THE DEVELOPMENT OF SUSTAINABLE AGRICULTURE DEFINING ELEMENTS

DEZVOLTAREA DURABILA A AGRICULTURII. ELEMENTE DEFINITORII

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Abstract: *The approach of sustainable agriculture problematic, as an important element of the Romanian rural development, from the perspective of EU integration. The paper deals with a single coherent set of criteria and principles of sustainable agriculture in relation to the increase in the efficient use of natural, energetic, material and informational resources. The article also highlights the need to accelerate the preoccupations of the competent organizations in order to implement, more evidently, programs for the sustainable development and implicitly of the rural area, which implies important changes in agricultural, environmental and ecological policies.*

Key words*: sustainable, natural, resources, development, enviromental*

INTRODUCTION

The process of transition from super-centralized economy to market economy has generated many economic and social problems for the Romanian agriculture and rural development. Therefore, the concerns about finding solutions and ways of solving them require a modern approach that takes into account the fact that rural areas have a wide variety of local resources whose upper turning on sustainability, leads to its development. The beginning of the millennium emphasizes the concern of mankind to promote agricultural development through a number of ways by funding research activities, providing services and other helping forms by stimulating the production through aid grants, etc. Agricultural development has had positive effects both on the increase in agricultural production and the contribution of the agricultural sector to society in general, but also negative effects such as increased agricultural pollution and degradation of

quality of some micro-regions[10]. Essentially there have been changes in the conduct of agricultural holdings and the technologies that had a large impact on the environment resulting in a number of problems facing agriculture today. In response to this situation, agriculture researchers seek with endeavor an "ideal" change for a less polluting and energy intensive ecosystem. The idea of sustainable agriculture consists of raising its productivity and obtaining reliable and consistent profits with minimal negative effects on the environment and ensuring food security of the population. Sustainable agriculture must be based both on the tasks, requirements and aspirations of the farmers themselves, but also on the restrictions they are facing, not only in farming, but also in domestic and non-agricultural activities[11]. Keeping the balance in the production factors, their scientific quantification in accordance with the biological requirements of plants and with local climatic conditions is essential for sustainable agriculture. In this context, F.A.O. believes that "for a sustainable development, the natural resources must be landscaped and preserved and technical and institutional changes should be made in such a way as to meet the needs of current and future generations. In agriculture, forestry and fishery it is all about how to conserve land, water, the phytogenetic and zoo genetic heritage and use safe means for the environment, well adapted from the technical point of view, economically viable and acceptable from the social point of view". The altitude determines the modification on the vertical of all the climatical elements[12]. Sustainable agriculture in most countries constitutes a priority in scientific research programs by helping to increase quality agricultural production. The need to protect soil functions is based “on a certain sort of agro technical invention”, based on understanding the laws of the evolution of soil fertility, by subordinating the way of doing agriculture to the basic criterion of biodynamic agriculture synthetically expressed as follows: “What is biologically correct is

[10] Rădulescu Carmen Valentina, 2003 - Dezvoltarea durabilă şi implicaţiile economico-financiare ale organizării exploataţilor agricole. Editura ASE, Bucureşti.

[11] Răuță, C,1997, *Agricultura durabilă în România,* în „Ştiința solului”, Soil Science, XXXI, Bucureşti.

[12] Spânu S., et co., 2010, The evaluation of periods with pluviometric surplus and deficit in cibin hydrographic basin – a way for sustainable development International Symposium “Risk Factors for Environment and Food Safety”, Faculty of Environmental Protection, November 5 - 6, Oradea

economically convenient"[13]. Based on this recommendation the traditional agriculture practices into the protected areas should be the most desirable agricultural practices[14].

MATERIALS AND METHODS

Thus, sustainable agriculture as the main economic sector of the rural areas should be promoted with the following principles[15]:

– Environmental protection of natural resources by maintaining production potential without destroying other species;

– Rendering profitable agricultural crops through the possibility of practicing long-term agricultural activities;

– Providing the necessary products, especially their quality;

– Promoting fairness and human features of agricultural activities;

– to be socially accepted and to promote ethics;

The working method consisted of the following steps:

• assessing the agricultural potential of the mountainous and hilly area and of innovative technologies adapted to the concept of sustainable agriculture for agricultural crops;

• designing a professional sustainable agriculture system and promoting within the system, together with traditional species, of some new species, less studied, such as phacelia with multiple uses;

• Recommendation within the proposed system of sustainable agriculture techniques to maintain the sustainability of soil fertility and to prevent the appearance of ecological imbalance;

• Assessment of biological resources and use within the system, of the most adapted techniques designed for sustainability and of organic materials insufficiently valued;

• increasing visibility of the results by publishing them in the form of reports, articles and scientific papers in journals or other prestigious

[13] Ştefanic Ghe., 1999 - Să cultivăm pământul gândind la o agricultură durabilă. Ministerul Agriculturii şi Alimentaţiei, Agenţia Naţională de Consultanţă Agricolă, Bucureşti,

[14] Antofie M., et co., 2010,Theoretical methodology for assessing the status of conservation of crop landraces in Romania, Analele Universităţii din Oradea - Fascicula Biologie Tom. XVII, Issue: 2, pp. 313-317,

[15] Mărăcineanu F., Hoinaru M., Elena Constantin, 2004, Concepte privind dezvoltarea rurală durabilă a judeţului Ialomiţa, Editura Star tipp, Slobozia

scientific journals or websites.

RESULTS AND DISCUSSIONS

Sustainable agriculture must be economically viable, ecologically "healthy" and socially[16] equitable, and sustainable agricultural exploitations must meet these three objectives as well as possible, considering their territorial context and their own agricultural[17] system. The goal of a sustainable agriculture is raising its productivity with obtaining reliable and constant profits, with minimal negative effects on the environment, while ensuring food security of the population, biological stability of plants and cultivated varieties, preservation and protection of natural resources, but also introduction, and widespread of modern technologies as productive as possible. To the achievement of sustainable agriculture, an important role is played by the design of farming systems, based on the fact that "the implementation of the sustainable agriculture concept must be done according to the specific circumstances of Romania"[18] and it relies both on culturally promoting some new species with multiple uses and the realization and qualitative increase in agricultural production, due to high resistance to diseases and pests of the biological resource used (variety and seed quality), following a careful selection and application of the appropriate technologies to facilitate nutrient absorption by crops and use of its genetic capacities of competing with weeds. The sustainable agricultural system is based on the fact that designing a sustainable agricultural system starts with determining the structure and crop rotation and it ends with the execution of the culture plan and the location sketch. The importance of crops rotation in the design of sustainable agriculture is major, as it is the first technological link that responds positively to the regeneration of the main agricultural natural resource – the soil – a major objective of sustainable agriculture (Table 1).

[16] Vilain, L., Metoda IDEA. Indicatorii durabilității exploatațiilor agricole. Ghid de utilizare, Editura Educagri, Dijon, 2003.
[17] Lazăr I., Maria Mortan, V., Vereş, - Un posibil model de evaluare a durabilității exploatațiilor agricole din zona de nord vest a României, Transylvanian Review of Administrative Sciences, 20/2007, pp. 52-67,
[18] Răuță C., 1997, *Agricultura durabilă în România,* în „Știința solului", Soil Science, XXXI, Bucureşti.

Table 1

Structure designed within a sustainable agriculture system

2010	2011	2012	2013	2014
Corn	Phacelia	Potato	Triticale	Corn
Mash	Potato	Triticale	Corn	Phacelia
Potato	Triticale	Corn	Phacelia	Potato
Rye	Red clover	Red clover	Red clover	Red clover
Beet	Corn	Phacelia	Potato	Triticale

Culture technologies proposed to be applied represent as well an important component of the sustainable agriculture system, in which special attention will be given to sustainable agriculture techniques. (Table 2) Among these, we mention the role of resources applied to soil where they study the impact they have on the maintenance of physiological and sanitary status, and the productive potential of the plants, as well as on the physical-chemical and microbiological features of the soil. Variability of biological material gives us information on opportunities in the ongoing operation of amelioration[19]. The evaluation of the biological material (seeds) contributes to the improvement of certain technological sequences regarding: reduction of infestation with weeds, diseases and pests, reducing pesticide use, reduce pollution, increase of production per kg of fertilizer applied, providing balanced plant nutrition, improving production quality. Taking into account the mentioned in the evaluation carried on the biological material authorized to be cultivated, we recommend the following experimental model of biological material to be introduced in the experimental model, being characterized by increased resistance to diseases and pests and adaptability

[19] Pop M., 2010. Characters with multiple usages- phenotypic variability analysis at *Echinacea purpurea* (l.) Moench Species**,** Analele Universității din Oradea - Fascicula Biologie Tom. XVII, Issue: 2, pp. 329-331,

Table 2

Culture technologies with sustainable acriculture elements

PHACELIA	**POTATO**	**TRITICALE**	**RED CLOVER**	**CORN**
Fall plowing;	Organic fertilization with manure	Organic fertilization with manure	Fall plowing;	Organic fertilization with manure
Land discing;	Fall plowing;	Fall plowing	Land discing;	Fall plowing
land preparation with the equipment GPGS;	Land discing in spring;	Land discing	land preparation with the equipment GPGS;	Land discing
Preparing land for sowing;	Preparing land for planting;	Preparing land for sowing	Preparing land for sowing;	Preparing land for sowing
sowing	Potato planting	sowing;	sowing	sowing;
Rollers after sowing;	Biological material characterized by: increased resistance to blight and lower demands on technological inputs.	Spring fertilization;	Rollers after sowing;	Manual weeding;
Hand weeding;	rebilonat;	harvesting.	toaletat câmp şi îndepărtat resturi vegetale;	Mechanical weeding;
weed;	Manual weeding debris removal and rebuilding resturilor vegetale rebuilding bilon;		sowing I + 2;	harvesting
harvesting	Phytosanitary treatments;		Hay scattering;	
	Haulm destruction;		baling	
	harvesting;			
	Sorting potatoes.			

to sustainable farming techniques: species phacelia - Julia variety, species Triticale - Titan and style varieties, red clover species - Rotrif and Novak varieties, corn species - Turda200 hybrids, Turda Favorit, Potato species -

Tempting, Sante and Productive varieties. Within the framework of the experimental model, the red clover field will be cultivated as secondary support for the other major crops (phacelia, potato, triticals, corn) because of its properties of soil natural recovery and soil enrichment in natural fertilizing substances, especially nitrogen.

CONCLUSIONS

Sustainable agriculture may constitute a guarantee of stability through which success is registered by strengthening the sustainability of food security and safety, so necessary for the peace and prosperity of our nation.

Keeping the balance in the production factors, their scientific dosage in accordance with the requirements of biological needs of the plants and with the local climatic conditions is essential for sustainable agriculture.

Sustainable agriculture and rural development require major changes in agricultural, environmental and ecological policies, worldwide.

The goal of a sustainable agriculture is raising its productivity with obtaining reliable and constant profits, with minimal negative effects on the environment, while ensuring food security of the population, biological stability of plants and cultivated varieties, preservation and protection of natural resources, but also introduction, and widespread of modern technologies as productive as possible.

Assessment of biological resources in the system designed for use in the most suitable cultivation techniques for sustainable agriculture is a significant step towards sustainable farming systems;

Sustainable development requires boosting agriculture and rural concerns and access to appropriate forums to accelerate the implementation of European programs for rural development.

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