The Economic Valuation of Urban Green Parks: The Application of Contingent Valuation Method

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Abstract

This study analyzes the total economic values of urban green areas conserved at Bahir Dar city. Contingent Valuation Method (CVM) was employed to obtain estimates of Willingness to Pay (WTP) for improving the endangered and overlooked environmental assets, urban green areas to sustain them & generate benefits to current and future generations. In this contingent valuation survey, the researcher adopted a dichotomous choice with follow-up debriefing questions and scenario description, as well as open-ended follow-up question to model individual's WTP. The study used purposive sampling method to select the parks under study followed by simple random sampling to select 200 sample respondents. The study result revealed that almost all the respondents have a positive attitude towards the conservation of urban green parks but uncertain about the sustainability of the area's that leads them not to take care of the areas. Besides, the study results show that the mean monthly WTP of the individuals was between 0.047 -0.16 USD and the Total Economic Value (TEV) of improved urban green areas per month was about 4656.75- 15,704.14 USD calculated from the double bounded elicitation format and open ended elicitation format respectively.

1. Introduction

Most of the time, urban parks are considered as important contributors to a sustainable development of cities both in developed and developing countries. They offer to residents and visitors a multitude of benefits such as recreational activities, fresh air, aesthetic, and ecological functions. The creation of urban parks is justified by the services they provide for the inhabitants of cities and also by their regulatory function on the environment. Their preservation also profit the future generations which can derive the ecological services they offer. Urban parks can sequester carbon dioxide emissions and produce oxygen (Jo, 2002).

In most cases environmental assets in general, though they were very important, are the most overlooked resources. This is because scientific understanding of how urban trees, parks, gardens benefit people is generally found lacking in majority of developing countries. This happens because non-market benefits of such areas are not correctly valued and incorporated in to cost-benefit analysis of so called development projects (Pradeep, 2006). However, the absence of a market does not necessarily imply the absence of value, since these benefits allegedly have a high social value through their contribution to the improvement of individual welfare.

According to the report from the office of Bahir Dar city administration (2010), there are about 27 conserved green spaces accounting about 39 hectares of land at five kebeles of the city administration: namely Hidar 11, shimbit, Belay Zeleke, Tana Kebele and Ginbot 20. The municipality of the city conserves these green spaces supposing and bearing in mind urban parks invaluable contribution to climate change adaptation and ecological balancing, recreation, keeping the beauty of the town etc. These assets are prone to different problems that conflicts with the purpose of their establishment. This is of course because of the improper management of the areas and the low/no value attached to them by the people and the government, forgetting the role played aside. The rapid urbanization coupled with the improper management and low value attachments by the people and the government to the very essential environmental assets pave the way to the selfish individuals to grab the areas for maximizing their individual benefits/interests. To curve these problems and make the areas contribute their share, study has to be conducted.

Hence, this study was conducted aiming at eliciting the maximum willingness to pay of the residents for the conservation and improvement of these very essential assets and to make them give the proposed environmental and economic functions to the community. This study tried to bridge the research gap in which the previously conducted works were site specific. Many of the works are done abroad in that as far as the researcher's exploration is concerned, the researcher couldn't find any study conducted at home in relation to urban green space valuation. These pave the way for policy makers not to consider them in policy formulation and decision making.

2. Objective of the study

The main objective of the study was to analyze individual's maximum willingness to pay for the protection and improvement of urban green spaces in order to estimate the total economic value of urban green areas.

3. Research Materials and Methods

3.1. Sources and Types of Data

For the purpose of conducting this research, both primary and secondary sources of data were employed. Secondary data were extracted and collected from office reports, different publications, journal articles and others were referred for obtaining the required information in line with the study. On the other hand, Primary data were collected via holding face-to-face interviews of structural questionnaires to the selected sample respondents from target population, holding interviews with key informants, conducting focus group discussions and taking summary of personal visit to the fields in to account.

3.2. Sampling Design

The study focused only on 10 critically prone urban green spaces from a total of 27 conserved areas available in the study area since the study focuses on determining the household's willingness to pay for the improvement of these endangered areas. The study clusters the respondents on the basis of their kebele and from these cluster, the study selected the respondents randomly to get interviewed. Accordingly, from total households of 19,000, about 200 randomly selected respondents were selected for interview from the purposely selected kebeles (i.e. in the five kebeles where the specified exposed green spaces are located). From a total of 200 individuals get interviewed, 28 responses were found to be invalid and thus for the analysis, information collected from 172 respondents used. Though face-to-face interview was made, 28 respondents had invalid responses in that some of them have no monthly income, and two were excluded because of the outlier that were willing to contribute 2% of their salary. Some about 3 were protesters to the conservation of these areas.

3.3. Method of Data Analysis

As stated in Areal and Macleod A. (2006), Contingent valuation Method (CVM) has become one of the most widely used techniques to value environmental public goods. CV refers to approaches based on surveying a sample of a population and applying econometric analysis to the data obtained from the survey to determine what value the population places, or what maximum amount it's WTP, for an environmental public good, or to prevent a specific change in an environmental quality such as loss of trees. Referendum-type questions, with a "yes" or "no" answer can also form part of CV studies with statistical efficiency obtained using a second, follow-up, referendum-type question (Hanemann et al., 1991).

In the double bonded dichotomous choice approach, the respondent is asked a question requiring a *yes or no* answer about whether he would pay a specified price. If the respondent says *yes*, another WTP question is asked using a higher price randomly chosen from a pre specified list. If the answer is *no*, the follow up question proposes a randomly chosen lower price (Mitchell and Carson, 1989 cited in Solomon Jebessa, 2004).

Double-bounded models increase efficiency over single dichotomous choice in three ways. First, the answer sequences *yes-no* or *no-yes* yield clear bounds on WTP. For the *no-no* pairs and the *yes-yes* pairs, there are also efficiency gains. These come because additional questions, even when they do not bound WTP completely, further constrain the part of the distribution where the respondents' WTP can lie. Finally, the number of responses is increased, so that a give function is fitted with more observations (Haab and McConnell, 2002 cited in Solomon Jebessa, 2004). Whichever response format is adopted, once the parameters of the WTP distribution and/or the random utility functions have been estimated, the welfare measures are calculated (Richard T. Carson and W. Michael Hanemann, 2005).

3.4. Model Specification

The goal of a CV study is to measure an individual's monetary value for some item. We denote the item being valued by *q;* for now we will treat this as a single item whether a single commodity or a single program involving some mix of commodities treated as a fixed group – and therefore *q* is a scalar. Assuming the individual is a consumer and using essentially the same notation as Bockstael and Freeman, (2000), we assume the individual has a utility function defined over the quantities of various market commodities, denoted by the vector *x*, and *q:*

$$u(x, q) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.1.$$

The act of valuation implies a contrast between two situations – a situation with the item, and the one without it. We interpret what is being valued as a change in *q*, specifically, supposes that *q* changes from q^0 to q^1; the person's utility thus changes from: $u^0 \equiv v(p, q^0, y)$ to $u^1 \equiv v(p, q^1, y)$. If she/he regards this change as an improvement, $u^1 > u^0$; if s/he regards it as a change for the worse, $u^1 < u^0$; and if she/he is indifferent, $u^1 = u^0$. The value of the change to her/him in monetary terms is represented by the Hicksian measures, the compensating variation *C* which satisfies:

$$u(p, q1, y - C) = u(p, q0, y) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.2.$$

For simplicity, in the remainder of this section we assume that the change is an improvement ($C \geq 0$) and we focus on the measurement of WTP (Richard et al. 2005). If the change is regarded as an improvement, $C > 0$; in this case, *C* measures the individuals' maximum WTP to secure the change implies C=WTP. Therefore, equation (2) can be rewritten as:

$$U\ (p, q1, y - WTP)\ =\ U\ (p, q0, y)\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots...\ldots3.$$

To elicit the WTP of the urban green spaces, the contingent valuation (CV) technique will be employed. CV elicits the maximum WTP of individual respondent to obtain improvement or avoid damages on environmental goods and services in a hypothetical market (Pek et al., 2010). Therefore, the respondents WTP for the conservation and improvement of urban green areas in the city of Bahir Dar was determined by directly asking the respondents about their preference.

Following Albertini and Cooper (2000); cited in Asrat P. , Belay K. and Hamito D., 2004), in the compensating variation when a person purchases an improvement in environmental quality can be specified as:

$$\upsilon\ (y - WTP, p, q1;\ z)\ =\ \upsilon\ (y, p, q0;\ z)\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.\ldots\ldots\ldots..\ldots\ldots\ldots4.$$

Where υ- denote the indirect utility function,

        Y - Income

        P - Vector of prices faced by the individual

        q_0, q_1-alternative levels of the good or quality indexes ($q_1 > q_0$, indicating that q_1 refers to improved environmental quality and q_0 unimproved one).

        WTP- willingness to pay

        z- Respondents characteristics (such as age, education, etc.)

The theoretical underpinning of the contingent valuation method is a well-developed area. For stated preferences, welfare change is measured by a change in these functions. WTP is the amount of income that compensates an individual for a welfare change. Solving equation (4) above for WTP yields:

$$WTP = f(y, p, z, q0, q1)\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots...\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.\ldots\ldots\ldots\ldots..\ldots..5.$$

Equation (5) is the model that used to identify the major factors that affects the individual's maximum willingness to pay in the conservation and improvement of green spaces in the study area.

In such types of studies, the response (dependent) variable is dichotomous taking on two values: 1 if the event occurs; and 0 if it does not. Estimation of this type of relationship requires the use of qualitative response models. For this study, the logistic distribution function (logit model) is selected because it represents a close approximation to the cumulative normal distribution. Moreover, it is relatively simple from mathematical point of view and lends itself to a meaningful interpretation. The logit model has advantages over the probit model in that it transforms the problem of predicting probabilities within (0, 1) interval to the problem of predicting the odds of an event occurring within the real line.

According to Verbeek (2004) the logistic regression distribution function can be specified as:

$$Pi = \frac{e^{zi}}{1+e^{zi}}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.\ldots\ldots\ldots...\ldots\ldots\ldots\ldots\ldots\ldots\ldots..\ldots6$$

Where Pi denotes the probability that the ith household is willing to pay for green space conservation and improvement and Z_i is a linear function of m explanatory variables (X), and is expressed as:

$$Zi =\ \beta0 + \beta1X1i\ +\ \beta2X2i +\ \beta3X3i\ + \cdots\ \beta mXmi\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.\ldots\ldots\ldots..7$$

Where $\boldsymbol{\beta}_0$ is the intercept and $\boldsymbol{\beta}_i$ is the slope parameters to be estimated in the model. The slope tells how the log-odds in favor of paying for conservation measures change as the independent variables change.

3.5. Dependent Variable

Willingness-to-pay [WTP]: The dependent variable in the model is the individual's WTP, which takes the value '0' if the respondent says 'no' for the conservation program and '1' if the response for the improvement is 'yes'.

3.6. Independent variables

The explanatory variables being considered as determinants of the dependent variable, WTP are the major variables which were identified from literature (empirical works of former scholars regarding the same topics) & other variables that were theoretically sound, are important theoretically and context specific variables. The following were the explanatory variables considered.

Age of the household**/AGELEVI/,** Education level of the household**/EDULEVI/,** household income**/INCOMI/,** Gender of the household**/GENI** , Distance from the park**/DISTI**, Marital status**/MARSTI/,** Religion**/RELI/,** Birth place**/PLAOBI/,** Degree of vulnerability**/VULNERABLITY/,** Current state of the areas in generating benefits   **/CURRENTSTAT/**   ,   Location/   **LOCATION/**   ,   and   Sense   of ownership/responsibility**/SENSEOFOWNSHIP/.**

The coefficient of the logit model is not directly interpretable. One way of giving meaning full interpretation of the logit coefficient is to put it in the form of odds ration or log odds ratio.

The odds to be used can be defined as the ratio of the probability that an individual is willing to pay for the conservation and improvement measures (Pi) to the probability that he/she is not **(1-Pi)**.This model can be derived as follows. From equation (8) above p_i is given as: $P_i = \frac{e^{zi}}{1+e^{zi}}$ and thus we can derive 1-pi as:

$$1\text{-}P_i = 1\text{-}\frac{e^{zi}}{1+e^{zi}}\ =\ \frac{1+e^{zi}-e^{zi}}{1+e^{zi}}=\ \frac{1}{1+e^{zi}}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..\ldots\ldots\ldots8$$

Solving the above equation for Zi and including the error term, equation (8) can be written as follows:

$$Zi = \beta 0 + \sum_{p=1}^{m} \beta p X p i + \varepsilon_i \qquad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 9$$

Here Xpi stands for the explanatory variables assumed to influence the decision of the individual to pay or not for the improvement scheme. Therefore, equation 13 can be rewritten as:

$$Z_i = \beta_0 + \quad B1GENI + B2MARSTI + B3AGELEVI + B4DISTI + B5EDULEVI + B6RELI + B7PLAOBI +$$
$$B8INCOMI + B9CURRENTSTAT + B10LOCATION + B11VULNERABLITY +$$
$$B12SENSEOFOWNSHIP + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 10$$

4. Results and Discussion

The descriptive statistics part presents the socio-economic and demographic characteristics of the sample respondents and their attitude, perception and knowledge about the current state of urban green areas conserved in the study area. On the other hand, the econometrics analysis section discusses the determinants of respondents WTP for the protection and improvement of urban green spaces. It presents the mean WTP to determine the total economic values of the very important but ignored environmental assets, urban green areas. For the purpose of presenting and analyzing the survey data, data were entered and coded using SPSS 16 and the analysis were made with help of statistical software's Stata 11 and SPSS 16.

4.1. Socio-Demographic Characteristics of the Respondents

Out of a total of 172 sample respondents for which responses were valid, about 116 (67.44%) were males and 56 (32.56%) were females. The age range for which the survey was conducted run from 19 and the age limit is about 72 years old. Here, the mean age level is about 36 years old. The majority of the respondents were from the age group of 19-40 years old that comprises 121 (70.35%) of the sample respondents, 41-60 consists of 35 (20.35%) and the remaining 16(9.30%) were included in the age group above 60 years.

Regarding the level of education, about 116 (67.44 %) of the respondents had diploma and above level of education, 25 (14.53 %) were high school educated (grade 9 to 12 completed), 23 (13.37%) had completed their elementary level of education (grade1 to grade8), who are able to read and write. The remaining 8 respondents (4.65%) had never gone to school to mean they are illiterates. Of the total respondents surveyed, more than half i.e. 101 (58.72%) of the respondents were married and the rest 71 (41.28%) were single.

From the sample respondents, around 18.60 % earned a monthly income of between Birr 300 and 600, 20.35%earned a monthly income between Birr 601 and 1200, 41.28% earned a monthly income of Birr between 1201 and 3000, about 15% had a monthly income of birr between 3001 and 5000. Finally about 4.65% earned of the respondents earn a monthly income of more than 5001. With regard to occupation, most of the respondents interviewed were employees either in government or non-governmental organizations accounting about 62.05% of the respondents.

Concerning the religious view of the respondents, 136 (79.07%) were Christians and the remaining 36 (20.93%) were Muslims. Out of the total respondents, 73 (42.44 %) were born here in Bahir Dar and the remaining 99 (57.56 %) were born somewhere else out of the city, Bahir Dar. From the sample population surveyed, 119 (69.19%) were from the areas nearer to the conserved green areas and the rest 53 (30.81%) were from areas far away from the areas but living in the Kebele selected for the study. Here, when we say nearer to the areas we mean the respondents are living around the green spaces bordering them in each corner i.e. their home shares boundaries with the urban green areas. Those respondents out of this but in the same kebele are included in the specification, far away.

4.2. Attitudes, Perceptions and Knowledge towards Urban Green Areas

It is common that the assessment of the attitudes, awareness and knowledge of the community towards the current state, benefits provided by the existing urban green spaces and the challenges the areas are suffering from are very important to draw conclusions. Accordingly, out of the total sample respondents surveyed, it is possible to say that almost all (93.02%) were replied that they were heard about the concept of urban green areas leading us to conclude that they had the knowledge about the all rounded connotations represented by the term urban green spaces. Similarly, from the total respondents, about 86.63% had visited or observed the urban green spaces located in their surrounding in particular and the city administration in general. These visits pave the way to have detailed knowledge about the areas in relation to what biodiversity they comprises, what problems they are suffering from and what remedy is taken to protect/to be taken to safeguard them from destruction. In other words, if they had visited/ observed the areas, they will have the tendency to see at what state they are and to perceive problems challenging the areas and the remedial actions to be taken by the concerned parties including themselves.

With regards to the importance of the conservation of these invaluable green spaces, it is expected that everyone agrees on their establishments and conservation. Similarly in this study, it is possible to say that almost all (97.67%) of the respondents are in support of their conservation in the city. This is because they are aware of the contribution of the areas to the multi-dimensional developmental activities of the country and to the regulation

of alarmingly changing climatic conditions. This is of course, also because these urban green areas are established as per the master plan of the city administration which is guaranteed by 147 (85.47%) of the respondents. This increases the respondent's confidence to be optimist about the sustainability of the areas and make them confident on the fortune of the environmental assets for future consumption.

4.3. Challenges of the Existing Urban Green Areas

According to Kuchelmeister (2000), urbanization, especially in the developing world, is frequently accompanied by the deterioration of the urban environment. It leads to the impairment of human health, economic and other welfare losses and damage to the urban ecosystem. Air and water pollution, inadequate waste management and reduction of green areas are frequently the major environmental problems. Conversion of open and green spaces to urban development reduces water permeable areas, upsets natural drainage patterns and causes serious flooding with subsequent damage to dwellings and infrastructure and sometimes involving even human casualties. These are because of the low value attached to the urban green spaces or because of absence of well-defined property right or lack of awareness concerning the contribution of these environmental assets.

It is normal that green areas are conserved expecting benefits to be generated from them and in this sense the areas to provide benefits should be well protected and improved. At this junction, 86.63 % of the respondents were claimed that the areas are not providing the benefits expected because they are prone to damages, destruction, ignorance and conversion of the spaces to other private or institutional projects at the cost of the conserved green areas. But doesn't mean they are totally insignificant rather relative to their expectation, the areas are contributing the minimum of the expected benefits. Here, 80.81% of the respondents agreed that no corrective measure is taken to safeguard them from destruction and improve then make them open to contribute their share in every aspects by the government, the society and other stakeholders in the selected study area. Because of being late to protect and take remedies by the government and other parties, the areas are exposed to different challenges which were assured by 150 (87.21%) of the respondents from the total.
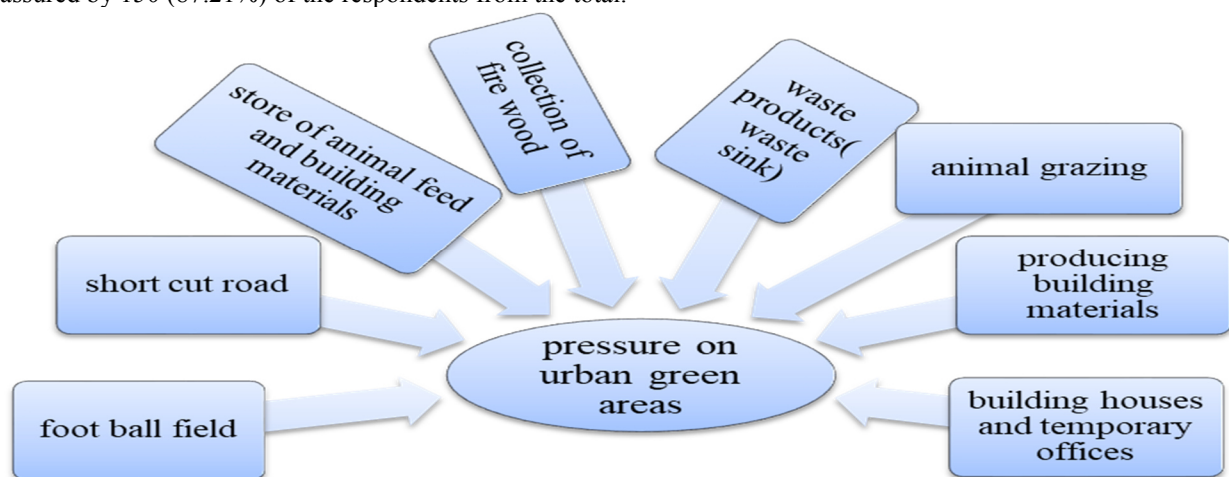

Figure1. The pressures exerted on green areas originated from different sources

Source: Researcher construction from observation and survey results, 2017

The figure is constructed aggregating the respondent's responses of the question raised to list out the major problems they have seen since they are in touch of the areas. At the same time, the researcher's field visit was taken in to consideration.

In addition to the problems mentioned above, especially in city centers where demand for land is high, open spaces are often subject to development project pressures and permitted to conversion for other projects. This was, of course, the one that make the residents to be pessimist on the sustainability of the areas and not to give proper management of the areas.

4.4. Benefits Generated from Urban Green Spaces

In the study area, though the areas are not given the attention rather ignored, they are contributing to the quality and beauty of the city directly or indirectly. In this regard, the respondents stated that the benefits generated from these overlooked assets without protecting and improving their wellbeing. The following figure summarizes the contribution of green areas in the study area given the challenges that they are suffering from.
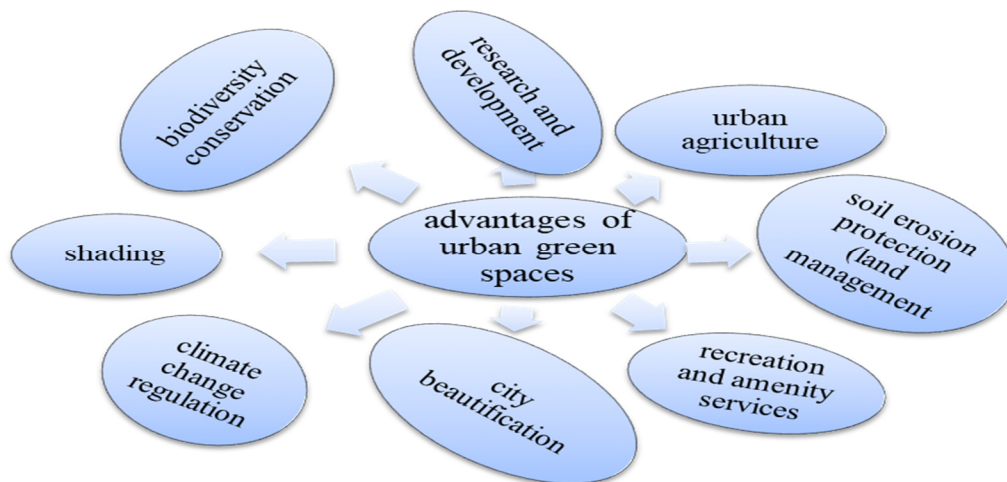
Figure 2. Benefits generated from urban green areas
Source: Researcher construction from observation and survey results, 2017

The figure above tries to show the benefits provided by urban green areas given if the areas are well protected, managed and safeguarded from various challenges. Taking these vital contributions to environmental quality, it is possible to identify the possible factors that affect the WTP of the residents for the protection and improvement of urban green spaces and estimate the economic values of them.

4.5. Determinants of Individual's Willingness to Pay for Urban Green Spaces Management
The variable willingness to pay to the management of urban green areas was used as a binary dependent variable taking a value 1 indicating the willingness of the individual to contribute money, and 0 otherwise.

Table 1.1. The logistic regression output

Explanatory variables	Coef.	log odds ratio	Robust Std. Err.	z -value	P>|z|	Marginal effects
GENI	1.956274**	7.07292	.7926104	2.47	0.014	.0228781
MARSTI	1.413565***	4.110582	.7755406	1.82	0.068	.0190943
AGELEV	0.0644645**	1.066588	.0298007	2.16	0.031	.0009104
DISTI	-0.676747	.5082677	.7323329	-0.92	0.355	-.008572
EDULEVID1	2.280068	9.777347	1.527275	1.49	0.135	.0173248
D2	2.677272**	14.54535	1.297041	2.06	0.039	.0195288
D3	2.79262**	16.32373	1.289301	2.17	0.030	.0814285
RELI	1.050336	2.858613	.9560013	1.10	0.272	.0114931
PLAOBI	-1.46933***	.2300784	.8434127	-1.74	0.081	-.020203
INCOMI	0.0003482	1.000348	.0003454	1.01	0.313	4.92e-06
CURRENTST	-2.566938*	.0767702	.7365851	-3.48	0.000	-.108221
LOCATION	2.282223*	9.798436	.7153852	3.19	0.001	.0824198
VULNERABILITY	2.099*	8.158011	.8047857	2.61	0.009	.0721388
SENSOFOWNSHIP	-1.631287*	.1956777	.754184	-2.16	0.031	-.039926
_cons |	-4.599695		2.105747	-2.18	0.029	

Sensitivity   Pr (+| D) 97.44%
Specificity   Pr (-|~D) 37.50%
Positive predictive value   Pr (D| +) 93.83%
Negative predictive value   Pr (~D| -) 60.00%
Correctly classified   91.86%
Logistic model for wtpfgr, goodness-of-fit test
     Number of observations =   172
       Pearson chi2 (156) =   105.50
Prob> chi2 =   0.9993
Mean VIF = 4.13

Note: * significant at 1%, ** significant at 5% and *** significant at 10%
D1, D2 and D3 stand for dummy variables 1, 2 and 3
Source: Own Calculation, 2017

Of the explanatory variables considered, about three variables namely income, religion and distance were found to be insignificant or were not powerful in influencing WTP. This study found that the level of income did not seem to have an influence on people's WTP. This implies that the green spaces are not superior good, rather an essential part of their everyday life in the study area. This can be concluded from the higher use of the spaces and positive attitude towards urban forests which were supported by more of the respondents in the descriptive part. Here, urban green areas are more than income for the respondents because the areas if improved provide them with a multitude of benefits. This is in line with the findings conducted in Finland by Liisa *and Hannu, (1998)*. Similarly, religion is not significant in that the areas are providing benefits irrespective of the religion people follow rather the people are enjoying the benefits of urban green areas. Despite the religion they follow, the people perceived that the existence of urban green areas will benefit without any difference in religion and the areas are doing these. With the same fashion, distance doesn't matter because the benefit provided by the essential green areas are not influenced by distance and everybody enjoys the fruits of urban green areas whether they live nearer to or far away from the areas. Actually, it is normal that environmental amenities and functions will not be shaped by distance rather they will invite the residents with their natural gifts irrespective of the distance.

The maximum likelihood estimate of the logistic regression model shows that out of the variables hypothesized to determine willingness of the individuals, nine were statistically significant. These variables were: gender, marital status, age of the individual, educational level, place of birth, current state of the areas, location where the areas are sited, sense of ownership and vulnerability. Of the variables that were significant, except for place of birth, sense of ownership and current state of the areas, the rest of the variables have a positive coefficient implying that they had positive effect on the probability of contributing for the conservation (WTP), as expected. The above three variables, though they were significant, they had negative coefficient indicating that they influence the probability of individuals WTP negatively.

4.6. The Total Economic Values of Urban Green Spaces
Table 1.2. WTP responses of the respondents

Response	Lower bid	Initial bid	Higher bid
Yes	158	137	113
No	14	35	59

Source: Computed from Survey, 2017

The above table presents that as the bid value increases, the number of respondents saying 'yes' declines and those that says 'no' increases which is in line with economic theory.

Table 1.3. The individuals WTP

WTPFGR	Coef.	Std. Err.	Z	P>|z|	[95% Conf. Interval]	
MAXWTP	0.881832	0.221494	3.98	0.000	.4477116	1.315952
cons	-4.22431	1.451295	-2.91	0.004	-7.068796	-1.379825
BID VALUE	3.740843	0.9152527	4.09	0.000	1.946981	5.534705
_cons	-5.313836	1.403167	-3.79	0.000	-8.063993	-2.563678
Log likelihood = -14.919199			Pseudo R2	=	0.7187	

Source: Survey Result, 2017

The above table is calculated on the basis of the individual's maximum willingness to pay and the double bound bid respectively. Given the above result, it is possible to calculate the mean WTP of the respondents surveyed that were the foundation for the calculation of the total economic values of the assets besides the total population.

In the above result, the coefficient of the bid values (both the open ended and closed ended) are positive indicating that the society are well aware and have positive attitude towards urban green spaces. Here, we can recall that income was not significant in influencing the individuals WTP because of the fact that environmental quality is more than income for them. This is because if environmental quality is achieved, the costs incurred like medical services as a result of environmental damage decrease encouraging the society to contribute higher amount to conserve and improve the green areas. The current due attention given by the government at home and abroad may also increase the awareness of the people about the risks of environmental damage and the benefits of environmental quality if well conserved.

In order to assess the implications for urban green areas sustainability of the service, we use the logit model for the double-bounded dichotomous format and open ended elicitation format and calculate the mean WTP (μ) as $\mu = -\alpha/\beta$, where α is the intercept and β is coefficient of the MAXWTP and the BID VALUE (double bounded). We can also compute the mean WTP using the open-ended format, the maximum WTP of the respondents and the double bound format.

Table 1.4. The mean WTP of the respondents from open and dichotomous format

WTPFGR		Coef.	Std. Err.	Z	P>|z|	[95% Conf. Interval]	
Mean WTP			0.16	.6538773	7.33	0.000	3.508804	6.071956
Mean WTP			0.047	.1312904	10.82	0.000	1.163167	1.677816

Source: Own Calculation, 2017

　　　Accordingly, the mean WTP for urban green areas improvement per individual per month in USD is 0.16 for the open ended format and 0.047 for the double bounded dichotomous elicitation format. This implies the individuals mean WTP for the scheme lies in the range between 0.047 -0.16 USD. Hence, we can calculate the monthly WTP for the residents of the city administration by multiplying this means by the total number of households /population.

Table 1.5. The total economic values of urban green spaces

WTPFGR		Coef.	Std. Err.	Z	P>|z|	[95% Conf. Interval]	
Total WTP			15,704.14	64307.52	7.33	0.000	345083.9	597164.7
Total WTP			4656.75	12912.15	10.82	0.000	114395.2	165009.8

Source: Own Calculation, 2017

　　　Therefore, the total economic values of the urban areas if conserved and improved will have a total economic value of between 4656.75- 15,704.14 USD per month.

4.7. Conclusions

In these regard, residents on average have positive attitude towards the green areas if protected and improved and understood that though they are vital to climate change regulation and to harmonize the people with the environment, the areas are exposed to various problems and are suffering from problems originated from different sources. At the same time, if the areas were protected and improved, they do have a multitude of benefits provided to the residents, the city and the countries green economy movement.

　　　The educational level of the household /individual was found to have a positive and significant impact on their willingness to pay for the improvement scheme, implying that educated individuals were more opt in understanding the problem of urban green areas and could easily decide to take part willingly in the protection and improvement of the areas. Similarly, as the educational level of the individuals increases, they could understand the consequence of climate change encouraging them to take part in environmental quality assurance. This is attributable to the fact that education reflects acquired knowledge of environmental amenities and educated individuals tend to spend more time and money on urban green areas improvement.

　　　Perception of the individuals about the current state of urban green areas was significant but negative for WTP for improving the areas indicating that household who perceive that the areas currently not generating the expected benefits are less willing to pay than households who perceive the current state of the areas is in a position to provide with the expected benefits. This is because for them areas that are not generating the expected benefits may conclude that they will never generate any benefit in the future questioning the fortune and sustainability of the spaces.

　　　Likewise, perception/ understanding of the degree of vulnerability of the urban green areas currently were positively and significantly related to the individuals WTP decision, implies that individuals recognition of urban green areas destruction and hazard is very important for their decision to participate in conservation activities.

　　　Sense of ownership - has significant impact at 5 percent probability level but with negative coefficient for WTP. People who assume that the responsibility for the protection and improvement of the areas is not the society rather the responsibility of the government are less willing to pay relative to their counter parts. This is because of the fact that those that consider the areas are their assets and if they are there, they will enjoy the benefits of urban green areas have better attitude towards the improvement of the area's leading them to pay higher bids.

　　　Similarly, the location where the urban green spaces conserved was a significant explanatory variable indicating that if the site of the areas is as per the master plan of the city administration, this was an indicator for the society to be certain about the sustainability of the areas. Therefore, the makes the society to decide to contribute and participate in urban green spaces improvement program.

　　　The average amount of money that they were willing to pay was also about 0.047 -0.16 USD per month per individual determined from the double bounded format and their stated maximum willingness to pay respectively. Given the mean WTP and the total population of the four kebeles where the study was conducted, the total WTP was about 4656.75- 15,704.14 USD. This shows the total economic values of the areas per month.

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5. References

Areal and A. Macleod., (2006); *estimating the economic value of trees at Risk from a Quarantine disease,* Central Science Laboratory, Sand *Hutton*, York, YO41 1LZ, UK.

As rat P., Belay k.andHamito D., (2004); *determinants of farmers' willingness to pay for Soil Conservation practices in the southeastern highlands of Ethiopia*, Dire Dawa, Ethiopia.

Bockstael, N., Freeman, M., Kopp, R., Portney, P. & Smith, V., (2000); *on Measuring Economic values for nature*, Environmental Science and Technology, 34, 1384-1389.

Haab.T.C and K. E. McConnell (2002), "*Valuing Environmental and Natural Resources'*: The Econometrics of Non-Market Valuation". Edward Elgar Publishing, Northampton.

Hanemann, M., Loomis, J.B. and Kanninen, B., 1991.*Statistical efficiency of Double- Bounded Dichotomous choice contingent valuation*. *American Journal of Agricultural Economics,* 73 (4), 1255-1263.

Jo, H., (2002); Impacts *of urban green space on offsetting carbon emissions for Middle Korea*. *Journal of Environmental Management*, 64, 115-126.

Kuchelmeister G., (2000); *Trees for the urban millennium: urban forestry update* Unasylva No. 200, 49-55, FAO, Rome.

Liisa and Hannu, (1998); *the economic value of urban Forest Amenities*: an application of the Contingent valuation method University of Joensuu, Faculty of Forestry, P.O. Box 111, SF-80101, Joensuu, Finland.

Mitchell, R. and Carson, R. (1993*). Using Surveys to Value Public Goods: The Contingent Valuation Method.*

Pek, et al., (2010); *a Contingent Valuation Estimation of Hill Recreational and Services Values in Malaysia*, Malaysia.

Pradeep Chaudhry., (2006); *valuing recreational benefits of urban forestry*- A Case study of Chandigarh (India) city" awarded by Forest Research Institute, deemed University.

Report, (2010); *Data prepared by Bahir Dar city service office*, Bahir Dar, Ethiopia.

Richard T. Carson and W. Michael Hanemann., (2005); *Contingent valuation*, *University of California, USA.*

Solomon Jebessa., (2004); *contingent valuation of multi-purpose tree resources*: The case of Arsi, zone, Ethiopia.