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## **ENVIRONMENTAL PROTECTION IN ROMANIA: PERCEPTIONS VERSUS ACTIVE PARTICIPATION**

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### **Abstract**

This study aims to measure the environmental concern in Romania, to investigate its state of fact at regional and county levels and to provide a better understanding of its determinants. Using data from World Values Survey (2010-2014), there were firstly analyzed the perceptions (care for environment, perspective on environmental pollution, alternative between protecting environment vs. economic growth), then active participation (membership in an environmental organization, financing ecological organization, participation in demonstration for environment) and, lastly, integrating both in one general composite index, we obtained the profiles and the distribution of individuals: (1) with positive perceptions towards environment; (2) with active participation in environmental activities; (3) with a high level of general environmental concern. We found out that the personal position regarding environment concern is influenced by: educational level, post-materialist values, gender and feeling of happiness. Thus, there is a higher probability for a person to be more aware and involved in pro-environmental actions in the conditions of having tertiary education, post-materialist values, feeling happy. More, the probability is higher for men than for women. We also concluded that the environmental concern is very low in all the Romanian regions, but the Northern part of the country registers better levels. Per counties, Harghita and Neamt seem to have the highest levels of concern towards environment. Considering different measuring approaches and a more careful segmentation of population in Romania, our findings represent potential starting points for better targeted national and regional environmental policies.

*Key words:* environmental concern, environmental policies, general composite index

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### **1. Introduction**

Protecting environment has become an important issue, frequently debated in the academic literature devoted to sustainability. The focus was initially on the economic dimension and nowadays greater attention is tending to be put on the environmental one especially because “today’s environmental problems are increasingly complex” (Burke et al., 2017) and represent a “threat” to human well-being (Dunlap and Scarce, 1991; Mironiuc and Huian, 2017).

In this process, a fundamental role should be played by what is called co-evolution, i.e. “the constant and active interaction between a living organism and its environment” (Lorenzoni et al., 2000; Norgaard, 1984; Norgaard, 1994), meaning that society with its two dimensions, economic and social, and environment have to be seen as two intimately co-evolving systems (Cappelletto et al., 2018; Lorenzoni et al., 2000). In other words, the environmental aspects have to be integrated within the theory and practices of economic development, meaning the humanization and greening of the economy (Pohoatã, 2003).

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### 1.1. Literature review

In this context, understanding the general environmental concern, collocation frequently used in the literature (Brieger, 2018; Diekmann and Franzen, 2019; Dunlap and Scarce, 1991; Dunlap and York, 2008; Gatti, 2016; Inglehart, 1995; Kimmelmeier, 2002; Poortinga et al., 2004), represents an initial step in the process of protecting environment because it addresses the changes of people's behaviours (Sneddon et al., 2006), based on opinions and attitudes. Moreover, as Inglehart (1995) mentions, the policies designed to solve environmental problems are unlikely to succeed without broad public support. But, even if the environmental legislation is applied and respected, sometimes the final goal of environmental protection is left unachieved (Ghinea et al., 2017; Marinescu, 2007; Rotaru et al., 2019), its impact and results ultimately depending on the level of awareness and active participation of the individuals.

Although it is not an easy task (Inglehart, 1995), a deep understanding of the environmental concern represented the main challenge in numerous studies (Brieger, 2018; Diekmann and Franzen, 2019; Dunlap and York, 2008; Inglehart, 1995; Kimmelmeier et al., 2002; Poortinga et al., 2004), in which there were developed different measurement approaches, such as: the Environmental Protection Index (Inglehart, 1995), the SACRIFICE Index (Kimmelmeier et al., 2002), the New Environmental Paradigm (NEP) scale (Poortinga et al., 2004) etc.

The environmental concern is influenced by different factors, each determining more or less positive perceptions or active participation in activities related to environmental protection. Although the most evident factors determining a higher level of environmental involvement should be the severe objective problems, as, for example, high levels of air or water pollution, as Inglehart (1995) emphasized, this assumption is a "naive environmental activist" approach, the so-called "challenge-response model". More deepen analyses were made in order to discover different other factors with influence on the level of environmental concern at the individual and national level (Brieger, 2018; Diekmann and Franzen, 2019; Dunlap and York, 2008; Franzen and Vogl, 2013; Inglehart, 1990; Inglehart, 1995; Kimmelmeier et al., 2002; Poortiga et al., 2004; Schultz et al., 2000; Turaga, 2015; Zelezny et al., 2000). Between those determinants, the most common are: education, income, post-materialist values (striving for self-actualization; stressing the aesthetic and the intellectual; cherishing belonging and esteem), gender, employment status etc. Usually, (1) higher levels of education are significantly associated with more pro-environmental attitudes (Kimmelmeier et al., 2002); (2) higher levels of income are related to more favourable attitudes (Diekmann and Franzen, 1999; Kimmelmeier et al., 2002; Lee and Kidd, 1997); (3) persons with post-materialist values give a higher priority to protect the environment than those with materialist values

(Bennulf and Holmberg, 1990; Betz, 1990; Hoffmann-Martinot, 1991; Inglehart, 1990; Kimmelmeier et al., 2002; Mueller-Rommel, 1990); (4) females are more disposed to allocate from their time in order to participate in pro-environmental activities than men (Agarwal, 2000).

Some studies highlight the fact that there are differences between perceptions and behaviours, people seeming to be aware and declaratively sustaining a cause, but when it is the case to put this into action, opt to not be implied in pro-environmental activities (Inglehart, 1995). More, the most common theoretical approach is to not differentiate perceptions from active involvement and to generally analyse the environmental concern and its determining factors. Although there are recent studies regarding the environmental concern in the global context (Brieger, 2018; Diekmann and Franzen, 2019; Franzen and Vogl, 2013), the findings show that there is a substantial difference in environmental concern among different countries and that it could be better understood analysing particular contexts in terms of regional and national levels. Moreover, the conclusions of a previous study, focusing on Romania comparatively to other 59 countries from all over the world (Ulman, 2018), showed that this country follows the most common trend of world's undeveloped and developing countries. It became clearly that it is necessary to understand the causes of this situation through a deeper analysis in the national and regional context for finding out the particularities and driving factors towards environmental concern, both in perceptions and active participation.

### 1.2. Research goals

Taking into consideration the aspects mentioned above and also the facts that: (1) Romania was not enough particularly analysed in terms of environmental concern and (2) its national environmental wellbeing is low (van de Kerk and Manuel, 2017), Romania also registering a low orientation towards environmental problems and a low to medium availability to prioritize environmental protection (Ulman, 2018), our study attempts to:

(1) measure the environmental concern (both perceptions and active participation) in Romania at national, regional and county levels;

(2) identify the profiles of individuals with a high environmental concern (both perceptions and active participation);

(3) analyse and understand the most significant socio-demographic and economic factors of environmental awareness and involvement in the national context.

The paper is structured as follows. Section 2 is dedicated to the methodology and the data used in order to compose the environmental concern indices and to measure their level in Romania. Section 3 illustrates and discusses the main empirical results. Section 4 represents the part dedicated to concluding remarks.

2. Material and methods

2.1. Environmental concern indices

We proposed an analysis in which, initially, we concentrated on environmental perceptions, then observed the active participation in pro-environmental activities and, lastly, integrated both in one index, offering a wider perspective regarding environmental concern. We followed Inglehart’s (1995) approach regarding the Environmental Protection Index, with 2 categories (*high* and *low*) according to the answers of the respondents to 4 issues regarding environment.

Firstly, we integrated the **declared perceptions** (care for environment, perspective on environmental pollution, alternative between protecting environment vs. economic growth) ( $I_{env\_intent-oriented}$ ) into a composite index (Table 1). Moving on, the next step was to analyse the **active participation** (membership in an environmental organization, financing ecological organization, participation in demonstration for environment) and we obtained the second composite index ( $I_{env\_act-oriented}$ ) (Table 1). Then, integrating both perceptions and behaviours in one single measure, we obtained a **general index for environmental concern** ( $I_{env}$ ) (Table 1).

Table 1. Definition of the variables

<i>Variables</i>	<i>Description</i>
<b>Intent oriented to environment Index</b> ( $I_{env\_intent-oriented}$ )	Analysing perceptions regarding environment and its problems ( $A_{env\_intent-oriented}$ , $B_{env\_intent-oriented}$ , $C_{env\_intent-oriented}$ ) ( <i>high, low</i> ) = <b>high</b> (if the respondent gives at least two <i>high</i> responses to $A_{env\_intent-oriented}$ , $B_{env\_intent-oriented}$ , $C_{env\_intent-oriented}$ ); = <b>low</b> (if the respondent gives only one or none <i>high</i> response to $A_{env\_intent-oriented}$ , $B_{env\_intent-oriented}$ , $C_{env\_intent-oriented}$ )
Care for environment ( $A_{env\_intent-oriented}$ )	Looking after the environment is important to this person: to care for nature and save life resources (yes = <i>high</i> ; no = <i>low</i> )
Perspective on environmental pollution ( $B_{env\_intent-oriented}$ )	Most serious problem of the world: environmental pollution (yes = <i>high</i> ; no = <i>low</i> )
Protecting environment vs. Economic growth ( $C_{env\_intent-oriented}$ )	Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs (yes = <i>high</i> ; no = <i>low</i> )
<b>Action oriented to environment Index</b> ( $I_{env\_act-oriented}$ )	Analysing active participation of the respondents on diverse activities for improving environmental conditions ( $A_{env\_act-oriented}$ , $B_{env\_act-oriented}$ , $C_{env\_act-oriented}$ ) ( <i>high, low</i> ) = <b>high</b> (if the respondent gives at least two <i>high</i> responses to $A_{env\_act-oriented}$ , $B_{env\_act-oriented}$ , $C_{env\_act-oriented}$ ); = <b>low</b> (if the respondent gives only one or none <i>high</i> response to $A_{env\_act-oriented}$ , $B_{env\_act-oriented}$ , $C_{env\_act-oriented}$ )
Member of an environmental organization ( $A_{env\_act-oriented}$ )	Active/Inactive membership: environmental organization (yes = <i>high</i> ; no = <i>low</i> )
Given money to ecological organization ( $B_{env\_act-oriented}$ )	Past two years: given money to ecological organization (yes = <i>high</i> ; no = <i>low</i> )
Participation in demonstration for environment ( $C_{env\_act-oriented}$ )	Past two years: participated in demonstration for environment (yes = <i>high</i> ; no = <i>low</i> )
<b>Environmental concern Index</b> ( $I_{env}$ )	Integrating the general concern regarding environment comprised both in perceptions and in active participation ( $I_{env\_intent-oriented}$ and $I_{env\_act-oriented}$ ) ( <i>high, low</i> ) = <b>high</b> (if the respondent gives at least three <i>high</i> responses to $A_{env\_intent-oriented}$ , $B_{env\_intent-oriented}$ , $C_{env\_intent-oriented}$ , $A_{env\_act-oriented}$ , $B_{env\_act-oriented}$ , $C_{env\_act-oriented}$ ); = <b>low</b> (if the respondent registers maximum two <i>high</i> from six possible ones)
<b>Age</b>	Age of the respondent
<b>Gender</b>	Gender of the respondent ( <i>female, male</i> )
<b>Marital status</b>	Marital status of the respondent ( <i>single, married, divorced</i> )
<b>Number of children</b>	Number of children of the respondent
<b>Educational level</b>	Highest educational level attained ( <i>lower-secondary, secondary, tertiary</i> )
<b>Employment status</b>	Employment status ( <i>employed, unemployed, retired</i> )
<b>Sector of employment</b>	Where the respondent is employed ( <i>Government or public sector, private sector</i> )
<b>Nature of tasks: routine vs. non-routine</b>	If the respondent has on his job mostly <i>routine task</i> or mostly <i>non-routine tasks</i>
<b>Nature of tasks: manual vs. intellectual</b>	If the respondent has on his job mostly <i>manual</i> or mostly <i>intellectual tasks</i>
<b>Scale of income</b>	The group of income where the respondent’s household is, counting all wages, salaries, pensions and other incomes that come in ( <i>first two steps, middle steps, last two steps</i> - meaning the highest incomes)
<b>Post-materialist values</b>	Post-materialist index ( <i>post-materialist, mixed, materialist</i> )
<b>Feeling of happiness</b>	Taking all things together, would you say you are: <i>very or rather happy; not very or not at all happy</i>

Source: Authors’ indices and considered factors based on WVS, wave 6, 2010-2014

### 2.2. Factors determining the environmental concern

One of our aims was to understand the most significant factors of environmental concern in the Romanian context. For doing this, we analysed the data provided by World Values Surveys, wave 6, 2010-2014, a global network of social scientists who surveys the role of values in social and political life, since 1991 in almost 100 countries, conducting national representative surveys (Brieger, 2018). We opted to use this reliable and validated database, with 1019 total observations for Romania, from all counties, which provided us the necessary data to go in in-depth analysis. We mentioned that some of the most relevant studies for the topic of environmental concern also used data from WVS (Inglehart, 1995; Dunlap și York, 2008; Turaga, 2015; Brieger, 2018).

Using 959 entries for Romania, we tested the significant variables that can be correlated to the three different perspectives regarding Romanians' environmental concern. Our **dependent variables** were:  $I_{env\_intent-oriented}$ ,  $I_{env\_act-oriented}$  and  $I_{env}$ . Our **independent variables** were: (1) age; (2) gender; (3) education level; (4) marital status; (5) number of children; (6) employment status; (7) sector of employment; (8) nature of tasks: routine vs. non-routine; (9) nature of tasks: manual vs. intellectual; (10) scale of income; (11) Post-materialist index; (12) feeling of happiness.

### 2.3. Statistical methods

Firstly, we descriptively analysed the **regional and county levels of environmental concern**, classifying the percentages of people with a high environmental concern in the following categories: (1) extremely low = <10%; (2) very low = 10%-20%; (3) low = 20%-30%; (4) low to medium = 30%-40%; (5) medium = 40%-50%; (6) medium to high = 50%-60%; (7) high = 60%-70%; (8) very high = 70%-80%; (9) extremely high = >80%, obtaining also some representative maps (Fig. 1-6).

Secondly, based on the test results for independence between the dependent variables and each independent variable, we linked the *high* or *low* environmental concern, with the mentioned independent variables with their categories using a *Joint Correspondence Analysis* (Greenacre and Blasius, 2005; Nenadic and Greenacre, 2007; Pintilescu, 2007), with the aim to describe the associations between them and to identify the **profiles of individuals** in terms of environmental concern. The

data was computed into Statistical Package for the Social Sciences (SPSS 25). It represents a preliminary step for the *Logistic Regression Analysis* (Inglehart, 1995; Poortinga et al., 2004; Turaga, 2015), used with the aim of estimating the **probability of an individual to be part of the high level of environmental concern group, considering several socio-demographic and economic characteristics**.

Then, since our dependent variables were binary ones, with values of *high* or *low*, we used logistic regression model, having at its base the link between the **dependent variable** and **independent variables**,  $X_1$ : age,  $X_2$ : gender (a. female and b. male),  $X_3$ : educational level (a. primary, b. secondary, c. tertiary),  $X_4$ : marital status (a. married, b. divorced, c. single),  $X_5$ : number of children,  $X_6$ : employment status (a. employed, b. retired, c. unemployed),  $X_7$ : sector of employment (a. Government and public sector, b. private sector),  $X_8$ : nature of tasks: manual vs intellectual (a. mostly manual tasks, b. mostly intellectual tasks),  $X_9$ : nature of tasks: routine vs creative (a. preponderantly non-routine tasks, b. preponderantly routine task),  $X_{10}$ : scale of income (a. first two steps, b. last two steps, c. middle steps),  $X_{11}$ : post-materialist index (a. materialist, b. mixed, c. post-materialist),  $X_{12}$ : feeling of happiness (a. not very or not at all happy, b. rather or very happy). The logistic regression equation is expressed by Eq. (1), where:

- $\pi_i$  represents the probability that a member „i” to be part of the *high level of environmental concern group* (concern related to perceptions), and  $(1 - \pi_i)$  indicates the probability that a member „i” not to be part of this environmental concern group;

- $\pi_i$  represents the probability that a member „i” to be part of the *high level of environmental concern group* (concern related to actions), and  $(1 - \pi_i)$  indicates the probability that a member „i” not to be part of this environmental concern group;

- $\pi_i$  represents the probability that a member „i” to be part of the *high level of environmental concern group* (general concern), and  $(1 - \pi_i)$  indicates the probability that a member „i” not to be part of this environmental concern group.

The Logistic Regression models are built taking into consideration three dependent variables:

- *Models 1* and *2* have as dependent variable the

$I_{env\_intent-oriented}$ ;

- *Models 3* and *4* have as dependent variable the

$I_{env\_act-oriented}$ ;

- *Models 5* and *6* have as dependent variable the

$I_{env}$ .

$$\ln\left(\frac{\pi_i}{1 - \pi_i}\right) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2ai} + \beta_{3a} X_{3ai} + \beta_{3b} X_{3bi} + \beta_{4a} X_{4ai} + \beta_{4b} X_{4bi} + \beta_5 X_{5i} + \beta_{6a} X_{6ai} + \beta_{6b} X_{6bi} + \beta_{7a} X_{7ai} + \beta_{8a} X_{8ai} + \beta_{9a} X_{9ai} + \beta_{10a} X_{10ai} + \beta_{10b} X_{10bi} + \beta_{11a} X_{11ai} + \beta_{11b} X_{11bi} + \beta_{12a} X_{12ai} + \varepsilon_i \tag{1}$$

Interpretation of signs and estimated regression coefficients' significance were made considering the reference group with the following categories: *gender (male); educational level (primary); marital status (single), sector of employment (private sector), nature of tasks (mostly routine), scale of income (middle steps of income), post-materialist index (post-materialist), feeling of happiness (rather or very happy)*. We also determined the Adjusted Odds Ratio for each category of the above mentioned variables in relation to the reference category.

In the case of *Logistic Regression Analysis*, the data was computed into Statistical Analysis System (SAS 9.3).

### 3. Results and discussions

#### 3.1. Descriptive analysis

Analysing the percentages of people, at national and regional level, that have **positive perceptions**, we observed that: (1) the Centre Region obtains the highest percentages in the country, being integrated into the *medium* category; (2) the North-

East, South Muntenia and South-West Oltenia Regions register lower percentages and are part of the *low to medium* category; (3) the West Region integrates into the *low* category; (4) the South-East and North-West Regions into the *very low* category (Fig. 1). Referring to **active participation**, it can be noticed that all the regions register *extremely low* level of personal involvement in environmental activities (Fig. 2). At the general level, the **environmental concern** is not at all notable, but the Northern part of Romania registers better levels (being included in the next category, i.e. *very low*, than the other part of the country that is included in the *extremely low* one) (Fig. 3). At **county level**, related to: (1) environmental positive perceptions, Neamt, Harghita, Brasov and Dolj are the counties with the highest percentages of respondents with a high  $I_{env\_intent-oriented}$ , possible to be included in the *medium to high* category (Fig. 4); (2) active participation in environmental activities, Arad and Harghita detain the highest percentages of respondents with a high  $I_{env\_act-oriented}$ , still possible to be included only in the *low* category (Fig. 5); (3) general environmental concern, Neamt and Harghita have the highest percentages of a high  $I_{env}$  (Fig. 6).

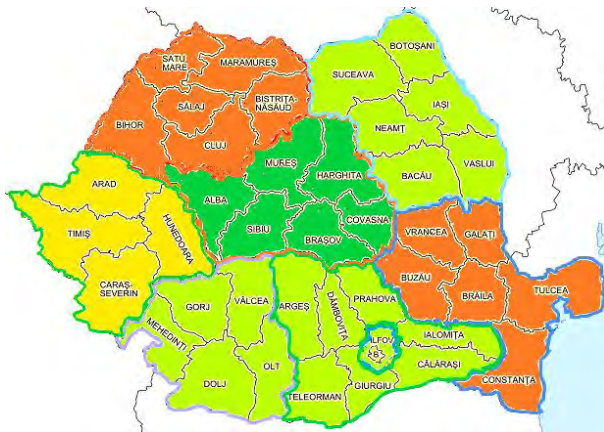


Fig. 1. Intent oriented to environment Index ( $I_{env\_intent-oriented}$ ) at national level, in different regions of Romania

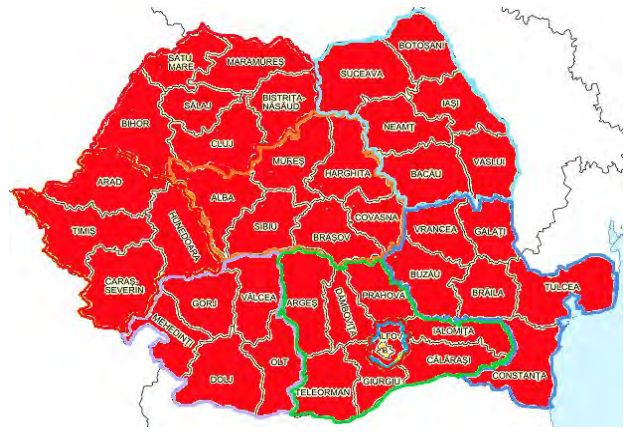


Fig. 2. Action oriented to environment Index ( $I_{env\_act-oriented}$ ) at national level, in different regions of Romania

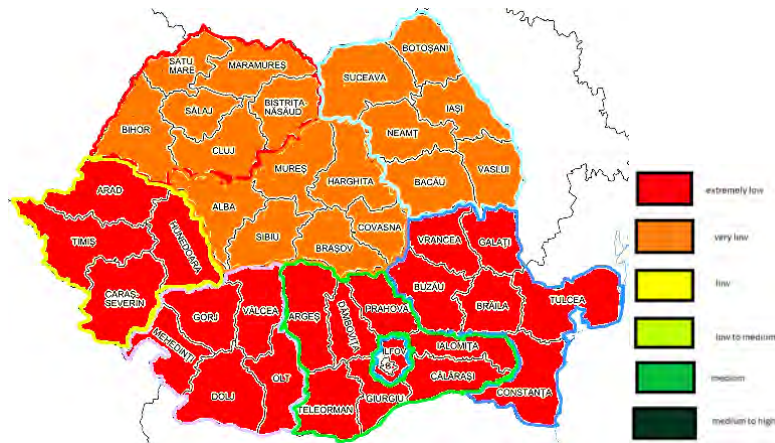


Fig. 3. Environmental concern Index ( $I_{env}$ ), at national level, in different regions of Romania  
Source: Authors' representation based on WVS, wave 6, 2010-2014

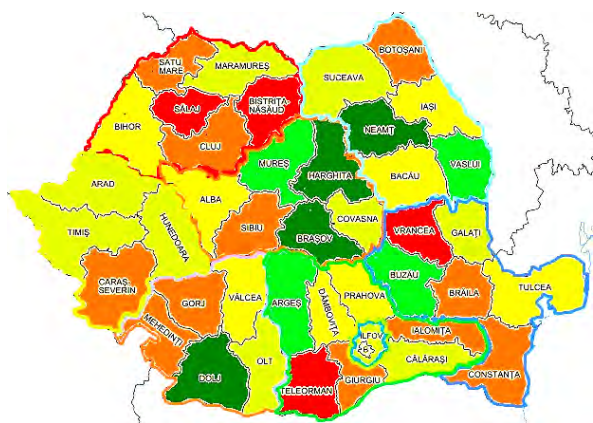


Fig. 4. Intent oriented to environment Index ( $I_{env\_intent-oriented}$ ) at county level in Romania

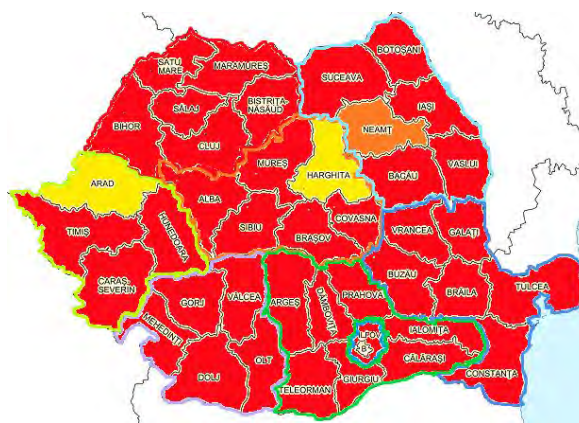


Fig. 5. Action oriented to environment Index ( $I_{env\_act-oriented}$ ) at county level in Romania

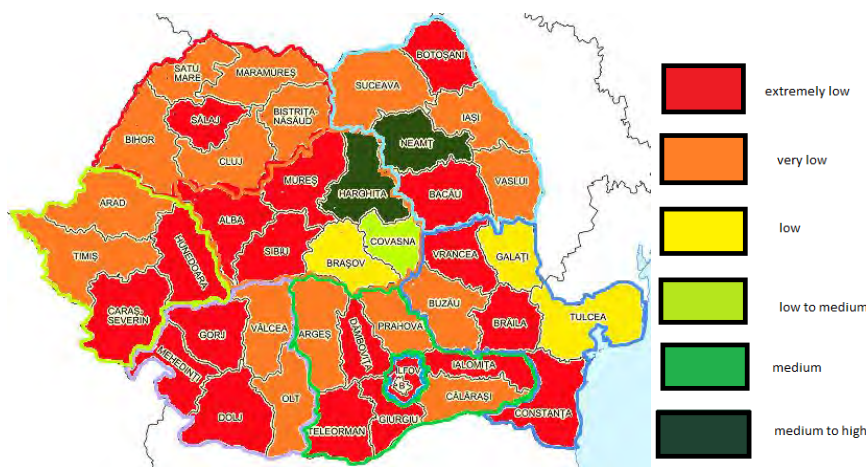


Fig. 6. Environmental concern Index ( $I_{env}$ ), at county level in Romania  
Source: Authors' representation based on WVS, wave 6, 2010-2014

### 3.2. Identifying the profiles of groups regarding the environmental concern

In this section, we analysed the specific profiles of individuals regarding environmental concern

related to **personal characteristics** considered to be representative for the Romanian respondents. We kept for the next analysis only the factors that were significantly correlated to the dependent variables (Table 2).

Table 2. Test results for independence between environmental concern indices and each independent categorical variable

Variables	Pearson Chi-square					
	$I_{env\_intent-oriented}$		$I_{env\_act-oriented}$		$I_{env}$	
	Value	Asym. Sig. (2-sided)	Value	Asym. Sig. (2-sided)	Value	Asym. Sig. (2-sided)
(1) Gender	3.16	<b>0.08*</b>	1.07	0.30.	3.14	<b>0.08*</b>
(2) Education level	6.55	<b>0.04**</b>	10.25	<b>0.01***</b>	17.75	<b>0.00***</b>
(3) Marital status	5.06	<b>0.08*</b>	1.16	0.56.	0.59	0.74.
(4) Employment status	0.21	0.90.	1.67	0.43.	6.83	<b>0.03**</b>
(5) Sector of employment	1.81	0.18.	4.14	<b>0.04**</b>	0.37	0.54.
(6) Nature of tasks: routine vs. non-routine	2.93	<b>0.09*</b>	9.43	<b>0.00***</b>	11.08	<b>0.00***</b>
(7) Nature of tasks: manual vs. intellectual	2.58	0.11.	7.54	<b>0.01***</b>	6.40	<b>0.01***</b>
(8) Scale of income	2.31	0.32.	14.02	<b>0.00***</b>	5.06	<b>0.08*</b>
(9) Post-materialist values	7.69	<b>0.01***</b>	8.08	<b>0.00***</b>	5.90	<b>0.02**</b>
(10) Feeling of happiness	8.71	<b>0.00***</b>	2.08	0.15.	7.94	<b>0.02**</b>

Note: (\*\*\*) indicates the null hypothesis rejection for 1%; (\*\*) indicates the null hypothesis rejection for 5%; (\*) indicates the null hypothesis rejection for 10%; (.) indicates the null hypothesis acceptance; the models 1, 3, 5 include all the independent variables taken into consideration and the models 2, 4 and 6 include only the significant ones.

Source: Authors' computation based on WVS, wave 6, 2010-2014, using SAS 9.3

Having the obtained results from the Pearson Chi-square statistic, it can be observed that, in the analysis of the correlations between: (1)  $I_{env\_intent-oriented}$  and *employment status, sector of employment, nature of tasks: manual vs. intellectual*; (2)  $I_{env\_act-oriented}$  and *gender, marital status, employment status, feeling of happiness* and (3)  $I_{env}$  and *marital status, sector of employment*, the calculated value of the statistical test was lower than the theoretical value (or  $Sig > \alpha=0.10$ ). This result implied the decision of accepting the hypothesis of independence between each index regarding environmental concern and the independent variables.

In the case of the other variables taken into analysis, the calculated values of statistical test indicated the rejection of the null hypothesis with a probability equal to 0.95, observing the fact that, between the three variables related to environment and each other variable, significant associations existed (Table 2).

### 3.2.1. Joint Correspondence Analysis

After analysing the test results for independence between variables, for identifying the respondents' profiles, the *Joint Correspondence Analysis* was applied. The graphical representation indicated the existence of some associations between the categories of considered variables (Figs. 7-9).

In the investigated sample, it was observed a difference of the respondents' **environmental perceptions** and the categories of the significant independent variables. Thus, on the basis of correspondent point representation for the variables, we obtained the following profiles:

- **the profile of respondents with a high  $I_{env\_intent-oriented}$** : (1) educational level: tertiary, (2) nature of tasks: mostly non-routine, (3) Post-materialist index: post-materialist;

- **the profile of respondents with a low  $I_{env\_intent-oriented}$** : (1) gender: male and female, (2) educational level: secondary, (3) marital status: married, (4) nature of tasks: mostly routine, (5) Post-materialist index: materialist and mixed.

Differences of the respondents' behaviour in terms of **environmental activities** and the categories of the significant independent variables were recorded and, on the basis of correspondent point representation for these variables, we obtained the following profiles:

- **the profile of respondents with a high  $I_{env\_act-oriented}$** : (1) educational level: tertiary, (2) sector of employment: Government or public sector, (3) nature of tasks: mostly intellectual, (4) nature of tasks: mostly non-routine, (5) scale of income: last two steps, (6) Post-materialist index: post-materialist;

- **the profile of respondents with a low  $I_{env\_act-oriented}$** : (1) educational level: secondary, (2) sector of employment: private sector, (3) nature of tasks: mostly manual, (4) nature of tasks: mostly routine, (5) scale of income: middle steps, (6) Post-materialist index: materialist and mixed.

In terms of **general environmental concern** and the categories of possible determinants, we defined the following profiles:

- **the profile of respondents with a high  $I_{env}$** : (1) educational level: tertiary, (2) employment status: employed, (3) nature of tasks: mostly intellectual (4) nature of tasks: mostly non-routine, (5) scale of income: last two steps, (6) Post-materialist index: post-materialist, (7) feeling of happiness: very or rather happy;

- **the profile of respondents with a low  $I_{env}$** : (1) educational level: secondary, (2) employment status: retired, (3) nature of tasks: mostly manual, (4) nature of tasks: mostly routine, (5) scale of income: middle steps, (6) Post-materialist index: materialist, (7) feeling of happiness: not very or not at all happy.

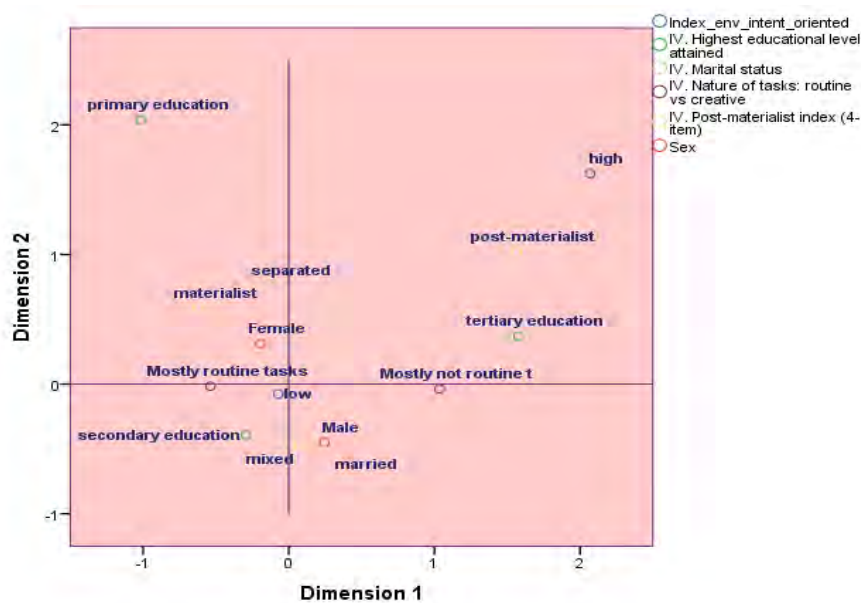
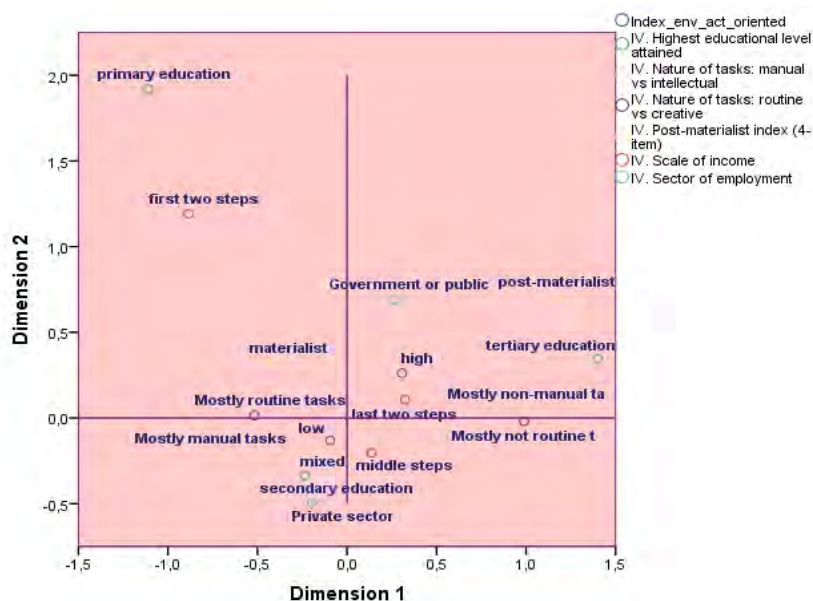
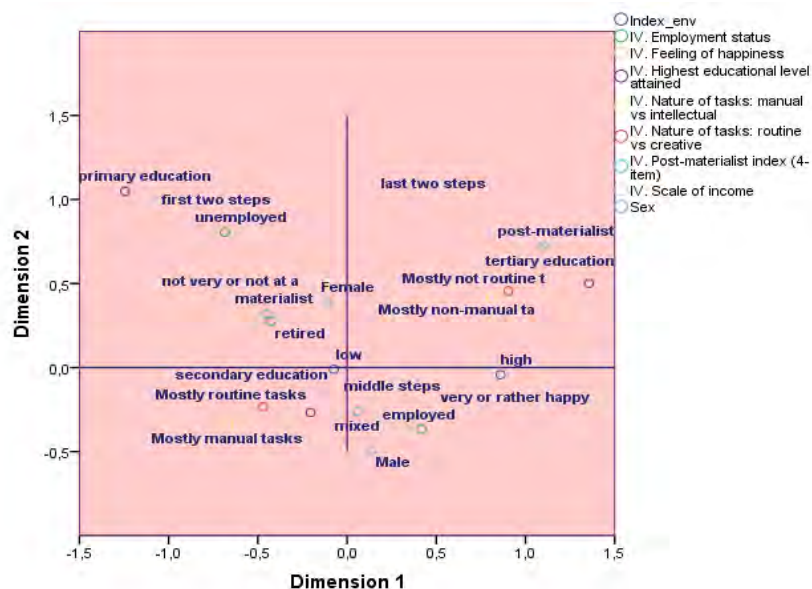


Fig. 7. The values representation on the first two factorial axes  
Source: Authors' representation based on WVS, wave 6, 2010-2014, using SPSS 25



**Fig. 8.** The values representation on the first two factorial axes  
 Source: Authors' representation based on WVS, wave 6, 2010-2014, using SPSS 25



**Fig. 9.** The values representation on the first two factorial axes  
 Source: authors' representation based on WVS, wave 6, 2010-2014, using SPSS 25

### 3.2.2. Binomial Logistic Regression Analysis

As we mentioned in the methodology, the Logistic Regression models were built considering the three dependent variables. The results of testing the influence of independent variables on the probability of belonging to a specific group related to environment, using the Wald statistic test, were summarized in Table 3. The results showed that **gender, marital status, post-materialist values and feeling of happiness** had a significant influence on the belonging of the group with a high level of **environmental awareness**. The probability for a high level of **active participation** to environmental

activities was significantly explained by **sector of employment, nature of tasks: routine or creative, scale income and values**. Also, the test results indicated a significant impact of **gender, education level, values and feeling of happiness** on the probability to be included in the group with a high level of **environmental concern**. The results of estimation test for the three Logistic Regression models that included only the significant variables were presented in Table 4. Applying the Hosmer and Lemeshow Test, the small Chi-squared values (with larger p-value closer to 1) indicated a good logistic regression model fit.



**Table 3.** Econometrical modelling results

Independent variables	<i>I<sub>env_intent-oriented</sub></i>		<i>I<sub>env_act-oriented</sub></i>		<i>I<sub>env</sub></i>	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age	1.03 .	-	2.23 .	-	0.11 .	-
Gender	3.65 **	3.15 *	0.91 .	-	3.23 *	2.55 *
Educational level	2.92 .	-	3.01 .	-	3.88 *	9.81 ***
Marital status	4.46 *	4.68 *	0.51 .	-	0.05 .	-
Number of children	0.01 .	-	2.24 .	-	0.06 .	-
Employment status	2.38 .	-	1.31 .	-	1.25 .	-
sector of employment	0.56 .	-	3.38 *	4.07 **	1.28 .	-
Nature of tasks: manual vs. intellectual	0.21 .	-	0.15 .	-	0.98 .	-
Nature of tasks: routine vs. creative	0.27 .	-	2.94 *	5.83 ***	0.21 .	-
Scale of income	1.85 .	-	4.52 *	11.30 ***	0.56 .	-
Post-materialist values	3.00 .	9.72 ***	3.01 *	7.11 ***	0.57 .	3.05 *
Feeling of happiness	7.74 **	8.02 **	0.11 .	-	6.12 ***	8.97 ***

Note: (\*\*\*) indicates the null hypothesis rejection for 1%; (\*\*) indicates the null hypothesis rejection for 5%; (\*) indicates the null hypothesis rejection for 10%; (.) indicates the null hypothesis acceptance; the models 1, 3, 5 include all the independent variables taken into consideration and the models 2, 4 and 6 include only the significant ones.

Source: Authors' computation based on WVS, wave 6, 2010-2014, using SAS 9.3

For Model 2 and Model 6 (Tabel 4), the results suggest that the probability of belonging to the group with a high level of environmental orientation was higher for males than for women. For the middle model (Model 4), the gender was no more a significant variable. Again, in the case of orientation put into practice, gender differences were not recorded. Men registered a higher probability to declare that 1) looking after the environment is important for them, caring for nature and saving life resources, 2) most serious problem of the world, in their opinion, is environmental pollution, or 3) protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs. More than that, our empirical results revealed the fact that the estimated chances for a higher *I<sub>env\_intent-oriented</sub>* in the case of a female, not married or divorced, having preponderantly post-materialist values and declaring rather or very happy was of 0.777 times less than the chances for a male in the same conditions. Contrary, when materializing these opinions into practice, no significant gender differences were met.

Regarding education, in the case of the first two models (Model 2 and 4), non-significant results were obtained. For the third model (Model 6), educational level was a significant variable, indicating that the probability for persons with tertiary education to have a high *I<sub>env</sub>* was higher than for the ones with primary education (Tabel 4). Going deeper, we observed that, a male, with a lower-secondary education, with preponderantly post-materialist values and rather or very happy had of 0.489 time lower chances to have a high *I<sub>env</sub>* than a man with tertiary education and with the same characteristics. The difference was almost

the same (0.479) when comparing secondary education to tertiary one, in the same mentioned conditions. In the case of females, with similar socio-economic characteristics as described above for males, the estimated chances for a high general environmental concern were much more influenced by the level of education, the differences between the ones with lower-secondary education and the ones with secondary or tertiary education were lower than in the case of men (with Odds Ratio equal to 0.978 and 2.044).

Analysing the results of the impact of marital status on the probability to belong to a specific group, non-significant results were observed for the last two models. For the Model 2, the results suggested that the probability for the Romanian respondents to be part of the group with high level of orientation to environment was higher for the divorced ones than for the ones that were single. For the married ones, the differences were not significant.

Going further, a male that was divorced, having preponderantly post-materialist values and declaring rather or very happy had higher chances (equal of 1.889 times) to have a higher *I<sub>env\_intent-oriented</sub>* than the single ones with the same characteristics. Comparing to those that were employed in the private sector, the category working in a Government or public institution was more likely to have a high *I<sub>env\_act-oriented</sub>* and have preponderantly non-routine tasks. In other words, the probability to get more implied in activities related to environment and fighting for resolving its specific problems was higher for the employees from the public sector than for the ones from the private sector.

**Table 4.** Econometrical modelling results

<i>Variables/Models</i>	<i>Model 2</i>		<i>Model 4</i>		<i>Model 6</i>	
Gender: female	-0.13 (0.07)	*	-		-0.17 (0.11)	***
Education: secondary	-		-		0.23 (0.30)	.
Education: tertiary	-		-		0.25 (0.18)	**
Marital status: married	-0.10 (0.12)	.	-		-	
Marital status: divorced	0.37 (0.18)	**				
Sector of employment: Government or public institution	-		0.38 (0.19)	**	-	
Nature of tasks: mostly non-routine tasks	-		0.45 (0.19)	***	-	
Scale income: first two steps	-		-0.78 (0.44)	*	-	
Scale income: last two steps	-		1.38 (0.43)	***	-	
Values: materialist	-0.33 (0.12)	***	-0.50 (0.19)	***	-0.19 (0.11)	*
Values: mixed	-0.12 (0.11)	.	-0.20 (0.12)	***	-0.11 (0.12)	*
Feeling of happiness: not very or not at all happy	-0.21 (0.08)	***		-	-0.47 (0.16)	***
Constant	-0.78 (0.12)	***	-2.80 (0.28)	***	-2.32 (0.20)	***
Hosmer and Lemenshow Test	8.136	.	9.422	.	4.942	.
Note: (***) indicates the null hypothesis rejection for 1%; (**) indicates the null hypothesis rejection for 5%; (*) indicates the null hypothesis rejection for 10%; (.) indicates the null hypothesis acceptance; values in brackets represent estimations of standard errors for the regression coefficients estimators.						

Source: Authors' computation based on WVS, wave 6, 2010-2014, using SAS 9.3

Because the value of Odds Ratio was 2.136, the estimated chances for a person working in the public sector, with mostly routine tasks, with a medium income and with preponderantly post-materialist values were higher than of a person working in the private sector and having the same other conditions. A similar situation was met in the case of a person working in the private sector, with mostly non-routine tasks, from the middle steps of income, and with mostly post-materialist values compared to a person with routine tasks and with the other characteristics being similar (Odds Ratio was equal to 2.479).

The probability for people included in the first two steps from the scale of income to register a high index for active participation in environmental activities was lower than the probability of the ones from the middle steps of income. Contrary, people from the last two steps of income registered a higher probability to have a higher implication in environmental activities than our reference category. We also observed that the estimated chances for a person, employed in the Government or in a public institution, having routine tasks, with preponderantly post-materialist values, feeling happy and being situated in the first steps from the scale of income were

of 0.838 lower than the person in the same conditions, but with a middle level of income. In the same time, the ones with similar characteristics as mentioned above, but were positioned on the last steps of income, had more estimated chances (of 7.274 higher) than the ones from the middle steps. It must be mentioned that, among all Odds Ratio, this was the biggest one, meaning that the highest difference between the independent variables was in the case of income, its level being critical in terms of active participation in environmental activities.

Significant differences were also recorded between materialist and post-materialist orientations, regarding all the three indices. The post-materialist people tended to have a higher environmental concern.

The coefficient estimations of the feeling of happiness (Model 2 and Model 6) indicated significant differences between the ones that declare themselves as being very or rather happy than the ones saying that they are not very or not at all happy, the probability for a high level of orientation to environmental problems in terms of opinions, but also of general environmental concern being higher for the ones that considered themselves happy. In the case of Model 4, non-significant results were obtained.

#### 4. Conclusions

Environmental concern is an important point of the policy devoted to environmental protection because it is related to its final recipient that is the human being. This is why the level of public support is essential in the process of putting policies into practice. As a response, we proposed an analysis in which, first, we concentrated on individuals' perceptions regarding environmental problems, then on their active participation in pro-environmental activities and, lastly, we integrated both dimensions in one index offering a wider perspective regarding environmental concern. This study is between the first ones to analyse consecutively the levels of positive perceptions, of active participation and, then, by integrating both, the levels of general environmental concern, in Romania, to our knowledge.

Analysing, at the national and regional levels, the active participation in pro-environmental activities, we concluded that there are no major differences, as the levels were very low. We observed that regarding the positive perceptions, the levels were the highest in the Central Region. Referring to the general environmental concern, we noticed that three regions (North-West, Centre and North-East Regions) had higher levels, even though all the regional levels were very low. At county level, the highest percentages of people with 1) environmental positive perceptions were in Neamt, Harghita, Brasov and Dolj; 2) active participation in environmental activities was in Arad and Harghita; 3) general environmental concern was in Neamt and Harghita.

We also outlined the profile of the individuals concerned with the environment protection in Romania, characterised especially as having tertiary education, a high level of income, post-materialist values, being employed, with mostly non-routine and non-manual tasks, and declaring themselves as being rather or very happy. More, we found out that, the personal position regarding environment, concentered in both perceptions and active participation, is influenced by: gender, educational level, post-materialist values, and feeling of happiness. This means that there is a higher probability for a person to be more aware and get more involved in pro-environmental actions in the conditions of having tertiary education, post-materialist values, feeling happy. Also, the probability is higher for men than for women.

Other findings were related to the personal position in terms of perceptions regarding environment, that is influenced by: gender, marital status, values and feeling of happiness. Thus, the probability for having positive perceptions is higher for a male that is divorced, with post-materialist values, and feeling happy. The active participation on pro-environmental actions is influenced by: sector of employment, nature of personal tasks, scale of income, values. This means that there is a higher possibility for people working in the public sector, with especially creative tasks, high income and post-

materialist values to actively participate in environmental activities.

We found that the economic factors are important only in the case of active participation. In other words, the level of income is determinant for the level of involvement in activities such as: active membership in an environmental organization, given money to ecological organization or participating in demonstration for environment.

The state of personal happiness is important for the general environmental concern, but, especially in the phase of forming the opinions in terms of favourable perceptions regarding environment and its specific problems. This confirms the theories that underline the tendency of people to put on the centre of their interests firstly the personal aspects and, only after these are at a satisfactory level, to turn their attention on external problems, such as the environment.

Our findings are consistent with the ones of other studies related to the environmental concern, especially regarding the influence of income, education and post-materialist values on it. It also adds value to the present knowledge regarding the national and regional peculiarities through identifying the profiles and the distribution of individuals with a high environmental concern (both perceptions and active participation) and its main socio-demographic and economic determinants.

These may constitute important foundation elements for the public policies related to environment at national and regional level, helping to target better the population segments with the aim of inducing positive perceptions and appropriate behaviours towards environmental protection in Romania. Yet, there are missing information regarding the differences between the regional profiles of individuals with a high environmental concern, with its main causes, that would be useful for regional and local policies, especially for a better education regarding the necessity of improving the environmental wellbeing that may constitute future directions of research.

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