THE MISI RURAL DEVELOPMENT PROJECT
AND
AREA’S RECREATIONAL VALUE BASED ON CONTINGENT
VALUATION METHOD

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ABSTRACT: In the long term, the Industrial Revolution had caused the welfare
increases in the urban areas and decreases in the rural areas. The weak rural society
who live with the nature had started to exhaust and destroy the natural resources
evertheless. To alleviate the pressure upon natural resources and increase the
welfare level Rural Development Projects had been put on the agenda by the
Developing Countries. However, in developing countries, environmental benefits
and costs have not included the project analysis, furthermore environmental
evaluation has been desired a luxury concept. The aim of this study is to put forward
the environmental impacts of the rural development project prepared for the Misi
Settlement which has recreational areas and natural beauties, and shed light on local
governments.

Keywords: Rural society, rural development projects, environmental evaluation

1. Introduction
Every type of economic activity affects the environment to some extent; they are
intrinsically linked. Changes in the economy in the form of changes in technology,
consumption patterns, investment levels, international trade links, spatial relocation,
macroeconomic policy, etc., will all have an impact, sometimes profoundly, upon
the natural environment. This situation in turn will affect human well-being (Kula
1994: 5-6).

In developing countries, the idea that environmental control is a luxury that can wait
for another decade is no longer valid (Çetin and Rehber, 1999). Environmental
problems are most acute in developing world and sometimes the survival of thousands of poor people depends upon the quality of the environment they live in (Hartwick and Olewiler, 1986).

Today, environmental damage now has an important part to play in environmental economics for some of reasons:

i. The valuation makes it clear that the environment is not an infinite and free resource, even in the absence of well-established markets. Especially when projects are making substantial claims on the environment, the valuation of such claims signals the growing scarcity of the environmental input.

ii. Development proposals that are in conflict with conservation will be judged from a better perspective when all environmental impacts are considered.

iii. When restoration of an environmental quality is considered, valuation can provide a true picture about the economic worth of projects, the performance of a region or the nation as a whole.

2. Economic Valuation Methods and the Concept of Contingent Valuation Method

2.1. Economic Valuation Methods

A number of techniques are available to value environmental goods in economic terms. Figure 1 shows these techniques and illustrates how they are related. Methods to value the environment can be broadly divided, into two categories: those which value a commodity via a demand curve; and those which do not (Turner and Pearce, 1994: 115-116).

![Diagram of Economic Valuation Methods](image)

*Figure 1. Monetary Evaluation Methods for Environmental Goods*
Non-market demand approaches have traditionally been used to assess the cost of environmental impacts, and hence to determine policy responses by policy makers in Developed Countries (Clawson and Knetsch, 1966). Those methods are: dose response approach, preventative expenditure approach, replacement cost, mitigation behaviour, opportunity cost methods.

Demand curve approaches take part in expressed preference and revealed preference methods. The demand for environmental goods can be revealed by examining the purchases of related goods in the private market place. These may be complementary goods or other factor inputs in the household’s production function. On the other hand, the demand for environmental goods can be measured by examining individual’s expressed or stated preference for these goods relative to their demand for other goods and services (Baumol and Oates, 1988).

There are a number of revealed preference methods. The travel-cost method (TCM) is primarily employed to estimate the demand or marginal valuation curve for recreation sites (Douglas and Taylor, 1999:81-92). Entry to many recreation sites is free of charge. However, individuals need to purchase a private good, to gain access to the recreation site. The demand for the recreation site can therefore be estimated by observing how the number of visits to the site varies according to the price of this private good: greater distances incur higher transport costs and hence lower numbers of visits, ceteris paribus.

The hedonic price method (HPM) is based on consumer theory which postulates that every good provides a bundle of characteristics or attributes (Lancaster 1966). HPM attempts to evaluate environmental services, the presence of which directly affects certain market prices. For instance, house prices are affected by many factors: number of rooms, size of garden, access to workplace, etc. Of course, one important factor will also be local environmental quality. If we can control for the non-environmental factors, e.g. by looking at houses with the same number of rooms, similar garden size, similar accessibility etc., then any remaining difference in house price can be shown to be the result of environmental differences.

Expressed preference techniques avoid the need to find a complementary good (travel or housing), or a substitute good (compensatory wage rate), to derive a demand curve and hence estimate how much an individual implicitly values an environmental good or safety feature. Expressed preference methods ask individuals explicitly how much they value an environmental good (Garrod and Willis, 1999: 20-21).

2.2. The Concept of Contingent Valuation Method

Contingent Valuation is a method of estimating the value that a person places on a good. The approach asks people to directly report their willingness to pay (WTP) to obtain a specified good, or willingness to accept (WTA) to give up a good, rather than inferring them from observed behaviours in regular market places.

Because it creates a hypothetical marketplace in which no actual transactions are made, contingent valuation has been successfully used for commodities that are not
exchanged in regular markets, or when it is difficult to observe market transactions under the desired conditions.

Although it is certainly possible to employ contingent valuation for commodities available for sale in regular marketplaces, many applications of the method deal with public goods such as improvements in water or air quality, amenities such as national parks, and private non-market commodities such as reductions in the risk of death, days of illness avoided or days spent hunting or fishing.

Contingent valuation has proven particularly useful when implemented alone or jointly with other valuation technique for non-market goods, such as the travel cost method or hedonic approaches. It remains the only technique capable of placing a value on commodities that have a large non-use component of value, and when the environmental improvements to be valued are outside of the range of available data (Jakobsson and Dragun, 1996).

The goal of contingent valuation is to measure the compensating or equivalent variation for the good in question. Compensating variation is the appropriate measure when the person must purchase the good, such as an improvement in environmental quality. Equivalent variation is appropriate if the person faces a potential loss of the good, as he would if a proposed policy results in the deterioration of environmental quality. Both compensating and equivalent variation can be elicited by asking a person to report a willingness to pay amount. For instance, the person may be asked to report his WTP to obtain the good, or to avoid the loss of the good. Formally, WTP is defined as the amount that must be taken away from the person's income while keeping his utility constant:

$$V(y - WTP, p, q_1; Z) = V(y, p, q_0; Z)$$

(1)

where $V$ denotes the indirect utility function, $y$ is income, $p$ is a vector of prices faced by the individual, and $q_0$ and $q_1$ are the alternative levels of the good or quality indexes (with $q_1 > q_0$, indicating that $q_1$ refers to improved environmental quality).

Willingness to accept for a good is defined as the amount of money that must be given to an individual experiencing a deterioration in environmental quality to keep his utility constant:

$$V(y + WTA, p, q_0; Z) = V(y, p, q_1; Z)$$

(2)

In equations (1) and (2), utility is allowed to depend on a vector of individual characteristics influencing the trade-off that the individual is prepared to make between income and environmental quality. An important consequence of equations (1) and (2) is that WTP or WTA should, therefore, depend on (i) the initial and final level of the good in question ($q_0$ and $q_1$); (ii) respondent income; (iii) all prices faced by the respondent, including those of substitute goods or activities; and (iv) other respondent characteristics. Internal validity of the WTP responses can be checked by regressing WTP on variables (i)-(iv), and showing that WTP correlates in predictable ways with socio-economic variables.
In theory, absent income effects and when WTP is a small fraction of income, WTP and WTA for a given commodity should be approximately equal. However, a number of CV studies have found that WTA is often much larger than WTP for the same commodity.

3. The Misi Project and Model
With the industrialization, that the investments being made for rural areas decrease is the terms that developing countries have to solve it. So, rural development projects had been practiced with the aim of preventing the immigration from rural areas to urban areas and providing to develop the rural side.

3.1. The Misi Settlement and Rural Development Project
In spite of these negative progresses. Misi is an old settlement which did not lose its traditional characteristics and green fabric. But, that residences are weak in the region threats the Misi Settlement and recreational areas. In this point, Bursa Metropolitan Municipality decided to make a project which will protect the historical - green fabric and provide to increase the welfare level of the region. However, it did not include the benefit/cost analysis environmental costs and benefits.

Misi settlement is far away 15 kilometres from Bursa province centre and at the western side. In addition, it is a natural recreational area which is surrounded with four hills and forests. Following are geographic characteristics of the region:

- Height from sea level : 340 metres
- Average heat : 0-36 °C
- Settlement area : 15 hectares
- Population : 1372
- The number of house : 260

3.2. Model
In order to apply Contingent Valuation Method (CVM), it is necessary to examine interviews or surveys using questionnaires to drive expression of a willingness to pay by the individual for some quantity of a good (benefit) via some payment mechanisms.

129 surveys were applied by the Uludag University Agriculture Economics Department Students. Respondents were selected by random sampling. This number is sufficient for statistically significant analysis considering the total effected population of 1372. The surveys were conducted between 18.00 p.m. and 21.00 p.m. Because landlords generally have been these time range in the Misi Center. The survey consists of three sections and a total of 40 questions. There are 5 demographic questions in the first section. The second section inquires about individual’s opinions about his/her environment terms. The positive and negative opinions, and expectations about the project are asked in the third section. The questions which is about “willingness to pay” and “willingness to accept” are also in this section. In the Turkey, rural side has got a quite closed and strange socio-cultural structure. So that, residences have given the surveyer the cold shoulder. Furthermore, they have considered the scientific survey study as a “taxation survey”. It was given the agricultural extension service to break this belief
and conduct the data fit. Survey was effectively prepared to remove the doubts regarding reliability of the data. For instance, in the first section, it was asked to respondents how much they have land and how much they have agricultural production cost per year. In the next section, it was directly asked to the respondent about his income. Thus, it was tried to be sure date. It was made crosswise verifications for other independent variables.

WTP question is: “There will be a rural development projects in your region, and your welfare levels and incomes will increase thanks to this project. But it will also be environmental quality loses such as the congestion of car and human, high rate chemical use, infrastructure constructions etc.. In this situations, how much money willingness to pay for this project”?

After the survey study, statistical analysis that explain WTP was practiced by “The Statistica Statistical Analysis Software” as following list:

- Specification of the maximum model
- Specification of a criterion for selection model
  * Normal procedure
  * Stepwise elimination procedure
  * Backward elimination procedure

The ordinary least squares statistical method is used to estimate the relationship of total annual benefit to the characteristics of households and resource. The objective of the statistical analysis is the estimation of the coefficients, and variables that provide the best estimates of WTP. Following model was used to estimate WTP:

$$ Y_i = a + \alpha_1 \beta_1 + \alpha_2 \beta_2 + \ldots + \alpha_n \beta_n $$  \hspace{1cm} (3)

\begin{align*}
I & = 1, N \\
Y_i & = \text{WTP for individual } I \\
a & = \text{Constant} \\
\beta_1, \ldots \beta_n & = \text{Variables} \\
\alpha_1, \ldots \alpha_n & = \text{Coefficients}
\end{align*}

Descriptions of the variables are given in Table 1:

| VARIABLE    | DESCRIPTION                                      |
|-------------|--------------------------------------------------|
| AGE         | Range: 20-72                                     |
| EDU         | Education Level: 1=Literate                      |
|             | 5=Primary School                                 |
|             | 8=Secondary School                               |
|             | 11=High School                                   |
|             | 15=University                                    |
| WITH_NAT    | Working time of the respondent                   |
For the model, a selection criterion is an index that can be computed for each candidate model and used to compare models. Thus, candidate models can be ordered from best to worst (Alp, 1999). This helps to automate the process of choosing the “best” model. Obviously, the selection criterion should be related to the goal of the analysis. $R^2$, $F$, MSE(p), $C_p$ and Durbin - Watson significant test are fundamentally used as selection criterias. In this study $F$, $R^2$ and Durbin - Watson significant test were used as the selection criteria.

In order to evaluate most significant parameters on mean WTP, first of all standart regression and then, the method of Forward Stepwise Regression was adapted. In the standart regression, variables AGE, WITH_NAT, EDU, INCOME, TOTALAND were included in the Model 1. In the method of Forward Stepwise Regression, indicator variables were used in the second model, and the independent variables were individually added or deleted from the model at each step of the regression until the “best” regression model is obtained. In the method, the importance of a variable is judged by the size of the $t/F$ statistics for dropping the variable from the model (Anonymous 1995). Following Table 2 is about means and standart deviations of the variables. Table 3 is about correlations among variables placed in the final model.

| VARIABLE | DESCRIPTION |
|----------|-------------|
| Means and Standard Deviations | Mean | Std.Deviation |
| AGE | 45,267 | 0,315 |
| WITH_NAT | 9,367 | 0,160 |
| EDU | 1,300 | 0,792 |
Table 3: The Correlation matrix for the variables

|        | AGE       | EDU       | INCOME     | TOTALAND  | ENV_SENS  | HOUSEHLD  | CHEM_USE   | LAND_OWN  | OTHER_SP | WTP       |
|--------|-----------|-----------|------------|-----------|-----------|-----------|------------|-----------|----------|-----------|
| AGE    | 1.0000    | -0.4435   | -0.4144    | 0.0519    | 0.0332    | -0.3054   | 0.4863     | -0.3338   | -0.0454  | -0.0348   |
| EDU    | -0.4435   | 1.0000    | 0.1810     | -0.2131   | 0.0360    | 0.3161    | -0.7973    | 0.2658    | 0.3365   | 0.1161    |
| INCOME | -0.4144   | 0.1810    | 1.0000     | 0.1334    | 0.1797    | 0.3161    | -0.7973    | 0.2658    | 0.3365   | 0.1161    |
| TOTALAND| 0.0519    | 0.1238    | 0.1334     | 1.0000    | 0.0047    | 0.0588    | -0.0118    | 0.3372    | 0.1836   | -0.2374   |
| ENV_SENS| 0.0332    | -0.2131   | 0.1797     | -0.0047   | 0.1000    | 0.1192    | -0.2503    | -0.4658   | 0.0514   | -0.2129   |
| HOUSEHLD| -0.3054   | 0.0360    | 0.3161     | 0.0588    | 0.1192    | 0.0000    | -0.2854    | -0.0326   | 0.0108   | 0.1867    |
| CHEM_USE| 0.4863    | -0.3138   | 0.7973     | -0.0118   | -0.2503   | -0.2854   | 1.0000     | -0.2662   | -0.3651  | 0.0655    |
| LAND_OWN| 0.3338    | 0.5118    | 0.2658     | 0.3372    | -0.4658   | -0.0326   | -0.2662    | 1.0000    | 0.1041   | -0.0265   |
| OTHER_SP| 0.0454    | 0.0607    | 0.3365     | 0.1836    | 0.0514    | 0.0108    | 0.3651     | 0.1041    | 1.0000   | -0.3327   |
| WTP    | -0.0348   | 0.4373    | 0.1161     | -0.2374   | -0.2129   | 0.1867    | 0.0655     | -0.0265   | 0.3327   | 1.0000    |

4. Conclusions

In the standard regression model, following equation was obtained:

\[
WTP = -7120593.246 + 0.313\, AGE + 0.098\, WITH\_NAT + 0.613\, EDU \\
+ 0.169\, INCOME - 0.377\, TOTALAND
\]

The first model has lower statistical significance than the second model. In model 1, total WTP is 5,534,737,872 USD. In the second model, as soon as variable number
increase, F and R values had risen. Furthermore, the impact of the indicator variables was examined upon final model.

As can be seen from Table 2, firstly, model 2 contains all of the variables entered introduced. In the following iterations, variables are eliminated one by one until the desired t-value is attained. As iterations went on, the adjusted R² value increased. WITH_NAT, PER_BENF, NAT_PROT were removed from the model and final model was obtained such as:

\[
WTP = -11904146.52 + 0.792EDU - 0.32OTHER _SP - 0.35LAND _OWN \\
-0.22ENV _SENS + 0.760INCOME + 0.588CHEM _USE - 0.28TOTALAND \\
+0.315AGE + 0.208HOUSEHLD
\]

The final equation for the second model is significant at the 0.05 level as indicated by F value of 9.82 and Durbin-Watson test value of 1.4457. Although this value is in the instability ranges which is dlow and dup, there is no autocorrelation among error terms.

Generally, in the analysis of WTP results are based upon medians instead of mean. However, it is the mean and not the median WTP, which strictly correct welfare measure in cost-benefit analysis (Brent 1998). In this study, total WTP(mean)=2,306,474,836 USD. The value of total WTP(mean) has to be included in the Benefit-Cost ratio.

Especially after the 1980’s, firstly in the USA and Avustralia and then in the other developed countries, environmental impacts were included in the Cost-Benefit analysis. There is no doubt that environmental impacts have increased or decreased the social welfare level. In spite of the fact that B/C analysis has been practiced in the public project assessment of Turkey, these assessments have only involved in the employment contribution, exchange creation impacts etc.. Even if the environmental impact assessment reports have been carried out in some entrepreneurships, it has been only a procedure. Social welfare and environmental impacts should be included in the analysis, and decision maker mechanism should considered the environmental impacts.
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