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Procedia Economics and Finance 22 (2015) 268 – 276

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**Procedia**  
Economics and Finance

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2nd International Conference ‘Economic Scientific Research - Theoretical, Empirical and Practical Approaches’, ESPERA 2014, 13-14 November 2014, Bucharest, Romania

## Has Organic Farming Potential for Development? Comparative Study in Romania and Serbia

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### Abstract

Nowadays, in the EU and worldwide, agriculture and food industry face new trends of developing green alternatives. This agriculture sector emerged as a result of people concerns about health and environment due to the intensification of agriculture technologies, and uses of chemicals, in both agriculture and food processing industry. These problems appeared and acknowledged by the developed countries, among others, are strictly related to environmental pollution and increasing problems of health degradation. The present study investigates the possibilities of developing organic farming in Romania and Serbia. The results show that there is a great application that can ensure its development, considering many factors relating to the way in which resources are exploited. Thus, statistical data about agricultural areas under organic farming, uncultivated areas, use of chemicals, and number of semi-subsistent farms are gathered in both countries and comparative analyzed. This article makes a foray in assessing the resources that countries can rely on in developing strategies based on organic agriculture.

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Selection and/or peer-review under responsibility of the Scientific Committee of ESPERA 2014

*Keywords:* organic farming; uncultivated areas, healthy food, HDI

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## 1. Introduction

Organic farming is a wide spread phenomenon. Globally, the total area cultivated with some form of organic farming grows steadily. Schifferstein and Oude Ophuis (1998) observe that, from the producer's perspective, two main reasons explain expansion of organic farming: "First of all, the number of governmental measures taken to limit or prohibit the use of polluting technologies increases, due to the public's general environmental concern. In addition, the possibility of higher financial returns makes organic farming a potentially attractive option for farmers in a saturated bulk market. Especially for small farmers who cannot benefit from the economy-of-scale effects of technologically advanced agricultural production, organic food production seems an interesting market niche." As Nastase noticed (Nastase et al. 2011), organic market in Romania has enlarged within last period. The main reason is consumer concern for healthy eating (Ion and Popescu, 2011).

Organic farming is "a form of agriculture that uses fertilizers and pesticides (which include herbicides, insecticides and fungicides) if they are considered natural (such as bone meal from animals), but it excludes or strictly limits the use of various methods, including synthetic petrochemical fertilizers and pesticides; plant growth regulators such as hormones; antibiotic use in livestock; genetically modified organisms etc." (European Commission, 2014). Consequently, it relies on techniques such as crop rotation, green manure, compost, and biological pest control.

Organic farming is encouraged in Romania using different instruments of agricultural policy (Manole et al. 2009). The European Union is committed in principle to promoting sustainable agriculture in its Common Agricultural Policy (CAP). As member state of the European Union, Romania implements the Common Agricultural Policy and, as such, the principle of promoting sustainable agriculture. This involves environmental and social issues (Boubacar and Foster, 2014) and, therefore, specific instruments (Hunter, 2014) for encouraging organic farming. To benefit of organic farming subsidies, farmers must comply with some rules: abandonment of the application of chemicals, farms' adaptation to the natural biological circuit of vegetal and/or animal production, investments for changes and adjustments (Art.17, Regulation CE 834/2007). As such, Romanian strategy for agriculture is oriented towards organic farming, among other priorities.

Although, it has not yet a member of the European Union, in previous years Republic of Serbia adjusted all its legal acts related to agriculture (with special reference to the organic production) in line with, currently in force, legal framework of the EU. Ministry of Agriculture and Environmental Protection of the Republic of Serbia established in May 2010 a Law on organic production, which comprehensively defined official state support to agricultural producers in order to overpass to organic production principles and procedures. The main goal of organic production development in Serbia is recognized in establishment of a unique management system that complies with environmental practices, a high degree of biodiversity and activities of natural resources preservation. In line with this activity National Action Plan for the Development of Organic Agriculture – 2013-2017 (established in 2011.), as well as National Research Agenda for the Sector of Organic Agriculture (established in 2013) are created, where both insist on permanent improvement of the available level of knowledge of all stakeholders (Popescu, 2014b) within the mentioned segment of agricultural production. Aforementioned reinforces the assumption that exist opportunities for further development as of complete agriculture, as well as of organic agricultural production, parallel with increase of the competitiveness of domestic producers and strategic strengthening of market segment (Dan, 2014) that relies on organic production.

The present paper tries to answer the question: what is the organic farming potential for development? Comparative study between Romania and Serbia, as neighbour countries, with relative similar agro-food systems, is conducted, by collecting statistical data from both states. The objectives of this paper are to identify the resources that countries can rely on in developing strategies (Nica and Potcovaru, 2014) based on organic agriculture.

## 2. Materials and method

### 2.1. Current status of organic farming in Romania

Romania ranks 16th worldwide for total area of certified organic farming land, and 20th worldwide for organic products export (BCG-Global Advisors, 2012). This is quite remarkable, considering that the farming land exploited in the “ae” system represents only 3.38% of the total utilized agricultural land of the country.

Organic farming is a dynamic system in Romania with a weighted average rate annual increase of 23%. In the year 2012, the arable area cultivated in organic was 174,643 ha, while the spontaneous flora cultures have been collected from an area of approx. 1 million ha. In 2012, land in organic systems increased by 45% since 2011, representing about 3.38% of the total utilized agricultural area of Romania.

Table 1. Dynamics of areas cultivated with main crops under organic farming in Romania (hectares)

Crop/Culture	2010	2011	2012
1. Area under organic farming, crop on arable land, of which:	148,033	147,581	174,643
Cereals	72,298	79,167	130,000
Oil crops and pulses	53,375	51,028	105,000
Vegetables	734	914	1,200
2. Area under organic farming, permanent crops: orchards and vineyards, of which:	3,093	4,166	7,781
Orchards	2,199	3,324	n.a.
Vineyards	894	842	n.a.
3. Pasture and hayfields	31,579	78,198	105,835
4. Spontaneous flora cultures	77,294	338,051	1,082,138

Source: Romanian Ministry of Agriculture and Rural Development

As seen in Table 1, the area cultivated with cereals under organic farming is 130,000 hectares, the area cultivated with oil crops and pulses is 105,000 hectares, the area cultivated with vegetables is 1,200 hectares, the area under organic orchards and vineyards is 7,781 hectares and pasture and hayfields under organic system are 105,835 hectares. Organic spontaneous flora cultures are collected on 1,082,138 hectares.

The livestock sector in 2012 recorded growth of livestock under organic methods, especially sheep and goats – 160,000 heads, 85,000 heads laying hens and 60,000 heads of dairy cows. Regarding the beekeeping sector in 2012 there were a total of 102,882 bee colonies (Table 2).

Table 2. Dynamics of livestock under organic farming in Romania (heads)

Species	2012
Dairy cows	60,000
Poultry	85,000
Sheep and goats	160,000
Bees	102,882

Source: Romanian Ministry of Agriculture and Rural Development

Number of operators (producers, processors and traders, importers and exporters) registered in organic farming system, in 2012 is 26,736 (Ministry of Agriculture and Rural Development of Romania). Since 2010, the number of operators increased annually by about three times by year. This was mainly due to the existing support measures for the period conversion granted under Art. 68 of Regulation (EC) No. 73/2009 establishing common rules for direct

support schemes for farmers under the common agricultural policy and establishing certain support schemes for farmers. In 2012, out of 26,736 producers, 103 operate in processing industry, 211 in trade and marketing and 26,390 are farmers.

As regards processing industry, in 2012 it was an increase in the number of processors (from 48 units in 2007 to 103 in 2012) and the assortment of organic products was more diverse, including: product processed cow and sheep milk (cheese, butter, cream, etc.), products processed soy (milk, tofu, and croquettes), sunflower oil, and various types of bakery products (bread, pasta, cookies), processed rice products, cereal, herbal teas, juices, berries, processed products hemp seeds, bee products (wax, pollen), processed products of pork meat (sausage, ham) and organic wine.

The average area of a holding in organic farming, for vegetable production, varies from about 100 square meters for growing vegetables in greenhouses, up to approx. 2000 ha for cultivation field crops. The average area of a farm, in 2011, was about 20 to 22 ha.

The market of organic products is expanding. Demand for organic products is constantly increasing. Organic products are marketed directly from the farm gate or through specialized stores and through supermarkets. As regards foreign trade, much of products from organic farming were intended to exports. Yearly, a percentage of approx. 70-80% of organic products is exported. The markets outside Romania are very interested in buying Romanian organic products. In all Western countries, which have a far more developed economy (Popescu, 2014a) compared to that of Romania, the organic products are sold for a very high price (BCG-Global Advisors, 2012). Imports of organic products increased annually, because of hypermarkets involvement in retail distribution. Thus, in 2011 the value of imports reached a value of approx. 75 million Euros.

## 2.2. Current status of organic farming in Serbia

Basic characteristics of husbandries that are directed to organic production in Serbia differ in accordance to production regions they are located. In Vojvodina, the average husbandry has on disposal more than 10 ha of arable land and it is specialized in the production of smaller number of plant species (primarily cereals, industrial crops and vegetables). In the central Serbia, the most of farms is connected to a processing facilities on cooperative basis (before all in repurchase of fresh fruits), while, conditionally, as the third group of husbandries it can be considered the large companies which have on disposal more than 500 ha each (Berenji et al., 2013).

According to März and associates (2013), organic production in Serbia is established on more than 829,000 ha (Table 3). Focusing only agricultural areas, it can be noted domination of areas under fruits and grapes (about 5,200 ha, or about 46%), than crops from arable land (cereals and industrial crops, 41.3%), meadows and pastures (7.6%), as well the areas under the vegetable (4.8%). Among the products of organic production in Serbia, the most important are plum (1,228 ha), apple (1,183 ha), cherry (436 ha), berries (raspberries (692 ha) and strawberries (53 ha)) that are mainly produced in Central and Southern Serbia. Also, organic production of cereals (maize, on 819 ha, and wheat, on 566 ha) and oil crops (mainly soybeans, 144 ha) is expressed, where mentioned production areas are mainly concentrated within the territory of Vojvodina province. Certified organic vegetables are grown on over the 500 ha. Besides that, it should be mentioned that constantly is increasing the demand for the production of oil crops (sunflower, pumpkin and rapeseed), medicinal herbs, mushrooms, as like various vegetable species (Filipović et al., 2013).

Table 3. Dynamics of areas under organic production in Serbia for the period 2010–2012 (in ha)

Crop/Culture	2010*	2011***	2012**
Cereals	568	731	1,386
Other crops from arable land	506	186	3,199
Meadows and pastures	3,800	3,733	839
Vegetables, medicinal and aromatic herbs etc.	309	286	530
Fruits and grape	3,452	4,551	5,145
Crop production (total)	8,645	9,524	11,099
Wild (dried) medicinal and aromatic plants, (frozen, salted and dried) wild mushrooms, and forest fruits	818,000	818,000	818,000
Total plant production	826,645	827,524	829,099

Source: based on März et al., 2011\*; März et al., 2013\*\*; Filipovic, 2012 \*\*\*.

From the previously presented data it can be noticed a huge land complex used for the collection (base for further processing activities) of wild medicinal and aromatic plants, and forest fruits and products (mainly mushrooms), established on about 818,000 ha.

Within the segment of livestock breeding, in 2012 was recorded rapid increase in the number of cattle heads that are bred in the system of organic agriculture, where the largest jump was achieved at pigs, goats and sheep (currently there are 983 animals, in compare to 49 heads of cattle in 2010, or 57 animals in 2011). The organic livestock breeding have also on disposal 2,394 heads of heavy livestock, 3,600 head of poultry and 4,394 bee colonies (hives), (Table 4).

Table 4. Dynamics of heads of animal under the organic production in Serbia (in 2012)

Species	2012
Cattle, buffalos, horses, donkeys, etc.	2,394
Pigs, goats, sheep	983
Poultry	3,600
Bee-hives	4,394

Source: based on März et al., 2013.

After the research of the team of local and GIZ experts in 2010 (survey was conducted on 140 agricultural husbandries active in the segment of organic agriculture), several conclusions are made. It was noticed that more than 60% of husbandries possess less than 6 ha of land, while only 25% of husbandries have on disposal production land complex in range 10-20 ha. Land is mainly cultivated by husbandry members, where every second farm hires labour for seasonal work activities. Husbandry size correlates the structure of cultivated plant species, so on the farms with over the 20 ha of land usually are grown grains and oilseeds. Farms that have on disposal less than 5 ha of arable land, bred a crops for their own use, where the part of land complex in use is ordinarily put into the function of berries growing, as well as other fruit species. Vegetables are mostly grown on farms that have 5-10 ha of arable land. On the other hand, large number of farms larger than 5 ha have on disposal parcels of land where is nothing grown, in other words the parcels are in the function of pastures, or they are uncultivated (Marz et al., 2013).

According to the records of the Ministry of agriculture and environmental protection about the producers involved in organic production, based on the report of the authorized control organizations in 2013, within the segment of organic agriculture, in Serbia, have been certified 285 producers. Mentioned number of producers is not final, as at some legal entities is made group certification, so total number of subcontractors is not recorded (Ministry of agriculture and environmental protection).

Having in mind data of national association *Serbia Organica* (Portal of the national association Serbia Organica), there are great diversity within the group of products that are realized on the market by their members, such as: buckwheat and buckwheat products, products from aronia, macrobiotic products from soybean (soya chees - tofu), dried fruits, mushrooms, wine, brandies, medicinal plants and spices, jam, tea, vegetable (fresh, frozen and processed), fruit (frozen, dried and chocolate-coated), fresh meat and meat products (sausages, ham, etc.), dairy products (yogurt), etc.

Certified organic agricultural products are mainly redirected to processing industry (around 70% of producers usually have signed contracts at the beginning of the production cycle), while only about 20% of the producers realize their products as direct selling in green market (Filipović et al., 2012). Generally, about 90% of organic products from Serbia (processed and in fresh state) is directed to the EU market, mainly as some form of raw materials for further processing (Marz et al., 2013), previously checked by the certified body of the national Ministry of Agriculture. On the state level, about 65% of the total production of organic products is sold in fresh state, while in semi-processed and processed condition is realized only about 35% of all products. Globally observed, organic food market in Serbia is not sufficiently developed, characterized by a lack of demand, as well as by under-developed production (Vlahović, Puškarić, 2013), whereby there are real possibilities of its widening, based on the potentially available resources of agricultural production, along with proper use of agro-technic measures and consistent application of legal provisions.

### 3. Results and discussions

#### 3.1. Comparative analysis of organic farming in Romania and Serbia

Even agricultural land in Romania is three times larger than in Serbia, the area under organic farming, including spontaneous flora and wild plants and fruits, is only 1.5 larger: the total organic area in Romania is 1,370,397 hectares and the total organic area in Serbia is 829,099 hectares. The structure of agricultural land under organic farming is similar in Romania compared to Serbia. In both cases, spontaneous flora and wild plants and fruits have the higher weights in total area: it accounts for 79% in Romania and for 98.7% in Serbia. These weights leave few areas for arable land (13% in Romania and 0.61% in Serbia) and for permanent crops, orchards and vineyards (8% in Romania and 0.72% in Serbia).

Organic livestock is more developed in Romania; the number of heads of cattle, poultry, sheep and goats and beehives is higher in Romania than in Serbia.

The number of operators in organic farming is over 26 thousand in Romania, compared to only 285 in Serbia. The products obtained in agricultural farming are similar in both countries: product processed cow and sheep milk (cheese, butter, cream, etc.), products processed soy (milk, tofu, and croquettes), sunflower oil, and various types of bakery products (bread, pasta, cookies), processed rice products, cereal, herbal teas, juices, berries, processed products hemp seeds, bee products (wax, pollen), processed products of pork meat (sausage, ham) and organic wine, in Romania and: buckwheat and buckwheat products, products from aronia, macrobiotic products from soybean (soya chees - tofu), dried fruits, mushrooms, wine, brandies, medicinal plants and spices, jam, tea, vegetable (fresh, frozen and processed), fruit (frozen, dried and chocolate-coated), fresh meat and meat products (sausages, ham, etc.), dairy products (yogurt), in Serbia.

As regards the destination of organic output, in Romania 70-80% is exported, while in Serbia 90% goes to EU market. It is well known that Serbia is an important producer of berries, which are considered as organic output, because they are collected from wildness.

#### 3.2. Perspectives of organic farming development

One reason that strengthens the arguments that Romania has potential for developing organic farming is that in the last years, the use of chemicals has been at a low level (Table 5), the farming land being far less polluted than in other European countries. As seen in table 5, the consumption of chemicals in Romania is 487,000 tones, which means per hectare 52 kg active substance (arable area in Romania is 9,352,300 ha).

Table 5. Dynamics of chemicals (active substances) used in agriculture in Romania (thousand tones)

Specification	2009	2010	2011
Total chemicals (active substances)	426	481	487

Source: Romanian Statistical Yearbook, 2012

More reasons that argue the claim that Romania has potential for developing organic farming consist in: the land in Romania is one of top fertility in Europe (Manescu and Dobre, 2012), in the hill and mountain areas, agriculture system is traditional, without using chemical substances, but is not certified. There are over 4 million registered subsistence farms that grow crops in the organic manner, but without having a certification. Large areas of pastures and hayfields and uncultivated land offer opportunities to be converted to organic farming (Table 6).

Table 6. Land fund, by use, in Romania (thousand hectares)

Specification	2011
Agricultural area	14590.9
Arable	9352.3
Pastures	3277.7
Hayfields	1553.5

Vineyards and vine nurseries	211.3
Orchards and tree nurseries	196.1
<b>Cultivated area</b>	<b>8081.6</b>

Source: Romanian Statistical Yearbook, 2012

Romania has an agricultural land of 14,590,000 hectares, of which 64% is arable land. Hayfields and pastures account for 32% of total agricultural land. Cultivated area is 8,081,600 hectares, which means 86% of arable land. More 1,270,700 hectares (24%) remain uncultivated and offers opportunities to be cultivated in organic system.

Serbia possesses real possibilities for the development of organic production. Mentioned is supported by the existence of high quality natural resources (land, water and air). Authorized Ministry has constantly updated the list of allowed chemicals, that can be used in organic agriculture (fertilizers and soil improvers, and pesticides), but, unfortunately, official statistics still has not record the data about applied quantities of allowed chemicals in organic agriculture.

By following table are presented the data from the Census of Serbian agriculture (in 2012) that is related to the used chemicals. According to totally applied area, mineral fertilizers and pesticides were dominantly used, while liquid manure and slurry were used at least.

Table 7. Use of chemicals in Republic of Serbia according to applied area (in 2012)

Territory	Mineral fertilizers		Solid dung		Liquid manure and slurry		Pesticides	
	Number of holdings	Applied on area, (in ha)	Number of holdings	Applied on area, (in ha)	Number of holdings	Applied on area, (in ha)	Number of holdings	Applied on area, (in ha)
Serbia	491,257	2,298,574	306,297	373,871	8,002	26,405	455,103	2,107,311

Source: Census of Agriculture, *Use of mineral fertilizers, manure and pesticides*, SORS, Belgrade, 2013.

Serbia has on disposal land complex of 5,052 thousands hectares of agricultural land, where in structure dominates arable land and gardens with 64.96%. Share of orchards, 4.71%, and vineyards, 1.07%, are significant too. Inefficiency in the land use in Serbia is reflected by relatively large areas of agricultural land in a state of neglected land (some estimations claim that in average around 600,000 ha of land remain uncultivated each year). This is mainly caused by intensive depopulation of rural areas and generally weak economic effects (Sum and Chorlian, 2014) of agricultural production on national level. However, by mentioned is done good natural conservation of huge land complex, what qualifies it as the production potential of organic agriculture (Jelocnik et al., 2011).

Table 8. Land fund, by use, in Republic of Serbia, in 2012 (thousand hectares)

Structure of used agriculture areas	2012
<i>Agricultural land</i>	5,052
Arable land and gardens	3,282
Orchards	238
Vineyards	54
Meadows	621
Pastures	837

Source: *Statistical yearbook of the Republic of Serbia for 2013*, SORS, Belgrade.

Furthermore, there is a potential market development of organic products in terms of the importance of these products to increase human health (Mulligan, 2015) through a healthy lifestyle approach in both countries. An important indicator used by World Health Organization to quantify health in terms of approach to a healthy lifestyle is HDI (human development index). The Human Development Index is a composite statistic of life expectancy, education, and income indices used to rank countries into four tiers of human development. High levels of HDI indicate that people are concerned in improving their lifestyle, including the consumption of organic food as a way of achieving a good health. Both countries, Romania and Serbia, recorded HDI levels of 0.785 and 0.745 respectively, below, but relatively closed, to the EU average that is 0.897 or average in the euro area 0.911 (data for the year 2013 according to the United Nations Development Programme). This indicates a high potential of increasing ecological products demand on the market in both countries through adopting a healthy lifestyle (Nica, 2014) by people that consume organic food.



#### 4. Conclusions

Analysing the statistical data, it can be argued that, currently, Romania and Serbia have high potential for developing organic farming, because of high fertility of the farming land, low level of chemical pollution in the intensively cultivated lands. In Romania, 24% of the arable land is uncultivated, which offers the opportunity of it growing organic crops, 32% of agricultural land is occupied by pastures and hayfields where organic farming can be performed, over 4 million subsistence farms can be rapidly and efficiently converted into small organic farms. In Serbia, 29% of agricultural land is use as meadows and pastures that can be easily converted to organic farming. Both countries, Romania and Serbia, have joined the trend of the development of organic agriculture, that because in business development opportunities (Rao, 2014) organic market is in a niche market (Boling et al., 2014), but mainly because of the growing demand for organic products in both countries. These products are based on food for consumers who follow a healthy lifestyle.

#### Acknowledgment

This paper has been financially supported within the project entitled „SOCERT. Knowledge society, dynamism through research”, contract number POSDRU/159/1.5/S/132406. This project is co-financed by European Social Fund through Sectoral Operational Programme for Human Resources Development 2007-2013. Investing in people!”

Paper is also a part of the research at the project no. III 46006 - Sustainable agriculture and rural development in the function of accomplishment of strategic goals of the Republic of Serbia within the Danube region, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia, for the project period 2011-2014.

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