Mariana Vashchyk[1]
Department of Finance and Credit,
National University of Life and Environmental Sciences of Ukraine
Tomasz Siudek[2]
Department of Economics and Organization of Enterprises,
Warsaw University of Life Sciences – SGGW

Ecological development of rural areas in the European Union member states in 2000-2012

Abstract. The purpose of research was to analyze ecological development in EU countries during 2000-2012. Six primary variables have been applied, namely: the share of forest area in total land area, emissions of sulphur oxides (SO_x) in agriculture, emissions of nitrogen oxides (NO_x) in agriculture, electric power consumption per capita, the share of alternative and nuclear energy in total energy use and the share of area under organic farming in total agricultural land area. The authors have developed a synthetic index, which enabled the statement that Latvia, Finland, Austria, Sweden and Estonia are leading EU countries in terms of ecological development; the worst situation is in France, Poland, Malta, Spain and in the United Kingdom.

Key words: ecological development, European Union, rural area.

Introduction

Poverty, development and environment are closely linked. The world's poorest countries are those most directly dependent on natural resources for their daily survival and therefore most vulnerable to environmental hazards. This statement is true not only for the less developed countries; a few decades ago the interdependence between poverty and environment and the functional links between agriculture and ecological issues became an area of particular concern among the wealthiest nations. The European Union is not an exception to this global tendency. Since the ratification of the Maastricht Treaty [Treaty on… 1992], there has been a legal obligation for the European Union to take account of environmental protection requirements when drawing up and implementing EU policies. The European Commission has defined the protection and sustainable management of natural resources as a top priority in its poverty reduction policies. Integrating environmental concerns into development policy is also a key to ensuring that natural resources are protected. The EU through the various development instruments has been paying particular attention to this. Thus, the support for biodiversity, water and climate change is among the key areas for development support identified in the European Consensus on Development [2006], besides the fact that environmental sustainability is also one of the Millennium Development Goals [Millennium… 2000].

The EU budgetary spending on agri-environmental measures has increased rapidly since 1993 and it reached EUR 3026 million in 2010. At EU-27 level, the average agri-

[1]PhD, e-mail: mariana.vashchyk@nubip.edu.ua
[2]Doctor habilitated, e-mail: tomasz_siudek@sggw.pl

environment expenditure (period 2007-2009) was EUR 84 per hectare of UAA under agri-environmental schemes. The amount of expenditure per hectare is higher in the 12 Member States which joined the EU in 2004 and 2007 (EUR 123.4 per ha) than in the EU-15 (EUR 77.8 per ha) [European Commission…2012]. The application of these differences in spending was meant to level general disparity in agriculture between "old" and "new" EU Member States.

As is known, a secure environment is the foundation of sustainable agricultural development. Ecological security displays the situation when the internal structure of the system is stable and the health service function of the system tends to be positive [Liao et al. 2004].

In order to control regional ecological evolvement more conveniently, factors that affect it the most should be determined. The principal ones are:

- population: human is the most important and active factor in an ecological region, being the consumers of ecological systems, and also the producers of an economic system. Both quantity and population education and awareness affect ecological status of a region, the style and extent of economic development, and thus – ecological carrying capacity;
- technology: it is the medium that joins the ecological and the economic system. Ecological system is the basis of system evolvement and economic system is its driving force;
- policy: policy affects not only the process of evolvement of ecological region, but also the direction of regional evolvement. When the market is out of order and cannot allocate environmental resources effectively, policy will be the key factor that affects regional ecological evolvement [Ran and Jin 2004].

The ecological development itself is a complicated, multi-factorial process that may be characterized by multiple uncertainties and mutual inconsistencies; it should be developed based on the features and evolvement trends of the particular study area.

Sustainability indicators have received increasing attention since the Rio Earth Summit [Agenda 21 1992], reflecting growing concern by the public and policy makers over environmental trends [Sherbinin 2003].

Choosing the representative indicators and building the conceptual system plays a key role in the entire assessment of the development outcomes (Table 1).

Different ecological development models have been elaborated for different purposes. Some of them can be unacceptable to policymakers [Ran and Jin 2004], because of great dependence on GDP per capita and the modernization level of agricultural and industrial infrastructure, which were chosen as development variables. As a result, man-made effort must be exerted on the vulnerable ecological region to change this evolvement trend.

On the other hand, the Environmental Sustainability Index (ESI) permits cross-national comparisons of environmental sustainability in a systematic and quantitative way. It assists the move toward a more analytically rigorous and data driven approach to environmental decision-making [Sherbinin 2003]. Some are aimed at regionalization of ecological security and sustainable agricultural development in order to provide the reference for the regional agricultural resources protection, environmental construction and formulating the ways to be lifted out of poverty [Liao et al. 2004].

Table 1.Selected definitions of ecological development models and approaches

Author(s) and year	Concept (model) description
Krutilla and Fisher [1975]	The Krutilla-Fisher approach ensures that the benefits of nature protection are correctly included in the basic cost-benefit equation. Environmental benefits are likely to increase relative to other benefits in the economy. This increase in relative value means that environmental benefits are discounted at less than other value or maybe not at all. If the relative importance of environmental benefits grew sufficiently strong, they could even count more than their nominal value so that, they would be "discounted" at a negative rate.
Environment al… [2001]	Traditional economic instruments for wealth estimates such as the GDP need to be supported with new environmental quality indicators. Therefore, on one hand economic reasoning is being combined with an environmental sustainable development analysis, while on the other hand statistical information needed as a support to the decision making process is being worked out, while suitable accounting and statistical tools are being provided to encourage integration. However it does not only apply to public decision makers or authorities but also to private sectors, such as initiatives for the certification and modernization of processes.
OECD [2002]	Many indicators and indicator sets are based on – or on some variation of – the OECD Pressure-State-Response framework. In terms of this framework index groups are classified into 4 groups: 1 – indices solely based on natural equivalent; 2 – policy performance indices; 3 – indices based on an accounting framework; 4 – synoptic indices. The aggregation of two or more indicators into one index typically involves several steps, to wit: selection of variables, transformation, weighting and valuation.
Sherbinin [2003]	The Environmental Sustainability Index (ESI) measures overall progress toward environmental sustainability through "indicators", each of which combines some number of variables. The ESI tracks relative success for each country in five core components: environmental systems, reducing stresses, reducing human vulnerability, social and institutional capacity and global stewardship.
Liao et al. [2004]	In view of the conception of system service of environment, according to Analytic Hierarchy Process (AHP), the general level structure system of ecological security evaluation can be formed. According to that, the index system of ecological security evaluation in particular area is formed from the pressure of resources and environment, the quality of resources and environment, as well as the ability of environmental protection and ecological improvement. Each index has distinct contribution to ecological environment. Using the degree of ecological security to indicate the ecological condition, the model of synthetic evaluation is as follows. $$P_0 = \sum W_i \times P_i$$ where P_0 is security index, W_i is the weight of the ith index, P_i is valuation of the i index. The larger security index, the higher ecological security degree is in the region.
Ran and Jin [2004]	Based on the theories of ecological carrying capacity and ecological resilience, a vulnerable ecological region's evolvement model can be established. Those synthetic variables are ecological carrying capacity, ecological resilience, economic development intensity and economic development velocity.
Lavlinskii [2010]	The functional part of the approach is the model of sustainable development of the natural resource territory. It generates predictions of the consequences of realization of the expertly stated regional development program based on the hypothetical assumption that the administration acts in such a way as to increase the living standard of the population over the long term and to conserve the natural environment. The dynamics of the indicators of the environmental condition of the region is defined by the distribution of the annual amounts of emissions of residents and by the environmental projects in the framework of the compensatory measures which have been realized. Synthesis of the initial model or some modification of equation makes it possible to close the general system of equations and at the same time solve the environmental problems and the problem of transformation of the natural resource potential into renewable growth factors.

Stanners et al. [2007], Environment al… [2013].	European Environmental Agency's (EEA) indicators are developed and categorized according to a causal framework that organizes interactions between society and the environment into five stages: driving force, pressure, state, impact, and response. In simple terms, this DPSIR assessment framework works as follows: social and economic developments drive changes that exert pressure on the environment. As a consequence, changes occur in the state of the environment, which lead to impacts on society. Finally, societal and political responses affect earlier parts of the system directly or indirectly. This framework helps to structure thinking about the interplay between the environment and socio-economic activities.

Source: own elaboration.

The Krutilla-Fisher algorithm leads to rather conservation-oriented rule, which is arrived at entirely on the ground of economic efficiency [Krutilla and Fisher 1975]. Most of nature policy programs, however, also deal with other goals, such as equity and sustainability, and the trade-offs between them [Heide 2005]. For instance, having constructed the dynamics of the pollution level in the framework of the general system, it is possible to check the ecological conditions of the initial setting of the task in the long-term prospect and reject the socioeconomic development trajectories violating the principles of sustainable development [Lavlinskii 2010].

Research purpose, materials and methods

The research was aimed at evaluating the level of the ecological development in rural areas and its changes over time in each EU Member State during 2000–2012.

The following ecological variables of rural sustainability were estimated: (1) forest area (% of land area), (2) emissions of sulphur oxides (SO_x) in agriculture (tons), (3) emissions of nitrogen oxides (NO_x) in agriculture (tons), (4) electric power consumption (kWh per capita), (5) alternative and nuclear energy (% of total energy use), (6) area under organic farming (%) (tab. 3).

The data needed for developing indicators and variables on which they are created, was chosen through selection of available data, its weighting and valuation. The data sets selection was related to certain indicators, in terms of its harmonization, quality, geographical coverage and availability. It was mainly obtained from the World Bank, OECD and European Commission statistics databases.

Through the specified calculating model, the synthetic index (SI) was applied to characterize the overall situation of ecological development in each particular country. We input the initial data (variables) into the factor analysis model to analyze and quantify the impacts of the indicators on overall sustainable development of rural areas dynamically. Each variable has distinct contribution to this SI and, as a result, to environmental development (security) of respective country.

A main hypothesis of the research states that it is possible for countries to have similar scores in terms of ecological development indicators, but very different economic development levels. It means that changes in ecological development of the EU counties don't reflect the level of economic development.

After defining the evaluation variables, it is still difficult to evaluate the level of ecological sustainability with them directly, because they are not unified and not suitable for the comparison. Therefore the authors have implemented factor analysis in order to replace the original secondary variables array, describing the development of rural areas, by

a new variables set, converted for more convenient practical application. Factor analysis was based on the study of interrelationships between variables in a multidimensional extend and to clarify the reasons for the general variability [Harman 1967; Bolch and Huang 1974; Morrison 1990; Jajuga 1993; Tadeusiewicz 1993; Dobosz 2001].

The analysis fulfilled a linear transformation of the original *n*-variables X_i (i = 1, ... n) to the new secondary *t*-variables U_k (k = 1, ... t), which were uncorrelated, and their variance sum equals total variance of the original variables X_i. Variables U_k have been defined as main factors. The variance of each new factor explains certain variation value of the primary (original) variables and is represented by eigenvalue. Subsequently isolated main factors indicated less variability each next time. The decision concerning definition the stage of termination isolating factors depended mainly on state of random variation, which remained undefined by the new factors. All the factors were applied to determine the SI with no exclusions, having defined 100% of the total variation.

The value of the main factors and the synthetic index has been calculated by the following equations:

$$U_k = a_{1k}x_1 + a_{2k}x_2 + a_{3k}x_3 + \ldots a_{nk}x_n \tag{1}$$

where:
U_k – value of the main *k*-factor, k = 1,2,…t,
a_{1k} – estimated significance of primary *i*-variable by the primary *k*-factor,
x_1 – value of primary *i*-variable, i = 1,2,…n.

$$W_s = b_1U_1 + b_2U_2 + b_3U_3 + \ldots b_tU_t \tag{2}$$

where:
W_s – synthetic index of ecological development of rural areas in the EU countries,
b_k – estimated significance of main *k*-factor, which reflects a certain percentage of variation, k = 1,2,…t,
U_k – value of main *k*-factor, k = 1,2,…t.

Ranking results of ecological development of EU Member States are presented in respective tables.

Results

Within the framework of factor analysis of six primary variables, the same number of main factors was distinguished. First, second and third factors reflected about 83% of the total variation (44%, 26% and 13% respectively) (table 2). The first factor was influenced mostly by the following primary variables: forest area, alternative and nuclear energy and area under organic farming; second factor – by emissions of sulphur oxides (SO_x) and emissions of nitrogen oxides (NO_x) in agriculture; and the third one – by electric power consumption (table 3).

Table 2. Factor analysis of ecological development of rural areas in EU countries, 2000-2012

Factor	Eigenvalue	Percentage of variation	Cumulative percent
1	2.64	43.93	43.93
2	1.54	25.70	69.63
3	0.81	13.48	83.10
4	0.54	8.99	92.09
5	0.32	5.28	97.37
6	0.16	2.63	100.00

Source: calculated by the authors.

Table 3.Factors which determine ecological sustainable development of rural areas in EU countries, 2000-2012

Primary variables	Cumulative percent = 83.1%		
	Factor 1	Factor 2	Factor 3
Forest area (% of land area) – $[x_1]$	0.8192	0.0584	-0.3019
Emissions of sulphur oxides (SO_x) in agriculture (tones) – $[x_2]$	0.1158	0.9210	-0.1438
Emissions of nitrogen oxides (NO_x) in agriculture (tones) – $[x_3]$	0.0812	0.9403	0.0634
Electric power consumption (kWh per capita) – $[x_4]$	-0.2183	-0.0523	0.9669
Alternative and nuclear energy (% of total energy use) – $[x_5]$	0.8592	0.2351	-0.0103
Area under organic farming (%) – $[x_6]$	0.8055	-0.0022	-0.1247

x_i – value of primary *i*-variable, i = 1,2, … 6; U_k – value of main *k*-factor, k = 1, 2,…6

Source: calculated by the authors.

In general Latvia, Finland, Austria, Sweden and Estonia are the leading EU countries in terms of ecological development by the applied indicators; the worst situation is in France, Poland, Malta, Spain and the United Kingdom (tab. 4, fig. 1).
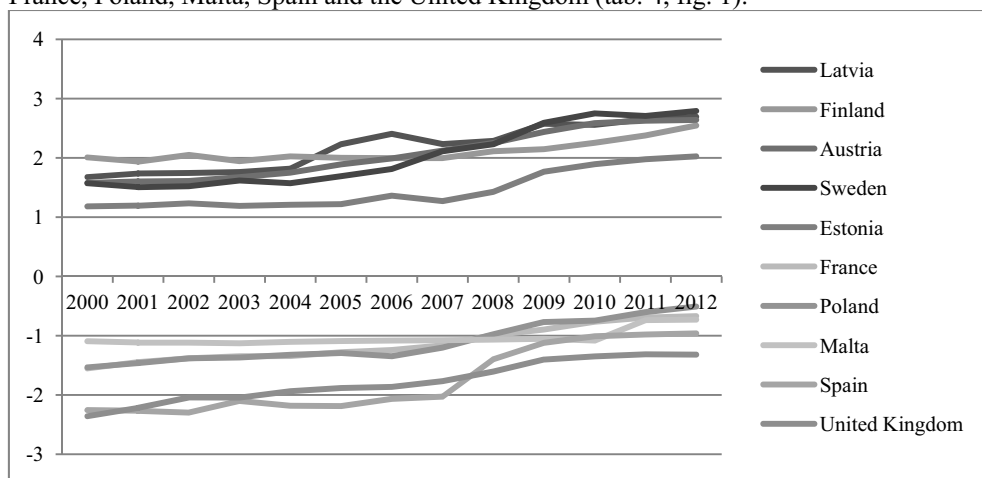

Fig. 1. Ranking of EU Member States by the value of the SI of ecological development of rural areas, 2000-2012

Source: calculated by the authors.

Comparing the average positions of the countries in the ranking for 2000-2012 with positions in 2012, it should be noted that the largest improvement in ranking has recently occurred in Greece, Italy, and the slight worsening – in Finland.

Ranking of 10 selected EU Member States (with the highest and lowest score by SI) based on GDP per capita shows that the countries distribution within these two groups has been changed. Latvia and Estonia, which have been holding 1st and 5th rank respectively, decreased to 9th and 8th rank (fig. 2) with 13,947 and 16,844 US$ per capita in 2012, whereas France (26th) and United Kingdom (28th) shifted to 4th and 5th place respectively.

These distinctions, however, weren't unexpected and can't be simply explained as belonging of one or another country to the "old" or "new" EU Member State. Higher level of economic development doesn't explain better outcomes in environmental situation in above mentioned states.

This means that some countries succeeded in economy growth while increasing emissions, pollution or electric power consumption etc. In some EU Member States, the total SI of rural areas' ecological development exceeded the rate of the GDP per capita increase inversely.
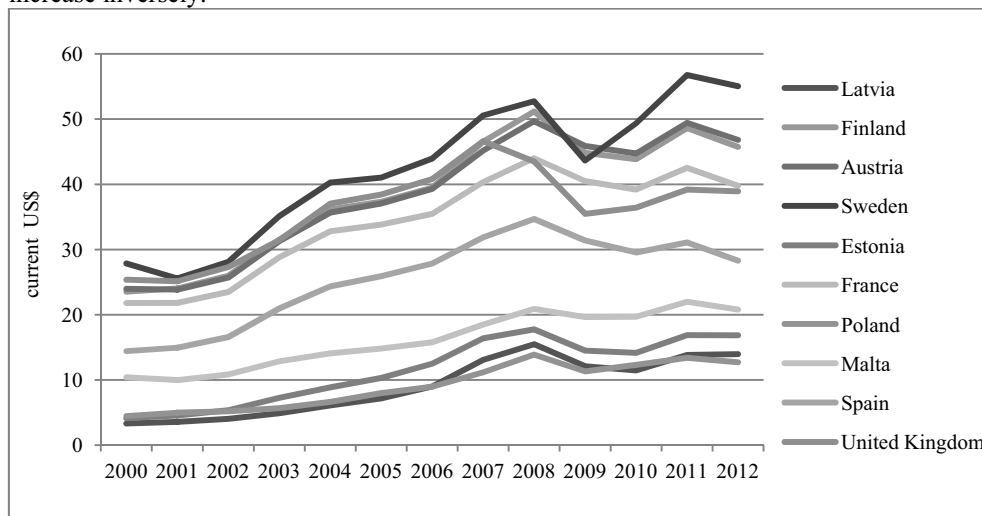

Fig. 2. Ranking of EU Member States by the value of GDP per capita (current US$), 2000-2012

Source: grouped by the authors based on http://data.worldbank.org/indicator/NY.GDP.PCAP.CD.

Table 4. Ranking of EU Member States based on the value of the main factors of ecological development of rural areas, 2000-2012

Country	2000 SI	2000 Rank	2001 SI	2001 Rank	2002 SI	2002 Rank	2003 SI	2003 Rank	2004 SI	2004 Rank	2005 SI	2005 Rank	2006 SI	2006 Rank
Austria	1.5776	3	1.6030	3	1.6121	3	1.6750	3	1.7504	3	1.8929	3	1.9923	3
Belgium	-0.7313	16	-0.7007	17	-0.6375	15	-0.6509	17	-0.6423	17	-0.6159	17	-0.5279	17
Bulgaria	-0.8993	18	-0.8832	18	-0.7872	18	-0.8078	19	-0.7559	19	-0.7479	19	-0.7309	20
Croatia	0.0157	10	-0.0572	11	-0.0685	11	-0.0143	11	-0.0150	11	-0.0401	12	-0.0233	12
Cyprus	-0.6887	15	-0.6868	16	-0.6817	17	-0.6820	18	-0.6708	18	-0.6354	18	-0.6215	18
Czech Republic	0.0146	11	0.0693	10	0.0910	10	0.0772	10	0.1121	10	0.1500	10	0.1735	11
Denmark	0.0367	9	0.1321	9	0.2117	8	0.2462	8	0.3087	8	0.3206	9	0.2797	10
Estonia	1.1826	5	1.1937	5	1.2334	5	1.1895	5	1.2097	5	1.2207	5	1.3626	5
Finland	2.0087	1	1.9381	1	2.0516	1	1.9446	1	2.0268	1	2.0027	2	1.9955	2
France	-1.5526	25	-1.4450	24	-1.3812	24	-1.3467	25	-1.3419	26	-1.2772	25	-1.2394	25
Germany	-1.6022	26	-1.4904	26	-1.3813	25	-1.2960	24	-1.2058	24	-1.1179	24	-1.0611	23
Greece	-1.0059	21	-1.0209	22	-0.8880	20	-0.5692	14	-0.5578	16	-0.4283	15	-0.4364	15
Hungary	-0.7436	17	-0.6760	15	-0.6480	16	-0.6122	15	-0.4941	15	-0.3910	14	-0.3623	14
Ireland	-0.9708	20	-0.9505	20	-0.9286	21	-0.9133	21	-0.8910	21	-0.8566	22	-0.8402	22
Italy	-1.1707	23	-1.0165	21	-0.9713	22	-0.9468	22	-0.9168	22	-0.7539	20	-0.6443	19
Latvia	1.6774	2	1.7366	2	1.7465	2	1.7628	2	1.8194	2	2.2303	1	2.4058	1
Lithuania	0.1921	8	0.1807	8	0.1675	9	0.1641	9	0.1964	9	0.3392	8	0.4859	8
Luxembourg	-0.3662	13	-0.2856	13	-0.2356	13	-0.2300	13	-0.2171	13	-0.1976	13	-0.1934	13
Malta	-1.0932	22	-1.1164	23	-1.1170	23	-1.1273	23	-1.1022	23	-1.0895	23	-1.0821	24
Netherlands	-0.9373	19	-0.9101	19	-0.8615	19	-0.8606	20	-0.8117	20	-0.7673	21	-0.7600	21
Poland	-1.5339	24	-1.4619	25	-1.3821	26	-1.3668	26	-1.3208	25	-1.2915	26	-1.3452	26
Portugal	0.2492	7	0.3232	7	0.3247	7	0.4482	7	0.6333	7	0.7012	7	0.8768	7
Romania	-0.4484	14	-0.5587	14	-0.5527	14	-0.6227	16	-0.4757	14	-0.5016	16	-0.4930	16
Slovakia	-0.1157	12	-0.1302	12	-0.1287	12	-0.1135	12	-0.0611	12	0.1290	11	0.2810	9
Slovenia	0.8679	6	0.8607	6	0.8336	6	0.8628	6	0.8708	6	0.8795	6	0.9579	6
Spain	-2.2564	27	-2.2669	28	-2.2983	28	-2.1014	28	-2.1822	28	-2.1869	28	-2.0648	28
Sweden	1.5724	4	1.5063	4	1.5223	4	1.6194	4	1.5748	4	1.6913	4	1.8127	4
United Kingdom	-2.3575	28	-2.2178	27	-2.0423	27	-2.0449	27	-1.9360	27	-1.8814	27	-1.8646	27

SI – the value of the synthetic index of rural areas' ecological development in the EU Member States.

Source: calculated by the authors.

Continuation of table 4. Ranking of EU Member States based on the value of the main factors of ecological development of rural areas, 2000-2012

Country	2007 SI	2007 Rank	2008 SI	2008 Rank	2009 SI	2009 Rank	2010 SI	2010 Rank	2011 SI	2011 Rank	2012 SI	2012 Rank	2000-2012 SI	2000-2012 Rank
Austria	2.1244	2	2.2522	2	2.4396	3	2.5879	2	2.6277	3	2.6417	3	2.0598	3
Belgium	-0.4691	17	-0.3939	17	-0.2703	17	-0.1993	18	0.1082	12	0.1537	12	-0.4290	16
Bulgaria	-0.7504	21	-0.5598	20	-0.4343	20	-0.3109	19	-0.4023	20	-0.3767	20	-0.6498	20
Croatia	-0.0770	12	-0.0550	12	-0.0178	12	0.0231	13	0.0946	13	0.0946	13	-0.0108	12
Cyprus	-0.5625	18	-0.5104	18	-0.4086	19	-0.3867	20	-0.3748	19	-0.3748	19	-0.5604	18
Czech Republic	0.2858	11	0.4109	11	0.6031	10	0.7920	9	0.8922	8	0.9253	9	0.3536	10
Denmark	0.3949	9	0.5226	9	0.6557	9	0.7784	10	0.8642	10	1.0726	7	0.4480	9
Estonia	1.2706	5	1.4290	5	1.7678	5	1.8934	5	1.9778	5	2.0262	5	1.4582	5
Finland	1.9955	4	2.1123	4	2.1470	4	2.2547	4	2.3784	4	2.5470	4	2.1079	2
France	-1.1634	25	-0.9897	25	-0.8947	25	-0.7637	25	-0.6923	25	-0.6686	25	-1.1351	26
Germany	-0.8807	23	-0.8192	23	-0.6268	22	-0.5676	21	-0.5534	21	-0.5525	22	-1.0119	23
Greece	-0.4651	16	-0.3517	16	-0.2301	16	-0.0724	15	-0.2490	18	-0.2159	18	-0.4993	17
Hungary	-0.3227	14	-0.2391	14	-0.1109	15	-0.0682	14	-0.0602	15	-0.0318	16	-0.3662	15
Ireland	-0.8113	22	-0.7810	22	-0.7224	23	-0.6941	23	-0.6604	24	-0.6405	24	-0.8201	22
Italy	-0.6078	19	-0.5546	19	-0.3184	18	-0.1851	17	-0.1116	17	-0.0292	15	-0.6328	19
Latvia	2.2346	1	2.2873	1	2.5776	2	2.5562	3	2.6521	2	2.6948	2	2.1832	1
Lithuania	0.5354	8	0.5944	8	0.6974	8	0.9076	7	0.8704	9	0.8789	10	0.4777	8
Luxembourg	-0.0936	13	-0.0684	13	-0.0631	13	-0.0764	16	-0.0694	16	-0.0713	17	-0.1668	13
Malta	-1.0750	24	-1.0659	26	-1.0533	26	-1.0812	27	-0.7370	26	-0.7285	26	-1.0360	24
Netherlands	-0.7425	20	-0.6782	21	-0.6267	21	-0.6422	22	-0.6025	23	-0.5873	23	-0.7529	21
Poland	-1.2011	26	-0.9747	24	-0.7677	24	-0.7441	24	-0.6023	22	-0.5066	21	-1.1153	25
Portugal	0.8164	7	0.8043	7	0.7571	7	0.8756	8	0.9329	7	0.9859	8	0.6714	7
Romania	-0.3517	15	-0.2617	15	-0.0767	14	0.0340	12	-0.0276	14	0.0151	14	-0.3324	14
Slovakia	0.3363	10	0.4403	10	0.5534	11	0.7029	11	0.6946	11	0.6813	11	0.2515	11
Slovenia	0.9873	6	1.0257	6	1.1751	6	1.2175	6	1.2347	6	1.2801	6	1.0041	6
Spain	-2.0287	28	-1.3966	28	-1.1192	27	-1.0077	26	-0.9791	27	-0.9593	27	-1.7575	27
Sweden	2.1122	3	2.2325	3	2.5933	1	2.7512	1	2.7092	1	2.7906	1	2.0376	4
United Kingdom	-1.7670	27	-1.6058	27	-1.4024	28	-1.3489	28	-1.3123	28	-1.3180	28	-1.7768	28

SI – the value of the synthetic index of rural areas' ecological development in the EU Member States.

Source: calculated by the authors.

Conclusions

The synthetic indicator of ecological development and its score can be interpreted as a measure of the relative probability that a country/region will be able to achieve favorable environmental conditions, but it doesn't mean that it will be able to sustain those for a longer period in the future. The assumption that the countries at the top of ranking are more likely than those at the bottom to experience lasting environmental quality, can be either fallacious. As was expected, the outcomes of the present research indicated that the relatively wealthy countries (by the value of GDP per capita) are at the bottom of the ranking in terms of their ecological development and vice versa. It means that changes in ecological development of the EU counties don't reflect the level of economic development.

Unfortunately, it is hardly possible in terms of dynamically changing environment to draw conclusions about ecological sustainability of a particular country/region in the long run. These kind of conclusions would require a whole complex of information associated with two other dimensions of sustainable development: economic and social.

Given the multiple factors that affect both the rural areas and agriculture, it is complicated to draw direct relationships between variables of environmental domain. Some additional descriptors which could aid in explaining the fluctuation of these are the characteristics of the economic structure of the sector (farm and household structure, economic accounts for agriculture, agriculture value added per worker, cereal yield, livestock production etc.), the social characteristics of the area (employment/unemployment level, rural population, total social expenditures etc.). However, the specific context of each country has to be taken into account, since it could cause differences in factor combinations and their aggregate effects.

Besides, the environmental component of rural areas' sustainable development has to be integrated into decision-making at all levels, by promoting coordination between all the policies of each EU Member State, taking into account economic, social and environmental dimensions.

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