*Notulae Botanicae Horti Agrobotanici*
*Cluj-Napoca*

# Funding Biodiversity Protection in Central and Eastern Europe – A Case Study of Bosnia Herzegovina

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## Abstract

Biodiversity conservation has drawn considerable attention as to where the funding is available in order for governments concerned with the conservation of biodiversity to fulfil their obligations. This paper examines if financing resources provided through Global Environmental Facility (GEF) in Bosnia Herzegovina could be supplemented with locally voluntary provided funding to lead to an appropriate protection level of threatened species. A study was conducted on a 1189 persons sample to establish the local population willingness to contribute to GEF sponsored biodiversity conservation projects. It was found that the local people are willing to contribute positively higher than the actual spending of the GEF and findings can be used to argue for more attention to preferences of the public in decision making on biodiversity protection activity and spending in Bosnia Herzegovina.

*Keywords:* Contingent Valuation Method, Global Environmental Facility, willingness to pay

## Introduction

Biodiversity conservation, or the protection of variety among species, is of a significant concern to many governments. While certain parties may derive benefits from the species and their diversity, the public good aspects of these resources make it difficult to finance the costs of conservation.

The Rio Convention of the 1992 United Nations Conference on Environment and Development nonetheless provides that nations have sovereignty over their genetic resources, but also have the responsibility for conserving their biological resources and for using them in a sustainable manner. "In situ" conservation of ecosystems and natural habitats is expensive in terms of both preservation costs and the lost alternative use of land and if biodiversity prospecting were a substantial and continual revenue generator for governments, the pressures against the conservation in developing countries could be lessened through financial mechanisms.

With Article 21 and one of the Conferences of the Parties respectively, the Global Environmental Facility (GEF) was appointed to operate the financial mechanism under the CBD. The overall question now is, whether or not the regulations concerning financing biodiversity protection lead to an efficient provision of biodiversity protection in developing countries. As the perspective is global, the question of a global efficient level of biodiversity protection in developing countries of Central and Eastern Europe is central in this article. The article endeavours to explore the following question: could the new and additional financial resources provided through GEF be voluntary supplemented by local population in order to get an appropriate level of biodiversity protection?

There are several economic methods to estimate the benefits of items or issues. Some are based on revealed preferences (they reflect consumer behaviour) and are called indirect methods (like the travel cost method or the replacement cost method). Others are based on stated preferences collected through direct questioning on willingness to pay for described goods or through observed choices of goods with slightly different attributes or parameter values, respectively.

Many endemic species important for European biodiversity are found in Bosnia Herzegovina (Ioras *et al.*, 2009; Visnjic *et al.*, 2009), a country which had, in 2009, 55 species listed on IUCN red list (Guardian, 2009). This study was conducted with the view of identifying local people willingness to pay for biodiversity conservation as a way to top up GEF contribution.

### CBD Mechanisms for Provision Of Biodiversity Protection

With articles 20 and 21 of CBD a multinational regulation was agreed upon to contribute to the solution of undersupply of biodiversity protection in developing countries. More developed countries compelled themselves to provide new and additional financial resources

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for biodiversity conservation. The incremental cost approach, which should lead to sharing of expenses provided for biodiversity protection projects, was also agreed. More developed countries only have to pay for global environmental benefit of measures or projects to protect biodiversity in developing countries. The national or local benefit that occurs from these projects in developing countries has to be financed by national governments or co-financers. At the same time Article 20(2) states, that "implementation of these commitments shall take into account the need for adequacy".

From an economic point of view this "need for adequacy" can be interpreted in several ways. In most of the cases the discussion about adequacy concerns sharing of burden between developing and developed countries. Developing countries interpret "adequacy" as following: They estimate that the contributions shall be as high as the individual costs which occur in developing countries when protection measures are implemented. The viewpoint of the developed countries is that the contributions shall be adequate to finance only social costs of these measures. Beyond the discussion of cost sharing between developed and developing country parties the need for adequacy can be alternatively interpreted as a level of contributions of donor countries that allows for a global efficient level of protection of biodiversity in developing countries.

An optimal global level of biodiversity conservation in developing countries can be achieved when the global social marginal costs of protection are as high as the social marginal benefit of the protection. The question is then: Are the commitments of donor countries adequate in sense of global efficiency?

With Article 21 and the Conference of the Parties (COP I), the Global Environmental Facility (GEF) was appointed to operate the financial mechanism under the CBD. Thus, the GEF is the institution that organises the governmental provision of financial resources for biodiversity protection in developing countries. Does the regulation defined to the CBD and achieved by the GEF lead to a level of biodiversity protection in developing countries where global social costs and benefit are equal?

If we consider the payments of the GEF, it must be distinguished between payments to and from the GEF. Besides biodiversity protection projects, the GEF-fund also finances climate change, international waters, ozone, land degradation, and persistent organic pollutants projects.

Every four years the donor countries decide on the payments for the following four years. After the pilot phase of the GEF (1991-1993) the GEF-fund was replenished three times in 1993 (GEF-1), 1997 (GEF-2) and 2002 (GEF-3) (Streck, 2001; Horta *et al.,* 2002; GEF 2002a; GEF 2002b). The intended ratio for the focal area biodiversity was 32 to 41 percent of the whole GEF-fund (GEF 2002b). For the GEF-1 approximately $834 million were planned to finance the biodiversity conservation (GEF 2002a). For the years 2003 to 2007 there were $960 million planned for biodiversity protection in developing countries (GEF 2002b).

According to GEF (www.gefonline.org) Bosnia Herzegovina has received since 1990 around US$14.3 million, for national projects and also had a share in regional/global projects from the total of US$67.7 million. The national contribution was US$18,2 million for the national projects and a share for the regional/global projects out of the total contribution of US$525.8 million. The total number of projects has been 19 and the funding was mainly for projects on mountain protected areas and management of projects centred on Mediterranean Sea Large Marine Ecosystem project.

*Study Design*
In this study the Contingent Valuation Method (CVM) was used as it is very popular in environmental economics to estimate values of non-market goods (Hanley *et al.,* 1997). In Contingent Valuation (CV) studies respondents are asked to answer how much they are willing to pay (wtp) for a non-market good or whether or not they are willing to pay a specific amount for a good. From these answers the median and mean of payments can be estimated. Also, the economic benefit of providing the valued good can be estimated with respect to the basic population. Many studies evaluate the benefit of the conservation of single species or specific conservation projects like national parks (Loomis, 1996; Hanley *et al.,* 1998).

Focus group discussions were conducted to determine people's awareness and opinions concerning biodiversity. This avenue was also used to determine what people thought of contributing towards biodiversity conservation, what would be an acceptable payment mechanism and the quantum of their willingness to pay.

The verbal protocol technique, as applied in CV studies by Schkade and Payne (1994), Kramer and Mercer (1997) and Manoka (2001), was undertaken as part of the preparatory steps before finalizing the survey questionnaire. It is a "think aloud" technique where the respondent thinks out loud by literally letting his thoughts speak for themselves on a particular question (Manoka, 2001). There is no interaction between the interviewer and the respondent, except for occasional interventions by the interviewer when the respondent stops verbalizing for a few seconds.

Pre-testing of the questionnaire was undertaken before finalizing it. The first pre-tests were conducted on 45 personal interview respondents. For the first self-administered pre-test questionnaire, another 45 respondents were solicited from the same sites as the personal interview pretest. All these pre-tests utilized the open-ended wtp question format. A third personal interview pre-test was also undertaken using the dichotomous choice format of the wtp question.

The basic population of the survey consists of residents aged 18 and older. Because of the large basic population of

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over 4 million people within Bosnia Herzegovina, a minimum sample of 1,000 people had to be interviewed to ensure a representative result. Because of the figure of 1,000 interviewed persons and restricted financial resources to conduct the study a telephone survey was chosen as interview technique. To get a sample from the basic population telephone numbers were generated with the "random digit dialling method". Within the household the "last-birthday-method" was adopted.

The object of valuation was the protection of the endangered species which will become extinct in the next ten years if nothing further is done. It was decided to use a tax increase as payment vehicle. It was considered that this form of payment lead the respondents to take the payment seriously (in comparison with a donor to a nature conservation organisation). A nature tax (comparable to a visitor's tax) was considered as implausible for the respondents, particularly because of the non-excludability from the benefits of biodiversity conservation (Bateman *et al.*, 2002). The dichotomous choice format was chosen as question format. This question format is favoured because it is similar to purchase decisions (Spash, 1999) and is also particularly suitable when the respondents are unfamiliar with the good they shall value.

A logistic regression with variables from the protection motivation theory and socio-demographic variables (self-efficacy, bidlevel, responsibility, age, threat appraisal, the opinion about the question whether the industrialised countries have the right to interfere in biodiversity protection affairs of developing countries) was performed to test the validity of the wtp-answers and to calculate the mean and median of wtp that resulted from the model.

The wtp question for the protection of half of the endangered species in Bosnia Herzegovina was evaluated as an unfamiliar question that demands a lot of attention and thought from the respondents.

The dichotomous choice format WTP question in the survey questionnaire was as follows:

*"Please keep in mind your personal income constraints when answering the following questions. Remember this is only one of many environmental issues, which may cost you money. Also remember that the following is only a hypothetical situation (that means suppose it happens as such), and that there are no correct or wrong answers and you should answer for yourself.*

*Considering the above information let us suppose that citizens will be asked to contribute to help protect the threatened red listed species.*

*Would you be willing to pay _____ Euro as your monthly contribution for the next five years, in order to conserve and protect biodiversity in your country and world heritage site? Please keep in mind your present income and financial commitments."*

It is assumed, that if the answers to the wtp question can be forecasted with the answers to the questions de-

duced form the psychological theory, the responses to the wtp-question are valid.

**Results and discussions**

In May-July 2007 a total of 9,903 numbers were dialled, 1,870 persons were contacted and read the screening text of which 19.1% refused to participate in an interview, 5.3% dropped out and a total of 1,189 people were interviewed.

52.6 percent of the respondents were female and 47.4 percent male. The age group ranging from 25 to 45 years is over represented in the sample and the group of people older than 65 are under represented (see Tab. 2).

The samples were more or less evenly distributed over

Tab. 1. Sample report for Bosnia Herzegovina

|  | Cases | Percentage |
|---|---|---|
| Sample size | 5,154 | 100 |
| Neutral outfalls | 3,321 | 64.4 |
| No connection | 1,537 | 29.8 |
| Wrong number | 63 | 1.2 |
| Business number | 233 | 4.6 |
|  |  |  |
| Revised sample 1 | 2879 | 100 |
| Other outfalls | 2148 | 74.6 |
| No connection | 201 | 7.0 |
| Busy | 36 | 1.2 |
| Answering machine | 201 | 7.0 |
| Fax | 124 | 4.3 |
| Communication problem | 169 | 5.9 |
| Revised sample 2 | 1870 | 100 |
| Not neutral outfalls | 358 | 19.1 |
| Cancelled arrangements | 65 | 3.5 |
| Person not available at agreed time (5 attempts) | 156 | 8.4 |
| Declined call | 100 | 5.3 |
| Cancellations | 2 | 0.1 |
| Realised interviews | 1189 | 63.6 |

the income categories. The representativeness cannot be easily evaluated but the distribution of the respondents over the categories seemed comparable to the basic population. It can be noticed that the study had some limitations as some people refused participation because the expres-

Tab. 2. Percentages of people in age groups in the sample and in the basic population of Bosnia Herzegovina

| Age | Percentage of sample | Percentage of basic population |
|---|---|---|
| 18-25 | 17 | 11 |
| 25-45 | 46 | 30 |
| 45-65 | 28 | 37 |
| >65 | 9 | 22 |

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sion "nature conservation" was used in the screening text or because their unwillingness to take part in a telephone interview or any other form of surveys. Also the fact that elderly people (older than 65) are under represented and people ranging from 25 to 45 ages are over represented, may have biased the result as older people seem to have lower and younger higher wtps. However, the wtp answers can be seen as valid, because the pseudo r2 (Nagelkerke) of the regression model was 0.339. This figure indicates a moderate to good model (Backhaus *et al.*, 2000). In terms of a conservative calculation of the average wtp estimation (Arrow *et al.,* 1993), a wtp of zero is assumed for people who refused to participate.

The respondents were randomly asked whether or not they were willing to pay a specific amount ranging from 0 to 2 Euros per month for biodiversity conservation. The bidlevels were 0, 0.5, 0.7, 1, 1.5, 1.7, and 2 Euros. The acceptance and rejection rate respectively ranged from 39% to 82% depending on the bidlevel. If a respondent had to decide about the 0 Euro amount, the probability of a "yes"-answer was 82%.

The median of wtp was 1.2 Euro. This could be calculated from the model as an average monthly wtp of the respondents. In the sense of a conservative average wtp-estimation, we assumed, that persons who refused to participate in the survey or dropped out (59,6%), have a wtp of zero Euros. We also assumed that people who cancelled their appointments and who were not available at the time the survey was taken, have the same wtp as people who took part in the interviews (total=40,4%). The multiplication of the calculated wtp of 1.2 Euros with the sample population (40,4%) results in an average wtp of approximately 0.5 Euros.

This can be interpreted as an expression of benefits for an "average" local resulting from protection of 55 species in Bosnia Herzegovina in the next ten years. We assume a basic population of 3.2 million in Bosnia Herzegovina. A multiplication of the average wtp and the basic population results in figure of approximately 1.6 million Euros in Bosnia Herzegovina case. These will total 15.36 million Euros annual wtp for beneficiaries in Bosnia Herzegovina (~80% of the population). That can be taken as a potential benefit for Bosnia Herzegovina, if the 55 threatened species in are prevented from extinction.

With the acquired average value of 0.5 Euros we can attempt to roughly estimate the benefits that occur in the "main" donor countries (USA, UK, Japan, France, Germany, Australia, Belgium, Canada, Finland, Italy, Netherlands, Norway, Sweden and Switzerland) (Word Bank, 2009). Taking a comparable percentage of beneficiaries in these countries (~80% of the population of a country), a similar average benefit per capita, and the population of the main donor countries, we can estimate (through multiplication) a benefit resulting from protection of endangered species in developing countries to be up to 3 billion Euros.

## Conclusion

Biodiversity is an important natural capital asset that provides society with several goods and services that play a critical role in the economic and social well being of humans. Economic instruments are particularly attractive because they can generate financial resources to support biodiversity conservation, and expand the participation of the private sector in environmental protection. The experience from both developed and developing countries shows that if properly designed and implemented economic instruments can significantly increase the returns to activities that conserve biological diversity and discourage behaviours that are detrimental to species and ecosystems.

At the moment Bosnia Herzegovina contributes annually zero Euros into the GEF-fund for the protection of biodiversity, but the wtp of people living in Bosnia Herzegovina can be estimated to be as high as 15 million Euros annually. This value can be condemned as unrealistic, but it is in the dimension of the estimated costs for a representative network of protected areas and a comprehensive conservation programme, respectively.

The results of the study show that commitments of donor countries could be supplemented by the recipient countries. However for such an approach to happen there is a need for a new policy on funding biodiversity conservation at national level in Bosnia Herzegovina and a possible complicated way to amend the tax collection as a result. Furthermore, the findings can be used to argue for more attention to preferences of the public in decision making on biodiversity protection activity and spending.

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