ASPECTS REGARDING THE APPLICATION OF SUSTAINABLE SOCIETY INDEX IN ROMANIA

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Abstract

Any comprehensive understanding of sustainable development and proper quantification of its different components requires an accurate information system developed especially for this field. Development trends monitoring relying on indicators that are stranger to business activities precede sustainable development principles formulation and have grown together with the sustainable development strategy definition process. The development of a worldwide accepted system of indicators able to allow SD monitoring is a preoccupation of the utmost importance. Therefore, an increasing number of international bodies, institutes, companies, governments, NGOs, etc. have developed indicators able to provide a full sustainable development image. The high number of examples supports the need to rely on such monitoring tools, which cover a diversified range of applications and help overcome some methodological drawbacks.
The main indices already developed have been analyzed in search of an adequate set of indicators able to measure a country's sustainability level, yet they were found not to fully meet the needs. The main deficiencies are related to the high number of sustainability definitions and to the lack of occasional updates. That is why the Sustainable Society Index (SSI), developed by the Sustainable Society Foundation (SSF), was considered, knowing that it reunites the most important aspects related to sustainability and quality of life in a simple and transparent manner. The set includes 24 indicators divided into 8 sub-categories. The SSF determined the SSI based on data provided by scientific bodies and international organizations from 151 countries. This index enables specialists to conduct fast comparisons among different countries and to follow the evolution of each country in time. Starting with 2006, the SSF determines this index once every two years. Our research aims to describe the calculation methodology and to analyze the evolution of this index as far as Romania is concerned. Also, we will include a European classification focusing on Romania's rank as compared to the other EU countries.

Key words: environmental indicator, sustainable development, Sustainable Society Index

Indicators were always governing defining statistical dimensions. Sustainable development indicators have been in use since the 1990s, subsequent to defining the concept of sustainable development and to establishing its fundamental principles. Since then, according to a report issued by the International Institute for Sustainable Development (IISD) of Canada, over 669 indicators were defined (Pintér and collaborators, 2005). The large number of examples proves the necessity of developing instruments for monitoring the sustainable development policies implementation, and for overcoming methodological difficulties. The present paperwork shall analyze the Sustainable Society Index (SSI), defined by the SSF in Holland, and calculated for 151 countries. That index was first defined back in 2006 for estimating the sustainability level of countries, integration important aspects regarding the quality of life and sustainability. It has been decided that the index should be estimated once every 2 years. So far it has been calculated for the years 2006, 2008 and 2010.

MATERIALS AND METHODS

The present paperwork is the result of investigating scientific literature and various reports concerning sustainable development published by international organizations. We've selected for analysis the Sustainable Society Index (SSI). We've analyzed the algorithm of calculating the indicators that make out the SSI, following its evolution in Romania and worldwide in the years 2006, 2008 and 2010. We've also taken into account how Romania relates to other EU countries.

RESULTS AND DISCUSSIONS

The SSI was initially calculated based on 22 indicators grouped in 5 categories. Due to the experience gained, suggestions received and the evolution of the world situation, the SSI suffered some changes (as emphasized on the SSF website, the decision of changing the indicators was also

due to the experience gained by carrying out the "Romania, Towards a Sustainable Society" project). Thus, in 2010, revisions have been made, as opposed to the 2006 and 2008 versions: 4 indicators were dropped for lack of available data, or due to the impossibility of frequent updating (for instance, the quality of terrains, waste recycling, material consumption, ecologic agriculture, savings, GDP). In 2010, the SSI was calculated based on 24 indicators grouped in 8 categories.

For each of the 24 indicators, a 0 to 10 scale score is being determined (0- lack of sustainability, 10- maximum sustainability), then they are being grouped in 8 categories (3 indicators per each sub-category), then regrouped in 3 categories (people's welfare, environmental welfare, and economic welfare), the end result being a composite index that illustrates the country's sustainability level. The score on each category is calculated as the average score for the indicators in that category, using the same ratio for every indicator. The method is justified by the fact that there is no scientific argument in support of the idea of assigning some indicators greater preponderance. In the 2010 version, all of the 8 sub-categories comprised 3 indicators, yet in the previous versions the number differed (3,5,6). The regrouping was due to criticism, pertaining to the idea that, even though more data had been used for calculation some indicators they should still have the same preponderance. Regrouping was done an attempt to eliminate possible flaws.

The SSI assesses the degree in which a person:

- may self-develop in a healthy fashion and have access to adequate education
- lives in a clean environment
- lives in a balanced, safe society
- utilizes conventional energy sources responsibly
- makes a contribution to a sustainable world [SSI, 2010]

Table 1 present the structure of the 2010 SSI, as well as the algorithm used for calculation each indicator.

Table 1

SSI 2010 – indicators and calculation algorithms

	Description	Source	Year	Formula	Value
Social welfare					
Basic needs					
1 Sufficient food	The overall percentage of underfe people	FAO	2005-2007	F(X)=(100-X)/10	0≤X≤100
2 Sufficient drinking water	Percentage of the overall population having access to drinking water	WHO - Unicef Joint Monitoring Programme	2008	F(X)=X/10	0≤X≤100
3 Proper sanitation services	The percentage of the overall population without access to proper sanitation services	WHO – Unicef Joint Monitoring Programme	2008	F(X)=X/10	0≤X≤100
Personal development					
4 Healthy lifestyle	Life expectancy expressed in healthy years	WHO and UN Population Division	2008	F(x) = ((X-20)/60)*10	20 ≤ x ≤ 80
5 Opportunity for education	The rate of subscribing to primary, secondary and higher education	UNESCO	2008 or MRYA	F(X)=X/10 F(X)=10	0≤X≤100 X>100
6 Equality of sexes	The equal opportunity index	World Economic Forum	2009 or MRYA	F(X) = X*10	0≤X≤1
A *balanced society*					
7 Good governance	The average value of the 6 indicators established by the World Bank for the act of governing	World Bank	2008	F(X)=((X+15)/30)*10	-15≤X≤+15
8 Income distribution	The country's ratio between the richest people revenue (10%) and the poorest (10%) people revenue	World Bank	2008 or MRYA	F(X)=exp(-0,1*(X-4,5))*10	4,5≤X≤168
9 Demographic growth	Mean annual demographic growth	UN Population Division	2008	F(X)=(1-(X+1,5)/6,5)*10	-1,5≤X≤5
I Environmental welfare					
A *healthy environment*					
10 Air quality (person)	The effects of air pollution on people	EPI, 2010	2007 or MRYA	F(X)=X/10	0≤X≤100
11 Air quality (nature)	The effects of air pollution on the nature	EPI, 2010	2006 or MRYA	F(X)=X/10	0≤X≤100
12 Quality of surface waters	The quality of surface water based on dissolved oxygen concentration, pH, electrical conductivity, nitrogen and phosphorus concentration	EPI, 2010	2008 or MRYA	F(X)=X/10	0≤X≤100

Energy and climate					
13 Renewable energy consumption	The percentage of renewable energy from the overall consumption	EA	2008	F(X)=X/10	0≤X≤100
14 Green house effect gasses emission	CO_2 emissions per capita	CDIAC and Millennium Indicators	2007	F(X)=10-X F(X)=0	0≤X≤10 X>10
15 Energy consumption	Energy consumption per capita	EA	2007	F(X)=(1-X/12000)*10 F(X)=0	X<12000 X≥12000
Natural resources					
16 The utilization of renewable water resources	The annual water consumption (m per capita) and the preponderance of renewable water resources	WRI, Aquastat	2000, 2007	F(X)=(100-X)/10 F(X)=0	0≤X≤100 X>100
17 The condition of forests	Changes in wooded areas at national level and the prevalence (‰) of wooded areas worldwide, for the period 2000-2010	FAO	2010	F(X)=(10*X+7)^2*((-20*X+19)/11)^3*10 F(X)=10	-0,65≤X≤0,4 X>0,4
18 Biodiversity	The number of endangered vertebrate species (% of the total number of species) as well as protected areas (% of the overall surface)	IUCN (threatened species), UNEP-WCMC (protected areas)	2009	Threatened species: $F(X_1)=10-0,5*X_1$ Protected areas: $F(X_2)= 0,5*X_2$ $F(X_2)=10$ $F(X)= (X_1+X_2)/2$	$0≤X_1≤20$ $0<X_2<20$ $X_2≥20$
Economic welfare					
Readiness for the future					
19 Consumption	The ecologic footprint minus the carbon dioxide footprint	Global Footprint Network	2007	F(X)=10-3*X*2/1,8 F(X)=0	0≤X≤3 X>3
20 Ecologic agriculture	Prevalence of ecological agriculture areas of the overall country's cultivated area	FiBL	2008	F(X)=0,5*X	0≤X≤20
21 Savings made	Percentage of savings of the overall GDP	World Bank	2008	F(X)=10*arctan(0,2*X)/π +5	-∞<X<+∞
Economy					
22 GDP	GDP per capita	IMF	2009	F(X)=10*(1,01-exp(-0,00007*X))	X>0
23 Employment	Percentage of unemployed of the overall labor force	CIA World Factbook, ILO and World Bank	1999-2009	F(X)=exp(-0,1*X)*10	X≥0
24 Public debt	Public debt percentage of the GDP	CIA World Factbook	2009	F(X)=exp(-0,009*X)*10	X≥0

Source: [SSF, 2011]

The source of data was very diverse and was based on trusted information. Data was not calculated unless an indicator or sufficient credible data was available for a country.

The 24 indicators values calculated for Romania and worldwide in 2010 are shown in Fig. 1.

In 2006, Romania ranked 49 with a score of 6.11, rising in 2008 to 22 by 6.7, and in 2010 entered the top 20, ranking in 19th place with a score of 6.7. Fig. 3 presents the evolution of SSI 2010 for Romania and worldwide, and in Fig. 4 the evolution of the 3 categories of indicators of well-being.

In 2010, at the EU-27 level, the first place was occupied by Sweden, with a 7.53 score, whereas the last place was occupied by Malta, with a 5.51 score. Romania was situated on the 15th place, alongside Britain (Fig. 4).

Romania has made good progress at the EU-27 level, advancing on the 25th place in 2006, on the 18th in 2008 and on the 15th in 2010. There were also preoccupations for calculating this index at the national level as well. In 2008, throughout the "Romania, Towards a Sustainable Society" project, the indicators for calculated the national SSI were determined, and in 2009, the SSI indicators for the 8 regions. Some indicators were not able to be determined due to lack of regional information. In fact, the experiences derived from this project by the people at the SSF provided grounds for modifying the SSI for 2010. after the decision of modifying the SSI was made, corrections were also made upon the previous versions, that of 2006 and that of 2008, so that to facilitate comparison making over time and between states.

For collecting all the necessary data, a national level workgroup was created in March 2010, as part of a project meant to establish a national set of indicators for monitoring the implementing of the National Sustainable Development Strategy, formed of experts from the Ministry of Forestry and the Environment, the National Agency for Environmental Protection and the National Statistics Institute.

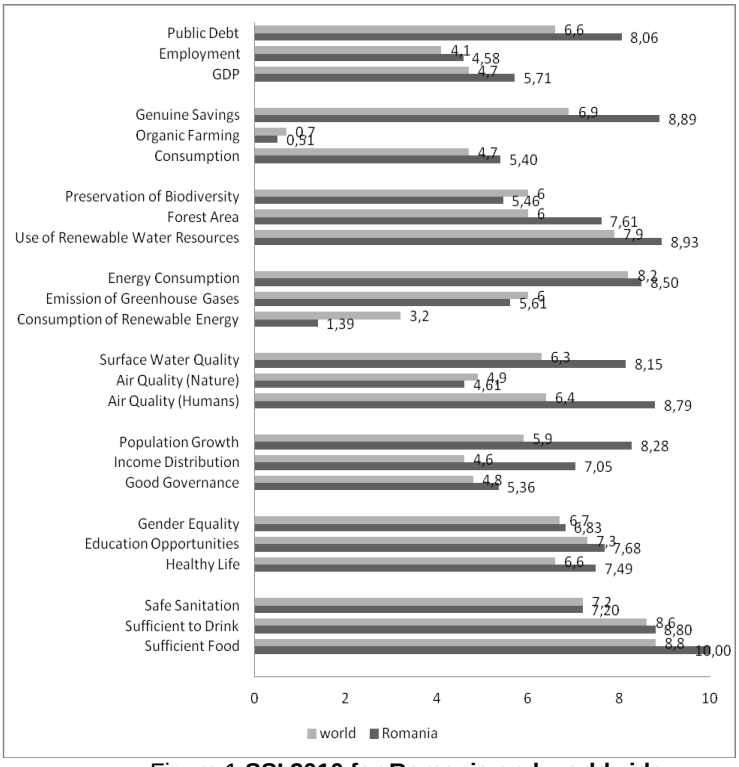

Figure 1 **SSI 2010 for Romania and worldwide**

Source: [SSF, 2010]

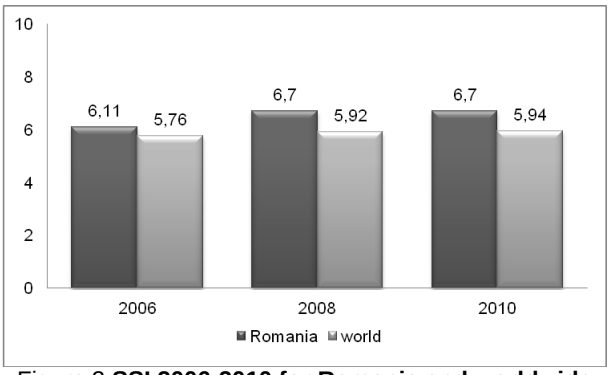

Figure 2 **SSI 2006-2010 for Romania and worldwide**

Source: [SSF, 2010]

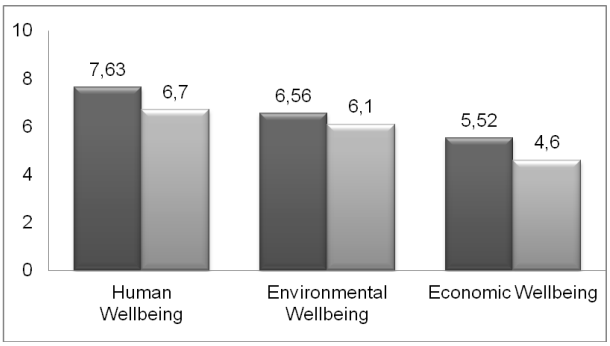

Figure 3 **The three SSI categories for Romania and worldwide in 2010**

Source: [SSF, 2010]

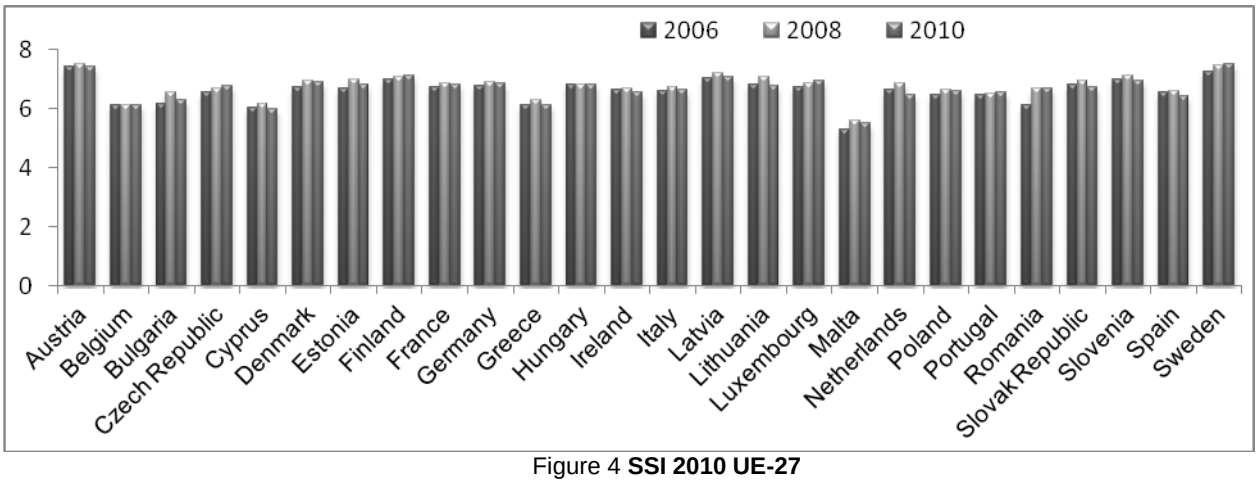

Figure 4 **SSI 2010 UE-27**

Source: [SSF, 2010]

Thus, the collection and processing of real data, quantified and periodically updated, cumulated in the form of sustainable development indicators, will allow the measurement of objective reaching performances [National Sustainable Development Strategy, 2008].

The [UN, 2007] indicators help decision-making and more efficient action taking by simplifying, clarifying, and offering cumulated information. Also, the indicators may help prevent economic, social and environmental failures, and constitute useful instruments for conveying values.

CONCLUSIONS

For developing a system of indicators that would contribute to monitoring sustainable development it is absolutely necessary that these be consensual and that they provide an accurate picture of the three aspects of sustainability: social, economic, and environmental.

The general trend is to create an index whose calculation is based on analyzing a large quantity of data, yet provide a picture of sustainability condensed in a single value. The SSI is such index, easy to use, event by non-experts, offering the picture of a country's sustainability in a single value. The index being calculated over several periods of time, it allows easily for comparison. Another argument for this index is its transparency, data being collected from various credible sources, easily accessible to those interested. Besides, the SSI index comprises both the people's welfare, and the environmental and economic welfare aspects. The fact is highlighted in the 2009 Stiglitz-Sen-Fitoussi report, which states that emphasis should be set on people's welfare, and not just on the economic aspects of well being, and that one cannot talk of welfare in the absence of sustainable development.

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