ECONOMIC VALUATION OF URBAN GREEN, OPEN- SPACES: EVIDENCE FROM ADDIS ABABA

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Abstract

Urban green spaces generate a variety of uses which range from amenities, aesthetic, bequest and altruism value

This study explores the awareness of the peoples of Addis regarding these ecosystem services of the environment. The monetary valuation of these environmental values which are not traded at ordinary market was estimated by the contingent valuation method using indirect utility measure and introducing a referendum take it or leave it price (initial bid).

A survey which gleaned data using a face-to-face inter views of 200/out which 8 samples were discarded /household heads in four-purposely selected sub-cities by using a stratified random sampling technique.

The people of Addis have a positive WTP and attitude towards the current activities of urban green space development as well as for improving the quality from the present level. Most of the interviewed households have the habit of recreation in urban parks (green open spaces).

The empirical results shows that house holds WTP is affected by a number of explanatory variables both socio-economic and others.

Socio-economic variables like sex of the house hold, income, education and type of working institution affect the probability of WTP positively. Total willing ness to pay were derived from the open-ended follow up question and conservative estimate of total willing ness to pay for the existed use of urban green spaces, were found to be birr 16,682,574.33 and birr and birr 31, 700,248.7 for improved use of urban green spaces per annum.

This study will help decision makers in this area to analyze the cost and benefit of the program, to identify intervening mechanism to develop public opinion in environmental issues. Also enable them to know the present awareness level and commitment of the public at large.

Key words: urban green space, Amenity value, bequest, aesthetic, altruism, CVM, WTP, Addis Ababa, Ethiopia.

CHAPTER ONE: Introduction

1.1 Background

Ethiopia is known being the least developed countries in the world having a total area of 1,235,000 km^2.According to the 2005 statistical estimate, the population is in excess of 77 million which is growing at 2.64% per annum (world, fact book 2005) .

The country, despite endowed with rich human and natural resources, it is affected by frequent drought and famine and yet remains unable to feed its people. The country's GDP is composed of Agriculture, industry and services which is about 52%, 11% and 37% respectively.

Addis Ababa, which is the geographical center of Ethiopia territory and act as the main political, cultural and economic centre. The city is located between $8^0$58'and $9^0$05' North latitude and $38^0$40' and $38^0$50' east longitude. It has a total area of 540 km^2 and out of which 18.2km^2 is rural inhibited by farmers (Tilaye and Mesfin, 1997 Rapid Environmental Assessment of Addis).

The central part of the city is characterized by gentle and rolling topography with scattered patches of hills here and there. Numerous streams and rivers, which start from Entoto, run North south within the city boundary and drain to the Awash (A WSA, 1984).

The altitude of Addis Ababa ranges between 2,200 and 3000m and the city boosts the highest point from any city any where in Africa and third highest capital in the world.

The city has a moderate temperature of 16^0c. Before the turn of the century, the city and its surroundings were richly covered with indigenous forests. This led some to refer to Addis Ababa as the "green city[1]".By the turn of the century; the population had removed really all the trees in and around the city for construction and fuel. Now, the most common plantation in the city is the eucalyptus. According to some environmentalists these tree species have highly affected the growth of herbs and grasses because of having an acid on its leaves.

According to CSA,1995 projection in 1997 the population was 2.3 million of which 28,149 live in the cities rural enclave and sex decomposition is 51.6% female and 48.4% male with an annual growth rate of 3.8%. The majority of the inhabitants (about 40%) are living below poverty line. The problems of poverty in the city can be attributed to deteriorating environmental conditions and made Environmental sanitation in Addis Ababa as a critical problem.

The performance of greening and developing open spaces in the city as well as solid waste management and disposal system is poor. This is due to among other factors, like the limitation of awareness or self initiative to maintain the city green and clean in particular and lack of knowledge about environmental issues in general.

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[1] ***By green city we mean that the coverage of an open space with shrubs and forests is sufficient to maintain the Ecosystem in terms of wind breaking, having sufficient recreation areas and other environmental aesthetics***

Some environmentalists[2] argue that Shortage of trucks and the chronic maintenance problem, inadequate number of waste container and the lack of access roads especially in poor and densely populated kebeles attribute to the reduction in clean and green level. A report from Addis Ababa health bureau earmarked that, currently only 60% of the solid waste is collected and disposed of. The remaining waste is left unattended and causes environmental damage and degraded the clean and green level of the city (*ibid*). This aggravates the city poor environmental condition and affects the over all health status of the population in general and the poor in particular. Hence provision of improved sanitary service made the problem of greening and beautification better and remains the highest point.

1.2. Statement of the problem

To take actions and decisions on urban development issues of Addis Ababa, specific environmental problems are components that have to be investigated and priorities have to be set. This research is motivated by the fact that there are no studies that measured the value of clean and green open space in Ethiopia. The contribution of improving the greening and beautification level of the city and developing standardized open spaces to the society as well as the costs and benefits of carrying out these tasks is not well studied.

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[2] ***Currently, The government and other civic societies are taking the responsibility of cleaning and greening the city these include ,The city Administration ,Green and Clean Association and GashAbera Molla are among the highly participated stakeholders which are involving in urban cleaning and developing green spaces***

To create a clean and green open space across the city of Addis Ababa will facilitate the cities potential to serve as African's centre of culture and economy there is a need to society's responsibility and over all commitment in taking care of the responsibility. Even though there is disorganized and uncoordinated society and government movement, there has to be under taken a need based study to bring both parties effective.

Unless we make the availability of city's green and clean open spaces to the optimum, it will cause environmental hazards and degrades urban growth. To keep the city clean and green and have plenty of green open spaces there is a need to promote community participation in terms of planting herbs and grasses in different corners of the city. This needs a direct transformation of the society's attitude towards advocating waste management and beautification.

Urban parks and other vegetated areas in the city have traditionally been viewed principally as recreational amenities. Urban greening comes from the recognition that such urban green areas can and should be used in an integrated, holistic manner for many other environmental and social benefits beyond recreational use and aesthetics. There fore, this study will try to fill the gap that existed between the urban planners and the beneficiaries of the growth.

1.3 Objective of the study

1.3.1 General objective

To give a detailed description of the steps involved in a CVM and to discuss the use of this method for valuing the non-market good i.e., the value of urban green open spaces.

1.3.2 Specific objectives

1. The study will determine which factors (Socio economic and demographic) affect the maximum willingness to pay (MWTP).
2. To elicit willingness to pay for existed and improved urban green open spaces[1] from the hypothetical market of sampled population
3. To estimate total willingness to pay and the value of the non-use value under consideration
4. To draw some important policy recommendation in this area of endeavor

1.4 .Significance of the study

A key decision making problem facing different concerning bodies and many agencies working in this area as well as government bodies in Least Developing countries (LDCs) like Ethiopia, is how to price intended financing schemes for community participation. This paper will provide further evidence on how useful the CVM can be for such pricing decision problem facing these organizations. Organizations which are working in these areas will use the out come of the study, to compare the actual costs of developing urban green open spaces with that of the benefits.

Also the research will present information that could help to know the community WTP values for an intended community based financing scheme aimed at introducing clean, improved greening and beautification city behavior.

1.5 Hypothesis to be tested

It is hypothesized that there are insufficient initiatives of the society to take part in urban cleaning and developing open green spaces. And also it is the desire of the research to test that whether income is a major determinant of house hold willingness to pay (WTP) and demand for high level of greening and beautification. In addition it is also aimed to test which socio- economic variables are significantly affected WTP.

1.6 Limitation of the study

Four different sub-cities were selected for the study which are assumed to represent the whole population. However, the sample size in each site is small to analyze the data separately; hence the analysis is done for all sites together.

CHAPTER TWO: Review of the Related Literature

2.1 Definitions

Urban open space and green area improvement refers to a variety of market and non- market benefits. For the particular case of Addis Ababa city benefits include direct on site uses, recreation area, availability of clean air, amenity value from the surrounding and other indirect use value. In this study green space is defined as comprising of four distinct types of land (Christopher A.; 2003).

Parakeets: Small parks that offer passive recreational amenities (e.g., sitting areas, walking path etc)

Local parks: Small parks that offer a range of passive and active recreational amenities e.g. sports biking trails etc)

District city parks: large parks that provide passive and active recreational amenities for residents across the city

Natural heritage areas: green lands that contain historically and aesthetically important environmental feature that require conservation and protection.

Urban greening and open space development may also produce a different type of benefits known as non-use values' that correspond to a wide range of motivations for which individuals might value environmental improvements irrespective of their use: benefits from protecting green parks and open spaces will benefit the city future generation (bequest value), from knowing that other people may enjoy clean city (altruistic value) or simply from the knowledge that cities are being preserved for their own sake, plants and wildlife (existence value).

The economic valuation of urban green open spaces has traditionally focused on the demand for on site recreation use. However, non-use values may play an important role in justifying expenditure in improving greening and beautification level as the more conventional use benefits. The question is how to estimate this total value because many of the benefits are not traded in market and, hence can not be valued by looking at market prices.

To resolve this for placing monetary values, on non-market goods and services, a method adopted is Contingent valuation method (CVM) (Mitchell and Carson, 1989) [3].

Willingness to pay (WTP) which is defined as the maximum amount that households desire to pay for the improvement of urban greening and open spaces. There fore WTP is considered to be the appropriate measure of the value which a person derives from a particular good corresponding to the correct monetary welfare measures namely Hicksian compensated and equivalent variation.

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[3] ***These authors jointly wrote a well known environmental economics valuation text in 1989 entitled <<using survey value public goods>>***

2.2 Theoretical literature

2.2.1 Review on the valuation of non-marketed environmental goods

Economists have long measured the value of goods that are routinely bought and sold in the market place i.e. via surrogate market. But ordinary markets do not exist for "public" goods such as environmental amenities[4].

Mitchell and Carson; 1989 underlined that our national commitment to a cleaner and safer environment has persisted in the face of oil embargos, stagflation, Concerns about economic competitiveness and competing budgetary claims where as in the public policy in the case of recreation sites claims no charge for entrance even if there is it may not cover the cost and this worsen the problem of valuing these environmental goods on market based instruments, due to all these facts Economics have been faced with the challenge of valuing public goods.

The idea of CVM was first suggested by Ciriacy- wantrup (1947) and first study ever done was in 1961 by Davis (1963). Since the CVM surveys have become one of the most commonly used methods for valuation of non market goods, its use has been questioned (diamond, et al 1994).

The methods of valuation of non marketed goods have become crucial when determining the costs and benefits of public projects and it has an implication for policy issue.

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[4] *amenities are uses derived from public goods yet which can not be traded at ordinary market, Mitchell and Carson use the word as a synonym for a change in public good*

Non-market valuation exercises have been conducted and under taken in many different areas of endeavor ranging from health and environmental application to transport and public infrastructure projects.

The theoretical basis of environmental valuation techniques roots from welfare economics, basically based on the utilitarian moral philosophy. David Hume, Jeremy Bentham and John Stuart Mill from 1711-1776, 1748-1832 and 1806-1873 respectively developed the pioneer theory of the utilitarian principle. According to these individuals utility has to be viewed over time and over inter generations.

Then, welfare changes can be calculated whenever there is a change in utility of the individual when there is variation in quantity, quality and price of the good in question.
This welfare change can be measured or can be derived from the utility maximizing behavior of consumers both from the marketed and non-marketed goods.

2.2.1.1 Methods of Environmental Valuation

Over the years the research on valuation of non market goods has developed into two branches i.e., revealed preference method and stated preference method .Revealed refers to the value of non-market goods by studying actual behavior on closely related market; the two most common methods are hedonic pricing and travel cost methods (Braden and Kolstad, 1991).

Stated preference method on the other hand assesses the value of non market goods by using individuals stated behavior in a hypothetical setting. The method includes a number of different approaches such as conjoint analysis, CVM and choice experiment.

2.2.1.1.1 Stated preference method

The CVM first came into use in early 1960s when an Economist Robert K. Davis, 1963 used questionnaire to estimate the benefits of out door recreation in a Maine backwoods area. Earliest, the well known resource economist Ciriacy -Wantrup (1947) had suggested the use of the direct inter view method to measure the value associated with natural resources. But it was Davis, at the time unaware of Ciriacy- Wantrup's suggestion that played the key role. He developed interests in social psychology and farmers attitudes towards wildlife.

In most applications CVM has been the most commonly used approach. In particular closed ended CVM surveys have been used, in which respondents are asked whether or not they would be willing to pay a certain amount of money for realizing the level of the non-market good described or more precisely, the change in the level of the good (Bateman and Willis, 1999).

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 some how estimated. So, how much are they worth? Since people do not reveal their WTP for them through their purchases or by their behavior, the only way or option for estimating a value is by asking them a question.

In recent year, CVM has been extensively applied in both developed and developing countries to the valuation of a wide range of environmental goods and services. CVM has been successfully applied to a variety of issues including sanitation, water supply, green parks, in stream and off-stream recreation, health risks, wetlands, marine and coastal areas. It is still on development or certain improvements because it is still demanding researchers to make few assumptions.

CVM involves directly asking people in a survey about how much they would be willing to pay or accept for specific change in environmental services.

The reason why the method is said to be contingent valuation is because people are asked to state their MWTP, contingent up on a specific hypothetical scenario and description of the environmental service. The method is thus aimed at eliciting house holds WTP in dollar amounts or what level of compensation they would be willing to accept (WTA) for a reduction from the present welfare level.

Because of the elicited WTP; values are contingent up on the particular hypothetical market described to the respondent this approach came to be called Contingent valuation method (CVM) (Brookshire and Eubanks et al 1978).

CVM requires that individuals express their preferences for some environmental resource, or change in resource status by answering questions about hypothetical choices. The methodology from its beginning has face criticism from both economic and psychological experimentalists, due to the problems in preference elicitation (Mitchell and Carson; 1989).

The respondents in CVM questionnaire will be asked a variety of questions about how much they would be willing to pay (WTP) to ensure a welfare gain from a change in the provision of a non-marketed environmental commodity; or how much they would be willing to accept (WTA) in compensation to ensure a welfare loss from a reduced level of provision. Therefore, CVM is designed to know whether WTP/WTA is the most appropriate indicator of value in a given situation.

Willing (1976) in Bateman claimed that WTP/WTA measures should in the absence of strong income effects, produce estimates of monetary value that are fairly close. But the same author suggests that WTA is significantly greater than WTP (40% + divergence) and have greater variance than WTP.

The format of questions used to elicit valuations may be continuous (or open-ended) i.e. asking respondents to state WTP/ WTA with out any prompts concerning possible answers, or discrete (dichotomous) i.e. presenting the respondents with a single buying price or selling price which just be accepted or rejected. But according to Bateman & Turners, the different formats produce systematically different responses; these could be due to income effect, psychological phenomenon, understandable of the question, and strategic action of the respondent.

The method and economic theory of CVM, according to Mitchell and Carson (1989) cited in Hanley (1990) identifies six distinct phases

Phase 1- Preparation, which set up the hypothetical market definition of the elicitation method, the major one's being open-ended, take-it or leave it (single bounded dichotomous choice) and

double bounded dichotomous choice Provide information regarding the good in question and define the payment vehicle

Phase 2 - Survey: obtaining responses to the questionnaire

Phase 3 - Calculation of mean WTP/WTA from responses, by omitting non-response protest values.

Phase 4 - Estimation: A bid curve can be estimated to investigate the determinants of WTP bids.

Phase 5 - Aggregation required in order to moving up from mean WTP to Total value

Phase 6 - Appraisal whether CVM is successful or not

Some theoretical backgrounds try to analyze the welfare change measures and CVM studies. According to Bate man & Turner, 1992 welfare gain/loss from such changes of provision have been approximated by changes in consumer surplus, the area underneath the ordinary (Marshalian) demand curve and above the price level[5]. In this regard the Marshalian demand curve tracks the "full price effect" which occurs when the provision of a good changes. But, since environmental commodities are not priced a good cannot be traded in a market and the price consumption information required to estimate the Marshalian demand have via a surrogate market fore example using incurred travel costs as a proxy for the recreational value of an open-access leisure site. Environmental goods, according to Bateman et al., 1992 have much higher income elasticity than those associated with many market goods.

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[5] ***Shows how much the quantity consumed of a normal good increase as its price decreases and it indicates full price effect. But this curve has a practical problem to use for un priced environmental goods because it keeps money income constant.***

The consequently large income effect arising from a change in quantity provision may under mine the consumer surplus measure of welfare change (*ibid*). We, there fore, need to compensate for the income effect by holding real income constant i.e. moving from using the ordinary Marshalian demand curve to the compensated (Hicksian) demand curve.

The Hicksian[6] approach evaluates welfare change as the money income, adjustment necessary to maintain a constant level of utility before and after the change of provision. Two such welfare change measures are feasible for such an approach. The "compensating variation" (CV) is the money income adjustment (welfare change) necessary to keep an individual at his initial level of utility (UO) through out the change of provision, while equivalent variation (EV) is the money income adjustment (welfare change) necessary to maintain an individual at his final level of utility (U1) through out the change of provision (Bateman et al., 1992).

Hence, now and afterwards we do have two welfare change measuring approaches and they can be positive (gain) or negative (loses). For a proposed welfare gain the CV measure tells us how much money income the individual should be willing to give up /WTP/ to ensure that the change occurs, while EV measure tells us how much extra money income would have to be given to an individual (WTA) for them to attain the final improved utility level in the absence of the provision (change occurring).

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[6] ***the Hicksian welfare measure using CV survey gives the following WTP/WTA***

	WTP	WTA
$Q\uparrow$	*CS*	*ES*
$P\downarrow$	*CS,CV*	*ES,EV*
$Q\downarrow$	*ES*	*CS*
$P\uparrow$	*ES,EV*	*CS,CV*

The CVM methodological study can be roughly divided into **validity, reliability** and **bias** categories (Mitchell and Carson; 1989). **Validity** refers to the degree to which the CVM valuation correctly indicates the true value of the asset under investigation, bias being a common cause of low validity. **Reliability** refers to the consistency or repeatability of CVM estimates. According to Bateman et al, 1991 reliability and validity of a CVM study can be generalized in linear models[7].

CVM reliability is associated with the degree to which the variance of WTP responses can be attributed to random error, variance in WTP responses derives from three sources; true random error, sampling procedure and the questionnaire. Bias is common in CVM survey because the method by it self is an expressed preference valuation and is inherently susceptible to various types of bias. The conventional classification is to partition bias in to general, procedural and instrumental[8] . General bias can be sub categorized as free-riding, strategic bias, hypothetical bias, and information bias. On the other hand Procedural bias comes from aggregation bias, interviewer bias and respondent bias. Also instrumental bias rooted from payment vehicle bias, and starting point bias. Validity according Mitchell and Carson; 1989 categorized in to three; content, criterion and Construct Validity.

Choice experiment (CE), on the other hand, is another stated preference method in which individuals are given a hypothetical setting and asked to choose their preferred alternatives

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[7] *Y=aX+b+e, and they said that the reliability of this model can be measured by e, while 'a' and 'b' reflect validity; the instrument being absolutely valid if a = 1; b = 0 and 'e' is a random variable implies a bias is likely to present.*

[8] [8]***see*** *(Smith and Devousges, 1986and krisrom*

among several alternatives in a choice set, and usually asked to perform a sequence of such choices .Each alternative is described by a number of attributes or characteristics (Alpizar et al, 2001 cited in Jonse ,2005). Regarding the practical use of CE one can't get a deep literature on the application of CE like CVM.

2.2.1.2 The revealed preference method

The revealed preference method, also known as an indirect approach and tries to infer the unobservable demand for the given environmental goods and services from the observable demand i.e., marketed commodities .Therefore, using information from marketed commodities, economists try to infer the value of such non transacted commodities (free man 1993, and Tietenburg,2003).

The indirect approaches of valuating environmental goods include hedonic pricing method (HPM), and travel cost method (TCM).

Travel cost method used to infer the value of environmental goods mostly recreational amenities (parks and lakes) by utilizing information on how much money and time is spent on that particular site chosen so as to gain a welfare change. Then, by aggregating these observed preferences, one can come up with the measure of the environmental good in question.

Hedonic pricing method on the other hand, basically gains great attention to value the value of air quality in a given locality. This method uses the information on the price of houses and

characteristics of houses such as age, size and number of rooms and neighborhood characteristics like crime rate and availability of public goods and level of air quality (Palmquist ,1984 cited in JONSE ,2005).

Kolstad, (2000) shows the most frequently applied areas which greatly demand the HPM method i.e. urban land use, land rents, effects of climatic conditions on agriculture etc. Palmquist(1984 in Jonse, 2005) again addresses the major problems of HPM; first if consumers are not well informed about the attributes of the good in question the response rate may be very few; secondly, it imposes strong assumptions concerning separability of consumers' utility function; thirdly, it is highly criticized from econometric pit falls such as identification problem, endogenity, non-linearity and functional form[9].

In this study, the researcher deliberately employs the CVM to elicit consumers WTP to value urban green open spaces. Because there is no as such any market which values the indirect benefits accrued from urban green spaces. The reason why the indirect methods particularly the HPM were not employed is that; first the CVM has very bulk literature ,second HPM methodology could not fit with population living standard i.e. people of Addis Ababa are not capable of valuing air quality, this is because of the different reasons like living standard and socio-economic problems.

2.3 Empirical Literature

[9] *see JONSE 2005*

2.3.1 Countries Experience in Urban Greening and Developing Open Spaces

Green area provides a range of tangible, easily valued benefits such as food, fuel and fodder from Agricultural plots. They also provide intangible yet valuable amenities such as aesthetics and noise reduction (Walters Warrensburg, Good practices of urban greening, 1998). The question here is how can city administrators value such multiple and diverse benefits and then compare them to benefits from other projects with early calculated costs and benefits.

With the exception of the goods produced by urban agriculture, many of the goods and services provided by urban greening activities produce no cash revenues (*Ibid*). But they produce a type of good called public good like, cleaner air, a prettier view, and a quieter environment, open to be enjoyed by every body.

The economic literature regarding urban greening programs views, if benefits are hard or expensive to quantify or if the particular urban greening objective is specified in law or zoning regulations a simple cost-effectiveness analysis could be used (Save doff, 1994, cited in Warrensburg 1998).

On the other hand, the benefits of some urban greening activities can be measured in a straightforward way. For example, the direct gross benefit of urban agriculture can be approximated using the market value of product out puts. Flood control benefits can be estimated as the value of damages avoided to property and the loss of profits arising from the temporarily disruption of commercial activity *(Ibid)*.

The replacement cost method is a rough-and-ready means of assessment that provides an upper bound for non-market benefits. In other words, the value is based on what a substitute would cost.

Also another most common valuation technique of urban greening and parks in general is the travel cost method. This method takes in to consideration the number of trips taken over a season by a sample of visitors to an existing site. The assumption behind this method is visitors would react to a certain hypothetical fee in the same way they react to actual out-of pocket travel expenses allows the analyst to derive a demand curve(price quantity relation ship) from the travel cost data.

Air pollution reduction benefits of urban greens spaces and parks on the other hand can be obtained by applying a hedonic model, which tries to capture the relation ship between property values and the characteristics of the housing unit and the surrounding neighborhood.

Other intangible benefits arise from the ecosystem are difficult to quantify in money terms particularly, the value of habitat preservation for biodiversity and general aesthetic improvements. In such cases, an alternative approach is CVM (Ibid). This method asks respondents how much they would be willing to pay for a hypothetical improvement, or bundle of improvements in environmental quality that an urban greening program could provide.

2.3.1.1 The African Experience

Urban greening programs in the Africa are either absent or little; this is because of various factors like lack of attention by the government, instability, and lack of economic wellbeing to turn attention from other programs to such environmental issues.

The only evidence in such programs is the South African government which took initiative after 1994. The government from then onwards was focus on the provision of clean water and sanitation as the key government policy. At the centre of the government development agenda since 1994 has been the alleviation of poverty among the majority of South Africans (greening South Africa; 2003). In addition to improving the livelihood and economic status of the peoples of South African, school greening and gardening program for education purpose was adopted.

The program in the school greening was funded by the South African Electrical giant Eskom's independent development foundation. The activities include planting vegetables, fruit, herbs and flowers. They also developed windbreaks to stop dust blowing, make organic of their waste.

2.3.1.2 The Ethiopian Experience in urban greening programs

The attention of the Ethiopian government and other civic societies were turned towards environmental issues in the late 2004. The regional government who took initiative in urban greening programs among others is the Addis Ababa city administrative. This is because of different reasons like the city being the center of economic and political sit of the federal government.

The first civic society involvement in the city was the one which was initiated by "Gash Abera Molla"[10], which tried to address the problems of urban sanitation basically and greening of major parts of the city through community participation. This program benefited the society by mitigating the most significant environmental problem i.e. sanitation and solid management issues.

The next up most movement by the civic society is the Addis Ababa green and clean association. It was primarily motivated by the business society and it was a society movement but later in September 13, 2003 it transferred in to Association. The goal of the Clean and Green Addis Ababa Society is to beautify the city of Addis by cleaning and developing urban green open spaces through the involvement of the business society.

One of the association's projects is the beautification of street medians and side walks of the city of Addis Ababa. Projects include, cleaning and greening of street median and sidewalks / Model Street/, "Clean and Green Week", Model villages, Model Park, Zoological / Botanical gardens. The city of Addis by its bureau of cleaning, beautification and sanitation currently under takes the coordinating and supervision of all environmental issues basically greening, sanitation and beautification activities.

2.3.1.3 Latin American Experience in urban greening

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[10] *Gash Abera Molla is a nick name for an Ethiopian traditional singer Sileshi Demissie known in playing <KIRAR>.*

The literature on urban greening programs of these nations was primarily stands in response to different socio economic problems like increase in population in cities of Latin American and degradation of environment, direct concerning bodies towards the development of a sustainable urban greening program through the initiation of Inter-American Development Bank (IDB).

The institution (IDB) organizes many seminars, which support urban greening in the continent. Most of the seminars focus area introduces the phenomenon of rapid urban growth and why an urban greening effort is particularly necessary. They also address the benefit gained from urban greening from different angles and fill the gap regarding the monetary value of intangible benefits from urban greening. IDB seminars and work shops also give focus on the basic frame works like social, political, financial etc, that need to be in place for an urban greening program to be successful.

IDB seminar also identifies the fundamental components that tend to make up a successful urban greening program like public out reach, offer education about the benefits of urban greening, inclusion of a variety of greening strategies consisting of public parks with recreational and ecological components street and residential trees, agricultural projects and green ways. The strategy also gives insightful solutions for financing such urban greening projects, including general taxes, permit and fee revenues, and municipal bonds.

2.3.1.4 European and North American Experience

Landscape and urban planning 62 turning from brown fields in to green space in the city of Toronto by Christopher A. De souse, in 2003 underlined that, the mid 1980's policy makers and

planners in North America and Europe have been paying significantly more attention to measure designed to foster sustainable development and improve the quality of life of urban area.

The main objective of the study by Christopher A. is to examine the issues, obstacles and processes involved in remedies potentially contaminated urban brown fields and changing them into green space, and to identify the benefits that these green spaces can bring to the community and culture.

Thus, far, research on greening urban areas including from fields, has explored both the benefits and barriers associated with greening. Landscape architects tend to focus on the aesthetic and environmental benefits that green space oriented redevelopment can bestow on urban areas, such as improving environmental quality (e.g. air, water, micro climates) restore natural habitats, enhancing recreational opportunities and enhancing urban appearance (Hough 1994; Hough et al., 1997; Thomson and Sorving 2000, cited in Christopher .A 2003).

Research on environment in North America and Europe shows that urban greening improves the social well being of city residents in a variety of ways (e.g. Crime reduction, business enhancement, improved wellbeing, stress reduction) (*Ibid*).

Another study cited by C.A in Lerner and Poole (1991) found that greening projects in the US tend to reduce costs related to urban sprawl and infrastructure provision, attract investment, raise property value and invigorate local economies, boost tourism, preserve farmland, prevent flood damage and safe guard environmental quality.

In Toronto, overall the greening projects generated new 614 ha of green space. Most of the redevelopment projects involved former industrial lands, a few involved former railway corridors and properties contaminated by previous land filling and waste disposal activities.

Most of the largest greening projects involved the redevelopment of sites that were near or within existing parklands.[11]

The Toronto greening experience gives a clue that the redevelopment of brown fields site constitutes a valuable opportunity to increase green spaces in urban areas and thus, bringing about benefits, such as soil quality improvement, habitat creation, recreational opportunity enhancement, economic revitalization of neighborhoods, but this action demand public-section involvement and is expensive and needs Community involvement, identify where greening opportunity is , Potential funding sources and administrative initiative.

2.3.2 Urban Greening related CVM studies

CVM studies are still at its infancy particularly in developing countries. This might be due to the fact that the economic situation in these countries mostly is not monetized and people are not aware of the payment vehicle proposed. In addition most development activities are under taken by government. Even though there is quantitative valuation of the eco-system services of urban green spaces, it is depending on how to have a well-defined urban land use planning (Trivinnen, 2001).

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[11] *Factors facilitating the conservation of brown field to green space in Canada include; Community involvement and collaboration , Political leadership, Government funding, Private funding and partnership and others (ibid)*

The usual methods for valuing non-market benefits may be applied to the recreational and aesthetic values of urban green spaces (price, 2003, Garrod and Willis, 1999)[12]. Economic analysis of urban greening initiatives is particularly relevant when size able tracts of land are involved. Such land has high value in private use because it can yield commercial and residential services that are precluded when the land is set a side for urban greening (*Ibid*).

In recent years, CVM has been extensively applied in both developing and the industrial countries to the valuation of a wide range of environmental goods and services .In particular, the system has been successfully applied to a variety of water related issues including sanitation, water supply in and off-stream recreation and health risks, lakes and rivers, fishing sites, urban water supply, parks, wet lands (*Brett Day and Susana, 1997*).

However, valuation exercises in developing countries have concentrated in two areas; water supply and sanitation, studies in related to urban cleaning and greening are scarce. This is due to the fact that in the absence of society's access to basic needs, it is not feasible to under take a valuation study on such aspects. The result estimated will be a biased one due to non-response biases (*Brett Day and Susana, 1997).*

The following section overviews selected contingent valuation studies estimating benefits of urban green areas and open spaces. Note that studies related to the particular urban greening and

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[12] ***found that house prices are higher when more than 20% of the land surrounding the house in a one KM ^{2} is in wood land***

cleaning are very minimal and insufficient. So, in this empirical literature other studies are included.

2.3.2.1 Other Countries Experiences In related to CVM Studies of urban greening

G. Garrod and Willis (1999) review a number of environmental benefits valued by different authors using different valuation techniques. The first review they under took concerned out door recreation values in Malaysia using travel cost method. In the study, it was taken the dependent variable as number of visits made by a respondent to a forest recreation area over the preceding six months and eight dependent variables were used and the variables included are those which are significant at the 0.15 statistical significance.

A willingness to pay study on urban green way was conducted by Lindsey and Knap in 1999. The study was focused on assessing the value of maintaining corridors and open spaces in Indianapolis. The study was focused on valuing by assessing household willing ness to pay (WTP) to an organization that organizes people to clean up. But finally the result shows that a relatively large number of the respondents (roughly 20%) indicated $0 WTP. This is because of the problem of the scenario designed, which had lesser information and causes a doubt on the results of the study.

Another study on this approach was the one carried out in Finland to value urban forests by Tyrvainen and Vaananen (1998) .This study looks at the value of two types of urban forest areas; one large and undeveloped, the other small and developed. Respondents were asked their WTP

for maintenance of the recreation forest areas. The finding shows that there were no as such a zero WTP and the WTP for the large forest area is $28. And finally they concluded that the aggregate monetary benefits are much higher than the current maintenance costs for the forested recreation areas.

Wendy Yan Chen (2006) in the University of Hong Kong estimated the monetary value of eco-system services of recreational opportunities and amenities provided by green spaces in the built up area of Guangzhou city was estimated as RMB 547.09million.

Amenity values estimated by CVM of tynesides green belt agricultural land by Willis and white in 1985 shows that the mean WTP and the tyneside green belt study demonstrates that the preservation of the green belt in terms of the amenity value of the land was highly dependant upon the property rights perspective and whether WTA or WTP measures were used in the valuation. WTP to avert the loss of the green belt was only one third of WTA compensation for its loss[13]. Therefore from this survey we can conclude that people are highly susceptible to WTP than WTA.

McPherson et al., (1999) on the other hand used a single bounded dichotomous choice model to estimate annual value of aesthetics of Modesto's urban forest which is US$1.5 Million. The study was conducted using face to face survey format. In another study of urban trees by McPherson in Santa Monica, California, the annual aesthetic benefit was US$26/tree and a forest was US$1.9Millon.

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[13]

	Brunton park	Melton park	Both
WTA	65	127	104
WTP	23	42	35

A Monetary valuation study of urban forest Amenities in Finland by Tyrrvannen by Using a Hedonic pricing method and CVM found that more than 2/3 of the respondents were willing to pay for the use of recreation areas in both town (Joensuu and salo). On the average half of the people were WTP to prevent the conservation of forested parks to another land use, MWTP for construction of urban forests varied in joensuu from 126 to 200 FIM/year household and in Salo from 74 to 169 FIM/year/ household. He finally concluded that monetary value of urban forest amenities in recreational areas is much higher than the present maintenance costs.

2.3.2.2 CVM Studies on Other Environmental Resources

In Barbados a contingent valuation study was conducted to study willingness to pay for a reduction of coastal water pollution by McConnell and Dueci in 1989. The study was conducted over 709 samples using an open ended dichotomous choice model .A payment vehicle provided was tax or water bill. The sample was taken from off and on site inhabitants. The finding depicted that mean annual WTP of US$11for off- site and us$ 178 for the on site inhabitants. This shows that the factor that significantly affected WTP is distance from the site i.e. not income of the society. Another study by the same author was carried out in Uruguay in the same year. The difference between the two studies were the type of sample; in the second study only considered the off site inhabitants. The out come of the survey shows that MWTP is $ 14, which is less than 1% of the median house hold income (McConnell & Ducci ,1989) .

Brett Day and Susana Mourato report a study on large scale economic valuation study of river water quality improvements in the Beijing metropolitan region. A contingent valuation study was conducted over a sample of 999 people in the region. The scenarios were proposed where by river water quality would deteriorate, then respondents were asked for this WTP to prevent

deterioration of specific rivers. The authors derived a conclusion from the survey that WTP model for the people of the developing world can easily translate and applied. And for these societies, WTP for river water quality ranked the fourth and WTP for drinking water quality ranked first· Finally, they concluded that average willingness to pay is higher than the value maintaining Beijing Rivers.

Breffle et al (1998) use CVM analysis to estimate the value of parcel of land in Colorado. The preserved land has the potential to provide residents both use and non use values. Out of 1500 residents within the site, 72 sample households were taken.

The finding showed that the median estimated WTP to preserve the parcel was $ 234 and they concluded that WTP is highly affected by income than distance from the preserved land. By extrapolation, they found that the total value of the land is $774,000 and the cost of the land is $600,000.

2.3.2.3 CVM Studies in Ethiopia

Generally, little has been done to value urban green and open spaces in Ethiopia and hence this study will contribute and fill the gap that existed among the planners and policy makers. But there are other environmental resources which have been studied by different authors using CVM. The following are some of them.

Alemu (2000) used CVM to examine the determinants of the value of community foresting in rural Ethiopia and its feasibility when plantations are established, managed and used by the community.

Jabessa (2004) use CVM to value forest resources in Arsi-Zone in 3-selected Peasant associations. He found that, sex of respondents, family size, education level, distance of the proposed plantation did not significantly affect household's WTP for establishment of new eucalyptus and indigenous trees plantation .Also he found that average WTP was 22.79 birr.

Tegegne (1999) also applied this method to elicit people's valuation for environmental protection by asking people to pay both in terms of cash and Labor contribution. He concluded that house holds in the study area are willing to contribute in terms of labor than cash

Fisha (1997) and Dunfa (1998) also applied the CVM studies for measuring the WTP for improved water quality in Meki town and Ada'a Libein districts of Ethiopia respectively. In both studies, income and time (distance) spent to fetch water become significant factors determining WTP .Education and wealth were insignificant.

Moges (1999) used CVM to estimate the WTP for Tana recreation site. His finding indicated that income, family size and level of education are significant factors influencing WTP of household for recreation.

Jonse (2003) used CVM to value non-farm use of irrigation water, evidence from Blue Nile. He used both single and double bounded elicitation format to value the good in question. He valued

the good under two scenario i.e. existed Vs improved institutional set up. The finding indicated that, under the two scenarios obtained different total WTP. For existing irrigation water quality TWTP = 261, 776 birr using open ended and birr 363, 063.60 using single bounded and birr 361,336 and 409, 441.6 after improvement respectively. He also reached a conclusion that introducing double bounded CVM form did not improve statistical efficiency over single founded.

CHAPTER THREE: SURVEY DESIGN, DATA COLLECTION AND ESTIMATION METHODOLOGY

3.1 Data Sources and Types

The source of data used for both the descriptive and for Econometric analyses of this study were collected from 200 randomly selected households in the four purposely selected kifle ketma's of Addis Ababa[14]. Sampling strategy were defining population for those living in different sub-cites, dividing these strata based on income and other relevant factors and took population sample proportionally. The survey questionnaire elicited data on demographic characteristics of respondents, and on socio-economic variable. Demographic variables like ,male, age (mean),marriage (single, married, divorced, etc.) , family size (mean),number of children (mean),education (No education, primary, secondary , professional degree , university degree) .On the other hand economic variables that were included are: yearly household income (in birr), employment (Self, employed full time, unemployed, and student, retired), monthly household expenditure (in birr), car, home appliances (TV, Washing machine, Tape/CD players, Telephone, Refrigerator etc).

The survey, in addition to the above characteristics, contained single-bounded CV questions in which prices (bids) on urban greening and open space development were proposed to respondents under the existed and improved urban greening and open space delivery setting. Specifically bids are introduced for urban greening and cleaning with out any change in quality and quantity of the

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[14] *Kifle ketema is an Amharic version given to sub-city and it is a synonym for district, and there are about 10 Kifle-ketema's in Addis according to the current administration*

current Addis Ababa green open space level under the current institutional set up. Here, the researcher tried to know the value of the existed urban green and open spaces with out any change.

Knowing the values of existed urban green open spaces will help policy makers (stake holders like Environmental Authority, NGOs, Civic society and others) to design sustainable strategies to enhance growth and environmental protection. Secondly, prices (bids) were introduced for the improved urban green open spaces after change in quality and quantity of the present green open space level.

This research particularly used primary sources and under took a survey within the residents of Addis Ababa. The study also used CVM to estimate the value of changes in urban greening and beautification in Addis Ababa city .The basic underlying idea is that by means of an appropriately designed questionnaire, a hypothetical market is designed where the good in question can be traded. People are then, directly asked to express their maximum willingness to pay (WTP) for a hypothetical change in the level of provision of the good.

3.2 Designing survey questionnaire and elicitation Method[15]

The literature on environmental goods exhaustively presents that the market generally fail to exist due to the common nature of these goods, and externalities. Due to such circumstances, researchers to know the value of these develop a hypothetical market, in which case they elicit

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[15] *Cameroon et al(2000) compares seven elicitation methods ,six were stated preference and one was revealed preference .Among the stated preference methods ,they find that the responses to four appear to imply the same underlying preference functions . Only open ended format and the payment card method appear to produce different results.*

from customers or potential consumers their WTP/WTA for a change in quality or quantity or both of environmental goods.

Contingent valuation survey usually includes detailed scenario of the good under consideration and possible circumstances under which the good will be available i.e. payment vehicle, WTP/WTA for a change in quality of the good under consideration and respondents socio economic and other relevant variables.

The CV questionnaire of this study has six-parts. The first two parts provide general and detailed description of the purposes of the survey followed by the third and fourth parts that try to collect information on demographic and other socio-economic characteristics of respondents. The fifth section focuses on attitudes of the consumers towards environment. The final section elicits consumers WTP for urban greening and cleaning (see Annex 3)

The CV literature generally provides us about four types of value elicitation formats, namely open-ended bidding game, payment card and dichotomous or discrete choice format. Each format has its own advantages and disadvantages. Double-bounded CV-elicitation format can improve statistical efficiency over singe-bounded being having a number of advantages (Mitchell and Carson 1989). First, yes, no and no, yes, answer to the initial bid make clear bounds on unobservable true WTP. Second, even though yes-yes or no-no answers do not bound actual WTP, additional questions will sharpen the true WTP, hence provide to have more questions in DBDC and it has greater efficiency gains (Haab & McConnell, 2002). But this research utilized only the single bounded dichotomous choice approach. This is because in the pretest the research questionnaire were primarily designed in a double bounded format; it was found that respondents

were highly affected by starting point biases , and we found no difference in response for the double bounded model. There fore, we utilized the single bounded dichotomous choice questions only leaving the rest responses.

3.3 Survey Scenario

The survey questionnaire primarily provided detailed description of the good to be valued i.e. urban greening and cleaning, in terms of its diverse uses. The single-bounded CV-questions were followed by open-ended follow up-question for the improvement of urban greening under two scenarios. The first scenario assumes no change in the institutional set up and with out any change in the environmental good. In this case respondents were asked to pay the proposed initial bid for the specific use of urban greening. Also the single Bounded Dichotomous Choice is followed by open-ended to express their maximum WTP for keeping the urban green and clean at the existed level (see annex 3)

In the second scenario, respondents were asked to pay to improve urban cleaning and greening by introducing a change in quality and quantity of the good in question (the indicator is green covered road side ways, development of parks, green belts Commercial green areas). The payment vehicle is implemented in the form of annual contribution to development association in that particular locality.

3.4 Sampling Techniques

The choice of sample size in a CV survey determines the precision of the sample statistics used as estimates of population parameter such as mean WTP/WTA (G. Garrod and Willies, 1999). In general the larger the sample sizes the smaller the variation in MWTP as measured by standard error. Mitchell and Carson, 1989 recommended that for applications which seek to evaluate policy, the sample size should be at least 600.

To carry out this survey, the sampling technique used was stratified sampling technique and the method employed is proportional random sampling and four sub-cities (Bole, Arada, Yeka, and Gulele) were purposely selected out of the ten sub-cities of Addis Ababa.

These four sub-cities were stratified into a number of kebeles from which a total of 200 households were selected using simple random sampling and stratified sampling techniques to select the sample house hold. Then the data were collected from the head of the sampled house hold using CV-questionnaires using face-to-face interview.

Before carrying out the final survey, a pilot survey that included 10 house holds was conducted. The objective of this pilot survey was to set up the starting bid to be used in the main survey. In this pilot survey, the open ended elicitation format is employed which takes the form << what is the maximum amount you are willing to pay for urban greening and developing open spaces annually>>?The maximum WTP from pilot survey varies from 20 birr to 80 birr for the existed level of greening and from 100 to 140 for the improved.

Then, based on the pilot results five starting bids were proposed. The whole survey was conducted from October 20-November 10, 2006 where 3 enumerators and one supervisor who have got his B.SC in statistics were participated. The survey were completed with 4% of protest zeros.

3.5 Analytical Models Specification

In the survey, the single-bounded willingness to pay models was estimated based on the data collected from primary sources. For the single-bound data, the probit model were used to empirically determine the factors that affect the fore and against votes. Then the model used to describe this distribution consists of the single bounded probit model for the existed and improved level of the urban green open spaces.

3.5.1 The probit Model

In this model it is explaining whether people are willing to pay (referendum question, single bounded) any thing for improving urban greening and beautification at the existed and improved level (see Hanemann and Kris tom, 1995). To model this we begin with by assuming that there exist some unobservable variable U_i (i indicates the i^{th} house hold) and this unobservable variable let's say < utility level> that is affected by certain characteristics of the house hold (like, income ,education level , change the quality of the good in question,, etc).

If U_i will is greater than certain thresh hold level U*

Then WTP >0 if $U_i \geq 0$

WTP = 0 if U_i <0 1

Since there is no way to know the house hold utility level, we have to assume some thing ,i.e., the house hold has a random utility function (and assumed that it has a log normal distribution and estimated by the maximum likelihood estimation) of the following type:

$U_i = \upsilon_i (X_{si}, \beta_s) + \mu_i$

$= B_{so} + \beta_{s1} X_{sli} + \beta_{s2} X_{s2i} + \ldots + \beta_{sn} X_{sni+} \mu_i$ 2

X_{si} = variables that affect U_i (like income, change in quality of goods etc.)

β_s = vector of parameters that measure the influence of the X_{si} variable on the value

μ_i = error term due estimation and we assume that e_i is normally distributed.

From equation 1 and 2;

WTP = 0 if $\upsilon_i + \mu_i < 0$

WTP > 0 if $\upsilon_i + \mu_i \geq o$ 3

From 3 the probability that U_i will lie above U* or equal 0 becomes

P^N = Pr (WTP =0) = pr (($\mu_i < -\upsilon_i$)

$= 1 - \emptyset (\upsilon_i)$

P^y = pr(WTP>0) =pr($\mu_i \geq -\upsilon_i$)

$= \emptyset (\upsilon_i)$ 4

Where Ø is the cumulative standard normal distribution (probit model)

Then the resulting log-likelihood function for the response to a CV survey using the single – bounded format:

$$Ln\upsilon_i = \sum\{ d_i^Y \ln \emptyset (\upsilon_i) + d_i^N \ln (1 - \emptyset (\upsilon_i))\}$$

Where $d_i^Y = 1$ if the i^{th} response is yes and 0 other wise , while $d_i^N = 1$ if the i^{th} response is no and 0 other wise. The descriptive and econometric analysis was carried out using The LIMDEP econometrics soft ware.

3.6 Description of Explanatory variables

1. Income (INCOM)

Societies WTP could be normally positively related to the household's monthly income. But mostly this variable is under estimated due to fear of tax increment, and this is actually observed in this survey particularly in the business community and low class societies. And this is clearly shown in the disparity of household income and monthly expenditure i.e., in this survey the surveyed house holds average monthly expenditure and income respectively is 1059.46 and birr 785.63 which is more or less reasonable to the CSA report of 2005.

2. Experience of visiting recreational parks (RH)

In this survey respondents were asked about their habit of recreation in the urban green open spaces and parks, and it is expected that those who have an experience have a positive WTP for the proposed bid.

3. Sex (FEM)

In our society mostly male is considered as the head of the house hold, and a decision maker in every social and economic affaire. In this survey 72% is male headed. And it is expected that male-headed households are willing to pay more for urban greening activities.

4. Education (EDU)

Whenever there is advancement in knowledge of the individual, there is always a tendency to take care of the environment and know the direct and indirect benefits of the natural resources, thus we expect that advancement in education has positive relation with willingness to pay.

5. Family sizes (TFS)

Since the increase in family particularly in the lower class group of the society causes high demand for consumption expenditure, house holds of this group are expected to have a limited willingness to pay. On the other hand, those with high income and large family will have a desire to create an environment for their children and have a positive willingness to pay.

6. Membership in urban development activities (MSDA)

Mostly in developing countries there are integrated grass root level development programs which need to address the community problems using participatory approach. In this situation people are voluntarily become the member of this group so as to combat the different socio economic

problems of their surrounding. There fore, those who are a member in such development associations are assumed to have a positive response to the proposed bid.

7. Accessibility to green parks and area of living (DIST)

The literature on the indirect valuation method i.e., hedonic pricing method proposes that people give high value to houses which are near to open and green areas, thus it is expected that people living in this areas have a high willingness to pay than the other.

8. Initial Bid level (ibid and iibid)

The higher the starting bid the lower the expected number of respondents who accept the bid and hence an inverse relation ship between an initial bid and a yes response.

9. Employment situation (GOV)

In any institutional set up there are always differences in awareness among the programs of government. In this study, since the initiative of urban greening is taken as a political and economic issue by government, those who are working in such institutions are expected to have a high willing ness to pay.

10. Age of house hold head (AGE)

Awareness and care of any environmental calamities always arise from increase in experience and this is always come in conjunction with age. Thus, in this survey it is expected that those household heads with the age category of adult and above could have a positive willingness to pay to the proposed bid.

11. Number of Children (NOC)

The higher the number of children the house hold has there a high tendency to have a positive WTP, this is because families may care for the future of their children.

12. Monthly average expenditure of the household (EXP)

Those households who have a higher monthly expenditure due to large family size could be against any additional expenditure, but on the other hand they may consider the annual payment for the use of urban green and open spaces may be negligible and there might be a positive WTP. In this study it is expected that the higher the expenditure the lesser the tendency to have a positive WTP.

Chapter four: Descriptive Statistics, Estimation and Discussion

4.1 Description of the Study Area

4.1.1 Background

Since, Addis Ababa is the centre of commercial, economical and political for Ethiopia and Africa, it highly demands environmental quality i.e. need for improved parks for recreation and well-equipped streets endowed with green herbs and vegetables. The reason behind the intensively practical phenomenon of urban greening program by the government and other civic society is backed by this fact.

Addis Ababa is the capital city of Ethiopia with a history of little more than 100 years; the city is extremely young especially in regard to the long history of Ethiopia. It was founded by Menelik II in 1887, and the population grown from the simple rural population to 3-4 million. Addis Ababa is a self-governed city according to the proclamation released in 1992 (proclamation No. 7/1992). There has been 7- master plan developed for the city during the current century but still no adequate urban planning has ever been achieved, as a result Addis Ababa has experienced almost uncontrolled growth from a small city to a metropolis lacking any sound land use and infrastructure (Addis Ababa master plan, 1993). The city currently has ten sub cites and 103 kebeles. The sub-cities are now become the center of all municipal works.

Regarding environmental and sanitation condition of the city it is agreed that the city lacks the facility to have the appropriate sewerage and waste management scheme. According to Addis Ababa health bureau, 1997 report more than 90% of the population has no access to adequate sewerage, 29.2% has no toilets, and 60% of the solid waste is disposed of uncollected. Regarding the cities open space and green area, in the current master plan in addition to the 11 previous parks 17 additional parks were proposed which will take about 292.55 ha. Also the Master plan proposes 18 square parks along the roadside ways and belts. The total green areas of the city currently account of about 7,900 ha (14.6%) (AACGA, 2006). But when the new master plan set in to practice the total green area will be about 22,000ha(41% of the total area of the city).

4.1.2Geographical Location

Addis Ababa is located in the central Ethiopia highland on a plateau with an elevation ranging from 2000-2800m. Its climate is characterized by warm temperate rainy climate due to high altitude, seasonal variation of air temperature are minimal, the average monthly maximum lies between 21°c and 24°c during daytime and minimum b/n 7°c and 12°c. Average annual rain fall amounts to 1,178mm with variation between 8mm in November and 278 mm in August (A.A city government and, 1998). The new boundary of the city was defined and approved by the master plan of 1994 by the government in proclamation No. 7/1994 (cited by Tilaye,1998) with a total size of 53,914ha.

Addis Ababa consists of urban and rural areas, the population density varies between 5 inhabitants/ha in rural areas and up to 632 in habitants/ha in urban areas that dominate the spatial structure (Abraham 1996, cited in Tilaye and Mesfin 1998.)

4.1.3 Socio-Economies Setting

4.1.3.1 Demographics

Addis Ababa is one of the fastest growing cites in the world and constitutes about 60%of the total urban population of Ethiopia. According to the 1994 population census the population was 2,112,737 with a Growth rate of 3.79. But other sources like CRDA estimate the population to be 3.5-4 mill with a Growth Rate of 6-8% (2/3 migration and 1/3 Natural) and according to CSA 1995a 32% of the population are less than 15years old and 1.7% over 64. The literacy rate is 83%. Public health services are better developed and reach 65-70%.

4.1.3.2 Economic Structure

Addis Ababa is the industrial centre of the country and hosts 67% of its industry and only 13% of employees are engaged in this sector (CSA, 1995).

The city become the place of destination of investment and the income of the city has got grown from 185 mill birr 1993/94 to 337 million in 94/95 but 65% of the population share only 1/5 of the total income (Begston and Negatu, 1995 cited in Tilaye and Mesfin ,1997).

4.2 Income and Expenditure of the surveyed house holds

According to welfare monitoring survey of the 2004 the city of Addis has 524,908.36 house holds and the annual income of the city also according to the statistical abstract of 1995 indicated

that about 1.3% has less than 2000 birr[4] 82.9% has annual income level of birr 2000-12,599 and 15.8% has greater than an income level greater than Birr 12,000. From this survey we found that the surveyed house holds have 1059.46 birr and 785.63 birr average income and monthly expenditure respectively.

From the surveyed house holds after conducting probit and estimates, we found that income determines WTP with high degree of significance. And monthly expenditure was related positively and implies monthly expenditure has some proportion allocated to activities like urban greening and developing open spaces.

4.3 Knowledge of the Surveyed Households toward Environmental Issues

4.3.1 Summary of General Environmental Attitudinal Responses

The third section of the survey contained questions aimed to behavioral and attitudinal aspects of the intended respondent. These questions were designed to reveal about the underlined issues for motivating in urban greening activities and environmental sanitation so as to aid in the interpretation of the valuation response.

The following table summarizes the results obtained regarding the attitudes of the respondents of the house holds towards the perceptions of particular environmental factors. These results will aid to give priority to which environmental problems any stakeholder or any intervening body set as target. Also in this section we have tried to identify the perceptions of house holds by proposing a

question and ranking their responses in terms of strongly agree, agree, disagree and strongly disagree (see figure4. 1). These are shown in a bar graph form of different types.

Table 4.1 Most environmental problems of Addis and perceptions of household towards environmental goods

Major Important problem of Addis	%
1Enviromental pollution	52%
2. Urban security	18.7%
3.transportation	6.7%
4. I don't know	3.6%
5. Other	19%
Major environmental problem of Addis	%
a. Air pollution	15.2%
b. Lack of dry waste management	64.7%
C. Lack sufficient green and open spaces	12.3%
D. Lack of pure water supply	6.4%
3. Reasons for greening and cleaning	%
a/ for future generation	47.9%
b/ for business affairs	9.4%
c/ inter generation equity	23.4%
d/because it has social and economic benefit	5.2%
e/other	14.1%
4. Willingness to clean and green the city	%

a/ Yes if the cost is minimal	37.4%
b/ yes if it creates job	31.6%
c/ yes if costs are less than benefits	21%
d/ Not willing	10%
5. Motives for developing urban green open area	%
a/ flood control	10.9%
b/ to protect wild animals	6.8%
c/ To have better recreation areas	61.5%
d/ other	20.8%
7. Type of recreation center used if the particular household used	%
a/ government parks	21.6%
b/ private parks	23.2%
c/ small parks	16.8%
d/ village	25.5%
e/ never	12.9%

Source: own computation from survey

In the table above it is found that 52% of the sample consider that the most common problems in Addis is environmental problem; like environmental pollution, lack of dry waste management, lack of sufficient green open spaces, lack of pure water, lack of toilets etc. and ranked urban security problem 18.7%, transportation problem being 6.7% and the rest respond as I don't know and other like political instability followed by the 2005 election. There fore, we can conclude that

the city of Addis is highly affected by environmental problems which are easily observed from this survey.

Also we can say that these responses are highly inflated due to reasons like the individuals political inclination and the present political unrest of the city and this affected the response rate. The next question respondents asked were which environmental problem is significant and how much they are sensitive towards urban greening and developing open spaces. In this regard 15.2% says air pollution, 64.7% lack of dry waste management, 12.3% lack of sufficient green and open areas, and 6.4% pure water supply. There fore, the utmost environmental problem of Addis is dry waste management and which is in line with the statistics of the 2004 Addis Ababa health bureau

In terms of their willingness to clean and green, we found that 37.4% are willing to pay if the cost is low, 31.6% yes if it creates job, 21% yes if costs are less than benefits, and about 10% are not willing to pay any thing. Also respondents were asked what type of indirect environmental uses they identify and we found that 47.9%for the bequest value, 9.4%% for existence value, 23.4% for aesthetic value. Respondents were also facing a question type that elicit for which direct use value they care to develop urban green space. In this regard 10.9% say for flood control, 6.8% to protect wild animals, 61.5% to have better green and open recreation areas and 20.8% for other use motive.

Finally, in this section of the questionnaire they were asked about their habit in recreation and type of recreation center used .In this regard 56.5 % sometimes and always and 43.5% never.

And the type of recreation center used was 21.6% government, 23.2% private, 16.8%small parks,25.5% village, 12.9%other types.

From this result we can draw some thing regarding the behavior of house hold in recreation habit and the most common area that they use as recreation centre.

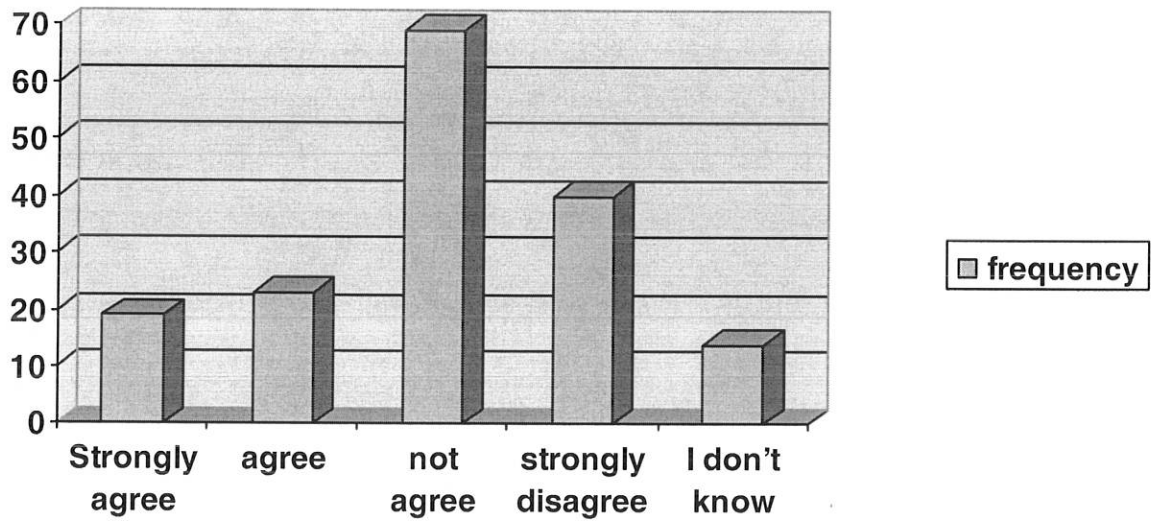
In view of this, more than half of the populations have the habit of recreation and unfortunately the greatest proportion of the population (23.2%) respond that they mostly use private parks, but it was expected that mostly they use government parks, this is basically on the assumption that government parks have lower entrance fee.

4.3.2 Households Attitudes to wards the urban green and open space development

This section summarizes how respondents' attitude is towards developing urban green and open areas. This descriptive part gives key policy issue for intervening parties before they start any project in this endeavor. Because any project which aim at social welfare maximization is not possible with out active participation of the target beneficiary. So it is aimed that this part will fill the gap that existed. Also this part helps to identify the degree to which societies have been understood being they have responsibility to safe guard their respective environment and also whether they are capable of valuing environmental goods in such circumstances.

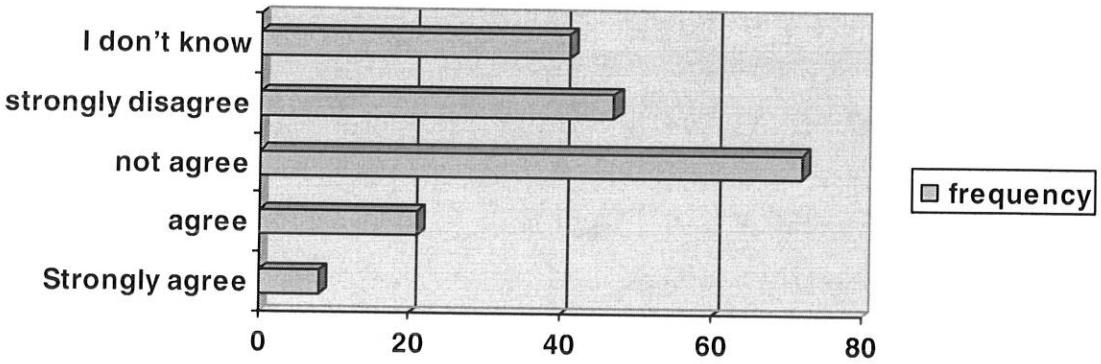
Figure 4.1 the following graphs summarize the attitudes of the intended household in urban greening and cleaning activities.

A/ If government Participates in urban cleaning and developing green spaces house hold involvement is not necessary.



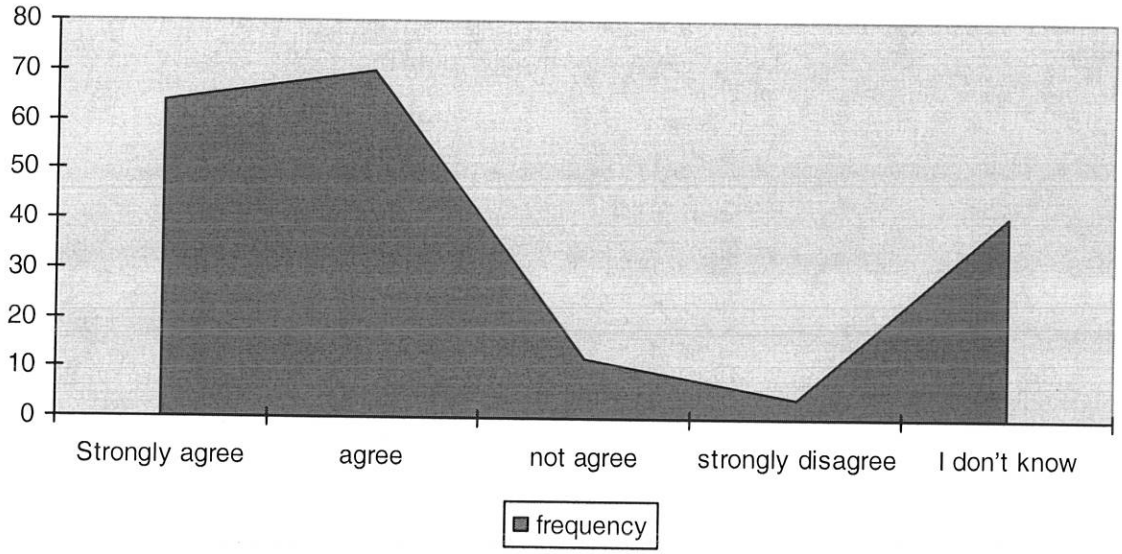
From this bar graph we can read that 35.9% of the population (which is the highest) responds that urban green and open space development is not only the responsibility of government but also they are responsible for the environment. On the other hand about 9.9% said that it is government's responsibility to develop urban clean and green areas.

B/ Even though lack of urban cleaning and sanitation brings environmental problems I don't care if am not affected



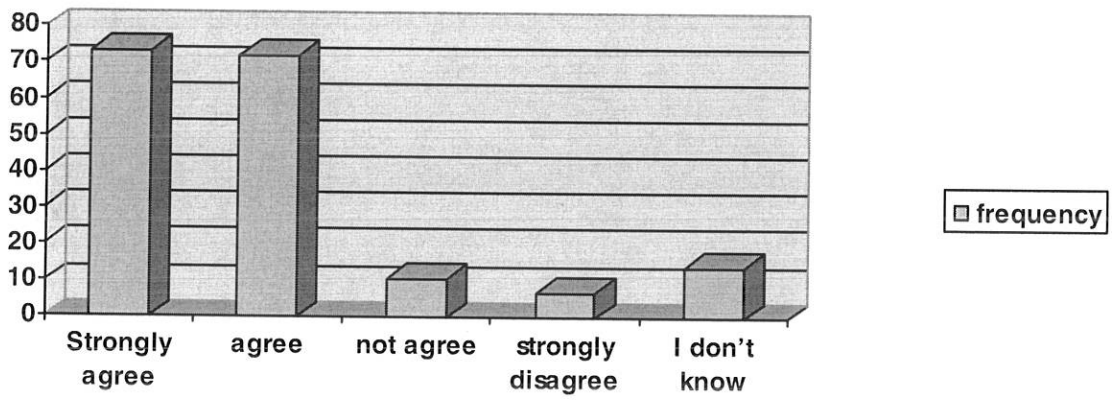
From this chart we can easily understand that the peoples of Addis are aware of the environmental hazards that can come from poor environmental management and safety; i.e. the highest proportion about 37.5% said they don't need to live in an area which is environmentally hazardous.

C/ Urban sanitation and developing urban green spaces brought business development



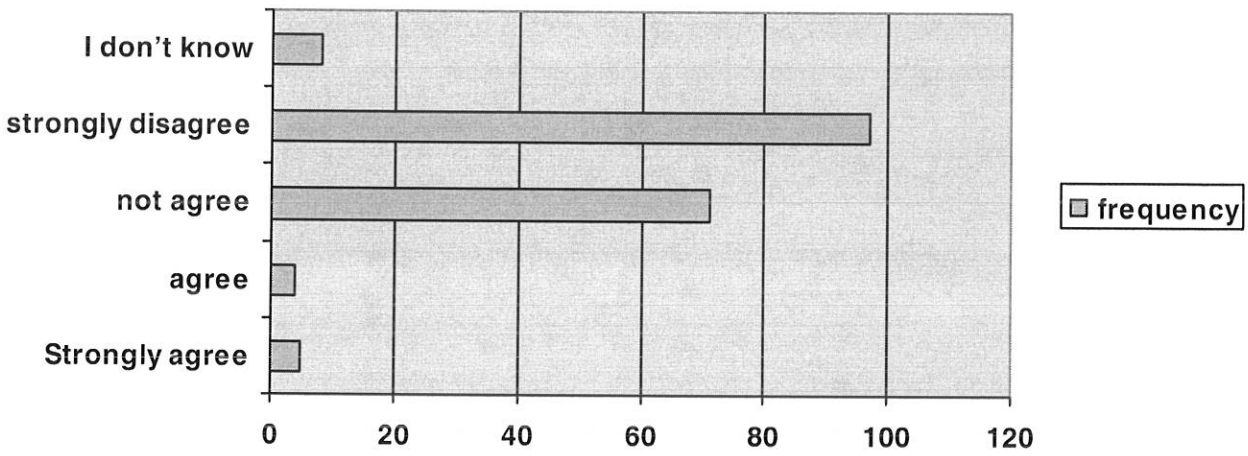
This part addresses the different use of urban green open areas whether brought business to the intended house hold or not. In this regard we found that36.4% of the house hold agree that green areas have the capacity to attract business.

D/ Wild and endemic animals have to be protected in special protected botanical parks



The fourth chart of this section tried to know whether they have knowledge about wild and endemic animals and the necessity of green parks for this plants and animals.38% of the house holds respond that they strongly agree to protect wild and endemic animals in a protected green area.

E/ It is rather to live in a polluted city if the cost of greening is high



This section tries to evaluate how house holds compare cost of urban greening and the impacts polluted city. We found in his survey that about 50.5% strongly disagree that they don't need to live in a polluted city what ever the cost of greening is .There fore we can conclude that house holds have high incentive to develop clean and green open spaces.

Lastly we tried to observe that whether there is other fundamental problem other than urban greening and sanitation, and in this regard we found that 34.8%of the surveyed house holds which is the highest proportion not disagree being they value that urban cleaning and greening is the highest problem they encounter.

In general, we can observe from the above figure the responses of house holds to what extent they reflect their motivations and to which motive category they mostly care about. According to Day and Mourato (1998), the above motives can classified in the following manner

By this logic figure 4a, anthropocentric motive, 4b, selfish 4c, and 4e existence motives 4d, option value motive. Finally, we conclude that respondents are driven by not only direct use values but also by altruistic motivations like, bequest, option and existence ones. In addition to this, there are significant out puts that shows many factor which play a role in individual attitudes.

Table 4.2 Descriptive Analysis of Explanatory variables

Variable.	Description of the variable	Mean	Std. Dev	Min	Max
WTP_i	$WTP_{i=}1$ if yes to initial bid ,0 other wise for the present urban cleaning and greening	0.44	0.49	0	1
WTP_{ii}	WTP_2=1 if yes to the initial bid , 0 other wise for the improved urban cleaning and developing green spaces	0.21	0.4	0	1
ibid	Initial bid for the existed use of urban green spaces(In birr) [5]	64.6	15.09	20	100
iibid	Initial bid for the improved use of urban open green spaces(in birr)	124	24	30	140
exp	Average monthly expenditure per house hold (in birr)	785.6	651.1	0	5000
INCO	Average monthly income per house hold (in birr)	1059.5	882.9	0	6000

TFSize	Total family size of the house hold (in number)	5.5	2.7	1	20
noc	Total number of children (in number)	2.8	2.3	0	8
Msda	Dummy for Membership in development association like urban cleaning and greening: Msda=1 if member , 0 other wise	0.53	0.2	0	1
dist	Dummy for access to green parks :dist=1, if there is green parks around the locality , 0 other wise	0.36	0.48	0	1
edu	Dummy for education: edu=1 if education of the house hold >12, 0 other wise	0.6	0.49	0	1
rh	Dummy for recreation habit of the house hold: rh=1 if they visited always or some times, 0 other wise	0.31	0.46	0	1
fem	Dummy for sex of the house hold : fem=1 if sex of the house hold is female, 0 other wise	0.28	0.45	0	1
Age	Age of the respondent in numbers	41.4	13.2	16	82
gov	Dummy for employment type : gov=1 if government employed , 0 other wise	0.4	0.49	0	1

Source; own computation from sample survey

Some of the interviewed household was found that they are representative of the household head and may this affect the reliability of the response in this CV survey. Despite having this reliability problem of the survey the descriptive statistics part is summarized as followed.

From this table, we can deduct that 28 % of the house holds are female headed and we can generalize from this peoples of Addis are generally male headed one and dependency is higher .Also it reveals that on the average each house hold has an average of 5.5 family size and average number of children is 2.8.(see table 4.3). On the other hand, the average monthly income and expenditure of the surveyed house holds is 1059.5birr and 785.6 birr respectively. Age composition of the house hold head ranges from 16 to 82 years which is analogous to the 2004 welfare monitoring survey.

Regarding the education level of the respondents we can see from the above table that 60% are diploma holder and above and 40% are either 12 complete or below grade 12. In Addition to the above house hold characteristics, we can see that 40 % of the interviewed house hold heads are government employed and the rest which account about 60% are engaged in other institutions like NGO, private, self ,retire and unemployed .

4.4 Econometrics Analysis

In this section we are primarily interested to see the correlation between the responses to the first bid and the socio-economic characteristics of the house holds under the existing use of urban green open space and at the improved use of urban green open spaces.

From table 4.4 we can see that the correlation between the discrete response and other explanatory variables at the existed scenario like income , bid(initial) age, family size , education dummy, membership in development association ,recreation habit in urban green parks and open spaces , distance from open and green areas it is found that significant at 95% confidence interval.

In the case of improved scenario the correlation existed between the discrete variable of the response and all variables except age, family, size education level, lnincome, and expenditure are significant at 90% confidence level.

Table 4.3: correlation analysis: existed and improved uses of urban open green spaces

Explanatory variable	Dependent variable	
	Existed	Improved
	WTP_i=1 if yes to 1st bid	WTP_{ii}=1 if yes to 1st bid
Initial bid :existing uses of urban clean and green open spaces	-0.032**	-
Initial bid :improved use of urban clean and green open spaces	-	-0.032**
Ln income (natural logarithm of income)	0.4	0.4
Average monthly Expenditure (in birr)	0.37	0.44
Agesq of the respondent (in numbers)	0.08**	0.14**
Number of children(noc) in numbers	0.02*	0.015**

Family size; in numbers	0.02*	0.3
Education dummy; edu=1 >12 grade ,0 other wise	0.25	0.031**
Access from open green spaces like urban parks dummy, dis=1 ,0 other wise	0.16	0.13*
Sex of the respondent dummy ;fem=1 , other wise 0	-0.11**	0.17**
Recreation habit of house holds dummy ;rh=1,0 other wise	0.06*	-0.02*
Membership in development activities like urban greening dummy; msda=1,0 other wise	-0.037**	0.017*
Employment dummy gov=1 if government employed ,0 other wise	0.07**	-0.07**
Age of the house hold head(in full years);age	0.39	0.235
Average monthly income; INCOM	-0.03*	0.01*

*& ** indicate significance level at 5%, 10%

Source: computed from sample survey

This analysis describes how much the variables used are correlated to each other and further help us to know how the explanatory variable determines the dependent variable. The correlation analysis helps us to know whether there is multicolliniarity problem or not which is not mostly encountered in such data types but it is the most pronounced problem in time series data types. Our finding tells us that there is as such high significant correlation among the two side variables

even it is less than half. Multi-co linearity also exists in our variables but the magnitude is very low.

4.4.1 The Probit Model Estimation and Discussion

Econometrics generally is a tool to analyze the determinants of any economic variable when regressed at different functions like OLS, Probit, Logit, Tobit, etc. In this survey the probit function is used, because the model we adopted is discrete choice model and we do not have other best alternative to determine which socio economic variable are significant in determining WTP of the CVM survey. In order to have efficient and reliable measurement and in modeling these determinants, we use probit model regression and this help us to know the disparity if there exist between the estimate results. In this survey we found no significant different in the sign of explanatory variables in both estimates between OLS and Probit estimates.

The estimates of the probit model are based on the theoretical model out lined in the methodology of the preceding chapter. Thus, as defined previously the model takes a normal distribution and employed to examine whether there exist negative or positive relation ship between WTP responses of the intended house hold and socio-economic variables or not. The results are expressed both for the existed and improved use of urban green and open spaces. The existed use value determination is based on the assumption that how much house holds value the non-use value of urban green and open spaces under the current situation i.e. without proposing any change in quality and quantity of the environmental good under consideration. Where as the improved scenario probit model estimation is supposed to know the determinants of the WTP responses of the house holds with same socio economic variables by assuming that there are

certain improvements both in quality and quantity of the provision of the good under consideration (see annex 3).

The measure of over all significance which is based on the chi-square distribution (x^2) is 39..58 for the probit model with 12 degrees of freedom (df) for the existed scenario and 48.3 for the improved with 12 degrees of freedom(see table 4.4 and 4.5)

The other one which is our interest in measuring the goodness of fit is the McFadden R^2 which has the same connotation to that of the coefficient of determinants (R^2). McFadden R^2 of this survey for the existed and improved scenario was found that 0.3954 and 0.743 respectively. This tells us the model is explained 39.5% and 74.3% by the explanatory variables.

Since the econometric estimates of the probit model only tells us the signs and significant levels of the coefficients of the explanatory variables i.e. we know only the signs not magnitudes and significant levels. There for, due to this reason we need further analysis to determine the magnitude of determination of the explanatory variable up on the discrete response of this model.

The effects of the explanatory variable up on the probability of respondents accept or reject of the proposed response to the bid level can be derived using the marginal effect command of the LIMDEP software. To do so according to Greene 1997, we have to take the partial derivative of the discrete response to that of the explanatory variables .The results of the partial derivatives gives us the marginal effect on the probability of accepting the bid up on the discrete response due to a unit change in the explanatory variables. Here we can have information about by how

much the explanatory variable determines the dependent variable .The marginal effects analysis is reported below both the existed and the improved scenario.

Table 4.5 and 4.6 gives the derivatives of WTP responses up on the explanatory variables explained so far and one can see the marginal effect of each explanatory variable for the two scenarios.

Table 4.4 Marginal effect estimates of the probit Model: Existed Use of urban green spaces

Variable	*df/dx*	Stan. error	p(Z>z)
Constant	-0.299	0.6050	0.000*
Ibid	-0.1045	0.2000	0.013**
Fem	0.4724	0.2887	0.173**
Age	- 0.4628	0.2829	0.1095**
Edu	0.3296	0.3010	0.001*
MSDA	- 0.3552	0.3552	0.164
Dis	- 0.54386	0.1234	0.44
Tfsiz	- 0.8506	0.1989	0.321
Noc	0.4810	0.1215	0.69
RH	0.1244	0.3556	0.716
Exp	0.965	0.1777	0.538
Gov	0.3536	0.1445	0.081***
Income	0.9375	0.1356	0.019 **

Log likeli hood = -112

Restricted log likelihood = - 131.82

$X^2 = 59.58$, DF = 12

Nobs = 192

P-value = 0.32

Fit measure

Pseudo $R^2 = 0.59$

- *, **and*** are significant levels at 1%,5% and 10% respectively
- source ; Own computation from sample survey

The analysis of the probit model helps us to know which socio – economic factor is significantly determined the dependent variable in this case WTP and the direction /sign/ of the coefficient. The probit model (greene, 2000) was used to estimate the relationship between the two sided variables i.e. the right hand side variable which was analyzed in a step – wise deletion method so as to know their significances. The estimation results of the probit model are summarized as follow.

Since the coefficient of the probit model only tells us the sign and significance of each explanatory variable ,i.e. the sign of the coefficient ,we need further investigation to know the magnitude .There for, any econometric analysis particularly of this type has the under lined objective of knowing the marginal effects of the explanatory variables on the dependent variable that is the probability that respondents accept or reject; the partial derivatives of discrete responses to the initial bid with respect to explanatory variable must be taken(df/dx) (Green, 1997). From this we can derive the marginal effect. This is reported in table 4.4 & 4.5

The marginal effect tells us the change in the likelihood of an event due to a unit change in continuous variables and a change from 0 to 1 for dummy variables for discrete response (Greene, 1997).

These results are summarized as follows.

1. Income (Incom):- The finding of the probit model in both scenarios (Status quo and improved) depicts that income has a positive relationship to a positive WTP. This suggests that the amenities gained from urban green spaces are a kind of superior goods, but they are not part of every day life of the peoples of Addis. This finding is analogous with the finding of Wendy yan Chen, 2005 in China Guangzhou. From table 4.6 and 4.7 income was significant at more than

95%, level of confidence coefficient (5% level of significance) in both scenarios. On the other hand, the marginal effect as summarized in table 4.4 and 4.5 shows holding other things constant, a one birr increase in income will increase the probability of accepting the initial bid proposed for both scenarios by about 46% and 16% respectively.

2. Access to urban green open spaces (like parks) (dis): - The distance between house holds residence and the relevant green spaces has assumed to have a significant effect on house holds WTP but the probit model estimate for the status quo and improved scenario shows negative relationship to WTP and insignificant at more than 10%. The negative relationship tells us that peoples in remote areas have no knowledge about the non-use value of green spaces. This finding is inline with the hedonic pricing model

3. Education level, dummy (Edu): In both status quo and improved scenarios the sign from the probit model is as expected and it is significant at 1% and 10% respectively. The marginal effect of a change in education from less than grade 12 to higher education increases the chance of accepting the proposed bid by 32% and 92% respectively (see table 4.4 and 4.5) . This led us to infer when education level increases concern about the environment proportionally increases.

4. Sex of the house hold head (Fem): The sign of the profit model is as we expected but it is statistically insignificant. This may be due to the fact that the problem is perceived by both sexes. The marginal effect i.e., the dummy sex is shown in table 4.4 and 4.5 for both scenarios

5. Age of the house hold head (age):- The result of the probit model is in contrary to our expectation because; my expectation was when age increases social responsibility like concern

about the environment may increase. But we found that it is related negatively and insignificant, this may be due to the fact that when age increases house holds becomes conservative to appreciate the value of urban green amenities.

6. Family size of the intended house hold (TFSIZ): Our prior expectation was that TFSIZ) could have a positive relationship to WTP. But the result is negative and insignificant at less than 10%.

7. House holds monthly expenditure (EXP): This variable has a positive relation ship to that of WTP and it's highly significant at 1%. The increase in monthly expenditure of the house hold by one birr result in the probability of accepting the initial bid by 96% and 90% for the two scenarios respectively. This may be due to fact that, house holds with high expenditure may consider the bid amount negligible (see table 4.4and 4.5).

8. Membership in urban development activities of the household head (MSDA): - The result of this dummy variable is once again in contrary to our expectation. Because we found that it has negative relationship and insignificant (see annex 1and 2)

9. Recreation habit of the house hold (Rh): - The coefficient of RH, dummy is as expected, but it is statistically insignificant (see table 4.6 and 4.7) to affect the probability of accepting the Initial bid for both scenarios.

10. Total number of children (NOC): - Contrary to our expectation the coefficient of NOC is negative and statistically insignificant.

11. Institution that the intended house hold is working (GOV): We have been thought that an individual who is working in government institution has a positive relationship, this is actually true in our finding but statistically insignificant to determine WTP (see annex 1 and 2)

12. The initial bid (Ibid and IIbid) : The initial bid is found to be as expected and related negatively with WTP and the marginal effect from both cases we found that the probability of the discrete response will increase by 10% and 47% respectively for a unit reduction in the bid value.

Table 4.5 Marginal effect estimates of the probit Model: improved Use of urban green spaces

Variable	*Df/dx*	*Stand.eror*	*P(Z>z)*
Constant	- 0.5389	0.1170	0.000*
iibid	- 0.4723	0.1968	0.0364**
Tfsiz	0.3277	0.2525	0.039**
Incom	0.1674	0.1142	0.007*
MSDA	0.1462	0.983	0.313
Edu	0.9266	0.6272	0.014**
fem	0.2159	0.8167	0.014**
dis	0.3849	0.2402	0.100***
gov	0.86504	0.13711	0.5281
Rh	0.932340	0.1601	0.5604
Noc	0.3086	0.8166	0.387
Exp	0.9018	0.693	0.4066
Age,	0.3693	0.2842	0.3423

$X^2 = 40.95$

Log likelihood = -79.09

Restricted log-likelihood= -99.57 p-value = 0.044

Restricted = -99.57 df=12

Goodness of fit McFadden R^2= 0.740

*, **and *** are significant at 1%, 5%and 10% respectively*

Source; own computation

4.4.2 Likelihood Ratio test

This test is applied to judge the goodness of fit of a variable and it follows a procedure that compares the value of the log likelihood function evaluated at the maximum likelihood estimator (β) with respect to all parameter α &β's to that of the restricted maximum likelihood estimator (β^*) which is maximized with respect to α only .The log likelihood ratio test is basically adopted to test the hypotheses of the research and given by: -

$\lambda_{LR} = 2\ (\ln L\ (\beta)-\ln L\ (\beta^*))$ which has a x^2 – distribution

From this we can have an inference by comparing it with X^2 distribution (if the data do not support the null the value of lambda is greater than the tabulated x^2) and it is rejected .Form table 4.6 and 4.7 we can calculate λ_{LR} for the two scenarios

1. For existed use of urban green spaces $\lambda_{LR} = 2((-112.02) - (-131.82))$

$$=19.8 - x^2_{(12)}$$

Then at α= 0.5the critical value is $X^2_{(12)} = 18.98$.There for since the calculated x^2 is greater than the tabulated x^2 we reject the null hypothesis which says that household WTP for the existed use of urban green and open space is not significantly different from zero .

2. For improved use urban green spaces $\lambda_{LR} = 2(-78.42-(-99.2))$

=20.8

Then at α= 0.5the critical value is $X^2_{(12)} = 18.98$. In this case once again the calculated x^2 is greater than the tabulated x^2 we reject the null hypothesis which says that household WTP for the improved use of urban green and open space is not significantly different from zero.

4.5 Estimation of the Total willingness to pay

Since house holds of the different strata face different initial bids (in this case five initial bids), the response found was varied. In this study for the existed use of urban green spaces 45.6% are willing to pay from birr 0 to birr 25, 22.3% are willing to pay from birr 26 to birr 46,16.6% are willing to pay from birr 47 to 67, 10.4% from birr 68 to 88 and 5.4 are willing to pay from birr 89 to birr 110. And for the case of the second scenario it is described in table 4.8 .This and the mid point of the bid interval is analyzed in the following two tables

Table 4.6 frequency distribution of WTP for the existed use

WTP in birr (for status quo)	Frequency (out of) 192	%
0-25	87	45.3
26-46	43	22.3
47-67	32	16.6
68 –88	20	10.4
89 -110	10	5.2

Source; survey data

Table 4.7 WTP Mid point for the existed use

WTP in birr (status quo)	Mid point	Frequency	%
0-25	12.5	87	45.3
26-46	36	43	22.3
47-67	57	32	16.6
68 –88	78	20	10.4
89 -110	99.5	10	5.2

Source; survey data

From this table we can generalize that only 23.4% are a zero WTP and the rest 76.6% have a positive WTP .The Zero or protest bids may be due to reasons like unaware of the benefits of environmental goods like this and low level of income ,in which case they might consider the recreational and other benefits of urban green spaces as superior goods .

Table 4.8 frequency distribution of WTP for the improved use

WTP in birr(for improved use)	Frequency (out of) 192	%
0-30	87	45.3
31-90	46	23.9
90-120	31	16.2
121 –150	16	8.3
151 -200	12	6.2

Source; survey data

Table 4.9 WTP Mid point for the improved use

WTP in birr (for improved use)	Mid point	Frequency (out of) 192	%
0-30	15	87	45.3
31-90	60.5	46	23.9
90-120	105	31	16.2
121 –150	135.5	16	8.3
151 -200	175.5	12	6.2

Source; survey data

The total willingness as depicted in table 4.10 and table 4.11 in the case of the two scenarios was calculated from the sample data and based on the above frequency .Total willingness to pay of the city of Addis in the case of existed and improved use of urban green spaces can calculated by multiplying the frequency distribution by the total house holds of the city (see table 4.10 and table 4.11).

Since the mid point of the interval is considered as the mean WTP, the total households are multiplied by the mean WTP to get total WTP. There fore for both case Total WTP is found to be birr16,682,574.33 and birr31,700,248.7for existed and improved uses of urban green spaces respectively.

4.5.1 Derivation of aggregate demand for existed and improved use of urban green spaces

The aggregate demand for the two scenarios were derived from the maximum willing ness to pay obtained from the open ended follow up question using the mid point of the interval of WTP. In the Y-axis we took the mid point maximum WTP and the X- axis being the total house holds calculated from the frequency table of figure 4.7 and 4.8 and put in table 4.10 and table 4.11. The demand curves for the respective scenarios were derived in the following figure 2 and figure 3.

Table 4.10 - **Derivation of Total WTP for the existed use**

Frequency	Total household	Midpoint	TWTP
45.3	237,783.48	12.5	2972293.5
22.3	117054.56	36	4213964.16
16.6	87134.7	57	4966677.9
10.4	54590.4	78	4258051.2
5.2	27295.2	99.5	271,587.57
Total	524,908.36		16,682574.33

Source; survey data

Table 4.11 **Derivation of Total WTP for the improved use**

Frequency (%)	Total household	Midpoint	TWTP in Birr
45.3	237,783.48	15	3566752.2
23.9	125,453.09	60.5	7589911.95
16.2	85,035.15	105	8928690.75
8.3	43,567.3	135.5	5903369.15
6.2	32,544.3	175.5	5711524.65
Total	524,908.36		31,700,248.7

Source; survey data

Figure 2 Demand curve for the existed use of urban green spaces

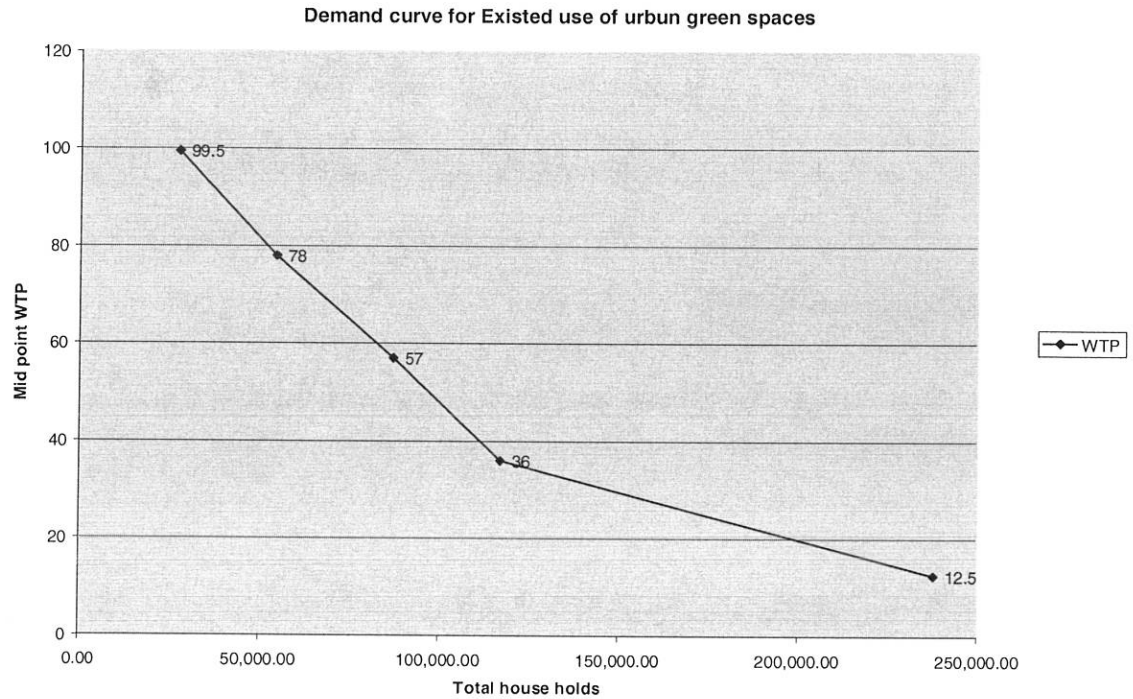
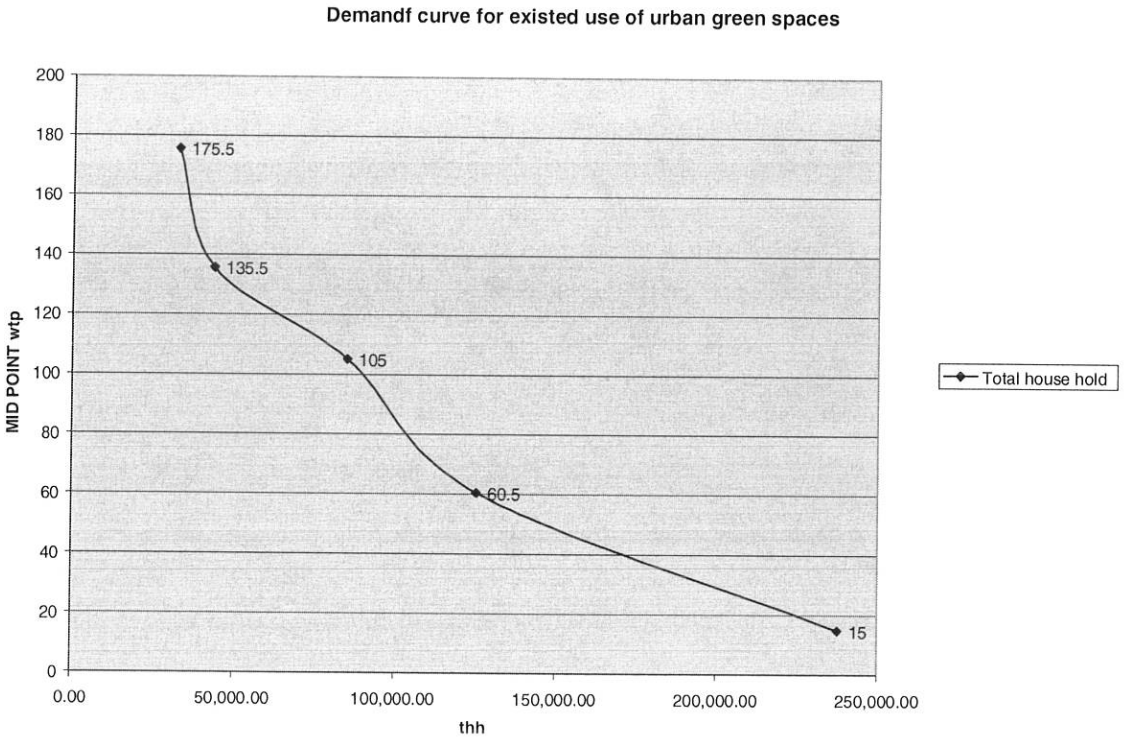


Figure 3 the demand curve for the improved use of urban green spaces



CHAPTER FIVE: CONCLUSION AND POLICY IMPLICATION

5.1 CONCLUSION

It is evident that the underlined step in building public support urban green space development program is primarily to estimate the value of urban green spaces and to know the knowledge and attitude of residents towards the use of these environmental goods. The finding of this survey is regarding the attitudes and perception of inhabitants about the benefits of urban green spaces and we have scored a high response rate. In this regard most of the house holds identified/perceived the negative impacts occurred due to poor environmental protection and the consequences of lack of urban green spaces like, absence of recreation area, bequest value, altruism value and in general we found high appreciation off urban green spaces in Addis and get more than half of the respondents have a positive WTP. Thus, this study adopts the CVM, and aim to empirically analyze vectors of determinants of house hold's WTP for multiple use urban green spaces (business, aesthetic, bequest, altruism) in two scenarios, under the existed and improved. Also the study addresses the total estimates of WTP for urban green space uses and derived aggregate demand.

Since this is a pioneer study in valuing urban green space in Ethiopia, there were problems of comparing the results and getting adequate literature. Despite its importance in adopting CVM, many problems arise from sampling, questionnaire design. Information provided to the respondents and the payment mechanism to be chosen. Since, this days the people's of Addis have got the awareness of participating in socio –economic activities via development association in their respective locality we did not face problems of payment vehicle, but most of the

respondents were unable to understand the scenario and much effort were made to make this clear to the extent they understand.

The study adopted a single bounded referendum style value elicitation format with open ended follow up question to collect data from 200(8 questionnaires were discarded as use less) randomly selected house holds of Addis. Respondents were face two scenario's, the first being the existing use of urban green open spaces and the second after introducing a change in terms of quality, quantity and standard and the payment vehicle was per annum contribution via development association in their locality.

The descriptive and the econometric analysis were both discussed to examine explanatory variables that affect house holds' WTP. The empirical finding tells us house holds socio economic and other variable affect WTP in different ways. Socio economic variables like, income, expenditure, education, sex of the house hold are among explanatory variables that affect the probability of accepting the initial bid positively in both cases. For existing scenario case, income, household sex, education level, expenditure did have a positive relation ship to WTP. But other socio –economic variables like number of children, age, and family size have a negative relationship. Other variable like reaction habit of the intended house hold have a positive impact on the probability of accepting the initial bid. The relationship remains the same in the case of improved use of urban green spaces.

The mean WTP of the households were derived from the open ended survey question and it was found that mean WTP is birr 36.18 for existed use and birr 58.96 for improved use per annum.

On the other hand, by assuming existing use of urban green space total WTP was found to be birr 16,682574.33 and birr31, 700,248.7for improved use Per annum.

5.2 Policy implication

The results found so for in this study are useful starting insights for sustainable management and policy approaches to urban green space in the city of Addis. This paper will be a starting in assessing public opinions in the decision making process concerning the management and conservation of urban green spaces in Ethiopia. Since we know from this study that house holds are willing to take over the burden of improving the quantity and quality of urban green spaces, it is evident that the value of the good in question got great consideration. From this we can draw the following policy recommendation.

1. The government as well as any intended party can use the result to analyze the costs and benefits of urban green space development projects.
2. Decisions which demand urban green space planning have better primarily know the awareness and ecosystem services of the environment.
3. Since our finding explicitly tell us that education in particular has a great positive impact in house holds WTP, it is mandatory to expand environmental forums informal education regarding urban environment
4. This study also reveals that more than half of the respondents have access to open-parks for recreation. Then, it is recommended that developing such parks by direct

involvement of the public is a promising investment for the government and the private sector.

5. Encouraging grass-root (kebele) level development association is an important tool for a positive contribution to improve the quality and sustainable urban greening program.

6. As we find in this study we saw that the inhabitants advocate the program of urban green space development if it creates job, then, urban greens space, and development may serve as an alternative unemployment reduction mechanism in the city.

7. Also green spaces are potential business areas, then investors if invest in this regard, they will get a positive return.

8. The results are useful starting points in including public opinions into the decision-making process concerning the management and conservation of urban green spaces.

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Annex 1: Estimation of the probit Model for the existed use urban green spaces

Variable	coefficient	Stan. dev	P|Z>z|
constant	-0.1515	0.910	0.090**
ibid	-0.1058	0.653	0.1050***
incom	0.6495	0.1439	0.000*
edu	0.5771	0.1980	0.003*
tfsiz	-0.6218	0.5383	0.242
age	-0.9867	0.1039	0.324
fem	0.1908	0.1598	0.9050
EXP	0.7004	0.1559	0.000*
gov	0.1503	0.1854	0.417
noc	-0.4952	0.5341	0.9261
dis	-0.3747	0.4878	0.4424
rh	0.118	0.1925	0.5380
msda	0.5847	0.7548	0.438

Log likelihood = -112.02, restricted log likelihood=- 131.82

Nobs =192 $X^2 = 39.58$ McFadden $R^2 = 0.3954$

NOV=12

, and *** are significant at 1%,5% and 10% respectively

Annex2. Estimation of the Probit model for the improved use of Urban green spaces

Variable	Coefficient	Stan. Dev	P|Z>z|
Constant	-1.100	0.6232	0.000*
iibid	-0.7008	0.5079	0.027**
tfsiz	-0.9697	0.668	0.145***
Age	-0.13	0.1011	0.174***
incom	0.4799	0.216	0.002*
Msda	0.6399	0.4943	0.1747
Dis	0.5108	0.6342	0.35
Noc	0.8633	0.54	0.100***
Rh	0.5133	0.1225	0.560
Exp	0.7714	0.1686	0.000*
Edu	0.5139	0.222	0.0209**
Fem	0.1252	0.1316	0.92
Gov	0.1805	0.7164	0.8010

Long likely hood = -78.42 Restricted log likelihood = -99.2

$X^2 = 48.3$ McFadden $R^2 = 0.743$

DF=12

NOBS=192

*,**,and *** are significant at 1%,5%and 10% respectively

Annex 3 - Questionnaire of the survey

Section Three: Valuation questions

Background information (scenarios 1)

The sanitation and over all greening and cleaning level in your sub-city is gradually degraded and it affects the social economical and health status of you and your family, the air is polluted by solid and liquid wastes.

Suppose the government or development association, or the Addis Ababa green and clean association will cut back its funding in sanitation improvement and greening, the city. Then, any concerned party who is responsible for this let the sub-city Administration introduces a house hold contribution in terms of annual payment for keeping the greening and cleaning level of the city at the present level. Given this information:

1. Are you willing to pay---- birr to take over the reduction in government funding?

Yes	No
1	0

2. What is the largest amount of money you are willing to pay to keep the city green and clean ever? _____ Birr

3. If your response to Q. 2 above is 0 birr what is your reason

   i. have no income (i.e. I can't afford)

   ii. The government has the responsibility to clean and green

   iii. It does not concern me.

4. If your maximum willingness to pay is less than the amount you agree to pay under Q1, what is the reason?

_____

_____

_____

Scenario 2

Now suppose the government, NGOs or let the Addis Ababa Green and Clean Association take part to improve the level of greening in Addis. So you and your family could get better recreation sites and quality air which safe guard your health. Moreover urban greening will enhance in reduction in warming and different species of plant and Animal will live in. The improvement will include planting of grasses and trees across road belts, Corridors, open spaces and developing urban parks. Given this Information:

1. Are you willing to pay---- birr to improve the quality of green space from the present level?

Yes No

1 0

2. What is the maximum amount of money you are willing to pay to Improve the quality of green spaces from the present level and aesthetic value of the city? _____ Birr

3. If your response to Q. 2 above is 0 birr what is your reason

i. have no income (i.e. I can't afford)

ii. The government has the responsibility to clean and green

iii. It does not concern me.

4. If your maximum willingness to pay is less than the amount you agree to pay under Q1, what is the reason?

_____

Declaration

I the undersigned, declare that this thesis is my original work, has never presented for a degree in any university and that all resources of materials used for the thesis have been dully acknowledged.

Declare by

Yalemzewd Molla

Signature _____

Date Feb. 2007

confirmed by

Dr. Sheil Singh

signature _____

Date 02.05.07