The FADN as an analytical tool in EU and Serbia

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Abstract

Farm Accountancy Data Network (FADN) is one of the most reliable data sources for economic analysis in the agriculture. The FADN methodology enables to extrapolate the data on economic results based on the sample farms and compare the relevant indicators of all EU member states. The main income indicator used by FADN is Farm Net Value Added (FNVA) per holding or per Annual Working Unit (AWU). Farm net value added (FNVA) is used to remunerate the fixed factors of production (labour, land and capital). In order to obtain a better measurement of the productivity of the agricultural workforce taking into account the diversity of farms, FNVA is also calculated by annual work unit (AWU - work of one person occupied full time on a farm). In the process of EU accession Serbian agricultural sector is obliged to align a set of regulations and standards and adopt certain requirements compliant with the objectives of the Common Agricultural Policy (CAP), inter alia, to establish Farm Accountancy Data Network (FADN).

This paper provides the comparative analyses on farm income based on FNVA in 2017. and classification of the holdings by economic size and type of farming. According to the paper results the FNVA is proven to be reliable indicator allowing comparative analyses between different EU countries.

Key words: FADN, FNVA, Standard output, AWU

Introduction

The Farm Accountancy Data Network (FADN) is a system aimed for collecting and processing farms data on production and economic parameters. In that sense, it can be said that through a representative sample, this system continuously provides information on the natural and financial aspect of the farms business (Vasiljević, 2011). The system is based on a precisely defined methodology for all EU member states and enables comparison of the production and economic results between different countries. The FADN system, started in the EU in 1965, imposes an obligation to the Member States to collect a properly prescribed minimum of production and financial information, primarily intended for the creation of the CAP Common Agricultural Policy (Vasiljevic et al., 2012).

The process of establishing the Agricultural Accounting Data System in the Republic of Serbia started in 2011, with data collection from 40 farms (pilot survey). The application of a fully harmonized methodology for the selection of farms started in 2013 (452 farms), after calculating the Standard Output (SO) of the farms from the Agricultural Census 2012, there is successive annual increase in the FADN sample. The last cycle of data collection, for 2017, included 1,460 agricultural holdings, of which 1,404 were validated and included in the analysis.
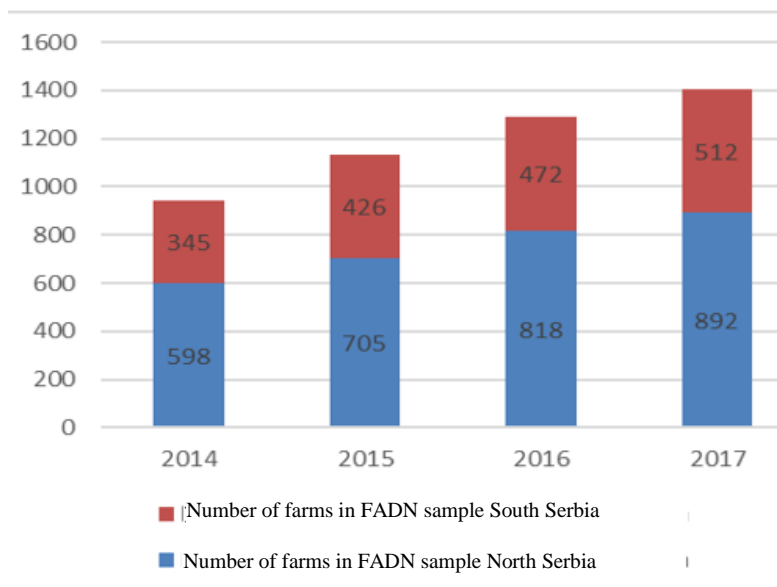
Graph 1. The size of the FADN sample for the Serbia-North and Serbia-South regions
(2014-2017)
Source: Authors based on data from FADN database

FADN is important for the analysis of data at the national level, macro indicators are used the most i.e. the information related to the business of farms enables the calculation of valid agroeconomic indicators (Bojcevski et al., 2016), and on the basis of their analysis, the adoption of adequate measures from different areas related to agro-sector (agrarian, customs, credit, monetary policy, etc.). In such circumstances, agricultural policy makers have at their disposal quantitative indicators on the terms and performance of the FARMS operations (Ivkov et al., 2013). At the farm level FADN is powerful toll in comparing results of farm with average results in same production line nationally and among EU countries (Bojcevski et al., 2015).

The basic indicators according to the FADN methodology are classified into different groups such as:

1) Production structure:
   • Total utilised agricultural area, share of rented agricultural land
   • Labour input (paid and unpaid labour)
   • Total livestock units (LU)

2) Productivity:
   • Crop yields (kg per ha)
   • Milk production per cow (kg per year)
   • Stocking density (LU per forage area)
   • Total crop output per UAA
   • Total livestock output per LU

3) Structure of total output:
   • Crop production, livestock production and other gainful activities

4) Structure of total input:
   Specific and overhead costs, external factors, depreciation

5) Subsidies:
   • Structure of subsidies
   • Subsidies (per UAA, LU)
   • Share of subsidies in FNVA
   • Share of subsidies in total output

In addition to the basic indicators, FADN data also enables the set of many derived indicators. Income analysis are among most important FADN tolls. Income categories can be grouped according to Type of farming (field crops, milk production, mixed farming ...), Economic size class, Total UAA (ha) etc (Bojcevski et al., 2016).

Most important income indicators are one or more indicators (i.e. NVA, NVA per AWU), or a percentage of performance (i.e. 25% most successful, 25% less successful).

The income indicators can be compared by years (Starting from 2000) and l location, region (Less favoured area - LFA), outside of the LFA areas, regions, counties, municipalities etc (Janković, 2016).

The Farm Accountancy data network are of special importance for developed South Eastern Europe countries which are developed under partially planned economy for many decades (Simonović et al., 2012; Sredojević et al., 2009).

Farmers improvement in book keeping as the enrolment in FADN system is proven to have positive effect on bank credits access (Popović et al., 2018).

Results and Discussion

According to Agricultural Census 2012 agricultural holdings in Republic of Serbia, reached a total standard output (SO) 3,750 million EUR, which is an average of 5,939 EUR per agricultural holding, or EUR 5,804 per one AWU (annual working unit). Number of farms per economic size classes and their share in the total standard output (SO) are shown in the following table 1[3].

Table 1. Number of farms per economic size classes and their share in the total standard output (SO)

SO	Farms, number	Total SO, EUR	Share of size classes' SO in the total SO, %
100,000 or more	1,902	803,541,678	21.42
50,000-100,000	4,825	327,469,428	8.73
25,000-50,000	11,221	385,335,130	10.27
15,000-25,000	18,261	346,286,320	9.23
8,000-15,000	52,949	563,169,693	15.01
4,000-8,000	113,194	636,383,661	16.97
2,000-4,000	140,641	404,571,557	10,79
less than 2,000	288,559	284,033,429	7.57
Total	631,552	3,750,790,895	100.00

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[3] Standard Output (SO) is the average monetary value of the agricultural output at the farm-gate price of each agricultural product (crop or livestock). The SO is calculated by Member States per hectare or per head of livestock, by using basic data for a reference period of five successive years. The SO of the holding is calculated as the sum of the SO of each agricultural product present in the holding multiplied by the holding's number of hectares or heads of livestock. The SO coefficients are expressed in euros and the economic size of the holding is measured as the total standard output of the holding expressed in euros.

According to Agricultural Census 2012 there are 207,277 farms with at least one full time employee (working over 6 hours a day), i.e. 38.2% of the total number of farms in the Republic of Serbia provide for at least 1 full time employment. The highest average SO per holding by type of farming in 2012 was on holdings specialized in horticulture (almost EUR 11,000), and in field crops specialized (more than EUR 8,000).
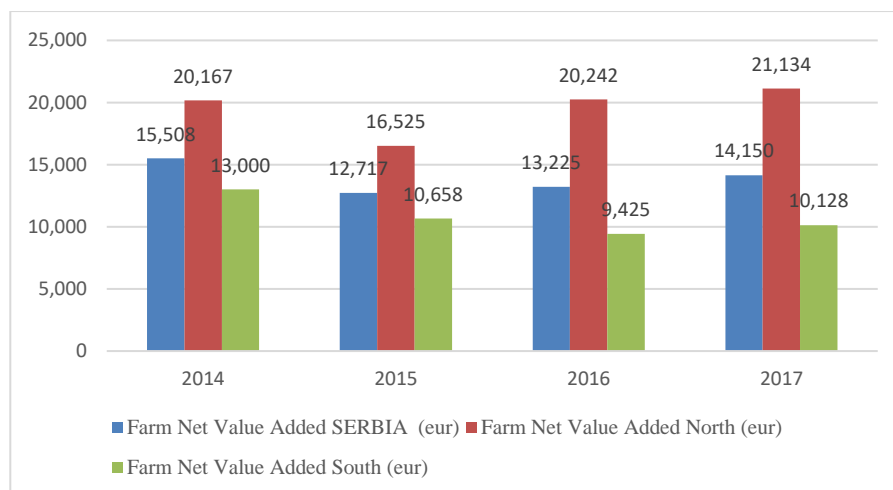
According to the FADN; data, the total value of production per farms presents about 2.8 million dinars or EUR 25. Data in 2017 do not show significant deviations from the previous years and amounts to RSD 2.9 million or EUR 25.8 thousand for the whole country. The results of the FADN survey show that there are major deviations between the North and South region, due to the different structure of the farm, and this significantly higher number of those belonging to larger economic categories in the North region. The higher total value of production per farm in this region is also affected by higher value of total yield in plant production, as well as higher total value of livestock products and the number of animals in livestock production.
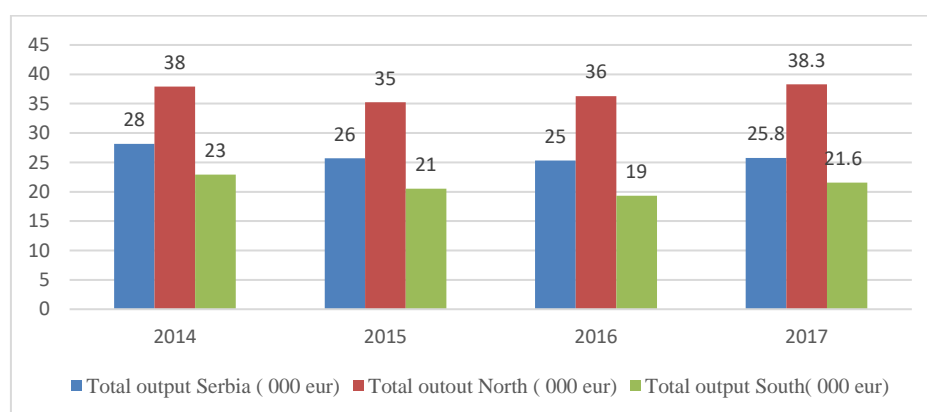
Graph 1. Total output in Serbia, Serbia–North and Serbia-South (average per farm)

Source: Authors based on data from FADN database

The Farm Net Value Added (FNVA) indicates the reimbursement for all the farm engaged factors of production (land, capital and workforce) in the holding, both in the ownership of the farm and outsourced. The average net added value of the household shows stagnation, so that in 2017 it amounted to 1.6 million dinars (EUR 14 thousand), and it is significantly higher in the region North Serbia 2.4 million dinars (EUR 21 thousand) in relation to the region South Serbia, 1.2 million dinars (EUR 10 thousand).

Graph 2. Farm Net Value Added in Serbia, Serbia-North and Serbia-South (average per farm)
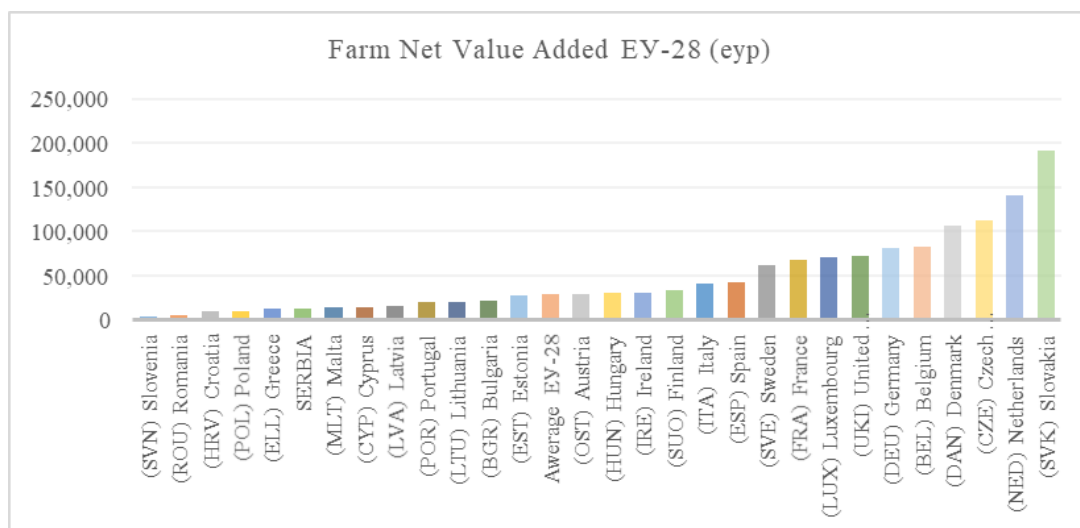
Source: FADN database of MAFWM

Comparison of the results according to the type of production points to the fact that in 2017, the households specialized in poultry and horticulture were the most successful, creating a net value added of 5.9 and 4.2 million dinars (EUR 53 thousand/38 thousand).
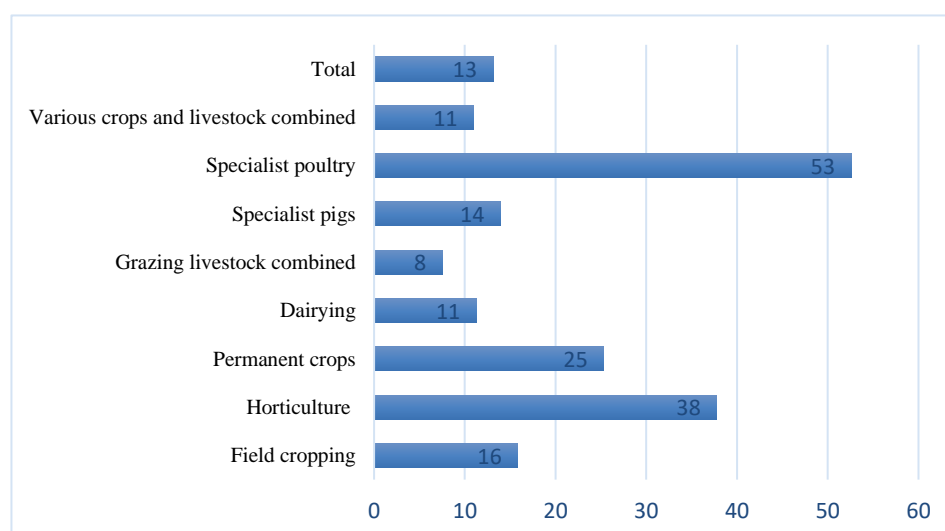
Graph 3. Farm Net Value Added in Serbia, (different type of farming) (000 EUR)

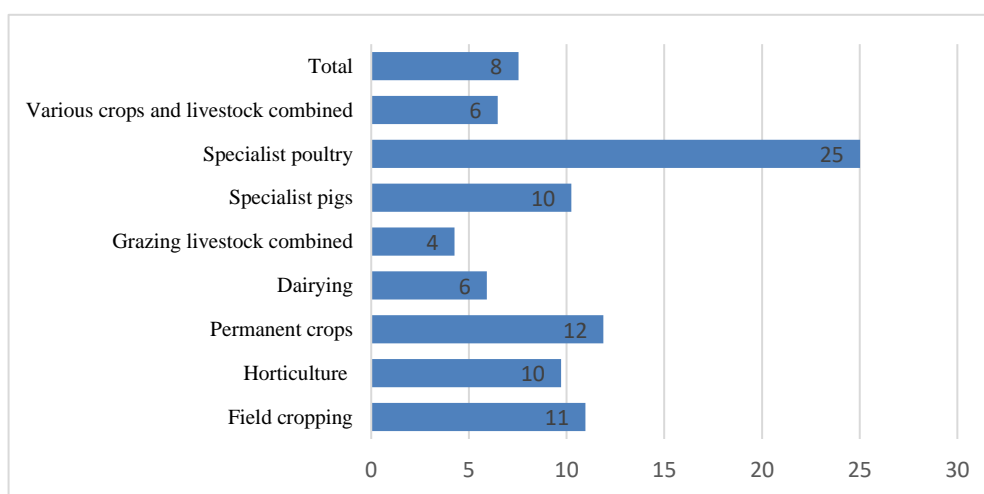Source: FADN database of MAFWM

The Farm Net Value Added (FNVA) varies considerably in the EU member countries. The EU-28 average was around EUR 28,494. The main advantage of the average FNVA/farm lies in its relative simplicity but it fails to reveal the differences in farm size, type of farming or structural decreases in the labour force employed in agriculture. To overcome this, FNVA is usually expressed per AWU, which can be seen as a measure of partial labour productivity.

Graph 4. Farm Net Value Added in Serbia and EU-28

Source: FADN database of MAFWM (2017) and FADN EU database (2016)

Important FADN' income indicator is Farm Net Value Added per Annual Work Unit (FNVA/AWU) depends on the size of the farm, the type of agricultural business or the structural reduction of the labour force of the employed in agriculture.


Graph 5. Farm Net Value Added per Annual Working Unit in Serbia (EUR)

Source: FADN database of MAFWM

FNVA/AWU varies significantly in EU Member States. The highest value was in Denmark, the Netherlands and Belgium, whose value is about EUR 60 thousand per farm, which indicates a lower labour cost per farm. On the other hand, the lower value of this indicator indicates lower

productivity. Serbia shows the extremely low value of this indicator, whose value is significantly below the EU-28 average, which amounted to about EUR 20 thousand. Farm Net Value Added per Annual Work Unit in Serbia amounted to about EUR 7,000 is among the lowest in Europe (see Graph 6).
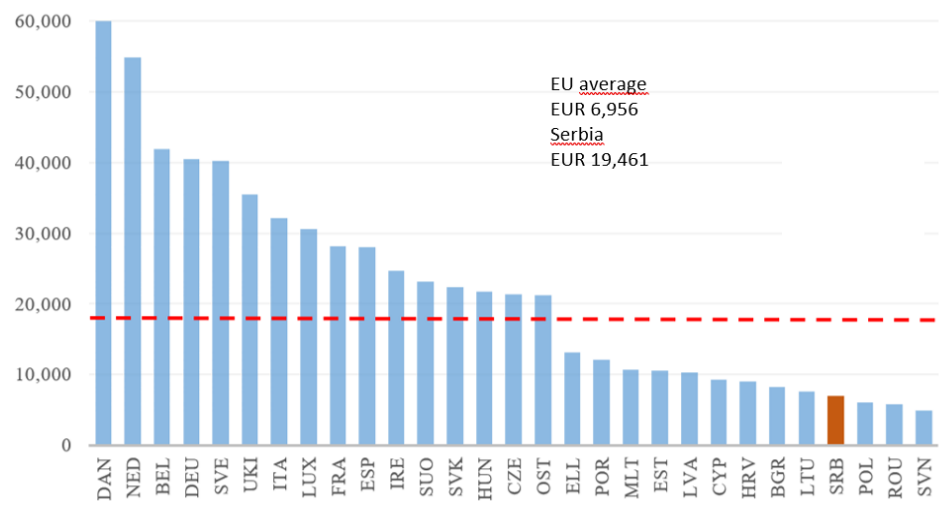
Graph 6. FNVA/AWU in EU and Serbia (EUR)

Source: FADN database of MAFWM (2017) [4] and FADN EU database (2016)

Observed by different types of agricultural production, Serbia has significantly lower values of this indicator and is below the average of the countries of the European Union.
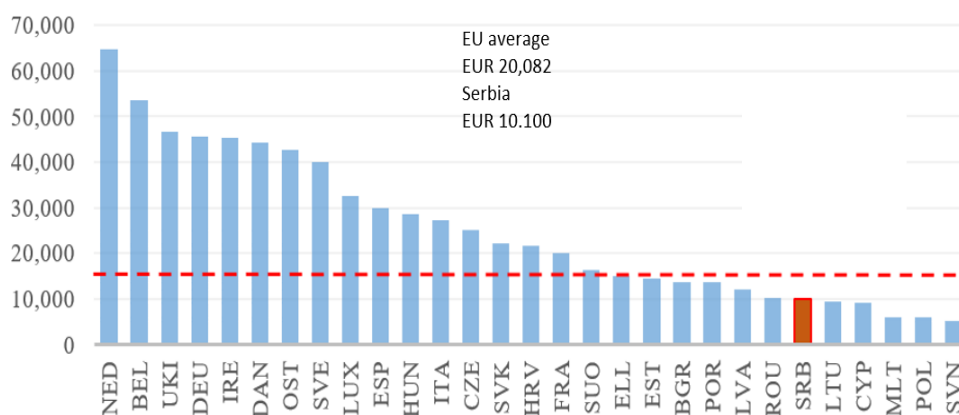

Graph 7. FNVA/AWU in field crop production EU and Serbia (EUR)

Source: FADN database of MAFWM (2017) and FADN EU database (2016)

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[4] Considering the fact that the FADN system in the Republic of Serbia is in the phase of establishment, as a representative sample has not been fully established, the data shown must be observed in accordance with the existing sample. Therefore, the conclusions should be made with caution, taking into account possible uncertainties regarding the data presented.
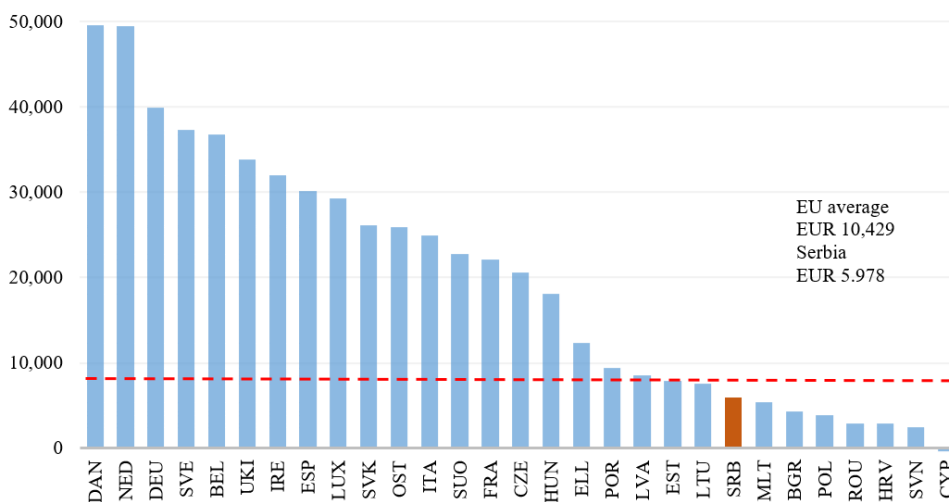
Farm Net Value Added per Annual Work Unit in crop production is according to Graph 7 among the lowest in Europe.
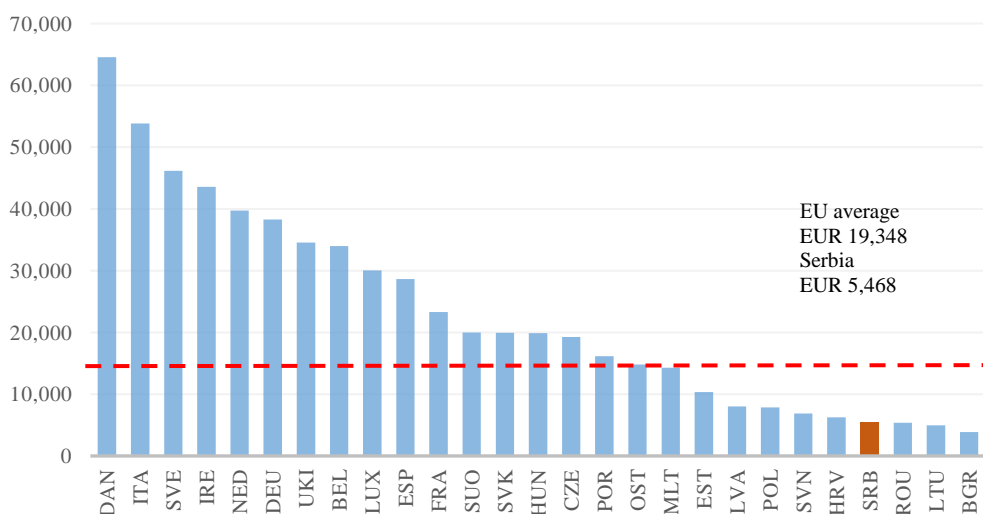
Graph 8. FNVA/AWU in dairy production - EU and Serbia (EUR)

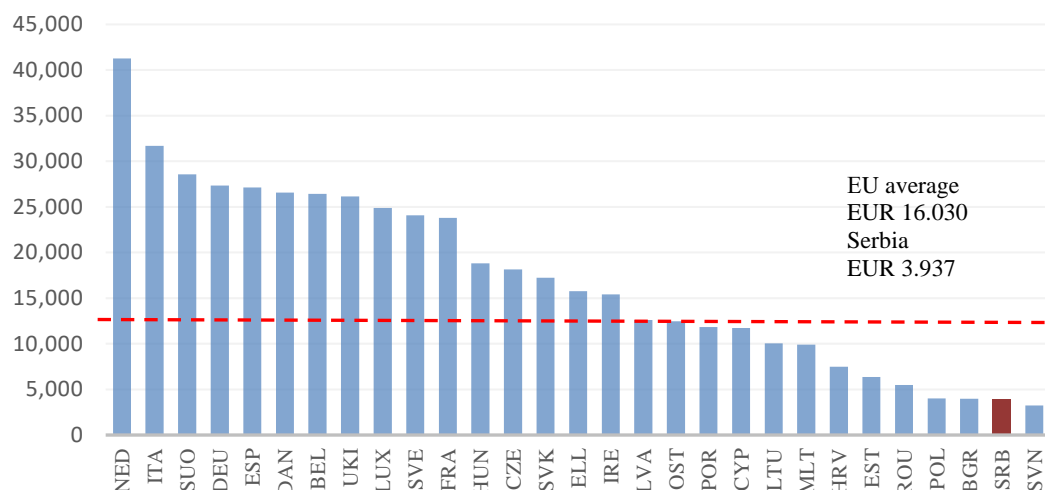Source: FADN database of MAFWM (2017) and FADN EU database (2016)

From Graph 8 can be observed that Serbia has very low FNVAAWU in dairy production compared to EU countries.

Graph 9. FNVA/AWU in mixed production - EU and Serbia (EUR)

Source: FADN database of MAFWM (2017) and FADN EU database (2016)

From Graph 9. can be observed that Serbia has very low FNVAAWU in mixed production compared to EU countries.

Graph 10. FNVAAWU in livestock and grazing - EU and Serbia (EUR)

Source: FADN database of MAFWM (2017) and FADN EU database (2016)

From Graph 10. can be observed that Serbia has very low FNVAAWU in mixed production compared to EU countries.

Conclusion

The results show the significant regional differences in FNVA per AWU in the EU-28 and Serbia. Based on this indicator, the farms with the highest income per working unit were mainly located in Denmark and Nederland. In these regions, there is a high percentage of highly intensive granivore production, horticulture and milk farms. On the other hand, Serbia have very low farm income (below EUR 10 000 per year), lower than average in all EU countries.

Furthermore, the FADN' Farm Net Value Added is a proved as reliable and highly useful indicator of farm income in EU and Serbia. At the macro level agricultural policy makers can use this indicator in analysing agricultural sector, while farmers can use this indictor to compare farm income with average income within the same line of production.

Serbian FADN sample is still not representatives and recommendation is going in direction to enlarge sample and achieve representativeness and reliability of all FADN' indicators. Further research could be directed toward creation of new FADN' income indicators as all countries are allowed to introduce additional national indicators. Furthermore, farmers education on technique on use of income indicators will be of highly importance in farm management improvements in Serbia.

References

Bojcevski M., Kovacevic V. & Subic J. (2015). *Importance of a farm accountancy data networks (FADN) for Agricultural sector in Serbia*. 2nd international symposium for agriculture and food. ISAF 2015. Organized by Faculty of Agricultural Sciences and Food - Skopje in co-organization with Institute of Animal Sciences, University Ss. "Cyril and Methodius" in Skopje. October, 2015. Ohrid, Republic of Macedonia.

Bojcevski M., Kovacevic V. & Subic J. (2016). Roll of a farm accountancy data networks (FADN) in agricultural sector in Serbia. *Ekonomika*, Niš. pp. 69-79, ISSN 0350-137X.

Bojcevski M., Kovacevic V., Ivkov I. & Veselinovic G. (2016). *Standard results of FADN research in Serbia*. 10th AAEM International Conference "Policy and Economics for Sustainable Agricultural and Rural Development". May 2016, Ohrid, Republic of Macedonia.

Commission Implementing Regulation (EU) 2015/220 of 3 February 2015 laying down rules for the application of Council Regulation (EC) No 1217/2009 setting up a network for the collection of accountancy data on the incomes and business operation of agricultural holdings in the European Union, OJ L 46, 19.2.2015, 1–106

Commission Implementing Regulation (EU) 2015/2323 of 11 December 2015 amending Implementing Regulation (EU) 2015/220 laying down rules for the application of Council Regulation (EC) No 1217/2009, OJ L 328, 12.12.2015, 97–100

Council Regulation (EC) No 1217/2009 of 30 November 2009 setting up a network for the collection of accountancy data on the incomes and business operation of agricultural holdings in the European Community, OJ L 328, 15.12.2009, 27–38

Directorate General for Agriculture and Rural Development (DG AGRI). *EU FADN database* - Retrieved from: http://ec.europa.eu/agriculture/rica/database/database_en.cfm.

EU Commission. web page - FADN unit DGAGRI - http://ec.europa.eu/agriculture/ricaprod/ (accessed: 08.08.2015)

European Union. *Official FADN web*. Retrieved from: http://ec.europa.eu/agriculture/rica/legalbasis_en.cfm accessed on: 22. March 2016.

FADN Serbia: Retrieved from: http://www.fadn.rs/ 05, April 2016.

Ivkov I., Vasiljevic Z. & Ghelfi R. (2013). *Establishment of the Serbian FADN institutional framework*. Book of proceedings, 50th Anniversary Seminar, Agriculture and Rural Development - Challenges of Transition and Integration Processes. pp. 336-354.

Janković Irena (2016). *Analiza izabranih ekonomskih indikatora razvoja poljoprivrede u Srbiji: primer proizvodnje i distribucije maline*. Monografija Stanje i perspektive agroprivrede i sela u Srbiji. Beograd. Univerzitet u Beogradu, Ekonomski fakultet, Centar za izdavačku delatnost, 161-176.

Jeločnik, M., Bekić, B. & Subić, J. (2012). *Aspects of development of Serbian agriculture in the context of the global economic crisis*. Scientific Papers Series „Management, Economic Engineering in Agriculture and Rural Development". Vol. 12, Issue 1/2012. University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania.

Popović S., Janković I. & Stojanović, Ž. (2018). The Importance of Bank Credits for Agricultural Financing in Serbia. *Economics of Agriculture*, Vol. 65, No.1, 65-80.

Regulation (EU) No 1318/2013 of the European Parliament and of the Council of 22 October 2013 amending Council Regulation (EC) No 1217/2009 setting up a network for the collection of accountancy data on the incomes and business operation of agricultural holdings in the European Community, OJ L 340, 17.12.2013, 1–6.

Simonović, Z., Jeločnik, M. & Vasić, Z. (2012). Economic position of Serbian agriculture in the transition period. *Economics of Agriculture*, 59(3), pp. 535-545.

Sredojević, Z., Jeločnik, M. & Beatović, S. (2009). Knjigovodstvena evidencija kao mogućnost unapređenja porodičnog gazdinstva u periodu tranzicije. *Ekonomika*. Vol. 55, br. 3-4, str. 110-119.

Statistical Office of the Republic of Serbia. *Agricultural Census 2012*.

Vasiljevic Z., Zaric V. & Ivkov I. (2012). *Recording of accountancy data at the family farms in Serbia*. Third International Scientific Symposium "Agrosym Jahorina 2012". November 15-17, 2012. Jahorina, Faculty of Agriculture, . pp. 599-604.

Vasiljević Zorica (2011). Uspostavljanje mreže računovodstvenih podataka na porodičnim poljoprivrednim gazdinstvima u Srbiji. *Izazovi evropskih integracija*, Tema broja "Poljoprivreda Srbije u procesu evropskih integracija", 2012/19, 27-40.