scenario (current status quo and proposed future improvement) corresponding valuation question were given. These were set following what we have obtained from the pilot survey, bids between ETB 25 to ETB 60 for the status quo scenario and ETB 36 to ETB 100 for improvement have been assigned in this survey .The distribution frequency of respondents' willingness to pay at each bid amount is shown in the below table. Generally: there were 97 (60.6%) out of 160 respondents who were willing to pay for the given bid, and 63 respondents (39.4%percent) were not willing to accept the given bid amount for both the current status quo and improvement scenario. With 25 birr bid level given to respondents as entrance fee for the current status quo approximately 74% percent were willing to pay and, when 36 birr was given 53% percent were willing to pay and when 60 birr was given 35.5% percent were willing to pay at the current status quo situation. The results were consistent to the theoretical expectation; as the given bid is increased, the number of respondents willing to pay decreases. In addition with 36 birr bid level given to respondents as an entrance

fee after improvement approximately 70.3% of respondents were willing to pay, when 50 birr bid level was given 64.4 % of the respondents were willing to accept the proposed price and when 100 birr was given 32.2% were willing to pay as entrance fee for proposed future improvement. In the second scenario condition the results were also consistent with the theoretical expectation. Looking at the percentage share of the three starting prices, it is inconclusive to see the effect of the starting bids on the final stated price.

Table 4.4. Distribution of bid level

First bid for status quo	YES-YES	YES-NO	NO-YES	NO-NO	Obs[a]
25	18(36%)	21(38%)	11(20.3%)	4(7%)	54
36	9(16%)	20(37%)	13(24%)	13(24%)	54
60	6(11.5%)	13(24%)	22(40.7%)	11(20.%)	52
First bid for improvement					
36	11(20.3%)	27(50%)	14(25%)	1(1.8%)	54
50	12(22.2%)	23(42.5%)	12(22.2%)	7(12.9%)	54
100	6(11.5%)	16(30.7%)	17(32.6%)	12(23%)	52

Obs[a] :shows number of observation corresponding to each initial

Source: computed from survey data.(2013)

4.3. Econometric analysis

4.3.1, Regression Result of WTP

In addition to the descriptive analysis, multivariate econometric analysis puts us in a broader framework, as to which factors are responsible for influencing the willingness to pay behavior of respondents for visiting the park at the current situation and after the proposed improvement. The general approach of this technique is to estimate a valuation function that relates the hypothesized determinants with the WTP responses. The variables to be included in the models were mainly based on the degree of theoretical importance and their significant impact on WTP.

Before estimation was done, data exploration is an important step. To start with, whether multicollinearity is present or not a simple correlation coefficient matrix was conveyed and, VIF test and person correlation coefficient was estimated. Gujarati (1995) establishes a rule of thumb, which says that multicollinearity is a serious problem when the correlation coefficient is 0.8 or above. Thus though correlation is present, multicollinearity is not a serious problem in our data. (Appendix 1)

Econometric theory tells us that we are likely to encounter heteroscedastcity frequently in econometric data, particularly with cross-sectional data. Before passing in to the analysis of the result of the estimation of the models, test on the possible existence of heteroscedastcity is important for this study. The violation of the homoscedaticity assumption in the general linear model, OLS estimates are consistent but inefficient. However the problem for non-linear models is more sever, i.e. the resulting estimates are not even consistent (Maddala 1983). Since our data is cross sectional by its nature, we are likely to encounter with the problem of heteroscedastcity. Using het test in STATA 11

version, heteroscedastcity was detected, to minimize such problem, STATA software computes robust estimation and we have followed the mentioned procedure. Greene (1993) states that the possibility of disturbance distributions with thicker tails than the normal, particularly in microeconomic data has led to numerous proposals of robust estimators. As most of these are designed to reduce the weight attached to extreme observations, the models were estimated with robust regration, thus the problem of hetroschedasticity were solved.

4.4, Zero Willingness to Pay Responses

From a total of 15 zero response and non response 5 response were found to be protest zero responses. To identify whether these responses were protest zero responses a follow-up question was raised to the respondents.

Table 4.5.Reasons for unwilling to pay for visiting the park

	Reason for respondents responded no-no for both bid level				
	Has no money	No reason but don't want to pay	Government should pay for protection	Entrance must be free	Project is not clear
	Count	count	Count	Count	Count
Status quo			3	2	
Improvement			4	1	

Source: computed from survey data. (2013)

four of them have responded that it's the governments job to protect and preserve natural resource areas and six of them think that visiting national parks should be free and the remaining respondent have responded that they have no enough money to visit the park or don't want to pay for no reason . Thus five of the non willingness answers can be considered as protest answers

4.5, Validity Test

To test the accuracy of the CV survey of this study, construct and scope validity tests were carried out. Construct test refers to the theoretical validity test, which involves assessing the degree to which the findings of a study are consistent with theoretical expectations. Basically the test is to see if there is significant correlation between WTP and income of respondent visitors. According to Mitchell & Carson (1993) the purpose of undertaking construct validity test is to assert the accuracy of CV results. It involves assessing the degree to which the findings of a CV survey is consistent with theoretical expectations. Forsythe (2001) and Whittington et al (1992) conducted construct validity tests. They argue that if people overbid without giving enough thought to their economic status, the correlation between income and WTP would be very small or non–existent.

To check whether this is the case in our data, a correlation test between income and WTP were conducted for both WTP scenarios. The correlation coefficients show that the variables are positively correlated (maxwtp1= 0.6788 and maxwtp2=0.642) for status quo and improvement respectively. Thus, according to this test, it asserts the validity of the CV survey in that people are taking due consideration to their economic situation when they state their willingness-to-pay for the proposed scenario situations. Both of the

Pearson correlation coefficients are significant at 0.001 level of significance.(Appendix 1 and 2)

Another test of the validity of a CV study is to test if respondents can distinguish the intervention according to the scope of the intervention program (Forsythe, 2001). In order for WTP to provide accurate estimates, respondents should be WTP more for an intervention that has a larger impact. In other words, they should place a higher value on the improvement situation than the current situation without improvement. Respondents have apparently passed the scope sensitivity test because their WTP for the proposed improvement scenario is definitely greater than their willingness to pay for status quo(See the estimated mean willingness to pay and the distribution of response) , which is consistent with economic theory i.e. WTP should be sensitive to better magnitude changes and should be higher for improvement.

.4.6, Analysis of regression Results

For the purpose of analyzing the authentic willingness-to-pay, it is important to eliminate all protest responses from the sample before evaluating the true willingness-to-pay, which reduces the number of observations. For estimating the mean willingness to pay for domestic visitors four models (interval data model, probit model, bivariate probit model and seemingly unrelated bivariate probit model) were estimated, and comparison has been made to identify efficient estimator for mean willingness to pay.

From the bivariate probit model regration result the rho coefficient for both status quo and improvement model respectively shows the value of the correlation coefficient between random errors of both regression equations is relatively high (-0.713 and -0.867)

and statistically significant at 99%, which indicates that the estimation of the bivariate probit model resulted in greater efficiency .

According to Hanemann et.al. (1999) interval data model could be applied if the **rho** coefficients were found to be insignificantly different from zero, which is not in our case, thus using these criteria the interval data model was dropped without further analysis.

The pusedo R^2 from the estimated probit model is 0.448 for the status quo and 0.4583 for improvement, which implies that this percentage of the variation in willingness to pay amount is explained by variables included in the model. According to Mitchell and Carson (1993), if a CV study failed to show an R^2 greater than 0.15 the result is open to question. So we can see that our model has passed this criterion. The waldchi-square test shows that both the BVP and SUBVP model is significant at 99% percent level of significance showing that the overall model is a good to fit. From the estimated three models (probit, bivariate probit model and seemingly unrelated model) bivariate probit model was found to be the best estimator due to its smaller CI/MEAN ration ,smaller confidence interval ,small mean WTP and great significance level compared to other models.(appendix 1and 2)

4.6.1, Determinants of willingness to pay at current status quo

Bid level

The marginal effect result of models shows that there is a negative relationship between initial bid level and willingness to pay .The bivariate probit model result shows that initial bid level affect willingness to pay significantly at 99% level of significance, with the negative sign implying that an increase in the initial bid reduces the likelihood that respondents are accepting the proposed bid price level, which is logical and theoretically acceptable .A one birr increase in the bid amount will decrease the probability of visitors to accept the proposed bide price by 1.067%, citrus paribus.

Quality (dummy)

Quality was also found to be one of the significant factors in determining willingness to pay at 95% level of significance. It has a positive correlation with willingness to pay, visitors who state the environmental and other service quality of the park as good tend to have high willingness to pay than those who disagree, which is expected and reasonable correlation. For respondent who tend to say the recreation quality of the park is good the probability of willingness to pay for accepting the proposed bide level increases by 22.99% citrus paribus.

Ecologist (dummy)

A dummy variable that takes a value of one if the individual stated that he belonged to an ecologist group. This result is fairly similar with the results found in other contingent valuation studies, where environmental goods have been valued. Individuals self-described as “strong environmentalists” are, all other things remaining equal, willing to pay significantly more for a given level of environmental service than those who describe

themselves otherwise. For individual visitor being an Environmentalist, the probability of willingness to pay for accepting the proposed initial bid increases by 10.11% ,citrus paribus, with 99% significant level significantly affecting willingness to pay positively .

Income

The other determinant factor was income .The variable income of the sample visitor positively affect willingness to pay and significant at 95%level of significance. Visitors who have high monthly average income were found to have high willingness to pay which is theoretically valid and acceptable. The marginal effect show that a one Birr increase in income will increase the probability of accepting the proposed initial bid by 20.5%, citrus paribus. This implies that visitors with higher income are willing to pay more.

Sex (dummy)

Sex and willingness to pay were also found to have a significant upward relationship at 90% level of significance, although there is no economic explanation behind this relationship ,for being male the probability of willingness to pay for accepting the proposed initial bid increase by 12.7% citrus paribus. Other socio-economic variables included in the model were found to have insignificant effect on willingness to pay.

Table 4.6: Bivariate probit model estimation of status quo

```
Bivariate probit regression                     Number of obs   = 160
                                                Wald chi2(26)   = 78.83
Log pseudolikelihood = -150.67775               Prob > chi2     = 0.0000
------------------------------------------------------------------------------
             |               Robust
             |      Coef.   Std. Err.      P>|z|     dy/dx    Std. Err      P>|z|
-------------+----------------------------------------------------------------
wtp1         |
  initialbid |   -.0452     .0089       0.000    -.0106***   .0025     0.000
         age |    .0165     .0215       0.442    -.0047      .0054     0.383
         sex |    .6653     .3108       0.032     .1279*     .0754     0.090
 marrystatus |    .1245     .3803       0.74     -.0092      .095      0.922
     famsize |    .0196     .1123       0.86      .0185      .0282     0.511
      emplyt |   -.1586     .2208       0.472    -.0400      .0502     0.425
     yrseduc |   -.0669     .0552       0.226    -.0074      .0130     0.569
  distancekm |   -.0025     .0035       0.481     .0009      .0010     0.377
   costvisit |    .0009     .0009       0.283     .0002      .0002     0.197
qualityhig~0 |    .7008     .2538       0.00      .2299**    .0673     0.001
 rateofvisit |   -.0908     .0711       0.202     .0214      .0223     0.337
  naturelove |    1.243     .3572       0.001     .1011***   .063      0.111
    lnincome |    .5460     .1687       0.001     .2054**    .0467     0.000
       _cons |   -3.762     1.332       0.005
-------------+----------------------------------------------------------------
     /athrho |   -.8934     .1878       0.000
-------------+----------------------------------------------------------------
         rho |   -.7130     .0923
------------------------------------------------------------------------------
Wald test of rho=0:          chi2(1) =  22.6253    Prob > chi2 =0.0000
```

legend: * p<.05; ** p<.01; *** p<.001

4.6.2, Determinants of willingness to pay for improvement

The initial bid level coefficient showed that there is a significant negative relationship between WTP and bid level amount, which is significant at 99% level of significance .The negative sign imply that an increase in the initial bid reduces the likelihood that respondents will accept the proposed bid price level. The result shows that a one birr increase in the bid amount will decrease the probability of visitors accepting the proposed price level after improvement by 0.33% citrus paribus ,this result is also theoretically acceptable, Demand and price have negative relationship, thus as price for visiting the park increase the demand for visiting the park in the future will decline.

Quality was also found to be significant determinant of WTP at 95% level of significance. For individual considering the recreational quality as good the probability of accepting proposed bid level increase by18.6%. Income was also found to be significant determinant factor at 99% level of significance. The model shows that a birr increase in income of visitors will increase the probability of accepting the proposed initial bide level by 29.13 % citrus paribus .The result also shows that job characteristics of the respondent as significant determinant for WTP at 90%level of significance negatively. This could be related with the income of visitors. Financial freedom by working in government organization is expected to be less than from non government and self employed privet work jobs. For visitor being a government organization employee the probability of willingness to pay for accepting initial bid declines by 0.197% citrus paribus.

Visitors who consider themselves as an Ecologist (very concerned about the nature) tend to have high willingness to pay, for being an Environmentalist, the probability of accepting the proposed initial bid price increase by7.8% with 90% level of significance.

Age of the respondent was also found to be a significant determinant of willingness at 90% level of significance negatively. For a year increase in the age of a visitor the probability of accepting the proposed bid level decline by 0.33%. A possible explanation for this sign is that as people get older, they might have lower expectations of future consumption of this public good or maybe it is due to a different education and values of older people. Other- socio economic variables included in the model tend to have no significant effect in determining willingness to pay .

Table 4.7 Bivariate probit regression for improvement

```
Bivariate probit regression                Number of obs   =        160
                                           Wald chi2(26)   =      77.82
Log pseudolikelihood = -138.17143          Prob > chi2     =     0.0000

                             Robust
             Coef.  Std. Err  P>|z|  dy/dx     Std. Err. P>|z|

wtp1
 initialbid | -.0191  .00479   0.000  -.0033*** .00107  0.002
        age |  .039   .01980   0.048  -.0033*   .00107  0.002
        sex |  .1130  .2792    0.686   .0116    .06597  0.859
Mary status |  .1236  .35155   0.725  -.0500    .08875  0.573
    famsize | -.13    .08351   0.11   -.0172    .02585  0.504
     emplyt | -.4880  .22537   0.030   .0019*   .05274  0.970
    Yrseduc |  .0094  .049     0.849   .0010    .01222  0.933
  costvisit |  .0005  .00054   0.351   .0002    .00014  0.097
   Quality  |  .5824  .27200   0.032   .1861*   .06242  0.003
rateofvisit |  .0968  .07682   0.208   .0452    .02325  0.052
 naturelove |  .7854  .33690   0.020   .0780*   .07777  0.31
   lnincome |  .8119  .17530   0.000   .2913*** .06026  0.000

    /athrho |  -1.322   .20305      0.000
        rho |   -.867   .05027

Wald test of rho=0:         chi2(1) =  42.4244    Prob > chi2 = 0.0000
legend: * p<.05; ** p<.01; *** p<.001
```

4.7, Mean /maximum willingness to pay

One of the objectives of this thesis is to estimate the mean and maximum willingness to pay. To confirm this objective we estimate the mean/median using the krinsky and Robb procedure, and maximum willingness to pay.

Using 'STATA11' the mean willingness to pay was estimated for all models using krinsky and Robb mean willingness to pay estimation method. The mean willingness to pay for BVPM has smaller confidence interval and CI/MEAN ratio and its statistically significant compared to the mean willingness to pay from probit model, IDLM, and SUBVPM.

Table 4.8: Estimated mean willingness to pay for status quo and improvement

Krinsky and Robb (95 %) Confidence Interval for WTP measures (Nb of reps: 5000)

Model	MEASURE	WTP	LB	UB	ASL	CI/MEAN
Mean willingness to pay for Status quo	MEAN/MEDIAN	46.22	39.78	54.54	0.0000	0.32
Mean willingness to Pay for improvement	MEAN/MEDIAN	91.19	74.83	122.48	0.0002	0.52

H0: WTP<=0 vs. H1: WTP>0, LB: Lower bound; UB: Upper bound

Table 4.9 Maximum willingness to pay

model	Obs	Mean	Std. Dev.	Min	Max
Max wtp for status quo	160	44.6	32.42	5	150
Max wtp for improvement	160	72.1	58.72	10	250

As seen in the above table, the mean WTP for open ended question at current status quo is ETB 44.6 per person per visit, which is less than but closer to the WTP obtained using the close-ended format (ETB 46.2) and ETB 72.1 after proposed improvement, which is also less than the close ended mean WTP (ETB 91.1). Therefore, visitors' mean WTP for visiting the park at current situation is in the range of ETB 44.6 – ETB 46.2 per visit and ETB72.1 - ETB 91.1 for the proposed future improvement.

4.8, Aggregation of benefit

According to Michelle and Carson (1989), there are four important issues to be considered regarding sample design and execution in order to have a valid aggregation of benefits; population choice bias, sampling frame bias, sample non response bias and sample selection bias. Random sampling was used in this study using the second available person for interview, protest zero responses were not excluded from the analysis and a face to face interview method is used, hence none of the above biases were expected in the analysis. If the bivariate probit model is estimated on dichotomies choice

CV question with a follow up, the parameter shows that either the mean or variance or both differ between the initial bid price and the follow up .The researcher must decide which estimates to use to calculate the WTP measure (Haab and MaConnell, 2002). Hence, in order to choose the appropriate WTP among the two bivariate estimates, we looked in to the data . The total amount of YY and NN response accounted for about 38.13% of the total response for the status quo and 30.6% of the total response for improvement and the remaining 61.87 % and 69.4% fall for the YN and NY answer respectively, for current status quo and future improvement scenario responses respectively .This means the first bide amount was closer to the unobservable true value of the individual willingness to pay. For example let the initial bide level was 25 and the respondent accepted the proposed bide level then the second bide level become 50 birr and the visitor rejected the proposed bide level, this means the respondents true WTP is greater than or equal to 25 birr but definitely less than 50 birr. The same is true for NY answer, this means the first bide amount was a better estimate of the true WTP. Hence using the first estimate of the double bounded BVP aggregate benefit from the visitors is summarized as follows.

Table 4.10 Visitation rate from 2007/08-2012/13

Year(E.C)	Domestic visitors	Foreign visitors
2007/08	1385	112
2008/09	5009	242
2009/10	3995	1092
2010/11	4353	1425
2011/12	4146	1926
2012/13	4454	1174
total	23342	5966
mean	3890	994.3

Source; Menagesha Suba Park record office

4.9, Aggregate benefit and consumer surplus

According to Michele and Carson (1989,) excluding protest zero response in aggregating total benefit might give as a biased result. Thus we have to consider protest zero response for total population. According to the survey result from 165 responses, five were found to be protest zero, given 3980 average visitors per year the protest zero response for total sample population will be 120.

5x3980/165=120

The total annual WTP of visitors for visiting the park at the current status quo, using the mid WTP, is estimated at ETB 168,142. Using the dichotomous double bounded question, the annual WTP is estimated to be ETB 174,249.4 .The actual WTP of visitors to the park falls between these two ranges. For the proposed improvement annual visitors

willingness to pay using the mid WTP is estimated at ETB 271,817.Using the dichotomous choice double bounded question ,the annual WTP is estimated to be ETB 343,786.3. The actual WTP of visitors to the park falls between these two estimated values. From the above estimated aggregate benefit and consumer surplus result, visitors are willing to pay higher amount of money (mean 46.2 per visit and max Wtp44.6 birr per visit) for visiting Menagesha Suba Park than the amount the park is charging them currently (10 birr). By considering peoples willingness to pay in setting a new entrance fee, the park could generate additional revenue amounted to be the consumer surplus (ETH 136,549 - ETH 130,442) at current situation per annum. By increasing the recreational quality of the site the total revenue generated from user's fee could be increase to ETH 343,786.3 per annum. This means after improvement the total revenue could be increased by 44.6 %.

Table 4.11 Aggregate benefit after considering protest zero response

Aggregate benefit for the status quo	Current status quo	Consumer surplus
Average per year visit after protest zero	3770	
Mean WTP for status quo	ETB 46.22	ETB 136,549.4
Aggregate benefit per year	ETB 174,249.4	
Max WTP for status quo	ETB 44.6	ETB 130,442
Aggregate benefit from Max WTP	ETB 168,142	
Aggregate benefit for proposed improvement		
Mean WTP for improvement	ETB 91.19	
Aggregate benefit from improvement	ETB 343,786.3	ETB 306,086.3
MaxWTP for improvement	ETB 72.1	
Aggregate benefit from Max WTP	ETB 271,817	ETB 234,117

source ; authors calculation

Chapter 5

Conclusion and Policy Implication

5.1. Conclution

Menagesha Suba Park is one of the fewer state owned well protected forest parks and the oldest among of all and found in easily accessible location than most of the parks. The attraction of Menagesha Suba forest park are based primarily on its naturally endowed resources, that includes the age old trees ,different wild life and bird species and the attractive scenery of the landscape attributed to its vegetation cover and richness in many bird species of interest to visitors .The above resource of the site are products of the ecological functioning of the ecosystem and the landscape and there for subject to influences by activities that occurs inside the park. The current entrance fee which was set without any Economic assessment on visitor's willingness to pay is not efficient in representing the actual recreational benefit that could be generated from visitors.

If information is required for better understanding and policy making in the utilization of the site resource, valuation has to be under taken, there for it is an important step to estimate how much value people attach to this site so as to demonstrate how the concerned authorities can extract revenue out of the excess benefit to improve quality and expand the type and variety of there service.

This study sought to provide quantitative estimates for current recreational use value and future improvement using visitors willingness to pay for Menagesha Suba Forest Park in order to assist planers and decision makers in increasing the input from the economic valuation by exploiting the consumer surplus and by presenting a sound valuation

technique and procedure in order to take the best possible road towards a sustainable future.

To analyze visitors willingness to pay for current status quo and future improvement dichotomies choice contingent valuation survey method was employed. It is observed from the sample that almost all visitors are from the nearby capital city and the surrounding nearby towns. From the average years of education it may be concluded that most of the tourists visiting the park are well-educated, mostly in middle age and primarily in public sector or private sector job. Visitors from foreign countries and also residents in Ethiopia visit the area throughout the year .From the survey result most proportion of visitation is covered by male visitors. The overall analysis reveals that initial bide level was found to have significantly strong negative impact on willingness to pay while per capita income of the visitors ,quality of the recreational site and the individual attitude towards conservation of nature have a strong positive impact.

Using the mean willingness to pay obtained from the double bounded dichotomous choice model aggregate benefit(revenue) and consumer surplus representing the recreation benefit derived by an average domestic tourist have been estimated.

Double bounded dichotomies choice contingent valuation survey was made to estimate the mean willingness to pay, this method is used because of its consistency with theory and efficiency in estimation of model and at the same time to reduce biases .Bivariate probit model was used to estimate the mean willingness to pay for double bounded dichotomies choice question. probit model is used to determine significant factors that affect visitors willingness to pay. The mean estimated entrance fee was ETB 42. 2 per visit at the current status quo and ETB 91 per visit after improvement. The estimated

maximum willingness to pay for status quo is ETB 44.54 per person per visit and, ETB 77.1 per visit per person for proposed improvement scenario. In the study visitors pointed out that the park have been faced different man made problems such as settlement ,degradation ,deterioration of recreational quality and didn't show any kind improvement from time to time. Over all, the revised estimates by considering the expressed willingness to pay show that there is huge potential for raising revenue from the visitors for the sustainable management of the tourist resources in the selected sites and potential recreation opportunity ,thus, from such contribution, government authority or any appointed bodies, is held responsible to preserve and protect Menagesha Suba park mainly the forest , wildlife and the same time to improve and add more infrastructure and public facilities such as toilets, pedestrian path, sign board ,rubbish bin etc. Indirectly, with such effort, the relationship of one's satisfaction derived from enjoying their visit to Menagesha Suba Park will more or less determine their WTP to preserve the areas.

5.2, Policy Implication

The use of economic valuation in the decision process regarding the development and management of national parks should be considered as necessity for having efficient management actions. This may also contribute to the sustainability in the development of these national parks. It is reasonable for policy makers consider at least to review the entrance fee as one of the sources of funding. The results from the study shows that visitors will be more willing to pay high amount of money as entrance fee if they knew the purposes of the payment is for the conservation and development of the park. The results of the survey showed that visitors of Menagesha Suba Park are willing to pay more for improvements in the quality of the site than the current state of the park. This result has interesting implication in that if the site authorities change the current level of entrance fee and raise additional money, there would be a higher income to support improvement and expansion of the types and varieties of recreational services and hence visitors will be interested in visiting the site. Therefore, if this can be done, we expect the recreational benefit of the site to be higher than reported.

Even though the nearness and easily accessibility of the park was expected to attract a number of visitors the current rate of visitation is very low hence, a hug promotion has to be done as a way of transferring information for potential visitors.

Currently the park is faced with the problem of settlement and deforestation ,which will put the park and its inhabitants in danger .Such type of problem could be solved by creating community based development program ,such as, creating job opportunity inside the park ,like community tour guyed ,cafeteria service, fast food shops etc...

By making the community the direct beneficiary from the park it's possible to make the society protect the park and also make visitors benefit from service provided by community. The survey result also shows that visitors are more willing to pay higher amount of entrance fee if they know the revenue generated was going to be used for conservation programs. This means visitors are willing to participate in the conservation activity of the park, thus by participating visitors in conservation program through financial contribution the management could generate additional revenue for development programs.

In setting a new entrance fee the socio-economic characteristics of the respondent should be taken into consideration, the survey result shows that there is a significant positive relationship between willingness to pay and income level, hence foreigners should be charged a significantly higher amount of entrance fee compared to domestic visitors, since foreigners tend to have significantly higher amount of monthly income compared to domestic visitors. The results from the survey shows that the current entrance fee which was charged with out incorporating visitors preference and willingness is not the true representative of the recreational value of the park. Thus as the major use of CVM is to calculate the benefit for market and non market goods and service the net and aggregate benefit and consumer surplus could be used as aground for designing and evaluation of the future benefit from the park in combination with the results from other similar studies.

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Appendix 1

OLS regration

```
      Source |       SS       df       MS              Number of obs =     160
-------------+------------------------------           F (13,   146) =   20.02
       Model | 107100.884    13   8238.52953           Prob > F      = 0.0000
    Residual | 60090.091    146   411.575966           R-squared     = 0.6406
-------------+------------------------------           Adj R-squared = 0.6086
       Total | 167190.975   159   1051.51557           Root MSE      =  20.287


------------------------------------------------------------------------------
      maxwtp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  initialbid |   .3169671   .1125468     2.82   0.006     .0945357    .5393986
         age |  -.4820176   .2584043    -1.87   0.064    -.9927137    .0286786
         sex |    7.92666   3.789739     2.09   0.038     .4368262    15.41649
 marrystatus |   .1207831   4.862491     0.02   0.980    -9.489181    9.730747
     famsize |   1.682634   1.282112     1.31   0.191    -.8512632    4.216531
      emplyt |   3.864843   2.768238     1.40   0.165    -1.606151    9.335838
     yrseduc |  -.6709105   .6638112    -1.01   0.314    -1.982831    .6410098
      income |   .0013495   .0001163    11.60   0.000     .0011196    .0015794
  distancekm |   .0102866   .0639178     0.16   0.872    -.1160372    .1366103
   costvisit |   .0085004    .003628     2.34   0.020     .0013302    .0156706
qualityhig~0 |   16.51509   3.378948     4.89   0.000     9.837118    23.19306
 rateofvisit |   .9562369   1.006984     0.95   0.344    -1.033912    2.946385
  naturelove |   7.337119   4.441734     1.65   0.101    -1.441283    16.11552
       _cons |   14.70703   11.33949     1.30   0.197    -7.703726    37.11779
------------------------------------------------------------------------------
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

chi2(1) = 37.52

Prob > chi2 = 0.0000

From table chi2(1)=392704 X 10^{-10}

Variance inflation factor test

Variable	VIF	1/VIF
marrystatus	2.21	0.452140
famsize	2.15	0.464907
yrseduc	1.41	0.708252
income	1.32	0.756861
naturelove	1.23	0.815605
costvisit	1.13	0.883892
rateofvisit	1.12	0.895355
qualityhig~0	1.10	0.908853
distancekm	1.10	0.910799
emplyt	1.10	0.912319
sex	1.07	0.930641
initialbid	1.04	0.962710
Mean VIF	1.33	

(obs=160)

	hhcode	maxwtp	wtp1	wtp2	initia~d	second~e	age	sex	marrys~s	famsize	emplyt	yrseduc
hhcode	1.0000											
maxwtp	0.2867	1.0000										
wtp1	-0.2258	0.5273	1.0000									
wtp2	0.0387	0.2573	-0.3155	1.0000								
initialbid	0.7260	0.2121	-0.3090	0.0129	1.0000							
secondbide	0.2270	0.6762	0.7341	-0.2619	0.2856	1.0000						
age	0.0309	0.1697	0.2606	-0.0820	-0.0021	0.2837	1.0000					
sex	-0.0677	0.0122	0.1209	-0.0416	-0.0576	0.0939	0.1200	1.0000				
marrystatus	0.1450	0.1970	0.2019	-0.0127	-0.0103	0.1945	0.5797	-0.0234	1.0000			
famsize	0.0365	0.1766	0.2130	-0.0029	0.0135	0.2420	0.7072	-0.0531	0.6935	1.0000		
emplyt	0.3597	0.1569	0.0186	0.0309	-0.0240	-0.0433	0.0751	0.0267	0.1867	0.0414	1.0000	
yrseduc	0.0694	0.1900	0.1543	0.0384	0.0972	0.1798	0.3568	-0.0288	0.3417	0.2324	0.1547	1.0000
income	0.2429	0.6788	0.3182	0.1603	0.0934	0.4163	0.3655	-0.0189	0.3011	0.2750	0.0685	0.3714
distancekm	0.0063	0.1009	0.0975	0.1063	-0.0234	0.0715	0.1826	0.0216	0.0570	0.1087	0.0864	0.1902
costvisit	0.0277	0.2473	0.1434	0.1085	0.0496	0.1604	0.0577	-0.1515	0.1772	0.1970	-0.1019	0.0893
qualityhig~0	0.1218	0.3595	0.2111	0.0750	0.0945	0.2335	-0.0039	-0.1106	-0.0086	-0.0471	0.0548	-0.0933
rateofvisit	-0.0513	-0.0228	-0.0339	0.1039	-0.0732	-0.0231	0.1141	0.1464	0.0983	0.1904	0.0371	-0.0414
naturelove	0.0116	0.2781	0.3940	-0.1361	0.0458	0.3719	0.1959	-0.0660	0.1427	0.2239	0.0163	0.2858

	income	distan~m	costvi~t	qualit~0	rateof~t	nature~e
income	1.0000					
distancekm	0.1898	1.0000				
costvisit	0.2162	0.0746	1.0000			
qualityhig~0	0.0826	-0.0909	0.0171	1.0000		
rateofvisit	-0.0949	0.0118	-0.1048	-0.0264	1.0000	
naturelove	0.2200	0.1647	0.1007	0.1493	0.0640	1.0000

```
. pwcorr maxwtp income,sig

             |   maxwtp   income
-------------+------------------
      maxwtp |   1.0000
             |
             |
      income |   0.6788   1.0000
             |   0.0000
             |
```

```
Bivariate probit regression                     Number of obs   =        160
                                                Wald chi2(26)   =      78.83
Log pseudolikelihood = -150.67775               Prob > chi2     =     0.0000
```

	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
wtp1						
initialbid	-.0452818	.0089678	-5.05	0.000	-.0628584	-.0277053
age	.0165416	.0215084	0.77	0.442	-.0256141	.0586972
sex	.6653302	.3108015	2.14	0.032	.0561704	1.27449
marrystatus	.1245031	.380353	0.33	0.743	-.6209751	.8699813
famsize	.0196676	.1123092	0.18	0.861	-.2004544	.2397896
emplyt	-.1586856	.2208267	-0.72	0.472	-.591498	.2741268
yrseduc	-.0669436	.0552776	-1.21	0.226	-.1752857	.0413985
distancekm	-.0025245	.0035849	-0.70	0.481	-.0095508	.0045018
costvisit	.000984	.0009169	1.07	0.283	-.0008132	.0027812
qualityhig~0	.7008397	.2538326	2.76	0.006	.2033371	1.198342
rateofvisit	-.0908326	.0711602	-1.28	0.202	-.230304	.0486388
naturelove	1.243189	.3572458	3.48	0.001	.5429998	1.943378
lnincome	.5460055	.1687544	3.24	0.001	.215253	.8767579
_cons	-3.762905	1.332616	-2.82	0.005	-6.374785	-1.151026
wtp2						
initialbid	3.51e-06	.0071461	0.00	1.000	-.0140026	.0140096
age	-.0330917	.0174632	-1.89	0.058	-.067319	.0011356
sex	-.1102075	.2348268	-0.47	0.639	-.5704595	.3500446
marrystatus	-.1467196	.3052706	-0.48	0.631	-.745039	.4515998
famsize	.0531912	.0811464	0.66	0.512	-.1058529	.2122352
emplyt	-.0101421	.1734291	-0.06	0.953	-.3500569	.3297727
yrseduc	.0318399	.0404521	0.79	0.431	-.0474448	.1111247
distancekm	.0058005	.0026855	2.16	0.031	.000537	.0110639
costvisit	.0002406	.0001762	1.37	0.172	-.0001047	.0005859
qualityhig~0	.2824851	.2170619	1.30	0.193	-.1429485	.7079187
rateofvisit	.1637935	.0758206	2.16	0.031	.015188	.3123991
naturelove	-.8617884	.293978	-2.93	0.003	-1.437975	-.2856021
lnincome	.2933594	.1101262	2.66	0.008	.077516	.5092029
_cons	-1.811177	.8689637	-2.08	0.037	-3.514315	-.1080398
/athrho	-.8934395	.1878315	-4.76	0.000	-1.261582	-.5252966
rho	-.7130884	.0923201			-.8514998	-.4817776

```
Wald test of rho=0:                     chi2(1) =  22.6253    Prob > chi2 = 0.0000

. mfx

Marginal effects after biprobit
      y  = Pr(wtp1=1,wtp2=1) (predict)
         =  .18578354
```

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
initia~d	-.0106729	.00253	-4.21	0.000	-.015637	-.005709	40.0875
age	-.0047599	.00546	-0.87	0.383	-.015459	.005939	31.7813
sex	.1279941	.07542	1.70	0.090	-.019832	.275821	.74375
marrys~s*	-.0092791	.0951	-0.10	0.922	-.195666	.177108	.41875
famsize	.0185545	.02823	0.66	0.511	-.036776	.073885	2.86875
emplyt	-.0400593	.05022	-0.80	0.425	-.138491	.058372	.41875
yrseduc	-.0074485	.01309	-0.57	0.569	-.033108	.018211	14.925
distan~m	.0009227	.00104	0.88	0.377	-.001125	.00297	31.6875
costvi~t	.0002949	.00023	1.29	0.197	-.000153	.000743	294.85
qualit~0*	.2299828	.06738	3.41	0.001	.097913	.362053	.5125
rateof~t	.0214486	.02234	0.96	0.337	-.022343	.065241	1.775
nature~e*	.1011148	.0635	1.59	0.111	-.023346	.225576	.78125
lnincome	.2054678	.04677	4.39	0.000	.113807	.297129	8.08205

```
(*) dy/dx is for discrete change of dummy variable from 0 to 1
```

Krinsky and Robb (95 %) Confidence Interval for WTP measures (Nb of reps: 5000)

MEASURE	WTP	LB	UB	ASL*	CI/MEAN
MEAN/MEDIAN	46.22	39.78	54.54	0.0000	0.32

*: Achieved Significance Level for testing H0: WTP<=0 vs. H1: WTP>0
LB: Lower bound; UB: Upper bound

Krinsky and Robb (95 %) Confidence Interval for WTP measures (Nb of reps: 5000)

MEASURE	WTP	LB	UB	ASL*	CI/MEAN
MEAN/MEDIAN	47.09	40.46	55.50	0.0000	0.32

*: Achieved Significance Level for testing H0: WTP<=0 vs. H1: WTP>0
LB: Lower bound; UB: Upper bound

Krinsky and Robb (95 %) Confidence Interval for WTP measures (Nb of reps: 5000)

MEASURE	WTP	LB	UB	ASL*	CI/MEAN
MEAN/MEDIAN	46.21	-296.85	369.70	0.2574	14.43

*: Achieved Significance Level for testing H0: WTP<=0 vs. H1: WTP>0
LB: Lower bound; UB: Upper bound

Bivariate probit regression — Number of obs = 160
Wald chi2(26) = 77.82
Log pseudolikelihood = -138.17143 — Prob > chi2 = 0.0000

	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
wtp1						
initialbid	-.0191593	.0047976	-3.99	0.000	-.0285625	-.0097561
age	.039184	.0198036	1.98	0.048	.0003696	.0779984
sex	.1130397	.279288	0.40	0.686	-.4343547	.660434
marrystatus	.1236088	.3515536	0.35	0.725	-.5654236	.8126412
famsize	-.13315	.0835129	-1.59	0.111	-.2968324	.0305323
emplyt	-.4880262	.2253789	-2.17	0.030	-.9297607	-.0462917
yrseduc	.0094063	.0495	0.19	0.849	-.0876118	.1064245
distancekm	-.0026489	.0029253	-0.91	0.365	-.0083825	.0030846
costvisit	.0005082	.0005447	0.93	0.351	-.0005594	.0015758
qualityhig~0	.5824076	.2720097	2.14	0.032	.0492784	1.115537
rateofvisit	.0968302	.0768249	1.26	0.208	-.0537439	.2474044
naturelove	.7854606	.3369083	2.33	0.020	.1251324	1.445789
lnincome	.8119735	.1753085	4.63	0.000	.4683752	1.155572
_cons	-6.891645	1.590114	-4.33	0.000	-10.00821	-3.775079
wtp2						
initialbid	.0054048	.0037984	1.42	0.155	-.0020399	.0128495
age	-.0174667	.0154982	-1.13	0.260	-.0478427	.0129093
sex	-.0555654	.2372493	-0.23	0.815	-.5205656	.4094348
marrystatus	-.2517933	.303674	-0.83	0.407	-.8469834	.3433968
famsize	.0547829	.0726354	0.75	0.451	-.0875798	.1971456
emplyt	.3985122	.1741201	2.29	0.022	.057243	.7397814
yrseduc	-.0044419	.0405022	-0.11	0.913	-.0838247	.0749409
distancekm	.0035482	.0020641	1.72	0.086	-.0004973	.0075937
costvisit	.0002776	.0002169	1.28	0.200	-.0001474	.0007027
qualityhig~0	.1175881	.216229	0.54	0.587	-.3062129	.5413891
rateofvisit	.0590533	.0596982	0.99	0.323	-.057953	.1760596
naturelove	-.4448145	.2880067	-1.54	0.122	-1.009297	.1196683
lnincome	.2284817	.1091549	2.09	0.036	.0145421	.4424213
_cons	-1.853881	.8757472	-2.12	0.034	-3.570314	-.1374477
/athrho	-1.322547	.2030502	-6.51	0.000	-1.720518	-.9245761
rho	-.867416	.0502731			-.9379254	-.728055

Wald test of rho=0: chi2(1) = 42.4244 — Prob > chi2 = 0.0000

. mfx

Marginal effects after biprobit
      y = Pr(wtp1=1,wtp2=1) (predict)
         = .19414107

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
initia~d	-.0033069	.00107	-3.10	0.002	-.005396	-.001217	61.4125
age	.0046437	.00586	0.79	0.428	-.00685	.016137	31.5562
sex	.0116854	.06597	0.18	0.859	-.117617	.140988	.74375
marrys~s*	-.0500419	.08875	-0.56	0.573	-.223986	.123902	.41875
famsize	-.01729	.02585	-0.67	0.504	-.067946	.033366	2.86875
emplyt	.0019736	.05274	0.04	0.970	-.101386	.105333	.41875
yrseduc	.0010325	.01222	0.08	0.933	-.022923	.024988	14.925
distan~m	.0004685	.00098	0.48	0.631	-.001443	.00238	31.6875
costvi~t	.0002269	.00014	1.66	0.097	-.000041	.000495	294.85
qualit~0*	.1861638	.06242	2.98	0.003	.063828	.3085	.5125
rateof~t	.0452573	.02325	1.95	0.052	-.000321	.090835	1.775
nature~e*	.0780708	.07777	1.00	0.315	-.074352	.230493	.78125
lnincome	.2913599	.06026	4.83	0.000	.173249	.409471	8.08205

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Krinsky and Robb (95 %) Confidence Interval for WTP measures (Nb of reps: 5000)

MEASURE	WTP	LB	UB	ASL*	CI/MEAN
MEAN/MEDIAN	91.19	74.83	122.48	0.0002	0.52

*: Achieved Significance Level for testing H0: WTP<=0 vs. H1: WTP>0
LB: Lower bound; UB: Upper bound

Krinsky and Robb (95 %) Confidence Interval for WTP measures (Nb of reps: 5000)

MEASURE	WTP	LB	UB	ASL*	CI/MEAN
MEAN/MEDIAN	99.88	78.88	146.21	0.0004	0.67

*: Achieved Significance Level for testing H0: WTP<=0 vs. H1: WTP>0
LB: Lower bound; UB: Upper bound

Krinsky and Robb (95 %) Confidence Interval for WTP measures (Nb of reps: 5000)

MEASURE	WTP	LB	UB	ASL*	CI/MEAN
MEAN/MEDIAN	64.00	-418.63	406.13	0.3730	12.89

*: Achieved Significance Level for testing H0: WTP<=0 vs. H1: WTP>0
LB: Lower bound; UB: Upper bound

Appendix 4

Survey interview questionnaire

ADDIS ABABA UNIVERISITY

SCHOOL OF ECONOMICS

Analysis of visitor's willingness to pay for recreational use value of Menagesha Suba forest park: application of contingent valuation method

A contingent valuation survey questionnaire for estimating the recreational use value of Menagesha Suba forest park

Mekdes Tadesse

(Natural resource and Environmental Economics)

Visitor's code_____

nationality_____

Residential place _____

For foreigners resided in Ethiopia, years they have lived _____

Date of interview _____

Part one

Hello how are you, first of all thank you for giving me your time. This questioner is the main part of a research to be done by Ms Mekdes Tadesse and she is currently studding at Addis Ababa university. This research is in partial fulfillment for the award of masters of Science in Economics. She is conducting a survey on Menagesha Suba Forest Park Recreational value concerning the recreational benefit of the park for visitors and the possible environmental and amenity service improvements. I would like to ask you about your perception and observation regarding the parks recreational service. This information will help the management to plan for the development, conservation and sustainable use of the parks natural resource and for policy makers for concise dictions making concerning the parks problems. The interview takes a few minutes to complete, whatever information you provide will be kept strictly confidential and will not be shown to other person and we only want to know your opinion so there is no right or wrong answer in this questioner.

THANK YOU!!!!!!

A Contingent valuation survey Question for Recreational Use Value of Menagesha Suba Forest Park

Name of the enumerator _____

Date of the interview _____

Name of the supervisor _____

Starting time_____

Name of the respondent _____

For every measurements use the local unit and write its equivalence in standard unit.

Hello how are you, firs of all thank you for giving me your time. My name is _____.This interview is the main part of a research MS/MR_____ is working on and she is currently studding at Addis Ababa University. This research is in partial fulfillment for the award of masters of Science in Economics. She is conducting a survey on Menagesha Suba Forest Park Recreational value concerning the recreational benefit of the park for visitors and the possible environmental and amenity service improvements. I would like to ask you about your perception and observation regarding the parks recreational service. This information will help the management to plan for the development, conservation and sustainable use of the parks natural resource and for policy makers for concise dictions making concerning the parks problems. The interview takes a few minutes to complete, whatever information you provide will be kept strictly confidential and will not be shown to other person and we only want to know your opinion so there is no right or wrong answer in this questioner.

Part two

Read the following scenario and try to answer the preceding questions

Scenario one

As you might have heard Menagesha Suba Forest Park is the oldest park in Africa and it is also one of the well protected forest parks found in Ethiopia .The Forest became a national park starting from 1955 but it has existed for more than 500 years. The major financial source of the park was the regional government budget and revenue collected in the form of entrance fee which is 10 birr for local visitors and birr for tourists. But the government could no longer fund the park because of shortage of budget and the current revenue collected from entrance fee is not enough for preservation, protection and maintenance of the park and its service. There are two options presented by the management to make the necessary preservation of the park, one is to increase revenue from entrance fee so that the necessary conservation for the park could be done accordingly or to close the park for visitors to decrease human contact from the park so that somehow the damage from the human contact could be reduced. The decision of the management depends on visitor's preference and willingness to pay for the future proposed entrance fee when visiting the park or stop visiting the park in the future .All the revenue generated from entrance fee will be used for conservation of the park. Given the above situation

1).Are you willing to pay **____ birr** (pre specified bide price) as an entrance fee for visiting the park for the future depending on the above situation

a) yes b) no c)refuse

2). If yes in question 1 what about **_____birr(higher amount)**

a) yes b) no c)refuse

3). If no in question 1 what about **_____birr(lower amount)**

a) yes b) no c)refuse

4) If yes in 1 and yes in 2, what is the maximum amount you are willing to pay for visiting the park? _____birr

5) If no in 1 and no in 2, what is the minimum amount you are willing to pay for visiting the park? _____birr

6) If yes in 1 and yes in 2 and if the respondent maximum willingness to pay in question 2 is greater than in 4 then ask

you said you are willing to pay _____birr in Q2 but when I ask you your maximum willingness to pay you said _____birr in Q4 which is less than the amount you already agree to pay previously. why?_____

7)If no in 1 and yes in 3 and if the respondent maximum willingness to pay in question 3 is greater than in 4 then ask

you said you are willing to pay _____birr in Q3 but when I ask you your maximum willingness to pay you said _____birr in Q4 which is less than the amount you already agree to pay previously. why?_____

8).If refuse to pay any amount to visit the park ,what is your reasons

1The government should have to conserve the park

2.I have no many to pay

3.I don't have any reasons at all but I don't want to pay any amount

4.I have no interest and don't care about the conservation of the park

5,other_____

9) How do you rate the current environmental and amenity service quality available in Menagesha Suba forest park?

1) very good 2) good 3) satisfactory 4) bad

10) Do you think there should be improvement in the environmental and amenity service?

1)yes 2)no

11) What kind of improvement do you think should be included ?_____

Part two

Second scenario

Proposed improvement in the environmental and amenity service in the park

As mentioned in scenario one Menagesha Suba forest park is one of the oldest park in Africa, initially the total are of the park use to be around 9000 hectare of land. currently only 3000 hectare is covered with forest of which 1000 hectare is under plantation .Ever since its establishment as a national park there has been no major improvement on the site .Currently the park management is planning to undertake a major improvement on the site .The development plan include a forestation of degraded part of the forest which will increase the environmental quality of the park which in turn will make the park a peace full place for habitats of the park and increase their number, this will make them seen easily .The other improvements include a well trained tour guide ,transport service inside the park and establishing a loge with full cafeteria service including internet service and other amenity service like toilet and clean water. But the major financial source for covering all the expenses for improvement is expected to be generated from future entrance fee. If the project turn out to cost less than visitors willingness to pay for future entrance fee the program will be implemented, if it turn out to cost more than visitors willingness to pay the program will not be carried out. Given the above situation

1).Are you willing to pay _____ **birr** (pre specified bid price)as an entrance fee for visiting the park for the future if all the above improvement could be implemented

a) yes b) no c)refuse

2). If yes in question 8 what about **_____birr(higher amount)**

a) yes b) no c)refuse

3). If no in question 8 what about **_____birr(lower amount)**

a) yes b) no c)refuse

4) If yes in 1 and yes in 2, what is the maximum amount you are willing to pay for visiting the park? _____birr

5) If no in 1 and no in 2, what is the minimum amount you are willing to pay for visiting the park? _____birr

6) If yes in 1 and yes in 2 and if the respondent maximum willingness to pay in question 2 is greater than in 4 then ask

you said you are willing to pay _____birr in Q2 but when I ask you your maximum willingness to pay you said _____birr in Q4 which is less than the amount you already agree to pay previously. Why?_____

7)If no in 1 and yes in 3 and if the respondent maximum willingness to pay in question 3 is greater than in 4 then ask

you said you are willing to pay _____birr in Q3 but when I ask you your maximum willingness to pay you said _____birr in Q4 which is less than the amount you already agree to pay previously. why?_____

8).If you refuse to pay any amount to visit the park please explain your reasons

1: I think that government should have to improve the program of the parks

2: I have no money to pay for the improvements

3: I you have no interest and don't care about the improvements of the park

4: I you have no reason at all but you don't WTP any amount of money

5, the proposed project is not clear.

5: If you have other reason, mention it_____

Part three

Socio-Economic characteristic of the respondent

1).Age of the respondent in year's _____

2).sex of the respondent

1) male 2)female

3). Marital status of the respondent

1) single

2) married

3) divorced

4) widow

5)Others_____

4). family size _____

5).respondent occupation

1) Government organization 2) non government organization 3) privet

4) unemployed 5)Student 6)self employed

7) other _____

6).Education level

1) primary 2)secondary 3)higher education 4)Uneducated

7).How many years have you attended in school (number of years in school)?_____

8).How much is your average monthly income?_____

9).How many times did you visit Menagesha Suba park?

a)1 b)2 c)3 d)more than three times

10).What aspect of the park do you enjoy most?

Which part of the park did you enjoy the most in your visitation of the park	Make a mark
Old threes	
Landscape	
Weather	
the forest	
Animal view	
Bird view	
Water fall	
Mouezium	
Over all the park	
None	
Other	

11).What aspect of the park do you enjoy least?

Which part of the park didn't you enjoy the most while you visited the park	Make a mark
Bird view	
Deforestation	
Animal view	
Quality of the road	
Quality of the site	
Settlement	
Water fall	
Mouezium	
Information	
Recreation services	
Tour guide	
None	
All	
Other	

12).Have you observed any improvements or deteriorations since your last visit?

1)yes 2)no

If yes, which aspect of the park?

_____

13).Have you ever visited other recreational sites?

1)yes 2)no

14).If you say yes for the above question how do you describe the recreational site quality compare to other sites?

a)very good b)good c)satisfactory d)bad

15).distance traveled from your starting point to reach the park? You can put the approximate distance or reference place._____

16).Total amount of money spend for visiting the park? You can put the approximate amount of money._____

17).How do you describe yourself concerning the environment?

a)very concerned about the environment

b) somewhat interested in the environment

c) less interested in the environment

d) indifferent

18).Do you think you will visit more often than ever if the park environmental and amenity service is improved

1)yes 2)no