

Monitoring Sustainable Agricultural Development in Romania¹

Raluca Adreea ION²

Abstract

Sustainable development is a concern of governments and groups of countries around the world. The topic is on top agenda because the need for a coherent development strategy became imminent under global crisis conditions. The objectives of the work consist in identifying the level of sustainable development of agriculture in Romania, by quantifying the indicators developed by the European Union and those published by the United Nations. The main results show a slight progress in sustainable agricultural development of Romania, at least in those regarding the area under organic farming, which increased 8 times from 2000 to 2009.

Keywords: *sustainable development, organic agriculture, models of production and consumption.*

JEL classification: Q01, Q15

Introduction

Sustainable development is a challenge to contemporary society. It aims to continuously improve the quality of life and wellbeing, now and for future generations. In the current global crisis, which manifests itself in financial terms, food and climate change, is even more necessary to develop a strategy for future development.

The objectives of the paperwork are to identifying the level of sustainable development of agriculture in Romania, by quantifying the indicators issued by the European Union and by the United Nations. The paper answers the question: how sustainable is development of agriculture in Romania? To find the answer, statistical data were collected from FAOSTAT and EUROSTAT and papers of different authors have been reviewed.

Specialists argue for sustainable resource management (Bran et al, 2011)

¹ This work was cofinanced from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/89/1.5/S/56287 „Postdoctoral research programs at the forefront of excellence in Information Society technologies and developing products and innovative processes”, partner Bucharest Academy of Economic Studies – Research Centre for “Analysis and Regional Policies”.

² **Raluca Andreea ION**, Bucharest Academy of Economic Studies, Romania,
Phone/fax: +4 0213191900, E-mail: raluca.ion@eam.ase.ro

and draw attention to effects of global crisis and the need of a development strategy (Nastase et al, 2009). Economists have focused on viewing the economy and the environment as a single interlinked system with a unified valuation methodology (Dasgupta, 2007). Therefore, the strategy of development must be a strategy of sustainable development. According to Hasna Vancock, sustainability is a process of resolving the conflict between the various competing goals, and involves the simultaneous pursuit of economic prosperity, environmental quality and social equity, famously known as three dimensions (Hasna, 2007).

The goal of the National Sustainable Development Strategy of Romania is to connecting our country to a new development philosophy adopted by the European Union and widespread in the world - sustainable development. This strategy includes specific objectives for the transition to a new development model, able to generate high added value. It is based on the interest of knowledge and innovation and aims to continuously improve quality of life and human relationships in harmony with the natural environment (Ministry of Environment and Sustainable Development, 2008).

Romania, as EU member state, subscribes the EU sustainable development strategy. Sustainable development is a fundamental objective of the European Union, aimed at continuous improvement of quality of life and welfare for present and future by creating a link between economic development, environmental protection and social justice.

EU Sustainable Development Strategy 2006 (EU Council, 2006) presents a coherent and unified plan on how the EU will more effectively meet the challenges of sustainable development. Strategy reaffirms the general objective of continuous improvement of quality of life of citizens through sustainable communities and use resources efficiently managing their potential environmental and social innovation of the economy, ensuring prosperity, environmental protection and social cohesion.

1. Material and Method

1.1. Set of indicators of sustainable development issued by the European Union

Measuring progress towards sustainable development is part of the strategy and Eurostat has to draw up every two years a report based on monitoring the EU set of indicators of sustainable development. Eurostat has published three reports to monitoring the strategy: in 2005, 2007 and 2009. The latest report marks the progress on implementing the strategy and objectives of the main challenges.

Of more than 100 indicators measuring the progress towards sustainable development, eleven were identified as key indicators. They are intended to provide an overview regarding the EU progress towards sustainable development in terms of objectives set in the strategy (Table 1).

Table 1 The sustainable development indicators used by the European Union

NO.	TOPIC	INDICATOR
1	Socio-economic development	Growth rate of real GDP per capita
2	Climate changes and energy	Greenhouse gas emissions; Share of renewable energy in gross final energy consumption
3	Sustainable transport	Energy consumption of transport relative to GDP
4	Sustainable production and consumption	Resources productivity
5	Natural resources	Common bird index; Fish catches taken from stocks outside safe biological limits
6	Public health	Healthy life years and life expectancy at birth, by gender
7	Social inclusion, demography and migration	People at-risk-of-poverty or social exclusion
8	Demographical changes	Employment rate of older workers
9	Global partnerships	Official development assistance as share of gross national income
10	Good governance	-

Source: Sustainable development strategy of EU, reviewed, EU Council, Bruxelles, 2006, 10117/06

Under the topic of this research, the theme of sustainable production and consumption with resource productivity indicator must be highlighted. It comprises four operational objectives and targets, and it contains a number of actions and explanatory variables (Table 2).

For the topic under research, the following indicators will be estimated:

- consumption of certain foodstuffs per inhabitant
- ecolabel licenses
- area under agri-environmental commitment
- area under organic farming
- livestock density index

Per capita food consumption belongs to the category of indicators that measure and analyze consumption patterns. It presents food for human consumption, for the main groups (cereals, meat and fish).

Table 2 Objectives and operational targets and actions/explanatory variables of the resource productivity indicator

OBJECTIVES AND OPERATIONAL TARGETS	ACTIONS/EXPLANATORY VARIABLES
Resources use and waste Non-mineral waste generation	Components of domestic material consumption
	Domestic material consumption by material
	Municipal waste generation and treatment, by type of treatment method
	Generation of hazardous waste, by economic activity

OBJECTIVES AND OPERATIONAL TARGETS	ACTIONS/EXPLANATORY VARIABLES
	Emissions of sulphur oxides (SO _x), by source sector
	Emissions of nitrogen oxides (NO _x), by source sector
	Emissions of non-methane volatile organic compounds (NMVOC), by source sector
	Emissions of ammonia (NH ₃), by source sector
Consumption patterns Consumption of electricity of households	Final energy consumption by sector
	<i>Consumption of certain foodstuffs per inhabitant</i>
	Motorization rate
Production patterns Organizations with EMAS (Eco-Management and Audit Scheme)	<i>Ecolabel licenses</i>
	<i>Area under agri-environmental commitment</i>
	<i>Area under organic farming</i>
	<i>Livestock density index</i>
Contextual indicators	Number of persons in households
	Final consumption expenditure of households, by consumption purpose

Source: Sustainable development strategy of EU, reviewed, EU Council, Bruxelles, 2006, 10117/06

The next group of indicators captures the production models. EMAS registration organizations (Eco-Management and Audit Scheme) measure the number of organizations that have implemented voluntary environmental management system Eco-Management and Audit Scheme (EMAS). Indicators belonging to the group "production models" are Ecolabeling licenses, land area under the environmental measures, the area of land under organic farming and livestock density index.

Ecolabel licenses indicator measures the total number of products having the organic certification, in all the EU Member States.

Area of land subject to environmental measures is calculated as a percentage of total utilized agricultural area. Data on land area subject to environmental measures include contracts signed in accordance with Regulation (EEC) No 1257/1999 on support for rural development from the European Agricultural Guidance and Guarantee Fund.

The UAA is considered arable land, pasture and permanent crops, and kitchen gardens. Unused agricultural land, forest land and other land (occupied by buildings, farms, etc.) are excluded.

The area of land under organic farming is calculated as a percentage of total utilized agricultural area. It highlights including the area which is under conversion. Livestock density is calculated as the number of animals per hectare (total area taking into account agricultural use).

It is an aggregate indicator, including various livestock of different species and ages.

1.2. The set of indicators for Sustainable Development developed the United Nations

The first two sets of sustainable development indicators developed the UN have been tested and continually improved, in the period 1994-2001, in many countries and they were published in the prestigious "blue card" (United Nations, 2006). The indicators are grouped according to four dimensions: social, environmental, economic and institutional. Environmental dimension includes, among others, agriculture, with sub-themes: arable and permanent crops, use of fertilizers and pesticides in agriculture.

Last version of the set of indicators can be found in Guidance of indicators on sustainable development issued by the UN in 2007 (United Nations, 2007). The topic of agriculture includes, in the new formula, the following indicators: arable and permanent crops, fertilizer use, pesticide use in agriculture and area of land under organic farming.

2. Results and discussions

To gain an insight into the level of sustainable development, indicators are calculated for Romania, compared with the European Union, in dynamic: 2000 and 2010 (Table 3).

Table 3 Patterns of agro-food consumption and production in the European Union and Romania, in 2000 and 2010

Objectives and operational targets	Actions/explanatory variables	MU	2000		2010	
			EU15	Romania	EU27	Romania
Consumption patterns	Consumption of certain foodstuffs per inhabitant*, of which:		-			
	▪ cereals	kg/cap	123	189.7	125	180
	▪ meat	kg/cap	85.3	48	86.2	63.2
	▪ fish	kg/cap	21	2.6	22	5.3
Production patterns Organizations with EMAS (Eco-Management and Audit Scheme)	Ecolabel licenses	no.	49	-	1067	4
	Area of land under environment condition	%	-	-	21.4	11.6
	Area of land under organic farming, including conversion**	% ha	3.1 3955504	0.12 17388	3.4 6161000	1 140132
	Index of livestock density	heads/ha	na	na	0.78***	0.43***

Source: Eurostat, * FAOSTAT 2000 and 2007, ** An analysis of the EU organic sector, European Commission, Agricultural and Rural Development, 2010, ***2007

Romania has food patterns based on grain and, in general, products of plant origin. Average consumption of cereals is 180 kg/person, compared to 123 kg/person - the EU average. Average consumption of meat and fish in the EU is higher than in Romania: 86.2 kg of meat and 22 kg of fish, compared with 63.2 kg of meat, fish 5.3 kg respectively.

In terms of environmental management systems in 2007, Germany, Spain, Italy and Austria held 87% of the total number of registrations in the EU15 (representing 86.4% of the total number of registrations in the EU27). In 2008, 80% of the EU15 EMAS certification organizations were part of two Member States: Germany (71%) and Austria (8.8%). In 2007, 87.9% came from four Member States (Germany 38.1%, Spain 23.6%, Italy 19.7% and Austria 6.6%). In 2007, the number of EMAS registration organizations belonging to the new Member States is marginal (European Commission, 2010).

The number of certified eco-labels products increased between 2000 and 2010 from 49 (in EU15) in 1067 (EU27). Eco-labels are signs of companies voluntarily adopted, aimed at informing consumers that the products are obtained in compliance with certain environmental conditions. In 1996 there were only six certified products, their number increasing to 458 in 2007, in the EU15. Half of eco-labels products belong to Italy and France.

At the end of 2009, accommodation services represented 42% of total. These are followed by cleaning products (25%), textiles and interior and exterior paints, by 10%. Italy has the largest number of eco-labelled products, representing 33% of EU27. France ranks second with 18% of the total number of eco-labels. Other three Member States: Bulgaria, Lithuania and Luxembourg do not have any products with environmental labels (European Commission, 2010).

Eco-label products have a reduced market share. Although sales of these products reached in 2008, the amount of 800 million euros, however, in relative terms, market share is reduced. One reason is that people do not know what eco-label is. A survey conducted in 2006 shows that 48% of Europeans do not know what the Ecolabel logo represents and only 11% of people recognised the label as a sign for the ecological products and services.

Area of land subject to environmental conditions in Romania is 1594532 hectares, representing 4.2% of the total area of land subject to environmental conditions in the EU27. The most extensive areas are found in Germany - 8.9 million ha, France - 8.1 million ha and Finland - 5 million hectares. In Romania, the share of area subject to environmental measures is 11.6%, half the EU average (21%).

The share of organic farming in the utilized agricultural area in EU15 increased from 3% to 4.7% and in Romania from 0.12% to 1%, in 2000-2007.

At Member State level, in the same period, the most significant increases occurred in Greece (885%), Portugal (458%), Luxembourg (200%) and Spain (167%).

Austria ranks first in EU in terms of percentage of land surface that organic farming is practiced in the utilized agricultural area: 11.7% in 2007, followed by

Sweden with 9.9%, Latvia with 9.8%, Italy with 8%. In general, organic agriculture has increased in all Member States except Denmark (-13.3%), Finland (-1.5%) and Hungary (-7.4%).

Livestock density decreased in the period 2003-2007 to 4.9% (-1.2% per year), reaching 0.78 head per hectare. In the EU15, the number of animals per hectare decreased from 0.92 to 0.88 in 2000-2007, representing an average reduction of 0.6% per year.

There are big differences between Member States regarding the latter indicator, which is comprised between 0.3 heads/ha, in Latvia, and 4.8 head/ha in Malta. In addition, grazing is practiced in many regions and the number of animals per hectare is low.

In Romania, the livestock density per hectare is 0.43 heads, showing a lower level of intensiveness of agricultural activities, compared to other Member States.

Table 4 Quantifying agricultural sustainable development indicators developed by the UN, Romania, in 2000 and 2009

Indicator	MU	2000	2009	2009/2000 (%)
Arable land and permanent crops, of which:	thou ha	9908	9151	92.3
▪ area under cereals	thou ha	5643	5265	93.3
Consumption of fertilizers:		-		
▪ nitrogen	tons	239071*	296055	123.8
▪ phosphorus		72996*	100546	137.7
▪ potassium		14056*	29606	210.6
Consumption of pesticides:		-		
▪ insecticides	tons	1239	1046	84.4
▪ herbicides		3870	3426	88.5
▪ fungicides		4318	2076	48
Area under organic farming**	ha	17388	140132	806

Source: FAOSTAT, 2011, *2002, ** including area under conversion

To have a detailed picture of sustainable agriculture in Romania, sustainable development indicators developed by the UN are quantified in Table 4.

The arable land and the cultivation of grain fell in the period 2000-2009, reaching levels of 92% and, respectively 93%.

Chemicals used reflected different trends: increased use of chemical fertilizers, while pesticide use has decreased. These trends have different impact on the economy and the environment. Increased consumption of chemical fertilizers leads to higher yields per hectare, but have negative effects on the environment by polluting its composition: the soil.

Reducing pesticide use leads to lower productions, but affects a lesser extent the environment. The area under organic farming increased, reaching 806%.

Conclusions

In conclusion, indicators show a slight progress in sustainable development of agriculture, at least in terms of area of land under organic farming, which increases by 8 times from 2000 to 2009. Some indicators have contradictory effects: the consumption of pesticides decreased, while consumption of chemical fertilizers increased. Lack of necessary statistical data quantifying sustainable development of agriculture limits, however, drawing relevant conclusions. Further research should focus on forecasting indicators for the following period for identifying the trend of agricultural development in Romania.

References

1. Bran, M. Paicu, C.E. & Dobre, I. (2011) "The Management of Regional Biodiversity – Forest Potential", *Review of International Comparative Management*, 12(2), 282-292
2. Dasgupta, P. (2007). "The idea of sustainable development", *Sustainability Science*, 2(1), 5-11
3. Hasna, A. M. (2007). "Dimensions of sustainability", *Journal of Engineering for Sustainable Development: Energy, Environment, and Health*, 2(1): 47–57
4. Manole, V. Stoian, M. & Ion, R.A. (2003). *Agromarketing*, ASE Publishing House, Bucharest
5. Nastase, M., Cretu, A. & Stanef, R. (2009). *Effects of Global Financial Crisis*, *Review of International Comparative Management*, 10(4), 691-699
6. Nastase, M., Radu, C., Tapurica, O. & Tache, F. (2010). "Methodological issues concerning the development of sustainable industrial parks", *Economia. Seria Management*, 13(2), 485-494
7. Ministry of Environment and Sustainable Development. (2008). *National Strategy of Sustainable Development of Romania*
8. European Union Council. (2006). *Strategy of Sustainable Development of the European Union*, Bruxelles.
9. United Nations. (1996). *Indicators of Sustainable Development Framework and Methodologies*. United Nations Sales Publication No. E.96.II.A.16, New York.
10. United Nation. (2007). *Indicators of Sustainable Development: Guidelines and Methodologies — Third Edition*
11. EUROSTAT, European Commission. (2010). *Sustainable Development in the EU. The 2009 monitoring report of the EU sustainable development strategy*
12. European Commision, Agricultural and Rural Development. (2010). *An analysis of the EU organic sector*.