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## Co-Financing of Organic Farming in the EU: Necessity or Fantasy?

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### **Abstract:**

**Purpose:** The purpose of the work is to analyse and assess the situation of organic farming in the EU, as well as the support system that is targeted at this type of activity.

**Design/Methodology/Approach:** Organic farming has shown dynamic growth and development in the last two decades, especially in economically developed countries. The study concerns sources of support for the development of organic farming in EU countries. An analytical and descriptive method based on Eurostat Faostat, Polish FADN, Statistical Yearbook of the Republic of Poland, as well as official documents and reports were used. The development of the number and area of organic farms was analysed, and mechanisms of financing ecological activity on farms were discussed.

**Findings:** Based on the analysed information, it was found that organic farming is not developing in a similar way in all EU countries. The results of the analyses show that the main reason for conducting this type of production was the compensation paid to farmers under the CAP.

**Practical Implications:** The obtained results can be used in analyses of agricultural policy in the scope of supporting farmers conducting production with the ecological system, considering the international perspective. Such studies are not carried out very often, and in addition, changes occur so quickly that the phenomenon should be monitored on an ongoing basis.

**Originality/Value:** The results and conclusions are crucial because they indicate that the policy used is important and should be expanded. The legitimacy of using both the national and EU financing system for the development of organic farming has been demonstrated. Financial support should be more flexible and tailored to the needs of beneficiaries.

**Keywords:** Organic farms, agricultural income, support measures.

**JEL codes:** Q5, Q15, Q18.

**Paper Type:** Research article.

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## 1. Introduction

Agriculture is an especially important area of the economy because it provides society with the necessary food products. Agricultural production is closely related to resources, the state of the environment and climate, and at the same time also affects the environment. These environmental conditions have been included in the Common Agricultural Policy of the European Union. This is reflected in, among others, promoting organic farming. The United Nations Food and Agriculture Organization defines organic farming as "*holistic production management systems which promotes and enhances agroecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, considering that regional conditions require locally adapted systems. This is accomplished by using, where possible, cultural, biological and mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system*" (FAO, 1999). Organic farming is developing due to consumer demand for good quality food products, using sustainable farming practices and contributing to environmental protection. As indicated by Perpar and Udovč (2019), organic farming also meets certain social aspects, such as employment opportunities, due to the high demand for labour.

The purpose of this work is to analyse and assess the situation of organic farming in the EU, as well as the support system that is targeted at this type of production.

## 2. Literature Review

Facing the inevitable economic crisis, which is a consequence of the fight against the Covid-19 virus, as well as the ubiquitous drought (caused by the lack of atmospheric precipitation in winter and dry spring 2020) in the European Union countries, an important topic of research is the functioning of agricultural farms, especially ecological ones and the possibilities of their financing or co-financing. Some experience (functioning in a difficult, changing environment) can be derived from research embedded in the period of transformation after the liberation of Central and Eastern European economies, when entrepreneurship was born in a new, difficult and capital-demanding economic environment. However, one of the key areas of research in this difficult time of the impending economic crisis (as a result of the Covid-19 epidemic) is the efficiency of organic farms, taking into account climate change and difficulties with rapid adaptation of agricultural producers to these changes (long production process, and especially investment).

Within the broadly understood negative effects of agricultural production, which are significant from the point of view of organic production, we can distinguish increasing concentration of greenhouse gases, an intense reduction of the worldwide consumption of harmful substances damaging the ozone layer, the growing mobility, destroying of the environment, growing number of global agreements (Svatoš, 2008). Research from around the world shows that production based on the principles of organic farming gives lower yields than conventional agriculture (Schrama *et al.*

2018). However, lower yields can be offset by numerous benefits, including increased soil fertility, stable production and high quality food, reduced pollution and protection of agroecosystems, income security and strengthening of local communities, and promotion of public health (Roljevic-Nikolic, Vukovic, and Grujic, 2017; Leifeld, 2012; Aldanondo-Ochoa, Casanovas-Oliva, and Arandia-Miura, 2014).

One of the elements limiting the risk of organic farm activity is a higher level of capital. In addition, the public debate on food safety, animal welfare and sustainable food production has resulted in a rapid increase in the importance of organic farming in Europe, and thus an increase in the demand for capital in agriculture (Tiedemann and Latacz-Lohmann, 2013). Therefore, it is important to undertake analyses regarding co-financing of ecological farming activities from European Union aid programs and assessing the efficiency of these farms.

When examining the period of agricultural transformation in Slovenia, it was found that in order to compete in terms of quantity and quality of the product with their farm counterparts in the EU and other global economies (farms are larger in some EU Member States) farms need to implement large investments to be able to increase size and implement modern technologies. Improvement of agricultural technology may also make it possible to reduce the employment of the labour force in the agricultural sector, and these employees can be more efficiently used in other sectors of the economy, such as tourism and other service activities (Bojnec and Latruffe, 2011). On the other hand, the transition from conventional agriculture to organic farming on farms in Canada takes a minimum of 3 years, and three statistically significant factors for the state of farmers' finances are identified, namely: 1) trouble attaining funding for additional costs associated with organic production, 2) negative response from financial institutions, and 3) legislation hinders conversion<sup>4</sup> (Cranfield *et al.*, 2010). This process is lengthy and expensive.

Co-financing of agricultural activity with aid has evolved. There have been radical changes generated within the framework of the common agricultural policy and various reforms, where eventually there has been a historical development of the common policy from market orientation to support for farmers and measures related to sustainable development and environmental protection (Drăgoi and Bâlgăr, 2016). In addition, an important argument for financial support for agriculture is that by nature agricultural production is characterized by a certain level of unpredictability. As a result, prices are often more volatile over time than, for example, industrial goods prices (Vander Stichele *et al.*, 2012). During the crisis, when consumers reduce spending, it may be necessary to "get out" of organic farming. "Getting out" from agriculture, including organic farming, can be a costly process (Tiedemann and Latacz-Lohmann, 2013). Another problem related to financing agriculture is investment in water protection infrastructure, which is one of the basic instruments for improving efficiency and adapting agriculture to climate change. The next

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<sup>4</sup>The cited studies consider the much wider context of the agricultural entrepreneur's situation.

financing need is in the area of agricultural technologies, as research potential is generally low. The area requiring support is building the adaptive capacity of agricultural entrepreneurs in changing operating conditions and risk management skills in these conditions (Huang and Wang, 2014). Research conducted for agriculture in Brazil, Serbia and Ukraine shows that the chronic lack of financial resources in the agricultural production phase (before harvest) is one of the most common factors limiting the achievement of better production results, and thus financial results (Kovačević *et al.*, 2018). Similar challenges are faced by agriculture located in the Canadian prairies, which is susceptible to climate shocks, manifested by an increase in temperature and changes in the rainfall pattern (increase of spring precipitation and their decrease in summer), which causes stretching during the dry vegetation period in agriculture (Lazurko and Venema, 2017).

One of the significant problems of financing agriculture is the impact of the expected financial return on environmental investments on the borrower's side, and therefore also the financing options available to farmers. It has been found that there are, from an environmental point of view, friendly practices that may have different levels of integration of agriculture and crops. As a result, the profitability condition may not apply to all possible investments. In some cases, farmers may be forced to opt out of the environmental option for economic reasons (Migliorelli and Dessertine, 2018). This observation is independent of the geographical location of agricultural activity and applies to all corners of the world. Only the scope and level of dilemmas of farmers are different if they have to make less environmentally friendly choices for economic reasons.

In addition, most African countries have insufficient levels of national financial resources that could be allocated to investment in agriculture. To achieve the target rate of agricultural-based economic growth, external financing (as foreign investment or foreign loans) would be needed to fill the financial gap (Obansa and Maduekwe, 2013). However, there are already systems that simultaneously support benefits for the farmer and the environment. Public payments for agri-environmental services clearly compensate farmers for reducing emissions or avoiding other negative externalities of agriculture (Schläpfer, 2020; Pajewski and Gołębiewska, 2018). However, the situation varies geographically.

The current problem for agricultural micro enterprises is that in financial markets, increasingly complex and competitive clients with low financial knowledge do not have the necessary information and tools to make conscious choices. Therefore, it limits their possibilities of obtaining beneficial financing sources that could enable the implementation of innovations, and thus, development (Otilia, 2014). An interesting solution has been adopted in the German market, where the sustainable food market, although it is still a niche, an increasing number of companies in the German organic food sector are using Community funding to replace or supplement traditional bank loan financing (Behrendt *et al.*, 2019 ).

Organic farming and integrated farming have a particularly important function on several levels, contributing to the development of rural economy. The environmental benefits of these farming systems can have positive effects for the economy, and can also help in the social integration of disabled or mentally handicapped people, the long-term unemployed, drug addicts or people at a disadvantage, children and adolescents with behavioural and learning difficulties. In this way, you can set up farms integrating older people, school, or kindergarten children. This approach is rare. The social function of organic farming that has been developing rapidly since 2007 in Bulgaria should be emphasised as an important argument for activities, including activities that are economically satisfying for the farmer and his family (Todorova and Ikova, 2014).

### **3. Methodology**

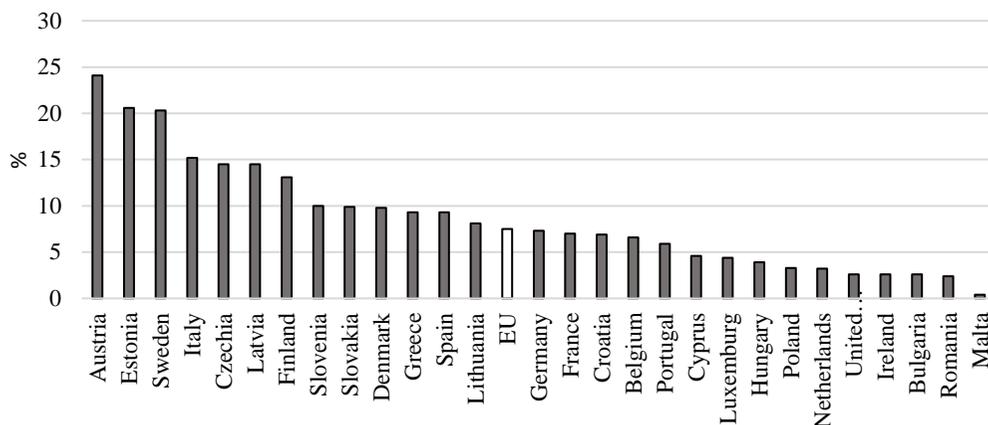
The aim of the study is to analyse the current state as well as assess the development of organic farming in the context of financing this type of activity. The research uses the desk research method, which creates the possibility of using a wide range of materials in various areas and periods. This created the opportunity for a broader analysis of the discussed issue. This is especially important when assessing the phenomena analysed globally. In this situation, a single research project would not allow such an analysis. The research material in this case was statistical data from Eurostat, Faostat, Polish FADN, Statistical Yearbook of the Republic of Poland as well as official documents and reports.

### **4. Results and Discussion**

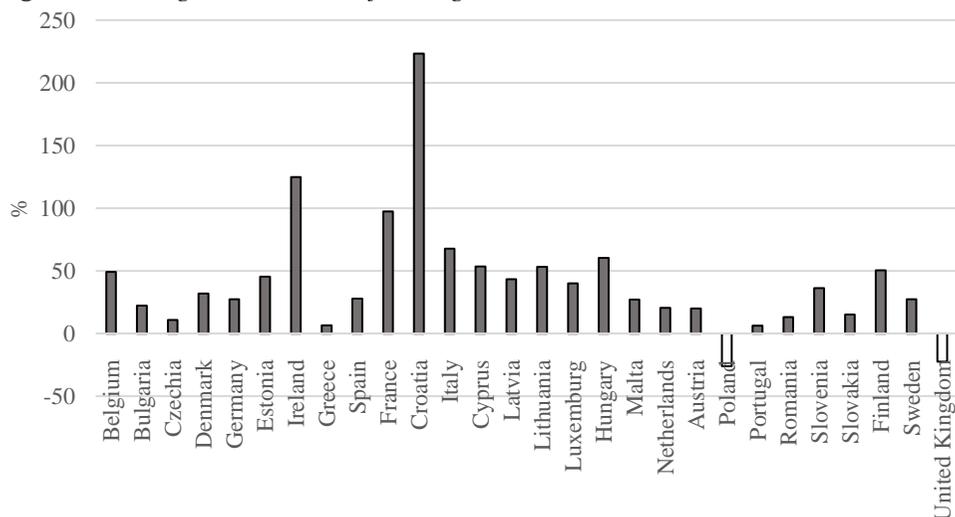
#### **4.1 Organic Farming at EU and Polish Level**

The development of organic farming is a response to the negative effects of conventional agriculture, which was observed especially in highly developed countries. They include, among others, pollution of water, soil, air, and reduction of consumer confidence in food produced by intensive agriculture. Many researchers have long been aware of this fact (Reganold *et al.*, 1987; Winqvist *et al.*, 2012). Therefore, from the beginning of the emergence of organic farms, their area has increased. In 2018, the total area of organic farmland in the EU was over 13.4 million ha, which accounted for 7.5% of the total agricultural area (EC, 2019). However, this area varied considerably between countries (Figure 1).

Austria, Estonia, and Sweden had the largest share of organic agricultural land in 2018. The smallest share of them occurred in Bulgaria and Romania. Poland at the level of 3.3% had less than half the EU average (7.5%). In general, however, the share of land under organic farming increased throughout the EU. According to EC (2019), the EU's ecological area has increased by 70% in the last ten years. Analysing the phenomenon in the years 2012-2018, it can be observed that only in Poland and in Great Britain this area decreased (Figure 2).

**Figure 1.** Share of total organic area in total utilised agricultural area (UAA)

**Source:** Eurostat 2020. Organic farming statistics. Statistics explained. Accessed from: [https://ec.europa.eu/eurostat/statistics-explained/index.php/Organic\\_farming\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php/Organic_farming_statistics).

**Figure 2.** Changes in the area of ecological land in EU countries in 2012 and 2018

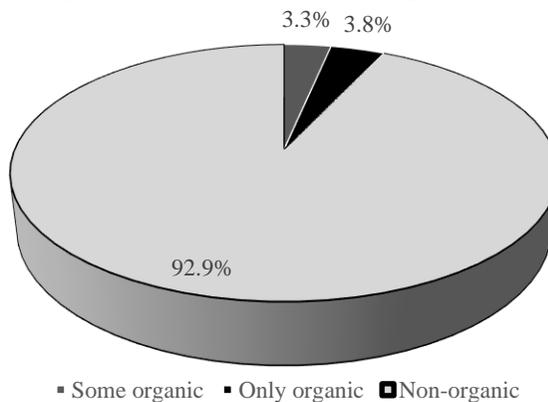
**Source:** Eurostat 2020. Organic farming statistics. Statistics explained. Accessed from: [https://ec.europa.eu/eurostat/statistics-explained/index.php/Organic\\_farming\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php/Organic_farming_statistics)

According to Eurostat data, in 2017 in the European Union there were over 305.6 thousand agricultural producers. The largest number of farms was in Italy (66.8 thousand). Over 30,000 organic agricultural producers were registered in Spain (37.7 thousand) and France (36.7 thousand). In Poland, this number was 20.3 thousand. The ministry of agriculture indicated that in 2003–2013 there was a boom in organic farming in Poland, and the number of such farms increased 11-fold (from 2.3 thousand in 2003 to almost 26.6 thousand in 2013). At present, however, their number has decreased. In 2017, only 21.4 thousand businesses were active in organic farming

entities, unlike the European Union as a whole, where this number is steadily increasing (EC, 2019a).

The share of arable land in the European Union managed by purely organic farms was 3.8% in the total arable land (Figure 3). Farms with part of the ecological area, i.e. farms with both non-ecological and ecological area, accounted for 3.3% of the total arable land area, while farms with non-ecological area managed the remaining 92.9% of arable land.

**Figure 3.** Utilised agricultural area (UAA) manager by holdings, EU-28



**Source:** Eurostat 2020. *Organic farming statistics. Statistics explained.* Accessed from: [https://ec.europa.eu/eurostat/statistics-explained/index.php/Organic\\_farming\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php/Organic_farming_statistics)

#### 4.2 Subsidies for the "Greening" of Agriculture

In order to assess farmers' income from organic farms, production costs, which are lower than on conventional farms, should be considered (Froehlich *et al.*, 2018), due to the minimal consumption of fertilizers and pesticides. Organic farming, on the other hand, is more labour-intensive, which contributes to the diversity of organic farm performance compared to conventional farms (EC, 2019a). The EU appreciates the role of organic farming for both consumers and the environment, and under the Common Agricultural Policy (CAP) for the 2014-2020 organic farmers can benefit from several support measures.

Therefore, the development of organic farming is largely associated with financial support. The CAP for 2014-2020 is a continuation of activities under the previous agricultural support system. As Stolze *et al.* (2016) said the reform introduced a new element of greening under direct payments. As in the previous programming period 2007-13, each national and regional rural development program (RDP) should use 30% of its total pillar 2 contribution to climate change mitigation as well as environmental issues. This corresponds to only 7.2% of the total EU public expenditure on agriculture for organic public goods (Table 1), in terms of compensation for undertaking sustainable farming practices (including organic

farming). Total expenditure on the total EU budget for agriculture in relation to measures causally related to environmental and climate issues is around 8.9% (Stolze *et al.*, 2016).

**Table 1.** Selected EU budget allocations for transitioning towards environmental and climate friendly practices and organic farming under the CAP 2014-2020

Budget Allocation	Billion Euro	% of total EU budget for agriculture
Total EU budget for agriculture Pillar 1 and Pillar 2	411.7	100
Greening Component (Pillar 1)		
1. Total national ceilings for direct payments 2014-2020	297.6	72.3
2. Greening component (maximum 30% of direct payments)	89.3	21.7
Climate and environment issues (Pillar 2)		
3. Contribution to environment & climate issues - including organic farming	29.7	7.2
EU budget for transition towards environmental and climate-friendly agriculture (2 +3)	119	28.9

*Source:* Based on Stolze *et al.*, 2016.

However, almost two-thirds of the EU agriculture budget is allocated to other goals, not related to environment and climate-friendly farming practices or to sustainable farming systems. On June 1, 2018, the European Commission presented proposals on how the CAP should work after 2020, where the 'aim higher' in relation to the environment and climate is clearly underlined (EC, 2019b).

Organic farming also functions independently of organic payments. The question is, to what extent subsidies for organic production in agriculture fulfil their role? It is pointed out that financial support can greatly help in running a farm using organic methods. Organic payments are ancillary to market factors, such as the development of demand for organic products.

Most organic farmers benefit from this type of financial support. Payments for organic farming in Poland under the agri-environmental program RDP 2007–2013 amounted to PLN 2.4 billion, and farmers received support for the transition to organic farming - or maintenance - for 7.7 million hectares. In the years 2014–2020, the target area increased to 10.4 million hectares. In addition, the target area covered by the agri-environment-climate measure for 2014-2020 is 31.7 million ha (EU, 2017).

In Poland, the payment rates in organic farming packages (2014-2020) range from 428 PLN / ha for permanent grassland after the conversion period to even 1882 PLN / ha for fruit and berry crops during the conversion period. However, are these rates sufficient to compensate farmers for lost profits from discontinuing production with the intensive system? The results of the Polish FADN indicate that conventional production is more economically advantageous than ecological. This is clearly stated

by Nachtman (2015) comparing farms that only produce organically and mixed farms (Table 2).

**Table 2.** *Income and share of payments in the income from a family farm*

Type of farms	Farm size (ha)				
	5 <ha≤10	10 <ha≤20	20<ha≤30	30 <ha≤50	ha>50
Income from a family farm (PLN)					
Mixed	35988	34718	62663		292383
Ecological	20289	34060	40551	58865	213829
Share of income subsidies (%)					
Mixed	46.4	78.8	75.0	.	75.1
Ecological	81.6	81.3	118.1	125.3	83.8

*Source:* Nachtman 2015.

The results of the Polish FADN show that farms with both organic and conventional production achieved higher economic results and the share of income subsidies in organic farms was higher than in mixed ones. Comparing the results with the change in the number of organic farms in Poland (decrease), it can be concluded that some farms were not engaged in production for the market, but only the collection of subsidies. On the other hand, specialised farms that produce and supply organic food are strengthening their position on the market. So, do farmers need direct financial support, which, according to the research, does not contribute to the development of such farms, or do we need to educate consumers about the benefits of organic food. What is more, organic (more expensive) food is purchased by wealthier consumers, so more attention should be paid to market regulations, which should directly compensate for the higher quality of organic products.

## 5. Conclusion

The area of arable land occupied by organic farms in individual European Union countries varies and ranges from less than 0.5% in Malta to about 25% in Austria. Poland with a share of slightly over 3% belongs to countries with a low share of such area. In addition, the number of organic producers who actually produce and deliver to the market has decreased in recent years. This indicates that some of these farms were not involved in production for the market, but only collecting subsidies. Therefore, a better organisation of support is needed to ensure subsidies for those farms that provide organic food in real terms.

Co-financing is also needed to promote organic food and educate consumers, because in order to produce, demand must be guaranteed. The growing consumer awareness has been reflected in market results for several years. As demonstrated in the study, the area of ecological land in the EU has increased in all the countries except for Poland and the UK, and therefore, the ecological products find the buyers. That is why it is generally expected in the EU that the area of ecologically used land will grow in the coming years. The organic sector responds to the growing demand for sustainable food production, and as such it perfectly fits into the objectives of the CAP.

## References:

- Aldanondo-Ochoa, A.M., Casasnovas-Oliva, V.L., Arandia-Miura, A. 2014. Environmental efficiency and the impact of regulation in dryland organic vine production. *Land Use Policy*, 36, 275-284. Doi:10.1016/j.landusepol.2013.08.010.
- Behrendt, G., Peter, S., Sterly, S., Häring, A.M. 2019. Community financing in the German organic food sector: a key for sustainable food systems? Bucharest.
- Bojnec, Š., Latruffe, L. 2011. Financing availability and investment decisions of Slovenian farms during the transition to a market economy. *Journal of Applied Economics*, 14(2), 297-317. Doi:10.1016/S1514-0326(11)60016-0.
- Cranfield, J., Henson, S., Holliday, J. 2010. The motives, benefits, and problems of conversion to organic production. *Agriculture and Human Values*, 27(3), 291-306. doi:10.1007/s10460-009-9222-9.
- Drăgoi, A.E., Bâlgăr, A.C. 2016. Financing the European Agriculture: A Comparative Approach across the Member States. 14 (1), 1-10.
- EC. 2019. Organic farming in the EU. A fast-growing sector. EU Agricultural Markets Briefs No 13. [http://ec.europa.eu/agriculture/markets-and-prices/market-briefs/index\\_en.htm](http://ec.europa.eu/agriculture/markets-and-prices/market-briefs/index_en.htm).
- EC. 2019b. The Post-2020 Common Agricultural Policy: Environmental Benefits and Simplification. Accessed from: <https://ec.europa.eu/info/sites/info>.
- FAO. 1999. Joint FAO/Who Food Standards Programme Codex Alimentarius Commission. Accessed from: <http://www.fao.org/3/a-w9087e.pdf>.
- Froehlich, A.G., Melo, A.S.S.A., Sampaio, B. 2018. Comparing the Profitability of Organic and Conventional Production in Family Farming: Empirical Evidence from Brazil. *Ecological Economics*, 150, 307314. doi:10.1016/j.ecolecon.2018.04.022.
- Huang, J., Wang, Y. 2014. Financing sustainable agriculture under climate change. *Journal of Integrative Agriculture*, 13(4), 698-712. doi:10.1016/S2095-3119(13)60698-x.
- Kovačević, V., Vasiljević, Z., Zakić, V. 2018. Pre-harvest financing in agriculture. *Agroekonomika/Agrieconomica*, 47(80), 23-31. Retrieved from <https://agroekonomika.rs/>.
- Lazurko, A., Venema, H.D. 2017. Financing high performance climate adaptation in agriculture: Climate bonds for multi-functional water harvesting infrastructure on the Canadian Prairies. *Sustainability*, 9(7). doi:10.3390/su9071237.
- Leifeld, J. 2012. How sustainable is organic farming? *Agriculture, Ecosystems and Environment*, 150, 121-122. doi:10.1016/j.agee.2012.01.020.
- Migliorelli, M., Dessertine, P. 2018. Time for new financing instruments? A market-oriented framework to finance environmentally friendly practices in EU agriculture. *Journal of Sustainable Finance and Investment*, 8(1), 1-25. doi:10.1080/20430795.2017.1376270.
- Obansa, S.A.J., Maduekwe, I.M. 2013. Agriculture Financing and Economic Growth in Nigeria. *European Scientific Journal*, 9(1), 1857-7881.
- Otilia, M.E. 2014. Innovations in rural micro financing and agriculture. *Procedia Economics and Finance*, 1-11.
- Pajewski T., Gołębowska, B. 2018. Rolnictwo a środowisko. Efekty zewnętrzne w systemach produkcji rolnej. Wyd. SGGW, Warszawa.
- Perpar, A., Udovč, A. 2019. Organic Farming: A Good Production Decision for Slovenian Small Size Farms and Farms in the Areas with Restrictions/Limitations or Natural Obstacles for Agriculture? Open access peer-reviewed chapter. doi: 10.5772 / intechopen.89716.
- Reganold, J., Elliott, L. Unger, Y. 1987. Long-term effects of organic and conventional farming on soil erosion. *Nature*. 330, 370-372. doi:10.1038/330370a0.

- Roljevic-Nikolic, S., Vukovic, P., Grujic, B. 2017. Measures to support the development of organic farming in the EU and Serbia. *Ekonomika Poljoprivrede*, 64(1), 323-337. doi:10.5937/ekopolj1701323r.
- Schläpfer, F. 2020. External costs of Swiss agriculture inferred from public expenditures for damage avoidance, 1-35.
- Schrama, M., de Haan, J.J., Kroonen, M., Verstegen, H., Van der Putten, W.H. 2018. Crop yield gap and stability in organic and conventional farming systems. *Agriculture, Ecosystems & Environment*, 256, 123-130. doi:10.1016/j.agee.2017.12.023.
- Stolze, M., Sanders, J., Kasperczyk, N., Madsen, G., Meredith, S. 2016. CAP 2014-2020: Organic farming and the prospects for stimulating public goods. IFOAM EU, Brussels.
- Svatoš, M. 2008. Selected trends forming European agriculture. *Agricultural Economics*, 54(3), 93-101. doi:10.17221/238-agricecon.
- Tiedemann, T., Latacz-Lohmann, U. 2013. Production Risk and Technical Efficiency in Organic and Conventional Agriculture: The Case of Arable Farms in Germany. *Journal of Agricultural Economics*, 64(1), 73-96. doi:10.1111/j.1477-9552.2012.00364.x.
- Todorova, S., Ikova, J. 2014. Multifunctional Agriculture: Social and Ecological Impacts on the Organic Farms in Bulgaria. *Procedia Economics and Finance*, 9(EBEEC 2013), 310-320. doi:10.1016/s2212-5671(14)00032-x.
- UE. 2017. Annual Activity Report 2016. Directorate General for Agriculture and Rural Development. [https://ec.europa.eu/info/sites/info/files/file\\_import/aar-agri-2016\\_en\\_2.pdf](https://ec.europa.eu/info/sites/info/files/file_import/aar-agri-2016_en_2.pdf).
- Vander Stichele, M., Kerckhoffs, T., Van Os, R. 2012. Financing Food: Financialisation and Financial Actors in Agriculture Commodity Markets. *SSRN Electronic Journal*, 1-12. doi:10.2139/ssrn.1597138.
- Winqvist, C., Ahnström, J., Bengtsson, J. 2012. Effects of organic farming on biodiversity and ecosystem services: taking landscape complexity into account. *Annals of the New York Academy of Sciences*, 1249(1), 191-203. doi:10.1111/j.1749-6632.2011.06413.x.