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From conventional to organic in Romanian agriculture – Impact assessment of a land use changing paradigm

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ABSTRACT

Arguing organic vs. conventional land use is broadly discussed in research papers, political discourse, and even more practical issues at farm level. In macroeconomic approach, the dilemma is that intensive agriculture that utilizes large quantities of inputs made it possible to grow enough food to meet the current global needs, but this way of land use leads to environmental damage and degradation of ecosystem services. In microeconomic approach, the dilemma is whether is more profitable for a farm to convert conventional crops to organic ones. This article aims to undertake this approach with respect to one case study carried out in North-West Romania, to a farm of 450 ha of cereals: wheat, corn, sunflower and soybeans. Its conclusions may not be representative for all organic conversions, but the findings are relevant at a time of debate over changing land use and crops structure of farms. The study indicates that the economic efficiency is slightly higher in organic system compared to conventional. The attractiveness of the sector made farmers to convert part of their land to organic farming, as shown the statistics of accelerated growth of area under organic farming in the last years in Romania.

Introduction and background

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 (European Commission, 2014).

According to Gold (2007), the USDA National Organic Standards Board defines organic agriculture as an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony.

This article aims to investigate whether is more profitable for a farm to convert conventional crops to organic ones in context of the new inland agricultural paradigm changes. In this context the leading argue of the current research is to establish the optimal area converted under organic wheat that brings the optimal profit for farmer.

In order to achieve answer to these questions, a case study is carried out in North-West part of Romania, in Satu-Mare County, for a farm of 450 ha of cereals, mainly consists of: wheat, corn, sunflower and soybeans. Starting from previous framework as (Gruia, 1998; Rusu et al., 2005; Subic et al., 2010; Dobre et al., 2011; Turek-Rahoveanu et al., 2011; Manescu and Dobre, 2012; Soproni et al., 2012; Andrei et al., 2013) carried on in order to test and confirming the viability of agricultural investments for diversifying the valuing of inland agricultural potential, in this research it was developed and adapted a methodology for testing the economic efficiency of converting the conventional agricultural productions structures to organic.

The assessment of the main economic indicators for understanding the organic farming efficiency against to conventional agricultural systems was developed among time in numerous researches as: (Girardin et al., 1999; Rigby et al., 2001; Van der Werf and Petit, 2002; Halberg et al., 2005; Halberg, 2012). For establishing the opportunity and the advantageousness of conventional farming to organic conversion some of the most representative indicators were computed and analyzed. So in this study, the efficiency of farm's economical activity was estimated by computing

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a range of representative indicators, as: technical endowment, labour productivity, average and total production, total and per hectare revenues and expenditure, structure of costs, total and per hectare profit, rate of return. These indicators are representative for the farm under analysis, because it has associative form and, as such, it can be considered as enterprise, in those regarding the market relationship, accounting system, workforce, functional and operational management. As comparison, in literature aspects as modelling tail behaviour of returns (Makhwiting et al., 2014) or analysis regarding the evidence and sources of momentum profits (Misra and Mohapatra, 2014) are often used for in implementing the business decision.

In recent years, numerous studies referring to conventional conversion to organic farming have been carried out, with different outcomes. Patil et al. (2012) compared the economic and environmental sustainability of conventional agricultural activities with organic agricultural activities. The study addresses the differences between conventional farming and organic farming activities in terms of economic (i.e. yields, input costs, net returns) and environmental (i.e. nutrient loss, nutrient balance, water use, biocide index) indicators in two regions of India. The main results show that organic farming has potential to increase net returns, reduce the risks of crop failure and reduce environmental impacts. However, these advantages are shown to be site-dependent and organic farming might lead to soil nutrient depletion and decreasing yields, if the livestock density and manure production is insufficient. Karali et al. (2011) present a novel approach to the analysis of rural land use/cover change that integrates agent-based models with a multiphase social survey. The study (Karali et al., 2011) underlines the human dimension of land use; findings from model's application to a farming area in Switzerland are used as an illustrative example to support the argument for the need to obtain insights into human decision-making processes and their complex interactions with the locale-specific environment.

In another study, Goewie (2002) reveals the challenges that organic sector currently faces and the opportunities and the threats that are expected to confront organic production in the coming years. In the author's reasoning, the success of organic production is based on producers who are well motivated about their roles in society at large. These producers need to be empowered and therefore enabled to put their holistic views into practice, and show a strong will in terms of organizing their know-how and supporting information networks according to their own criteria. The future success of organic agriculture will be determined above all by consumer demands. In another studies, researchers (Morgan and Murdoch, 2000) examine the distribution of economic knowledge within two food chains: the conventional food chain, which relies on intensive inputs into the food production process, and thus tends to distribute knowledge towards input suppliers, and the organic food supply chain, which distributes knowledge back towards the farm as farmers must relocalise their understandings of the production process. In a previous research Cobb et al. (1999) studied the changes in soil conditions, biodiversity and socio-economic welfare linked to the conversion from non-organic to organic production. The main findings show that there are definite environmental and economic advantages arising from organic agriculture that are not fully reflected in the present pattern of agricultural incentives in UK. The study also showed that variations in farm management practice strongly influence the notion of on-farm and off-farm environmental consequences. On the other hand Vidal et al. (2013) studied agricultural efficiency, comparing organic wine farms with conventional ones.

In literature, numerous studies have reviled the advantages of promoting organic agriculture in valuing the inland agricultural potential. As Pretty (1995), Singh (2000), Altieri (2002), Rasul and Thapa (2004), Bengtsson et al. (2005), and Eickhout et al. (2007) argue not only the most visible advantages of the organic agriculture could be highlighted: conserving soil and water resources, improving soil and water quality, enhancing diversity, sustaining yield, producing quality products, natural pest control with less environmental pollution, but also numerous disadvantages: labour intensive, needs constant attention and skills, needs abundance of natural input material, and in transition periods (two years for arable crops) often yield reductions occur (Prasad, 2005). Debates organic vs. conventional are discussed in what follows.

Worldwide, the organic vs. conventional farming had generated great debates. On the one hand, Smil (2000) considers that intensive agriculture that utilizes large quantities of inputs in the form of fertilizers, pesticide, labour and capital made it possible to grow enough food to meet the current global needs. On the other hand, these practices made agriculture a major driver of land use change (Goldewijk and Ramankutty, 2004; UNEP, 2005), leading to environmental damage and degradation of several ecosystem services. The main goal expressed by United Nation is to meet the food demands of a growing population to achieve Millennium Development Goals (MDGs) by 2015 that include the eradication of hunger (UN, 2005) and yet maintain and enhance the productivity of agricultural systems (UN, 1992). It seems that food security and organic farming drive to totally different land uses: one is intensive and the other one is extensive.

Conventional farming is the model of intensive or productivist agriculture, issued in 40, with its main features (Morgan and Murdoch, 2000): economic and strategic rationale, political commitment and administrative authority, technological innovation aimed at increasing output and productivity. Farmers were expected to maximize efficiency and maximize value for taxpayers' money. The keyword in conventional agriculture is efficiency, as a result of high yield due to high allocation of factors: machineries, pesticides, fertilizers, selected seeds, etc. With the widespread use of chemicals however, the relationship between the farm and the local ecosystem was to some considerable extent disrupted. Largely, productivity is achieved due to the use of chemicals in combating both weeds and pests and in fertilizing the crops. But chemicals' use harms environment and ecological systems, and, furthermore, human health. These are the reasons why organic farming becomes an alternative to the conventional one.

"Organic farming is considered a remarkable phenomenon, because it originated without the support of government, scientific institutions, extension services or special legislation. From the outset, organic producers were people acting upon an inner urge, passion, courage, perseverance and team spirit. Already at an early stage they saw disadvantages in the use of synthetic chemicals and therefore maintained traditional methods such as crop rotation and organic manuring – methods that they considered trustworthy" (Goewie, 2002).

Organic agriculture generates many advantages (environmental, social and economic) associated with a change of direction towards a more sustainable agricultural future (Cobb et al., 1999) and with food health and safety (Dyson, 1996). It is based on crops' rotation and it follows the rhythms of nature.

In this research, organic agriculture is consider as one variant of sustainable agriculture and not the only possible substitute for conventional farming, because a total conversion of a farm to organic agriculture puts pressure to profitability.

Increasing concerns about food security in least developed and developing countries require a wide range of sustainable agricultural practices (combining some organic and conventional practices) to fulfil the food demand of a growing population (Ericksen et al., 2009). There are some characteristics of organic farming that make it an advantageous direction of land use: it offers great potential to develop low cost, low input, locally available eco-technologies to produce food and fibber (Badgley et al.,

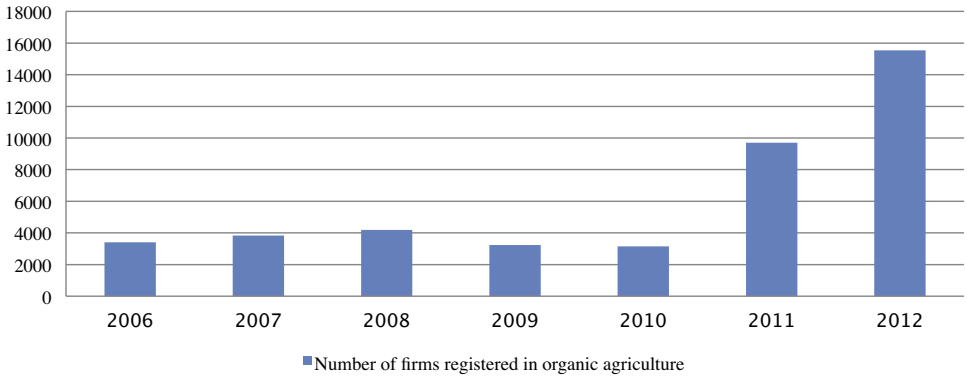

Fig. 1. Evolution of firms activating in organic agriculture in Romania, 2006–2012.

Source: Based on (MARD, 2014).

2007), without causing damage to human health and the environment (UN, 2008). Another advantageous feature is that this type of ecological knowledge can be easily transferred to small-scale farms in least developed and developing countries where the need is much higher due to non-availability of other high input and costly resources (Sandhu et al., 2010).

Policy measures for promoting organic farming in Romania

Agricultural policies contain instruments for enhancing farm sustainability and promote organic production. The new European agricultural framework 2014–2020 develops a massive change of paradigms, including organic and sustainable agriculture. As it was argued in previous studies (Andrei and Darvasi, 2012; Andrei and Dusmanescu, 2012), valuing the inland agricultural potential requires an integrative approach to massive issues starting to rural tourism (Andrei et al., 2014), or approaches regarding the food security and developing the sustainable agriculture (Istudor et al., 2014) and farmers' perception on patient protection (Boubacar and Foster, 2014) or reviling models of economic growth (Gheorghe, 2014).

The European Union is committed in principle to promoting sustainable agriculture in its Common Agricultural Policy (CAP). This is one objective of the Articles 2 and 3c of the Treaty of Amsterdam (Haigh, 1998). These require the European Union to "promote harmonious, balanced and sustainable development of economic activities...a high level of protection and improvement of the quality of the environment (Article 2)", and that "environmental protection requirements must be integrated into the definition and implementation of community activities and policies, in particular with a view to promoting sustainable development" (Article 3c) (European Commission, 2010)

As member state of the European Union, Romania implements the Common Agricultural Policy and, as such, the principle of promoting sustainable agriculture. The latter involves not only high economical outputs, but also environmental and social issues. Therefore, specific measures and subsidies for encouraging organic farming are provided.

According to European Union and national legislation, the transition from conventional to organic production pass through a period named conversion. Regulation CE 834/2007, in art.2 (h) defines "conversion" as "transition from conventional agriculture to ecological in a period of time in which provisions of organic production are applied". Also in the same document it is specified the period of conversion[1] for annual crops is two years.

Romania, as member state of the European Union, benefits of European Funds of 4,098,000 € through the European Agricultural Guarantee Fund. The financial allotments are distributed among the potential beneficiaries taking into account both the type of the farm and the area converted into organic, by using certain criteria. Among these criteria and in accordance to inland regulations (Governmental Decision no.759/2010), the farms of vegetal and animal production receive specific aids, if they are registered in organic agriculture system and if their farms are in the period of conversion from conventional to organic agriculture. In this context, the aid allotments vary by farm size as: 0.30–5 ha, 540 €; 5.1–20 ha, 611.43 €; and for areas above 21 ha the aid is 510 €. The CAP and inland financial allotment support has a major impact in increasing the organic agriculture potential in attracting new producers and conversing classical agricultural areas to organic ones. In this context, mentioning the financial support amounts and farm characteristics is relevant in carrying out this research. Also these instruments are taken into consideration in the case study, when elaborating scenarios of converting the farm from its conventional system to the organic one.

Current status of organic agriculture in Romania

Organic farming emerged in Europe as a result of diseases caused by products containing contaminants (dioxin, threadworms, *Salmonella*, *E. coli*, etc.) and of lack of trust of population in measures regarding food safety. As more episodes of illness were caused by technologies of intensive industrial production based on over-fertilizing agricultural land, by using stimulators (antibiotics, hormones, etc.) in animal nutrition, a new approach emerged. It has turned into a movement in Europe, and worldwide, to obtain agricultural products through environmental friendly methods and food products through clean technologies.

The basic idea of organic production is high quality of natural products. Quality stands for the first place, while quantity and yields occupy secondary places. Lower yields of organic crops are compensated by higher prices of organic products, resulting in consumers' willingness to pay more money for safer and natural products.

The businesses seemed to be profitable, thus specialized producers began to emerge in Romania. Fig. 1 shows that the number of firms registered in organic agriculture in Romania sharply increased from 2006 to 2012, from 3409 operators to 15,544 operators (4.55 times). This dynamic demonstrates the attractiveness of organic sector and its potential of development, in the current

[1] According to Art.17, of the Regulation CE 834/2007, the process of conversion to organic agriculture means (...) abandonment of the application of chemicals, farms' adaptation to the natural biological circuit of vegetal and/or animal production, investments for changes and adjustments.

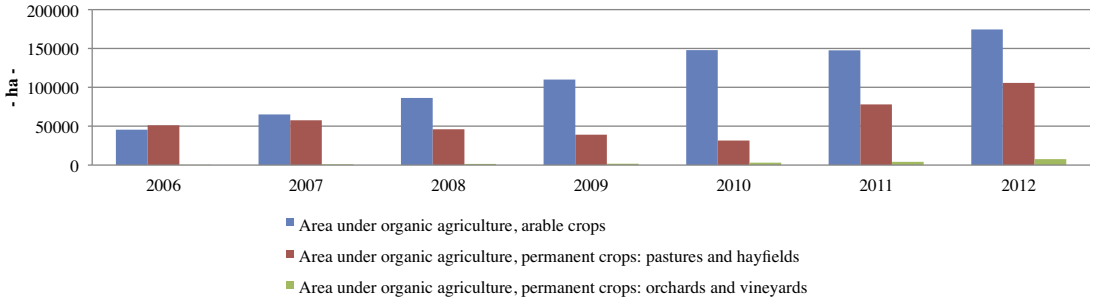

Fig. 2. Evolution of the area under organic agriculture in Romania, 2006–2012.

Source: Based on (MARD, 2014).

stage of Romanian agriculture transformations for achieving performances.

Worldwide, almost 31 million hectares are used for organic production (practiced in over 633,890 farms) representing 0.7% of total agricultural land (Ion, 2011). Seven of the top ten countries of the world, ranked by percentage of agricultural land worked in the ecological system, is the European Union. As seen in official publications of European Commission (European Commission, 2010), "in 2008 it is estimated that there were about 197,000 holdings involved in the organic sector in the EU-27, i.e. 2.9% of all holdings in the EU-15 (comparison with the total number of holdings in 2007 according to the Farm Structure Survey) but a mere 0.6% in the EU-12 (where the total number of farms is largely inflated by very large numbers of small farms, in Poland and Romania in particular)" (European Commission, 2010) (Fig. 2).

In Romania, the area under organic agriculture cultivated with arable crops increased 3.8 times from 2006 to 2012, from 45,605 ha to 174,644 ha. The total area of arable land is 9,352,000 ha (NIS, 2012). The share of organic arable land in total arable land is 1.86%, less than the average share in European Union countries, where, in 2008, the area under organic farming accounted for 4.3% of utilized agricultural area in the EU-27 (European Commission, 2010).

Pastures and hayfields under organic farming doubled in the period analyzed, from 51,200 ha to 105,835 ha. The total area under pastures and hayfields is 4,831,200 ha (NIS, 2012), the organic system accounting for 2.2%. The area under organic farming with orchards and vineyards increased from 294 ha in 2006 to 7781 ha in 2012 (26 times). The total area under orchards and vineyards is 407,400 ha, organic system representing 1.9%. As it is in Fig. 1, the number of specialized producers increased. They offer distinctly labelled products, traded at higher prices.

As a result of data analysis, in Romania, organic sector has insignificant weight in agro-food system, in those regarding agricultural area. However, accelerated growth of area under organic farming in the last years shows the high potential of development organic businesses in Romania. The attractiveness of the sector made farmers to convert part of their land to organic farming. Taking into account all the considerations above, agriculture must provide enough food to feed the growing world population, but it needs new mechanisms and policies to maintain and enhance farming sustainability without compromising yields. Such measures and instruments are discussed further.

Material and methods

In this research it was considered a Romanian agricultural farm from Northwest Region which has under exploitation 452 ha of agricultural area with main object of activity production and marketing of grain and oilseeds. For analyzing the efficiency of conventional farm and the perspective of conversion gradually an area of 20 ha to organic, three scenarios have been developed. The farm has been chosen for research because it has a major influence in local community, high degree of farm technical endowment and appropriate structure of production.

In this case, the farm has the whole agricultural machinery needed for developing agricultural services: two harvesters, six tractors, one seeder, and one sprayer, plough and combine harvester. The average area per tractor is 113 ha. Workforce consists of ten persons, of which two in management and eight in production. The labour productivity is 47,784 €/person, in 2013. As concerning the structure of production, the farm has a relatively simple structure consisting in cereals and oilseeds: wheat, maize, sunflower, and soybean for which the land allocation is shown in Fig. 3.

Taking into account the crops' shares in total area, cereals account for 81.6% and oilseeds for 18.4%. The structure is well balanced, if the rational use of land (in terms of achieving crop rotation,

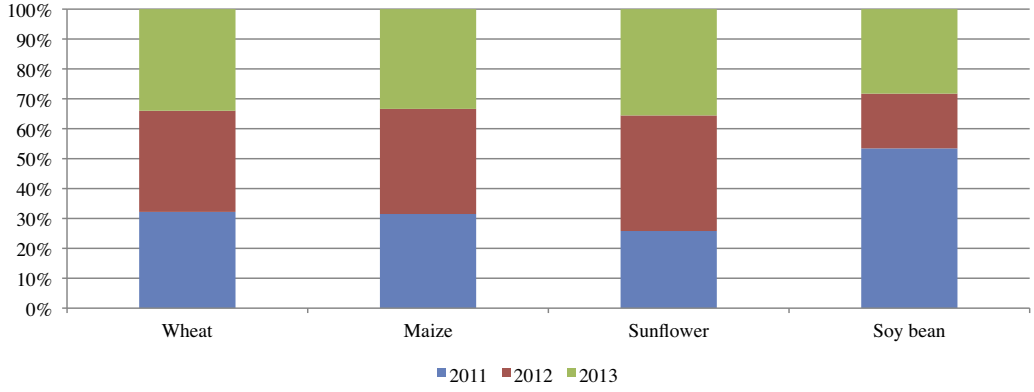

Fig. 3. Evolution of land crops' allocation, 2011–2013.

Source: Authors' own computation based on field research.

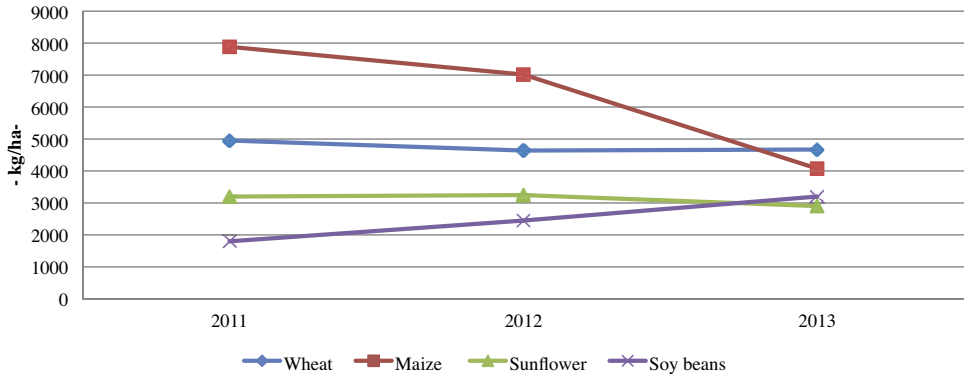

Fig. 4. Evolution of farm average production, 2011–2013 (Kg/ha).
Source: Authors' own computation based on field research.

especially the requirements of practicing organic farming) is considered, and economic factors (high demand for these products) and social ones (represented by the fact that Romanian has long tradition in the cultivation of cereals and oil plants).

As regards the average production, significant results can be noticed (Fig. 4). Both cereals and oilseeds have higher yields, compared to the national average. For example, in 2012, the last statistical year, the national average yield for wheat is 2.6 t/ha (MARD, 2014), and the farm achieved 4.6 t/ha. Moderate inflexions in production can be noticed, but they are not significant, except maize, in 2013, when yield is much more below the level obtained in 2011 and 2012 (4 t/ha compared to 7.8 t/ha, respectively 7 t/ha). As regards total production, it increased to wheat and decreased to maize and soybeans. The dominant cause of production oscillation is area cultivated and not yields for each crop.

Production factors (inputs) have been purchased from outside the farm: chemical fertilizers, pesticides, fuels and seed. Their use in the production process generates significant variable costs affecting the overall level of production cost and total expenditure. Considering the nature of the factors of production, the structure of their expenditure was maintained during the period under analysis: 35.7% chemical fertilizer, pesticide 14.5%, fuels 27.6% and seeds 22.2%. Besides these, the structure of expenditures includes: expenses of labour (13.6% for wheat crop, 15.9% for maize crop, 8.5% for sunflower crop and 16.7% for soybean crop), rent expenses (17.8% wheat, 11.2% for maize and 7.9% for sunflower).

Considering the type of crop, the structural spending has different weights: 39.1% wheat, 37.2% maize, 19.1% sunflower and 4.6% soybean. Total expenditure on farm level tend to increase, resulting of input price growth, which is evident for Romanian agriculture, where lack of organizational support is identified upstream to financially support farmers.

The farm revenues, generated from the sale of grain and oilseed crops, have oscillatory trend by product, determined, mainly, by the selling price variation. The same situation for the whole activity can be noticed. By product, important contributions have cereals, whose large area (extensive character) and relatively higher production compared to oilseed have led to a higher share in total income (Table 1). Economical results, by crops and in dynamic, are presented in Table 5, the budget of revenues and expenditure. Significant variation of rate of profit can be noticed. This is a result of market instability, as refers to prices and supply and demand balance. In 2013, the economic activity recovers and results seem to strengthen.For assessing economical efficiency of the new structure of production that includes organic wheat, the revenues and expenditure per hectare are needed. Previous research (Manescu and Dobre, 2012) shows that expenditure per hectare for organic wheat are 1000 €/ha, and revenues per hectare are 1100 €/ha. It results a level of profit of 100 €/ha. Also, revenues and expenditures for crops that farmer already cultivates must be considered for assessing economic efficiency of the new structure of production. Expenditure and revenues per hectare have been calculated as simple arithmetic average of their levels in the period 2011–2013, because, as shows other studies (Soproni et al., 2009), one single year is not relevant for economic results in agriculture, as long as yields are significantly influenced by weather conditions and products' prices and, as such, farm revenues, are dependent on market demand.

Results and discussions

The weaknesses identified in analysis of economical activity of the farm drives to the need of changing the structure of production, towards more efficient crops. Furthermore, changes in structure of production should be made, considering the conversion to organic farming. For developing scenarios of conversion, financial aids paid by state, in accordance with agricultural policy measures, should be taken into consideration. A farmer who decides to convert part of its area to organic farming receives supplementary payments, depending on the area under conversion. Potential scenarios of conversion

Table 1
Production sold, prices and revenues (t, €/t, €).

Specification	2011			2012			2013		
	Production sold	Price	Value	Production sold	Price	Value	Production sold	Price	Value
Wheat	681.6	281.8	192,087	830	220.5	182,977.3	745	250	186,250
Maize	1348	143.2	193,009	1265	159.1	201,250	712.5	265.9	189,460.2
Total revenues from cereals sales	–	–	385,096	–	–	384,227.3	–	–	375,710.2
Sunflower	105.6	795.5	84,000	162.3	545.5	88,527.27	262.4	454.5	119,272.7
Soybean	124.2	227.3	28,227	58.8	386.4	22,718.18	82	431.8	35,409.09
Total revenues from oilseeds	–	–	112,227	–	–	111,245.5	–	–	154,681.8
Total revenues	–	–	497,392	–	–	495,472.7	–	–	530,392

Source: Authors' own computations based on farm records.

Table 2
Structure of production, expenditure, revenues and profit for module with 5 ha of organic wheat.

Crop	Area		Expenditure			Revenues			Profit		
	ha	%	€/ha	€	%	€/ha	€	%	€/ha	€	%
Wheat (conv.)	180	39.8	990	178,200	38.3	1039	187,020	35.8	49	8820	15.3
Wheat organic	5	1.1	1000	5000	1.1	1100	5500	1.1	100	500	0.9
Maize	184	40.7	929	170,936	36.8	1065	195,960	37.5	136	25,024	43.3
Sunflower	46	10.2	2079	95,634	20.6	2302	105,892	20.3	223	10,258	17.8
Soybean	37	8.2	415	15,355	3.3	771	28,527	5.5	356	13,172	22.8
Supplementary payment							540				
Total (after the first two years of conversion)	452	100	–	465,125	100	–	522,899	100	–	57,814	100
Total (in the first two years of conversion)				460,125			517,939			57,814	

Source: Authors' own computations.

Table 3
Structure of production, expenditure, revenues and profit for module with 10 ha of organic wheat.

Crop	Area		Expenditure			Revenues			Profit		
	ha	%	€/ha	€	%	€/ha	€	%	€/ha	€	%
Wheat (conv.)	175	38.7	990	173,250	37.2	1039	181,825	34.8	49	8575	14.8
Wheat organic	10	2.2	1000	10,000	2.1	1100	11,000	2.1	100	1000	1.7
Maize	184	40.7	929	170,936	36.7	1065	195,960	37.5	136	25,024	43.1
Sunflower	46	10.2	2079	95,634	20.6	2302	105,892	20.2	223	10,258	17.7
Soybean	37	8.2	415	15,355	3.3	771	28,527	5.5	356	13,172	22.7
Supplementary payment							611.43				
Total (after the first two years of conversion)	452	100	–	465,175	100	–	523,204	100	–	58,029	100
Total (in the first two years of conversion)				455,175			512,815			57,640.4	

Source: Authors' own computations.

are 5 ha, 10 ha and 20 ha, because the supplementary aids received by farmers vary within these ranges. The areas above 20 ha have not been considered, because higher production of organic wheat needs to be sold on a market which is not enough developed in Romania and where the farmer does not hold commercial relationships with potential clients. This is the reason why more than 20 ha, and, as such, almost 44 t of organic wheat, seems to be risky to consider.

During the research three scenarios have been developed, as follows. First scenario takes into account conversion to 5 ha under organic wheat (Table 2). The 5 ha agricultural land is the upper limit of the range where farmers receive 540 € for conversion. The second scenario takes 10 ha under organic wheat (Table 3). The 10 ha agricultural land is the middle of the second range of the supplementary payment of 611.43 €.Considering the third scenario, 20 ha of wheat is converted from conventional to organic production (Table 4). 20 ha is the upper limit of the range where farmers receive 611.43 € for conversion.The three scenarios have been developed starting from the following common elements: introduction of organic wheat within the structure of production, total existing area of farm, maintenance of other cultures in the structure, income, expenditure and, obviously, profit per hectare. What distinguishes them are: share of organic wheat in total area, and its related additional payments, and economic results obtained during and after the conversion period.

Economic efficiency of farm in the first two years of conversion and after the two years of conversion

The economic result (profit rate in particular) has been determined by the size (module size) for which the forecast has been made and the state support for creating organic farms or plots of land transformation through the application of green technologies. Summarizing, the rates of profit for scenarios considered before are presented in Fig. 5.

The economic efficiency of farm in its new structure shows linear growth rate of profit. The growth is analyzed in several ways:

(i) For the same period and between periods of conversion and per module of size;
(ii) Economic results obtained in organic system compared to conventional (organic vs. conventional).

For the same period and between periods of conversion and per module of size

In the first two years of conversion, 2014–2016, the rate of profit has grown, as a result of introducing organic wheat within the structure of production. This growth is different depending on module of size: 12.6% for 5 ha module, 12.7% for 10 ha module and 12.8%

Table 4
Structure of production, expenditure, revenues and profit for module with 20 ha of organic wheat.

Crop	Area		Expenditure			Revenues			Profit		
	ha	%	€/ha	€	%	€/ha	€	%	€/ha	€	%
Wheat (conv.)	165	36.5	990	163,350	35.1	1039	171,435	32.7	49	8085	13.8
Wheat organic	20	4.4	1000	20,000	4.3	1100	22,000	4.2	100	2000	3.4
Maize	184	40.7	929	170,936	36.7	1065	195,960	37.4	136	25,024	42.7
Sunflower	46	10.2	2079	95,634	20.6	2302	105,892	20.2	223	10,258	17.5
Soybean	37	8.2	415	15,355	3.3	771	28,527	5.4	356	13,172	22.5
Supplementary payment				–			611.43				
Total (after the first two years of conversion)	452	100	–	465,275	100	–	523,814	100	–	58,539	100
Total (in the first two years of conversion)				445,275			502,425			57,150.4	

Source: Authors' own computations.

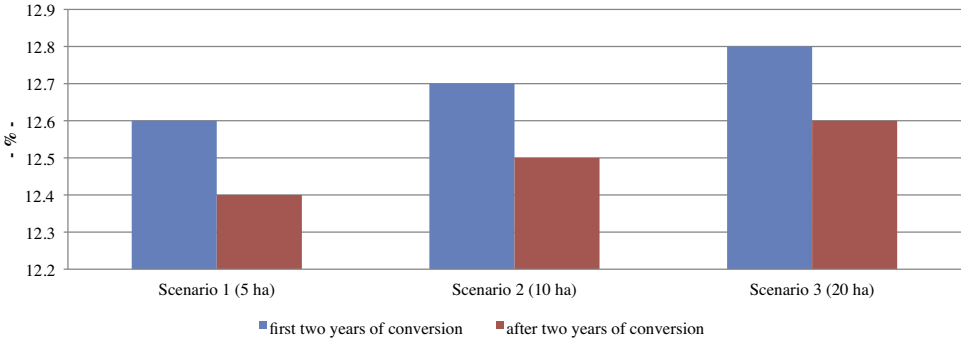

Fig. 5. Rate of profit for different size of organic conversion.
Source: Authors' own computation based on field research.

Table 5
Budget of revenues and expenditure, 2011–2013 (€, €/ha).

Specification	2011				2012				2013			
	Wheat	Maize	Sunflower	Soybean	Wheat	Maize	Sunflower	Soybean	Wheat	Maize	Sunflower	Soybean
Total revenues (€)	192,087.3	193,009.1	84,000.0	28,227.3	182,977.3	201,250.0	88,527.3	22,718.2	186,250.0	189,460.2	119,272.7	35,409.1
Revenues per hectare (€/ha)	1116.8	1128.7	2545.5	409.1	994.4	1037.4	1770.5	946.6	1006.8	1029.7	2592.9	957.0
Expenditure (€)	172,527.0	163,260.9	83,836.6	20,297.3	180,437.7	171,684.3	87,939.5	21,431.6	182,945.1	174,070.1	89,161.6	21,729.4
Expenditure per hectare (€/ha)	1003.0	954.7	2540.5	294.2	980.6	885.0	1758.8	893.0	988.9	946.0	1938.3	58.4
Profit (€)	19,560.2	29,748.2	163.4	7930.0	2539.5	29,565.7	587.7	1286.6	3305.0	15,390.2	30,111.2	13,679.7
Profit per hectare (€/ha)	113.7	174.0	4.9	114.9	13.8	152.4	11.8	53.6	17.9	83.6	654.6	36.8
Rate of profit (%)	11.3	18.2	0.1	39	1.4	17.2	0.66	6	1.8	8.8	33.7	63

Source: Authors' own computations based on farm records.

for 20 ha module. A higher growth of rate of profit from module of 5–10 ha can be noticed, compared to the growth of rate of return from 10 ha to 20 ha, determined by the level of supplementary payments sustained by state, which support conversion of smaller agricultural areas to organic farming. As a result, the value of supplementary payments is not proportional with area (0.30–5 ha, 540 €; 5.1–20 ha, 611.43 €; and for areas above 21 ha the aid is 510 €).

After the two years of conversion (after 2016), for the same modules of size for which scenarios have been elaborated, the rate of profit is also increasing, from 12.4% for module of 5 ha to 12.6% for the module of 20 ha, but lower than its level in the first two years of conversion, as a result of the fact that supplementary aids are not paid any more. Thus, final economic results are the difference between effects (revenues) and effort (expenditure). We have to mention that the percentages obtained in the period after conversion (12.4%, 12.5% and 12.6%) were calculated for the year 2013 in terms of costs, average selling prices and production. However, the amounts of income and spending, and the average production volume are variables that can lead to changes in the sense of the increasing or decreasing the efficiency of the farm.

Economic results obtained in organic system compared to conventional

The evolutions of the main indicators computed and analyzed reviles that the decision to convert conventional crop's area to organic is appropriate and it records acceptable levels of efficiency. An important role in adopting the decision to convert is the state financial aid allotment for such operations, which highlights the need of maintaining the economic stimulus both from the government and through the CAP financial measures.

During the period 2011–2013, the rate of profit of the business was 11.8%, with large oscillations of wheat profitability. Moreover, during this period, profit of wheat crop recorded the lowest level among all cultures (1.4% in 2012 and 1.8% in 2013 compared to other crops: 17.2% and 8.8% to corn and 39.0% and 63% to soybean, in the same years). As a result, for developing scenarios, these shares have been considered in respect of increasing efficiency. Thus, the consecutive conversion of the 5, 10 and 20 ha of conventional into organic one using wheat crop drives to increasing farm's economic efficiency, expressed by the rate of profit. The latter has increased, both in the first two years of conversion, when financial aid has been allocated by the state, and after this period. In the first two years, the growth will be higher by 0.8% for 5 ha of organic wheat, respectively 0.9% and 1% for 10 ha and 20 ha. After the conversion period, it will also rise. The growth will be slower than in the first two years (because of the lack of additional financial support of the state), but it will get, in addition to the year 2013, 0.6%, 0.7% and 0.8% for 5 ha, 10 ha and, respectively, 20 ha, the corresponding surfaces for which the scenarios have been developed.

The level of the business profit during 2012–2013 encourages the farmers to consider promoting more actively organic agriculture against conventional agricultural production systems. Despite the oscillations of profitability, organic agriculture could be considered as an actual method for increasing results in valuing the inland agricultural potential in context of a transitional economy as Romania continues to be (Table 5).

Conclusions

The recent evolutions of the Romanian agriculture demonstrates, that, despite the massive changes in land tenure, production and farm structures, lack of capital investments, reduced levels of efficiency, it is capable to promote organic agriculture as a fundamental factor in increasing the capitalization potential. As it was reviled in recent studies (Ciutacu et al., 2014) between the EU agricultural and rural development model and Romanian agriculture are still massive dissimilarities which need to be challenged and overcome. In this context, an analysis regarding the possibility of promoting organic agriculture in Romania, as alternative and

instrument of a better agricultural paradigm, comes to complete the research panoply in highlighting the opportunities for future development.

From this perspective, the research had as a primary objective to investigate whether is more profitable for a farm to convert conventional crops to organic ones, in actual conditions of inland agriculture developments. So, in a production approach, a final answer to the research question is that organic wheat brings higher returns than conventional one, but when farmers decide how much of their land to convert to organic farming, they should answer the question whether they can sell the production, and to consider the market approach and its opportunity to sell. For Romanian agriculture the process of converting important crop areas from classical to organic agriculture may represent a favourable decision in increasing the rural farmers' revenues which are constrained to practice subsistence farming, due the lack of capital investments and land fragmentation.

In this regard, the research targeted, in the beginning, the conversion of a part of the total arable land owned, developing the three scenarios to evaluate the results. The case study has been developed for wheat crop, cultivated under organic system in surfaces of 5, 10 and 20 ha. The findings show that the economic efficiency is slightly higher in organic system compared to conventional. The results are in accordance to the findings of other researches (Patil et al., 2012), that show that organic farming has potential to increase net returns, reduce the risks of crop failure and reduce environmental impacts.

In a social responsibility approach and ecological knowledge perspective, organic farming may be a good business for producers. The beneficial effects of organic farming to environment must be, also, considered. The findings surprise, also, the fact that organic farming should be viewed as a technological alternative to conventional agriculture in terms of obtaining performance, and to ensure food safety for population. Land use conversion to organic became an opportunity for those who manage agricultural businesses. The high level of land fragmentation and the increasing number of small farms in Romanian agriculture makes more suitable the organic farming instead of conventional one. The rural farmers may choose organic agriculture as a viable option. Opportunity is given by the demand of organic products increasingly desired by consumers. Future research should investigate organic products' market and identify its trends to see whether organic agricultural products have potential of development in a larger context of new CAP changing paradigm. In such conditions, farmers should consider organic land use as a decision to be taken.

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