RESPECT AND SUSTAINABILITY OPTIONS

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Abstract: *What's surrounding us? Everyone observes and, according to the knowledge's and interests, finds explanations. The set of life-conditioning elements is natural and artificial, most of them. The last ones, designed to comfort and to fill some deficits, have altered and even interrupted, over time, the energy flux of ecosystems. The physical world and biodiversity have evolved by inter-conditioning, until the "creativity" of the industrial age has given increasingly "rich" destinations to matter. Specialist literature and statistical data revealed transformations, some of them even as "alarm signals". The purpose of updating bio-mechanisms in ecosystems is relevant to astral energy input, matter circulation and deepening of socio-economic aspects, as well as sustainability.*

Keywords: *biodiversity, bioenergy, economics, matter circulation, sustainability*
JEL Classification: O4; O5; Q1; Q2

Introduction

The information sustains economic and environmental development in favor of socio-human comfort. Collaboration and interdisciplinary coordination have a decisive role. Thus, the ecologists, remarking and recording deviations into ecosystem mechanisms, can fix them only through economic exploitation, driven by not only domestic but also European and planetary policy. Following global discussions, the consensus for action makes it possible to plan and execute actions that are conducive to perpetuating life. The current challenges cannot ignore any of the components of the universe: energy, gas, water, soil and temperature. Selectively gathered up, they are exploited by organic systems, no matter if they are vegetal or animal. Biodiversity is the "dough" that "shapes" agriculture, as an important economic branch, for example in Romania. The biomass is the heart of the bio-economy and the key society challenges are addresses. Growing market demand for biomass involves existential assessment and availability, so that, by reconciling with ecological, economic and social sustainability, the biomass flows in the economy will not put pressure on

natural resources, regardless of their level. The European Commission itself has the objective (by 2050) to develop a competitive, resource-efficient and low-carbon economy. This challenge is in the field of bio-economics, and the review of the bibliography studied leads us to strong the proposed key notions and to raise awareness of bio-economic inter-connections. Scarlat et al. (2015) are convinced that the transition to bio-economy is based on advancing technological processes, achieving technical performance and cost efficiency and will depend on the availability of sustainable biomass. At the same time, for 2020, biomass energy is advancing to 50% of total renewable energy in the EU target. Concomitantly, Georgescu-Roegen N's statement is not neglected: "The economic system consumes nature - matter and energy with low entropy - and provides garbage - matter and energy high entropy - back to nature". So, in the current economic system, we are unable to incorporate long-term risk and value (Rockström, 2017).

1. Biodiversity

To survive, the living organisms have specific, continuous and diversified consumption, and their lifecycle plays an important role in assessing the production of goods and services and of the impact on the environment. Through the economic exploitation of the environment and intensive agricultural technologies, the trophic chains specific to the ecosystem have been interrupted, with repercussions on the biodiversity dimension. As a result, the prosperity promoted by modern economies has disrupted natural resources through excessive consumption, but also by introducing synthesis resources in the form of inputs to feed the market-led ideology. Lester Brown, pointing out the negative effects of industrialization, signaled minimum guarantees against the risk of biodiversity loss or carbon stocks, saying: if everything is destroyed, there will be no economy. Today, the number one economic threat to humanity is our inability to real value the nature (Rockström J., 2017). Therefore, the nature assessment belongs to the field of ethics, inclusion and justice.

2. Food safety and security

The activity of the biosphere through material and energy flows is completed by human force to obtain existential goods. Firstly, they were expressed through food resources. Micu and Petanec (2008) have approached the subject, defining food as the regulator of the exchange processes between the organism and the environment. Referring to Romania, whose territory includes structurally harmonized reliefs and in which vegetal crops are seasonally managed, the food is diversified and its quality depends on human

health. The food quality is strongly influenced by internal factors (physico-chemical composition, biological properties) and external ones (handling demands, storage environment, time etc.), Teodor et al., 2018.

The Romania's accession to the European Union, meant practically, the implementation of its requirements at all stages of food, from its obtaining to consumption. Teodor et al. (2018) have emphasized the importance and influence of raw materials on food quality. They took as an example the wheat, the second grain which exploits the quality of arable land in our country (Figure 1). The soil classification (9,236,031.59 ha and 63.40% of the total agricultural 2010, respectively) for the purpose of assessing yield capability through bonuses is generally based on cumulative conditions related to relief, climate, hydrology and physico-chemical properties of the soil.

36% of the arable land (the first two quality classes) meet very good and good conditions for field biodiversity and, if it is exploited by wheat cultivation, the bread production guarantees food safety and security. But, in the third class, predominantly presented by this structure, there are good enough conditions for the activity of the vegetal holdings.

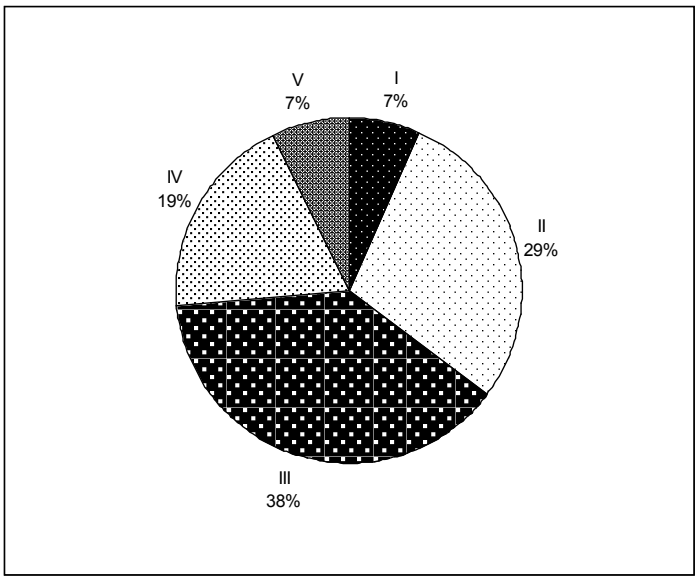

Figure 1. Classification of arable land in quality classes, according to the rating scale, by country - Romania, in 2010 (partly)

Source: I.C.P.A.

The determination of the product's suitability as a food, for example wheat, is made by the determination of specific indices with standardized

values (hectolitric mass> 78 kg, dropping index between 220 and 280 seconds, protein> 13%, wet gluten> 26% gluten between 65 and 80%, impurities up to 3%, IBA - Bucharest, 2015), together with maintaining of their value constantly. The quality of wheat yield is influenced by cultural, natural (exploited) and artificial parameters (technology: input allocation, harvest time). As a result, the quality of the soil resource influences the obtaining of quality agricultural raw materials and, for example, quality results in bakery (Teodor et al., 2018). During last time, the qualitative assessments are based on the land use or animal feed system, choosing for organic products. In Romania, according to Eurostat data (2010), only 0.2% of the 13.3 million hectares were certified as an ecological system.

The organic food system is designed to produce cleaner foods, as Ion (2012), quoting Manole (2006), and in full correlation with the conservation and development of the environment, using methods that respect its nature and systems. At the stage of organic farming, the use of genetically modified organisms, fertilizers, pesticides and growth synthesis regulators, hormones and antibiotics are prohibited.

The same author amplifies the aspect of food safety if the additions in recipes (use of additives, additional substances and synthetic chemicals) are limited in the processing stage.

The quality gives safety to the product as food, and the amount gives the security. Regarding the quantitative aspect, the plant biodiversity in Romania provides important yields through cereals, leguminous plants, horticultural plants, technical and forage plants.

Starting with 2011, according to statistical data, MARD attributed to the Romanian farmer 0.6 hectares of arable land. Assuming the efficient use of this surface, 1.7 tons of wheat or 2.4 tons of maize (www.zf.ro) could be harvested each year. The cereals providing, in addition to human food, and animal feed, result in a corresponding quantitative feeding of the inhabitants of Romania's borders.

Thus, according to the data of the Ministry of Agriculture and Rural Development (MADR), in 2017, agricultural output per head was as follows:

- wheat, rye and triticale - 516 kg / capita / year;
- peas - 15 kg / capita / year;
- sunflower - 160.57 kg / capita / year;
- soya been - 20.59 kg / capita / year;
- corn - 739.86 kg / capita / year.

The economic value of primary crop products (eg: grains, fruits, roots, tubers, etc.) is the main motivation for land cultivation. The Romanian

agricultural sector cannot only provide domestic demand but can become a notable player on the European market and even global one (Teodor et al., 2018). The independence in ensuring domestic food security and the supply of agricultural products, raw materials and food products is only achieved by increasing the exploitation of the Romanian agricultural potential (Bazga and Chelmu, 2013). The Romanian people has a balanced diet between vegetable and animal foods because the share of cereals, roots and tubers in the total dietary energy supply is 45% and half of the protein consumption is of animal origin (Istudor et al. 2014).

3. Biofuels

As Barber (2009) observed, there are significant opportunities to exploit solar energy to generate fuels (hydrogen, alcohols and methane) on sustainable paths. Thus, biomass, as energy, includes agricultural products of arable crops, perennial herbs, tree vegetation, vegetal waste (straw, strains, cocoons, panes). These, undergoing processing (Table 1), undergo transformation with energy input.

Table 1. Processing techniques to obtain energy from biomass

Biomass processing techniques	**Energy and bio-fuels**				
	thermic	**electrical**	**gas**	**liquid**	**solid**
Direct burning	Yes				
Anaerobic digestion	Yes	Yes	Yes		
Fermentation				Yes	
Oil extraction				Yes	
Pyrolysis	Yes		Yes	Yes	Yes
Gasification	Yes		Yes	Yes	

Source: http://biomasa-energie.ro/biomasa/conversia-biomasei-in-energie/

A great part of the cultural (lignocellulosic) biomass, or residues, remains in the field, although it could generate revenue by using as animal bedding (straw). The residues are essential for ecosystem services, namely to maintain organic carbon in the soil or to prevent soil erosion. But, the demand for secondary agricultural products, which we called residues, is also expected to increase due to the development of the bio-economy, as a reformer of the economic conditions of production. By a European Council decision, the use of conventional biofuels to 7% of energy consumption in transport for 2020 (European Council, 2014) was limited; the rest must come from lignocellulosic biofuels (second generation, Scarlat et al., 2015).

The basis for the European waste management policy is the management options, namely reduction, reuse, recycling, recovery and storage. To ensure

sustainable use of the residue, only a certain part of this total can be removed from the field. On this basis, the plant residues is recovered by category (80% of residues resulting from cereals, 15% of oil seeds) and then introduced into industrial processes for the production of renewable energy. Thus, if only 1000 kg of strains + maize cobs yields 225.7 l of bioethanol (Vasile and Bran, 2017, citing Balat et al., 2008), the average yield of an intensive 10t maize / ha farm, by simple calculation, results (if respects the annual retention of 60% waste on the soil according to good environmental practices - criterion of sustainability) 900 liters of bioethanol/ha of arable land cultivated with corn. The example sustains the recognition of the Danube basin as the main agricultural residue area in the EU-28 (Camia et al., 2018). The biomass, as a concept, also includes industrial waste resulting from and through processing raw materials listed by the food industry (Figure 2).

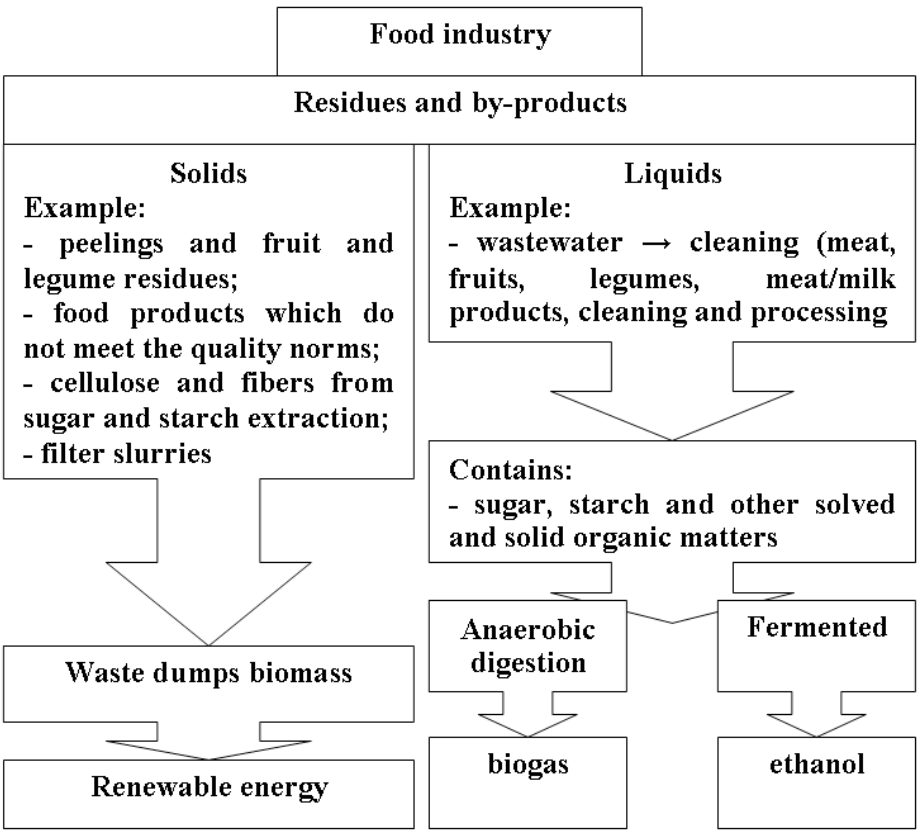

Figure 2. Renewable energy from industrial residues and by-products
Source: personal interpretation of the studied literature

In the biological world, the fuels directly derived from photosynthesis (biofuels) could form new technologies based on the success of photosynthesis. As an example, Barber (2009) refers to the potential of new photochemical energy technologies that copy our natural system. Similarly, Inderwildi and King (2009) highlighted an innovative carbon cycle for the production of synthetic biomass fuels (Figure 3).

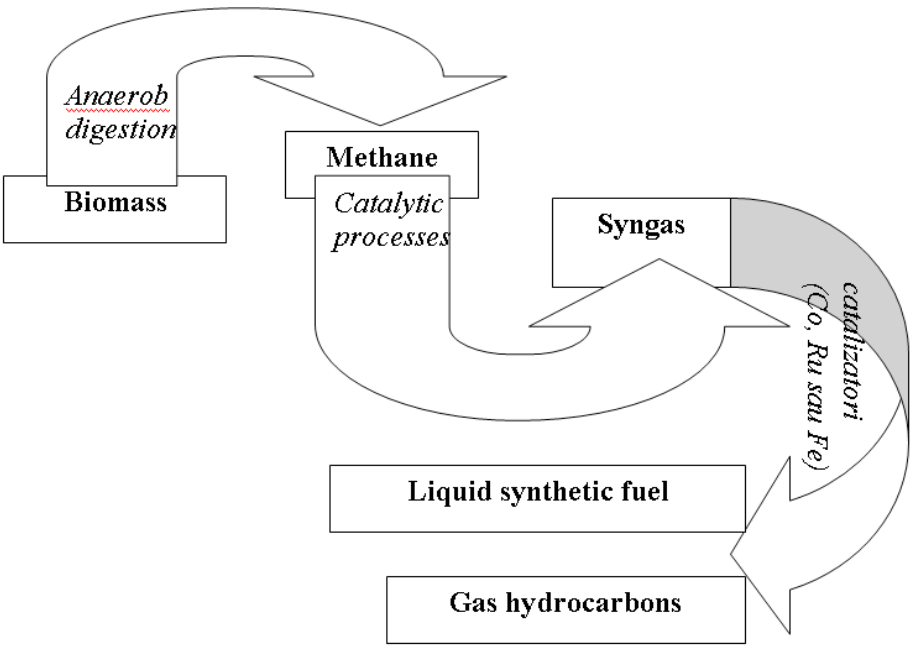

Figure 3. Processing variant of biomass into renewable energy
Source: Processing after Inderwildi and King (2009)

The improvement of the waste management is stimulating innovation in recycling and re-use. At the same time, it limits waste landfills, reduces resource losses, recovers energy and creates behavioral habits.

Conclusions

The systems sustained by natural and integrated ecosystems and managed by man by agricultural technology play a key role for human well-being. Thus, the agriculture provides the economy with food, feed, fiber, energy and ecosystem services. The production processes in agriculture can rely more on re-use of products and raw materials and on the ability to restore natural resources. By processing agricultural products, the food industry produces a variety of feed-stocks, but also generates a large number of residues and by-

products that can be used as biomass energy sources. For biomass to be effective in reducing greenhouse gas emissions, it must be produced in a sustainable way. The biomass production involves a range of activities ranging from raw material growth to final energy conversion. Every step along this way can raise different sustainability challenges that need to be managed. The bioenergy plays a significant role anywhere in the world, without differentiating countries by degree of development. And this, under current conjuncture, when the world is dominated by concerns about energy requirements, but also for sustainable and fair development and environmental preservation. Total renewable energy support expenditure, including renewable energy technologies installed by 2020, plus new plants, indicates an increase in annual support expenditure under all policy options.

One of the main factors determining the possible economic use of agricultural residues - for bioenergy production – is the transport costs. For Romania, in the Danube Basin, a very favorable area for most vegetal species, large amounts of cereal residues, especially maize, are collected. If there is a waste processing point in bioethanol in this area, the transfer of lignocellulose to the processing is inexpensive and is done optimally in time and space. The situation is a little bit difficult to achieve because lignocellulose biofuels (bioethanol) have not yet reached commercial maturity, so there, there is no infrastructure and related logistics. During future, to support 9 billion co-citizens in the world, it is necessary to move to circular economic principles and practices.

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