

Agriculture, Environment and Sustainable Development of Rural Areas

Cristian - Marian Barbu

Faculty of Management-Marketing, Artifex University, 47 Economu Cezarescu Street,
Bucharest, Romania

E-mail: barbu_cristianmarian@yahoo.com

Sorinel Căpușneanu

Faculty of Finance and Accounting, Artifex University, 47 Economu Cezarescu Street, Bucharest,
Romania

E-mail: sorinelcapusneanu@gmail.com

Abstract

To make a balanced assessment of the agricultural progress towards sustainable development, the social, environment and economical factors that characterize the sustainability should be identified and examined in detail. Sustainable agriculture should aim at branch resources management in order to meet human needs, both present and future, by maintaining and improving at the same time the quality of the environment and by protecting natural resources. Among the many tasks that the agricultural science and practice face, significant importance is attached to the development of measures whose application should use energy efficiently and rationally, the adoption of techniques to ensure the continued recirculation of elements and materials, avoidance of both short and long term adverse effects of the damaging of agricultural land as a result of erosion and pollution and the promotion of agricultural systems correlated with certain food chains, that should ensure a rational, sufficient and balanced diet.

Keywords

Sustainable agriculture, rural space, environment, agricultural exploitation, indicators

The Concept Of Sustainable Agricultural Development

Although sustainability, sustainable agriculture and sustainable agricultural systems have been defined several times at various levels, it is not advisable that we should impose a rigid definition of sustainable agriculture since countries and areas within countries work in different social, economic and ecological contexts. This remark should be kept in mind since it links nature to the development process and it highlights two significant aspects: the regional and the local aspect, meaning the specific area where the country lies, the group of countries to which the respective country belongs (advanced countries or countries under development) and the time-related aspect, meaning the stage reached by the economic development and the economic vulnerability. Following the imbalance of the

development factors, the structural adjustment policies and the long term objectives are based on these two aspects.

According to Conway cited by Sumelius, the performance of an agro-ecosystem can be defined by four elements: *productivity* – the ratio between the output and the input resource unit (expressed by profit, by the income per hectare, by the total household or by the regional production etc); *stability* – stable productivity of the agro-ecosystem maintained when facing obstacles in the normal cycles and fluctuations of the environment; stability can be measured, for instance, by the productivity variation parameter over a certain time; *durability* – defined as the ability of an agro-ecosystem to preserve its productivity when facing stress or shocks; stress is defined as predictable deviating forces of low importance but rather frequent and having a high cumulative effect (e.g.: salinity, land erosion, pollution, low market demand etc); the shock can be defined as an unpredictable, rare force of high importance and having an immediate effect (e.g.: draught, floods, new diseases, high input prices etc); *equitability* – a unified distribution of the productivity of the agro-ecosystem between the beneficiaries.

Apart from the protection of the environment, all definitions of sustainable agriculture shall include the human dimension with its two key components: farmers (some of them already make use of advanced technologies to perform sustainable agriculture and others will do sustainable agriculture unless it can be done without significant loss and if they have access to information and technologies typical of this kind of agriculture) and consumers (whose demand in ecological food products is admitted by all parties involved; they shall be informed about the overall costs of the agricultural products produced with intensive agriculture, given the absence on the market of accurate values that may reveal the hidden ecological costs). Regarding the human dimension, special attention shall be paid to marketing systems that may highly encourage or discourage sustainable agriculture. Achieving a sustainable agriculture is a long term process and, in addition, it is very difficult to achieve it since there are many contradictions and obstacles preventing the implementation of specific practices and technologies. The information exchanged between consumers and productions is often hidden; consequently, farmers respond to signals of prices that do not fully reflect social costs of the natural resources. In many countries, the result has been the apparition of an agricultural community lacking the flexibility needed to positively respond to various agricultural technologies.

Since it is a concept with a broad definition, the main dimensions of the sustainable agriculture are: the time-related dimension, implying continuous protection and conservation of the land throughout the centuries, aiming at long term objectives; social sustainability – it is considered that the family farm and the traditional rural community shall last in time, despite changes of the agricultural economy; economic sustainability – it is considered that agriculture shall stay viable from the economic point of view, in the long run; focus is placed on the biological agriculture and diversification; land conservation and conservation of the genetic resources (a diversified gene bank appears as a necessary „buffer” in order to ensure long term survival); lower pollution of the environment; modification of the ratio man/land area triggers an increased demand in clean water and fewer chemical substances in the environment; reduction

of industrial input (fertilizers, pesticides etc); a long term sustainable agricultural growth (the best way to meet human needs in terms of food and fibers).

Sustainable Agriculture In Romania

In our opinion, sustainable agriculture in Romania is not easy to achieve. Firstly, because the issue as such is highly complicated; the socio-economic system is not very stable and there are many random variables of the projection. Secondly, because it starts in the matrix of a transition taking place at a moment of crisis; no matter how well it may be designed, therefore, it will bear the general mark of the transition. Admitting these predictable difficulties does not necessarily mean rejecting the need and the possibility to achieve a sustainable agriculture in Romania. It is actually the only chance able to concentrate the thinking and the actions of the country, efforts made to achieve a modern, highly productive agriculture.

The experience of the developed countries shows that sustainable agriculture is an extremely complex process. These countries reached sustainable agriculture after long and difficult efforts, at the end of the 20th century; efforts that implied decades of tests and improvement, and successive investments, aided by the forces of the market. Only by going beyond this threshold of material efforts and by bringing the production factors to a balance it has been possible to achieve large and consistent productions, efficiency and competitiveness, enough food and significant amounts for export.

In the case of our country, the concept of sustainable agriculture must meet the following features: to ensure long term agricultural production and to improve the quality of the agricultural production; to enhance the supply of the population and economy with agricultural products and food products with high nutritional ingredients, clean, compliant with international standards; to train economic agents able to achieve performance. This implies an economic surplus, needed to shape the capital required in order to increase and to modernize production, able to give life to agricultural companies and consequently, to agriculture in general; to develop agriculture and to ensure agricultural employees incomes comparable with other economic sectors and, therefore, to improve the level of civilization and culture in the rural areas. The economic gap between the agricultural employees and the employees of other sectors is immoral and defying, and it is also an obstacle preventing economic growth and the general social progress of the country; given the Romanian context of the post-EU accession, the adoption and promotion of convergent policies in compliance with the *acquis communautaire* is required so that the mutual economic flows should ensure stability and the overall economic balance; to preserve and ensure reproduction of the agricultural natural resources potential, especially the soil fertility which is the biggest wealth of a country; to achieve an agriculture that is "friendly to the nature", by combining economic growth with ecology in a harmonious system that gives new dimensions to the quality of life; openness to foreign environment; enhanced international inter-dependencies, and Romania's accession to Euro-Atlantic forms of integration, impose agriculture to connect its growth to the foreign environment (regional, European and global) in order to receive stimulating signals; however, it may also receive risk and instability.

This is the concrete concept that we believe Romania needs in order to develop its agriculture; however, translating this concept into practice – sustainable agriculture – is not easy. It requires time, a vast investment and restructuring program as well as specific policies for each component. Although agriculture is the main factor in rural development in most rural areas, it does not follow that rural development resides only in agricultural development. The future of rural areas does not entirely depend on agriculture; a new economic architecture of the rural space is, therefore, needed.

Sustainable Development In The Rural Space

The issue of rural development and management is one of the most sophisticated issues of modern society; it implies a balance between the conservation needs of the rural areas from economic, ecologic, social and cultural point of view, on the one hand, and the modernizing tendency of the rural life, on the other hand. For many countries across the world, among which Romania, the rural space is the most valuable asset of the national culture and civilization, and an infinite resource of historical spirituality and perennial dimension. According to Melinda Căndea and Florina Bran, „the rural area is the expression of the long term effort of man to make the physical and geographical components of the space, of nature, his servants. It is a space that man shaped according to his needs, a space created through his work and filled with his anthropic creations; it is, therefore, a rustic masterpiece of man”. Given this context, the conclusion is, obviously, that all generations that live in the rural area, with its elements that are extremely valuable for health and human comfort – water, air, forests, landscape – and especially, the population of this area, must be continuously looked after and monitored by human society in general and by every and each individual, that is permanent preservation and protection must be ensured. Undoubtedly, in order to fulfill this objective that should be always considered as a national interest, the politics of national parliaments and governments has a major role.

Modernization of agriculture and rural areas cannot be limited to a single dimension but it should be a complex process, extended to all economic and social structures. Most important in Romania’s stage of post-accession to the EU is the effort to turn the comparative advantage into a competitive advantage. Romanian agriculture has the comparative advantage of natural resources, favoring high yields, and has cheap workforce in rural areas, but it gets a low level of agricultural productivity and has not enough financial resources to modernize agricultural and rural activities. These are the pre-requisites to continue the process of reform at the EU post-accession stage. The integration strategy cannot ensure the ability to overcome obstacles preventing medium term advantages unless the comparative advantages possessed are used and unless we follow the path of accelerated modernization of agricultural structures harmonized with the 21st century structures. To achieve this objective, we definitely need a long term strategy because in agriculture, the yield of investments requires long term approaches. In our country, agriculture and agricultural activities, irrespective of their type, must follow the global agricultural tendencies in order to efficiently and competitively produce, among these approaches, the most important is to shift the focus from the traditional elements

– land, work and capital – to the ability to use these classical elements with most efficiency. Although Romania ranks the 7th in the EU after France, Spain, Germany, Great Britain, Poland and Italy in terms of agricultural land used, there are significant discrepancies in terms of the weight of agriculture in the GDP between Romania and the EU member states, and between the incomes of the farmers, their living standards, the investment possibilities, the development prospects for agriculture. About 30% of the EU populations live in the rural area but only 4-5% of the active population work in agriculture which means that most adults living in rural areas do not earn their living by working the land. Moreover, the weight of agriculture in the EU GDP is only 1.5 - 2%. In Romania, 45% of the population lives in the rural areas; out of the 9.2 millions active persons, 45% are active in the rural area and about 28% are active in agriculture out of which more than a million are unpaid family workers. The weight of agriculture in the GDP is 6-7% in Romanian as against other EU countries, like Poland and Hungary which have 4%.

The Romanian export of agricultural products basically consisted of raw products with low added value and import consisted mainly of processed products; which proves that the weak point of our agricultural and food economic sectors and of our weak reform has been the poor processing of raw agricultural materials by the food industry.

The lack of a coherent and realistic strategy caused the failure of the Romanian agriculture. Romanian agriculture remained stuck in a past century and it is rather laughable at than “sustainable”. A vicious circle appeared in the rural area in which poverty entails poverty. Most private farmers are poor and because they are poor, they isolated themselves away from modern economy that generates progress, to do a primitive agriculture that hardly ensures subsistence. Since less than 8% of the population active in agriculture is under 35, given the excessive fragmentation of the agricultural land (there are about 3.9 million farms), which caused more in-house consumption and, implicitly, low profitability, the big farms of over 100 ha represent only 1% of the total of farms that own more than 1 hectare, and since most farms cultivate cereals which have the lowest productivity in the EU (table 1), it is hard to imagine that Romania could soon meet the food needs of its own citizens.

Table 1. Cereal production per hectare in Romania, as against other European countries

Country	Period	Average of the years (kg/ha)	Gaps as against Romania	
			Absolute (Kg/ha)	Relative (Romania = 1)
Romania	1999-2001	2,678	0	1.00
	2007-2009	2,453	0	1.00
Belgium	1999-2001	8,244	+5,566	3.08
	2007-	9,350	+6,897	3.81

	2009			
Ireland	1999-2001	7,062	+4,384	2.63
	2007-2009	8,320	+5,867	3.39
France	1999-2001	7,082	+4,404	2.64
	2007-2009	7,197	+4,744	2.93
United Kingdom	1999-2001	6,850	+4,172	2.56
	2007-2009	7,810	+5,357	3.18
Germany	1999-2001	6,737	+4,059	2.52
	2007-2009	7,620	+5,167	3.11
Denmark	1999-2001	6,114	+3,436	2.28
	2007-2009	7,487	+5,034	3.05
Austria	1999-2001	5,732	+3,054	2.14
	2007-2009	5,133	+2,680	2.09
Sweden	1999-2001	4,537	+1,859	1.69
	2007-2009	6,153	+3,700	2.51
Italy	1999-2001	4,895	+2,217	1.83
	2007-2009	3,603	+1,150	1.47
Greece	1999-2001	3,266	+588	1.22
	2007-2009	2,597	+144	1.06
Finland	1999-2001	3,076	+398	1.15
	2007-2009	3,853	+1,400	1.57
Spain	1999-2001	2,966	+288	1.11

	2007-2009	3,193	+740	1.30
Portugal	1999-2001	2,558	-120	0.96
	2007-2009	1,947	-506	0.79

Source: *Our own calculation for 1999-2001, based on the Romanian Statistic Annuary, INS, 2003 and the Czech, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian and Slovenian Agriculture in Comparison with EU Countries, table no 4.1.1.4., IERIGZ, Poland, Warsaw, 2003; our own calculation based on Eurostat for 2007-2009.*

This archaic production means has led to only one result: perpetuation of the poverty. Because of the poverty, rural markets are weak: there are very few those who buy raw materials to do modern agriculture, and also a few those who sell agricultural products. The Romanian village does do perform transition towards the market economy but remains stuck in the natural economy of subsistence because there are very few those who either sell or buy; there is few business in industry, trade or services. We need a rural development strategy to solve these issues.

The advanced countries have significantly reduced – both in absolute and relative values – the workforce in agriculture and laced the workforce in services for agriculture or in other sectors of activity; regarding the land, these countries have special programmes to temporarily remove this arable land from crop-producing programmes. In terms of increased output per hectare and per animal, with a production meeting the needs of the consumption of the Romanian population (to ensure food needs) and the export demands, Romania shall have to place itself close to the other EU countries from the point of view of competitiveness. We possess an advantage against the other EU countries: their high average agricultural yields will not necessarily cause agricultural growth in the future because of the surplus and because of the measures to limit production. Increased economic, social and ecologic efficiency in agriculture in our country, optimal use of natural and human resources, in particular of the labour and of the land, require promotion of qualitative factors among which: knowledge – as an infinite resource of development; management and managerial culture; technology innovation; high performance technologies; implementation of IT technologies.

The development of agriculture correlated with a set of measures to diversify economic activities in the rural area, an increased number of ecological farms, extension of ecological food production and development of agro-tourism are ways to get competitive advantage. Agriculture is, by its nature, multifunctional: it produces food raw materials or recyclable industrial materials and, at the same time, it plays a role in the management of nature (water, land, bio-diversity, air); it contributes to landscape, basic elements of life and efforts to develop land based on the quality of the land; last but not least, it plays a social role in the dynamics of the rural area. Romania must promote a multi-functional agriculture with dominant influence in

the rural area and the Romanian village must develop and modernize through diversification of the economic and social life that must help the village come out of the isolation dictated by the poverty of the villagers.

Sustainable development of agriculture and of rural communities, in compliance with the EU programmes, is a long term process that will be achieved, depending on the various local conditions, by taking the following measures:

- Enhanced agricultural production through adjustment to specific area conditions; the structure of the agricultural production shall aim at strengthening of the rural economy by using the natural potential, favorable conditions, meeting the consumer needs of the population and by creating export capabilities. In order to do this, we need to act in the sense of developing competitive environment, shaping and developing specific markets through a flexible price system, fiscal system and loan system, compatible with the EU agricultural policies;

- Increased work time for the population employed in agriculture by ensuring multiple functions to agricultural activities, by developing non-agricultural activities and services (crafts, handicraft industry, household industry, agro-business, agro-tourism) in order to increase income and economic power of the rural communities;

- Direct aid to agricultural producers with low incomes in order to counteract the tendencies to de-populate communities, to stabilize the young generations in the rural areas and to create viable agricultural exploitations;

- Creation of an insurance system of the agricultural producers that should include insurance for persons, products and assets and real estates;

- Creation of a social protection system for children, elderly, disabled and people who have professional diseases;

- Development of economic and social infrastructure;

- Environmental protection (agricultural technologies that are friendly with the environment; re-considering the land in compliance with their productive capabilities and measures taken in order to ensure land development etc);

- Aid to unfavoured areas, including the mountain areas, by preserving the economic and cultural traditions;

- Specific training and consulting provided to the private agricultural producers to enable them to pass to the new model of commercial farm and to operate on a competition market;

- Promotion of professional and inter-professional associations of agricultural producers, depending on their products;

- Promotion of ecological agricultural structures and brand agricultural products.

-

Agro-Environment Indicators

Although important progress has been incurred at the European level to identify indicators to characterize sustainable development, there is no such agreed indicator system at national level that should be the starting point in assessing the potential of agricultural sustainable development, by correlating them with the requirements to preserve and protect the

environment, that should allow better transparency, quantification and monitoring, oversight and evaluation of global aspects related to the implementation of agricultural policies. Agriculture, like any other human activity, can negatively affect the environment, both locally and globally. For a better description of the relationships between human activities and the environment, OECD and later on, EEA (the European Agency for Environment) worked together to devise a conceptual model/framework entitled DPSIR (Driving forces, Pressures, State, Impacts, Responses). This model has been adopted by most EU member states and international organizations that work with environmental information (Eurostat, EEA). The development of the DPSIR model, whose main objective was to understand interactions between economy and the environment, is a general framework to organize information about the environment based on the cause-effect relation of interactions between the components of the social, economic and environmental systems. The DPSIR model defines 5 categories of indicators: the command forces – basic factors that influence a whole range of major variables (ex. Tendencies of major sectors: energy, transport, industry, agriculture, tourism, etc.); the pressure indicators – describe the variables that directly affect the environment (ex. CO₂ or methane emissions, noise); the status indicators – describe the parameters of the environment at a certain moment (ex. Concentration of lead in urban areas, level of noise along the main roads, quality of water in rivers and lakes); the impact indicators – describe the effects of the changing of the environmental status upon the factors it interacts with; the response indicators – describe the efforts of society (politician, decision-makers) to solve problems (ex. Taxes on energy, budget spent on solar energy research).

In the agricultural sector, given the importance of the issues deriving from the relation agriculture-environment for the political decision-makers, these issues can be defined as „driving forces“: management of the agricultural activities and agricultural practices.

Given the issues related to the assessment of the aspects regarding the interaction between agricultural practices and the environment, continuous efforts are made at the European level to select a set of indicators that should allow assessment of the factors that influence the agricultural production and also affect the environment. A harmonized system of agro-environmental indicators allowing characterization of the relation between these two components may give transparency to the debates regarding the agricultural policies by limiting, at the same time, potential controversies regarding the relevance of the information. A basic requirement in devising and maintaining a system of indicators is to ensure comparability in time and space, both at national and international levels.

The data can be available, in general, at a higher level of aggregation (national and regional) and it can be included in the harmonized system of indicators of pressure upon the environment. The indicators taken into account fall in the following three main categories: a) Indicators to assess the use of land: the weight of the irrigated area out of the total Used Agricultural Area (UAA), irrigations are the main use of agricultural water; the average production per hectare for the main crops, indicate the intensity of the agricultural systems implemented; the weight, out of the total agricultural activities, of cereals crops higher than 50% of the total Used Agricultural Area provides information about the level of specialization of

the agricultural production systems implemented; the weight of the areas covered with natural pastures out of the total Used Agricultural Area (UAA), indicates the agricultural production systems implemented; density of the animal rearing reflects the concentration of the animal production at the regional level. b) Indicators regarding fertilizers – organic and inorganic fertilizers: nitrogen input from animal dejections; indicators reflecting problems related to azoth pollution, closely related to animal production systems where there is a surplus of azoth resulting from animal dejections; indicate the “hot” areas that concentrate animal rearing activities and areas where the nitrates levels go above the level admitted by the EU Directive regarding the nitrates; the azoth surplus, identifies the azoth flows in the agricultural system and allows selecting the options to improve the efficiency in the azoth use; indicates the areas where azoth is used in excess, comparatively with the volume needed for the vegetal production. c) Indicators regarding pesticides: data regarding the direct use of pesticides, per category, allow obtaining information about the area treated, the dose, how frequent for each type of relevant pesticide, all relevant crops; data regarding sales, per category of pesticide, allow indirect measurement of the active ingredient; cost of pesticides, per crop, total cost of pesticides for a crop shows the relative amount of pesticides used.

Currently, the efforts of international bodies shift from the conceptualization of the indicator towards the obtaining of the practical indicators devised. From this point of view, it is crucial to identify to what extent the information needed is available.

The relevant indicators are those regarding the management of the agricultural activities. These indicators can be obtained through Agricultural Structural Investigations, planned to take place every 2-3 years during the inter-census periods of time. While some of these indicators can be already computed from the data obtained from the general agricultural census, most indicators can be obtained only after periodical investigations, through specific enquiries.

Conclusions

In order to perform a balanced assessment of the progress incurred by agriculture on its path to sustainable development, we must identify and analyze in detail all social, environmental and economic factors characterizing sustainability. This requires identification and monitoring of the factors that influence the sustainable development of agriculture. In order to devise a strategy appropriate for this field, we need know the trend of individual indicators that are specific for the sustainable development of agriculture; these indicators must be carefully analyzed and interpreted in order to draw conclusions regarding the stage and the trends of sustainability in this field of activity.

Restructuring of agriculture and rural development in compliance with sustainable principles must be done against the future foreseen evolution of the agricultural EU policy as Romania is a EU member. Initiating a sustainable development strategy for agriculture implies knowing and anticipating the problems and the opportunities that may arise on long term.

In order to maintain competitiveness on the global market, we need create the best market conditions that should allow farmers to promote sustainable development of agriculture and remove all contradictions that may arise from inequities of globalization. Romania, as a EU member state, apart from its domestic requirements related to the development of a competitive agriculture, must comply with the sustainability requirements related to the rural areas and agriculture in order to have access and maintain its position on a global, competitive market.

References

- Barbu, C.M. (2011). The Romanian agriculture – between myth and reality, *Annales Universitatis Apulensis review, Series Oeconomica, no 13, volume 2*, pp. 485 - 496.
- Barbu, C.M. et al. (2006). *Politici și strategii în susținerea agriculturii prin mecanismul plăților directe din bugetul comunitar*, Artifex Publishing House, Bucharest.
- Barbu, C.M. (2005). *Posibile politici de susținere a dezvoltării durabile a agriculturii și a spațiului rural în România*, Matrix Rom Publishing House, Bucharest.
- Byerlee, D., de Janvry, A., Sadoulet, E., (2009). Agriculture for Development: Toward a New Paradigm, *Annual Review of Resource Economics*, Vol. 1, pp. 15 -31.
- Cândea, M., Bran, F. (2001). *Spațiul geografic românesc*, Economic Publishing House.
- Davidovici, I., Gavrilescu, D. (coordinators) (2002). *Economia creșterii agroalimentare*, Expert Publishing House, Bucharest.
- Giurcă, D. (2008). Semi-subsistence Farming – Prospects for the Small Romanian Farmer to choose between a way of living or efficiency, in *Agricultural Economics and Rural Development*, nr. 3-4, pp. 215–230.
- Manole, V. (coordinator) (2001). *Managementul Fermei*, Tribuna Economică Publishing House, Bucharest.
- Popescu, M. (2001). *Lecții ale Tranziției - Agricultura 1990-2000*, Expert Publishing House, Bucharest.
- Sumelius, J. (1999). *State of sustainability of farming system in the selected Central and Eastern Europe Countries*, Finland, University of Helsinki.
- Zahiu, L., Dachin, A., Alexandri, C. (coord.). (2010). *Agricultura în economia României - Între așteptări și realități*, CERES Publishing House.
- Zahiu, L., Traian, L. (2000) *Agricultura României în Procesul de Integrare Agricolă Europeană*, Ex Ponto Publishing House, Constanța.

*** National Institute of Statistics – Statistic Annularies.

14. *** Eurostat database, available at http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/main_tables