



**INSTITUTE OF ENVIRONMENTAL SCIENCES  
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**Master Thesis**

**PERCEPTION OF AND ATTITUDES  
TOWARDS BIODIVERSITY BY EXPERTS  
AND LAYPERSONS IN KOSOVO – A KEY TO  
CONSERVATION**

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## Table of contents

<b>Abstract</b>	5
<b>1. Introduction</b>	6
<b>2. Methods</b>	8
<b>2.1 Data collection</b>	8
First approach: in-depth interviews	9
Second approach: questionnaire	10
<b>2.2 The instruments</b>	11
First approach: in-depth interviews	11
Second approach: questionnaire	12
<b>2.3 Data analysis</b>	13
<b>3. Results</b>	14
<b>3.1 First approach: in-depth interviews</b>	14
Main problems in Kosovo today in view of conservation experts	14
Main environmental problems in Kosovo today in view of conservation experts	14
Main environmental problems worldwide in view of conservation experts	15
Importance of world-issues in view of conservation experts	16
Familiarity with the term biodiversity and sources of information	17
Importance of and measures to protect biodiversity in view of conservation experts	18
Familiarity of conservation experts with the Kosovo Environmental Action Plan	20
Endemic and endangered plant species of Kosovo in view of conservation experts	21
Endemic and endangered animal species of Kosovo in view of conservation experts	22
Knowledge of conservation experts about plant and animal species in the world and in Kosovo	23
Familiarity with natural areas in Kosovo (conservation experts)	23
<b>3.2 Second approach: questionnaire study</b>	24
Main problems in Kosovo today in view of lay-persons	24
Main environmental problems in Kosovo today in view of lay-persons	25
Main environmental problems worldwide in view of lay-persons	26
Importance of environmental issues in view of lay-persons	26
Familiarity of lay-persons with the term biodiversity and their sources of	27

information	
Importance of biodiversity in view of lay-persons	28
Measures to protect biodiversity in view of lay-persons	29
Endemic plant and animal species in Kosovo in view of lay-persons	30
Endangered plant and animal species in Kosovo in view of lay-persons	32
Knowledge of lay-persons about plant and animal species in the world and in Kosovo	33
Familiarity with natural areas in Kosovo (lay-persons)	34
<b>3.3 Comments of experts on items used in questionnaire for the general public</b>	36
<b>4. Discussion</b>	37
<b>5. Conclusion</b>	42
<b>6. Acknowledgement</b>	44
<b>7. References</b>	44
<b>8. Appendices</b>	48
<b>8.1 Interview agenda for stakeholders</b>	48
<b>8.2 Questionnaire for lay-persons</b>	51
<b>8.3 Picture tests</b>	54

## List of Figures

Figure 1	Overview of study area	10
Figure 2	Ranking of world-issues	17
Figure 3	Sources of information about biodiversity used by 20 conservation experts	18
Figure 4	Ranking of environmental-issues	27
Figure 5	Familiarity with and sources of information about biodiversity in view of general public	28

## List of tables

Table 1	Main problems in Kosovo today in view of conservation experts	14
Table 2	Main environmental problems in Kosovo today in view of conservation experts	15
Table 3	Main environmental problems worldwide today in view of conservation experts	16
Table 4	The importance of world issues in view of conservation experts	16
Table 5	Definition of biodiversity provided by conservation experts	18
Table 6	Measures to protect biodiversity in view of conservation experts	19
Table 7	Measures undertaken by the Government in Kosovo to stop loss of biodiversity	20
Table 8	Objectives of the Kosovo Environmental Action Plan (KEAP) in view of conservation experts	21
Table 9	Endemic plant species of Kosovo in view of conservation experts	21
Table 10	Endangered plant species of Kosovo in view of conservation experts	22
Table 11	Endangered animal species of Kosovo in view of conservation experts	23
Table 12	Main problems in Kosovo today in view of general public	24
Table 13	Main environmental problems in Kosovo today in view of general public	25
Table 14	Main environmental problems worldwide today in view of general public	26
Table 15	Meaning of biodiversity in view of general public	28
Table 16	Importance of biodiversity in view of general public	29
Table 17	Official measures to protect biodiversity in view of general public	30
Table 18	Personal measures to protect biodiversity in view of general public	30
Table 19	Plant taxa perceived as endemic in Kosovo in view of general public	31
Table 20	Animal taxa perceived as endemic in Kosovo in view of general public	32
Table 21	Plant and animal taxa perceived as endangered in Kosovo in view of general public	33
Table 22	Estimated plant species richness worldwide and in Kosovo in view of lay-persons	34
Table 23	Estimated animal species richness worldwide in view of lay-persons	34
Table 24	Familiarity of lay-persons with natural areas in Kosovo	35

## **Abstract**

One major issue in Kosovo and elsewhere is the loss of biodiversity due to urbanization, industrial development, deforestation, illegal hunting or fishing. Measures to preserve biodiversity are urgently needed. The necessity to mobilize popular and political support for its conservation and sustainable use has frequently been pointed out. However, at present hardly anything is known about whether the loss of biodiversity is regarded as a serious environmental problem in Kosovo. In the present project, people's perception of and attitudes towards biodiversity in Kosovo were investigated by using two approaches. In the first approach, in-depth interviews with 20 conservation experts (university professors, NGO members, members of the Institute of Nature Protection, and politicians from local environment departments) were carried out, whereas in the second approach a pre-structured questionnaire was administered to 500 randomly selected laypersons in five cities in Kosovo.

The following questions were addressed: (1) How familiar are conservation experts and laypersons in Kosovo with the concept of biodiversity and measures to protect biodiversity in their country? (2) Do they regard the loss of biodiversity as a major environmental issue both worldwide and in Kosovo? (3) How familiar are conservation experts and laypersons in Kosovo with the natural richness of their country? (4) Are their perception of and attitudes towards biodiversity influenced by factors such as age, gender, level of education (academic, non-academic), and place of residence?

Both experts and laypersons considered unemployment and the undecided political status of the country as major problems in Kosovo. Environmental problems were mentioned less frequently, and, in case of the world, even unknown to the majority of laypersons. In contrast to experts, most laypersons in Kosovo were unfamiliar with the concept of biodiversity, and a loss of biodiversity was regarded as a minor environmental problem. Moreover, knowledge about endemic and endangered species in Kosovo was poor, and only a few people could estimate species richness correctly. Study participants were unfamiliar with natural areas in Kosovo. Sharr Mountain, the only national park in the country, was least known and visited. Both experts and laypersons thought education the best way to officially conserve biodiversity. However, most laypersons felt that personally they could do nothing to protect biodiversity. The results of the present study show the necessity for conservation education in Kosovo as a first step to increase the awareness about the loss of biodiversity and its conservation.

## 1. Introduction

Kosovo is located in the centre of the Balkans and landlocked by Macedonia, Albania, Serbia and Montenegro. In 2006, about two Million people were living in Kosovo on an area of 10'877 km<sup>2</sup>, i.e. 200 persons per km<sup>2</sup>. However, because only 50% of the land area is suitable for settlement, the actual population density is 400 persons per km<sup>2</sup> (Pushka & Isufi, 2006). Unfortunately, a high population density might result in severe ecological problems. Rapid human growth and activities are reducing biodiversity of natural systems at dramatic rates and these changes are often irreversible (Pfisterer et al., 2005).

Kosovo has inherited a large number of environmental problems. These problems have accumulated for decades as a consequence of the uncontrolled use of natural and mineral resources, a growing industrial production with a high level of pollution, and a lack of appropriate policies, laws, and institutions which could treat and solve the problems (Kosovo Environmental Action Plan, 2006). As a result, the environment in Kosovo has been degraded, and severe negative impacts on the health of the population have already occurred (Kosovo Environmental Action Plan, 2006). One major issue in Kosovo is the loss of biodiversity due to urbanization, industrial development, deforestation, illegal hunting or fishing (Ministry of Environmental and Spatial Planning, 2003).

Global climate change, tropical deforestation, and the loss of biodiversity are seen as today's major environmental problems (UNEP/CBD/COP/8/14, 2006). The 'Convention on Biological Diversity' defines biodiversity as 'the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems' (CBD, 1992). Unfortunately, Kosovo has not signed the Convention on Biological Diversity and is also not a member of IUCN. However, a local 'Kosovo Environmental Action Plan' exists which includes the issue of biodiversity (Ministry of Environmental and Spatial Planning, 2003).

About 1'800 plant species and 230 species of wild vertebrates have so far been inventoried in Kosovo, whereas invertebrate species have not been studied yet (Mustafa & Hoxha, 2004). However, it has been suggested that plant species richness must be much higher - up to 2'500

species (Mustafa & Hoxha, 2004). Due to a high number of endemic, sub-endemic and relict varieties, the flora and fauna of Kosovo is both attractive and important (Kosovo Environmental Action Plan, 2006). Areas with a high species richness are ‘Sharr Mountain’ which is the only national park in Kosovo, and the mountainous area of ‘Bjeshkët e Nemuna’ which is considered to become a new national park (Mustafa & Hoxha, 2004).

Protection of nature through protected areas is an important measure to preserve biodiversity. Until 2006, about 46’000 ha, i.e. 4.3% of the landmass of Kosovo have been put under legal protection (Mustafa & Hoxha, 2004). Among these protected areas are one national park, eleven nature reserves, 37 natural monuments, and two protected landscapes. The main aim of the local environmental action plan is to strengthen and expand the existing network of protected areas (Kosovo Environmental Action Plan, 2006). If the mountain area of ‘Bjeshkët e Nemuna’ would become a second national park as it is currently discussed (Kosovo Environmental Action Plan, 2006), the protected area in Kosovo would increase from four to ten percent of the countries’ territory.

Considering the significance of biodiversity conservation, it is of utmost importance to develop a strategy within the action plan for the protection of biological diversity (Kosovo Environmental Action Plan, 2006; also stipulated by the ‘Law on Nature Conservation’). It has been stated that tasks to be addressed in such an action plan should be (1) to monitor the existing state of biological diversity, (2) to find causes of threats to biological diversity, (3) to address problems of biological diversity protection, (4) to develop guidelines for the protection and conservation of biodiversity by priorities, and (5) to develop a sustainable management plan for protected areas, in particular national parks.

Measures to preserve biodiversity are urgently needed – in Kosovo and worldwide, and the necessity to mobilize popular and political support for its conservation and sustainable use has frequently been pointed out (CBD, 2002; Hanski, 2005; UNEP/CBD/COP/8/14, 2006). Reconnecting people and nature is a major challenge for future conservation biology (Balmford & Cowling, 2006). However, at present hardly anything is known about whether the loss of biodiversity is regarded as a serious environmental problem in Kosovo. In the present project, people’s perception of and attitudes towards biodiversity in Kosovo were investigated by using two approaches. In the first approach, selected experts in the field of nature conservation were

interviewed in-depth. In the second approach, randomly selected laypersons in several locations in Kosovo were interviewed with the help of a pre-structured questionnaire. The two approaches complement each other and together allow a more comprehensive understanding of people's perception of and attitudes towards biodiversity in Kosovo. The results of this study will be useful for future conservation education in Kosovo, which will be a necessary first step to increase the awareness of lay persons about the loss of biodiversity and its conservation in the country. The following questions were addressed:

1. How familiar are conservation experts and laypersons in Kosovo with the concept of biodiversity and measures to protect biodiversity in their country?
2. Do they regard the loss of biodiversity as a major environmental issue both worldwide and in Kosovo?
3. How familiar are conservation experts and laypersons in Kosovo with the natural richness of their country?
4. Are their perception of and attitudes towards biodiversity influenced by factors such as age, gender, profession, and place of residence?

## **2. Methods**

### **2.1 Data collection**

People's perception of and attitudes towards biodiversity in Kosovo were investigated using two approaches. In the first approach, in-depth interviews with 20 experts in the field of nature conservation were carried out, whereas in the second approach a pre-structured questionnaire was administered to 500 randomly selected laypersons in several cities in Kosovo. Only adults were addressed because some of the questions were too difficult to answer for younger people. To allow a comparison between the knowledge about and importance placed on biodiversity by experts and laypersons in Kosovo, most questions asked were the same in both interviews and the survey.

### ***First approach: in-depth interviews***

In-depth interviews with 20 stakeholders' influential in environmental policy-making in Kosovo were carried out. Only native Albanians were interviewed because contact with other communities in Kosovo is currently impossible. Several different methods exist on how to interview people, e.g. personal interviews, group or round table discussions or consensus finding approaches such as the Delphi technique (Linston & Turoff, 1975). In the present study, face-to-face interviews were carried out because people in Kosovo are not used to and might also not like to work and discuss in groups. Moreover, only 5% of the population have access to the internet, and mail service is not always functioning which excludes methods such as the Delphi technique.

Conservation experts from four different organizations were interviewed because different stakeholders may hold different perspectives on what to sustain (Swart et al., 1998). They were NGO members, professors in the field of ecology / nature conservation, members of the Institute of Nature Protection and politicians. In each of the four organizations, five people were interviewed.

- The NGO members were from the two main environmental organizations in Kosovo: 'Environment Protection Association (Aquila)' and 'Eko Trepqa'. Aquila was founded in 2000. Its main task is to provide the general public with information about environmental problems in Kosovo. Eko Trepqa was founded in 2001. This organisation carries out a diversity of projects including public relations work on the values of nature. Two of the interviewees were engineers, one was a technologist, one a biologist, and one an economist.
- The five professors were all from the 'University of Pristina, Department of Biology'. They were all biologists, and mainly involved in teaching.
- Five interviewees were from the 'Institute of Nature Protection' which is part of the 'Ministry of Environmental and Spatial Planning'. The institute was founded in 1968, and is nowadays organized in three sectors; one of them the biodiversity sector. The interviewees were all biologists.
- The politicians were from the 'Municipality Environmental Departments' of the five largest cities in Kosovo: Pristina, Peja, Prizreni, Mitrovica and Gjilani. Their task is to take care of the environment in their region and to convince people to respect the law and nature legislation. Two of them were engineers; one was a geologist, one a chemist and one a

biologist. All professors and interviewees from the NGOs were male. Two politicians from the environment departments and one member of the Institute of Nature Protection were women. Interviewees were between the age of 29 and 59. On average, they were 39.95 years old. The interviews were carried out in the above mentioned organizations. All interviewees were informed in advance about the interview structure (pre-structured interview agenda with open and closed-ended questions). One interview lasted of about 45 minutes.

### ***Second approach: questionnaire study***

In the second part of the project, 500 randomly selected inhabitants of Kosovo were asked on 20 days about their perception of and attitudes towards biodiversity with the help of a written questionnaire. Filling in the questionnaire took between 10 to 15 minutes time. All participants received a little incentive for their participation (Swiss chocolate).

Because people's perception of and attitudes towards biodiversity may vary between regions, the interviews were carried out in different parts of Kosovo. However, to have easily access to a large number of people, all interviews were carried out in cities (Pristina, Peja, Preizreni, Mitrovica, Gjilani; Fig. 1). In each city, 100 persons were interviewed. People were approached in well-visited areas of the cities, e.g. parks and main shopping areas. I tried to question people in their leisure time who were not stressed and willing to take their time to fulfil the required tasks.



Fig. 1: Overview of the study sites

To test whether the level of education influences perception of and attitudes towards biodiversity, study participants were asked to write down their profession. From this data a variable was created which indicates whether a participant is an academic or not. 46 % of the participants were academics and 54 % non-academics. All study participants were asked about their age and gender. However, control was placed that men and women were interviewed in equal numbers. Because the order of questions might influence people's responses, ten different versions of questionnaires were prepared (same questions but different order).

## **2.2 The instruments**

### ***First approach: in-depth interviews***

In the first part of the interviews, stakeholders' level of sensitization towards biodiversity and the loss of biodiversity in Kosovo were investigated. All conservation experts were asked to name spontaneously the three most important problems of Kosovo today (see interview guideline in Appendix I). They were then asked to state the three most important *environmental* problems in the world and in Kosovo, regardless of whether they had already named some or not. Afterwards, participants received a list of six environmental issues, including the loss of biodiversity, which they should rank-order by priority. Moreover, they were asked to rate the importance of each issue on 7-step scales, ranging from very unimportant to very important. To make it more easy, the rating scale was shown to the interviewees on a piece of paper (see Appendix I).

The second part of the interview investigated in more detail how much importance stakeholders in Kosovo place on the issue of biodiversity and the loss of biodiversity. First of all, the conservation experts were asked to state whether they are familiar with the term and, if so, to indicate their sources of information about biodiversity. They were then asked to define the term and to discuss the importance of biodiversity. If they could not provide a definition, an official definition of biodiversity was presented to them. They were asked if a loss of biodiversity takes place in their country and, if so, to discuss the reasons. Finally, they were asked to state the importance of biodiversity on a seven-step rating scale, ranging from very unimportant to very important (see scale in Appendix I).

The third part of the interview focused on biodiversity conservation. The experts were asked about the 'Convention on Biological Diversity' and the role their Government plays in terms of

biodiversity loss and conservation. Some questions were addressed about the 'Kosovo Environmental Action Plan', especially about the article on biodiversity. Experts were also asked about the general role education can play in terms of biodiversity conservation. Moreover, they were asked to discuss in detail which role their own institution / organization is playing or can play in protecting biodiversity, and how they can encourage people to protect biodiversity. Finally, experts were asked about examples of good practice and the best way to convince people to protect biodiversity.

In the last part of the interviews, participants were asked to estimate how many plant and animal species exist in the world and in Kosovo, and to name some endemic plants and animals of Kosovo as well as some endangered ones. Finally, five pictures of different natural sites in Kosovo were shown to the interviewees (see pictures in Appendix I). The first step, they were asked to look at the pictures and name each site. The second step, they were all told the names of the sites and then asked whether they had already been there or not.

### ***Second approach: questionnaire study***

As in the interviews, study participants were asked in open questions about the three most important (environmental) problems in Kosovo and the world, and to rank-order six environmental issues (including the loss of biodiversity) by priority (see questionnaire in Appendix II). Additionally, they were asked if they were familiar with the term biodiversity or not and, if so, to indicate their sources of information about biodiversity. Study participants were then asked to define the term biodiversity and to discuss its importance. If they had problems in doing so, an official definition of biodiversity was presented to them.

As in the interviews, questionnaire participants were also asked whether they think that a loss of biodiversity occurs in Kosovo and, if so, to present potential reasons for this loss. They were further asked to state the importance of biodiversity on a seven-step rating scale, ranging from 1: very unimportant to 7: very important. Moreover, they were asked what could be done to protect biodiversity (in general and by themselves). Finally, five pictures of different sites of Kosovo were shown to the study participants. They were asked if they knew the sites and if they had ever been to the sites. Finally, participants were asked to estimate how many plant and animal species

exist in the world and in Kosovo, and to name five endemic plant and animal species and some endangered ones of Kosovo.

### **2.3 Data analysis (first and second approach)**

The expert interviews were tape-recorded, transcribed and translated into English. The answers to the open questions were content-analyzed and sorted into categories according to the type of response given. Coding was discussed between the researcher and the research project leader, and reliability judged by comparing their categorizations. Grouped responses were firstly compared within each group of experts, and secondly among the four different groups. Finally, the results of the expert interviews were compared with those of the survey with the general public.

Differences between the four groups of experts, between academics and non-academics, men and women, and people from different cities in Kosovo in their answers to the open questions (sorted into broad categories) were analyzed by using chi-square-tests. To test whether age influenced the probability that a certain answer category was mentioned, the data were analyzed by binary logistic regressions.

The test whether age, gender, city, and level of education (academic, non-academic) influenced the importance which the general public placed on environmental issues (measured on 7-step rating scales), the data were analyzed by general linear models (type II SS). Initially, all variables were included in the model and then with backward elimination variables with the lowest significance step by step eliminated, until only significant ( $p < 0.05$ ) variables remain (Crawley, 2005). All analyses were carried out with SPSS for Windows 12.0.1.

### 3. Results

#### 3.1 First approach: in-depth interviews

##### *Main problems in Kosovo today in view of conservation experts*

When asked to spontaneously name three main problems of Kosovo today, conservation experts most frequently mentioned political and economic problems, i.e. the unclear status of the country, whereas environmental problems were hardly thought of (Table 1). On average,  $2.7 \pm 0.1$  problems were named by each interviewee. Among the four different groups of conservation experts no differences occurred in the frequency of the problems named (Chi-square tests: all  $p > 0.05$ ).

Table 1: Main problems in Kosovo today in view of conservation experts (n = 20). The answers to the open question were sorted into broad categories.

Category	Proportion of responses (%)
<b>Political &amp; economic problems</b>	<b>42.6</b>
<i>Political situation</i>	26.5
<i>Economic problems</i>	16.1
<b>Unemployment</b>	<b>22.0</b>
<b>Corruption</b>	<b>22.0</b>
<b>Environmental problems</b>	<b>10.4</b>
<b>Others</b>	<b>3.0</b>

##### *Main environmental problems in Kosovo today in view of conservation experts*

When asked to spontaneously name three *environmental* problems in Kosovo, pollution was mentioned most frequently by almost all conservation experts (Table 2). The loss of biodiversity was also mentioned, but only by four university professors and four interviewees from the Institute of Nature Protection. However, only three experts (two from the university, and one expert from the Institute of Nature Protection) could actually name three problems. On average,  $1.7 \pm 0.2$  problems were named by each interviewee.

Table 2: Main environmental problems in Kosovo today in view of conservation experts (n = 19). The answers to the open question were sorted into broad categories.

Category	Proportion of responses (%)
<b>Pollution</b>	<b>57.5</b>
<i>Water pollution</i>	20.0
<i>Air pollution</i>	17.7
<i>Soil pollution</i>	8.8
<i>Radioactivity pollution</i>	4.4
<i>Pollution in general</i>	4.4
<i>Garbage</i>	2.2
<b>Loss of biodiversity</b>	<b>22.0</b>
<i>Loss of biodiversity</i>	20.0
<i>Loss of habitat diversity</i>	2.0
<b>Degradation</b>	<b>9.0</b>
<b>Erosion</b>	<b>7.0</b>
<b>Others</b>	<b>4.5</b>

### *Main environmental problems worldwide in view of conservation experts*

Interviewees named on average  $2.1 \pm 0.1$  environmental problems of the world. Climate change was mentioned most frequently as a worldwide environmental problem (Table 3). All interviewees from the Institute of Nature Protection and the environment departments, and each four experts from the other organisations named climate change as a major issue. Aspects of pollution were mentioned less frequently. Four university professors, three local government representatives, two NGO experts, and one member of the Institute of Nature Protection named this issue. There were no significant differences in the view of experts of what a major environmental problem is (all  $p > 0.26$ ).

Table 3: Main environmental problems worldwide today in view of 20 conservation experts. The answers to the open question were sorted into broad categories.

Category	Proportion of responses (%)
<b>Climate change</b>	<b>40.0</b>
<b>Pollution</b>	<b>23.0</b>
<i>Air pollution</i>	9.3
<i>Water pollution</i>	6.8
<i>Garbage</i>	2.3
<i>Pollution in general</i>	2.3
<i>Radioactivity pollution</i>	2.3
<b>Loss of biodiversity</b>	<b>21.0</b>
<b>Deforestation</b>	<b>16.0</b>

#### *Importance of world-issues in view of conservation experts*

All conservation experts were asked to indicate on 7-step rating scales the importance they would place on six pre-given problems of the world. They considered all issues at least as slightly important. However, climate change was considered to be the most important problem (Table 4).

Table 4: The importance of world-issues in view of conservation experts. 20 conservation experts were asked to rate six pre-given problems of the world on 7-step rating scales, ranging from 1: totally unimportant to 7: very important. Mean scores and SE are given.

World-issues	Mean scores
Climate change	6.5 $\pm$ 0.2
Unemployment	6.1 $\pm$ 0.2
Loss of biodiversity	6.0 $\pm$ 0.2
Tropical deforestation	5.9 $\pm$ 0.3
Terrorism in the world	5.6 $\pm$ 0.5
Pollution in polar regions	4.7 $\pm$ 0.4

Conservation experts were further asked to rank-order the six pre-given issues by priority. Again, climate change received the highest priority (Figure 2).

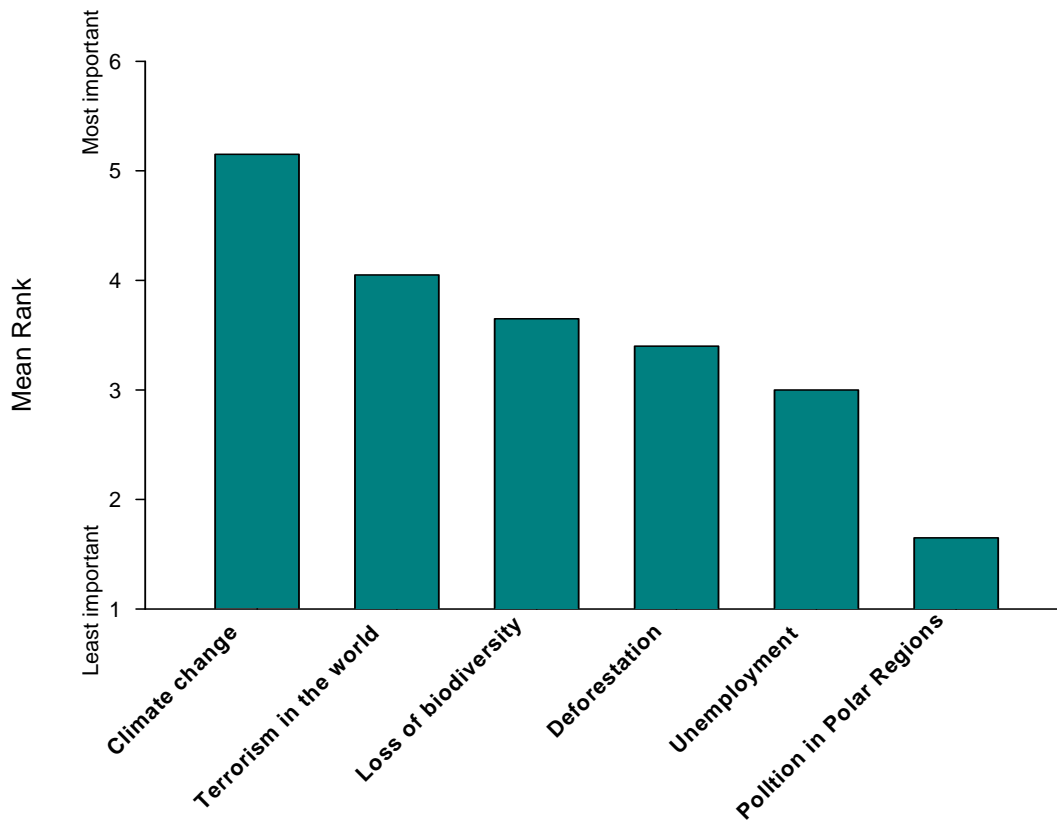


Fig. 2: Ranking of world-issues. 20 conservation experts were asked to rank-order six pre-given issues by importance (1: least important, 6: most important)

### ***Familiarity with the term biodiversity and sources of information***

All conservation experts stated to be familiar with the term biodiversity, and had heard about it mainly in school and journals (Fig. 3). However, only half of the conservation experts could provide a correct definition of biodiversity (Table 5). Whereas all university professors, and four experts from the Institute of Nature Protection excelled in the task, none of the interviewees from the environment departments, and only two of the NGO members could provide a definition (Chi-square value 13.60,  $p = 0.040$ ). On average, 70% of the conservation experts stated to have

heard about the Convention of Biodiversity (see CBD, 1992). Two experts from the environment departments considered themselves familiar with the Convention and four experts each in the other group<sup>c</sup>

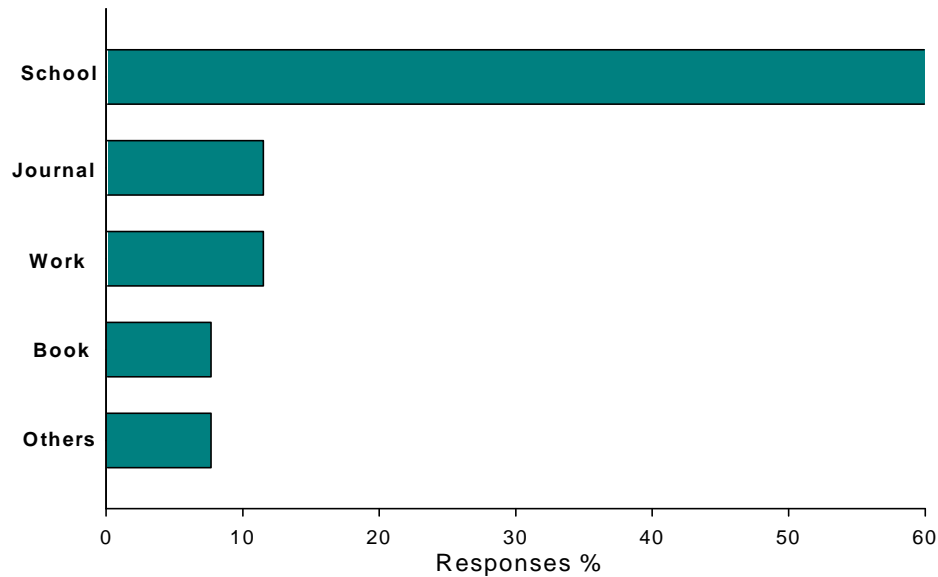


Fig. 3: Source of information about biodiversity used by 20 conservation experts. The answers to the open question were sorted into broad categories.

Table 5: Definitions of biodiversity provided by conservation experts (n = 20)

Definition of biodiversity	Answers (%)
Diversity of plants and animals	30.0
Diversity of genes, species, and ecosystems*	25.0
Diversity of plant and animal species, genes, and habitats*	25.0
Diversity of living organisms	5.0
I do not know	15.0

\*Correct answer combination

### ***Importance of and measures to protect biodiversity in view of conservation experts***

Conservation experts considered biodiversity to be very important (mean score of 6.5 on the 7-step rating scale). They felt that biodiversity is mainly threatened worldwide and in Kosovo by

deforestation and illegal hunting, or in the words of one professor (male, 47 years old): “*Main threats to biodiversity are deforestation, poaching and fishing, i.e. anthropogenic factors.*”

Education was named most often as a measure to protect biodiversity (Table 6). Especially at primary school level, education was considered as an essential measure to conserve biodiversity, as two experts stated:

“*The best way to protect biodiversity is to educate people and to expand protected areas.*”  
(professor, male, 45 years old)

“*We should use the term biodiversity more often in primary and high school, and also to do big campaigns about the values of biodiversity.*” (NGO member, male, 34 years old)

Table 6: Measures to protect biodiversity in view of conservation experts (n = 20). Multiple answers were allowed. The answers to the open question were sorted into broad categories.

Category	Proportion of responses (%)
<b>Education</b>	<b>44.4</b>
<i>Education</i>	25.9
<i>Campaigns</i>	14.8
<i>Seminars</i>	3.7
<b>Protection by law</b>	<b>30.0</b>
<b>Expansion of protected areas</b>	<b>14.6</b>
<b>Others</b>	<b>11.0</b>

Conservation experts were also asked to discuss what the government of Kosovo could do to stop the loss of biodiversity. They answered most frequently that the biodiversity in their country should be protected by law (Table 7). However, none of the experts from the Institute of Nature Protection felt that the government should work more in legislation.

Table 7: Measures undertaken by the government in Kosovo to stop the loss of biodiversity in view of 20 conservation experts. Multiple answers were allowed. The answers to the open question were sorted into broad categories.

Category	Proportion of responses (%)
<b>Protection by law</b>	<b>37.0</b>
<b>Signing of environmental conventions</b>	<b>26.0</b>
<b>Education</b>	<b>21.0</b>
<i>Education</i>	15.7
<i>Campaigns</i>	5.3
<b>Increased attention by Government</b>	<b>16.0</b>

Three experts from the Institute of Nature Protection, one professor from the University of Pristina, and one expert from the environment departments suggested that the government should sign environmental conventions such as the Convention on Biological Diversity. Education and media campaigns were also mentioned. All university professors, four of the NGO experts, and three experts from the environment departments and the Institute of Nature Protection felt that education is the best way to convince people to protect biodiversity.

In addition, experts were asked about their organizations' efforts to protect biodiversity. All organizations seemed to provide brochures, seminars or lectures on biodiversity conservation.

### ***Familiarity of conservation experts with the Kosovo Environmental Action Plan***

Overall, 18 experts stated to be familiar with the Kosovo Environmental Action Plan. Protection of nature through protected areas is a very important instrument for preserving biodiversity. Until 2008, approximately 46.000 ha or 4.3% of Kosovo has been put under legal protection. By designating Bjeshket e Nemuna as the second national park, the total protected area of Kosovo would amount to 10% of the total surface area. This is the main aim of the Kosovo Environmental Action Plan. However, only nine out of 20 experts were actually able to name at least one objective of this plan (Table 8). Four out of five experts from both the university and the Institute for Nature Protection could do so, but no expert from the environment departments and only one NGO member (Chi-square value 10.30,  $p = 0.010$ ).

Table 8: Objectives of the Kosovo Environmental Action Plan (KAEP) in view of 20 conservation experts

Objectives of the KAEP	Proportion of responses (%)
I do not know	50.0
10% of the Kosovo territory must be under protection	45.0
Conservation of biodiversity	5.0

### *Endemic and endangered plant species of Kosovo in view of conservation experts*

When conservation experts were asked to name five endemic plant species of Kosovo, they had difficulties to fulfil the task. On average, they could come up with one name, but only 12 experts could actually do so (four university professors, four members of the Institute for Nature Protection, two NGO experts, two local government members). *Forsythia europaea* was mentioned most frequently as an endemic plant species (Table 9). Based on literature from the region, this answer is correct (Mustafa & Hoxha, 2004; Sherifi et al., 2005). One NGO expert and one expert from the environment departments thought poppy to be endemic.

Table 9: Endemic plant species of Kosovo in view of conservation experts (n = 12)

Endemic plant species	Proportion of responses (%)
<i>Forsythia europaea</i> *	38.0
<i>Aster albanicus</i> *	9.5
<i>Bornmuellera dickei</i> *	9.5
<i>Dianthus scardicus</i> *	9.5
<i>Achillea alexandri</i> *	5.0
<i>Convolvulus cochlearis</i> *	5.0
<i>Acer heldreichii</i> *	5.0
<i>Rhododendron ferrugineum</i> *	5.0
<i>Lilium albanicum</i> *	5.0
<i>Quercus trojana</i> *	5.0
<i>Dioscorea balcanica</i> *	5.0

\*Correct answers (Mustafa & Hoxha, 2004; Sherifi et al., 2005)

Interviewees were also asked to name five endangered plant species in Kosovo. Again, only about half of the experts could fulfil the task. Three university professors, three members of the Institute of Nature Protection, one NGO expert, and one local government member came up with at least one name, and all species named were indeed endangered ones. *Gentiana lutea* was mentioned most frequently (Table 10).

Table 10: Endangered plant species of Kosovo in view of conservation experts (n = 12)

Endangered plant species	Proportion of responses (%)
<i>Gentiana lutea</i> *	50.0
<i>Forsythia europaea</i> *	17.0
<i>Quercus trojana</i> *	17.0
<i>Acer heldreichii</i> *	8.0
<i>Lilium albanicum</i> *	8.0

\*Correct answer

### *Endemic and endangered animal species of Kosovo in view of conservation experts*

Conservation experts were also asked to name five endemic and five endangered animal species in their country. They stated correctly that no endemic animals exist in Kosovo. Four professors, three NGOs, three members of the Institute of Nature Protection, and 2 experts from the environment departments could name at least one endangered animal in Kosovo. Among the endangered animals, the brown bear (*Ursus arctos*) was mentioned most frequently (Table 11), although one professor stated: “*It is almost impossible to see brown bears in our mountains*” (male, 56 years old).

Table 11: Endangered animal species of Kosovo in view of conservation experts (n = 12)

<b>Endangered animal species</b>	<b>Proportion of responses (%)</b>
<i>Ursus arctos</i> *	44.0
<i>Lynx lynx</i> *	35.0
<i>Rupicapra rupicapra</i> *	17.0
<i>Capreolus capreolus</i> *	4.0

\*Correct answer

### ***Knowledge of conservation experts about plant and animal species in the world and in Kosovo***

Conservation experts were asked to estimate how many plant and animal species exist, both in the world and in Kosovo. According to the IUCN database<sup>1</sup> the correct numbers for the world would have been: approx. 288'000 plant and 1'248'000 animal species. The correct answers for Kosovo would have been: approx. 1'800 plant species; animal species unknown (Mustafa & Hoxha, 2004).

Overall, about half of the experts could answer the question correctly, the others refused to answer the question. All university professors, three experts from the Institute for Nature Protection, and one NGO expert could provide the right answer for plant species richness worldwide, and all university professors, all experts from the Institute of Nature Protection, and two of the NGO experts could estimate plant species richness in Kosovo correctly. All experts knew that the number of animal species is unknown for Kosovo, and all professors, three experts from the Institution of Nature Protection, and one expert each from the NGOs and environment departments estimated the world's animal species richness correctly.

### ***Familiarity with natural areas in Kosovo (conservation experts)***

Five pictures of natural areas in Kosovo were shown to the experts (see Appendix III). They were asked whether they knew and had already visited these places. All experts were familiar and actually had been to these places.

<sup>1</sup> <http://www.iucnredlist.org/info/tables/table1>

### 3.2 Second approach: questionnaire study

#### *Main problems in Kosovo today in view of laypersons*

In view of the general public, unemployment is a main problem in Kosovo today, whereas environmental problems were hardly mentioned (Table 12). Although study participants were explicitly asked to name three problems, they could, on average, only name  $1.6 \pm 0.03$  ones.

Table 12: Main problems in Kosovo today in view of the general public (n = 492). The answers to the open question were sorted into broad categories.

Category	Proportion of responses (%)
<b>Unemployment</b>	<b>53.6</b>
<b>Political problems</b>	<b>24.4</b>
<i>Political situation</i>	23.7
<i>UN-KFOR presence or Serbian presence</i>	0.7
<b>Economic problems</b>	<b>10.9</b>
<i>Economic crisis</i>	9.7
<i>Poverty</i>	1.2
<b>Environmental problems</b>	<b>6.9</b>
<i>Garbage</i>	2.7
<i>Water pollution</i>	1.5
<i>Pollution in general</i>	1.3
<i>Air pollution</i>	1.2
<i>Deforestation</i>	0.2
<b>Social problems</b>	<b>2.6</b>
<i>Bad education</i>	1.3
<i>Drugs</i>	0.8
<i>Social problems</i>	0.3
<i>Violence</i>	0.2
<b>Others</b>	<b>1.3</b>

Women significantly more often than men mentioned unemployment (86% and 73%, respectively; Chi-square value 11.62,  $p = 0.001$ ), whereas men significantly more often

mentioned political problems (43% and 30%, respectively; Chi-square value 8.18,  $p = 0.004$ ). People in Pristina named unemployment least often (69% in Pristina, 77% in Peja, 80% in Prizreni, 82% in Mitrovica, and 89% in Gjilani; Chi-square value 12.55,  $p = 0.014$ ).

With increasing age of the study participants, the probability that unemployment was mentioned as a problem decreased ( $B = -0.022$ , Wald = 7.11,  $p = 0.008$ ), whereas the probability that political problems were mentioned, increased ( $B = 0.029$ , Wald = 15.76,  $p < 0.001$ ).

### ***Main environmental problems in Kosovo today in view of laypersons***

Study participants were also asked to spontaneously name three main *environmental* problems Kosovo is facing today. On average,  $1.1 \pm 0.02$  problems were named by each person. Most frequently, different aspects of pollution were named, whereas the loss of biodiversity was not mentioned at all (Table 13). Women more often than men named pollution as a major issue (95% and 87%, respectively; Chi-square value 9.28,  $p = 0.02$ ).

Table 13: Main environmental problems in Kosovo today in view of the general public ( $n = 492$ ). The answers to the open question were sorted into broad categories.

Category	Proportion of responses (%)
<b>Pollution</b>	<b>87.0</b>
<i>Air pollution</i>	46.2
<i>Garbage</i>	22.5
<i>Pollution in general</i>	10.2
<i>Water pollution</i>	8.1
<b>Lack of green areas</b>	<b>5.5</b>
<b>Deforestation</b>	<b>3.9</b>
<b>Degradation</b>	<b>2.6</b>
<b>Climate change</b>	<b>2.2</b>

### ***Main environmental problems worldwide in view of laypersons***

About two thirds of the study participants were not able to name at least one *environmental* problem worldwide. More women than men were unable to name an environmental problem of the world (on average 48% and 22%, respectively; Chi-square value 38.09,  $p < 0.001$ ). Non-academics were also less able than academics to fulfil the task (on average 40% and 29%, respectively; Chi-square value 6.35,  $p = 0.010$ ). The other participants most frequently referred to different forms of pollution (Table 14).

Table 14: Main environmental problems worldwide. 492 people answered the open question. The answers to the open question were sorted into broad categories.

Category	Proportion of responses (%)
<b>I do not know</b>	<b>66.0</b>
<b>Pollution</b>	<b>18.0</b>
<i>Air pollution</i>	12.9
<i>Environmental pollution</i>	2.6
<i>Water pollution</i>	2.4
<b>Climate change</b>	<b>13.5</b>
<i>Global warming</i>	7.3
<i>CO<sub>2</sub> increase</i>	3.4
<i>Ice melt</i>	1.5
<i>Flooding</i>	1.2
<b>Ozone depletion</b>	<b>2.0</b>

### ***Importance of environmental issues in view of laypersons***

A list of six *environmental* problems was shown to the study participants, and they were asked to rank-order them by importance. Air pollution received the highest, the loss of biodiversity the lowest priority (Figure 4).

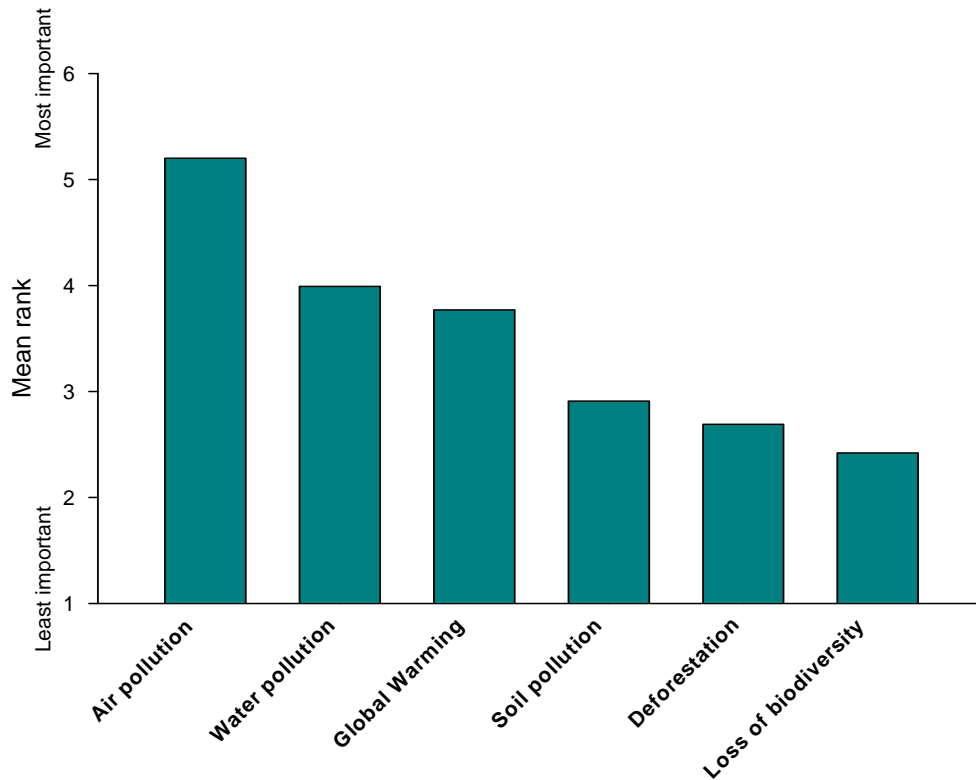


Fig 4: Ranking of environmental-issues. 492 lay-persons were asked to rank-order six pre-given issues by importance (1: least important, 6: most important)

### ***Familiarity of laypersons with the term biodiversity and their sources of information***

More than 80% of the study participants had never heard of the term biodiversity. Participants who were familiar with the term had heard about it mainly in the media (Fig. 5). However, none of them could come up with a correct definition. Only 22 participants were at least able to define biodiversity as the diversity of plants and animals which is not a wrong answer but only part of the definition (Table 15).

People's familiarity with biodiversity was influenced by both age and level of education. With increasing age the probability decreased that a study participant had heard about biodiversity ( $B = -0.03$ , Wald = 8.15,  $p = 0.004$ ), or could provide a definition ( $B = -0.06$ , Wald = 21.15,  $p < 0.001$ ). About 24% of the academics, but only 13% of the non-academics stated to be familiar with biodiversity (Chi-square value 9.42,  $p = 0.002$ ). Moreover, 11% of the academics, but only 5% of the non-academics came up with a definition of biodiversity (Chi-square value 5.83,  $p = 0.020$ ).

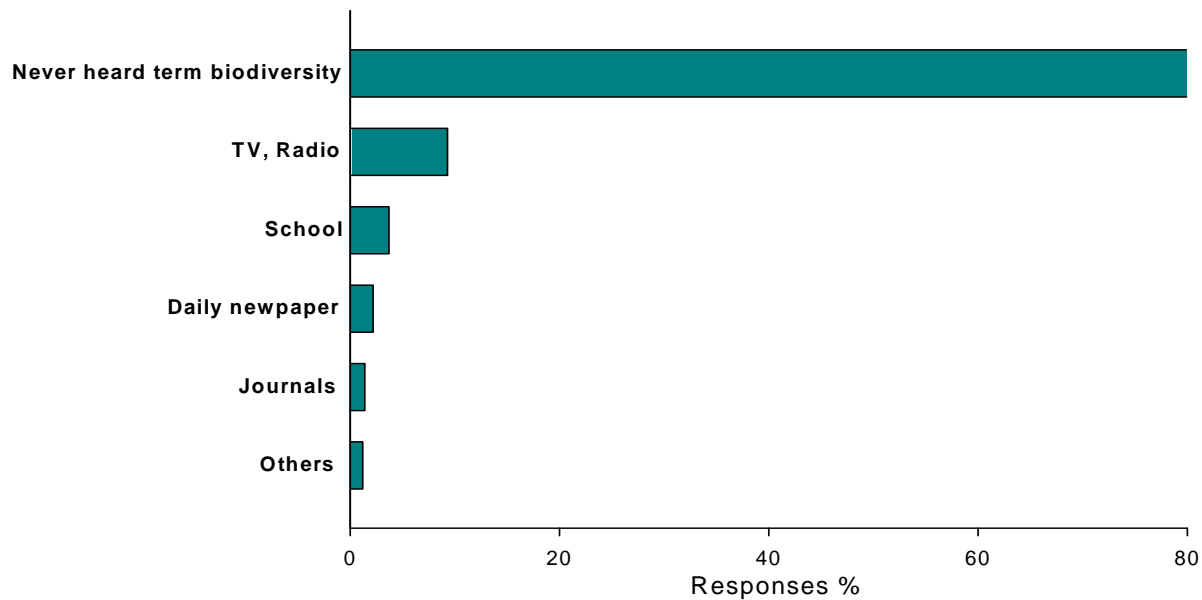


Fig. 5: Familiarity with and sources of information about biodiversity in view of 492 laypersons. The question comprised of six pre-given statements.

Table 15: Meaning of biodiversity. 492 study participants answered the open question, but only 22 of them could come up with a definition.

Meaning of biodiversity	Proportion of responses (%)
I do not know	92.0
Diversity of organisms	6.1
Diversity of plants and animals	2.9
Diversity of life on earth	2.2
Misconceptions	0.8
Biological diversity	0.5

### ***Importance of biodiversity in view of laypersons***

The general public showed a considerable interest in biodiversity issues (mean score of 5.6 on the 7-step rating scale), and all of them thought it important to preserve biodiversity. About 94% of the study participants agreed that there is a loss of biodiversity in Kosovo.

When asked why biodiversity should be preserved, more than 70% of the study participants referred to human life and future (Table 16). However, women more often than men considered biodiversity to be important for human life and future (74% and 65%, respectively; Chi-square value 4.35,  $p = 0.040$ ).

Table 16: Importance of biodiversity in view of the general public ( $n = 437$ ). Multiple answers were allowed. The answers to the open question were sorted into broad categories. A definition of biodiversity was shown beforehand to all study participants.

Category	Proportion of responses (%)
Human life and future depends on it	78.0
I do not know	14.0
Health	2.5
Ecological balance	2.0
Food	1.6
Benefits for nature	0.7
Tourism	0.5
Economy	0.2
Biodiversity is beautiful	0.2

### *Measures to protect biodiversity in view of laypersons*

In an open question, the general public was asked to suggest what could be done by the Government to protect biodiversity. Better education was named most frequently (Table 17). However, study participants in Pristina named education less frequently than those in the other cities (on average 19% of participants in Pristina, 30% in Prizreni, 31% in Mitrovica, 33% in Gjiłani, and 46% in Peja; Chi-square value = 16.40,  $p = 0.003$ ).

Moreover, study participants were asked what they themselves could do to protect biodiversity. More than half of them felt that they could do nothing (Table 18).

Table 17: Official measures to protect biodiversity in view of 492 laypersons. Multiple answers were allowed. The answers to the open question were sorted into broad categories.

Category	Proportion of responses (%)
<b>Education</b>	<b>40.0</b>
<i>Education</i>	34.4
<i>Seminars</i>	5.6
<b>Personal considerations</b>	<b>27.0</b>
<i>To be more careful</i>	22.6
<i>To work more</i>	4.4
<b>Campaigns</b>	<b>22.0</b>
<i>Campaigns</i>	21.1
<i>Brochures</i>	0.9
<b>Increased attention by Government</b>	<b>7.6</b>
<b>Cultivation</b>	<b>3.4</b>

Table 18: Personal measures to protect biodiversity in view of 492 laypersons. Multiple answers were allowed. The answers to the open question were sorted into broad categories.

Category	Proportion of responses (%)
<b>Nothing can be done</b>	<b>53.0</b>
<b>Personal considerations</b>	<b>26.0</b>
<i>Greater care about the environment</i>	25.0
<i>More education about biodiversity</i>	1.0
<b>Promotion of biodiversity</b>	<b>12.0</b>
<b>Support of NGOs</b>	<b>9.0</b>

### *Endemic plant and animal species in Kosovo in view of laypersons*

Overall, 27% of the study participants named at least one plant species they thought to be endemic in Kosovo. More than 20 plant taxa were mentioned (Table 19). However, none of those was actually endemic to Kosovo.

Table 19: Plant taxa perceived as endemic in Kosovo in view of laypersons (n = 259). Multiple answers were allowed. The answers to the open question were grouped into broad categories. None of the answers given were correct.

Category	Proportion of responses (%)
<b>Flowers</b>	<b>77.0</b>
<i>Poppy</i>	68.5
<i>Flowers</i>	3.1
<i>Violet flower</i>	2.3
<i>Lily</i>	1.6
<i>Sunflower</i>	1.5
<b>Local trees</b>	<b>12.0</b>
<i>Pine</i>	7.0
<i>Beech</i>	1.6
<i>Oak</i>	1.6
<i>Chestnut</i>	1.6
<i>Lime tree</i>	0.2
<b>Local fruit trees and shrubs</b>	<b>9.0</b>
<i>Huckleberry</i>	2.4
<i>Plum</i>	1.6
<i>Apple</i>	1.6
<i>Pear</i>	1.6
<i>Bilberry</i>	0.9
<i>Strawberry</i>	0.9
<b>Others</b>	<b>2.0</b>
<i>Agaves</i>	1.0
<i>Healer plants</i>	1.0

Study participants were also asked to name endemic animal species in Kosovo. Overall, 31% of the study participants named at least one animal species they thought to be endemic in Kosovo (Table 20). However, all of their suggestions were wrong. Most frequently, they named the Illyrian shepherd dog which is not an endemic species in Kosovo, but a typical domestic one.

Table 20: Animal taxa perceived as endemic in Kosovo in view of laypersons (n = 259). Multiple answers were allowed. The answers to the open question were grouped into broad categories. None of the answers given were correct.

<b>Animal taxa perceived as endemic</b>	<b>Proportion of responses (%)</b>
<b>Native mammals</b>	<b>73.0</b>
<i>Illyrian shepherd</i>	33.6
<i>Brown bear</i>	11.8
<i>Wolf</i>	5.9
<i>Fox</i>	3.9
<i>Wild pig</i>	3.9
<i>Cat</i>	3.4
<i>Dog</i>	2.4
<i>Lynx</i>	2.4
<i>Rabbit</i>	1.9
<i>Deer</i>	1.4
<i>Mountain eagle</i>	1.4
<b>Useful mammals</b>	<b>27.0</b>
<i>Cow</i>	7.4
<i>Buffalo cow</i>	6.4
<i>Goat</i>	5.9
<i>Donkey</i>	3.9
<i>Horse</i>	3.4

### ***Endangered plant and animal species in Kosovo in view of laypersons***

Study participants were much more able to name endangered animal than plant species in Kosovo (Table 21). Most frequently, they named the brown bear which is correct. Only few participants also named endangered plant species. However, of these none was actually endangered in Kosovo.

Table 21: Plant and animal taxa perceived as endangered in Kosovo in view of laypersons (n = 250). Multiple answers were allowed. The answers to the open question were grouped into broad categories.

Category	Proportion of responses (%)
<b>Animals</b>	<b>96.0</b>
<i>Brown bear*</i>	32.0
<i>Deer</i>	20.0
<i>Wild pig</i>	10.0
<i>Rabbit</i>	6.2
<i>Buffalo cow*</i>	5.4
<i>Dog</i>	5.0
<i>Mountain goat*</i>	4.5
<i>Lynx*</i>	4.2
<i>Fox</i>	4.2
<i>Illyrian shepherd</i>	1.7
<i>Mountain eagle*</i>	1.7
<i>Donkey</i>	1.1
<b>Plants</b>	<b>4.0</b>
<i>Pine</i>	2.5
<i>Beech</i>	1.0
<i>Poppy</i>	1.0
<i>Oak</i>	0.5

\* Correct answers

### ***Knowledge of laypersons about plant and animal species in the world and in Kosovo***

Laypersons were asked to estimate how many plant and animal species exist, both in the world and in Kosovo. Overall, only 9% of all participants could answer the question. Of those, ten knew the correct answer for plant species richness in the world, and five for plant richness in Kosovo. Estimates ranged from 100 species to 5 million species in the world (mean of estimates =  $465'054 \pm 125'163$ , median = 150'000), and from 10 to 500'000 in Kosovo (mean of estimates =  $22'571 \pm 11'457$ , median = 1'000; Table 22a and b). For Kosovo, people strongly overestimated plant species richness.

Table 22: Estimated plant species richness (a) worldwide (45 laypersons gave an estimate) and (b) in Kosovo (48 laypersons gave an estimate)

(a) Number of plant species in world		(b) Number of plant species in Kosovo	
Range of estimates	Proportion of responses (%)	Range of estimates	Proportion of responses (%)
100 – 50'000	31.0	10 - 500	42.0
100'000 – 400'000*	35.0	1'000 - 2'000*	33.0
450'000 – 500'000	15.0	3'000 - 500'000	25.0
600'000 – 5'000'000	22.0		

\* Correct answer

When study participants were asked to estimate the number of animals worldwide, only 12% answered the question, and of those, only 14 knew the correct answer. Estimations ranged from 20 species to 3 million species (mean estimate =  $526'449 \pm 94'589$ , median = 200'000; Table 23).

Table 23: Estimated number of animal species worldwide in view of laypersons (n = 56)

Range of estimates	Proportion of responses (%)
20 – 50'000	32.0
100'000 – 900'000	38.0
1'000'000 – 2'000'000*	25.0
2'000'000 – 3'000'000	5.0

\* Correct answer

### ***Familiarity with natural areas in Kosovo (laypersons)***

Five pictures of natural areas in Kosovo (see Appendix III) were shown to the study participants. They were asked whether they knew these places, and after they had given an answer provided with the name and asked whether they already had visited the areas. Unfortunately, Sharr Mountain, the only national park in Kosovo, was least known to the general public and also least visited (Table 24).

More men than women knew Mirusha Falls (74% and 65%, respectively; Chi-square value 6.34,  $p = 0.008$ ), and also more often had been there (64% and 54%, respectively; Chi square value 6.09,  $p = 0.009$ ). People in Peja were most familiar with the location, whereas people in Mitrovica were least familiar with it (78% in Peja, 75% in Pristina, 73% in Prizreni, 64% in Gjilani, 58% in Mitrovica; Chi-square value = 13.12,  $p = 0.011$ ). More academics than non-academics knew the national park (81% and 60%, respectively; Chi-square value 24.57,  $p < 0.001$ ), and had actually been there (64% and 54% respectively; Chi square value 5.69,  $p=0.011$ ).

Table 24. Familiarity of laypersons ( $n = 492$ ) with natural areas in Kosovo. In a first step, participants were shown pictures of five different natural areas and asked whether they knew it. In a second step, they were given the names and asked whether they had already visited these places.

Natural areas	Proportion of participants (%)	
	Familiar with area	Visited area
Mirusha Falls	69.9	58.9
Sharr Mountain	21.7	37.8
Drini i Bardh River	46.5	64.2
Germia Park	94.3	87.8
Batlava Lake	73.8	66.7

Overall, more men than women recognized Sharr Mountain (27% vs. 16%, Chi-square value 8.32,  $p = 0.004$ ), Germia Park (98% vs. 91%; Chi-square value 9.47,  $p = 0.002$ ), and Batlava lake (81% vs. 66%; Chi square 13.73,  $p < 0.001$ ), and had already been to this areas (Sharr Mountain: 44% vs. 31%; Chi-square value 9.68,  $p = 0.002$ ; Germia Park: 93% vs. 83%; Chi-square value 10.30,  $p = 0.001$ ; Batlava lake: 75% vs. 57%; Chi-square value 17.72,  $p < 0.001$ ).

More academics than non-academics recognized Sharr Mountain (26% vs. 18%; Chi-square value 5.07,  $p = 0.020$ ) and Drini i Bardh River (53% vs. 40%; Chi-square value 8.50,  $p = 0.004$ ), and had already been to Drini i Bardh River (76% vs. 54%; Chi square value 26.01,  $p < 0.001$ ).

People in Prizreni were most familiar with Sharr Mountain, whereas people in Peja were least familiar with it (Prizreni 61%, Pristina 28%, Gjilani 9%, Mitrovica 7%, Peja 5%; Chi-square value = 128.31,  $p < 0.001$ ). Moreover, more people from Prizreni had already been there (Prizreni 77%, Pristina 45%, Gjilani 26%, Mitrovica 24%, Peja 19%; Chi-square value 95.66,  $p < 0.001$ ).

People from Peja knew Drini i Bardh river best (Peja 61%, Pristina 55%, Prizreni 41%, Mitrovica 40%, Gjilani 36%; Chi-square value = 18.97,  $p = .001$ ), and also had been there most often (Peja 84%, Pristina 69%; Gjilani 61%, Mitrovica 55%, Prizreni 52%; Chi-square value = 28.88,  $p < 0.001$ ).

Germia Park was most often recognized by people in Pristina and least often by people in Peja (Pristina 98%, Gjilani 90%, Prizreni 88%, Mitrovica 87%, Peja 77%; Chi-square value = 20.40,  $p < 0.001$ ).

Batlava lake was best known to people in Pristina (Pristina 96%, Mitrovica 79%, Gjilani 75%, Peja 65%, Prizreni 56%; Chi-square value = 45.70,  $p < 0.001$ ), and also visited by more of them (Pristina 94%, Mitrovica 88%, Gjilani 56%, Peja 51%, Prizreni 48%; Chi-square value = 80.70,  $p < 0.001$ ).

### **3.3 Comments of experts on items used in the questionnaire for the general public**

The questionnaire for the general public was shown to all conservation experts, and they were asked to predict the answers given by the public. In most cases, conservation experts did well and predicted correctly what the public might answer (in case of items 1 and 2, 4 to 12, and 14 to 19; see questionnaire in Appendix II). However, two discrepancies occurred. When asked to comment on item 3, Appendix II (three most important environmental problems worldwide), 14 experts thought that global change would be the most common answer. However, as shown before, 65% of the public could not even state one important problem worldwide, and global change was not often mentioned. In case of item 13 (what can you personally do to protect biodiversity), almost all experts thought that the public would state to be more careful and not to destroy the environment. However, 55% of the participants felt that they could do nothing to protect biodiversity.

#### 4. Discussion

The present results show that both conservation experts and the general public considered unemployment and the difficult political situation as main problems in Kosovo today. This reflects reality. Almost 50% of the working population is currently unemployed, and the country's political status unclear (UN, 1999). Women are more affected by unemployment than men are (61%; Krause & Kalludra, 2006), and, as the present study shows, more worried about it. Although statistics on unemployment rates by municipalities are lacking in Kosovo, it can be assumed that people's working situation in large cities such as Pristina is better (Krause & Kalludra, 2006). This would explain why study participants from Pristina are less concerned about unemployment than those from smaller cities. Unemployment and economic problems were also named as major problems in a large German poll (Kuckartz et al., 2006). However, the economic situation in both countries is hardly comparable. Based on a World Bank report, 50% of the population in Kosovo are living on less than 2 US\$, and 12% on less than 1 US\$ per day, whereas in Germany, the average income per capita is 37 US\$ per day (World Bank, 2007).

Environmental problems were hardly mentioned by the study participants which does not necessarily mean that they are unimportant for people in Kosovo. However, due to the poor economic situation and unclear political status of the country, they might not be so prominent in people's mind. When the general public was explicitly asked to name some environmental problems in Kosovo, pollution was mentioned most frequently. Pollution is also considered as a major issue by the government (Ministry of Environmental and Spatial Planning, 2003). The dust emissions from power plants near Pristina, for instance, are 30-times higher than international agreements would allow (Ministry of Environmental and Spatial Planning, 2003). Air pollution not only originates from power plants, but also from cars. In Kosovo, approximately 265'000 cars exist (plus an unknown number of cars from KFOR or UNIMK), and more than half of them are old ones without a catalyser (Ministry of Public Services, 2006). Another environmental problem which was also mentioned by the study participants is the poor garbage management. In 2003, 401'500 tons of house garbage were produced that were not correctly disposed of (Ministry of Environmental and Spatial Planning, 2003). Deforestation is another major environmental issue. As long as people have wood firing in their houses, it will almost be impossible to stop deforestation. In 2003 alone, 185'890 cubic meters of wood were cut as firewood (Ministry of Environmental and Spatial Planning, 2003).

However, when asked about environmental problems on a global scale, more than half of the laypersons were not able to answer the question. This might be due to several, not mutually exclusive reasons. One reason for people's ignorance could be the lack of media coverage of such topics in Kosovo (Berisha, 2007). Other studies have also shown the strong influence of the media on people's knowledge about environmental problems. Television was found to be highly influential on people's knowledge about biodiversity in the UK (Gayford, 2000). Another reason might be that global environmental problems are not fully covered by school books and basic education in Kosovo. This would explain why study participants with an academic background performed better in the task than non-academics. In Kosovo, only higher education provides people with a basic knowledge about environmental issues (personal communication with governmental employee). At primary and secondary school level hardly any environmental knowledge is provided, whereas in Croatia, for example, environmental topics are already included in pre-school education (Vican et al., 2007). In Kosovo, environmental issues are only integrated into high school curricula, and included in school books. However, they are often found at the end of such books, and are thus likely to be neglected by both teachers and their students (personal communication).

Global climate change, tropical deforestation, and the loss of biodiversity are seen as today's major environmental problems (UNEP/CBD/COP/8/14, 2006). Global change is a real and growing problem for the world. Over the past two decades, and especially in the past few years, global change has become one of the most heavily researched subjects in science (Gilman et al., 2007). Global change is also *the* problem with the largest media coverage (Corbett & Durfee, 2004). It is thus not surprising that it was frequently mentioned by conservation experts in the present study. However, it was hardly in the minds of the general public which might be due to the strong lack of environmental education in school as discussed above.

More than 20 years after the first usage of the term biodiversity (Wilson, 1988), the general public in Kosovo is still unfamiliar with its meaning. More than 80% of the study participants had never even heard about biodiversity, but familiarity with the term increased with the level of education (but see Colton & Alpert, 1998). Other studies have also shown that the general public is hardly familiar with the concept of biodiversity (Turner-Erfort, 1997; Hunter & Brehm, 2003). Even among science teachers, the concept of biodiversity is hardly known (Ayres, 1998). In consequence, people might not consider the loss of biodiversity as a major environmental

problem (Gigliotti, 1994; Ayres, 1998). In the present study, the loss of biodiversity was ranked last in importance, whereas different kinds of pollution— which were actually known to the participants - received a higher ranking, and thus priority. In contrast, conservation experts mentioned the loss of biodiversity as an environmental problem on both the local and global scale, and were familiar with its meaning. This is not surprising because all experts were well-educated, working in the field of conservation and, in case of the university professors, even teaching about biology / ecology. However, when asked to rank-order some major world issues by priority, climate change was considered to be more important than the loss of biodiversity.

Another important issue worldwide and in Kosovo is the loss of biodiversity (IUCN, 2006). The term biodiversity encompasses a broad spectrum of biotic scales, from genetic variation within species to biomes of the planet, and is frequently described in terms of numbers of genotypes, species, or ecosystems (IUCN, UNEP & WWF, 1991; Hooper et al., 2005). In the present study, at least half of the conservation experts, i.e. professors and experts from the Institute of Nature Protection could provide a correct definition of biodiversity, whereas none of the laypersons could do so. However, the local government experts were hardly familiar with and knowledgeable about biodiversity. One reason might be that only one of these experts was a biologist, and that government employees might be more involved in administrative work in the department than in actual nature conservation projects. However, if these people are expert advisors in the local Ministries, the question remains how the general public can ever be convinced about the importance of biodiversity conservation.

Biodiversity loss is occurring so rapidly that it threatens the health and future of organisms, including human beings (Roger, 2005). Maybe this is one reason why laypersons named the dependence of human life and future on biodiversity as the most important reason why it should be protected. Both conservation experts and laypersons thought it important to preserve biodiversity, and felt that the best way to protect biodiversity is to educate young people. Unfortunately, school books in Kosovo hardly ever mention the loss of biodiversity. Only in one book for twelfth-graders, biodiversity is mentioned, and only in terms of economic values (Bajraktari et al., 2005). At present, only well-educated people such as high-school or university students in Kosovo might have heard about biodiversity. Results of the present study show that people with an academic background are more knowledgeable about biodiversity than others. However, other studies have shown that even among science teachers, the concept of biodiversity

is hardly known (Ayres, 1998). It has thus been suggested that high priority should be given to the integration of biodiversity education into curricula from kindergarten to university (UNEP/CBD/COP/8/14, 2006). Biodiversity education should include multiple active experiences with the diversity of local wild organisms which are enjoyed by pupils, and also result in significant learning gains (Lindemann-Matthies, 2006).

Until 2008, 150 government leaders have signed the Convention on Biological Diversity (CDB, 1992). Conceived as a practical tool for translating the principles of Agenda 21 into reality, the Convention recognizes that biological diversity is not only about plants, animals, micro organisms, and ecosystems, but also about people and their need for food, security, medicines, fresh air and water, shelter, and a clean and healthy environment (CDB, 1992). Unfortunately, without official status as a country, Kosovo cannot sign the Convention. However, conservation experts in Kosovo were informed about the conventions' contents, and considered the signing of the Convention as an important first action step of an independent country. However, a local environmental action plan (KEAP) already exists in Kosovo with one chapter merely on biodiversity (Kosovo Environmental Action Plan, 2006). This action plan aims to enlarge the protected area in Kosovo from 4% to 10%. Although most conservation experts felt familiar with the action plan, only half of them could name some objectives of the KEAP concerning biodiversity. Conservation experts thought that biodiversity should be protected by law. At present, a law to protect nature and the environment in Kosovo only exists on paper but is not yet applied (Ministry of Environmental and Spatial Planning, 2003). Unfortunately, most laypersons – in particular women - felt that they could do nothing to protect biodiversity.

Although the number of species on earth cannot be named, rough estimates range from 10 to 100 million species (overview in Heywood, 1995), with a mean estimate of approximately 14 million species (Purvis & Hector, 2000). In the present study, both conservation experts and laypersons were asked to estimate the number of plant and animal species worldwide and in Kosovo. At least half of the experts could fulfil the task. However, it should be noted that the exact number of animal species in Kosovo is still unknown (Sherifi et al., 2005). Only few laypersons knew the approximate number of plant and animal species worldwide and in Kosovo. People strongly overestimated the number of plant species in Kosovo, and strongly underestimated animal species worldwide. Other studies have also shown that people have widely inaccurate ideas of the species richness of communities (Dunning, 1997; Bose, 2004).

Although Kosovo covers only 2.3% of the territory of the Balkan, it contains 20% of its biodiversity (Mustafa & Hoxha, 2004). Whereas many endemic plant species occur in Kosovo, no endemic animal species exist (Mustafa & Hoxha, 2004). Endemic plant species are, for instance, *Forsythia europaea*, *Aster albanicus*, *Bornmuellera dickei*, *Dianthus scardicus*, *Achillea alexandri*, *Convolvulus cochlearis*, *Acer heldreichii*, *Rhododendron ferrugineum*, *Lilium albanicum*, *Quercus trojana*, and *Dioscorea balcanica* (Sherifi et al., 2005). In the present study, only half of the conservation experts (mainly the professors and members of the Institute of Nature Protection) were able to name at least one endemic plant species of Kosovo. This is surprising because all experts worked in the field of nature conservation. However, most of the NGO and local government members were non-biologists, and might therefore be less familiar with local organisms. *Forsythia europaea* was named most frequently as an endemic species. Based on literature from the region, this answer is correct (Mustafa & Hoxha, 2004; Sherifi et al., 2005). *F. europaea* is also regarded as highly endangered in Kosovo with only few individuals left (Mustafa & Hoxha, 2004). In contrast to experts, laypersons were not able to name any endemic plant species of Kosovo. Most frequently, they considered poppy to be endemic which could be explained by its popularity and strong symbolism. In Kosovo, the large red flower of the poppy symbolizes the blood of people killed in the wars, and is thus thought to grow nowhere else. However, it could also be that study participants just wanted to name something, and due to its bright red colour poppy is likely to be well-known to people (Lindemann-Matthies, 2005).

Biodiversity is currently declining in Kosovo (Mustafa & Hoxha, 2004). Plant species such as *Forsythia europaea*, *Quercus trojana*, *Acer heldreichii*, *Pinus peuce*, *Pinus mugo*, *Gentiana lutea*, and *Lilium albanicum*, and animal species such as *Ursus arctos*, *Lynx lynx*, *Rupicapra rupicapra*, *Capreolus capreolus*, and *Felis sylvestris* are endangered due to human influences (Mustafa & Hoxha, 2004). *Galium mateii* has already gone extinct, and it is feared that 10% of all plant and animal species in Kosovo will become extinct in the near future if no considerable actions are undertaken to preserve them (Mustafa & Hoxha, 2004). However, at present no red data lists exist in Kosovo. Conservation experts considered deforestation and illegal hunting as the main threats towards plant and animal diversity in Kosovo. Both deforestation and illegal hunting are uncontrolled. At present, people in Kosovo are free to cut trees and to hunt animals without permission (Ministry of Environmental and Spatial Planning, 2003).

As the present study shows, knowledge about the natural richness of Kosovo was poor. The general public was most familiar with those sites that were nearest to their place of living. This cannot be explained by a lack of mobility, because every 6th person in Kosovo has a car (Ministry of Public Services, 2006). It is more likely that people are uninterested in nature. The most popular and most visited site was Germia Park because it is close to Pristina, the capital and largest city of Kosovo, and also most frequently shown on TV. However, most visitors enjoy their leisure time in Germia Park by walking or playing with the family, or by having a barbeque. No interpretive paths exist in the park, and until now no attempt has been made to educate people about plants and animals living in the area. Even in Sharr Mountain, the only national park in Kosovo, no efforts are made to educate visitors. Neither campaigns nor TV programmes exist to promote the value of the park or other natural areas in Kosovo (Berisha, 2007). In consequence, the national park was hardly known to laypersons and also seldom visited. Considering both the lack of informal education and the lack of environmental education in school as discussed above, it is thus not surprising that people in Kosovo have so few knowledge about their local flora and fauna. Animals such as buffalo cow, lynx, mountain goat, and mountain eagle were hardly known as endangered, and even the brown bear, a charismatic animal, was seldom mentioned. No endangered plant species could be named by the public. Even experts had difficulties to fulfil the task, and it can be asked how conservation in Kosovo should take place.

## **5. Conclusions**

At the 2002 World Summit on Sustainable Development in Johannesburg, South Africa, world leaders agreed to significantly reduce the current rate of biodiversity loss by 2010 (UN, 2002, article 44). This cannot be done effectively without the participation of society at large, which has to be convinced of the importance of biodiversity if there is to be any real hope of implementing meaningful measures (Hanski, 2005). Reconnecting people and nature should be a major challenge for future conservation biology worldwide, and in Kosovo (Balmford & Cowling, 2006). However, the challenges of conserving biodiversity lie in the realm of human values, policy making processes, legal structures, organizational behaviours, agency culture, public education, and communication flows (Clark et al., 1994; Jacobson & McDuff, 1998).

To insert issues such as the importance of maintaining native biodiversity into public discourse, the processes and structures by which public policy is established including laws, administrative regulations and channels for lobbying have to be understood, and the attitudes and opinions of local and international stakeholders towards nature protection to be known (Trombulak et al., 2004). Unfortunately, in the present interviews conservation experts were quite reluctant to discuss environmental problems. Their answers were very short, sometimes even shorter than those provided by laypersons. One reason could be that the experts themselves were not sure about conservation approaches. Another reason could be that they were reluctant to discuss problems of their country in public. However, it can be asked whether the above mentioned communication flows which are so important for a dialogue between experts and the general public (see Clark et al., 1994; Jacobson & McDuff, 1998) will actually take place in Kosovo.

The results of the present study show that both unemployment and the country's undefined political status are main problems in Kosovo today. It can be assumed that as long as people are poor and hardly any official regulations exist, the environment can even get worse before attempts for its protection are made. Moreover, as long as environmental issues such as biodiversity are not included into formal or informal education, people will be ignorant about conservation.

Based on a report by a group of conservation experts, nature conservation requires a combination of strategies. These strategies include the protection of endangered species, the promotion and protection of ecological reserves, control of destructive human actions, ecosystem restoration, captive breeding, control of non-native species, and conservation biology education (Trombulak et al., 2004). All of these steps are important to implement in Kosovo. However, as the present study shows, educating the public about both environmental and conservation issues, raising an awareness towards environmental protection including biodiversity conservation, and showing people how to act accordingly, seem to be most important first steps in Kosovo. High priority should thus be given to the integration of environmental / biodiversity issues into curricula from kindergarten to university level in Kosovo.

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## 8. Appendices

### 8.1 Appendix I: Interview agenda for stakeholders

NAME ----- AGE ----- SEX: M F  
SURNAME -----  
ORGANIZATION -----  
CITY -----  
EDUCATION -----

#### I. Part

1. Which are the three most important problems in Kosovo?
2. Which are the three most important **environmental** problems in Kosovo?
3. Which are the three most important **environmental** problems worldwide?
4. Indicate the importance of the following issues (7-step rating scale) and rank-order them by importance:

a) Terrorism in the world      1 2 3 4 5 6 7

b) Climate change              1 2 3 4 5 6 7

c) Tropical deforestation      1 2 3 4 5 6 7

d) Loss of biodiversity        1 2 3 4 5 6 7

e) Pollution in Polar Regions 1 2 3 4 5 6 7

f) Unemployment              1 2 3 4 5 6 7

g) Others \_\_\_\_\_

## **II. Part**

5. Have you heard about the term biodiversity? (*yes, no*)

***If yes***

6. Where have you heard about the term biodiversity (*school, TV, radio, daily newspapers, journals, work, family, friends, ...*)

7. How would you define the term biodiversity?

***If no***: Definition shown to participants

8. Do you think that there is a loss of biodiversity worldwide? Please explain your opinion.

9. Do you think that there is a loss of biodiversity in Kosovo? Please explain your opinion.  
What are the threats to biodiversity?

10. What can be done to protect biodiversity in Kosovo? Please explain

11. Indicate how important biodiversity issues are for you (7-step rating scale)

## **Part III**

12. Do you know what happened in Rio de Janeiro in 1992?

13. What can the Government do to stop the loss of biodiversity in Kosovo?

### ***Introduce Kosovo Environmental Action Plan***

14. Are you familiar with the Local Environmental Action Plan of Kosovo?

15. Can you mention objectives of the Kosovo Environmental Action Plan for biodiversity?

16. Does your institution / organization carry out projects to conserve or promote biodiversity?

17. Does your institution / organization encourage people to protect biodiversity?

18. Do you think that education can play a role in conserving biodiversity? If so, in which way?

19. Which is in your opinion the best way to convince people to protect biodiversity?

a) Educate young people      b) TV campaign, media      c) others

20. How many ha (%) of Kosovo are under protection?

## Part IV

### 14. Picture tests

- a) Do you know where these sites are? (Show 5 pictures)
- b) Have you ever been there?

### 15. How many different plant species exist in:

in the world \_\_\_\_\_

in Kosovo \_\_\_\_\_

### 16. How many different animal species exist

in the world \_\_\_\_\_

in Kosovo \_\_\_\_\_

- 24. Please name five endemic plants of Kosovo.
- 25. Please name five endemic animals of Kosovo.
- 26. Please name some endangered plants of Kosovo.
- 27. Please name some endangered animals of Kosovo.

*In addition, I will show the experts some of the questions I will ask in the written questionnaires and collect their opinion on how the general public might answer the questions.*

## 8.2 Appendix II: Questionnaire lay-persons

Address general public as follows:

*Hello – I carry out my Master thesis in Environmental Sciences at the University of Zurich in Switzerland. Would you mind to participate in a short interview – approximately 10 minutes?*

Men and female in equal numbers should be asked. All participants should be adults. Questions will be read to the participants. The answers will be written down by the researcher.

1. What do you think are the main problems in Kosovo today? (open question; researcher has already categories on paper)
2. What do you think are the main *environmental* problems in Kosovo today? (open question; researcher has already categories on paper)
3. What do you think are the main environmental problems worldwide? (open question)
4. Please rank-order the following environmental problems according to their importance ( from 1 to 7)

- |                        |                          |
|------------------------|--------------------------|
| - Global warming       | <input type="checkbox"/> |
| - Loss of biodiversity | <input type="checkbox"/> |
| - Air pollution        | <input type="checkbox"/> |
| - Deforestation        | <input type="checkbox"/> |
| - Water pollution      | <input type="checkbox"/> |
| - Soil Pollution       | <input type="checkbox"/> |
| - Others               | <input type="checkbox"/> |

5. Have you ever heard the term „biodiversity“? (yes, no)

6. If so, where have you heard about it?

- School: *Can you remember in which subject?*
- University: *Can you remember in which subject?*
- TV, radio: *Can you remember in which programme?*
- Newspaper: *Can you remember in which newspaper, article?*
- Journal: *Can you remember in which journal, article?*
- Others:

7. What is biodiversity? / Do you know what is meant by the term? If yes, explain it.

If people are unaware of the term: It is about the diversity of plant and animal species. What do you know about it?

8. Biodiversity is the diversity of plants and animal's species, diversity of varieties within species (corps, domestic animals) and the diversity of habitats. Do you think it important to conserve biodiversity? (yes / no)

9. If so, why / if not, why not?

10. Do you think that that there is a loss of biodiversity in Kosovo?

11. How important are biodiversity issues to you? (7-step rating scale shown to participants)

1. ☐    2. ☐    3. ☐    4. ☐    5. ☐    6. ☐    7. ☐

12. What should be done to protect biodiversity?

13. What can you personally do to protect biodiversity?

14. Picture tests

c) Do you know where these sites are? (Show 5 pictures)

d) Have you ever been there?

14. How many different plant species exist

in the world

\_\_\_\_\_

in Kosovo

\_\_\_\_\_

15. How many different animal species exist

in the world

\_\_\_\_\_

in Kosovo

\_\_\_\_\_

16. Please name five endemic plants of Kosovo

17. Please name five endemic animals of Kosovo

18. Please name some endangered plant and animal species in Kosovo

**Age:** \_\_\_\_\_ years

**Sex:** female ☐ male ☐

**Place of residence:** \_\_\_\_\_

**Profession:** \_\_\_\_\_

**if student, subject:** \_\_\_\_\_

**End of interview:** *Thank you very much for your participation. The data will be very useful for my Master thesis.*

### 8.3 Appendix III: Picture tests

- a) **Do you know where these sites are?** (Show 5 pictures)
- b) **Have you ever been there?**

**I**



II



III



IV



V

