

# The Economic and Social Importance of Farm Diversification towards Nonagricultural Activities in EU

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**Abstract:** The paper deals with the economic and social importance of farm diversification towards non-agricultural activities in the EU, and examination whether the level of employment in agricultural enterprises differs with regard to the economic importance of these diversified activities in total production. The analysis covers 135 European regions in 28 EU countries in the year 2018 based on the FADN database. In order to find out how employment differs with regard to the economic importance of other gainful activities (OGA), the data set was divided into four groups according to OGA's share of total output and the differences between these groups were analyzed and tested by the ANOVA analysis. The results show that the social and economic importance of other gainful activities is much higher in the countries of Central and Northern Europe than in the countries of Southern and South-Eastern Europe. Furthermore, statistically significant differences in the level of employment between groups were found according to the economic importance of OGA. The group with the highest economic importance of OGA has on average 3.5 times more paid AWU compared to the group with the lowest economic importance of OGA.

**Keywords:** farm diversification; other gainful activities; FADN; economic importance; social importance; ANOVA analysis

**JEL Classification:** Q12; Q18; R12

## 1. Introduction

There are important synergies between agricultural and rural economies. Agriculture and its value chain was historically an important contributor to rural employment in many rural regions. However, the role of agriculture as a provider of jobs in rural areas has weakened significantly since the 1960s, when the Common Agricultural Policy (CAP) was introduced. Up until the 1950s and 1960s, the majority of farms in Europe were mixed farms, combining animal and plant production and exploiting the agronomic advantages of this combination. With the introduction of the CAP, there has been constant pressure for specialization and growth in labor productivity and as a result, there was a decrease in agricultural workers. Roest et al. (2018) mention, that for decades agricultural development has been led by a modernization paradigm based on specialization, intensification, and scale enlargement. This model of development has been supported using price support policies and, often, strong central marketing agencies, which had a stabilizing effect on prices and significantly reduced market risks for an array of commodities. The increased market

orientation of the CAP launched by the document Agenda 2000 was reflected in the reduction of market measures and the consequent problems of price volatility and economic vulnerability of specialized farms. This fact has led many farmers to rethink their farm development strategies. According to Salvioni et al. (2013), the second pillar of the CAP became in this time pivotal in widening the realms of the intervention of multifunctional agriculture with the production of externalities and public goods and also stimulating other economic activities with indirect social and environmental effects in rural areas. Nowadays employs agriculture only a fraction of the working population of rural areas, nevertheless, it plays an irreplaceable role in rural areas, as food and feed producers and landscape managers, as well as in the area of forestry, crafts, rural tourism, or the sustainable use of farm and forest resources to produce renewable energy, etc., so in the production of non-agricultural activities.

Ilbery (1991) and other authors as Boncinelli et al. (2018) define similarly on-farm non-agricultural diversification - as a business strategy in which a farmer produces non-agricultural goods and services employing farm resources to sell them in the market. The criterion of using the farm production factors and the economic impact of these activities on the farm is also included in the definition according to the European Commission (see Commission Regulation (EC) No. 1200/2009). On-farm diversification is defined as the creation of any gainful activities on the farm. These include all activities other than farm work – so-called other gainful activities (OGA), directly related to the holding or having an economic impact on the holding. Such activities include e.g., agri-tourism, handicraft, processing of farm products, renewable energy production, wood processing, contractual work, or other activities.

According to European Parliament (2016a), many rural areas face a series of challenges such as low income, negative population growth, a lack of jobs and high rate of unemployment, slow development in the tertiary sector, a lack of processing capacity for food products, low skills, and limited capital. The implementation of other gainful activities can bring benefits for the farm itself, from reducing income variability to the optimal use of production factors, but it can also be beneficial for the development of rural areas. Diversification of agricultural business generates new jobs in rural areas. Di Iacovo (2014) in Boncinelli et al. (2018) adds that diversification has a pivotal impact at a local level because it helps to maintain employment levels in areas with development concerns and where opportunities provided by other economic sectors are limited. The contribution to the local economy is also obvious, as farmers provide a wider range of services to the local rural economy, which can create spillover effects on employment in rural areas.

Salvioni et al. (2020) mention that in many cases, additional revenues coming from non-agricultural activities may be strategic to keep family farms in business, with benefits that go well beyond the farm gates, both to the local communities and to society (increase in revenue of local budgets, etc.). Diversification towards non-agricultural activities can be also beneficial from the point of view of the environment or infrastructure.

CAP instruments to support non-agricultural diversification in the RDPs are also seen as a means of maintaining rural employment and creating new jobs. According to the European

Parliament (2016b), in the programming period (2014–2020) EU regions have allocated 7.4% on average of total public expenditure from the rural development fund (EAFRD) to the measure dedicated to farm and business development (Measure 6), which include instruments to support non-agricultural diversification. Specific conditions of these instruments commit the beneficiary to create new jobs.

Many authors deal with the characteristics of farms or farmers and the adoption of diversification activities or with the main forces for diversification (Salvioni et al., 2013; Bartolini et al., 2014; Meraner et al., 2015; Boncinelli et al., 2018). However, there are not many authors who deal with the relationship between diversification and on-farm employment and existing studies usually have a local or regional focus. Based on a questionnaire survey in the Czech Republic, Poland, and Hungary, Chaplin et al. (2004) state that other gainful activities of agricultural enterprises in these countries are of course not the main source of new jobs in rural areas, but their implementation contributes in some way to regional employment. Also Salvioni et al. (2013) deals with differences in employment in Italy with regard to the adoption of a diversification and differentiation strategy in comparison to conventional farms.

According to the official statistics, the income from non-agricultural production represents a still small but growing share of total farm income. Therefore, it is also important to address the impact of diversification on employment. The main objective of this paper is to:

- measure and compare the economic importance of OGA,
- measure and compare the social importance of OGA,
- determine whether there are differences in employment (paid and unpaid labor force) between groups of regions divided according to the economic importance of the OGA.

The paper is structured as follows: in the introduction was carried out a literature review and were introduced basic research goals, in section 2 are introduced the data used in the analysis and their advantages and disadvantages and the methodology. In the next step are presented results, which are discussed in section 5. Section 5 draws some conclusions as well.

## **2. Methodology**

The analysis is performed using the data from the Farm Accountancy Data Network (FADN) database, which monitors farms' income and business activities across all EU regions and is the only source of microeconomic data based on harmonized bookkeeping principles. From this database, although is mainly focused on monitoring the production dimension of agriculture, it is possible to obtain some information on the socio-economic importance of non-agricultural activities. FADN is continuously evolving and since 2017 includes more information about non-agricultural production and other non-productivist aspects of the farm's activities. This analysis seeks to respond to these changes. For this reason, the analysis used data from the FADN database for the year 2018. The definitions of variables used in FADN standard results is given in RI/CC 1750 (European Commission, 2020). The other possible source of statistical information on the farm diversification towards non-agricultural activities is the Farm Structure Survey (available in the Eurostat database) which is collected

by all Member States, Iceland, Norway, and Switzerland, and sent to Eurostat. Within this survey, it is only monitored whether non-agricultural activities are carried out within the farm or not. However, the economic or social dimension of these activities for the farm is not monitored. Therefore, this source is not suitable for this analysis.

The data set consists of 135 observations per the year 2018 of FADN regions (NUTS I) in 28 EU states. Although this regional data represents the lowest level of aggregation freely available within the FADN database, it introduces several limitations to the analysis, see Madau et al. (2017). However, as mentioned above, it is the only source for analyzing the socio-economic dimension of diversification at the EU level.

First, the economic importance of farm diversification across 135 European regions is evaluated using the indicator share of total OGA output (FADN code: SE700) on total output (SE131). The results are presented at the country level. Also, the importance of individual other gainful activities and differences between countries are monitored. Total OGA output is coming from other gainful activities directly related to the holding such as processing of farm products both, animal's and crop's, receipts from contract work, agritourism, production of renewable energy, forestry, and other OGA (see Commission Regulation (EC) No 1200/2009). However, only forestry and wood processing (SE715), contractual work (SE720), and agritourism (SE725) are monitored separately within FADN. The other OGA are calculated as the difference between total OGA output (SE700) and these mentioned categories (SE715, SE720, SE725). The share of AWU (The full-time equivalent employment, i.e. the total hours worked divided by the average annual hours worked in full-time jobs in the country (see Commission Regulation (EC) 1200/2009) for other gainful activities in total labor (in %) (SE022) is then the indicator of the social dimension of farm diversification. This indicator is monitored and calculated by the FADN database.

Subsequently, the data set is divided according to the economic importance of other gainful activities in the total output into four groups – group I with low economic importance (the share of OGA in the total output is 0–2.5%), group II (OGA's share of total output is 2.5–5%), group III (OGA's share of total output is 5–10%) and group IV with the greatest economic importance (OGA's share of total output is 10% and more). The differences in employment characteristics (total, paid, and unpaid labor force) between these groups are tested through one way ANOVA analysis. The null hypothesis that among the above-mentioned groups, there is no difference in the average value of the given indicator is tested actually. If the P-value is less than 5% alpha, the null hypothesis is rejected. That means there is a significant difference in the average value of the indicators between groups according to the economic importance of OGA. Assumptions of normal distribution and homogeneity of the variances were checked using the Shapiro-Wilk and Levene's tests respectively. The null hypothesis formed in Levene's test is that the groups have equal variance. However, the result of Levene's test rejects the null hypothesis. Therefore, robust tests of equality of variances (Welch test, Brown-Forsythe test) were used. Statistical analyses were carried out using the SPSS software package.

### 3. Results and Discussion

The economic and social importance of other gainful activities varies significantly between EU countries. The results for 135 European regions are aggregated according to individual EU countries and are presented in Table 1.

**Table 1.** The economic and social importance of other gainful activities in EU countries in the year 2018.  
Own calculation according to FADN

	Share of OGA work /AWU (%)	Share OGA/Total output (%)
Belgium	2.55	5.23
Bulgaria	0.58	2.30
Cyprus	1.41	5.23
Czech Republic	8.64	10.64
Denmark	17.98	13.86
Germany	7.13	7.18
Greece	1.19	1.95
Spain	0.56	1.25
Estonia	8.28	14.88
France	2.52	3.01
Croatia	0.75	4.99
Hungary	4.24	15.76
Ireland	0.40	0.70
Italy	5.95	6.42
Lithuania	1.71	2.68
Luxembourg	0.00	8.97
Latvia	7.25	9.62
Malta	1.91	5.98
Netherlands	4.86	4.64
Austria	3.96	18.02
Poland	0.67	1.22
Portugal	0.26	2.92
Romania	0.98	2.00
Finland	7.85	9.74
Sweden	12.03	13.01
Slovakia	7.22	14.76
Slovenia	7.98	19.49
United Kingdom	11.32	5.79

Based on the FADN database the social importance is measured as the share of AWU for other gainful activities in total labor (in %) and the economic importance as the share of OGA output on total output.

Most annual work units are engaged in other gainful activities in Denmark (17.98%), Sweden (12.03%), and the United Kingdom (11.32%). Diversification towards non-agricultural activities also has a tradition in the Czech Republic, Estonia, Slovenia, and Slovakia. Especially in these post-communist countries, the implementation of other gainful activities in agricultural enterprises in the form of associated production has a relatively long tradition. Less than 2% AWU for OGA in total labor is in the Southern European countries (Portugal, Spain, Malta,

Cyprus), in the South-Eastern countries (Croatia, Greece, Bulgaria, and Romania), and some countries of Central and Eastern Europe (Poland, Lithuania), and in Ireland as well.

With regard to the economic importance, it can be stated that other gainful activities account for the largest share of total output in the Central European countries – Slovenia (19.49%), Austria (18.02%), Hungary (15.76%), Slovakia (14.76%) and the Czech Republic (10.64%). Further in Estonia (14.88%), and Denmark (13.86%), and Sweden (13.01%) as well. Especially in these countries, it is clear that the farm, apart from food and feed production, is a producer of various products and services in the rural sector as well. As in the case of social importance, economic importance is lower in the Southern and South-Eastern European countries.

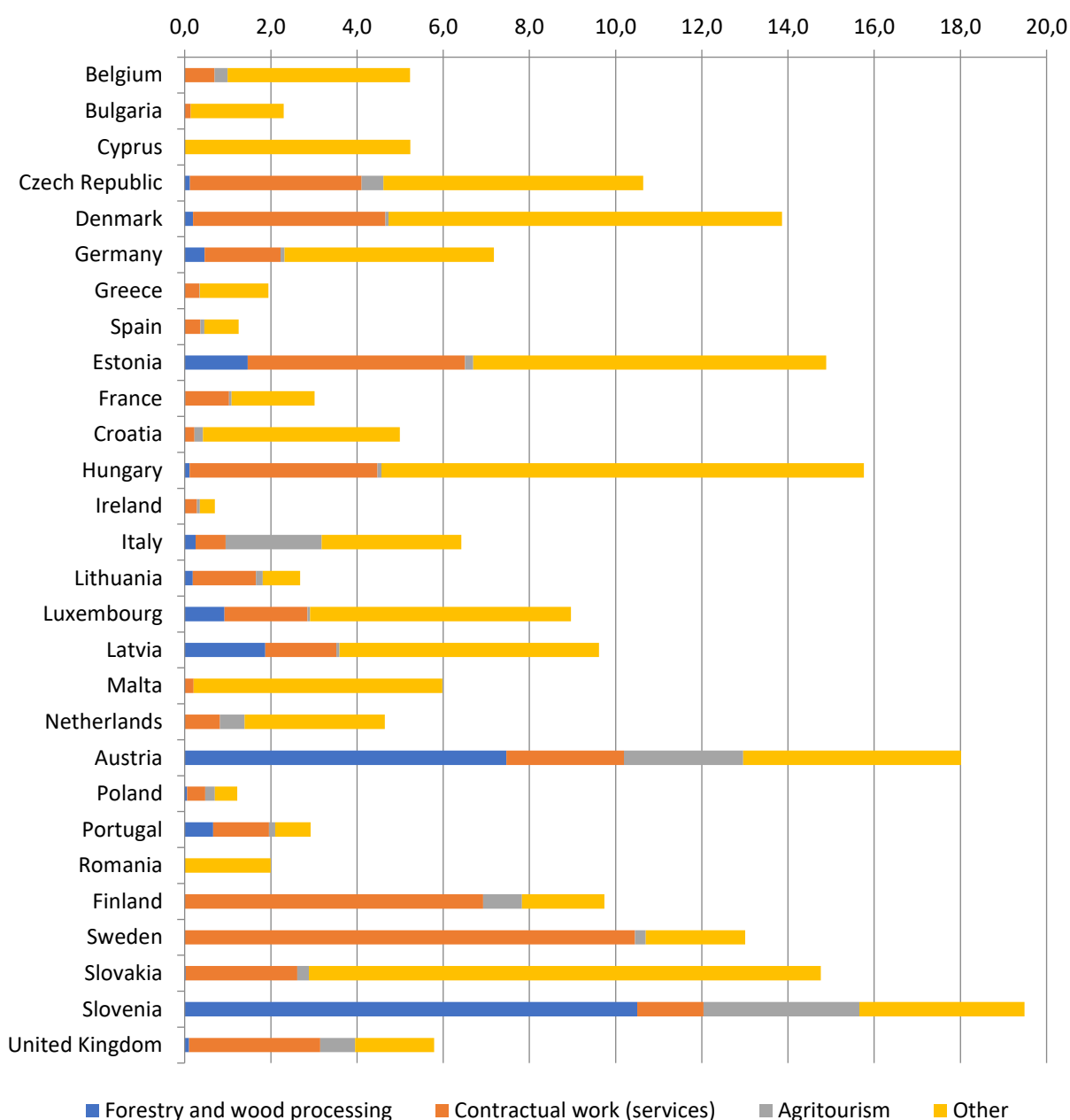


Figure 1. Share of individual OGA on total output (in %)

The economic importance of individual gainful activities in total output is presented in Figure 1. The economic importance of particular gainful activities reflects the natural and

historical conditions of a given country. Moreover, the implementation of particular OGA's and thus their social and economic importance is also influenced by the farm size, its specialization, soil quality or location, management, and in the case of the sole holder the education, age, and the number of family members living on the farm as well (see for example Bartolini et al. (2014), Boncinelli et al. (2018)).

Forestry and wood processing as other gainful activity covers sales of felled and standing timber, of forestry products other than timber, and processed wood (see EC RI/CC 1750). A higher share of forestry and wood processing in the total output of agricultural enterprises is obvious in Slovenia, Austria, and is also typical for the Baltic countries as Latvia and Estonia.

Contractual work includes hiring out of equipment or agricultural contract work carried out by the labor force of the holding (see EC RI/CC 1750). These activities are economically significant, especially in Sweden, Finland, Estonia, Denmark, and the Czech Republic. In these countries, agricultural production is carried out in conditions of high concentration of production resources (measured by utilized agricultural area/farm and AWU/farm). It is therefore clear that diversification into this activity represents a strategy for more efficient use of production factors, which, for example, for reasons of seasonality, but also other reasons, are not used.

Agritourism includes various tourist activities, such as accommodation (bed and breakfast, rural lodgings, farm campsite), catering, leisure activities (pedagogical farms, sports, horse-riding, farm visits), etc. Agritourism contributes the most to the total production of agricultural enterprises in the Alpine countries like Slovenia and Austria and also in Italy. In contrast, agritourism is very underdeveloped in the Balkan countries – such as Greece, Bulgaria, and Romania.

Other gainful activities that are not subject to the previous categories include activities directly related to the holding such as processing of farm products both, animal's and crop's, production of renewable energy, handicraft, and other. The FADN database does not allow its more detailed monitoring. These activities are particularly important in Slovakia and Hungary, where they could continue the tradition of associated productions from the communist period, and in Denmark.

In order to find out how employment differs with regard to the economic importance of OGA, the data set was divided into four groups according to OGA's share of total output. The differences between these groups were analyzed and tested by the ANOVA analysis. The assumptions for the analysis were tested using the Shapiro-Wilk test and robust tests equality of variances (Welch test, Brown-Forsythe test).

Focus on total labor input (measured in time worked in hours and in AWU) and paid labor input (measured in time worked in hours and AWU), the ANOVA reveals the statistically significant differences between the groups according to the economic importance of OGA at the 5% significance level (see Table 2). In group IV, with the greatest economic importance of OGA (OGA's share of total output is 10% and more), works on average 2.84 total AWU, while in group I, with the small economic importance of OGA (OGA's share of total output is less than 2.5%), works on average 1.66 total AWU. An even more significant

difference is in the case of paid labor input. The value of the indicator in AWU is for group IV 3.5 times higher than for group I.

Only the difference in the unpaid labor input is not statistically significant based on the ANOVA test at 5% significance level. This is due to the limited possibility of expanding the family workforce in the case of the implementation of these diversified activities.

**Table 2.** The comparison of labor characteristics according to the economic importance of OGA

	Groups according to the economic importance of OGA			
	I. (N = 43)	II. (N = 38)	III. (N = 31)	IV. (N = 23)
Total labor input	3,276.39	3,714.07	4,201.84	5,796.93
Total labor input (AWU)	1.66	1.86	2.01	2.84
Unpaid labor input	2,296.42	2,511.11	2,579.38	2,354.32
Unpaid labor input (FWU)	1.15	1.23	1.20	1.08
Paid labor input	979.97	1,202.96	1,622.46	3,442.60
Paid labor input (AWU)	0.51	0.63	0.81	1.76

Based on this analysis, it cannot be stated that other gainful activities create new jobs and thus directly contribute to higher employment. However, it can be stated that diversification towards non-agricultural activities is linked with a higher concentration of paid labor and thus total labor as well. The other gainful activities help to maintain employment in agricultural enterprises by more efficient use of production factors. These activities can make the farm more resilient and stable in the event of an agricultural crisis and create new income sources.

#### 4. Discussion and Conclusions

The main aim of this paper was to analyze the social and economic importance of on-farm diversification towards non-agricultural activities. It was also examined whether the level of employment in agricultural enterprises differs with regard to the economic importance of these diversified activities in total production. The analysis includes 135 European regions in 28 EU countries in the year 2018 based on the FADN database.

The results show that the most workers are engaged in other gainful activities in Denmark, Sweden, and the United Kingdom, as well as in Central European countries such as the Czech Republic, Slovenia and Slovakia, and Estonia. Economically, other gainful activities are the most important especially in Central European countries such as Slovenia, Austria, Hungary, Slovakia, and the Czech Republic, as well as in Estonia, Denmark, and Sweden. Based on the analysis, it can be stated that the social and economic importance of other gainful activities is much higher in the countries of Central and Northern Europe than in the countries of Southern and South-Eastern Europe.

Statistically significant differences in the level of employment were found between the groups according to the economic importance of other gainful activities in total production, except unpaid work of family workers. Group IV with the highest economic importance of OGA employs 3.5 times more AWU compared to group I with the lowest economic importance. This conclusion is in line with Salvioni et al. (2013), who compared conventional



farms in Italy with diversified farms and also found that farms engaged in some other gainful activity employed more workers than conventional farms. Also the results of McNamara and Weiss for Austria (2005) and Boncinelli et al. (2018) for the Italian region Tuscany indicate that the larger farms (measured by workforce or land) are more diversified or have more farm resources allocated to non-agricultural activities.

Other gainful activities thus help maintain employment through a more efficient allocation of production resources or the creation of new sources of income. Because the viability of rural areas is closely linked to the products and services provided by agricultural holdings and to their ability to generate a sufficient level of income to prevent further reductions in the number of workers.

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## References

- Bartolini, F., Andreoli, M., & Brunori, G. (2014) Explaining determinants of the on-farm diversification: Empirical evidence from Tuscany region. *Bio-based and Applied Economics*, 3(2), 137–157. <https://doi.org/10.13128/bae-12994>
- Boncinelli, F., Bartolini, F., & Casini, L. (2018). Structural factors of labour allocation for farm diversification activities. *Land Use Policy*, 71, 204-212. <https://doi.org/10.1016/j.landusepol.2017.11.058>
- Chaplin, H., Davidova, S., & Gorton, M. (2004). Agricultural adjustment and the diversification of farm households and corporate farms in Central Europe. *Journal of Rural Studies*, 20(1), 61-77. [https://doi.org/10.1016/S0743-0167\(03\)00043-3](https://doi.org/10.1016/S0743-0167(03)00043-3)
- Commission Regulation (EC) No 1200/2009. *On agricultural production methods, as regards livestock unit coefficients and definitions of the characteristics*. European Commission. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009R1200&from=en>
- European Commission. (2020). *RI/CC 1750. Definitions of Variables used in FADN standard results*. European Commission Directorate – General for Agriculture and Rural Development. [https://circabc.europa.eu/sd/a/17a3cb1f-8199-4df2-b857-161fefc4c857/RICC%201750%20Standard%20Results%20v%20May%202019\(0\).pdf](https://circabc.europa.eu/sd/a/17a3cb1f-8199-4df2-b857-161fefc4c857/RICC%201750%20Standard%20Results%20v%20May%202019(0).pdf)
- European Parliament. (2016a). *Report on how the CAP can improve job creation in rural areas*. European Parliament, Committee on Agriculture and Rural Development. [https://www.europarl.europa.eu/doceo/document/A-8-2016-0285\\_EN.pdf](https://www.europarl.europa.eu/doceo/document/A-8-2016-0285_EN.pdf)
- European Parliament. (2016b). *Farm Diversification in the EU - Briefing*. European Union. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2016/581978/EPRS\\_BRI\(2016\)581978\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2016/581978/EPRS_BRI(2016)581978_EN.pdf)
- Ilbery, B. W. (1991) Farm diversification as an adjustment strategy on the urban fringe of the West Midlands. *Journal of Rural Studies*, 7(3), 207-218. [https://doi.org/10.1016/0743-0167\(91\)90085-7](https://doi.org/10.1016/0743-0167(91)90085-7)
- Madau, F. A., Furesi, R., & Pulina, P. (2017). Technical efficiency and total factor productivity changes in European dairy farm sectors. *Agricultural and Food Economics*, 5(1). <https://doi.org/10.1186/s40100-017-0085-x>
- McNamara, K. T., & Weiss, C. (2005). Farm household income and on-and off-farm diversification. *Journal of Agricultural and Applied Economics*, 37(1), 37-48. <https://doi.org/10.1017/S1074070800007082>
- Meraner, M., Heijman, W., Kuhlman, T., & Finger, R. (2015). Determinants of farm diversification in the Netherlands. *Land Use Policy*, 42, 767-780. <https://doi.org/10.1016/j.landusepol.2014.10.013>
- Roest, K. D., Ferrari, P., & Knickel, K. (2018). Specialisation and economies of scale or diversification and economies of scope? Assessing different agricultural development pathways. *Journal of Rural Studies*, 59, 222-231. <https://doi.org/10.1016/j.jrurstud.2017.04.013>
- Salvioni, C., Ascione, E., & Henke, R. (2013). Structural and economic dynamics in diversified Italian farms. *Bio-based and Applied Economics*, 2(3), 257-275. <https://doi.org/10.13128/BAE-13094>
- Salvioni, C., Henke, R., & Vanni, F. (2020). The Impact of Non-Agricultural Diversification on Financial Performance: Evidence from Family Farms in Italy. *Sustainability*, 12(2), 486. <https://doi.org/10.3390/su12020486>