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**SUSTAINABILITY AND ENDOGENOUS INDIVIDUAL NEEDS: A SURVEY
AMONG THE WORKING AGE POPULATION OF HAJDÚ-BIHAR COUNTY,
HUNGARY**

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ABSTRACT

The purpose of this study was to identify the preferences among the working age population of Hajdú-Bihar County, Hungary regarding the dimensions of sustainability. The significance of the financial increment, welfare, and the preserving of environmental capital were considered. The preferences were examined using choice experiment. The dimensions of sustainability were represented by six attributes and the respondents were asked to evaluate them indirectly. The results are representative of the county's working age population by age, gender, qualification and dwelling

type. The most important attribute regarding future development is the healthy life expectancy. Inflation, unemployment and income are valued lower and the less important issues are those connected with the ecosystem (biodiversity and climate change). However, the results vary significantly by gender and qualification. Ecological aspects are not at all considered in the preferences of men. The higher level of education helps the environmental awareness.

KEYWORDS: sustainability, preferences, choice experiment, gender
JEL: Q56; Q35

Introduction

The main challenge for humanity in the next few decades is to avoid the irreversible consequences of the global ecological crisis. There are several pressing dangers in the world such as the war of civilisations, poverty, territorial inequality in food supply and loss of water resources, but the turnover of the equilibrium of the planetary-wide acting ecological regulation systems would result in the destruction of life on Earth or at least of mankind.

Social and economic development is necessary for humanity but social and economic subsystems are subordinated to the ecosystem—they cannot exist independently because the ecosystem provides them with the basic inputs and the appropriate conditions for functioning. Accordingly, when the ecological balance of the Earth's ecosystem is endangered by humans, the whole society and economy embodied in the ecosystem is endangered. Thus the solving of

ecological problems must have priority (Ayres, 2007; Costanza, 1993; Daly 1990; Gowdy and O'Hara, 1997; Pearce and Turner, 1990).

Those mainstream production and consumption features as well as analysing methods causing the present multiple crisis, has to be eliminated. The main question is how to remodel the economy, society and the basic values of the relationship with nature as well; hence they cannot exceed the boundaries of the ecosystem. This process is currently not successful enough and consequently the socio-economic system is too far removed from sustainability (Wilson *et al.*, 2007; Rockström *et al.*, 2009).

The unsustainable state is a result of the existing terms of human development, i.e. the need for permanent economic growth (Meadows *et al.*, 2005). The parallel poverty and overconsumption and the environmental deterioration are embodied in our socio-economic system (Schmuck and Schultz, 2002). However, changes in human values are required as well. The human actor is the source and the object of the changes towards sustainability (Redclift, 1992; Dobson, 2007). The question is whether mankind is able to achieve 'collective moral renewal' (Danilov-Danilian *et al.*, 2009).

Our study examined whether the inner needs of society overlap the requirements of sustainability. Why is humanity unaffected by the environment and what are our real preferences? To show this the classical three-dimension model was used and each dimension was represented by two indicators. Respondents were required to choose between several future ways of development by the method of choice experiment (CE). According to Robert Costanza 'the choices between competing alternatives imply that the one chosen was more highly 'valued'' (Costanza, 2003; p. 19). It was assumed that the structure of the preferences represents the hierarchy of human needs and values – and this hierarchy is not at all consistent with the priority of ecosystem and sustainability.

Numerous surveys are analysing the environmental awareness, attitude, knowledge, human values or consumers' behaviour but fewer studies are aiming to examine them in an integrated socio-economic context (Michalos *et al.*, 2011; Hassan *et al.*, 2010; Torbjörnsson, 2011; Uitta and Saloranta, 2010). The possibilities of questionnaires with nominal, ordinal and scale questions are limited because the answers are referring to social norms. Such complex issues as sustainable development cannot be examined in this form (Leisterowitz *et al.*, 2005).

The understanding of people's attitude and behaviour cannot be supported by those types of questions. It is not clear what the real content of such results is. For example according to a world-wide survey 52% of the respondents pointed out that 'protecting the environment should be given priority over economic growth and creating jobs,' (Leisterowitz *et al.*, 2005) or according to 60% of Hungarian inhabitants the protection of the environment is 'very important' while fighting against poverty is important only for 50% (WWF Hungary, 2010). Analysis of the preferences requires complex, reality-like situations.

The aim of the study was to show what issues are more important for us: the financial increment, safety and welfare or securing environmental capital towards the long term existence? Socio-economic aspects such as variation of preferences among the working age population in different age, gender and qualification groups were closely analysed as well. The studied area was Hajdú-Bihar County, Hungary which is one of the less developed areas even in Hungary (see Box 1).

This paper is organised as follows. In the first section we outline the research questions. In Section 2 the methodology of Choice Experiment is presented while in Section 3 the details of the survey are described. In Section 4 the results are described then some conclusions are drawn in Section 5.

Methodology

Choice experiments have become one of the most important statistical methods used by studies across various research areas in the social sciences (Bateman *et al.*, 2002; Holmes and Adamowicz, 2003; Kaninnen, 2007; Ryan *et al.*, 2008; Aizaki, 2012). The economic value of the changes in the ecological, social and economic conditions of the environment is estimated by a recently developed non-market valuation technique, namely the choice experiment method (Birol *et al.*, 2006). The study presented here is the first application of CE for the integrated analysis of sustainability.

In comparison to other questionnaire methods the greatest advantage of the conditional choice method is that the revealing preferences of the respondents are much less distorted. However the method is more complicated and it can handle only a small number of key attributes (factors, features, characteristics).

The importance (weight) of each attribute in the assessment of sustainable development in Hungary (via a representative sample of Hajdú-Bihar County's working age population) was determined using a survey processed by the conditional choice method (choice experiment, CE). With the CE method the significance of the attributes that affect the population's decisions regarding the future was measured. With this method the preferences connected to the features of the development are shown.

The CE methodology was used because of its suitability for valuing the changes in welfare in contrast to other stated preference methods (Bennett and Blamey, 2001). This methodology is based on Lancaster's characteristics theory of value (Lancaster, 1966) and the McFadden's random utility theory (McFadden, 1974). Lancaster proposed that consumers derive satisfaction not from goods themselves but from the attributes they provide. Beyond the material nature of the goods the method can be applied to examination of development policies; in this case we tried to do the same.

In order to link actual choices with the theoretical construct utility, the random utility framework is used (Hensher, 2005). According to this theory the i th respondent is assumed to obtain utility U_{ij} from the j th alternative in choice set C . U_{ij} is supposed to comprise a systematic component (V_{ij}) and a random error component (ε_{ij}):

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (1)$$

Selection of alternative h by individual i over other alternatives implies that the utility (U_{ih}) of that alternative is greater than the utility of the other alternatives j :

$$P_{ih} = \text{Prob} (V_{ih} + \varepsilon_{ih} > V_{ij} + \varepsilon_{ij}) \quad (2)$$

Assuming that the error components are distributed independently and identically (IID) and follow the Gumbel distribution. The probability that alternative h would be chosen is calculated in the conditional logit model (CL) as

$$P_{ih} = \exp [\mu V_{ih}] / \sum \exp[\mu V_{ij}] \quad (3)$$

where μ is a scale parameter which is commonly normalised to 1 for any one dataset. The systematic part of utility of the j th alternative is assumed to be a linear function of attributes (Meyerhoff et al. 2009). The scope of the CE method is the estimation of utility (V_j) connected with the attributes (A) of each alternative which is chosen by the individual.

$$V_j = ASC_V + \beta_1 A_1 + \beta_2 A_2 + \dots + \beta_n A_n \quad (4)$$

ASC is an 'alternative specific constant'. The β values are the coefficients associated with each of the attributes (Bennett and Blamey, 2001). The attribute coefficients (β) and the trade-off ratio between the attributes are the results of this methodology. They are presenting the preferences of the respondent and hence the whole population. The common attributes of the alternatives and their levels are defined before the examination.

Using the coefficients the marginal rate of substitution between the attributes is calculated, which is also used to describe the preferences.

$$MRS = (\delta U / \delta A_i) / (\delta U / \delta A_j) = \beta_i / \beta_j \quad (5)$$

Study design

In any survey fulfilled by CE, the respondents are asked to choose between some (2-4) hypothetical alternatives regarding investments, goods or policies. The attributes and the attribute levels have first to be described (Table 1.). They have to be relevant, easy to understand and useful for policy making.

Since the aim of the survey was to show indirectly the preferences connected with the dimensions of sustainability, they were described by some well-known indicators. We assumed that these indicators are adequately representing the dimensions. Furthermore, they are evident enough for the whole population regardless the qualification. The attributes and their levels were defined by an advisory group of experts in course of meetings with researchers working at the University of Debrecen with focus on the sustainable development. The 'climate change' attribute was explained in the choice tasks by extreme weather events, which is one of the important consequences in Hungary. Bringing the ecological aspects closer to the respondents was tried in this way because the ecological problems are generally less personally sensible than the economic and social dimensions. Increased appearance of extreme meteorological events (storms, floods etc.) deemed to be the most general phenomena connected with climate change on central continental areas harming the everyday life.

Table 1. Attributes and their levels

Attribute	Description	Levels
Environment		
<i>Declining species</i>	Decrease in biodiversity, Common Bird Index	-5%; -10%
<i>Climate change; days with extreme weather</i>	Extreme weather, days of drought or storm	+ 1 days; + 8 days; + 15 days
Society		
<i>Unemployment</i>	Number of unemployment persons	-5%; +5%
<i>Expected healthy lifetime</i>	Expected healthy lifetime	-3 yr., +1 yr.; +4 yr.
Economy		
<i>Income</i>	Change in GDP	-1%; +5%; +10%
<i>Inflation</i>	Change in Consumer Price Index	+1%; +5%; +10%

After that the choice profiles were built up. These profiles contain the choice alternatives described by different combinations of attribute levels. Every combination is the full factorial – in this case it counts 324 alternatives¹. Since it is impossible to complete this amount of tasks for a respondent, the ‘fractional factorial’ was calculated in order to reduce the number of combinations (alternatives) by a certain sampling process. Experimental design techniques (Louviere *et al.*, 2000) and SPSS 13.0 software were used to obtain an orthogonal design which consisted of only the main effects. Sixteen alternatives profiles and then eight choice sets of them were constructed. Every respondent had to choose eight times between two different alternatives.

There are ‘A’ and ‘B’ alternatives shown in sets but no ‘status quo’ or ‘neither’ option was given which would represent the long term maintenance of present conditions. This third option is mainly considered in choice experiment studies but we treated it as illogical: certain changes are unavoidable in the future especially in ecological circumstances. It is no longer possible to develop or rather grow in the current way.







		A	B
	Income	-1%	+5%
	Expected healthy lifetime	+1 yr.	-3 yr.
	Climate change; days with extreme weather	+8 days	+15 days
	Inflation	+5%	+5%
	Unemployment	-5%	-5%
	Declining species	-10%	-5%
	Your choice:	<input type="checkbox"/>	<input type="checkbox"/>

Figure 1. Example choice set

Although there were only two alternatives in the sets (forced choice survey), the Conditional Logit model results in similar coefficients compared with probit model which is mainly used in forced choice experiments (Pedersen, 2011). Figure 1 presents an example choice set.

Note that the alternatives are representing hypothetical, non-existing development pathways so that effects of any real development policy cannot be recognised. The aim of the survey was merely to identify the importance of the attributes and characteristics in the choices and decisions which refer to preferences regarding each dimension of sustainability.


¹ Permutation of the attribute levels' number: $2 \times 3 \times 2 \times 3 \times 3 \times 3 = 324$

The questionnaire includes three parts. At the beginning there were some simple warm-up questions to illustrate the knowledge and opinion of the respondent about sustainability. The attitude regarding the three dimensions was examined too. The second part contained the eight choice tasks. After these tasks there were some socio-demographic segmentation data required in the classification part. A screening question was also built in.

The preferences of the working age population (age 16-65) of Hajdú-Bihar County, Hungary (Box 1) was analysed so that the youth and the middle aged social groups with the highest economic activity are involved in the survey.

Box 1. Hajdú-Bihar county – the examined territory

Hajdú-Bihar County is located in the North-East part of Hungary. It is part of the Northern Great Plain Region. 5.4% of the Hungarian population lives there. The population density is 87.5 people per km². Although in the last two decades there has been some improvement to observe in the health of the Hungarian population, the country is still far from the European Union average according to most health indicators. The GDP per inhabitant is 30% lower in Hajdú-Bihar County than the Hungarian average, contrary to the unemployment rate which is higher. The social and economic conditions are even worse when the low level of the populations' activity (56%) is considered.

		GDP €/cap. PPP	Unemployment rate (%)	Life expectancy (year)	
European Union	2007	25,000	7.3	M76.1/F82.2	
	2011	25,200	9.5 (10.6)*	M75.7/F82.1	
Hungary	2007	10,054	10.7	M69.8/F77.8	
	2011	16,500	11.8 (10.8)*	M70.9/F78.2	
Hajdú-Bihar County	2007	7,138	12.4	M68.8/F77.4	
	2011	11,715	12.8/13.2	M70.8/F78.5	

The survey was conducted using an on-line survey tool between 10 January and 10 April 2012 and also by paper-and-pencil activity later, until September 2012. No help was allowed in the course of personal administration to avoid an information surplus. The questionnaire was completed by 277 persons. We had to weigh the data in case of some socio-demographic variable (age, gender, qualification and dwelling type) so that the data collected by us could represent the ratios of Hajdú-Bihar county. This means that the data of the questionnaires in which there were less data than in the basic population we multiplied by the various weigh numbers in accordance with the data of the basic population. The highest weight among the weights was 1.4. As a result of this the ratios in the sample equal to the socio-demographic ratios of the county, so the sample size is 329 (Table 2).

Table 2. Descriptive statistics, N = 329

Age			Gender		Qualification			Dwelling type	
	n	%		n	%		n	%	
			<i>Male</i>					<i>Urban</i>	
16-25	83	25		168	51	Primary	127	39	n 251 76
			<i>Female</i>					<i>Rural</i>	
26-35	70	21		161	49	Secondary	162	49	78 24
						Graduate			
36-45	63	19				d	40	12	
46-55	67	20							
56-65	46	14							

We employed dummy variables for socio-demographic variables. Marginal coding was used because the partial dummy variables are not able to demonstrate the interaction between two socio-demographic categories. The calculation of the main effect of nominal variables is possible in this way by comparison of each category to the mean of all categories. Statistical analysis used by the survival package of the R program (Aizaki and Nishimura, 2008; R Development Core Team, 2012).

Results

According to answers in the first part of the questionnaire the economic circumstances are the most important for Hajdú-Bihar County's population. These questions were scale questions of problems connected with sustainability's dimensions. In the categories 'moderately serious' and 'serious' the higher portion of ecological and environmental problems were observed. On the contrary, in the 'very serious' category the economic aspect is the most significant (Figure 2) probably because of the prolonged, deep recession in Hungary. The ranking of the dimension's problems calculated by the weighted average of answers in scale questions shows the priority of economic issues (4.51). Social problems are seen as less serious (4.23) while the ecological dimension was the least valued of all (4.16).

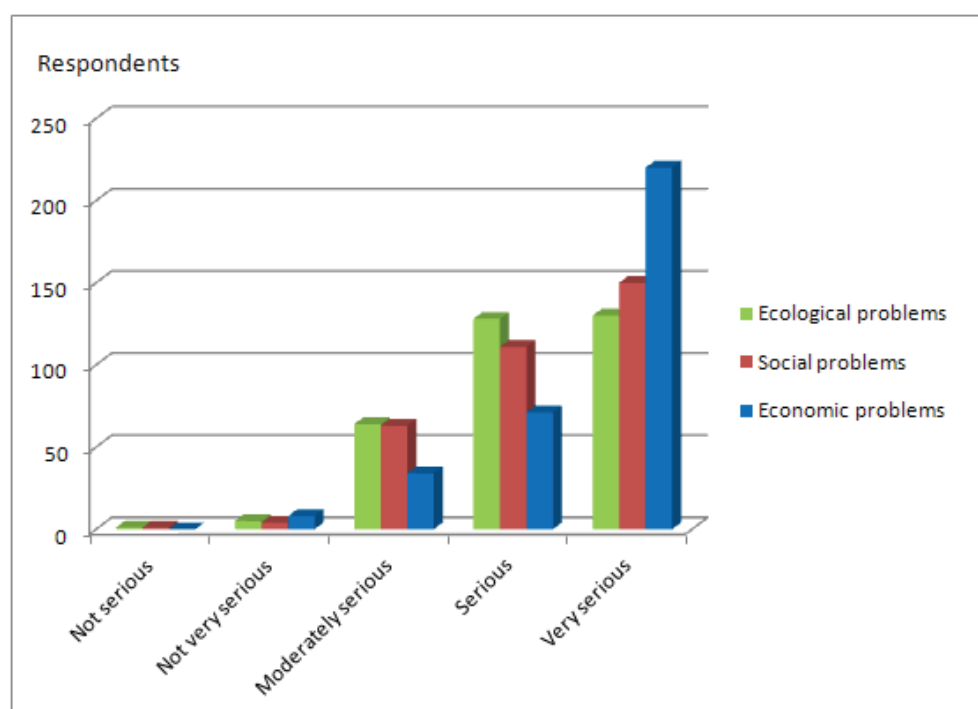


Figure 2. Opinions about the importance of each dimension's issues at the present

In the last phase of the questionnaire – combined with a screening question – respondents were asked for the statement regarding the most important issue. In this case only one dimension's choice was allowed. Figure 3 shows the priority of the economics aspect as well, but in this case ecological issues come before the social ones.

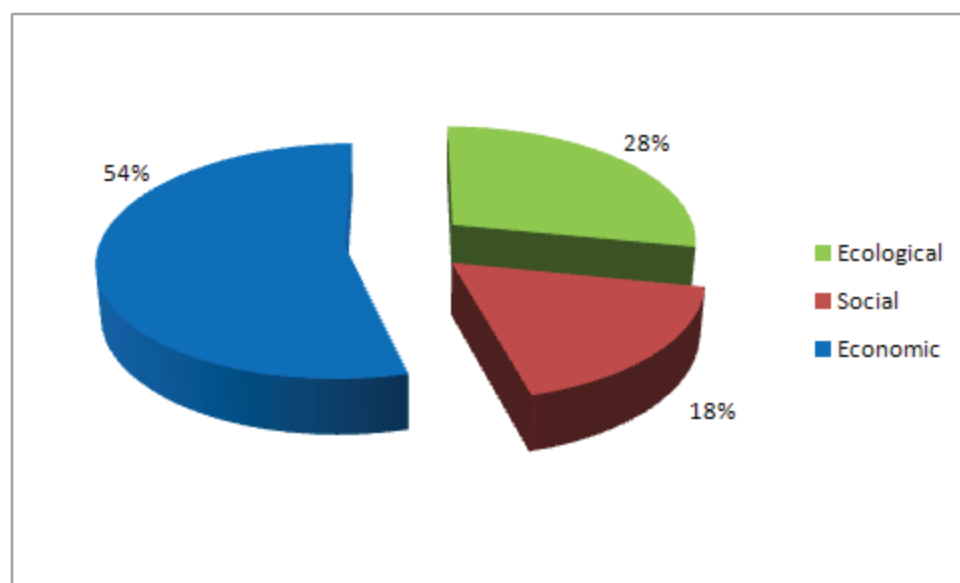


Figure 3. Answers of question 'What is the most important dimension of sustainability?'

Results of the Choice Experiment are presented in Table 3. Two different models were built up in Conditional Logit methodology. In Model 1 only the attribute coefficients were calculated. In Model 2 those coefficients which are significantly independent in several socio-demographic groups were also estimated – next to the attribute coefficients. On the basis of this second model the different preferences of each group were concluded.

Table 3. Estimation results from CL models

Descriptor	Model 1			Model 2		
	Coefficient	SE	p	Coefficient	SE	p
Income	0.1126	0.0189	2.8e-09	0.1297	0.0248	1.7e-07
Lifetime	0.1765	0.0198	0.0e+00	0.2527	0.0320	2.7e-15
Climate	-0.0109	0.0050	3.1e-02	-0.0320	0.0080	6.4e-05
Inflation	-0.0849	0.0238	3.7e-04	-0.1207	0.0309	9.4e-05
Unemployment	-0.0861	0.0212	5.0e-05	-0.1322	0.0297	8.5e-06
Species	0.0542	0.0143	1.5e-04	0.0935	0.0218	1.8e-05
Lifetime*Male				-0.0662	0.0291	2.3e-02
Climate*Male				0.0224	0.0077	3.8e-03
Species*Male				-0.0460	0.0209	2.8e-02
Lifetime*Graduated				0.1613	0.0587	6.0e-03
Climate*Graduated				-0.0547	0.0147	2.0e-04
Unemployment*Graduated				-0.0897	0.0528	8.9e-02
Species*Graduated				0.0870	0.0396	2.8e-02
Lifetime*Secondary				-0.0662	0.0359	6.5e-02
Climate*Secondary				0.01684	0.0090	6.2e-02
Species*Secondary				-0.0415	0.0248	9.4e-02
Income*Male*Graduated				-0.0526	0.0309	8.8e-02
Lifetime*Male*Graduated				-0.1352	0.0499	6.8e-03
Species*Male*Graduated				-0.1018	0.0371	6.0e-03
Climate*Male*Secondary				-0.0157	0.0083	5.8e-02
Species*Male*Secondary				0.0435	0.0224	5.2e-02
LL model	-1824.363			-1824.363		
LL (constant only)	-1736.575			-1675.964		
Pseudo- R^2	0.048			0.081		
Likelihood ratio test	176			297		
p - value	0.00			0.00		
N of observations	5264			5264		

CL = Conditional Logit; SE = standard error

The impact of attributes on the utility is represented by the coefficients. These coefficients are significant at the level of 95% in both models – in most of the cases it is higher than the 99% level. Negative attribute coefficient implies the negative connection: the higher is the climate change, inflation and unemployment; the lower is the utility of that alternative. It means that the development pathway likely to be chosen by society can be described with a lower level of these factors but with higher income, life expectancy and biodiversity.

The absolute value of the coefficients refers to the influence on the choosing mechanism of the given attribute. The primary characteristic is the expected healthy life expectancy in both models analysing the whole population. Income and unemployment are in second and third place – it is the only difference between the two models. At the end the ecological issues follow inflation. The importance of these attributes is significantly lower.

The minimum recommended acceptable value of pseudo- R^2 is 0.1 (Louviere *et al.*, 2000). The values in our models are lower, probably because of the high complexity of the research question. The high level of significance of the attributes refers however to the importance of these factors, while the low model fit (pseudo- R^2) implies that there are more driving forces of decisions to show, for instance the amount of assets, interest rates, ethnic or other social conflicts etc. Further research in the topic is required.

Our assumption, regarding the significant undervaluation of ecological problems by society, seems to be verified. However, the stronger influence on choices of biodiversity attributes (declining species) than climate change is surprising especially because climate change has been a much more central issue in the Hungarian media in last ten-fifteen years. Probably the extinction of species as an irreversible process is seen as more fearful² than the extreme weather.

The stronger influence on the choice of social factors is surprising as well. In Model 2 both social attributes (life expectancy, unemployment) were estimated more highly than the economic factors (income, inflation).

These statements are more deeply analysed due to the socio-demographic interactions shown by the estimations in Model 2. Among male respondents the attributes of life expectancy, climate change and biodiversity have the opposite sign. It implies that the preferences of men are rather economic-oriented. Unfortunately, such a correlation was not revealed. However, the fact that the income attribute's coefficient is negative among the group of graduated men (-0.0526) can be explained by the high utility of being employed. The avoidance of unemployment may be the main priority in this category. The consequences of unemployment are for the intellectuals not only financial but also existential because the social status could be lost as well. The main driving forces of the civilization are fear (Hobbes, 1981) and distress (Fromm, 1965).

The social evolutionary differences between male and female gender are proved by the opposed preferences of men. While the role of men is to raise material goods, focusing on long term aspects such as life expectancy and ecological conditions—important for the preservation of family and humanity—are rather features of women. Care, solidarity and importance of human relations are reckoned among female values while male are characterised by values of success and importance of material essentials (Hofstede, 1998).

According to ecofeminism the oppression of women and nature are historically connected. They are based on the same domination logic, i.e. men were historically identifying themselves with 'humanity' and spirit whereas women with physically nature (Warren, 2005). The human-nature relationship is ruled by masculine and conquistador sentiment which could be compensated by those women involved in the decision-making processes, especially in cases connected with social and ecological issues.

Preferences are differing by qualification as well. Signs of social and ecological attributes coefficients in the higher educated group are the same in the whole population. The climate change attribute is higher valued in this group. The higher environmental awareness amongst the higher educated population is proved in this case.

On the contrary, regarding the men's choice in this group life expectancy and biodiversity are opposite signed. It means that graduate men are ready to 'sacrifice' themselves too—as men generally. It is further evidence of gender differences.

In the social group of secondary educated, there are opposite signs to observe in the case of above-mentioned coefficients. This is probably a consequence of higher utility derived by

² In Hungarian, the term 'extinction' involves the term 'death'.

economic factors. Unfortunately, it is not proved by the significant coefficient of income. Other factors can also have an influence here such as the amount of savings and assets.

The unemployment rate is lower among the graduate population. The probability of employment and also the expected wage is higher. The social explanation of unemployment—with the importance of the avoiding its negative social impacts—was assumed in this group represented by higher coefficient of unemployment. Contrarily, the coefficient of the unemployment attribute is lower which implies that unemployment is an individual effect for the graduates as probably the same for the whole population. The solidarity, the social coherence and the need for the improvement of social capital does not exist even amongst the intellectuals. There is no responsibility felt even for other people so how it would be possible for Nature?

The valuation of attributes in different ways by gender is deep-rooted. The decisions depend on qualification as well. This factor refers to the level of knowledge and information. Any significant coefficient was calculated in the group of primary educated due to the inhomogeneous choices probably because of the information deficit. The lack of a correlation is surprising in some cases. Any evaluation of attributes does not depend on income level, age or dwelling type of the respondent.

Table 4. MRS for Conditional Logit Model 2

	<i>Income</i>	<i>Lifetime</i>	<i>Climate</i>	<i>Inflation</i>	<i>Unemployment</i>	<i>Species</i>
<i>Income</i>	-	0,51	-4,05	-1,07	-0,98	1,39
<i>Lifetime</i>	1,95	-	-7,90	-2,09	-1,91	2,70
<i>Climate</i>	-0,25	-0,13	-	0,27	0,24	-0,34
<i>Inflation</i>	-0,93	-0,48	3,77	-	0,91	-1,29
<i>Unemployment</i>	-1,02	-0,52	4,13	1,10	-	-1,41
<i>Species</i>	0,72	0,37	-2,92	-0,77	-0,71	-
<i>Lifetime*Male</i>	-0,51	-0,26	2,07	0,55	0,50	-0,71
<i>Climate*Male</i>	0,17	0,09	-0,70	-0,19	-0,17	0,24
<i>Species*Male</i>	-0,35	-0,18	1,44	0,38	0,35	-0,49
<i>Lifetime*Graduated</i>	1,24	0,64	-5,04	-1,34	-1,22	1,73
<i>Climate*Graduated</i>	-0,42	-0,22	1,71	0,45	0,41	-0,59
<i>Unemployment*Graduated</i>	-0,69	-0,35	2,80	0,74	0,68	-0,96
<i>Species*Graduated</i>	0,67	0,34	-2,72	-0,72	-0,66	0,93
<i>Lifetime*Secondary</i>	-0,51	-0,26	2,07	0,55	0,50	-0,71
<i>Climate*Secondary</i>	0,13	0,07	-0,53	-0,14	-0,13	0,18
<i>Species*Secondary</i>	-0,32	-0,16	1,30	0,34	0,31	-0,44
<i>Income*Male*Graduated</i>	-0,41	-0,21	1,64	0,44	0,40	-0,56
<i>Lifetime*Male*Graduated</i>	-1,04	-0,54	4,23	1,12	1,02	-1,45
<i>Species*Male*Graduated</i>	-0,78	-0,40	3,18	0,84	0,77	-1,09
<i>Climate*Male*Secondary</i>	-0,12	-0,06	0,49	0,13	0,12	-0,17
<i>Species*Male*Secondary</i>	0,34	0,17	-1,36	-0,36	-0,33	0,47

Marginal rates of substitution (MRS) for each attribute are presented in Table 4. They refer to the connection between utility of attributes and the preferences of different social-demographic groups. Additionally, the trade-off ratio between the attributes is quantified in this way as well. For example an average respondent is willing to accept a decrease of 1.95% in income for the increment of one per cent in life expectancy but only 0.25% of income compensation is required for every day of extreme weather 'surplus'. The income compensation for biodiversity loss for one percentage reduction in the number of species is

higher: 0.72%. The highest trade-off is observable between healthy life expectancy and climate change: eight days of extreme weather is accepted for one plus year.

Discussion

The main results of our study are the following. There is a significant difference between simple statements about the importance regarding dimensions of sustainability and the revealed endogenous preferences which will affect the actions of the individual, ultimately. Also, the positive role of higher qualification in environmental awareness was revealed. Finally, fundamental distinction of motives regarding gender is reported. In this section these results are compared with former quantitative examinations.

Leisterowitz and his colleagues as well as other researchers had found that according to several surveys the global population would support endeavour towards sustainability. However, there is a large gap between this supporting, positive opinion and the habits or rather actions (Leisterowitz *et al.* 2005; Gilg *et al.*, 2005; Reid *et al.*, 2010).

The attitude of sustainability towards more efficient education of sustainable development among the Canadian population was estimated by Michalos *et al.* (2011). While 97.4 percent of respondents have recognised the responsibility of the present generation for the future generations, only 71.5% has agreed that the ‘environmentally sustainable’ enterprises will be more profitable in the long run. This paradox refers to the ‘hidden’ priority of the economic dimension: people believe less in business success of enterprises managed by priorities of sustainability than they feel it necessary. In our study ecological, social and economic problems were valued almost at the same level in case of the scale questions but real preferences were revealed in the choice experiment. Obviously, under conditions characterized by limited possibilities—modelled by the choice experiment in this study—respondents are enforced to use their real preference system, thus ‘hidden’ priorities are able to observe.

The correlation between knowledge, attitude and behaviour was examined by Michalos and his colleges (2011). Attitude is mostly depending on knowledge ($r^2 = 0.54$) while habits are connected with attitude ($r^2 = 0.32$). In the case of income and other socio-demographic variables only a few connections were presented. We prove the importance of knowledge as well.

Hassan *et al.* (2010) found that ‘there is a relationship between the level of practice, attitude and sustainable noble value, and the level of environmental awareness in the concept of sustainable development amongst secondary school students’. In Malaysia this relationship is rather weak ($r = 0.31$). The environmental awareness in the concept of sustainability is significantly higher in the case of urban pupils (3.88 using a Likert scale with 5 alternatives; $n = 340$) than the suburban area (3.69). However, the awareness was examined by 15 statements. There is higher value of ‘soft’ statements to observe e.g. ‘I aware my responsibility towards environment’ (4.04) and ‘I feel disappointed with air/river pollution’ (4.36/4.42). On the contrary, the ‘real’ actions are lower valued for example ‘I do not use plastic bag to wrap things’ (2.51). Even delivering information about the environment within the family is not important (2.98) (Hassan *et al.* 2010). The gap between the positive opinion about the environment and the habits still exists. The positive conclusions of this study are biased by public expectation.

The connection between basic human values and the motivation to act in environmentally and socially responsible ways were examined by Uitto and Saloranta (2010) amongst grade nine students in Finland ($n = 2,367$). Higher means of self-admission specific human values were observed in case of 'positive' values such as 'biocentric nature value' (3.41 on a Likert scale of 6 degrees) or 'pro-environmental attitude' (3.40) contrary to such as 'utilistic nature value' (2.65) or 'dismissive human value' (2.42). Furthermore, the authors revealed a strong correlation between the basic human value 'power' and the specific value 'utilistic nature value' as well as dismissive environmental and social attitude. However, these positive attitudes are not going to materialise into actions: the mean of 'interest in environmental issues' and 'interest in human issues' are only 2.36 and 2.83 even though the pro-environmental and social behaviour at school is rather internally motivated according to pupils (Uitto and Saloranta, 2010). It is another paradox of statements and actions.

The role of gender is rarely examined feature of the human-nature relations; quantitatively in particular. According to a survey among 16 years old Swedish pupils ($n = 917$) boys are anthropocentric in the environment-civilisation relationship while girls are rather biocentric. Regarding biocentric values, any significant correlation with dwelling type (urban or rural) was not found (Torbjörnsson, 2011).

Conclusions

The preferences connected to the implementation of sustainability of classic three dimensions cannot be firmly separated by the two representing indicators. The significance of the healthy life expectancy was outstanding, while the ecological attributes were rather unvalued. The importance of income, inflation and unemployment attributes are very near to each other so it is assumed that in these cases the preferences are evolved by many endogenous interactions. It can be concluded that the 'ordering principle' in the decisions regarding future development paths is life expectancy and the less considered characteristics are those with environmental issues.

It was examined whether the inner needs of society meet the requirements of sustainable development. Humanity is unaffected by the ecological crisis hence improvement of the individual position within the society (lifetime, income, employment) is the primary endogenous need—especially men are short-term oriented in the examined population.

The influence of knowledge on the position of ecological attributes in the preferences was verified, thus the increment of ecology's role in education needs further promotion on every scale in the educational system. Education for sustainable development is actually one of the most important tasks.

The most novel result of the research is the significant difference of gender regarding the judgment of attributes. It was proved that long term thinking is proper of women. Although the male and female roles have been combined for a long time in the civilization, this evolutionary difference still acts very strongly. The issue of sustainable development could capitalise on it maybe via the greater role of women involved in decision making processes.

The 'collective moral renewal' is probably the greater challenge ever for mankind. We assume that our results are unfortunately representing the preferences and attitudes in the majority of civilisation. The intensive communication on the global ecological crisis as well

as real political actions must begin immediately otherwise the cause of sustainability will fail before it has even had a chance to substitute the paradigm of economic growth.

Limitations and further research

The problem of unsustainable development model is a very complex phenomenon which is caused by the human socio-economic processes. These processes strongly depend on human values and attitudes. Naturally, the six attributes used by us are not covering all the fields of sustainability but it was clearly shown that the ecological problems are not considered seriously by the population at all.

The general conclusions are limited by the relatively small size of the examined area. The expansion of the survey is aimed to the level of Hungary as a whole. Comparison with other regions under other economic and social conditions would be also interesting by involving such factors as religion, family models and gender roles, political structure, economic coordination etc.

The survey could be fulfilled in other countries too because the preferences may vary significantly with the level of development as well as environmental knowledge, awareness and attitudes. Focusing on the examined county the lack of autonomous and endogenous need for highlighting ecological aspects as a priority was concluded.

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