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TITOLO TESI

ANALYSIS OF THE FADN SYSTEM IMPLEMENTATION IN THE REPUBLIC OF SERBIA

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Abstract

One among many other preconditions in the field of agriculture for Serbia's accession to the EU is establishment of the Farm Accountancy Data Network (FADN) system. It can improve both on-farm and agricultural policy decision making processes by providing valuable information on physical, structural, economic and financial data.

Republic of Serbia does not have farm accounting legal base and therefore the agricultural holders are not obliged to keep records in order to have accurate income calculations.

In line with this, Serbian FADN system has been established.

As a consequence to aforementioned, this deliverable is an earliest attempt to examine the usefulness and suitableness of the FADN system implementation in the Republic of Serbia.

The applied EU FADN methodology is described, clarifying the basic definitions (universe of agricultural holdings, field of observation, sample selection, standard output, etc.). Harmonization and application of this methodology in the Republic of Serbia is described as well.

In this research it was observed Serbian FADN life cycle from 2012 to 2015, with the main focus on 2013.

Comparative research method was used in a particular areas of this study, which aimed to make comparisons across different FADN organizational infrastructures of certain EU Member States and Republic of Serbia, as well as to make comparisons of the first Serbian FADN results with the same results of a few selected EU Member States.

In the pre-conclusion section the emphases is given on SWOT analyses, which gives an assessment of the FADN system implementation in the EU and in the Republic of Serbia. In addition to this, recommendations are given in order to achieve better FADN system implementation in the Republic of Serbia.

Research findings indicated that the Serbian FADN system is still under development, faces many challenges, and needs to be further improved and strengthened.

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Chapter 1 Introduction

Success in business depends on the decisions you make... which depend on the information you receive.

“FADN is a pan-European system of sample surveys that take place each year and constitutes an important tool within the Commission's technical apparatus for supplying information and executing analyses” (Farm Accountancy Data Network - An A to Z of methodology, 1989, p.1). The uniqueness of this system lies in the fact that the FADN is the only data source with EU wide comparable micro-economic data on agricultural holdings.

FADN has been used in European Union for five decades. It was created as a tool to deliver more information in order to support the European Commission’s proposals as well as to evaluate the impacts of the Common Agricultural Policy by measuring the income of applicable number of agricultural holdings.

“FADN is a network of networks of accounting offices” (Argilés, J.M. and Slof, E.J., 2001, p.10). The aim of this network is to collect broad spectrum data from agricultural holdings in order to determine their financial situation, for farm management and to support the agricultural policy decision making process in the EU.

This systems should be adapted periodically to the changes in the economic environment. Otherwise the FADN data lose their significance and become out-of-date. In this sense, the FADN is matter of constant changes especially after the integration of new Member States that take effect in a faster way.

“Today, Serbia is modern country in transition approaching towards EU integration, recognizing in agricultural sector the needs for viability of innovation in farm accounting and its consequences for data gathering for economic and policy analysis in FADN” (Ivkov I., Vasiljevic Z., Ghelfi R., 2013, p.337).

Opposite of the EU Member States, Republic of Serbia doesn’t have farm accounting legal base and as a result, in the last years there has been a rising interest for business results of agricultural holdings. On this basis, the Serbian FADN has officially been introduced to 40 farmers in late 2011. Before EU integration, Serbia needs to reach representative sample of approximately 2,000 agricultural holdings. The importance of establishment of this commonly used accounting system is justified by the fact that the role of micro-economic information is substantial in both on-farm and agricultural policy decision making process.

1.1 Objective of the Dissertation and data sources

FADN basically serves two objectives: On the one side, it serves as a basis for agricultural sector analyses whereby the profitability of agricultural holdings is in the focus. On the other side, it is an instrument for agricultural policy analyses. In the Member States, the data are collected according to EU-wide standardised guidelines. However, there are national distinctions concerning data availability.

Therefore, the aim of this deliverable is to provide a theoretical background of the EU FADN system (to briefly describes the FADN framework), and on the other side, to examine the usefulness and suitableness of the FADN system implementation in the Republic of Serbia. In other words, with introducing the differences of the two FADN systems (EU and the initial Serbian), the goal is to evaluate the accounting rules and operation of the Serbian system and to elaborate the improvement possibilities.

As a data source, it is used EU FADN public database. Moreover, based on the available databases of Agricultural Census 2012 and other databases of the Statistical Office of the Republic of Serbia, and Ministry of Agriculture and Environmental Protection of the Republic of Serbia, bibliography and legislation, as well as using appropriate methods, the aim of this research is to study, identify and to explain comprehensively and in detail state of Serbian FADN system.

1.2 Observed period of time

In this research it was observed Serbian FADN life cycle from 2012 to 2015, with the main focus on 2013. This period of time is chosen in order to overlap with the period of FADN project implementation in the Republic of Serbia. The main focus was put on 2013 because of the fact that the public data about standard results for Serbian FADN are presented only for this period.

1.3 Structure of the Dissertation

With the dissertation aim in view, it is structured in two main parts that are summed up with reached conclusions based on reasoning and on accumulated evidence.

The first part relates to the EU FADN system implementation and includes Chapter 2 and Chapter 3 of this dissertation. As the EU Regulations forms the frame of the operation of the Member States' FADN systems, it was crucial to introduce these Regulations in details. Therefore, in the first part an overview of the general legislation, infrastructural framework, data collection and methodology of the EU FADN system is given, clarifying the basic definitions (universe of farms, commercial farms, standard output, etc.). The selection of agricultural holdings, organization of the data collection, as well as the procedure of data verification are described.

The second part relates to the Serbian FADN implementation and includes Chapter 4 to Chapter 7. This part, on the one side, focuses on the analyses of the FADN system implementation in the Re-

public of Serbia. On the other side, tries to reveal the different interpretation of the FADN system applied by Member States. More precisely, it concerns many topics and tries:

- to make comparisons across different FADN organizational infrastructures of certain EU Member States such as Poland, Estonia and Croatia and Republic of Serbia, and
- to focus on the main FADN standard results and comparative analyses between the Republic of Serbia and certain Member States (Poland, Estonia and neighboring countries Slovenia, Bulgaria, Romania) in years when the data were available.

The conclusion of this research theses is presented in Chapter 8, where the emphases is given on SWOT analyses, which gives an assessment of the FADN system implementation in the EU and in the Republic of Serbia. In addition to this, recommendations are given in order to achieve better FADN system implementation in the Republic of Serbia.

1.4 Methodology

Taking into account the objective of the dissertation and the complexity of the case, in the preparation of this doctoral thesis are used empirical and a priori knowledge, method of analysis and comparison, as well as methods of reasoning as the deductive and inductive approaches.

Subsequently, in this research it is used unique replicable European Union (EU) methodology that has been applied and adjusted in accordance with national conditions in the Republic of Serbia. More specifically, the methodology presented in this study was developed within the framework of the European Commission, with the main focus on applied EU FADN methodology in 2013. The source of the methodology lies in the following main Regulations:

- **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 *(Official Journal L 328, 15/12/2009);*
- **COMMISSION REGULATION (EU) NO 1291/2009 of 18 December 2009** concerning the selection of returning holdings for the purpose of determining incomes of agricultural holdings *(Official Journal L 347, 24/12/2009);*
- **COMMISSION REGULATION (EC) NO 1242/2008 of 8 December 2008** establishing a Community typology for agricultural holdings *(Official Journal L 335, 13/12/2008);*
- **COMMISSION REGULATION (EC) NO 868/2008 of 3 September 2008** on the farm return to be used for determining the incomes of agricultural holdings and analyzing the business operation of such holdings *(Official Journal L 237, 04/09/2008);*
- **COMMISSION REGULATION (EEC) NO 1915/83 of 13 July 1983** on certain detailed implementing rules concerning the keeping of accounts for the purpose of determining the incomes of agricultural holdings *(Official Journal L 190, 14/07/1983)*.

Based on the above mentioned Regulations, there are several EU FADN requirements to the methodology such as connections/relations with other statistics, field of survey/observation, sample selection, weighting requirements, data requirements, data processing requirements (confidentiality requirements, data quality requirements, data transmission requirements). In the different Chapters of this deliverable the said EU FADN requirements to the methodology are presented.

Furthermore, a comparative research method was used in a particular areas of this study, which aimed to make comparisons across different FADN organizational infrastructures of certain EU Member States such as Poland, Estonia and Croatia and Republic of Serbia, as well as to make comparisons of the first Serbian FADN results of two predominant types of farming (specialized farms for field crops and for dairying) with the same results of a few selected EU Member States such as Poland, Estonia and near neighboring countries (Hungary, Slovenia, Bulgaria, and Romania) and Republic of Serbia.

Finally, as a tool for making pre-conclusion, it is used SWOT analysis as an analytical method for assessment of the FADN system implementation in the EU and in the Republic of Serbia.

The aforementioned methodology serves as a tool for finding answers to the following questions:

- The Serbian FADN system to what extent satisfy the EU FADN requirements to the methodology?
- How special is the Serbian FADN system comparing to the certain EU Member States FADN systems?
- What are the advantages and disadvantages of FADN system implementation at EU level as well as precisely in the Republic of Serbia?

Chapter 2 EU concept of FADN

2.1 General theory of FADN data systems

Farm Accountancy Data Network - FADN, also known by its French acronym RICA - Reseau d'Information Comptable Agricole, is a system settled in 1965 by 6 members of the European Economic Community – EEC, "… with the objective of collecting data that are necessary for: making an annual assessment of farm incomes and farm management analysis, and for the purpose to form the basis for the drafting of an annual report on the situation of agriculture and agricultural markets in the Community" (Organization of the EEC Farm Accounts Information Network, 1966, p.2).

The system was firstly known as **Farm Accounts Information Network of the Community**, and its justification was rooted in policy...

European Economic Community (EEC) has started to be of interest to a broad audience since 1958, and from that period of time the Common Agricultural Policy has frequently come into the attention.

The goals of the Common Agricultural Policy were laid down in Article 39[1] of the EEC Treaty. In order to achieve these goals, the Community had to have objective information on farm incomes on the whole territory of the EU. Taking into consideration above mentioned, the EEC Council took a significant step in this direction by adopting a regulation establishing in the EEC an information service on farm incomes and farm management. This information service had been proposed by the Commission in March 1963. The explanatory memorandum to the regulation read in part:

> "In order to implement the common agricultural policy, objective and pertinent information is required on the incomes of typical Community farms and on the conduct of business of those which merit special consideration at Community level.
>
> Farm accounts will constitute the chief source of the data essential to any assessment of farm incomes and conduct of business" (Full information and comparable statistics required for the EEC agricultural policy, 1965, p.2).

With this in view the EEC Council adopted in June 1965 a regulation creating a network for the examination of farm accounts with the view to measuring farm incomes and conduct of business in the Community.

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[1] *Article 39*
1. The common agricultural policy shall have as its objectives:
(a) to increase agricultural productivity by developing technical progress and by ensuring the rational development of agricultural production and the optimum utilization of the factors of production, particularly labor.
(b) to ensure thereby a fair standard of living for the agricultural population, particularly by the increasing of the individual earnings of persons engaged in agriculture.
..... /..... [17]

Establishment of this system was one of the requirements of the CAP, which is clearly pointed out under the EEC Regulation 79/65 (1965, p.1859-1860): "...the development of the Common Agricultural Policy requires that there should be available objective and relevant information on incomes in the various categories of agricultural holdings and on the business operation of holdings coming within categories which call for special attention at Community level." Moreover, this Regulation described evidently that the reason of establishment of the system was to collect farm accountancy data "to meet the needs of the Common Agricultural Policy".

On July 13, 1965, the EEC Regulation 79/65 entered into force. The Network was able to begin functioning in the very near future.

“Since then a series of implementing measures have been adopted (91/66/CEE, 184/66/CEE, 118/66/CE), dealing in particular with the selection of farms, the presentation of the data obtained in the course of the survey, and the relationship between the various agencies co-operating” (Organization of the EEC Farm Accounts Information Network, 1966, p.2).

The first accounting operations of the Farm Accounts Information Network of the Community were started during the first few months of 1967. Establishment of this Network had been gradual in order to allow necessary time for creation of this giant mechanism.

By the time mentioned, “the CAP requires reliable statistical information on the farmers’ economic situation. A central requirement of a policy as complex as the CAP is data on the incomes of farmers, which can be used to assist the policy design and at the same time be a part of the monitoring of its performance” (Measuring farmer's incomes and business performance, 1991, p.3). “Thus, a functional farm accountancy data system can be useful for the decision-makers in creating adequate agricultural policy, but also in validation of the results from the appropriate measures and the integration effects. In addition, it can support the advisory and extension segment, as well as the research and academic community” (Martinovska-Stojčeska A., Georgiev N. and Erjavec E., 2008, p.42).

Since 1967, agricultural holders in the various regions of the European Union have been able to take part directly in the development of the Common Agricultural Policy through the FADN system.

2.2 FADN legal basis

The aims of the wide range of areas, from agriculture to transport, placed in the EU treaties are achieved by several types of legal act. There are three basic types of EU legislation: Regulations, Directives and Decisions.

Regulation[2] is similar to a national law with the difference that it is applicable in all EU Member States. Directives[3] set out general rules that need to be transferred into national law by each Member State as they estimate they are appropriate. Decision[4] only deals with a specific issue and specifically mentioned persons or organisations. These laws (Regulations, Directives and Decisions) take precedence over national law and are compulsory on national authorities. The EU also issues non- compulsory instruments, such as Recommendations and Opinions, as well as rules governing how EU institutions and programmes work, etc.

In order to reach and achieve objectives, as laid down in the Treaties, reliable information on the holders' economic situation is required by the Common Agricultural Policy. Therefore, the FADN justification is rooted in the Common Agricultural Policy, and consequently, existence and the overall functioning of the system are founded on the legal basis according to the various EC Regulations. Based on the Treaties, the FADN legislation has several Regulations, which could be divided into two main categories: Basic and Other Legislation.

Categorisation of the FADN legislation with main focus on year 2013 is show in following Figure.

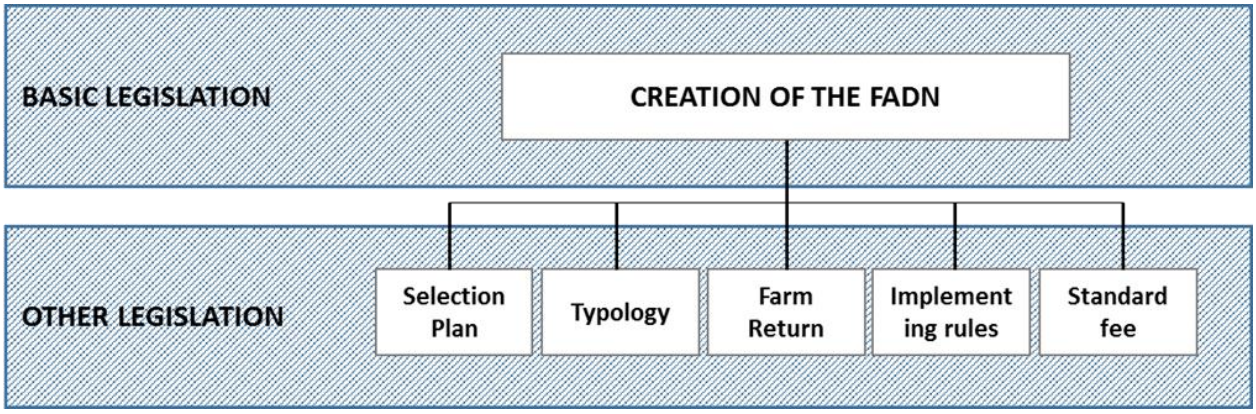

Figure 2:1 **General Farm Accountancy Data Network legal basis**

Source: Adapted from EUR-Lex: http://eur-lex.europa.eu/en/index.htm (accessed 30 August 2015)

The table below shows the EU FADN legislation's life cycle from 2012 to 2015. This period of time is chosen in order to overlap with the period of FADN project implementation in the Republic of Serbia, with the main focus on 2013. This is because of the fact that the only public data for Serbian FADN are presented for 2013.

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[2] Regulations are the most direct form of EU law - as soon as they are passed, they have binding legal force throughout every Member State, on a par with national laws. National governments do not have to take action themselves to implement EU regulations. They are different from directives, which are addressed to national authorities, who must then take action to make them part of national law, and decisions, which apply in specific cases only, involving particular authorities or individuals. Regulations are passed either jointly by the EU Council and European Parliament, or by the Commission alone.

[3] EU directives lay down certain end results that must be achieved in every Member State. National authorities have to adapt their laws to meet these goals, but are free to decide how to do so. Directives may concern one or more Member States, or all of them. Each directive specifies the date by which the national laws must be adapted - giving national authorities the room for maneuver within the deadlines necessary to take account of differing national situations. Directives are used to bring different national laws into line with each other, and are particularly common in matters affecting the operation of the single market (e.g. product safety standards).

[4] Decisions are EU laws relating to specific cases. They can come from the EU Council (sometimes jointly with the European Parliament) or the Commission. They can require authorities and individuals in Member States either do something or stop doing something, and can also confer rights on them. EU decisions are: addressed to specific parties (unlike regulations), and fully binding.

Table 2:1 **EU FADN legislation's life cycle from 2012 to 2015**

LEGISLATION:	2012	2013	2014	2015
A BASIC LEGISLATION				
1 Creation of the FADN	1217/2009	1217/2009	1217/2009	1217/2009
B OTHER LEGISLATION:				
1 Selection plan	1291/2009	1291/2009	1291/2009	1198/2014
2 Typology	1242/2008	1242/2008	1242/2008	
3 Farm Return	868/2008	868/2008	385/2012	
4 Implementing rules	1915/83	1915/83	730/2013	220/2015
5 Standard fee	283/2012	283/2012	283/2012	

Source: Author's own elaboration based on the information from the EUR-Lex: http://eur-lex.europa.eu/en/index.htm (accessed 30 August 2015)

The table indicates that the basic Regulation 1217/2009 is still in force. On the other hand five Regulations belonging to the other legislation category are replaced by two new Regulations in 2015.

2.2.1 Basic legislation - creation of the Farm Accountancy Data Network

The legislation establishing FADN is **« REGULATION No 79/65/EEC OF THE COUNCIL of 15 June 1965 setting up a network for the collection of accountancy data on the incomes and business operation of agricultural holdings in the European Economic Community »** (*Official Journal 109 , 23/06/1965)*. It had been adopted by the Council of the European Economic Community, which has taken into account the Treaty establishing the European Economic Community (Article 43), the proposal from the Commission, and the Opinion of the European Parliament.

This legislation has since been modified, expanded and repealed. It has also been consolidated[5] several times. Life cycle of the basic legislation relating to the creation of the FADN is shown by the following Figure.

[5] *Consolidated texts are intended for use as documentation tools and the Institutions do not assume any liability for their content. These texts have no legal value. Only the texts published in the "Official Journal of the European Union" are authentic. Consolidation involves the integration of basic instruments of Community legislation, their amendments and corrections into single, non-official documents. Consolidated texts aim to provide more transparency and easier access to EU-Law. Consolidation is on-going, as Community legislation is evolving, due to frequent publications of new, amending, legal acts. Therefore the consolidated texts may not be complete and cannot be guaranteed to represent the up-to-date state of the legislation in force. Each consolidated text contains a list of all the legal documents taken into account for its construction. In addition, throughout the text there is data concerning the origin of the various sections (basic act, amending act or corrigendum).*

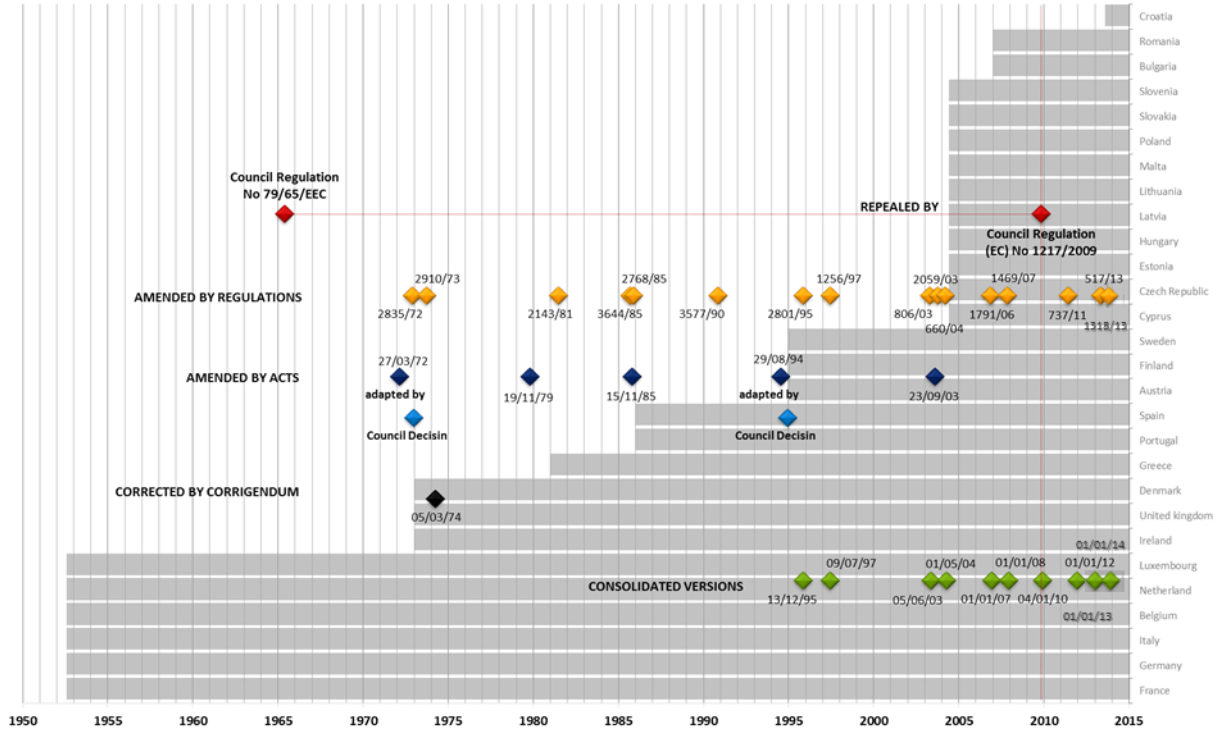


Figure 2:2 **Life cycle of the basic legislation - creation of the Farm Accountancy Data Network**

Source: Author's own elaboration based on the information from the EUR-Lex: http://eur-lex.europa.eu/en/index.htm (accessed 30 August 2015)

The table indicates that the founding Regulation was mostly amended by the Regulations and Acts across the pre-accession and post-accession period for new EU Member States. Council Regulation No 79/65/EEC had been amended by thirteen Regulations and five Acts (two of them were adapted by Council Decisions), and corrected by one Corrigendum. Additionally, there were seven consolidated versions with the Council Regulation No 79/65/EEC as the basic act.

Taking into account aforementioned in the interests of clarity and rationality the said Regulation had been codified, and repealed by **« 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 »** (*Official Journal L 328, 15/12/2009)*, which is currently the FADN legislation in force with regard to creation of the FADN system. Thus far, it has been amended by three Regulations and also three times consolidated.

Content of this Regulation includes:

- Objectives, Art 1
- Definitions, Art 2
- The field of the survey, Art 5
- Selection of returning holdings, Art 5a
- Union typology for agricultural holdings, Art 5b
- FADN committees, Art 6, 17 and 19b
- Liaison agencies, Art 7
- Farm return, Art 8

- Confidentiality, Art 16
- Standard fee, Art 19

COUNCIL REGULATION (EC) NO 1217/2009 presents the legal basis of all Regulations belonging to the Other Regulations category.

2.2.2 Other legislation

2.2.2.1 Selection plan

The first FADN legislation dealing in particular with the selection of agricultural holdings is **« REGULATION NO 91/66/EEC OF THE COMMISSION of 29 June 1966 concerning the selection of returning holdings for the purpose of determining incomes of agricultural holdings »** (*Official Journal 121, 04/07/1966)*.

Regulation No 91/66/EEC of the Commission had been amended by twelve Regulations, two Acts, and corrected by one Corrigendum. It had never been consolidated. In the light of the latest amendments to Regulation No 79/65/EEC and of experience acquired since 1965 the detailed rules for the selection of returning holdings had to be completely revised, and accordingly, it was repealed and replaced by a new **« REGULATION COMMISSION REGULATION (EEC) NO 1859/82 of 12 July 1982 concerning the selection of returning holdings for the purpose of determining incomes of agricultural holdings »** *(Official Journal L 205, 13/07/1982)*. Commission Regulation (EEC) No 1859/82 had been amended twenty times by Regulations, and had been consolidated sixteen times in the time period 1983 to 2009.

Therefore, in the interests of clarity, **« COMMISSION REGULATION (EU) NO 1291/2009 of 18 December 2009 concerning the selection of returning holdings for the purpose of determining incomes of agricultural holdings »** (*Official Journal L 347, 24/12/2009)* repeals Regulation (EEC) No 1859/82 and the Regulations amending it.

Content of this Regulation includes:

- Main definitions, Art 1
- Thresholds for the economic size in EUR for returning holdings by Member State, Art 2
- Number of returning holdings per Member State as well as per division for accounting year, Art 3
- Selection plan that shell ensure representativeness of returning holdings, Art 4
  - stratification procedure
  - selection rates procedure
  - selection procedure
  - breakdown of holdings in the field of survey according to types of farming and economic size classes
- Notification of the selection plan to the Commission, Art 5

This Regulation is FADN legal act that has been amended by tree Regulations and has been consolidated four times since 2010, and it is repealed by **« COMMISSION DELEGATED REGULATION (EU)**

NO 1198/2014 of 1 August 2014 supplementing 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 » *(Official Journal L 321/2, 17/11/2014)***.**

2.2.2.2 Typology

The first legal FADN Act about typology for agricultural holdings was **« COMMISSION DECISION of 7 June 1985 establishing a Community typology for agricultural holdings »** *(Official Journal L 220, 17/08/1985).*

This Decision had been amended by five Decisions, corrected by one Corrigendum, and six times consolidated in the time period from 1985 to 2009. It was repealed and replaced by **« COMMISSION REGULATION (EC) NO 1242/2008 of 8 December 2008 establishing a Community typology for agricultural holdings »** *(Official Journal L 335, 13/12/2008)*. This Regulation (EEC) had been once amended by Regulations, once corrected by the Corrigendum, and once consolidated in the time period from 2009 to 2015.

Content of this Regulation includes:

- Uniform classification of holdings in the Community according to
  - Type of farming, Art 2
  - Economic size, Art 3
  - Other gainful activities directly related to the holding, Art 4
- Standard output and total standard output, Art 5
- Transmission to the Commission, Art 6
- Annexes:
  - Classification of agricultural holdings by type of farming
  - Economic size of holdings
  - Other gainful activities directly related to the holding
  - Standard outputs (SOs)

Furthermore, this Regulation was repealed by **« COMMISSION DELEGATED REGULATION (EU) NO 1198/2014 of 1 August 2014 supplementing 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 »** *(Official Journal L 321/2, 17/11/2014)***.**

2.2.2.3 Farm Return

The first FADN legislation dealing with the farm return of agricultural holdings is **« REGULATION NO 118/66/EEC OF THE COMMISSION of 29 July 1966 on the form of farm return to be used for the purpose of determining incomes on agricultural holdings »** (*Official Journal 148, 10/08/1966)*.

Regulation No 118/66/EEC of the Commission had been amended by three Regulations, and corrected by one Corrigendum. It had never been consolidated. It was repealed and replaced by a new **« COMMISSION REGULATION (EEC) NO 2237/77 of 23 September 1977 amending Regulation No 118/66/EEC on the form of farm return to be used for the purpose of determining in-**

comes of agricultural holdings » *(Official Journal L 263,17/10/1977)*. This Regulation (EEC) had been amended eleven times by Regulations, an Act, and had been consolidated eleven times in the time period from 1977 to 2009. Furthermore, it was corrected by one Corrigendum.

Therefore, in the interests of clarity, **« COMMISSION REGULATION (EC) NO 868/2008 of 3 September 2008 on the farm return to be used for determining the incomes of agricultural holdings and analysing the business operation of such holdings »** (*Official Journal L 237, 04/09/2008)* repeals Regulation (EEC) No 2237/77. This Regulation, in a period of time of 5 years, was once amended by a Regulation, and repealed by **COMMISSION IMPLEMENTING REGULATION (EU) NO 385/2012 of 30 April 2012 on the farm return to be used for determining the incomes of agricultural holdings and analysing the business operation of such holdings** *(Official Journal L 127, 15/05/2012)*. Moreover, it was two times consolidated.

This Regulation as well as the next one have the same content with slight differences. Its content includes:

- Nature and form of presentation of the accountancy data, Art 1
- Transmission of Farm Returns to the Commission, Art 2
- Annex:
  - Layout of farm return
  - General definitions and instructions in respect of the Farm Return
  - 14 tables (from A to N) for entry of specific Farm Return data. Tables contain detailed instructions for data recording and clarifications of various exceptions

The Regulation No 385/2012 had been once consolidated, once amended by the Regulations, and it is repealed by **« COMMISSION DELEGATED REGULATION (EU) NO 1198/2014 of 1 August 2014 supplementing 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 »** *(Official Journal L 321/2, 17/11/2014)***.**

2.2.2.4 Implementing rules

The first FADN legislation dealing with the implementing rules concerning the keeping of accounts is **« REGULATION NO 184/66/EEC OF THE COMMISSION of 21 November 1966 concerning the collection, verification and forwarding of accountancy data obtained for the purpose of determining incomes of agricultural holdings »** (*Official Journal 213, 23/11/1966)*.

Regulation No 184/66/EEC of the Commission had been amended by nine Regulations, an Act, and corrected by one Corrigendum. It had never been consolidated, but it was repealed and replaced by a new **« COMMISSION REGULATION (EEC) NO 1915/83 of 13 July 1983 on certain detailed implementing rules concerning the keeping of accounts for the purpose of determining the incomes of agricultural holdings »** *(Official Journal L 190, 14/07/1983)*. This Regulation had been amended three times by Regulations, and had been consolidated four times in the time period 1983 to 2013.

Content of this Regulation includes:

- Deadlines for Farm Return deliveries, Art 3
- Standard fee payments, Art 5

In the interests of clarity, **« Commission Implementing Regulation (EU) No 730/2013 of 29 July 2013 on certain detailed implementing rules concerning the keeping of accounts for the purpose of determining the incomes of agricultural holdings »** *(Official Journal L 203/6, 30/07/2013)* repeals Regulation (EEC) No 1915/83 and the Regulations amending it.

Furthermore, this Regulation, in a short period of time, is repealed by **« 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 »** *(Official Journal L 46, 19/02/2015)***.**

2.2.2.5 Standard fee

The first FADN legislation dealing in the same time with the standard fee and with the implementing rules concerning the keeping of accounts is **« REGULATION NO 184/66/EEC OF THE COMMISSION of 21 November 1966 concerning the collection, verification and forwarding of accountancy data obtained for the purpose of determining incomes of agricultural holdings »** (*Official Journal 213, 23/11/1966)*. Article 5 of this Regulation defines the sum of 25 units of account for each duly completed farm return. This regulation in regard with standard fee was repealed by **« COMMISSION REGULATION (EEC) NO 1860/82 of 12 July 1982 amending Regulation No 184/66/EEC as regards the amount of the standard fee per farm return for the 1983 accounting year and the arrangements for payment »** (*Official Journal L 205, 13/07/1982).*

There are a lot of Regulations about fixing the standard fee per farm return of the Farm Accountancy Data Network for the each accounting year: one regulation shall apply for one accounting year.

In the observed period of time for the dissertation research, the main Regulation for the standard fee is **« COMMISSION IMPLEMENTING REGULATION (EU) No 283/2012 of 29 March 2012 fixing the standard fee per farm return from the 2012 accounting year of the farm accountancy data network »** (*Official Journal L 92, 30/03/2012).*

This Regulation, in a short period of time, is repealed by **« 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 »** *(Official Journal L 46, 19/02/2015)***.**

2.3 FADN organizational infrastructure

2.3.1 European Commission

Data collected in a variety of ways, through different organizations appointed as Liaison Agency always arrive to the EU FADN highest authority - European Commission.

While the European Commission is the primary user of FADN system (for instance, the European Commission is user of FADN analyses), it also contributes to the system:

- Financially: “The Commission recognizes that participation in the FADN survey imposes a cost on the Liaison Agencies” (Farm Accountancy Data Network - An A to Z of methodology, 1989, p.2). Therefore, a payment is made for each successfully completed Farm Return by the Liaison Agencies, as well as validated and approved by the Commission.
- Technically:
  - Data Validation: Both the Commission and Liaison Agencies take great care with attention to guarantee that any errors in FADN data are recognized and corrected. The Commission, in assistance and consultation with a FADN Community Committee, checks the validity of the method in which the returning holdings were selected, as well as the validity of information received.
  - Data Storage: Since 1989 FADN public data base presents unique collection of structured, harmonised and comparable agricultural accounting data from a variety of agricultural holdings.

Each operation of the scale of the Farm Accountancy Data Network relies on the most important thing in the entire FADN legal system, which is close collaboration between the Member States and Commission staff.

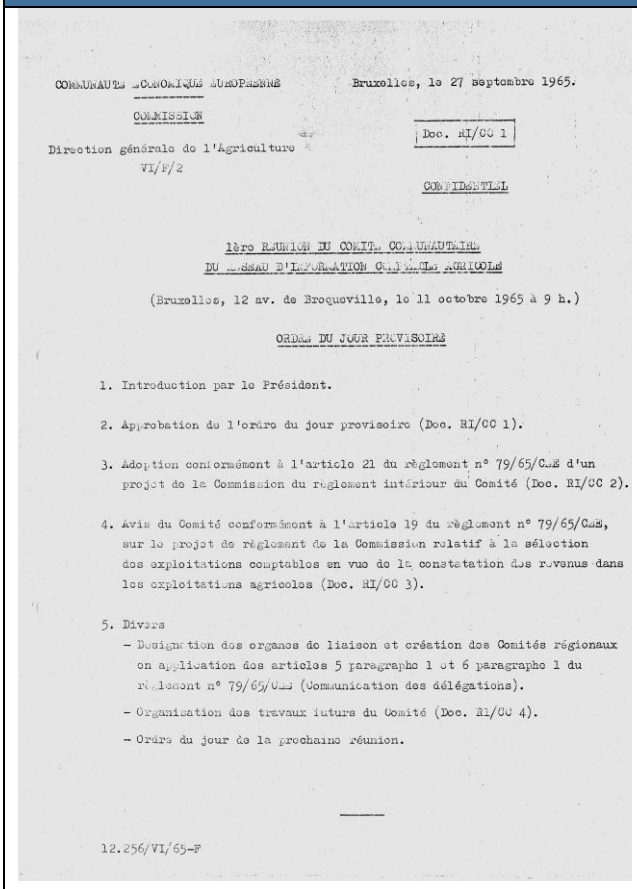
2.3.2 FADN Community Committee

The Committee for the FADN assists the Commission in the implementation of the FADN.

“The Committee is known as the FADN Community Committee and consists of representatives of the Liaison Agencies of the Member States. It is chaired by a staff member of the Commission and amongst its other duties considers all legislation relating to FADN” (Farm Accountancy Data Network - An A to Z of methodology, 1989, p.2).

The Committee meets regularly about 3-4 times per year, in Brussels, in order to discuss results and developments, and ways to additionally improve the FADN system. The Committee papers has been classified under a numbering system coded as RI/CC after the first meeting. The RI/CC is a French abbreviation that stands for Réseau d'Information Comité Communautaire (Information Network Community Committee).

1th MEETING OF THE COMMITTEE FOR FADN Brussels, 27 September 1965	195th MEETING OF THE COMMITTEE FOR FADN Brussels, 11 and 12 June 2015



COMMUNAUTÉ ÉCONOMIQUE EUROPÉENNE — Bruxelles, le 27 septembre 1965.

COMMISSION

Direction générale de l'Agriculture
VI/F/2

Doc. RI/CC 1

CONFIDENTIEL

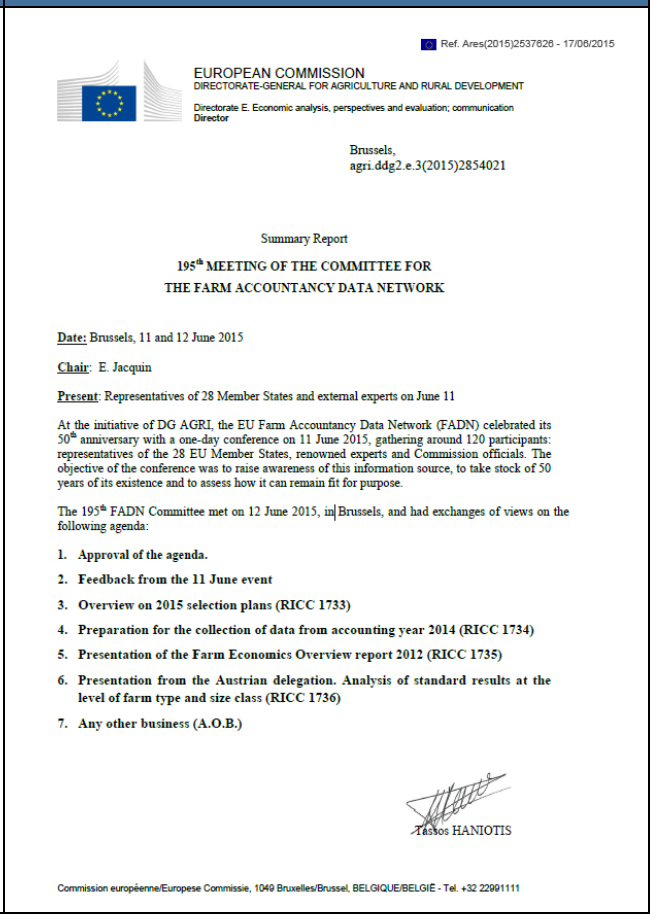
1ère RÉUNION DU COMITÉ COMMUNAUTAIRE
DU RÉSEAU D'INFORMATION COMPTABLE AGRICOLE

(Bruxelles, 12 av. de Broqueville, le 11 octobre 1965 à 9 h.)

ORDRE DU JOUR PROVISOIRE

1. Introduction par le Président.
2. Approbation de l'ordre du jour provisoire (Doc. RI/CC 1).
3. Adoption conformément à l'article 21 du règlement n° 79/65/CEE d'un projet de la Commission du règlement intérieur du Comité (Doc. RI/CC 2).
4. Avis du Comité conformément à l'article 19 du règlement n° 79/65/CEE, sur le projet de règlement de la Commission relatif à la sélection des exploitations comptables en vue de la constatation des revenus dans les exploitations agricoles (Doc. RI/CC 3).
5. Divers
   - Désignation des organes de liaison et création des Comités régionaux en application des articles 5 paragraphe 1 et 6 paragraphe 1 du règlement n° 79/65/CEE (Communication des délégations).
   - Organisation des travaux futurs du Comité (Doc. RI/CC 4).
   - Ordre du jour de la prochaine réunion.

12.256/VI/65-F



Ref. Ares(2015)2537626 - 17/06/2015

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT
Directorate E. Economic analysis, perspectives and evaluation; communication
Director

Brussels,
agri.ddg2.e.3(2015)2854021

Summary Report

195th MEETING OF THE COMMITTEE FOR THE FARM ACCOUNTANCY DATA NETWORK

Date: Brussels, 11 and 12 June 2015

Chair: E. Jacquin

Present: Representatives of 28 Member States and external experts on June 11

At the initiative of DG AGRI, the EU Farm Accountancy Data Network (FADN) celebrated its 50th anniversary with a one-day conference on 11 June 2015, gathering around 120 participants: representatives of the 28 EU Member States, renowned experts and Commission officials. The objective of the conference was to raise awareness of this information source, to take stock of 50 years of its existence and to assess how it can remain fit for purpose.

The 195th FADN Committee met on 12 June 2015, in Brussels, and had exchanges of views on the following agenda:

1. **Approval of the agenda.**
2. **Feedback from the 11 June event**
3. **Overview on 2015 selection plans (RICC 1733)**
4. **Preparation for the collection of data from accounting year 2014 (RICC 1734)**
5. **Presentation of the Farm Economics Overview report 2012 (RICC 1735)**
6. **Presentation from the Austrian delegation. Analysis of standard results at the level of farm type and size class (RICC 1736)**
7. **Any other business (A.O.B.)**

Tassos HANIOTIS

Commission européenne/Europese Commissie, 1049 Bruxelles/Brussel, BELGIQUE/BELGIË - Tel. +32 22991111

Figure 2:3 **Reports of the 1st and 195th meetings of the Committee for FADN**

Source: Reprinted from Summary Report on 1st meeting of the Committee for the FADN, (EC, 1965, p.1) and Summary Report on 195th meeting of the Committee for the FADN, (EC, 2015, p.1)

2.3.3 Liaison Agencies

The Commission does not directly collect data itself. This is the responsibility of a Liaison Agency in each Member State and is undertaken by the Liaison Agency itself or by bodies nominated by it.

The highest authority at national level, which plays a main role in the management of the FADN data, is Liaison Agency. Each Member State appoints a relevant organisation as a Liaison Agency, which should be competent authority for the data transmission to the European Commission. Organisations that are appointed as national Liaison Agencies for FADN was selected differently among EU Members States, as shown in the following Table.

Liaison Agency is responsible for FADN data collection, often together with agricultural research institutes or other relevant organization such as agricultural extension offices. “These either employ their own staff to visit the sample farms and collect the data, or they contract this work out to accountants, universities, farmers' cooperatives or other organisations” (Farm Accountancy Data Network - An A to Z of methodology, 1989, p.39).

Table 2:2 **EU Member States organisations appointed as Liaison Agency**

EU Member States	Organisations appointed as Liaison Agency
Belgium	Office for Agricultural Coordination (BCA/LB) - FADN Liaison Agency
Bulgaria	Ministry of Agriculture and Food, Agrostatistics Department
Czech R.	Institute of Agricultural Economics and Information
Denmark	Statistics Denmark , Division for account statistics for
Germany	Johann Heinrich von Thünen Institute (vTI)
Estonia	Rural Economy Research Centre (RERC)
Ireland	Teagasc Hq - The Irish Agriculture and Food Development Authority
Greece	Ministry of Rural Development and Food, General Directorate of Agricultural Extension & Research, Directorate of Agricultural Extension
Spain	Ministry of Agriculture, Food and the Environment, Undersecretariat of Agriculture, Food and the Environment, General Technical Secretariat
France	Ministry of Agriculture, Food and Forestry, General Secretariat, Department of Statistics and Prospective
Croatia	Agriculture Advisory Service (Public administration) - Department of
Italy	National Institute of Agriculture Economics (I.N.E.A.)
Cyprus	Ministry of Agriculture, Rural Development and Environment, Department of Agriculture
Latvia	Latvian State Institute of Agrarian Economics
Lithuania	Lithuanian Institute of Agrarian Economics
Luxembourg	Ministry of Agriculture, Viticulture and Rural Development, Department of Rural Economy
Hungary	Research Institute of Agricultural Economics, Farm Business Analysis Department
Malta	Ministry For Sustainable Development, the Environment and Climate Change, Agriculture and Rural Payments Agency
Netherlands	Agricultural Economics Research Institute
Austria	Federal Ministry of Agriculture, Forestry, Environment and Water Management
Poland	Institute of Agricultural and Food Economics - National Research Institute, Agricultural Accountancy Department
Portugal	Ministry of Agriculture, Sea, Environment and Spatial Planning, Office of Planning and Policies, Statistics Unit
Romania	Ministry of Agriculture and Rural Development, Directorate General of Food Industry, Service for quality policy, RICA Department
Slovenia	Ministry of Agriculture, Forestry and Food, Directorate for Agriculture, Education Non-Governmental and Fadn Section
Slovakia	Research Institute of Agricultural and Food Economics (RIAFE), National Agricultural and Food Centre, Department of Informatics, FADN Division
Finland	Natural Resources Institute Finland
Sweden	Statistics Sweden
UK	Department for Environment, Food & Rural Affairs (DEFRA)

Source: Author's own elaboration based on the information from the Agriculture – FADN: http://ec.europa.eu/agriculture/rica/liaisonagency_en.cfm?CodeCountry=EUR (accessed 22 December 2015)

Based on Table above, there are four basic types of entities appointed as the Liaison Agency in EU Member States. The following Figure shows the percentage share of the basic types of entities in the total number of Liaison Agencies of the EU Member States.

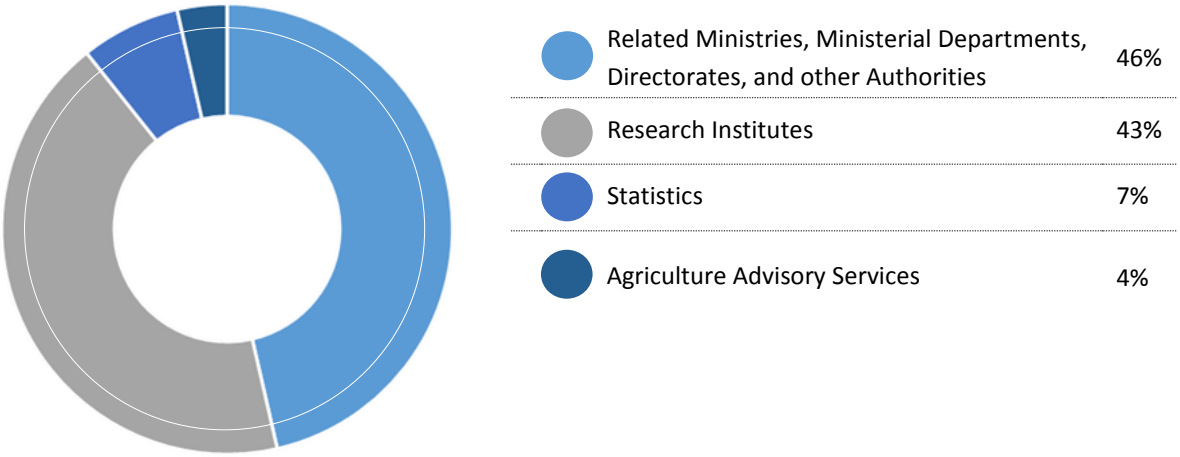


Figure 2:4 **Percentage share of four basic types of entities appointed as Liaison Agency in the total number of Liaison Agencies of the EU Member States**

Source: Author's own elaboration based on the information from the Agriculture – FADN: http://ec.europa.eu/agriculture/rica/liaisonagency_en.cfm?CodeCountry=EUR (accessed 22 December 2015)

Highest percentage of 46% makes the group of Related Ministries, Ministerial Departments, Directorates, and other Authorities (13 entities) as the most frequent type of entities appointed as the FADN Liaison Agency.

This group is followed by the Research Institutes with percentage of 43% (12 entities). These entities are generally essential Research Institutes in the EU Member States that are responsible for innovative research in the areas of agriculture, the rural development, as well as the environmental protection.

The Statistical Offices appointed as the Liaison Agency having share of only 7% in the total number of FADN Liaison Agencies in the EU Member States (2 entities), while the Republic of Croatia is currently the only EU member having Agriculture Advisory Service appointed as the national Liaison Agency (1 entity).

2.3.4 FADN at national level is also guided by the Committees

Each Liaison Agency is supervised by the FADN Committees in consideration of having an organized system made of parts that are highly integrated in order to achieve an overall goal.

2.3.4.1 National Committee

"For the purposes of FADN each Liaison Agency is guided by a National FADN Committee" (Rainer Meyer, 2004, p.119). The National Committee is composed of members who are representatives of the different organisations, which are considered as appropriate organizations for the FADN management.

2.3.4.2 Regional Committees

Additionally, EU Member States which have several divisions may, for each of the divisions under their authority, establish Regional Committees of the FADN. The Regional Committee has the responsibility to cooperate with the Liaison Agency in selection of the agricultural holdings.

2.3.5 Accountancy Offices

For the purpose of FADN each EU Member States has to establish the Accountancy Offices.[6]

The Accountancy Offices vary among the EU Member States. Some are commercial Accountancy Offices that already keep the records for tax purposes or investment aids and then modify them for the purpose of FADN. In other Member States Accountancy Offices only keep the records for the purpose of FADN.

The data collected by the Accountancy Offices are send to the Regional Offices (body nominated by Liaison Agency) and from there to the national Liaison Agencies, which then forward them to the European Commission.

NOTE:
The Liaison Agency, the National Committee, the Regional Committees and the Accountancy Offices are obliged, within their relevant areas of responsibility, to provide the Commission with any information.[7]

2.4 Data collection

2.4.1 Organisational structure for data collection

Individual agricultural holdings are the source of the data for the FADN purposes. Further FADN data transmission depends on the Member State's FADN institutional organization and on the characteristics of the national legislation. The common institutional organization structure for data collection, is shown by the following Figure.

[6] Accountancy Offices (AO) is official FADN term for the organisations appointed for data collection from agricultural holdings in the FADN sample.

[7] Further duties of the European Commission, the FADN Community Committee, national Liaison Agency, the National Committee, the Regional Committees as well as the Accountancy Offices are described in the 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.

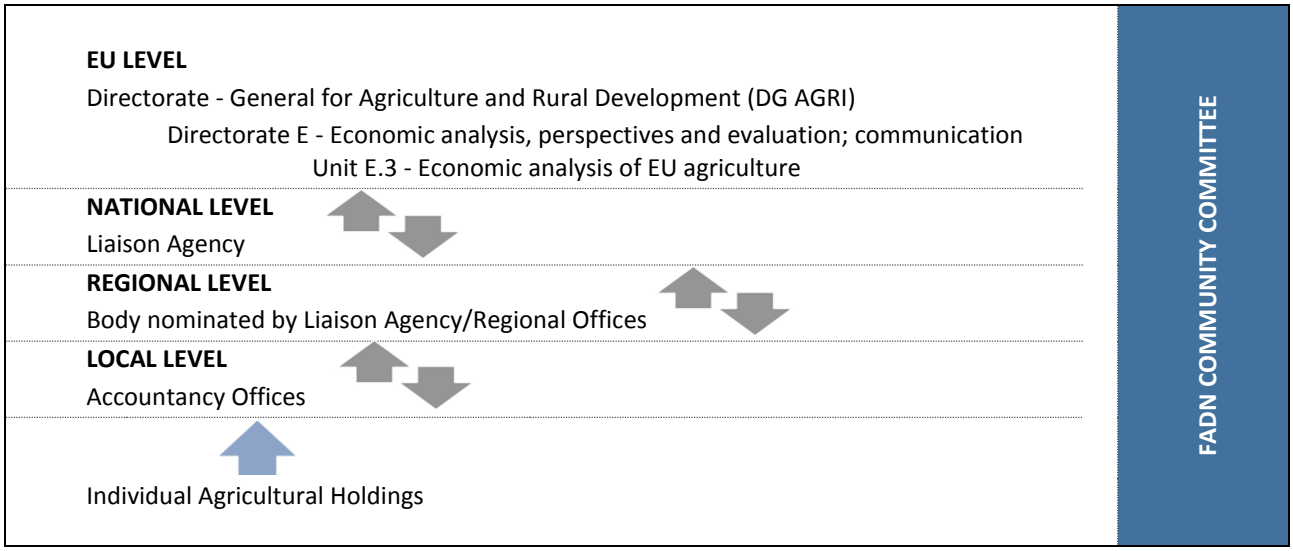


Figure 2:5 **FADN organisational structure for data collection**

Source: Adapted from the Farm Accountancy Data Network of the European Union (Vlahopoulos G., 2008, s.4)

2.4.2 FADN data confidentiality and time period for collection

2.4.2.1 FADN data confidentiality

"FADN never publishes nor otherwise provides information about individual farms" (Argilés, J.M. and Slof, E.J., 2001, p.11).

Council Regulation No 1217/2009 of 30 November 2009 - the basic legal instrument establishing FADN, clearly states that data supplied to the Commission is treated in the strictest confidence.

Consequently, data at the level of individual agricultural holdings are not normally released outside the Directorate General for Agriculture of the Commission. Only aggregated results for a group of agricultural holdings and for holdings within regions and Member States are published since information relating to individual holdings cannot be separated at this level of aggregation.

FADN data are confidential, which means that they cannot be used individually and/or for administrative, legal, taxation or control purposes. Consequently, a minimum number of agricultural holdings is necessary for each stratum to guarantee privacy.

The users of FADN data have to guarantee that the research outcome in the form of publication eliminates the risk of identifying the individual agricultural holdings.

2.4.2.2 Time period for data collection

Submission of farm return data for each EU Member State is mandatory. Data transfer deadline for most of the EU Member States is 1st of December of current year for the data collected for previous year. Therefore, transfer of the farm return results from Liaison Agency to the Commission should take no more than 11 months from the end of an accounting year.

2.4.3 Farm Return

The data are collected on the basis of a specific "Farm Return" well-defined in the FADN Regulation.

The Farm Return, for the observed period of time: 2012-2015, is specified in Regulation (EC) 868/2008 from the financial year 2009 and subsequent amendments until the year 2013 accounting included, then in Regulation (EU) No 385/2012 for 2014. Regulation (EC) No 385/2012 is repealed by Regulation (EU) No 1198/2014, with effect from 1 January 2015.

These regulations contain detailed instructions on how the Farm Return is to be completed and provide definitions of the used terms. Data in the Farm Return concern about production and agricultural holdings as a special matter. These data refer to the agricultural as well as other useful activities directly related to the holding. Except these activities, in preparing the FADN Farm Returns it is not considered any other non-farming activity.

"FADN only takes into consideration the broader sense agricultural activity of farms (agricultural production, primary processing of agricultural products, forestry, fishery, agricultural services, rural tourism) but does not include the industrial, commercial and non-agricultural service activities" (Keszthelyi S., Pesti C., 2010, p.11).

The required data are extracted from the different sources, such as appropriate accounts or registers saved by the agricultural holders or managers of the holdings. In some Member States, the Liaison Agencies have prepared special entry books to be completed from time to time by the agricultural holders with assistance of data collectors.

The Farm Return includes 14 sections described in the following Table.

Table 2:3 **The Farm Return tables**

Table	Regulation (EC) 868/2008	Regulation (EU) No 385/2012
A	GENERAL INFORMATION: Identification and classification of the agricultural holding.	
B	TYPE OF OCCUPATION: Breakdown of the farm area: owned, rented or sharecropped.	
C	LABOUR: All labour, paid and unpaid, which has contributed to work on the farm during the accounting year.	
D	NUMBER AND VALUE OF LIVESTOCK: Opening and closing valuations (in number and value) and average number of livestock	ASSETS: Value of all non-capital inputs used in the production of non-capital products during the accounting year.
E	LIVESTOCK PURCHASES AND SALES: The value of such transactions together with the value of any farmhouse consumption of livestock	QUOTAS AND OTHER RIGHTS: Quotas and other rights included those acquired free if they can be traded separately from linked land.
F	COSTS: Value of all non-capital inputs used in the production of non-capital products during the accounting year.	DEBTS: Outstanding amounts i.e. loans contracted minus the repayments already made.
G	LAND AND BUILDINGS, DEADSTOCK AND CIRCULATING CAPITAL: Includes production, replacement or major repair of any fixed assets by the farms own resources valued on a cost basis.	VALUE ADDED TAX: The VAT system applying and in certain cases VAT payments and receipts.
H	DEBTS: Opening and closing valuations of short-, medium- and long-term loans	INPUTS: Costs in cash and in kind, quantities of selected inputs.
I	VALUE ADDED TAX (VAT): The VAT system applying	CROPS: The area, quantity and value of all crops, animal

	and in certain cases VAT payments and receipts	products and other activities.
J	GRANTS AND SUBSIDIES: Defined as specific payments made directly to the farm business from public funds, excluding those for investment in land, plant, machinery and equipment.	LIVESTOCK PRODUCTION: Opening and closing valuations (in number and value) and average number of livestock, value of transactions together with the value of any farmhouse consumption of livestock, purchases and sales.
K	PRODUCTION (excluding animals): The area, quantity and value of all crops, animal products and other activities.	ANIMAL PRODUCTS AND SERVICES: Per animal category.
L	QUOTAS AND OTHER RIGHTS: Quotas and other rights included those acquired free if they can be traded separately from linked land.	OTHER GAINFUL ACTIVITIES DIRECTLY RELATED TO THE FARM: The definition of OGA is the same as used in the Farm Structure Surveys and in the Community typology for agricultural holdings.
M	DIRECT PAYMENTS: Detailed data concerning CAP arable crops area payments (Regulation (EC) n° 1251/99) and direct payments for beef (Regulation (EC) n° 1254/99).	SUBSIDIES: Defined as specific payments made directly to the farm business from public funds, excluding those for investment in land, plant, machinery and equipment. Detailed data concerning CAP arable crops area payments and direct payments for beef.
N	DETAILS OF PURCHASES AND SALES OF LIVESTOCK: Purchases and sales per categories of livestock. The sub-totals of purchases and sales per animal species (equines, cattle...) are registered in table E.	

Source: Adopted from the Commission Regulation (EC) No 868/2008, (EC, 2008, p.20-68) and Commission Implementing Regulation (EU) No 385/2012, (EC, 2012, p.4-55)

The table indicates notable differences between two Regulations (Commission Regulation (EC) No 868/2008 and Commission Implementing Regulation (EU) No 385/2012), such as structural differences made up of many different parts, as well as different table shapes and content.

2.4.4 Data quality checks

“Decisions regarding agricultural policy in the European Union must be based on sound and accurate analyses. This means that FADN data themselves must be as accurate as possible. The Liaison Agencies and the EC take great care to ensure that any errors in FADN data are identified and corrected. The procedures used by the Liaison Agencies are outlined before the data is transmitted to the Commission” (Barkaszi L., Keszhelyi S., Csatári E.K., Pesti C., 2009, p.12).

2.4.4.1 Quality control procedures followed by Liaison Agencies

Liaison Agencies use their own control methods to maintain a level of data quality. These methods could be higher or lower than the standard methods required by the European Commission.

When the data are considered error-free, the Liaison Agencies transform their national data to the FADN Farm Return as it stated in Commission Regulation (EEC) No 2237/77 and subsequent amendments until the year 2008 accounting included.

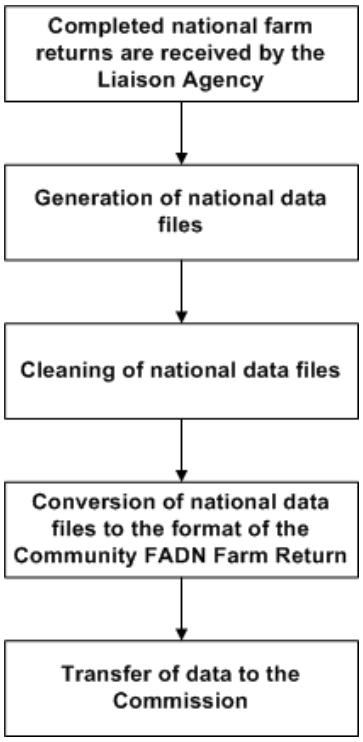


Figure 2:6 **Quality control procedures implemented by Liaison Agencies**

Source: Reprinted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/annex001_en.cfm#la (accessed 10 May 2015)

After that, in Regulation (EC) 868/2008 from the financial year 2009, and then in subsequent amendments until the year 2013 accounting included, then in Regulation (EU) No 385/2012 for 2014.

Having done this, Liaison Agencies deliver the data for the further quality procedures implemented by the Commission.

Regulation (EC) No 385/2012 is repealed by Regulation (EU) No 1198/2014, with effect from 1 January 2015.

2.4.4.2 Quality control procedures implemented by the Commission

There are two main quality control procedures implemented by the Commission: first - quality control procedures at the level of the individual agricultural holding and second - at the aggregate level. These have three tests: coherence tests, homogeneity tests belonging to the first procedures, as well as continuity tests belonging to the second procedures.

Quality control procedures at the level of the individual agricultural holding contains: firstly procedure of agricultural holding classification in line with Community typology. During this stage, agricultural holdings, for the selection purposes, may be moved from the originally classified cell to another cell. The coherence tests contain several hundred tests that try to detect and identify possible errors, irregular data and uncertain values.

The homogeneity tests help to develop sub-samples that are relevant for specific analyses. They identify outliers, i.e. agricultural holdings for which the value of one or more variables is notably different from the general category value to which the agricultural holding belongs. This may indicate an error in data collection or data coding that was not discovered by the standard tests.

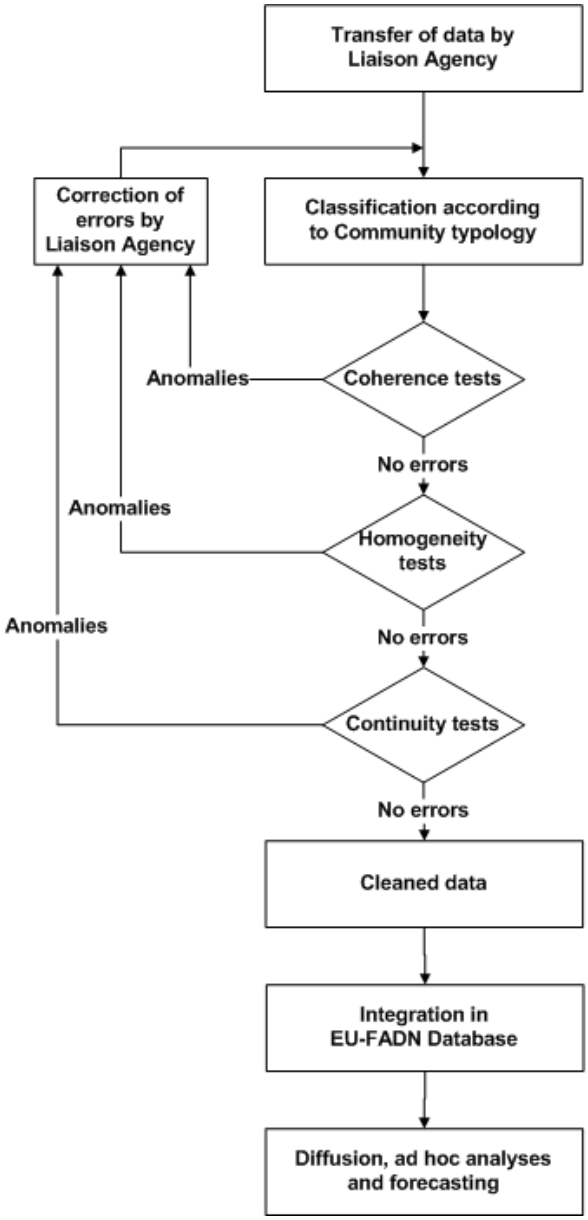


Figure 2:7 **Quality control procedures implemented by the Commission**

Source: Reprinted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/annex001_en.cfm#la (accessed 10 May 2015)

When the first procedures have been completed, the second control procedures at the aggregate level are initiated. During the second procedures, firstly the data are weighted and aggregated at the level of region, Member State, size class and type of farming.

Continuity tests are then run. These compare the calculated general values of the standard set of variables to the expected general values, i.e. the general values that would be expected on the basis of previous trends. For instance, if the average land area of agricultural holdings has been constantly increasing over the last three years, then it would be reasonable to expect further growth of land area at a similar rate.

The correction procedure is repeated during the both quality procedures. Farm Returns that need to be corrected are administered by the Liaison Agencies and may have to be addressed back to the regional level or to the accounting office.

2.4.4.3 Timetable for quality control and calculation of standard results

Once the data are recognized as error-free, the Commission can produce the standard results, make other analyses and estimates. “The completion of all the procedures needed to produce the standard results should take no more than 15 months from the end of an accounting year. In practice, some participants of the FADN have not always been capable of respecting the timetable set out in the legislation. Consequently, there happened delays in the publication of aggregates for the European Union as a whole. Constant efforts are made to follow the timeliness of FADN operation” (Barkaszi L., Keszhelyi S., Csatári E.K., Pesti C., 2009, p.13).

The following Table shows the planning for the data quality checks for the accounting year N.

Table 2:4 **Timetable for data quality control**

<table>
<tr><th>31 December N+1</th><th>First quarter N+2</th><th>Second quarter N+2</th><th>By 31 July N+2</th><th>By end of September N+2</th><th>October N+2</th></tr>
<tr><td rowspan="4">Data delivery deadline for most of the Member States</td><td>The Commission does basic data checks and exchanges comments, if any, with Member States</td><td>Preliminary results are published following the finalisation of the basic data checks</td><td>The Commission has sent detailed feedback to all Member States</td><td rowspan="4">The Commission has received explanations from all Member States and the data are approved</td><td rowspan="4">The Commission presents standard results to the FADN Committee and data are made available to users</td></tr>
<tr><td colspan="3">The Commission sends feedback on full data checks to Member States</td></tr>
<tr><td colspan="3">Member States should reply within one month with explanations or corrections of the data - more than one round of data verifications may be needed</td></tr>
<tr><td colspan="3">As soon as the data are final, facts-sheets with main results at Member State level are published</td></tr>
<tr><td colspan="6">Estimated time required for data validation process: 10 months</td></tr>
</table>

Source: Reprinted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/collect_en.cfm?Version=13699#tfr (accessed 10 May 2015)

2.4.5 Steps of data flow from the agricultural holdings to the final results

All steps of data flow from the agricultural holdings to the final results that are already described in detail are simply explained by the following Figure.

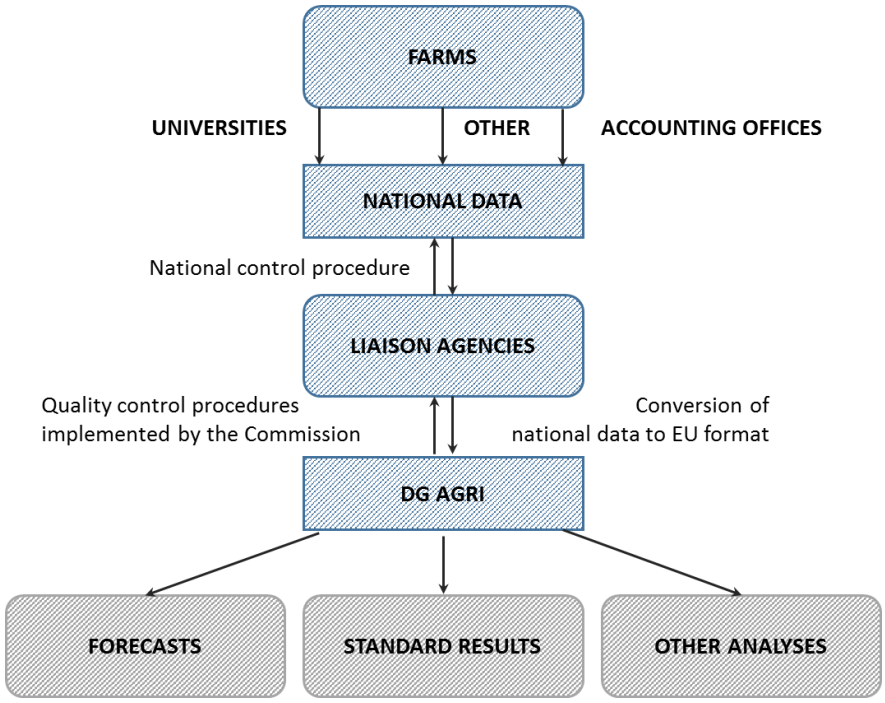


Figure 2:8 **Steps of data flow from the agricultural holdings to the final results**

Source: Adopted from the FACEPA Farm Accountancy Cost Estimation and Policy Analysis of European Agriculture (Barkaszi L., Keszhelyi S., Csatári E.K., Pesti C., 2009, p.12)

Chapter 3 FADN methodology

3.1 The FADN universe of agricultural holdings

"The term "universe" is the statistical term used to define the set of units under observation" (Barkaszi L., Keszhelyi S., Csatári E.K., Pesti C., 2009, p.8).

The universe of agricultural holdings is represented by the Farm Structure Survey (FSS) and by the Agricultural Census, carried out by the EU Member States and managed by Eurostat.

This set of holdings contains all agricultural holdings in the European Union of at least 1 hectare and those of less than 1 hectare provided the latter market a certain proportion of their output or produce more than a specified amount of output. However, Member States can use thresholds different than 1 hectare, with respect to requirements specified in Regulation (EC) No 1166/2008 of 19 November 2008 on Farm Structure Surveys and the survey on production methods.

3.2 The field of observation

"In the universe there are some farms which produce little output and from this point of view do not warrant inclusion in the FADN sample" (Farm Accountancy Data Network - An A to Z of methodology, 1989, p.3).

Thus, in defining the FADN field of observation, the Commission follows the guidelines specified in Council Regulation (EC) No 1217/2009 of 30 November 2009 and subsequent amendments and implements a practical approach by including only those agricultural holdings estimated to be commercial.

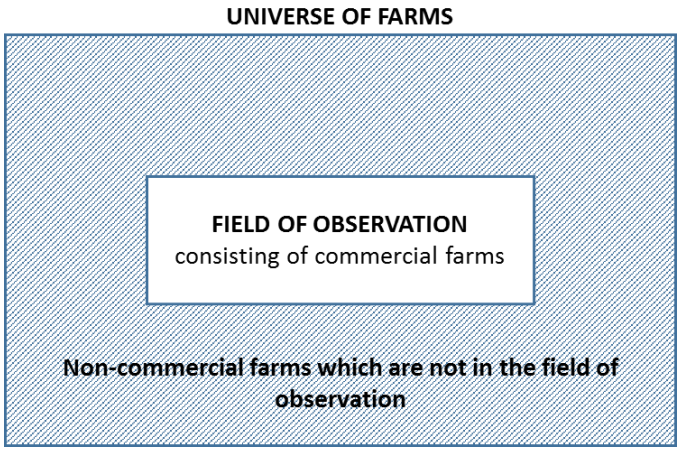


Figure 3:1 **The universe and the field of observation**

Source: Adopted from the Farm Accountancy Data Network - An A to Z of methodology (1989, p.3)

A commercial agricultural holding is defined as a holding which is large enough to provide a main activity for the agricultural holder and a level of income sufficient to support his or her family. In practical terms, in order to be classified as commercial, an agricultural holding must exceed a minimum economic size. However, because of the various agricultural holdings structures across the European Union, a different threshold is fixed for each Member State. Therefore, agricultural holdings surveyed by the FSS, with an economic size exceeding the threshold fixed for a certain Member State, represent the set of agricultural holdings that create FADN field of observation in that Member State.

3.3 Sample selection

3.3.1 Stratification

FADN's field of observation covers a wide-range of agricultural productions taking into consideration both the economic size, as well as type of farming. In terms of their economic size some agricultural holdings are very large while others are very small. On the other side, in terms of type of farming, some agricultural holdings focus on crop production, some are specialised in livestock production while others have mixed farming, that is, both crop and livestock production. “On these two criteria - economic size and type of farming - alone, the field of observation of Community farms is highly heterogeneous” (Farm Accountancy Data Network - An A to Z of methodology, 1989, p.56).

Liaison Agencies stratify the field of observation before the sample selection of agricultural holdings in order to make a guarantee that this sample adequately reproduces heterogeneity.

Stratification is a statistical technique that is used to increase sampling efficiency (i.e. to minimize the number of agricultural holdings required to present the wide-range of agricultural productions in the field of observation). The Commission makes use of this statistical technique in line with the three dimensions below:

- Regions: for the FADN purposes the European Union is divided into FADN regions.
- Economic size: is the value of total standard output of the agricultural holding expressed in euro.
- Type of farming: is defined in terms of the relative importance of the different productions on the agricultural holding. Relative importance is itself measured quantitatively as a share of each agricultural production's SO to total SO of the agricultural holding.

3.3.2 Regions - the first dimension

For FADN purposes the European Union is divided into 139 FADN regions. These are shown in the following Table, as well as Figure.

Table 3:1 **Number of FADN regions per Member State**

Member State	Number of regions
Austria	1
Belgium	3
Bulgaria	6
Cyprus	1
Czech Republic	1
Croatia	2
Denmark	1
Estonia	1
Finland	4
France	25
Germany	16
Greece	4
Hungary	3
Ireland	1
Italy	21
Latvia	1
Lithuania	1
Luxembourg	1
Malta	1
Netherlands	1
Poland	4
Portugal	4
Romania	8
Slovakia	1
Slovenia	1
Spain	17
Sweden	3
United Kingdom	6

Source: Adopted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/regioncodes_en.cfm (accessed 12 September 2015)

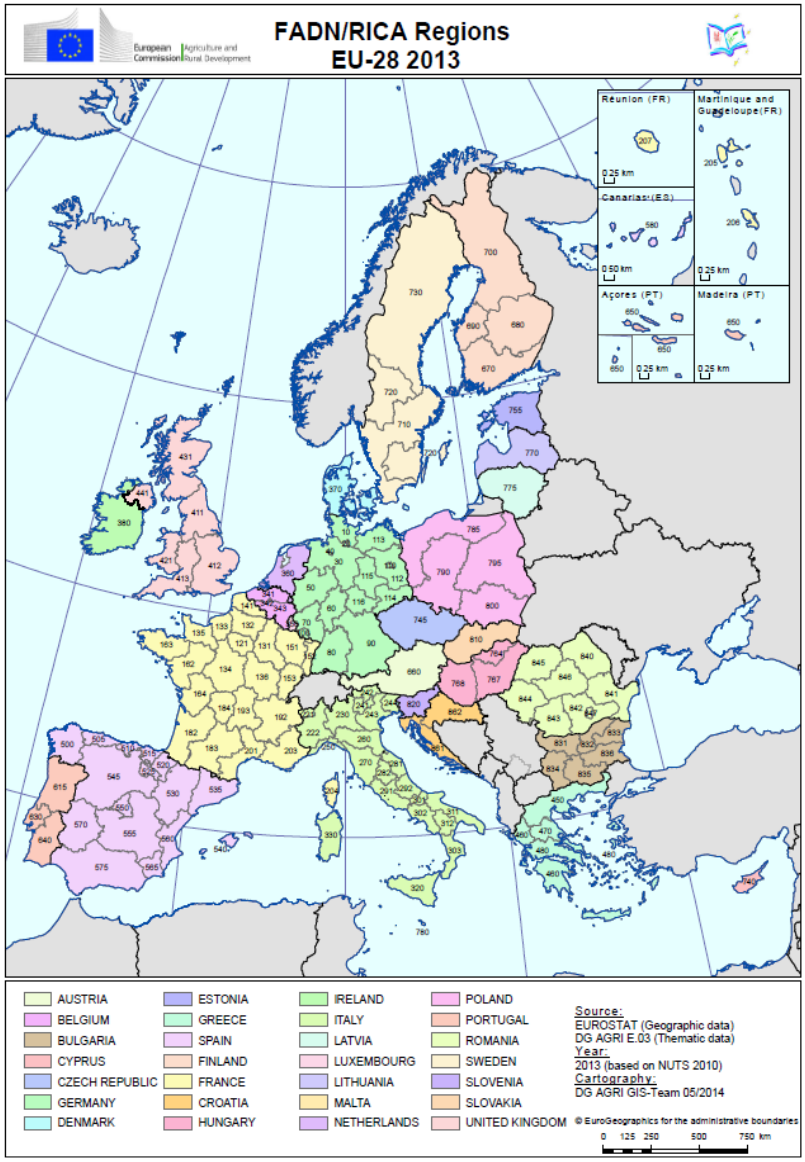


Figure 3:2 **FADN regions**

Source: Reprinted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/pdf/fadn2012_eu_A4.pdf (accessed 12 September 2015)

The biggest number of FADN regions have Member States belonging to the group of first six founders of European Union, such as France (25), Germany (16) and Italy (21) have the biggest number of FADN regions, as well as Spain (17).

In all EU28 Member States due to relatively high aggregation level of the FADN regions, there are 13 Member States with only one FADN region.

3.3.3 Economic size - the second dimension

All agricultural holdings belonging to the FADN field of observation are classified into economic size classes and type of farming.

The economic size of agricultural holdings is one of the dimensions used to classify agricultural holdings according to the farm typology. Commission Regulation (EC) No 1242/2008 of 8 December 2008, and then in subsequent amendments, has presented significant changes in the previous methodology of agricultural holdings classification, which was established by Commission Decision 85/377/EEC of 7 June 1985.

With Regulation (EC) No 1242/2008 that enters into force from the accounting year 2010, the economic size of an agricultural holding is measured as the total standard output (SO) of the holding expressed in euro.

"The economic size of an agricultural holding until the end of 2009 was defined by means of Standard Gross Margin (SGM) for all activities carried out in a holding. The economic size of an agricultural holding was expressed in European Size Units (ESU)" (Goraj L., Olewnik E., 2014, p.18). An agricultural holding has an economic size of 1 ESU when its total SGM is 1200 € of SGM (1 ESU = 1,200 € SGM). The SGM for each agricultural holding relates to the average value of production, over a three-year period and in a given region, minus certain variable costs.

The both methods have the same measuring principle: the sum of all the SO or SGM per hectare of crop and per head of livestock of each agricultural holding is an amount of its overall economic size.

The main differences between this two methods are:

- Methodologies used for calculations (the SO eliminates direct payments and costs[8]):
  - **SGM = Output + Direct payments – Costs**
  - **SO = Output**
- Measurement units used for the economic size of the agricultural holding (the economic size based on the SO is expressed in euro, while the economic size based on the SGM is expressed in ESU).

3.3.3.1 Standard output

The standard output coefficient of an agricultural product (crop or livestock) is the average monetary value of the agricultural output at farm-gate price, expressed in euro per hectare of crop or per head of livestock, and excludes direct payments, value added tax and taxes on products. Taking into consideration the regions as the first dimension of FADN stratification, there is a regional SO coefficient for each agricultural product. The Member States estimate regional SO coefficients for each product as average values over the reference period. The SO coefficients are calculated for more than 90 individual crop and livestock products. This large number of products reflects the diversity of agriculture within the European Union.

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[8] The decision to have SO instead of SGM was guided by the CAP starting with decoupled payments instead of coupled payments. Since decoupled direct payments cannot be applied to any specific production, they were eliminated from the SGM calculation. Moreover, if the cost were calculated, it would be possible to have a negative SGM values in cases where costs were higher than output. Therefore only the output is taken for calculation.

The standard output of an agricultural product (crop or livestock) is obtained by multiplying the standard output coefficient of that agricultural product by the relevant number of hectares or heads of livestock. In the FSS relevant number of hectares or heads of livestock relates to the area and livestock as recorded at a given time, whereas in the FADN it relates to the yearly average. The standard output is abbreviated as SO and expressed in euro.

The sum of all the individual SO of all the agricultural products in an agricultural holding is a measure of its overall Economic Size, expressed in euro.

The standard outputs are based on average values over a reference period of 5 years, but they should be updated in order to be in line with the economic trends. Therefore, the SO updates should be linked to the years in which FSS are conducted. FSS is calculated every third year.

The SO 2004 is an exception since the SO 2004 coefficient was calculated using the average of 3 years: 2003, 2004 and 2005. It is applied in 2007 FSS data and has been applied to 2005 FSS to grant comparability over the time periods.

The SO 2007 includes the calendar years from 2005 to 2009, or the agricultural production years from 2005/06 to 2009/2010. It is applied in the 2010 FSS, as well as for the 2010, 2011 and 2012 FADN sample selection based on 2010 FSS.

The SO 2010 was calculated using the average of 2008, 2009, 2010, 2011 and 2012. It was applied in the 2013 FSS, as well as for the 2013, 2014 and 2015 FADN sample selection based on 2013 FSS.

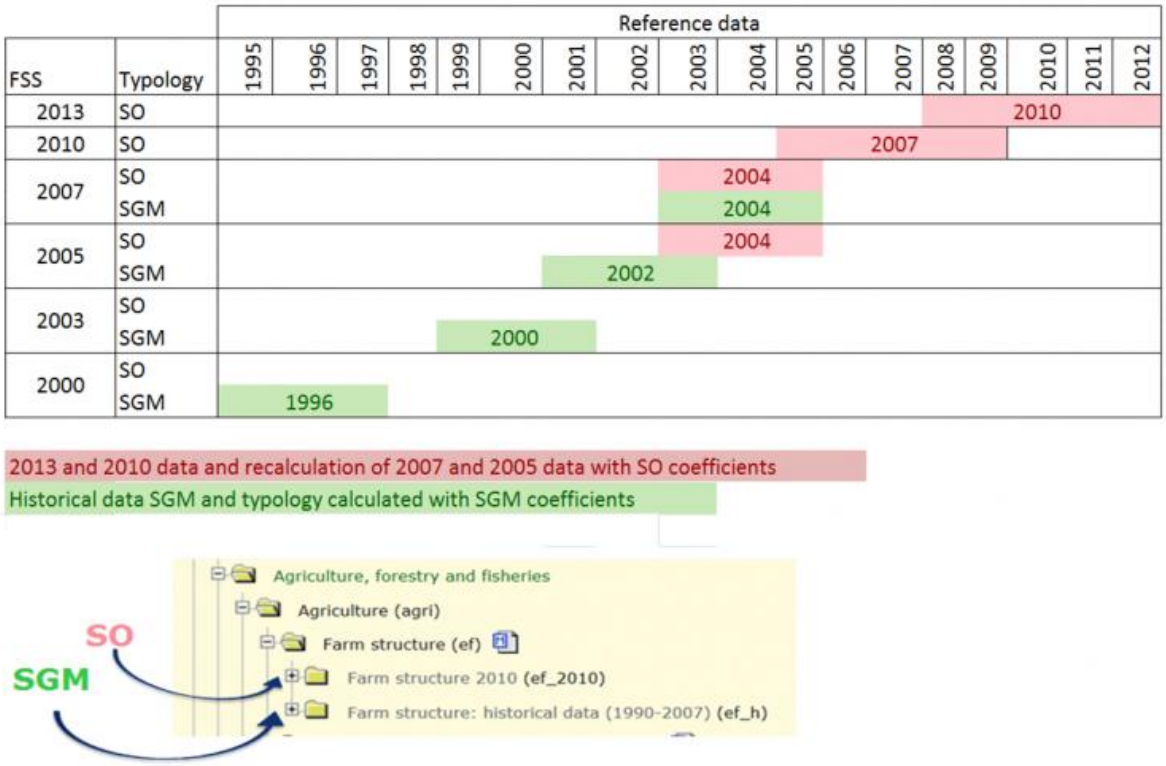


Figure 3:3 **The use of SO and SGM coefficients in FSS in the period 2000-2013**

Source: Reprinted from EUROSTAT: http://ec.europa.eu/eurostat/statistics-explained/index.php/File:SGM_SO.png (accessed 15 December 2015)

Standard output is the sum of the value of the principal product and, if applicable, secondary products. The principal product is usually the one with the highest SO value, and the other products are observed as secondary ones. For instance the milk is the principal product of a dairy cow, whereas the values of the calf and of the cow meat are secondary products.

Standard output values are calculated for a production period of 12 calendar months. For crop and livestock products for which the period of production is less than or exceeds 12 months, the figure should be transformed into values relating to a period of 12 chronological months.

"It might be concluded, that the total economic size of a farm is depending on its structure (i.e. number of hectares and animals) and on the SO coefficients applied in the region the holding belongs to" (Saravia Matus S., Cimpoies D., Ronzon T., 2013, p.17).

According to the total SO, agricultural holdings are grouped by 14 classes as it shown in the following Table.

Table 3:2 **Economic size classes of holdings**

Classes	Limits in euro
I	less than 2 000 euro
II	from 2 000 to less than 4 000 euro
III	from 4 000 to less than 8 000 euro
IV	from 8 000 to less than 15 000 euro
V	from 15 000 to less than 25 000 euro
VI	from 25 000 to less than 50 000 euro
VII	from 50 000 to less than 100 000 euro
VIII	from 100 000 to less than 250 000 euro
IX	from 250 000 to less than 500 000 euro
X	from 500 000 to less than 750 000 euro
XI	from 750 000 to less than 1 000 000 euro
XII	from 1 000 000 to less than 1 500 000 euro
XIII	from 1 500 000 to less than 3 000 000 euro
XIV	equal to or greater than 3 000 000 euro

Source: Reprinted from Commission Regulation (EC) No 1242/2008, p.20

Regulation (EC) No 1242/2008 is repealed by Regulation (EU) No 1198/2014, with effect from 1 January 2015.

3.3.3.2 FADN threshold based on standard output

In order to make limited number of agricultural holdings of the field of observation FADN threshold is determined.

Based on the FADN universe data (FSS data or Agricultural Census data), the FADN field of observation is defined by excluding agricultural holdings below a certain threshold of standard output, with the intention of eliminating small agricultural holdings. It is necessary to specify separate thresholds for each Member State since each of them has different farm structure.

The threshold is determined according to the principle that the field of observation must cover 90% of the agricultural production of the Member State (total output, land use, livestock units).

The threshold of the economic size of the holding is different by EU Member States. In most Member States the threshold is €4,000. However, in some Member States even upper thresholds are determined as well, such as in Belgium, United Kingdom, France, Luxembourg, Netherlands and Germany where it is €25,000. In Bulgaria and Romania the threshold of the economic size of the holding is €2,000.

The following Table shows that there are no changes with regard to economic size thresholds in period of time from 2012 to 2014. There is only one threshold changed in Italy in 2014. Italy decided to have threshold of 8,000 EUR instead 4,000.

Table 3:3 **Economic size thresholds (in 1000 EUR) applied by the Commission according to Regulation (EC) 1242/2008**

Member States	2012	2013	2014
Belgium	25	25	25
Bulgaria	2	2	2
Czech Republic	8	8	8
Denmark	15	15	15
Germany	25	25	25
Estonia	4	4	4
Ireland	8	8	8
Greece	4	4	4
Spain	4	4	4
France	25	25	25
France (Guadeloupe)	15	15	15
France (Martinique)	15	15	15
France (La Réunion)	15	15	15
Croatia	0	4	4
Italy	4	4	8
Cyprus	4	4	4
Latvia	4	4	4
Lithuania	4	4	4
Luxembourg	25	25	25
Hungary	4	4	4
Malta	4	4	4
Netherlands	25	25	25
Austria	8	8	8
Poland	4	4	4
Portugal	4	4	4
Romania	2	2	2
Slovenia	4	4	4
Slovakia	15	25	25
Finland	8	8	8
Sweden	15	15	15
United Kingdom	25	25	25
United Kingdom (Northern Ireland)	15	15	15

Source: Adopted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/methodology1_en.cfm (accessed 17 September 2015)

3.3.4 The typology of production - the third farm dimension

The typology of production of agricultural holdings is a uniform classification of holdings in the European Union. It is designed in a way to classify homogeneous groups of agricultural holding to the smaller or grater aggregates. This typology is described in Commission Regulation (EC) No 1242/2008 of 8 December 2008. This Regulation was repealed by Commission Delegated Regulation (EU) No 1198/2014 with effect from 1 January 2015.

“The "type of farming of a holding" is the production system of a holding which is characterised by the relative contribution of different enterprises to the holding's total SO” (Typology Handbook RI/CC 1500 Rev.3, p.7).

Agricultural holdings can be classified by type of farming on 3 levels: 8 general types, 21 principal types and 62 particular types of farming. The unclassified agricultural holding goes to "9. Non-classified holdings" type. This can occur when holding does not have SO value (holding has only kitchen garden or fallow land or land without economic use). Classification of agricultural holdings by general and principal type of farming is used almost entirely since there are not sufficient number of holdings of particular type of farming that can be used for analysis.

Table 3:4 **Classification of holdings by type of farming - specialist holdings — crops**

General TF		Principal type of farming		Particular type of farming	
1	Specialist field crops	15	Specialist cereals, oilseeds and protein crops	151	Specialist cereals (other than rice), oilseeds and protein crops
				152	Specialist rice
				153	Cereals, oilseeds, protein crops and rice combined
		16	General field cropping	161	Specialist root crops
				162	Cereals, oilseeds, protein crops and root crops combined
				163	Specialist field vegetables
				164	Specialist tobacco
				165	Specialist cotton
				166	Various field crops combined
2	Specialist horticulture	21	Specialist horticulture indoor	211	Specialist vegetables indoor
				212	Specialist flowers and ornamentals indoor
				213	Mixed horticulture indoor specialist
		22	Specialist horticulture outdoor	221	Specialist vegetables outdoor
				222	Specialist flowers and ornamentals outdoor
				223	Mixed horticulture outdoor specialist
		23	Other horticulture	231	Specialist mushrooms
				232	Specialist nurseries
				233	Various horticulture
3	Specialist permanent crops	35	Specialist vineyards	351	Specialist quality wine
				352	Specialist wine other than quality wine
				353	Specialist table grapes
				354	Other vineyards
		36	Specialist fruit and citrus fruit	361	Specialist fruit (other than citrus, tropical fruits and nuts)
				362	Specialist citrus fruit
				363	Specialist nuts
				364	Specialist tropical fruits
				365	Specialist fruit, citrus, tropical fruits and nuts: mixed production

		37	Specialist olives	370	Specialist olives
		38	Various permanent crops combined	380	Various permanent crops combined

Source: Reprinted from Commission Regulation (EC) No 1242/2008, p.6

Table 3:5 **Classification of holdings by type of farming - specialist holdings — animal production**

General type of farming		Principal type of farming		Particular type of farming	
4	Specialist grazing livestock	45	Specialist dairying	450	Specialist dairying
		46	Specialist cattle — rearing and fattening	460	Specialist cattle — rearing and fattening
		47	Cattle — dairying, rearing and fattening combined	470	Cattle — dairying, rearing and fattening combined
		48	Sheep, goats and other grazing livestock	481	Specialist sheep
				482	Sheep and cattle combined
				483	Specialist goats
				484	Various grazing livestock
5	Specialist granivores	51	Specialist pigs	511	Specialist pig rearing
				512	Specialist pig fattening
				513	Pig rearing and fattening combined
		52	Specialist poultry	521	Specialist layers
				522	Specialist poultry-meat
				523	Layers and poultry-meat combined
		53	Various granivores combined	530	Various granivores combined

Source: Reprinted from Commission Regulation (EC) No 1242/2008, p.7

Table 3:6 **Classification of holdings by type of farming - mixed holdings**

General type of farming		Principal type of farming		Particular type of farming	
6	Mixed cropping	61	Mixed cropping	611	Horticulture and permanent crops combined
				612	Field crops and horticulture combined
				613	Field crops and vineyards combined
				614	Field crops and permanent crops combined
				615	Mixed cropping, mainly field crops
				616	Other mixed cropping
7	Mixed livestock holdings	73	Mixed livestock, mainly grazing livestock	731	Mixed livestock, mainly dairying
				732	Mixed livestock, mainly non-dairying grazing livestock
		74	Mixed livestock, mainly granivores	741	Mixed livestock: granivores and dairying combined
				742	Mixed livestock: granivores and non-dairying grazing livestock
8	Mixed crops — livestock	83	Field crops — grazing livestock combined	831	Field crops combined with dairying
				832	Dairying combined with field crops
				833	Field crops combined with non-dairying grazing livestock
				834	Non-dairying grazing livestock combined with field crops
		84	Various crops and livestock combined	841	Field crops and granivores combined
				842	Permanent crops and grazing livestock combined
				843	Apiculture
				844	Various mixed crops and livestock
9	Non-classified holdings	90	Non-classified holdings	900	Non-classified holdings

Source: Reprinted from Commission Regulation (EC) No 1242/2008, p.7

Example of classification of a farm according to European Union typology
The "poles" P1 to P5 correspond to the five main groupings of specialist holdings, i.e. the five general types of farming: **P1 - specialist holdings with field crops** **P2 - specialist horticultural holdings** **P3 - specialist holdings with permanent crops** **P4 - specialist grazing livestock holdings** **P5 - specialist granivores holdings** **Example** **Is: P2 > 2/3 * total SO?** **YES: The general type of farming of the holding is** **1. Specialist horticulture** **Is: P21 > 2/3 * total SO?** **YES: The principal type of farming of the holding is** **21. Specialist horticulture indoor**

3.3.5 Weighting system

"The purpose of the weighting system is to take account of different sampling fractions for different cells. In the production of FADN results, weighted averages are calculated using these weights applied to each individual farm recorded in the sample" (Barkaszi L., Keszhelyi S., Csatári E.K., Pesti C., 2009, p.10).

A weighting factor calculated for the FADN sample is applicable to each agricultural holding of the sample. For the purpose of having this individual weighting factor calculation, agricultural holdings belonging to the FADN sample and the field of observation are stratified according to the same three criteria: FADN region, economic size class and type of farming. The individual weighting factor is equivalent to the ratio between the numbers of agricultural holdings belonging to the same stratum in the field of observation and in the FADN sample. "A weighting system is used in the calculation of results to accommodate different sampling fractions" (Farm Accountancy Data Network - An A to Z of methodology, 1989, p.56).

Weighting system elaboration includes the following process:

1. Application of typology on the final FADN sample: since the FADN sample is the subset of the FSS, it is very important that the applied typology methodology has to be same in both databases.
2. Compiling the table of FADN sample structure: based on typology results the FADN sample structure has to be summarized in the same way as it is in the FSS (same type of farming and economic size classes). The agricultural holdings below the chosen threshold are out of consideration for the purpose of compiling the table of FADN sample structure, as well as for the FADN field of observation.
3. Post-stratification: empty stratums have to be merged with similar stratums. In most cases the economic size classes are clustered, but certain types of framings could also be merged,

such as special horticulture indoor and outdoor, or specialist fruit and vineyards, or pigs and poultry.

4. Calculation of the weighting factor: each stratum (FADN region x type of farming x economic size class) of field of observation has to be divided with the same stratum in the FADN sample.
5. Results checking: after stage of completion of weighting factor calculation, the sum of individual agricultural holdings weights in the FADN sample have to be equal to the total number of agricultural holdings in the field of observation.

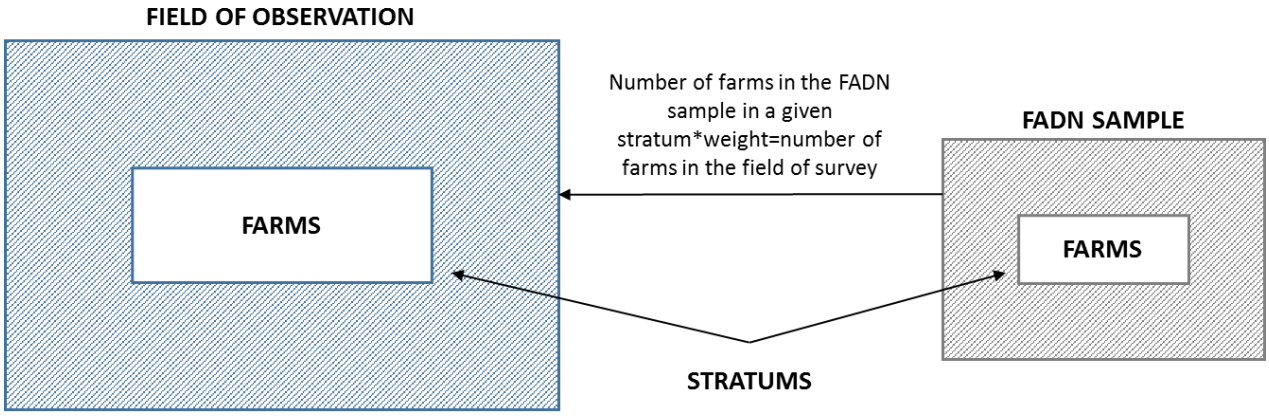


Figure 3:4 **Schematic description of weighting**

Source: Adopted from the FADN Accountancy Framework and Cost Definitions (Barkaszi L., Keszhelyi S., Csatári E.K., Pesti C., 2009, p.10)

3.3.6 The universe, field of observation and FADN sample represented as a matrix of cells

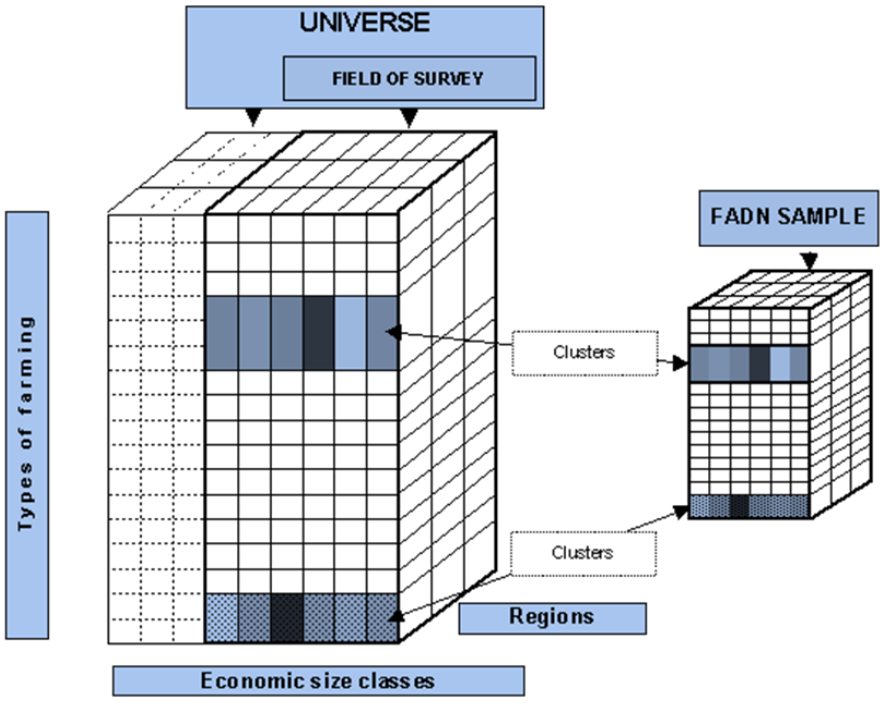


Figure 3:5 **3-dimensional matrix of stratums**

Source: Reprinted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/methodology3_en.cfm#taoc (accessed 20 September 2015)

The above figure shows a 3-dimensional matrix of stratums. As it aforementioned the number of agricultural holdings in each stratum is extracted from the FSS.

Each stratum in FADN sample matches to an explicit category of agricultural holdings (FADN region x type of farming x economic size class) from field of observation. In other words, all classification cells that contain holdings in the field of observation/survey should be represented in the FADN sample. In practice, however, some stratums represent a large number of agricultural holdings while other stratums represent very few agricultural holdings. Moreover, in FADN sample some cells can be empty and the intended FADN sample may not be reached.

On this matter, the Liaison Agencies and the Commission are able to judge for which farm types cells in the sample may be empty. Furthermore, for the calculation of weight, cells with comparable characteristics are then clustered (aggregated) and treated as a particular cell. Aggregation of cells increases the coverage of the field of observation/survey.

Table 3:7 **Farm structure survey and field of observation coverage**

Member State	Farms FSS 2010		Coverage field of observation FADN				
	Total	Field FADN	Farms %	SO %	UAA %	AWU %	SO
Belgium	42850	31010	72.0	98.0	95.0	87.0	2007
Bulgaria	370490	115390	31.0	91.0	96.0	51.0	2007
Czech Republic	22860	14820	65.0	99.0	98.0	93.0	2007
Denmark	42100	29340	70.0	99.0	96.0	89.0	2007
Germany	299130	196520	66.0	97.0	93.0	87.0	2007
Estonia	19610	8080	41.0	98.0	89.0	76.0	2007
Ireland	139890	105170	75.0	98.0	92.0	84.0	2007
Greece	723010	341180	47.0	90.0	85.0	79.0	2007
Spain	989800	597970	60.0	98.0	92.0	84.0	2007
France	516100	317360	61.0	97.0	91.0	85.0	2007
Italy	1620880	838740	52.0	97.0	91.0	82.0	2007
Cyprus	38860	10530	27.0	92.0	76.0	70.0	2007
Latvia	83390	21940	26.0	91.0	73.0	52.0	2007
Lithuania	199910	53440	27.0	86.0	78.0	54.0	2007
Luxembourg	2200	1610	73.0	98.0	97.0	90.0	2007
Hungary	576810	107250	19.0	90.0	93.0	46.0	2007
Malta	12530	3080	25.0	93.0	56.0	54.0	2007
Netherlands	72320	52220	72.0	99.0	93.0	90.0	2007
Austria	150170	95150	63.0	97.0	86.0	85.0	2007
Poland	1506620	730880	49.0	93.0	85.0	68.0	2007
Portugal	305270	114170	37.0	93.0	89.0	53.0	2007
Romania	3859040	1042570	27.0	83.0	78.0	59.0	2007
Slovenia	74650	41300	55.0	92.0	85.0	74.0	2007
Slovakia	24460	4260	17.0	96.0	95.0	76.0	2007
Finland	63870	42630	67.0	97.0	89.0	90.0	2007
Sweden	71090	29050	41.0	94.0	84.0	72.0	2007
United Kingdom	186660	94640	51.0	96.0	82.0	75.0	2007

Source: Reprinted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/methodology2_en.cfm (accessed 20 September 2015)

3.3.7 Selection plans

In accordance with Commission Regulation (EU) No 1291/2009 of 18 December 2009 and subsequent amendments, the Liaison Agencies are required to draw up a selection plan before the beginning of accounting year.

In Member States different selection procedures are used. During implementation of the selection plan several problems can happen, which are the reasons for deviations from planned sample size. For example there are not enough agricultural holdings who are both willing to participate and who have the necessary FADN information. Another clarification may be that a participating holder may quite agricultural production before the completion of the accounting year. Furthermore, reason may be that the Farm Return is incorrectly completed and unable to be corrected and consequently failing at the control stage.

"The choice of family farms for FADN system is based on the selection plan, which must ensure the representativeness of the family farms in sample" (Ranogajec Lj., Deže J. and Tolić S., 2014, p.81).

The FADN sample size and average weights of a sample holding fluctuate between Member States, as shown below.

Table 3:8 **FADN sample size and average weights of a sample holding**

Country	Actual sample size	Number of farms represented in the field of observation	Average weight of a sample holding
Belgium	1201	30620	25
Bulgaria	2298	115277	50
Czech Republic	1429	14820	10
Denmark	2055	28917	14
Germany	8988	205877	23
Estonia	661	8012	12
Ireland	1048	103821	99
Greece	3456	332902	96
Spain	8229	514873	63
France	7444	291433	39
Italy	10731	781221	73
Cyprus	432	10220	24
Latvia	1000	21968	22
Lithuania	1061	53397	50
Luxembourg	449	1548	3
Hungary	1919	105337	55
Malta	508	2959	6
Netherlands	1468	51140	35
Austria	2088	93251	45
Poland	11194	727750	65
Portugal	2258	110588	49
Romania	5634	1042281	185
Slovenia	956	40961	43
Slovakia	521	4270	8
Finland	926	39173	42
Sweden	1050	27365	26

United Kingdom	2738	92361	34

Source: Reprinted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/methodology2_en.cfm (accessed 25 September 2015)

Average weight of a sample holding is minimum 3 in Luxembourg and maximum 185 in Romania.

In the recent years, "a number of issues have arisen with FADN and the data derived from it: The main issues are representativeness of the sample in general and with respect to certain data items and sub-samples, and the quality of the sampling process. Specifically, there are questions about the size of the sample and whether it is capable of producing reliable information at a sub-national level. In addition, a big question is how the data are collected and by whom, and whether the methods employed introduce a selection bias" (Neuenfeldt S., Gocht A., 2014, p.ii).

3.4 Standard results

"The standard results are a set of statistics, calculated from the Farm Returns that are periodically produced and published by the Commission. They describe in considerable detail the economic situation of farmers by different groups throughout the Community" (Farm Accountancy Data Network - An A to Z of methodology, 1989, p.61).

By presenting the standard results, the Commission achieves one of the basic goals of FADN, which is calculating the income of agricultural holdings. The Commission has defined indicators in the standard results and has also defined the method of calculation of those indicators. Standard results are calculated as weighted averages per agricultural holding. They provide a detailed overview of the economic situation of agricultural holdings of different economic size classes and types of farming.

Since the methodology of data collection and calculation of standard results is common across the Member States, it is possible to analyse and compare the Standard Results of different Member States. "The FADN data gave an opportunity to examine economic, as well as structural development in the defined farm groups" (Rikkonen P., Mäkijärvi E., Ylätalo M., 2013, p.3).

Standard results can be aggregated into nine groups of indicators: income, sample and population, structures, production, costs, subsidies, balances subsidies and taxes, balance sheet, financial situation.

The detailed table of indicators for standard result in EU FADN system is described in Annex 1, as well as calculation schemes of the main FADN indicators are presented by the subsequent Figures.

The first relates to the Gross Farm Income (GFI). It is calculated by deducting intermediate consumption from total output, and by adding the balance current subsidies and taxes. Subsidies increase the GFI, whereas taxes decrease it.

The Farm Net Value Added (FNVA) is obtained by removing depreciation from the GFI. Then, the Farm Net Value Added is reduced by the cost of total external factors, and increased by the balance of subsidies and taxes on investment.

This gives Family Farm Income (FFI) that is produced as fragment of operating activity conducted in the agricultural holding. This indicator characterizes remuneration for family factors (work, land and capital) included in agricultural production, and agricultural holder's risks in the accounting year.

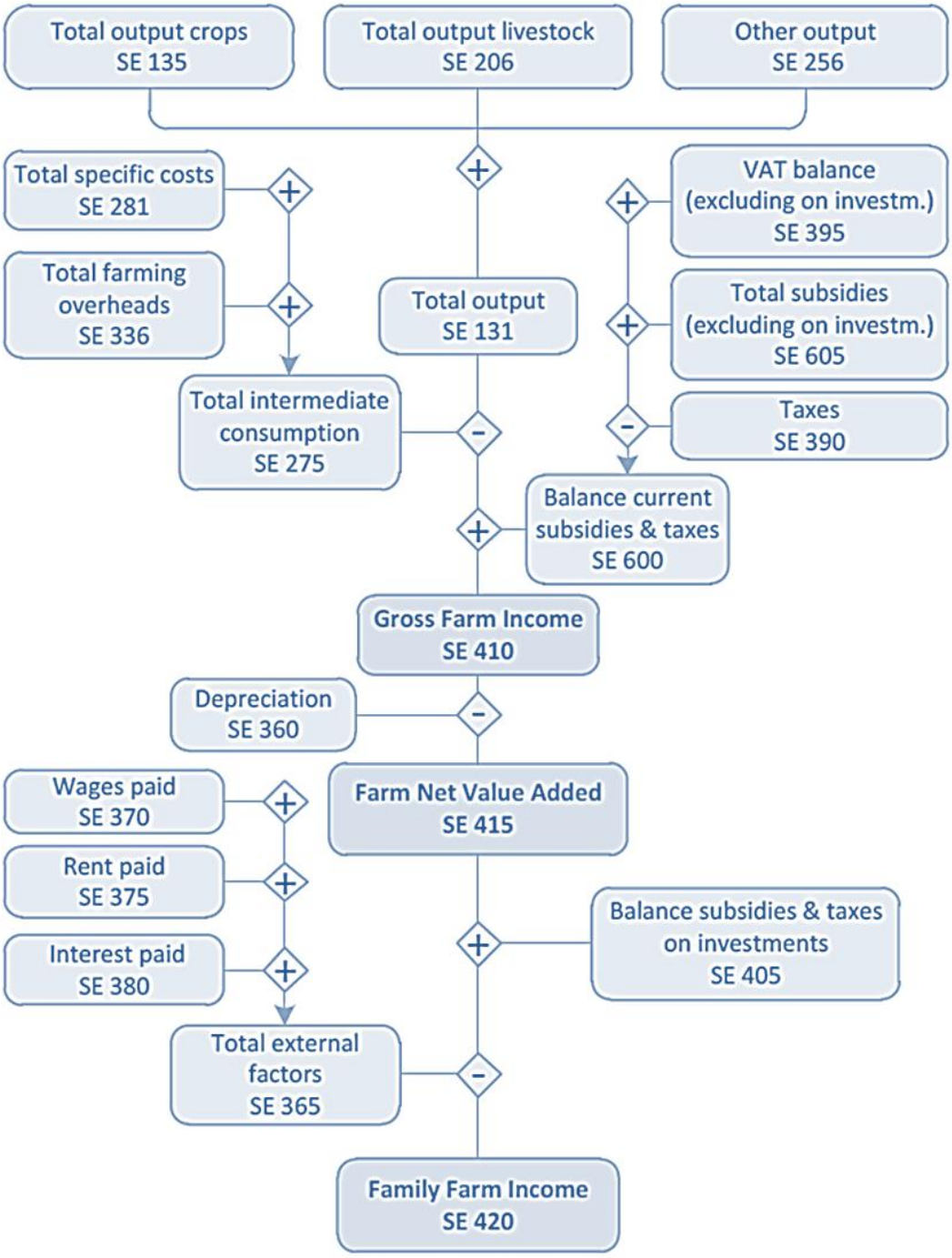


Figure 3:6 **Calculation scheme of the main economic indicators**

Source: Adopted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/annex003_en.cfm#ii (accessed 01 August 2015)

The below Figures represents the calculation method for the total output of crop and crop products, as well as total output of livestock and products realized as fragment of operating activity conducted in the agricultural holding. The output calculations also include the change in stocks, the sales of production, farmhouse consumption and farm use.

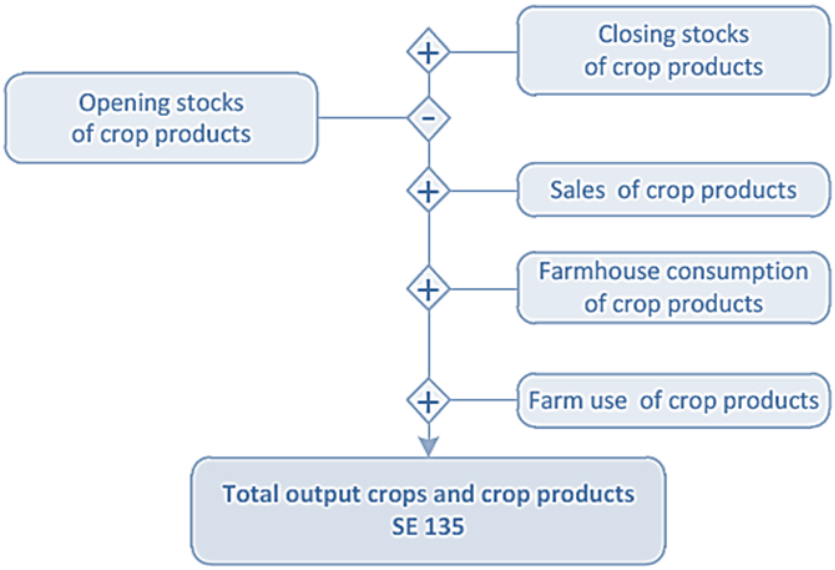


Figure 3:7 **Calculation scheme of the total output crops and crop production**

Source: Adopted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/annex003_en.cfm#ii (accessed 01 August 2015)

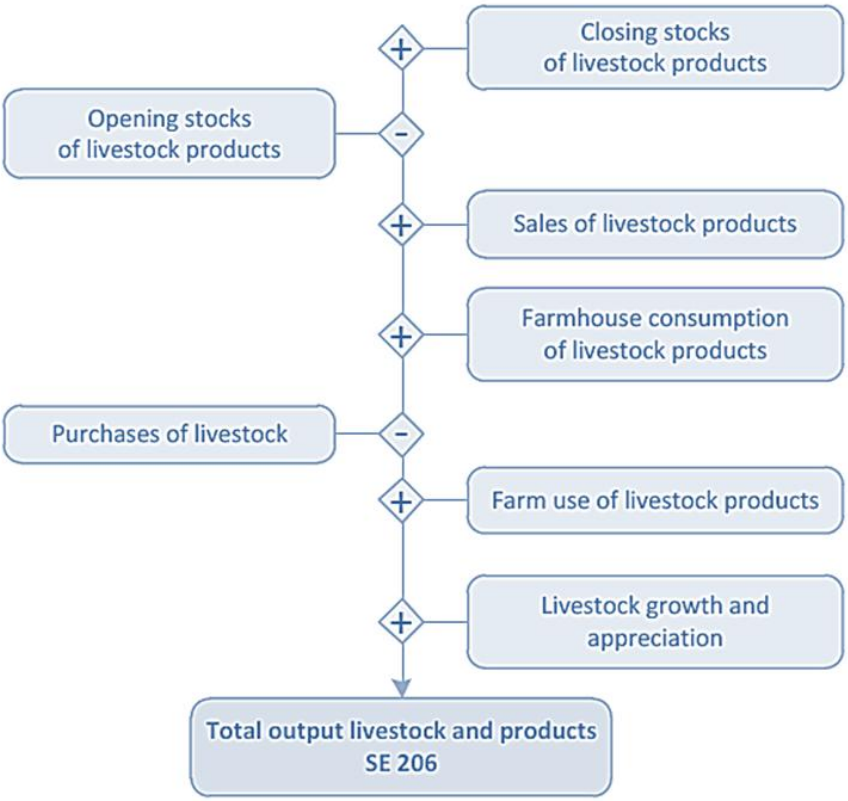


Figure 3:8 **Calculation scheme of the total output livestock and products**

Source: Adopted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/annex003_en.cfm#ii (accessed 01 August 2015)

3.5 FADN database

3.5.1 EU FADN database

FADN information is aggregated into a standard results database, which includes particular FADN dada for the following dimensions: year, geographical dimension (country, region), type of farming and economic size classes. Indicators defined in the standard results database represent averages. These public database offering the possibility to view a large set of pictures of different average agricultural holdings all over the European Union.

FADN public database has three stars of total five according to high-value datasets publication requirements.

“High-value data set which is published at least as 3-star data, implies making it available on the web under an open license in a non-proprietary structured format. Publishing data ranked as 3-star is still rather simple to do since normally there is no need to learn new tools. For instance, the data can be made available as Comma Separated Values (CSV) or Open Document Spreadsheet (ODS) by simply selecting this particular type when saving the document. 3-star data set gives some important advantages, like: changing and manipulating the data without being confined by the capabilities of any particular software; processing the data; sharing the data; and exporting the data to another format” (Bargiotti L., De Keyzer M., Goedertier S., Loutas N., 2014, p.9-10).

Before 1989 the data were kept on paper and up to 2001 on several magnetic medium, hardly supporting any quality checks.

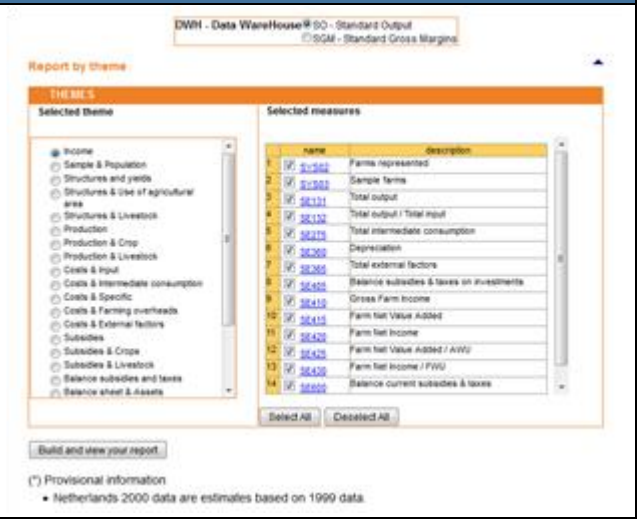
An example of historical data supports	FADN public database
	

Figure 3:9 **Historical data supports and public database**

Source: Reprinted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/50th_anniversary_en.cfm and http://ec.europa.eu/agriculture/rica/database/database_en.cfm (accessed 03 August 2015)

3.5.2 National FADN database

National FADN database should manage the following set:

- Providing the main functions of the FADN database administrator who is responsible for the performance, integrity and security of a database,
- Providing data processing services for the purpose of conducting surveys, as well as for the needs of the Liaison Agency and other users,
- Processing the FADN data according to the standards and methodologies of EU,
- Providing the application of the classification system of the agricultural holdings within the FADN and FSS,
- Transmitting the national FADN data to the EU Commission in required format, time period and quality,
- Providing constant updates of the agriculture holdings FADN registry and other databases in order to ensure normal functioning of the FADN system,
- Validating and maintaining the public FADN Web site,
- etc.

3.6 Publications

The unit responsible for FADN within the Commission, Directorate-General for Agriculture and Rural Development, Directorate-Economic analysis, perspectives and evaluation, provides yearly the EU FADN farm economics overview based on different economic and financial indicators. It describes the economic situation of EU agricultural holdings by Member State and by type of farming in the last years, as well as importance of direct payments for farm income and characteristics of holdings. Several sector analyses are also realized each year for beef, cereals and dairy sector. In addition to the regular reports, the FADN unit makes specific analyses. These are requested by various units and directorates of the Commission and other European Union institutions.

The demand for analyses for a specific purposes based on FADN data is constantly increasing. The analyses based on FADN data play an essential role in whole CAP. They have an impact on the evaluation of CAP measures and on the policy proposals.

FADN publications has two stars of total five according to high-value datasets publication requirements.

3.7 Contributions

The FADN unit in the Commission contributes significantly to research projects, estimations and studies by providing data and supervision for the interpretation of the data.

FADN data are mainly used for research projects related to agriculture.

Chapter 4 Serbian concept of FADN

4.1 Synopsis of agricultural sector in the Republic of Serbia

Agriculture in Serbia has extremely strong economic impact. It is the basis for the economy within and the development of rural areas. The favorable natural conditions and available resources determine the comprehensive significance of agriculture in the socio-economic development of the Republic of Serbia.

Table 4:1 **Serbian agriculture indicators**

Indicators	
Population, total	7,186,862
Rural population	around 45% of total population
Land area	8,841 thousand ha
Agricultural land	57.8% of land area
Arable land	37.5 % of land area
Total number of agricultural holdings	631,552
Employment in agriculture (% of total employment)	21%
Average agricultural land per agricultural holding	6,12 ha (between 4.40 ha/AH in Sumadija and Western Serbia and 11.42 ha/AH in the Vojvodina region, or in a ratio of 1:2.6 times)

Source: Adapted from the Statistical Office of the Republic of Serbia: http://webrzs.stat.gov.rs/WebSite/public/ReportView.aspx, and the World Bank: http://data.worldbank.org/indicator#topic-1 (accessed 13 August 2015)

Figure 4:1 **Serbian map**

Source: Reprinted from the Statistical Office of the Republic of Serbia: http://webrzs.stat.gov.rs/WebSite/userFiles/file/Opsti%20podaci%20u%20Republici%20Srbiji/dokumenti/razno/Karta_NSTJ_po_oblastima_1_1_2012_en.pdf (accessed 25 December 2015)

Total land area of the Republic of Serbia is 8,841 thousand ha of which agriculture land covers 0.7 hectares per capita, while arable agriculture areas covers 0.5 hectares per capita.

Rural regions in Serbia take up 85% of the total territory, with 45% of the population living in them. The economic structure of Serbian rural regions is highly dependent on primary sector and still based on the exploitation of natural resources.

4.2 The need for FADN

The Republic of Serbia is an EU-candidate country. The European Council granted Republic of Serbia Candidate status at 1 March 2012 and its EU accession is regulated by Council Decision 2008/211/EC of 18 February 2008 on the principles, priorities and conditions contained in the European Partnership with Republic of Serbia and repealing Decision 2006/55/EC.

As a modern country in transition, Republic of Serbia identifies in agricultural sector the needs for farm accounting and its significances for data gathering for economic and agricultural policy analysis in Farm Accountancy Data Network (FADN).

Contrary to EU Member States, Republic of Serbia doesn't have farm accounting legal base, with the exception that there is a special legislation obliging agricultural holders to keep accounts if they are in the VAT system. As a consequence to this, in the last years there has been a rising interest for economical results of the agricultural holdings and analysis of their farm management.

"As the result of the above-mentioned and since the Republic of Serbia is increasingly moving towards EU integration and moreover, taking into consideration that the establishment and functioning of FADN system is one of the preconditions to join the EU, the need to establish and develop FADN system becomes an important strategic option" (Ivkov I., Vasiljevic Z., Ghelfi R., 2013, p.337).

NOTE:

Legislation obliging farmers to keep accounts:

- Law on personal income tax (Official Gazette of the Republic of Serbia Nos. 24/01, 80/02, 80/02-et al., 135/04, 62/06, 65/06- corrigendum, 31/09, 44/09, 18/10, 50/11, 91/11-CC, 93/12, 114/12-CC, 47/13 and 48/13- corrigendum)
- VAT Law (Official Gazette of the Republic of Serbia Nos. 84/04, 86/04- corrigendum, 61/05, 61/07 , 93/12, 6/2014)

Following agricultural holdings/holders fall under this group: natural persons - holders incurring income from agriculture and forestry related activities, i.e. from agricultural and forestry products. Under the legislation in force, keeping accounts for this group of agricultural holders is compulsory in the following cases:

FIRST CASE:

If the holder has decided to have the status of entrepreneur by filing a tax return to the competent tax authority.

In order to be granted the status of entrepreneur, holder needs to meet the following two requirements cumulatively:

1. The agricultural holding needs to be entered in the Registry of agricultural holdings in line with the applicable legislation
2. To keep accounts

If the natural person-holder fails to meet these two requirements cumulatively, the status of entrepreneur shall not be granted. Acquiring the status of entrepreneur has a voluntary character.

Under the Law on personal income tax, Article 32 paragraph 2 thereof holders who are granted the status of entrepreneur shall be liable to payment of income tax stemming from self-employment, on the basis of income from agriculture and forestry. Entrepreneurs shall keep accounts and shall record business changes in the manner as prescribed by the law.

Under this law, the entrepreneurs shall keep accounts on the single-entry basis. If they so decide the entrepreneurs may keep accounts on the double-entry basis, in line with the law governing the fields of accounting and audit.

The book of entries (for single-entry accounting) shall include data relating to revenues, expenditures, fixed assets, tools and inventories with calculative write-offs, as well as other data in accordance with the Law on personal income tax.

SECOND CASE

If the registered agricultural holding is subject to payment of value added tax.

Registered holding shall become liable to payment of value added tax if in previous 12 months the sales of goods and services of that holding exceeded 8,000,000 dinars (about 70,000 EUR). In this case the holder shall keep accounts and records as provided for by the VAT Law. Keeping accounts in this case is compulsory and this obligation arises under compulsion of law.

Holders with turnover under 8,000,000 dinars can choose voluntarily to enter the VAT system if they assess this is favourable for them. The said holders keep accounts on the single-entry or double-entry basis.

Accession countries are expected to have a fully operational FADN upon entry into the EU, because:

- The development of the CAP obliges objective and relevant information on incomes in the numerous categories of agricultural holdings and on their farm management.
- The accounts of agricultural holdings are the main source of data for agricultural holdings income measurement and for study of their farm management.
- The returning agricultural holdings should be distributed among the various categories of agricultural holdings on the basis of a stratification of the field of observation.

"Establishing a network of accounting data on the family farms based on FADN methodology is a condition for Serbia's accession to the European Union, which gives a high priority to this activity in the Republic of Serbia" (Vasiljević Z., Zarić V., Ivkov I., 2012, p.600).

In line with this, the establishment of Serbian FADN system has formally been presented in late 2011 and assisted by the project "Establishment of the Serbian Farm Accountancy Data Network (FADN)" financed under EU IPA 2010 programming cycle.

4.3 Synopsis of the Project: "Establishment of the Serbian Farm Accountancy Data Network (FADN)"

The Project "Establishment of the Serbian Farm Accountancy Data Network (FADN)" formally started on 4th of October 2011.

Project implementation period was initially planned to be over a period of 24 months. During this period of time, significant changes were made in the EU Regulations determining the format of the holdings Farm Return that should be sent to the RICA system in Brussels. Furthermore, it was realized that the establishment of the Serbian FADN needed more support than it was initially predicted. Consequently the Project was extended by additional 24 months.

Additionally, on the basis of the successful Project implementation, the Ministry of Agriculture applied for an extra extension of the Project until end of the calendar year 2015 in terms of further support on FADN activities during the last 3 months of the year. Unfortunately, this idea was not supported. Therefore end date of the Project was on 03rd of October 2015.

The overall objective of the project was to contribute to the provision of improved economic, financial and performance data on Serbian agricultural holdings and the agricultural sector in com-

pliance with EU criteria thus increasing agricultural productivity and competitiveness, and integration with the EU.

This project supports the setting up of the Serbian FADN system through following activities:

- Establishing the legal basis for FADN;
- Establishing the infrastructural framework;
- Development of methodology for collection, validation and processing of data for national use as well as use at EU level;
- Development of procedures;
- Development and installing software for data recording, validation and processing;
- Extensive training of staff at all levels;
- Development of statistics and analysis for national use of data.

4.4 FADN national legislation

FADN is based on the EU requirements. During the period up to EU accession Republic of Serbia has to elaborate the national legislation on FADN that would support the establishment of the Serbian FADN, and secure that it is in line with the official EU requirements, laid down in EU Regulations. Base on this facts, the Serbian FADN legislation on its road map to EU integration can be divided in two phases: pre-accession and post-accession phases.

4.4.1 Pre-accession phase

Apart of EU-level legal acts, FADN is regulated by legal acts of different level (national law, ministerial orders, and interinstitutional agreements) in all EU Member States, as well as in candidate as well as applicant countries, which are subject to FADN implementation. The FADN of the Republic of Serbia is not an exception.

In this phase, the legislation could be divided in two categories such as:

1. Basic legislation that already exists, and
2. New legislation relating to adoption

4.4.1.1 Basic legislation that already exists

Although currently there is no specific legal basis for FADN in Serbia, currently, there are general legal acts in power, applicable as supporting documents for establishment of FADN in the Republic of Serbia. The following list of Serbian legislation serves a purpose of FADN:

a) **Law on Agriculture and Rural Development of the Republic of Serbia** (Official Gazette of the Republic of Serbia no. 41/09)

Existing Law on agriculture and rural development of the Republic of Serbia (Article 33) stipulates that the Ministry of Agriculture, Forestry and Water Management keeps the system of agricultural accountancy data to monitor the level of income and expenses of the registered agricultural holdings and family farms, assess the efficiency of agricultural production and analyse the agricultural policy measures. It provides the legal base for the establishment of the FADN and will be the ground for the future sub-legal acts on Farm Accountancy Data Network in the Republic of Serbia.

This main legal act firstly showed enough support for establishment of FADN system. But then, after the first negotiations with the EU about Chapter 11 – Agriculture and rural development, it has been discovered a huge gap under the Law on Agriculture and Rural Development of the Republic of Serbia, which is not in accordance with the EU legislation. Therefore, firstly, it is identified need for updating basic national low, which should be adjusted with the EU legislation and later on need for adoption of new FADN legal acts.

b) **Law on Agricultural and Rural Development Subsidies** (Official Gazette of the Republic of Serbia no. 10/2013 and 142/2014)

Law on Agricultural and Rural Development Subsidies (Article 41) describes that the national special subsidies shall include, among others, Subsidies for the establishment, development and operation of farm accounting accountancy data systems on agricultural holdings. These subsidies are payments for the collection, processing, analysis and dissemination of relevant defined accounting and economic data from selected holdings.

c) **Law on the Provision of Advisory and Professional Services in the Field of Agriculture** (Official Gazette of the Republic of Serbia no. 30/10)

Since 2010, the Agricultural Extension Service has been operating in compliance with this law, in two territories:

- REPUBLIC – Ministry of Agriculture in collaboration with the Institute for Science Application in Agriculture is responsible for creating a multi-annual and annual work plans for those services that are distributed on the whole territory of Serbia, except for those located on the territory of the Autonomous Province of Vojvodina, monitoring of these services, as well as their evaluation. Number of services that cover this territory is 22. The work of these services is financed from the budget of the Ministry of Agriculture. At the republic level, FADN data collection is regulated under the **Regulation on the Establishment of Annual Development Programme of Agricultural Extension Service**.
- PROVINCIAL – Provincial Secretariat of Agriculture, Water Economy and Forestry is responsible for creating multi-annual and annual work plans of those services that are located on the territory of the Autonomous Province of Vojvodina, monitoring of these services, as well as their evaluation. Number of services that cover this territory is 12 plus one oenological station. The operation of these services is financed by the Provincial Secretariat of Agriculture, Water Economy and Forestry. At the provincial level, FADN data collection is regulated under the **Annual Enhancement Programme of Agricultural Extension Service of the Autonomous Province of Vojvodina**.

d) **Law on Personal Data Protection** (Official Gazette of the RS No. 97/2008 and 104/2009, 68/2012 - decision and 107/2012)

The collection of data for FADN must conform to the requirements of the Law on Personal Data Protection. The data collection must therefore be based on agreement or on a legal basis. In addition, the FADN data collection must be registered by Ministry of Agriculture with the Commissioner for Data Protection.

The registration document is finalized, but the registration process should start after the rulebook is approved.

4.4.1.2 New legislation relating to adoption

Abovementioned legal acts provide for the framework conditions on functioning of the FADN in the Republic of Serbia, although do not specify any particular rules and/or methodology.

In this way, there is a need for the specific legal acts of the by-law category as following documents:

a) **Rulebook on FADN** to describe and regulate the Serbian FADN activities

Rulebook on FADN, is being elaborated in 2014-2015, but not jet adopted. It would govern the implementation of the FADN system before the accession to EU.

The Rulebook aims at:

- Establishment of the clear and transparent legal conditions for the establishment and implementation of FADN in the Republic of Serbia,
- Transposition of the basic articles of EU FADN regulations to the national law of the Republic of Serbia,
- Provision of other relevant legal conditions for the effective functioning of FADN system in Serbia, not included in EU FADN regulations.

The Rule Book enters into the force upon approval by the Minister of Agriculture of the Republic of Serbia, and by the Government of the Republic of Serbia. However: on the date of accession of the Republic of Serbia to EU, the Rule Book will terminate its legal power, and the EU regulations will enter into force. If during the EU accession negotiations, the Government of the Republic of Serbia decide on the earlier transposition of EU FADN regulations into the national law of Serbia, then – the Rule book will terminate its power earlier or act in parallel with the EU FADN regulations, under the special decision.

b) **The 5-year National plan**

The 5-year National plan gives a short description of the EU-requirements to the Serbian FADN, present the Serbian FADN institutional framework and list the main activities to be implemented during the period 2016 - 2020

c) **Agreement between participating holders of agricultural holdings and the Ministry of Agriculture**

Each agricultural holding has to agree on their involvement in FADN by signing the standard agreement between the Ministry of Agriculture and the farm holder.

d) **Memorandum of understanding between the Ministry of Agriculture and Statistical Office of the Republic of Serbia**, which is responsible for preparation of selection plan.

The next step in the process are changes of Low clauses, introduction of minor adjustments to the documents and hereafter adoption of the Rulebook, the 5-year plan, etc..

Alignment plan of Serbian FADN adoption of FADN legislation is presented in following Table.

Table 4:2 **Alignment plan of Serbian FADN legislation**

ADOPTION OF FADN LEGISLATION	15	2016				2017				2018				2019				2020			
Quarter	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
ACTIVITY																					
The change of Law on Agriculture and Rural Development clauses		X																			
Adoption of Rulebook on FADN				X																	
Adoption of 5-year National plan					X																

Source: Author's own elaboration based on information from Delegation of the EU: http://europa.rs/eng/serbia-develops-its-farm-accounting-system-with-eu-support/ (accessed 25 October 2015), Strategy for Development of Agricultural Statistics in the Republic of Serbia for the period 2014-2018 (2014, p.8)

4.4.2 Post-accession phase

The EU Regulations in area of EU FADN that have already been described in Chapter 2, Heading 2.2, have been identified and clearly presented in the Republic of Serbia. It has been foreseen that up to accession to EU, any of these Regulations would be completely transposed to the law of the Republic of Serbia, although basic articles of these Regulations will form the base of the Rulebook that is already prepared during year 2015 and will be adopted in 2016. The EU FADN Regulations will enter into force on the date of the accession of the Republic of Serbia to EU.

4.5 Serbian FADN organizational infrastructure

Serbian FADN system has been launched in late 2011 when the related organizations were involved in different segments of FADN system and represent current Serbian FADN organizational infrastructure. The term "current" is used due to the fact that the structure of the FADN organizational infrastructure is inconsistent and changeable.

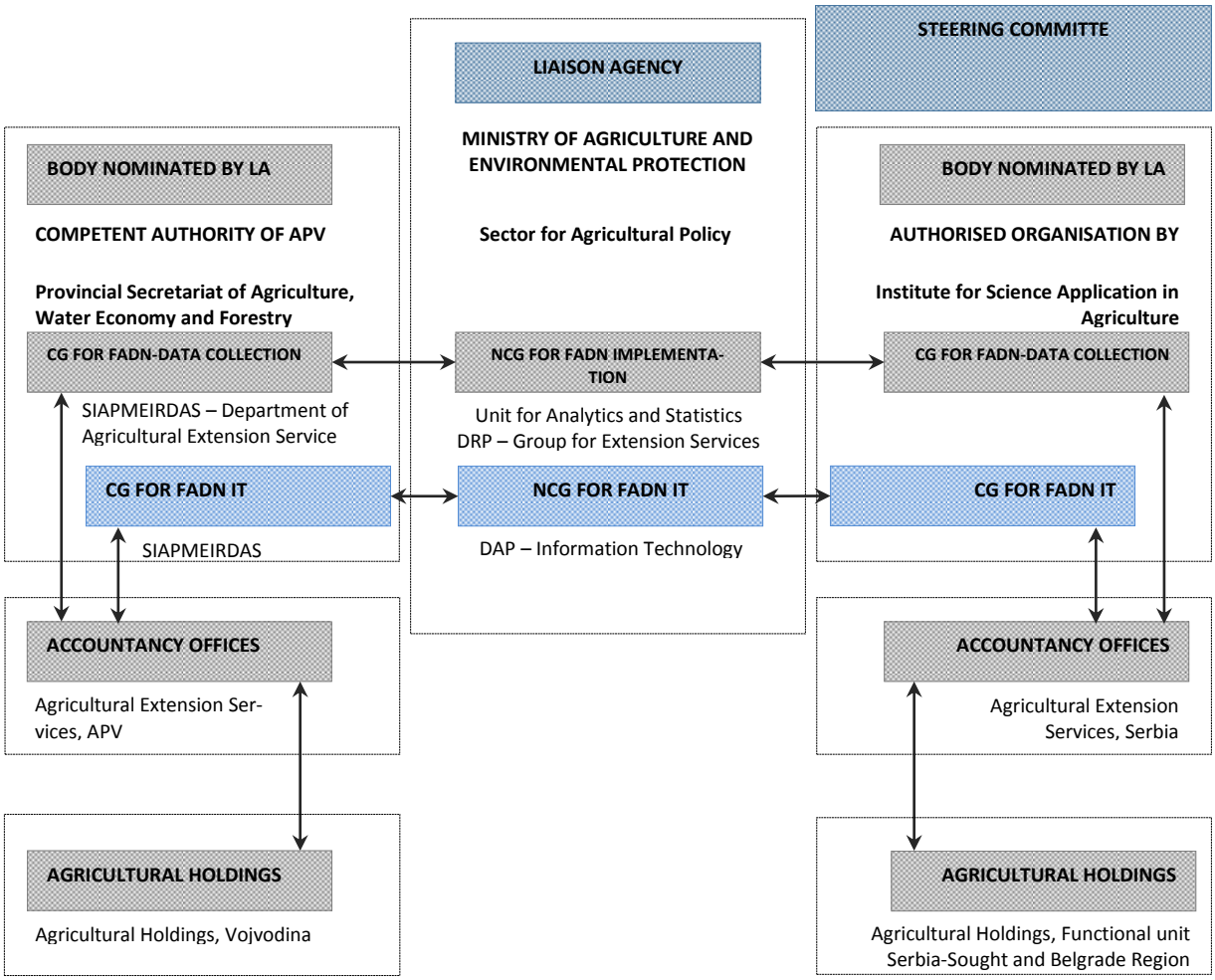


Figure 4:2 **Current Serbian FADN organizational chart**

Source: Reprinted from the Establishment of the Serbian FADN Institutional Framework (Ivkov I., Vasiljevic Z., Ghelfi R., 2013, p.345)

Sector for Agricultural Policy within the Ministry of Agriculture is appointed to be the Liaison Agency – competent authority for the data transmission to the European Commission. The subsidiary Unit for Analytics and Statistics is appointed to coordinate the whole system. Group for Extension Services within the Department for Rural Development is providing assistance and support to the establishment and development of Serbian FADN system since it closely cooperates with the agricultural extension services and the Institute for Science Application in Agriculture (IPN). IPN is authorized organization by Minister to coordinate and control the activities of Agricultural Extension Services from the Republic of Serbia, except for those located on the territory of the Autonomous Province of Vojvodina. Furthermore, as the FADN database hosting provider is appointed the Information Technology Sector within the Directorate for Agrarian Payments.

IPN and competent authority of Autonomous Province of Vojvodina - Provincial Secretariat for Agriculture, Water Management and Forestry (PSAWMF) are appointed to be bodies under the Liaison Agency responsible for supervision of data collection. Precisely described, within the PSAWMF, responsible subsidiary for supervision of data collection is the Department of Agricultural Extension Service under the Sector for Implementation of Agricultural Policy, Monitoring of European Integration in the field of Rural Development and Advisory Services (SIAPMEIRDAS).

The total number of Agricultural Extension Services that are appointed as Accountancy Offices is 33. Currently, these offices have 100 advisers appointed as FADN Data Collectors responsible for collection, processing, and dissemination of data from agricultural holdings. Moreover, plus 94 data collectors are in the process to be trained for FADN.

Serbian FADN Steering Committee that is precursor of the National Committee has been established. Statistical Office of Republic of Serbia (SORS), Faculty of Agriculture in Belgrade-Zemun, University of Belgrade and Faculty of Agriculture, University of Novi Sad, Serbian EU Integration Office (SEIO) are represented in the FADN system through the Steering Committee. Related Ministry as well as EU Delegation is also represented in the Steering Committee. After finalization of the project "Establishment of the Serbian Farm Accountancy Data Network (FADN)", the Steering Committee is shaped without representatives of SEIO and EU Delegation as members within it. Further, the Steering Committee will be converted to the National Committee after Rulebook adoption.

4.5.1 Participating organizations within Serbian FADN

Currently appointed participating organizations for the Serbian FADN purposes are described by the following Table. However, besides organisations, the most important participants of the FADN system are agricultural holders, managers of agricultural holdings and their families.

Table 4:3 **Participating organizations currently appointed for the Serbian FADN purposes**

Participating organization of the Republic of Serbia and its brief description	The role of participating organisations within the FADN
Ministry of Agriculture, Forestry and Water Management	
Is, among other things, responsible for proposing system solutions in the areas of agriculture, creation of agricultural policy and its implementation.	
Sector for Agrarian Policy	Steering Committee member
Performs, among other tasks, providing agricultural analysis; following and analysis of EU legislation, rules, principles; harmonization of regulations, etc.	Liaison Agency
Unit for Analytics and Statistics	
Performs among other tasks related to: analysis of agricultural policy measures, harmonization of national agricultural measures with measures of Common Agricultural Policy, etc.	National Coordination Group for FADN implementation
Department for Rural Development – Group for Extension Services	
Performs, among other, tasks related to: programming, monitoring and coordination of agricultural extension services, etc.	Support Group for FADN implementation
Directorate for Agrarian Payments - Information Technology Sector	Steering Committee member
Performs, among other, tasks related to: organizing, managing and executing tasks within the field of information technology, etc.	National Coordination Group for FADN information technology
Provincial Secretariat of Agriculture, Water Economy and Forestry	
Performs in the field of agriculture, forestry, hunting, water management, food, veterinary, plant protection, fisheries, agrarian cooperatives and rural development.	
Department of Agricultural Extension Service under the Sector for Implementation of Agricultural Policy, Monitoring of European Integration in the field of Rural Development and Advisory Services	Steering Committee member

Sector/Department are, among other things, responsible for monitoring and analysis of the development of agricultural extension services in order to improve agricultural production, preparation and monitoring of the implementation of the program for improvement extension services in agriculture in AP Vojvodina.	Body nominated by Liaison Agency responsible for management of data collection from Agricultural Extension Services of Autonomous Province of Vojvodina. It is composed of two Coordination Groups: for FADN data collection and for FADN information technology.
Institute for Science Application in Agriculture	Steering Committee member
Authorised organisation by Minister, which is, among other things, responsible to coordinate and control the activities of agricultural advisory and extension services in Central Serbia (NUTS 1 – Serbia South functional unit and NUTS 2 – Belgrade Region).	Body nominated by Liaison Agency responsible for management of data collection from Agricultural Extension Services of Serbia. It is composed of two Coordination Groups: for FADN data collection and for FADN information technology.
Agricultural Extension Services (AES)	
The agricultural extension services are, among other things, responsible for: giving expert advices and recommendations to farmers, organizing seminars, workshops and publishing expert material, as well as carrying out other activities which improve the agricultural production. AES include: Agricultural Extension Services of Autonomous Province of Vojvodina that cover NUTS 2 – Vojvodina Region and Agricultural Extension Services of Serbia that cover NUTS 1 – Serbia South functional unit and NUTS 2 – Belgrade Region.	Accountancy Offices
Statistical Office of the Republic of Serbia	Steering Committee member
Performs among other expert tasks related to: adopting programs, organization and conducting of the statistical surveys, methodology creation, collecting, processing, statistical analysis and publishing of the statistical data, etc.	It will be appointed to carry out tasks such as typology of agricultural holding, standard output coefficient, etc.
Faculty of Agriculture in Belgrade-Zemun, University of Belgrade and Faculty of Agriculture, University of Novi Sad	Steering Committee member
Faculties are a teaching and research institutions whose activities cover all aspects of agricultural production and food technology, etc.	Faculties are providing valuable contributions to the Serbian FADN establishment and development. Furthermore, they will improve cooperation with other agricultural research institutions.

Source: Reprinted from the Establishment of the Serbian FADN Institutional Framework (Ivkov I., Vasiljevic Z., Ghelfi R., 2013, p.346-348)

4.5.2 Comparison of the current FADN organizational infrastructure in certain EU Member States and Republic of Serbia

The following Table illustrates the comparisons across different FADN organizational infrastructure of certain EU Member States (Poland, Estonia, and Croatia) and the Republic of Serbia.

Table 4:4 **FADN organizational infrastructure in Poland, Estonia, Croatia and Republic of Serbia**

EU level				
FADN Committee **EUROPEAN COMMISSION (DG AGRI, Direction E)**				
Country	**Poland**	**Estonia**	**Croatia**	**Serbia**
National level				
National Committee	Ministry of Agriculture and Rural Development, Ministry of Finance, Ministry of Regional Development, Central Statistical Office, National Council of Agricultural Chambers (KRIR), Institute of Agricultural and Food Economics	Ministry of Agriculture, Statistics Estonia, Estonian University of Life Sciences, Estonian Chamber of Agriculture and Commerce, representatives of producers' organizations	Ministry of Agriculture, Agriculture Advisory Service, Central Bureau of Statistics, Faculty of Agriculture, University of Zagreb	MAEP, PSAWMF, IPN, SORS, Faculty of Agriculture in Belgrade-Zemun, University of Belgrade, Faculty of Agriculture, University of Novi Sad
Liaison Agency	Institute of Agricultural and Food Economics, Agricultural Accountancy Department	Rural Economy Research Centre	Agriculture Advisory Service, Department of FADN	MAEP, Sector for Agricultural Policy
Regional level				
Regional Committees	/	/	/	/
Bodies nominated by Liaison Agency/ Regional Offices	Agricultural Advisory Centres, total number 16	/	Agriculture Advisory Service – Regional coordinators, total number 2	Authorised organisation by Minister - IPN and competent authority of Autonomous Province of Vojvodina - PSAWMF
Local level				
Accountancy Offices	Agricultural Advisers on FADN	Data collectors, total number 22 (on a contract basis) over Estonia – those are advisors who provide advices relating to accounting and/or economics	Agriculture Advisory Service – County Advisors, total number 56	Agricultural Extension Services, total number in FADN system 33 with 100 Agricultural Advisers on FADN + 94 in in the process to be trained for FADN

Source: Adopted from the Establishment of the Serbian FADN Institutional Framework (Ivkov I., Vasiljevic Z., Ghelfi R., 2013, p.349-350)

NOTE:
After EU accession, Republic of Serbia has to transmit accountancy data for the FADN purposes to the European Commission (DG AGRI, Direction E) for the purpose of meeting the requirements of the Common Agricultural Policy.

The Table indicates that each of the observed EU Member States including the Republic of Serbia as candidate country has a particular FADN organizational infrastructure. Furthermore, among observed FADN organizational infrastructures there are some similarities and differences.

It can be specified as similarities the following:

- All observed FADN organizational infrastructures have representatives of the related Ministries and Statistics as members of the National Committee.
- In most observed cases the members of National Committees are representatives of related Faculties.
- All observed FADN organizational infrastructures does not have the Regional Committees.

On the other side, there is also a difference:

- Observed FADN organizational infrastructures have different organizations appointed as Liaison Agency.

4.6 Data collection

Understanding agricultural production systems and farmers decision making requires an exact picture of the real agricultural holding situation. However, the real situation in an individual case study always contains some particularities. Therefore Serbian FADN uses data from a group of agricultural holders who run agricultural holdings similar to the typical agricultural holdings according to the economic size and type of farming. Furthermore, FADN system includes the know-how from a data collector who knows his agricultural holders in the particular region.

4.6.1 Organisational structure for data collection

Table 4:5 **Agricultural extension services-Accountancy Offices**

Agricultural extension services	Total number	Accountancy Offices
AES of Autonom Province of Vojvodina	12+oenological station	12
AES of Serbia	22	21
TOTAL	**35**	**33**

Source : Author's own elaboration based on information from Agricultural Extension Services-Serbia: http://www.psss.rs/news.php?default.9.15 and Agricultural Extension Services-APV: http://www.polj.savetodavstvo.vojvodina.gov.rs (accessed 19 October 2015)

257 advisors are employed in 35 agricultural extension services on the tasks defined by the Ministry of Agriculture and the PSAWEF. Services and resources included: Agriculture extension service in Serbia – South and Belgrade Region (22 agricultural stations with 168 advisers), and the Agricultural extension services in Vojvodina Region (13 stations with 89 advisers).

The total number of Agricultural extension services which are appointed as Accountancy Offices is 33, of which Agriculture extension service in Serbia – South and Belgrade Region counts 21 Agri-

cultural Extension Services appointed as Accountancy Offices, and the Agricultural extension services in Vojvodina Region counts 12.

Table 4:6 **Agricultural extension services belonging to the FADN system**

Agricultural Extension Services	
1	Nis
2	Valjevo
3	Vranje
4	Kraljevo
5	Jagodina
6	Mladenovac
7	Kragujevac
8	Kruševac
9	Leskovac
10	Užice
11	Negotin
12	Novi Pazar
13	Čačak
14	Pirot
15	Smederevo
16	Požarevac
17	Šabac
18	Zaječar
19	Prokuplje
20	Loznica
21	Padinska Skela
22	Subotica
23	Bačka Topola
24	Senta
25	Sombor
26	Vrbas
27	Novi Sad
28	Ruma
29	Sr. Mitrovica
30	Kikinda
31	Zrenjanin
32	Vršac
33	Pančevo

Source: Adopted from FADN Serbia: http://www.fadn.rs/involved-institutions.php (accessed 25 January 2016)

Figure 4:3 **Agricultural extension services**
Source: Reprinted from the Agronomija: http://agronomija.rs/psss/ (accessed 21 January 2016)

Table 4:7 **Agricultural advisers-data collectors**

Agricultural extension services	Total number of Advisers	Advisers - data collectors already in FADN system	Advisers-data collectors in the process to be trained for FADN	TOTAL nuber of data collectors
AES of Autonom Province of Vojvodina	168	33	28	61
AES of erbia	89	67	66	133
TOTAL	**257**	**100**	**94**	**194**

Source : Author's own elaboration based on information from Agricultural Extension Services-Serbia: http://www.psss.rs/news.php?default.9.15 and Agricultural Extension Services-APV: http://www.polj.savetodavstvo.vojvodina.gov.rs (accessed 19 October 2015)

Agricultural extension services appointed as Accountancy Offices have 100 advisers appointed as data collectors responsible for collection, processing, and dissemination of data from agricultural holdings. Moreover, plus 94 data collectors are in the process to be trained for FADN.

It is noteworthy that Serbian FADN organizational structure has more than 70% of total Agricultural Advisers trained for data collection.

Currently, there are 10 agricultural holdings in FADN system per data collector. Since one of the tasks of the data collector is to visit each agricultural holder 4 times per year to check and collect data, and in order to maintain holders trust, to secure confidentiality and to provide the best quality of the data, it is made decision to have more trained data collectors and to keep the level of 10 agricultural holdings per data collector.

Therefore, plus 94 data collectors are in the process to be trained for FADN in interest of keeping the level of 10 agricultural holdings per data collector, as well as in order to ensure accurate and appropriate data for FADN sample of around 2,000 agricultural holdings before the EU integration.

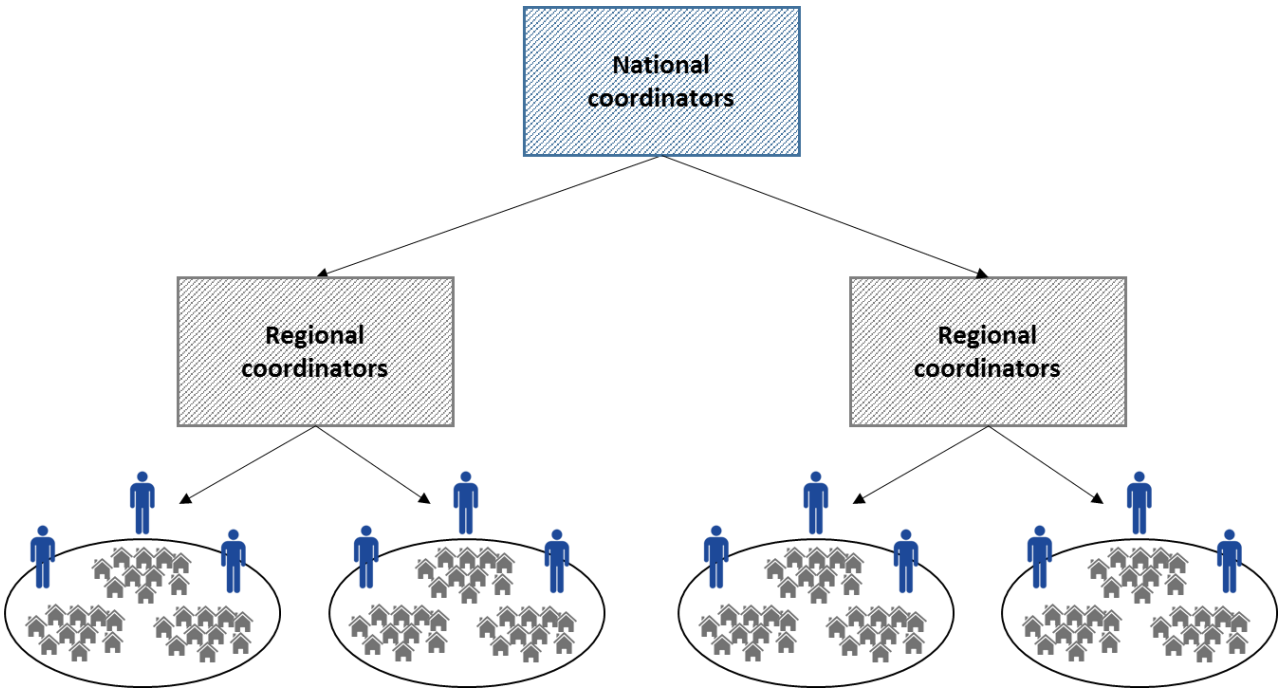


Figure 4:4 **Serbian FADN data collection organizational chart**

Source: Author's own elaboration

The tasks of the data collectors employed at the accountancy office should be as following:

- To identify new agricultural holdings,
- To make an introductory interview with new farmers on their value of assets at the beginning of the accounting year,
- To provide agricultural holders with Specific Questionnaires,
- To conclude agreements with agricultural holdings on participation in FADN,
- The data collector will visit each farmer 4 times per year to check and collect data,
- To offer Feedback form to the agricultural holders on their results.

As the majority of agricultural holders in the Republic of Serbia (80%) are not keeping accounts, the data collectors are visiting the farmers 4 times a year:

- January/February, to close previous accounting year and to start up the data collection for the current year,
- April, to follow up on the recording for the first quarter,
- July, to follow up on the recording for the second quarter, as well as to give farm management recommendations based on the Feedback data of previous year,
- October, to follow up on the recording for the third quarter.

4.6.2 FADN data confidentiality

In FADN data collection it is necessary to mention data security. It is important, that no figures from an individual agricultural holdings may be provided to institutions outside the FADN organizational infrastructure. All involved staff has to sign a written declaration stating the obligations of keeping all information on individual holdings confidential. Summary data can only be provided from an analysis of at least 5 agricultural holdings.

4.6.3 Specific questionnaire

One Specific Questionnaire was designed to collect data covered by the Serbian FADN for agricultural holders to record production, sales, farm use, farmhouse consumption, payments in kind, purchases, number and value of animals, services, taxes, insurance, maintenance, rents, subsidies and other events that occur during the accounting year.

The Specific Questionnaire is indeed modified EU Farm Return for specific Serbian conditions as well as farmers awareness. There are also two different Guidelines. The first Guideline was designed for agricultural holdings with no accounting records, while the second was designed for agricultural holdings that have accounting records.

4.6.4 Feedback to the agricultural holders

The Feedback to the agricultural holders is not compulsory within the EU FADN system. This means, that there are no EU requirements to provide agricultural holders with any kind of feedback. It is although considered as an integral part of good FADN practice to provide the holders with Feedback form for their superior farm management.

Benchmarking data are calculated at individual, as well as average national level of group agricultural holdings belonging to (for example, the group of same type of farming and economic size). The data collector presents and analyses the results of previous year to the agricultural holder during the third visit in the new accounting year. This Feedback form to the agricultural holders presents actually standard results of holding business.

4.6.5 Motivation of agricultural holders

Finally, the success of FADN implementation depends a lot on the motivation of participating agricultural holders. If this is ignored, agricultural holders will view the FADN as an unnecessary additional workload as most holders do not keep financial records on their farming activities.

It would be expected that they would lose the interest in keeping records between the visits of the data collectors. In the first years of FADN implementation in Serbia, it became very obvious that agricultural holders need additional motivation to keep the detailed records and in many cases the agricultural holders were keeping records only due to the special relations with the data collectors.

In order to achieve proper motivation of agricultural holders, the recommendations, described in detail in chapter 8, paragraph 8.3 of this deliverable, should be taken into consideration.

Chapter 5 Serbian FADN methodology

It is used unique replicable European Union (EU) methodology that has been applied and adjusted in accordance with national conditions in the Republic of Serbia.

5.1 The universe

Currently, the universe of farms is represented by the agricultural holdings surveyed by the Agricultural Census 2012, carried out by the Statistical Office of the Republic of Serbia. The Census data have been published in late 2013.

The Agricultural Census is a base for FADN in terms:

- to present FADN universe,
- to provide data for calculation of FADN field of observation, and
- indirectly throughout field of observation to be used for preparation of FADN sample plan.

The next Census will be carried out in ten years. In mean time the Farm structure survey, abbreviated as FSS and also known as Survey on the structure of agricultural holdings, is planned to be carry out in 2017. The FSS should be conducted consistently in the Republic of Serbia with a common EU methodology at a regular base and should provide therefore comparable and representative statistics, at regional levels (down to NUTS 3 level). Every 3 or 4 years the FSS should be carried out as a sample survey, and once in the ten years as a census.

The Census of Agriculture was conducted in the Republic of Serbia in the period from 1 October to 15 December 2012. Pursuant to the Law on the Census of Agriculture 2011, the Census of Agriculture was anticipated for the period from 1 – 15 November 2011. Due to the delayed 2011 Census of Population, which the Census of Agriculture is directly related to, the Law on Amendments to the Law on the Census of Agriculture 2011 was passed (Official gazette of RS, number 24/11) and thereby this Census was postponed for the year 2012, and its period of implementation extended to last two and a half months. Since there is large number of Serbian citizens working abroad, in order to achieve the best possible coverage of agricultural holdings, in the municipalities of Požarevac, Petrovac na Mlavi, Kladovo, Negotin, Žagubica, Žabari, Velika Plana and Kučevo, the enumeration procedure was extended until 28 December 2012.

The applied instruments, coverage, features and definitions are all in accordance with the World Programme for the Census of Agriculture, 2010 (FAO – UN) and Eurostat methodology (Regulation (EC) No 1166/2008 of the European Parliament and the Council of 19 November 2008 on farm structure surveys and the survey on agricultural production methods and repealing Council Regulation (EEC) No 571/88).

Table 5:1 **Agricultural holdings by legal status, by regions**

	Agricultural holdings		TOTAL
	Family holdings	of legal entities and unincorporated enterprises	
REPUBLIC OF SERBIA	**628,552**	**3,000**	**631,552**
SRBIJA – SEVER	**179,386**	**1,482**	**180,868**
Belgrade region	33,117	127	33,244
Region of Vojvodina	146,269	1,355	147,624
SERBIA - SOUTH	**449,166**	**1,518**	**450,684**
Region of Sumadija and West Serbia	261,935	1,005	262,940
Region of South and East Serbia	187,231	513	187,744
Region of Kosovo and Metohija	...	...	...

Source: Reprinted from the Census of Agriculture 2012, Agriculture in the Republic of Serbia (2013, p.18)

According to the results of the Census of Agriculture 2012, the Republic of Serbia has 631,552 agricultural holdings. In the process of enumeration recorded were 108,230 households with 45,002 ha agricultural land and certain number of livestock, however they did not meet the criteria to be observed as agricultural holding. Also, recorded were 508 legal entities registered to engage in agricultural activity, however in the referent agricultural year they did not carry out agricultural production. The data on holdings that do not meet requirements to be recorded as agricultural holdings, as well as the data on legal entities that did not carry out agricultural production, have not been included in this publication.

Of the total number of holdings, 0.5% are holdings of legal entities and unincorporated enterprises. Observing the legal form, limited liabilities companies make the largest share, i.e. 34%, unincorporated enterprises have the share of 16%, and farm cooperatives 13%.

According to the results of the Census of Agriculture 2012, as well taking into consideration NUTS levels, out of 631,552 agricultural holdings, 29% belonging to SERBIA-NORTH NUTS 1, and 71% belonging to SERBIA-SOUTH NUTS 1.

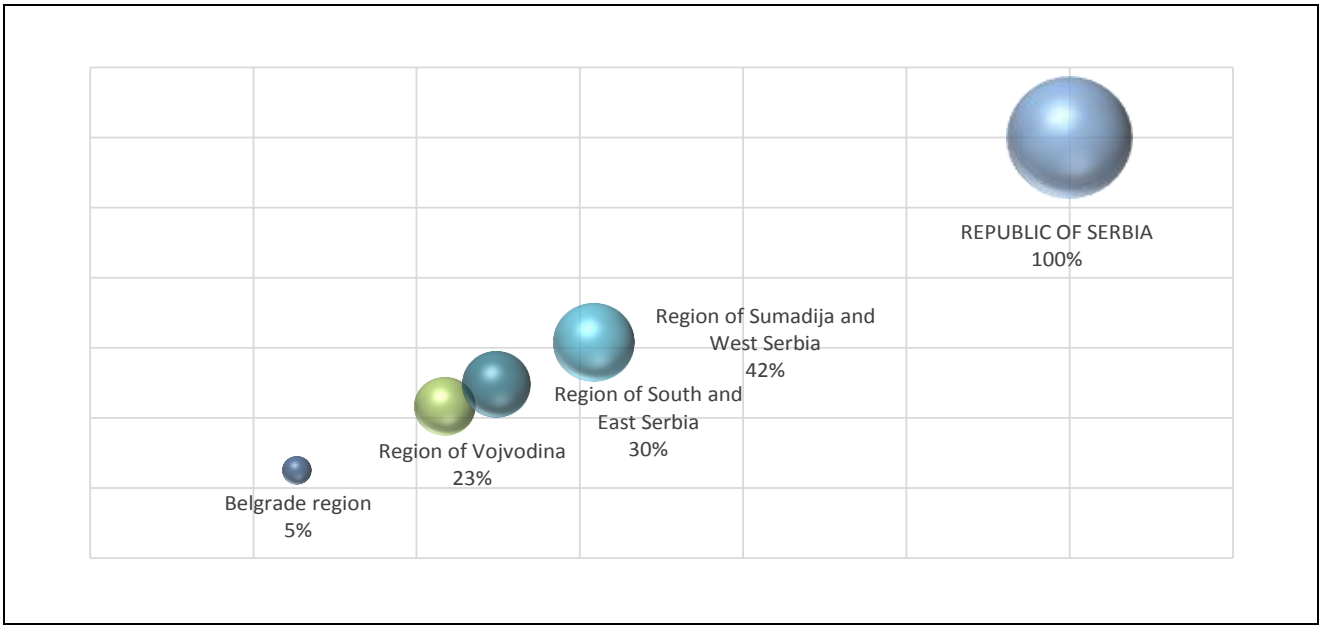


Figure 5:1 **Share of holdings by regions in total number of holdings**

Source: Adopted from the Census of Agriculture 2012, Agriculture in the Republic of Serbia (2013, p.18)

Following are the main indicators of the structure of holdings:

- the agricultural land covers the total area of 3 861 477 ha, of which 89% was utilized in 2011/2012. Of the total utilized agricultural area, 30% is rented land;
- the average utilized agricultural area per holding extends over 5.4 ha;
- the average number of separate lots of utilized agricultural area per holding is six, and the average separate lot covers 0.98 ha;
- agricultural holdings raise 908,102 heads of cattle, 3,407,318 pigs, 1,736,440 sheep and 26,711,220 hens;
- the number of own tractors (with one axle and with two axles) is 597 816, of which the major part, i.e. 583 723 were used in 2011/2012;
- the average age of holders of family agricultural holdings is 59 years.

Table 5:2 **Universe - holdings in the field of survey according to the Community typology (by type of farming and economic size class)**

Economic Size Classes 2012 TYPE OF FARMING–TF	1	2	3	4+5	6+7	8+9	10+11	12+13+14	TOTAL
Specialist and general field cropping	105,232	31,496	21,107	16,725	7,965	855	70	75	183,525
Specialist horticulture indoor	749	547	675	934	282	25	3	1	3,216
Specialist horticulture outdoor	2,718	907	953	1,141	474	79	5	3	6,280
Specialist vineyards	1,326	151	109	110	35	6	-	3	1,740
Specialist fruit	31,360	6,476	3,435	1,559	153	30	1	1	43,015
Specialist dairying	8,120	19,778	21,881	14,118	1,674	103	3	7	65,684
Various grazing livestock combined	25,434	17,484	12,683	8,280	1,341	58	1	4	65,285
Specialist pigs	20,888	3,732	1,901	1,518	623	111	7	18	28,798
Specialist poultry	8,379	245	213	393	542	168	21	22	9,983
Various crops and livestock combined	81,303	59,741	50,768	27,245	3,049	197	7	26	222,336
Non-classified	1,690								1,690
Total	287,199	140,557	113,725	72,023	16,138	1,632	118	160	**631,552**

Source: Adopted from the Agricultural holdings according to economic size classes and type of farming (Cvijanovic D., Subic J., Parausic V., 2014, p.24 and 26) and information obtained by the Statistical Office of the Republic of Serbia

5.2 Sample selection

The FADN sample is stratified according to FADN region (NUTS-region), type and size of the Agricultural Holdings.

5.2.1 FADN Regions

The Statistical Office of Republic of Serbia has already established the NUTS regions. NUTS classification[9] for the Republic of Serbia is based on the territorial organization of the Republic of Serbia,

[9] *The NUTS classification is a hierarchical system for dividing up the economic territory of the EU for the purpose of:*

which is defined by Law on Regional Development ("*Official Gazette of the Republic of Serbia*", No. 51/09 *and* 30/10). The levels under NUTS are the statistical functional territorial units. Classification of statistical functional territorial units according to the level is performed in a way that the NUTS 1 level is composed of territorial units of the regions at NUTS 2 level, and the NUTS 2 level is composed of territorial units of the districts at the NUTS 3 level. NUTS 3 level is composed of the local self-government units within the administrative districts.

According to the levels determined in Regulation on nomenclature of statistical territorial units *("Official Gazette", No. 109/2009 and 46/2010)*, the following functional units at NUTS 1 level are formed in the Republic of Serbia:

1. Serbia–North is the unit at NUTS 1 level composed of the Belgrade Region and Region of Vojvodina.
2. Serbia–South is the unit at NUTS 1 composed of: Region of Sumadija and West Serbia, Region of South and East Serbia, Region of Kosovo and Metohija.

Functional units at NUTS 1 level are composed of territorial units – region of NUTS 2 level, and are the following: Belgrade Region, Region of Vojvodina, Region of Sumadija and West Serbia, Region of South and East Serbia, Region of Kosovo and Metohija.

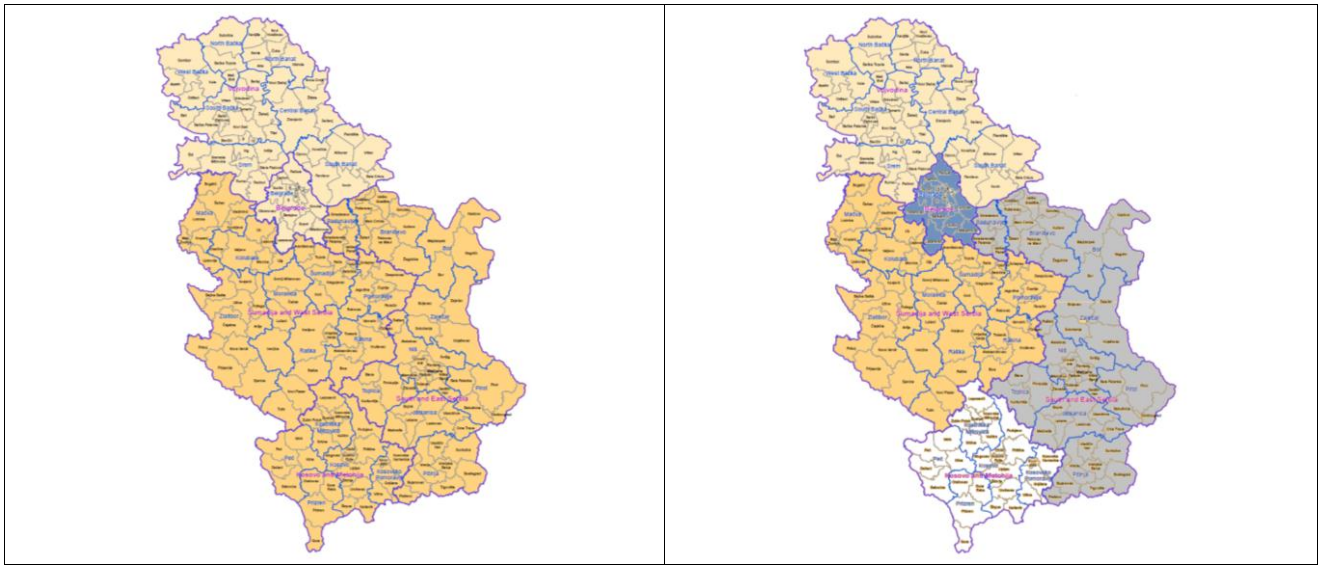


Figure 5:2 **NUTS 1 and 2 levels in the Republic of Serbia**
Source: Adopted from the Statistical Office of the Republic of Serbia:
http://webrzs.stat.gov.rs/WebSite/userFiles/file/Opsti%20podaci%20u%20Republici%20Srbiji/dokumenti/razno/Karta_NSTJ_po_oblastima_1_1_2012_en.pdf (accessed 25 December 2015)

- *The collection, development and harmonisation of EU regional statistics.*
- *Socio-economic analyses of the regions.*
- *Framing of EU regional policies.*

Table 5:3 **Statistical functional territorial units at the NUTS levels**

NUTS 1	NUTS 2	NUTS 3
SERBIA - NORTH	Belgrade region	Belgrade district
	Region of Vojvodina	West Bačka district
		South Banat district
		South Bačka district
		North Banat district
		North Bačka district
		Middle Banat district
		Srem district
SERBIA - SOUTH	Region of Sumadija and West Serbia	Zlatiborski district
		Kolubarski district
		Mačvanski district
		Moravički district
		Pomoravski district
		Rasinski district
		Raški district
		Šumadijski district
	Region of South and East Serbia	Borski district
		Braničevski district
		Zaječarski district
		Jablanički district
		Nišavski district
		Pirotski district
		Podunavski district
		Pčinjski district
		Toplički district
	Region of Kosovo and Metohija	Kosovski district
		Kosovsko-mitrovački district
		Kosovsko-pomoravski district
		Pećki district
		Prizrenski district

Source: Reprinted from the Annex 2 of the Regulation on nomenclature of statistical territorial units: http://webrzs.stat.gov.rs/WebSite/Public/PageView.aspx?pKey=133 (accessed 17 January 2015)

For FADN purposes it had been decided that Serbia has two FADN regions according to NUTS 1 regions: SERBIA - NORTH and SERBIA – SOUTH.

5.2.2 Stratification and the field of observation

For the FADN purposes is decided to have 10 Clusters of types of farming applied (plus Non-classified cluster) and 6 Clusters of economic size classes applied.

Stratification by type of production was obtained by grouping the basic types into clusters as it is shown in the following Table.

Table 5:4 **Clusters of types of farming applied**

Name of Serbian FADN cluster		EU General type of farming		Principal type of farming		Particular type of farming	
1	Specialist and general field cropping	1	Specialist field crops	15	Specialist cereals, oilseeds and protein crops	151	Specialist cereals (other than rice), oilseeds and protein crops
				16	General field cropping	161	Specialist root crops
						162	Cereals, oilseeds, protein crops and root crops combined
						166	Various field crops combined
		6	Mixed cropping	61	Mixed cropping	612	Field crops and horticulture combined
						613	Field crops and vineyards combined
						614	Field crops and permanent crops combined
						615	Mixed cropping, mainly field crops
						616	Other mixed cropping
2	Specialist horticulture indoor	2	Specialist horticulture	21	Specialist horticulture indoor	211	Specialist vegetables indoor
						212	Specialist flowers and ornamentals indoor
						213	Mixed horticulture indoor specialist
				23	Other horticulture	231	Specialist mushrooms
3	Specialist horticulture outdoor	1	Specialist field crops	16	General field cropping	163	Specialist field vegetables
						164	Specialist tobacco
		2	Specialist horticulture	22	Specialist horticulture outdoor	221	Specialist vegetables outdoor
						222	Specialist flowers and ornamentals outdoor
						223	Mixed horticulture outdoor specialist
				23	Other horticulture	232	Specialist nurseries
						233	Various horticulture
4	Specialist vineyards	3	Specialist permanent crops	35	Specialist vineyards	351	Specialist quality wine
						352	Specialist wine other than quality wine
						353	Specialist table grapes
						354	Other vineyards
5	Specialist fruit	3	Specialist permanent crops	36	Specialist fruit and citrus fruit	361	Specialist fruit (other than citrus, tropical fruits and nuts)
						363	Specialist nuts
						365	Specialist fruit, citrus, tropical fruits and nuts: mixed production
				38	Various permanent crops combined	380	Various permanent crops combined
		6	Mixed cropping	61	Mixed cropping	611	Horticulture and permanent crops combined
6	Specialist dairying	4	Specialist grazing livestock	45	Specialist dairying	450	Specialist dairying
		7	Mixed livestock holdings	73	Mixed livestock, mainly grazing livestock	731	Mixed livestock, mainly dairying
		8	Mixed crops — livestock	83	Field crops — grazing livestock combined	832	Dairying combined with field crops
7	Various grazing livestock combined	4	Specialist grazing livestock	46	Specialist cattle — rearing and fattening	460	Specialist cattle — rearing and fattening
				47	Cattle — dairying, rearing and fattening combined	470	Cattle — dairying, rearing and fattening combined

				48	Sheep, goats and other grazing live-stock	481	Specialist sheep
						482	Sheep and cattle combined
						483	Specialist goats
						484	Various grazing livestock
		7	Mixed livestock holdings	73	Mixed livestock, mainly grazing livestock	732	Mixed livestock, mainly non-dairying grazing livestock
		8	Mixed crops — livestock	83	Field crops — graz-ing livestock com-bined	833	Field crops combined with non-dairying grazing livestock
						834	Non-dairying grazing livestock combined with field crops
8	Specialist pigs	5	Specialist granivores	51	Specialist pigs	511	Specialist pig rearing
						512	Specialist pig fattening
						513	Pig rearing and fattening combined
9	Specialist poultry	5	Specialist granivores	52	Specialist poultry	521	Specialist layers
						522	Specialist poultry-meat
						523	Layers and poultry-meat combined
10	Various crops and livestock combined	5	Specialist granivores	53	Various granivores combined	530	Various granivores combined
		7	Mixed livestock holdings	74	Mixed livestock, mainly granivores	741	Mixed livestock: granivores and dairying combined
						742	Mixed livestock: granivores and non-dairying grazing livestock
		8	Mixed crops — livestock	83	Field crops — graz-ing livestock com-bined	831	Field crops combined with dairying
				84	Various crops and livestock combined	841	Field crops and granivores combined
						842	Permanent crops and grazing livestock combined
						843	Apiculture
						844	Various mixed crops and livestock
	Non-classified	9	Non-classified holdings	90	Non-classified hold-ings	900	Non-classified holdings

Source: Adopted from the information obtained by the Statistical Office of the Republic of Serbia and Commission Regulation (EC) No 1242/2008, p.6-7

Table 5:5 **Clusters of economic size classes applied**

Name of Serbian FADN cluster		EU General type of economic size	
1	3	3	from 4 000 to less than 8 000 euro
2	4+5	4	from 8 000 to less than 15 000 euro
		5	from 15 000 to less than 25 000 euro
3	6+7	6	from 25 000 to less than 50 000 euro
		7	from 50 000 to less than 100 000 euro
4	8+9	8	from 100 000 to less than 250 000 euro
		9	from 250 000 to less than 500 000 euro
5	10+11	10	from 500 000 to less than 750 000 euro
		11	from 750 000 to less than 1 000 000 euro
6	12+13+14	12	from 1 000 000 to less than 1 500 000 euro
		13	from 1 500 000 to less than 3 000 000 euro
		14	equal to or greater than 3 000 000 euro

Source: Adopted from the information obtained by the Statistical Office of the Republic of Serbia and Commission Regulation (EC) No 1242/2008, p.20

Threshold, according to the economic size classes, is decided to be 4,000 EUR. Based on that, research area - field of observation for the Republic of Serbia counts firstly for Serbian selection plan, which had been used in 2013 accounting year 200,087 agricultural holdings, and later on with corrections 201,567 agricultural holdings (32%) out of total of 631,552 agricultural holdings included in Agricultural Census 2012, which had been used in 2014 and 2015 accounting year.

The FADN for the Republic of Serbia considered 10 types of farming and 6 classes of economic size. Consequently, the filled of observation should be divided in a first approximation into:

1 REGION (Republic of Serbia) * 10 TFs * 6 SIZE CLASSES = 60 STRATA

and/or

2 SUBREGIONs (SERBIA-NORTH and SERBIA-SOUTH) * 10 TFs * 6 SIZE CLASSES = 120 STRATA

Table 5:6 **Field of observation 2013**

Economic Size Classes TYPE OF FARMING–TF	3	4+5	6+7	8+9	10+11	12+13+14	TOTAL
Specialist and general field cropping	21,058	16,550	7,756	668	9	2	46,043
Specialist horticulture indoor	673	931	270	19			1,893
Specialist horticulture outdoor	949	1,119	419	42			2,529
Specialist vineyards	102	91	21	1			215
Specialist fruit	3,435	1,545	128	15			5,123
Specialist dairying	21,987	13,944	1,662	94	1		37,688
Various grazing livestock combined	12,033	7,823	1,269	39			21,164
Specialist pigs	1,900	1,502	600	93	2		4,097
Specialist poultry	213	384	501	120	8	4	1,230
Various crops and livestock combined	50,223	26,713	2,992	176	1		80,105
Total	112,573	70,602	15,618	1,267	21	6	**200,087**

Source: Reprinted from the Serbian FADN data for 2013 (Rakic M., 2014, s.3)

The table above was used as a basis for selection plan which had been used for FADN sample in 2013 accounting year.

Table 5:7 **Field of observation 2014, 2015**

Economic Size Classes TYPE OF FARMING–TF	3	4+5	6+7	8+9	10+11	12+13+14	TOTAL
Specialist and general field cropping	21,147	16,712	7,967	850	70	75	46,821
Specialist horticulture indoor	678	937	282	25	3	1	1,926
Specialist horticulture outdoor	958	1,146	468	79	5	3	2,659
Specialist vineyards	110	110	35	6	0	3	264
Specialist fruit	3,455	1,570	153	30	1	1	5,210
Specialist dairying	21,987	13,947	1,664	101	3	7	37,709
Various grazing livestock combined	12,050	7,842	1,284	58	1	4	21,239
Specialist pigs	1,904	1,509	615	112	6	18	4,164
Specialist poultry	214	394	540	168	21	22	1,359
Various crops and livestock combined	50,237	26,734	3,017	195	7	26	80,216
Total	112,740	70,901	16,025	1,624	117	160	**201,567**

Source: Reprinted from the Typology (Keszthelyi S., 2014, s.25)

The table above was used as a basis for selection plan which has been used for FADN sample in 2014 and 2015 accounting year.

The main difference between these Fields of observation laying down in the fact that firstly Ministry of Agriculture did not want to include all legal entities since the special FADN Guideline for fill-

ing out the Questionnaire for them has not been prepared. Corrections were made by specialized expert in field of stratification engaged by the Project "Establishment of the Serbian Farm Accountancy Data Network".

After preparation of above-mentioned Guideline, the legal entities have been included and the biggest change can be notice under the three clusters of economic size classes: 8+9, 10+11 and 12+13+14.

5.2.3 The universe and field of observation represented as a matrix of cells

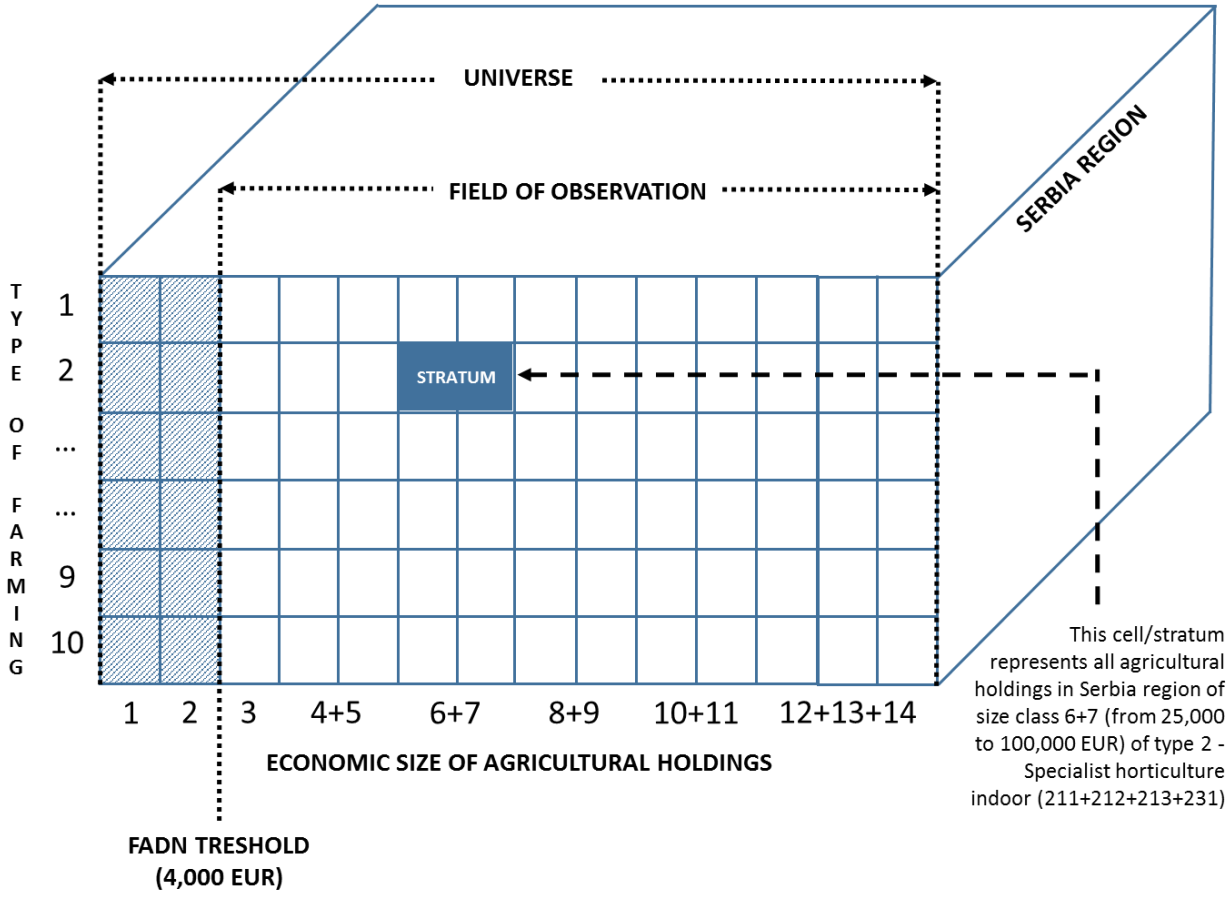


Figure 5:3 **The universe and field of observation represented as a matrix of cells**
Source: Author's own elaboration

The three dimensions (region, economic size and type of farming) stratification of universe allows it to be represented as a 3-dimensional matrix of stratums. The number of agricultural holdings in each stratum of the universe are extracted from the Agricultural Census. Those agricultural holdings that exceed Serbian FADN threshold (economic size of 4,000 EUR) are defined as commercial, and thus fall into the field of observation. The figure above illustrates the universe and the filled of observation divided into one region - Republic of Serbia that consists 60 stratums made of 10 types of farming and 6 classes of economic size.

5.2.4 Selection plan

5.1.5.1 Elaboration of the selection plan

The selection plan shall be submitted to the European Commission at least 2 months before the particular accounting year. Accounting year for the Republic of Serbia starts on 1 of January. It means that elaboration of the selection plan shall start as early as in spring to be submitted to the National Committee at very beginning of June to have the first reading in late June, the second reading in September and the third reading, if necessary – by mid-October at the latest.

The selection plan presents the sample for the FADN. The sample shall be stratified according to type of production, economic size and FADN region. The sample has to be representative for Serbia. Since it has been decided to establish FADN-regions, the sample has also to be representative for each FADN region.

Experts from the Statistical Office of Republic of Serbia will elaborate the selection plan in order to coordinate FADN with the other agricultural statistics, where SO, economic size and typology are also used. The criteria and guidelines for elaboration of the selection plan will be provided by the Liaison Agency.

The selection plan has to be based on the latest register of agricultural holdings of the Statistical Office of Republic of Serbia (based on the Agricultural Census, Farm Structure Survey and other sources of information where necessary).

The standard outputs for crop and livestock production calculated by the Statistical Office of Republic of Serbia is the essential basis for calculating the economic size and type of specialisation for the agricultural holdings. Especially in the first years, the selection plan will be based on uncertain SO values. Changes in the SO on the different enterprises might result in changes in the economic size or the type of the farm. Hence, it is important to analyse the sensitivity of the selection plan.

In addition, questions on the sampling frame, registers, supplementary data and typology have to be agreed upon.

The selection plan has to be elaborated in due time. In order to identify and agree with agricultural holders not keeping accounts, the deadline should be around July/August of the year before the accounting year for the FADN holders (i.e. calendar year). In order to come up with preliminary figures for the national budget, as well as basic figures needed by the European Commission for their budget, September should be the final deadline.

5.1.5.2 Determination of the selection plan

During the first 2 years of FADN system implementation, the results of the Agricultural Census were not available – and therefore only agricultural holders having good cooperation with the data collectors were identified and randomly selected for participating in the FADN system.

The first data were collected in 2011. 40 agricultural holdings were randomly appointed to deliver data to the pilot data collection for this accounting year.

In 2012 the data were collected from 172 agricultural holdings. Also, for this year it was a random selection without selection plan.

In 2013 selection plan with 500 agricultural holdings have been elaborated. This was the first year when the agricultural holdings were involved in system using the selection plan. Nearly all the strata have been sampled in this accounting year (data from 497 agricultural holdings were collected).

The Neyman Optimal allocation method is used for the FADN sampling. Based on Neyman allocation, the best sample size for stratum h would be:

$$nh = n * (Nh * \sigma h) / [\Sigma (Ni * \sigma i)]$$

nh is the sample size for stratum h
n is total sample size
Nh is the population size for stratum h
σh is the standard deviation of stratum h

The sample frame for 2013 accounting year makes 200,087 family farms. The population by stratum is presented through the field of observation (Table 5:6 Field of observation 2013).

Also, the corresponding standard deviation for each stratum is calculated using a comprehensive statistical software SAS by the Statistical Office of the Republic of Serbia. The formula is defined as follows:

$$s = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \overline{x})^2}$$

where the denominator N stands for the size of the sample – number of holdings belonging to the exact stratum, {x1,x2, … xN} are the observed values of the sample items – individual standard output value of agricultural holdings, while $\overline{x}$ is the mean value of these observations.

Table 5:8 **Standard deviation**

Economic Size Classes TYPE OF FARMING–TF	3	4+5	6+7	8+9	10+11	12+13+14
Specialist and general field cropping	1122.58	4633.74	18754.48	79005.80	82695.45	321930.9
Specialist horticulture indoor	1133.04	4478.80	17283.79	53700.89		
Specialist horticulture outdoor	1153.22	4717.52	16137.78	80876.04		
Specialist vineyards	1167.52	3920.36	23123.90			
Specialist fruit	1107.43	3737.61	15677.12	50602.77		
Specialist dairying	1127.10	3983.84	15375.77	70355.42		
Various grazing livestock combined	1114.44	4247.61	13794.48	26349.07		
Specialist pigs	1125.00	4579.06	17837.09	69223.78	31426.92	
Specialist poultry	1209.75	4817.92	20551.61	78456.64	98979.70	594085.3
Various crops and livestock combined	1114.77	3974.83	15750.80	59330.89		

Source: Reprinted from the data obtained by the Statistical Office of the Republic of Serbia

Using the Neyman Optimal allocation method, where the n is 500, Nh is the population size for stratum h (Table 5:6 Field of observation 2013), and σh is the standard deviation of stratum h (Table 5:8 Standard deviation) has been calculated selection plan.

Example of stratum's calculation for selection plan
Example of calculation for stratum of size class 6+7 of type 2-Specialist horticulture indoor
nh = n * (Nh * σh) / [Σ (Ni * σi)]
n = 500, Nh = 270, σh = 17283.8
Σ (Ni * σi) = 789,020,971.73
nh = 2.957
Stratum of size class 6+7 of type 2-Specialist horticulture indoor for total sample size of 500 agricultural holdings should be 3.

Table 5:9 **FADN selection plan for the accounting year 2013**

Economic Size Classes TYPE OF FARMING–TF	3	4+5	6+7	8+9	10+11	12+13+14	TOTAL
Specialist and general field cropping	15	49	92	33	0	0	189
Specialist horticulture indoor	1	3	3	1	0	0	8
Specialist horticulture outdoor	1	3	4	2	0	0	10
Specialist vineyards	0	0	0	0	0	0	0
Specialist fruit	2	4	1	1	0	0	8
Specialist dairying	16	35	16	4	0	0	71
Various grazing livestock combined	9	21	11	1	0	0	42
Specialist pigs	1	4	7	4	0	0	16
Specialist poultry	0	1	7	6	1	2	17
Various crops and livestock combined	35	67	30	7	0	0	139
Total	80	187	171	59	1	2	500

Source: Author's own elaboration

Sample allocation is performed according to the frequency of the number of holdings from the Census of Agriculture 2012 by strata.

In 2014 selection plan with 1,000 agricultural holdings have been elaborated using the Neyman Optimal allocation method, where the n is 1,000, Nh is the population size for stratum h (Table 5:7 Field of observation 2014, 2015), and σh is the standard deviation of stratum h (Table 5:8 Standard deviation). Nearly all the strata have been sampled in this accounting year (data from 989 agricultural holdings were collected).

Table 5:10 **FADN selection plan for the accounting year 2014**

Economic Size Classes TYPE OF FARMING–TF	3	4+5	6+7	8+9	10+11	12+13+14	TOTAL
Specialist and general field cropping	26	71	116	58	7	7	285
Specialist horticulture indoor	1	7	7	1	0	0	16
Specialist horticulture outdoor	1	8	10	10	1	0	30
Specialist vineyards	0	0	1	0	0	0	1
Specialist fruit	6	7	3	2	0	0	18
Specialist dairying	41	80	25	7	0	0	153
Various grazing livestock combined	24	56	26	7	0	0	113
Specialist pigs	3	9	14	9	1	1	37
Specialist poultry	0	3	15	21	3	2	44
Various crops and livestock combined	88	152	49	11	1	2	303
Total	190	393	266	126	13	12	1,000

Source: Author's own elaboration

Table 5:11 **FADN selection plan for the accounting year 2015**

Economic Size Classes TYPE OF FARMING–TF	3	4+5	6+7	8+9	10+11	12+13+14	TOTAL
Specialist and general field cropping	33	88	146	76	6	6	355
Specialist horticulture indoor	1	8	9	2	0	0	20
Specialist horticulture outdoor	1	9	13	12	0	0	35
Specialist vineyards	0	0	1	0	0	0	1
Specialist fruit	7	9	3	3	0	0	22
Specialist dairying	50	94	30	9	0	1	184
Various grazing livestock combined	29	68	31	7	0	0	135
Specialist pigs	3	9	16	11	0	2	41
Specialist poultry	0	3	19	26	3	2	53
Various crops and livestock combined	105	176	59	12	0	2	354
Total	229	464	327	158	9	13	1,200

Source: Author's own elaboration

5.1.5.3 Retrospection

Table 5:12 **Retrospection of number of holdings in the sample and number of holdings delivering data**

Accounting year	Number of holdings in the sample	Number of holdings delivering data
2011	40	40
2012	172	172
2013	500	497
2014	1,000	989
2015	1,200	As the acc. year is not finished, the figure is not known

Source: Author's own elaboration based on information from Serbian FADN Farm Return 2014 (Bojcevski M., 2015, s.2)

The figure below indicates very slight differences between number of holdings in the sample and number of holdings delivering data.

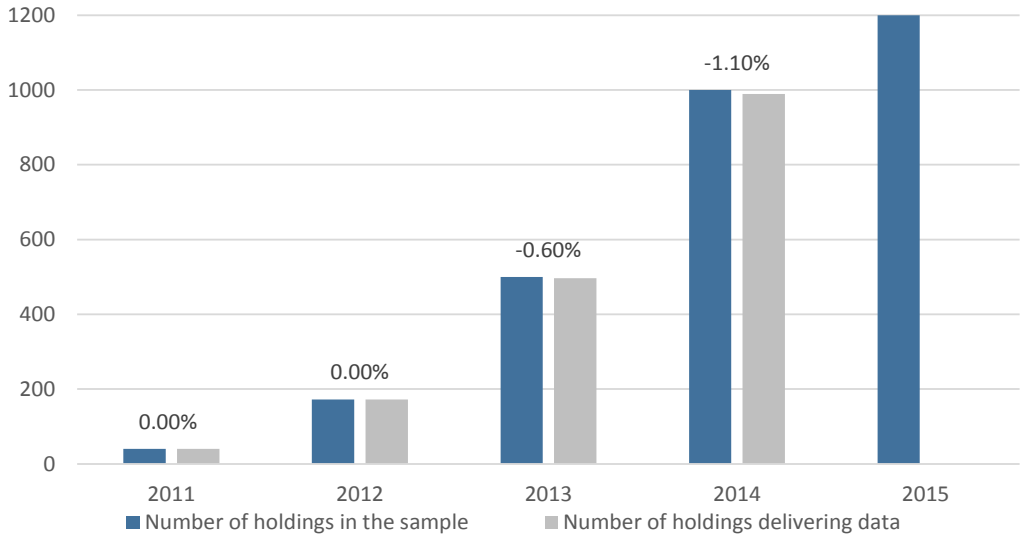


Figure 5:4 **Differences between number of holdings in the sample and number of holdings delivering data**

Source: Author's own elaboration based on information from the Serbian FADN Farm Return 2014 (Bojcevski M., 2015, s.2)

"It has been planned that definitive sample for monitoring and recording the accountancy data on the farms in the Republic of Serbia amounts between 1,500 and 2,000 farms" (Vasiljević Z., Zarić

V., Ivkov I., 2012, p.602). They should represent a research area - field of observation of about 200,000 agricultural holdings in the Republic of Serbia, which covers approximately 85% of the total utilised agricultural area (UAA) and account for about 85% of the total agricultural production.

5.2.5 Weighting system

Weighting is the process that allocates to each agricultural holding of the sample a weighting factor indicating the number of holdings in the field of observation that the holding represents.

WEIGHTING FACTOR = NUMBER OF THE HOLDINGS IN THE FIELD OF OBSERVATION / NUMBER OF THE HOLDINGS IN THE SAMPLE

The strength of the weighting factor lies in the fact that FADN results are valid not only for agricultural holdings in the sample (500, 1,000, 1,200 farms), but also for the holdings in the field of observation (200,087, 201,567). This is the kind of extrapolation.

Consider, for example, specialized pig agricultural holdings with the economic size class from 8,000 to less than 25,000 euro in the Republic of Serbia. If there are 9 holdings belonging to this group in the FADN sample and if there are 1,509 in the population, then each individual farm in the sample for that group will have a weight of 1,509 / 9 = 168.

Weighting factor has some critical points, such as:

- empty or infrequent cells in the matrix, which should be horizontally or eventual vertically aggregated, as well as
- this factors must be at least 1 and preferably not above 500.

Critical points of weighting factor, as well as the improvement of the factor are presented in the following tables:

Table 5:13 **Critical points of weighting factor, 2013**

Economic Size Classes TYPE OF FARMING–TF	3	4+5	6+7	8+9	10+11	12+13+14	TOTAL
Specialist and general field cropping	1,404	338	84	20			244
Specialist horticulture indoor	673	310	90	19			237
Specialist horticulture outdoor	949	373	105	21			253
Specialist vineyards							
Specialist fruit	1,718	386	128	15			640
Specialist dairying	1,374	398	104	24			531
Various grazing livestock combined	1,337	373	115	39			504
Specialist pigs	1,900	376	86	23			256
Specialist poultry		384	72	20	8	2	72
Various crops and livestock combined	1,435	399	100	25			576
Total	1,407	378	91	21	21	3	400

Source: Author's own elaboration

The table above indicates a lot of critical points, such as dark-grey empty cells, a lot of light- grey cells with values higher than 500, as well as the values are also presented through blue data bars

where the Specialist pigs farms belonging to the economic size class from 4,000 to less than 8,000 euro, have the highest value of weighting factor (1,900).

Table 5:14 **Critical points of weighting factor, 2014**

Economic Size Classes TYPE OF FARMING–TF	3	4+5	6+7	8+9	10+11	12+13+14	TOTAL
Specialist and general field cropping	813	235	69	15	10	11	164
Specialist horticulture indoor	678	134	40	25			120
Specialist horticulture outdoor	958	143	47	8	5		89
Specialist vineyards			35				264
Specialist fruit	576	224	51	15			289
Specialist dairying	536	174	67	14			246
Various grazing livestock combined	502	140	49	8			188
Specialist pigs	635	168	44	12	6	18	113
Specialist poultry		131	36	8	7	11	31
Various crops and livestock combined	571	176	62	18	7	13	265
Total	593	180	60	13	9	13	202

Source: Author's own elaboration

The table above indicates better picture of weighting critical points. There are less dark-grey empty cells then in previous year, and the highest value of weighting factor is 958, which is two times lower than the highest value in 2013.

Table 5:15 **Critical points of weighting factor, 2015**

Economic Size Classes TYPE OF FARMING–TF	3	4+5	6+7	8+9	10+11	12+13+14	TOTAL
Specialist and general field cropping	641	190	55	11	12	13	132
Specialist horticulture indoor	678	117	31	13			96
Specialist horticulture outdoor	958	127	36	7			76
Specialist vineyards			35				264
Specialist fruit	494	174	51	10			237
Specialist dairying	440	148	55	11		7	205
Various grazing livestock combined	416	115	41	8			157
Specialist pigs	635	168	38	10		9	102
Specialist poultry		131	28	6	7	11	26
Various crops and livestock combined	478	152	51	16		13	227
Total	492	153	49	10	13	12	168

Source: Author's own elaboration

In 2015 the weighting factor are much better than previously. There are two times less light-grey cells with values higher than 500 (only 4 cells), but the highest value of weighting factor is still 958. There are still dark-grey empty cells, but this critical point do not present threat since they could be horizontally or eventual vertically aggregated.

The grey empty cells could be corrected through the following steps explained by the subsequent Tables.

Table 5:16 **Simulation of strata to be merged (step 1), 2015**

Economic Size Classes TYPE OF FARMING–TF	3	4+5	6+7	8+9	10+11	12+13+14	TOTAL
Specialist and general field cropping	641	190	55	11	12	13	132
Specialist horticulture indoor	678	117	31	13	to be merged!	to be merged!	96
Specialist horticulture outdoor	958	127	36	7	to be merged!	to be merged!	76
Specialist vineyards	to be merged!	to be merged!	35	to be merged!	to be merged!	to be merged!	264
Specialist fruit	494	174	51	10	to be merged!	to be merged!	237
Specialist dairying	440	148	55	11	to be merged!	7	205
Various grazing livestock combined	416	115	41	8	to be merged!	to be merged!	157
Specialist pigs	635	168	38	10	to be merged!	9	102
Specialist poultry	to be merged!	131	28	6	7	11	26
Various crops and livestock combined	478	152	51	16	to be merged!	13	227
Total	492	153	49	10	13	12	168

Source: Author's own elaboration

Table above indicates the strata/cells to be merged. Through this simulation it is also presented not empty strata/cells with which the empty cells should be merged/aggregated.

Table 5:17 **Simulation of merged/aggregated strata (step 2), 2015**

Economic Size Classes TYPE OF FARMING–TF	3	4+5	6+7	8+9	10+11	12+13+14	TOTAL
Specialist and general field cropping	641	190	55	11	12	13	132
Specialist horticulture indoor	678	117	31	15			96
Specialist horticulture outdoor	958	127	36	7			76
Specialist vineyards	264						264
Specialist fruit	494	174	51	11			237
Specialist dairying	440	148	55	11	10		205
Various grazing livestock combined	416	115	41	9			157
Specialist pigs	635	168	38	10	12		102
Specialist poultry	203		28	6	7	11	26
Various crops and livestock combined	478	152	51	16	17		227
Total	492	153	49	10	13	12	168

Source: Author's own elaboration

Strata aggregation, for example: the only one agricultural holding in the FADN sample 2015 belonging to the type of farming specialist vineyards, and to the economic size class 6+7, before simulation presented 35 agricultural holdings only for economic class 6+7, and after aggregation simulation it presents 264 agricultural holdings (total number of holdings belonging to the TF 4-Specialist vineyard from field of observation with stratums marked "to be merged" divided by total number of holdings belonging to the TF 4-Specialist vineyard from FADN sample with stratums marked "to be merged") for all economic classes of this type of farming.

5.3 Standard results

In the Republic of Serbia the standard results are presented as a group of figures based on the specific Questionnaire of agricultural holdings and calculated according to the defined methodology. Groups of indicators for standard result in Serbia, as well as their description based on the EU FADN methodology are presented in Annex 2.

For FADN purposes in Serbia, in terms of Feedback preparation form to the agricultural holders, are used output Tables based on the standard results as following.

Table 5:18 **General information**

Standard results	Unit
General information	
Labor (total number of working hours on the farm)	h
Of which pail labor	h
Total utilized agricultural area	ha
Maize	ha
Wheat	ha
Green maize	ha
Other grain	ha
Sunflower	ha
Soya	ha
Sugar beet	ha
Potatoes (including early potatoes and seed potatoes)	ha
Fodder crops	ha
Other industrial crops	ha
Fresh vegetables, melons and strawberries	ha
Orchards - total	ha
of which:	ha
Apples	ha
Pears	ha
Peaches and nectarines	ha
Other fruit (plums, cherries, sour cherries etc.)	ha
Berry species	ha
Vineyards	ha
Other agricultural land	ha
Average number of livestock	
Dairy cows	head
Breeding sows	head
Pigs for fattening	head
Sheep (all ages)	head
Laying hens	head
Broilers	head

Source: Adopted from the Serbian FADN data for 2013 (Rakic M., 2014, s.5-8, 14-17) and RI/CC 882 Rev.9.2 - Definitions of variables used in FADN standard results, p.16-33

Table 5:19 **Yield and balance sheet**

Standard results	Unit
Yield	
Maize	t/ha
Wheat	t/ha
Green maize	t/ha
Other grain	t/ha
Sunflower	t/ha
Soya	t/ha
Sugar beet	t/ha
Potatoes (including early potatoes and seed potatoes)	t/ha
Orchards	
of which: Apples	t/ha
Pears	t/ha
Peaches and nectarines	t/ha
Other fruit (plums, cherries, sour cherries etc.)	t/ha
Berry species	t/ha

		Grapes	t/ha
		Vine	l/ha
	Yield of milk		kg/cow
Balance sheet - end of year			
+	Fixed assets		RSD
		Land, permanent crops and quotas	RSD
		Buildings	RSD
		Machinery	RSD
		Breeding livestocl	RSD
+	Circulating capital		RSD
=	Total assets		RSD
-	Total debts		RSD
		Long term and medium term loans	RSD
		Short term loans and receivables	RSD
=	Net worth		RSD

Source: Adopted from the Serbian FADN data for 2013 (Rakic M., 2014, s.5-8, 14-17) and RI/CC 882 Rev.9.2 - Definitions of variables used in FADN standard results, p.16-33

Table 5:20 **Financial indicators and additional indicators**

Standard results			Unit
Financial indicators			
+	Total output		RSD
		Crops and products	RSD
		Livestock and products	RSD
		Other output	RSD
-	Total intermediate consumption		RSD
		Total specific crops	RSD
		Specific costs of crops and products	RSD
		of which costs of: seeds and seedlings	RSD
		fertilizers and land improvers	RSD
		plant protection	RSD
		other costs of crop production	RSD
		Specific costs of livestock and products	RSD
		of which costs of: purchased feeding stuff	RSD
		farm produced feeding stuff	RSD
		other costs of livestock production	RSD
		Specific costs of other products and services	RSD
		Total farming overheads	RSD
+	Balance current subsidies and taxes		RSD
=	Gross farm income		RSD
-	Depreciation		RSD
=	Farm net value added		RSD
+	Balance subsidies and taxes on investments		RSD
-	Total external factors		RSD
		Wages paid	RSD
		Rent paid	RSD
		Interest paid	RSD
=	Farm net income		RSD
Additional indicators			
	Farm net income / ha		RSD/ha
	Farm net income without subsidies / ha		RSD/ha
	Farm net income per working hour of unpaid labor		RSD/h
	Output/input ratio		-
	Debt ratio		-
	Liquidity ratio		-
	Gross margin of crops and products		RSD

Gross margin of livestock and products	RSD
Gross margin of other products and services	RSD

Source: Adopted from the Serbian FADN data for 2013 (Rakic M., 2014, s.5-8, 14-17) and RI/CC 882 Rev.9.2 - Definitions of variables used in FADN standard results, p.16-33

5.4 Serbian FADN database

The Serbian FADN software has been developed and finalised during the Project "Establishment of the Serbian Farm Accountancy Data Network".

The developed Serbian FADN software can perform the following activities:

- Data entry,
- Data validation,
- Processing of data (calculation of standard results and the farm return) and
- Preparation of data file for the RICA 1 system in Brussels. Analysis of data for policy making will be based on the databases produced by the software.

The software is updated for data entry according to the latest EU Regulations, as well as the transmission of data to the RICA 1 system in Brussels have been prepared and tested.

The above-mentioned activities are conducted by data collectors, as well as human resources at regional and national levels. Data collectors were trained on entering data into the software and validation of data. Staff at regional and national level has been trained in management of the software as well as validation of data, preparing the database for statistics and transmission of data to the RICA 1 system in Brussels.

A software testing environment is build up on the web application where it appears as an input mask for data submission, and it is consisted of username and password.

Figure 5:5 **Serbian FADN input mask for data submission**
Source: Reprinted from FADN Serbia: http://www.fadn.rs/admin/ (accessed 25 December 2015)

This software was installed on the Server at the computers of the Directorate for Agrarian Payment in August 2015. IT network structure is described by the following Figure.

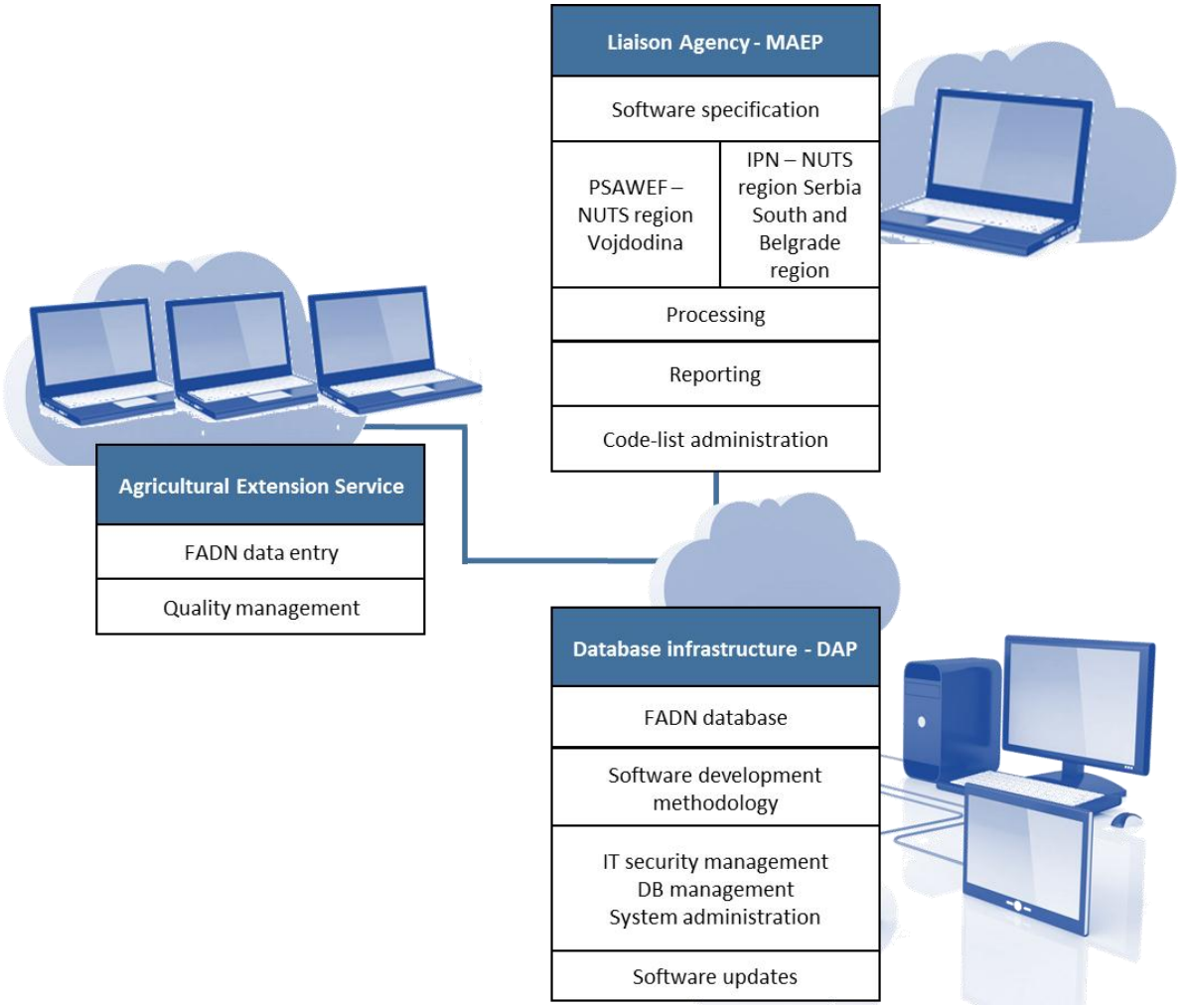


Figure 5:6 **Serbian FADN IT network organizational chart**

Source: Author's own elaboration

The Serbian FADN software has certain advantages, as well disadvantages.

The software allows data to flow between the Server and the rest of the personal computers located under the FADN system's groups (Agricultural Extension Services, IPN, PSAWEF, and Ministry of Agriculture). In the first year of the implementation of the Serbian FADN Software, the data were more general. In next period, additional software tolls were established in order to enable corrections of data quality. Therefore, the quality of the data was improved.

On the other side, there is a need to be constantly upgraded and updated in order to be able to process data with the latest versions of EU Regulations. In addition, as software disadvantage it can be underlined that there is a lack of defined control parameters in the Serbian FADN software.

Chapter 6 FADN results in the Republic of Serbia in 2013

This Chapter covers FADN data from the accounting year 2013, where the calculations are based on data collected in the Serbian FADN database. The analyses of the main farm income indicators are presented for two predominant types of farming: TP1- Specialist and general field cropping and TP6- Specialist dairying.

6.1 Serbian FADN sample in 2013

The number of agricultural holdings in FADN sample for the accounting year 2013 is 500. On the other side the number of FADN holdings delivering data is 497, which is only 0.6% less than the planned number under the FADN sample.

Table 6:1 **FADN holdings delivering data in 2013 – Republic of Serbia**

Economic Size (in '000 EUR) 2013 TYPE OF FARMING–TF	0-2	2-4	4-8	8-25	25-100	100-500	TOTAL
Specialist and general field cropping	4	9	16	76	76	10	191
Specialist horticulture indoor	0	1	0	0	0	0	1
Specialist horticulture outdoor	3	1	4	5	0	0	13
Specialist vineyards	3	3	3	2	0	0	11
Specialist fruit	2	7	6	9	3	0	27
Specialist dairying	0	0	6	48	19	4	77
Various grazing livestock combined	0	1	10	18	14	3	46
Specialist pigs	0	0	0	1	3	3	7
Specialist poultry	0	0	0	3	5	2	10
Various crops and livestock combined	3	6	14	60	28	3	114
Total	15	28	59	222	148	25	**497**

Source: Reprinted from the Serbian FADN data for 2013 (Rakic M., 2014, s.4)

The FADN sample for 2013 covers 10 types of farming where the Specialist and general field cropping type is predominated with 191 agricultural holdings in total number of 497, than Various crops and livestock combined with 114 and Specialist dairying with 77 holdings.

The following Figure represents the share of number of agricultural holdings by type of farming in total number of agricultural holdings allocated in the field of observation as well as FADN sample.

Taking into account that these are the first results of FADN implementation, seems that the sampling was well done.

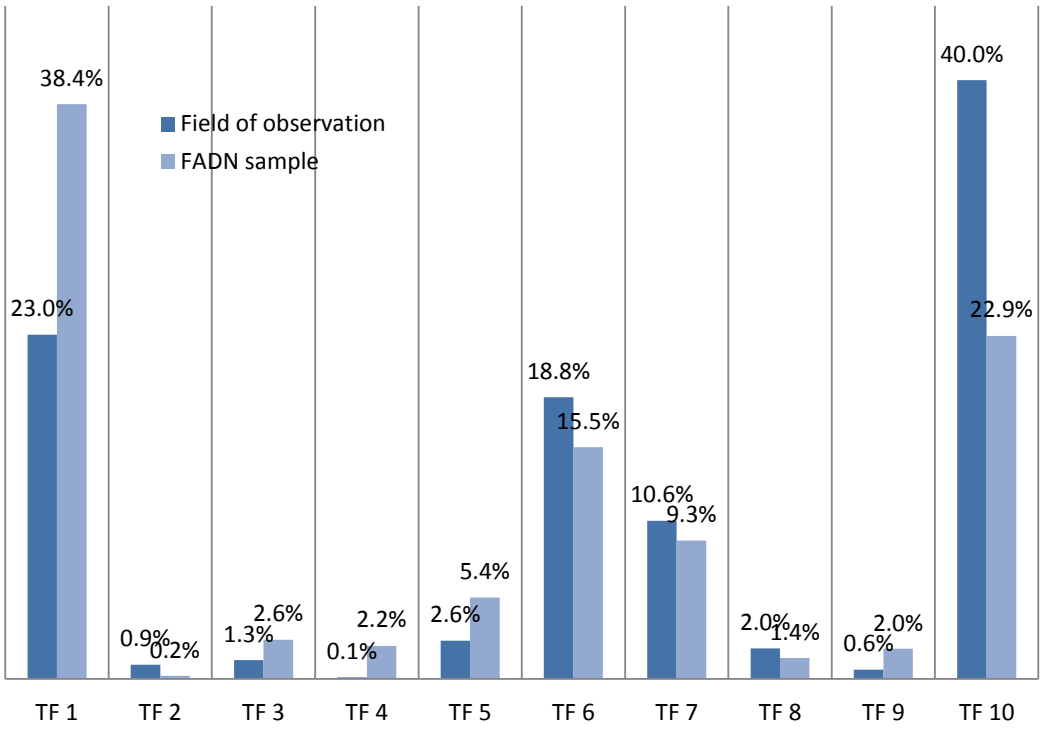


Figure 6:1 **Share of AH by TF in the field of observation and FADN sample, 2013**
Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.3,4)

According to observations of percentage structure of each type of farming in both total number of agricultural holdings counted for field of observation and FADN sample, there are just couple of normal slight deviations such as: Specialist and general field cropping agricultural holding have higher share of around 15% in FADN sample than in field of observation and on the other side Various crops and livestock combined holdings have smaller share of 17% in FADN sample than in field of observation.

6.2 Farm income by economic size and by type of farm classification

The income calculation takes into account all factors influencing economic activities in observed agricultural holdings at the level of the whole holding.

The following income indicators are presented:

- Farm Net Value Added (FNVA) equals total output (total production value) minus intermediate consumption and depreciation. It represents the amount available to remunerate all fixed production factors (land, labour and capital), either owned by the agricultural holding or external.
- Family Farm Income equals FNVA minus external factors, plus balance on subsidies and taxes on investments. It is the amount available to remunerate family factors (labour, land and capital).

These indicators are also expressed per Annual Work Unit (AWU), for FNVA, or per Family Work Unit (FWU) for Family Farm Income, to take account of the differences in the labour force remunerated on the holding:

- Farm Net Value Added / AWU: Farm Net Value Added expressed per agricultural work unit. Takes into account differences in the labour force to be remunerated per holding.
- Family Farm Income / FWU: Family Farm Income expressed per family labour unit. Takes into account differences in the family labour force to be remunerated per holding.

For the analyses in 2013 are chosen two main Serbian productions as well as in the same time predominated types of farming in the FADN sample, which are Specialist and general field cropping and Specialist dairying types of farming.

Table 6:2 **Average income indicators per type of farming in Serbia, 2013**

Average Income Indicators / 2013 / TYPE OF FARMING	Number of holdings	Farm Net Value Added (in '000 RSD)	Family Farm Income (in '000 RSD)	AWU	FWU
Specialist and general field cropping	**191**	**3,308**	**2,374**	**2.42**	**1.71**
Specialist dairying	**77**	**2,239**	**1,809**	**3.00**	**2.63**

Source: Adopted from the Serbian FADN data for 2013 (Rakic M., 2014, s.5,7,14,16)

In comparison with field crops in 2013, milk specialized agricultural holdings are ranked second for FNVA/AWU as well as for FFI/FWU.

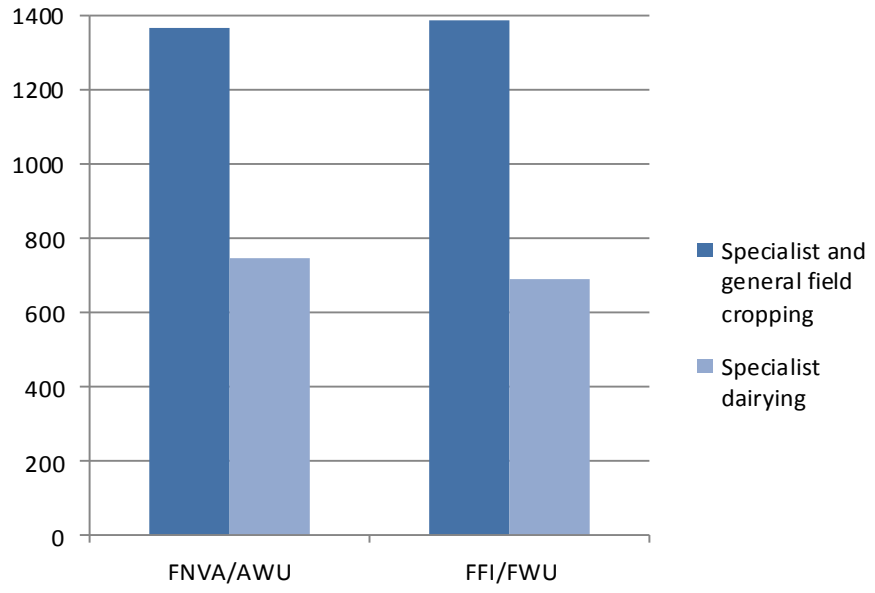


Figure 6:2 **Average FNVA/AWU and FFI/FWU for field crops and dairy production**

Source: Author's own elaboration based on data from the Serbian FADN data for 2013 (Rakic M., 2014, s.5,7,14,16)

Therefore, whilst milk specialized farms may not have appeared the most attractive in terms of income in 2013 in comparison with field crops at national level in the Republic of Serbia, the author believes they were in a better situation than some other types of farming such as horticulture and/or other grazing livestock.

6.2.1 Specialist and general field cropping agricultural holdings

This part of study provides an overview of Serbian agricultural holdings mainly oriented towards crop production, based on the first public available FADN data for 2013. The FADN sample includes 191 agricultural holdings belonging to the Specialist and general field cropping type of farming and according to the standard output per holding it was presented through five different economic size classes. Furthermore, this type of farming has the biggest share of agricultural holdings (38.4%) in the total number of holding under the FADN sample for 2013.

There are large differences among field cropping agricultural holdings across the different economic size classes.

Table 6:3 **General Indicators for specialist and general field cropping AH in the Republic of Serbia, 2013**

Economic Size (in '000 EUR) / 2013 / GENERAL INDICATORS	X<4	4≤X<8	8≤X<25	25≤X<100	100≤X<500	AVERAGE
Number of holdings	**13**	**16**	**76**	**76**	**10**	**191**
Labour input - AWU	1.70	3.02	2.32	2.37	3.63	2.42
of which paid labour input - AWU	0.36	0.52	0.57	0.83	1.68	0.72
Total utilised agricultural area (UAA) - ha	4.71	7.31	20.70	71.37	214.50	48.80
Maize	1.05	2.02	6.77	23.92	89.10	17.12
Wheat	0.79	2.66	6.40	21.80	46.36	13.92
Other cereals	0.27	0.31	0.67	1.00	1.00	0.76
Potatoes	0.25	0.33	0.24	0.26	0.00	0.24
Forage crops	0.73	0.35	0.67	0.74	0.10	0.65
Vegetables	0.07	0.44	0.34	0.38	0.30	0.35
Permanent crops	1.20	0.31	0.42	0.01	0.00	0.28
Other agricultural land	0.36	0.88	5.19	23.24	77.64	15.48
Yield of maize - t/ha	4.46	4.85	6.34	6.92	7.81	6.47
Yield of wheat - t/ha	4.89	4.74	5.34	5.86	6.32	5.55

Source: Reprinted from the Serbian FADN data for 2013 (Rakic M., 2014, s.5)

Considering the average of entire sample of 191 specialist and general field cropping agricultural holdings, maize covers 35% of the total utilised agricultural area, followed by wheat with 29%. Maize represents Serbia's top agricultural product, and the country ranks among the top ten maize-producing countries in the world, which is again approved by the values based on the national average FADN data.

The average maize yield in the Republic of Serbia was 6.47 t/ha, while the average wheat yield amounted to 5.55 t/ha. Maize yields varied by economic size classes from 4.46 t/ha to highest maize yield of 7.81 t/ha, which was achieved by the largest agricultural holdings. The highest achieved wheat yield of 6.32 t/ha also was produced on the largest agricultural holdings.

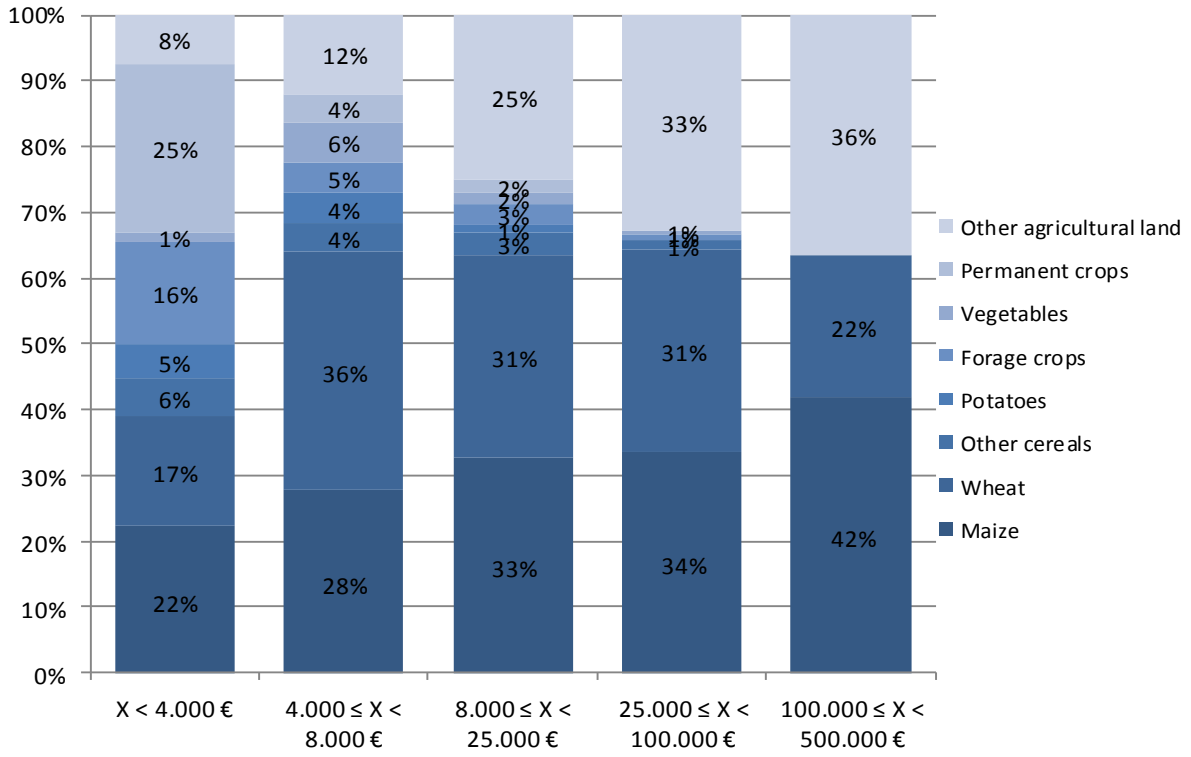


Figure 6:3 **Shares of different types of crop production in total utilised area by ec. size classes**
Source: Author's own elaboration based on data from the Serbian FADN data for 2013 (Rakic M., 2014, s.5)

The above Figure shows the share of different types of production in total utilised area by different economic size classes. Agricultural holdings belonging to the first three economic size classes, especially the smallest one, had diverse share of different types of production, while the last two economic size classes had been mostly based on maize, wheat and other agricultural land types of production.

Table 6:4 **Balance sheet for Specialist and general field cropping, 2013**

	Economic Size (in '000 EUR) / 2013 / BALANCE SHEET (in '000 RSD)	X<4	4≤X<8	8≤X<25	25≤X<100	100≤X<500	AVERAGE
	Number of holdings	**13**	**16**	**76**	**76**	**10**	**191**
+	Total fixed assets	6,477	10,415	14,490	33,415	59,942	23,513
	Land, permanent crops & quotas	3,569	4,479	8,374	20,250	38,715	14,035
	Buildings	1,992	4,332	3,211	5,042	3,225	3,952
	Machinery	881	1,580	2,859	8,034	18,002	5,469
	Breeding livestock	35	25	46	89	0	58
+	Total current assets	352	708	972	3,803	12,387	2,632
=	Total assets	6,829	11,123	15,461	37,218	72,330	26,145
-	Total liabilities	0	9	194	1,160	4,232	761
	Long & medium-term loans	0	0	182	1,064	4,006	706
	Short-term loans	0	9	12	96	227	55
=	Net worth	6,829	11,113	15,268	36,058	68,097	25,384

Source: Reprinted from the Serbian FADN data for 2013 (Rakic M., 2014, s.6)

The average farm size in terms of asset value, based on the 2013 data, was highest in agricultural holdings belonging to the largest economic size classes (around 72,330,000 RSD). By contrast, the smallest agricultural holdings demonstrated the lowest values of total assets (below 6,830,000

RSD) as they are oriented towards less capital-intensive farming. The largest holdings have the biggest amount of long & medium-term loans as well as short-term loans. In contrast, the smallest holdings do not have any liabilities.

Table 6:5 **Financial indicators for Specialist and general field cropping, 2013**

	Economic Size (in '000 EUR) / 2013 FINANCIAL INDICATORS (in '000 RSD)	X<4	4≤X<8	8≤X<25	25≤X<100	100≤X<500	AVERAGE
	Number of holdings	**13**	**16**	**76**	**76**	**10**	**191**
+	Total output	1,038	1,840	3,043	8,773	30,865	6,542
	Crop production	958	1,529	2,844	8,490	29,493	6,247
	Livestock production	61	243	169	260	0	195
	Other production	19	68	30	23	1,372	100
-	Total intermediate consumption	415	872	1,361	4,406	11,205	2,983
	Specific costs	259	455	798	2,740	7,361	1,849
	Farming overheads	156	416	563	1,666	3,843	1,134
+	Balance current subsidies & taxes	34	53	163	618	1,227	382
=	Gross Farm Income	658	1,021	1,845	4,985	20,887	3,942
-	Depreciation	244	352	436	831	1,583	633
=	Farm Net Value Added	413	668	1,409	4,154	19,304	3,308
+	Balance subsidies & taxes on investments	11	0	20	19	0	16
-	Total external factors	86	150	342	1,279	5,499	951
	Wages paid	68	119	133	136	561	151
	Rent paid	12	31	188	1,043	4,703	739
	Interest paid	6	1	21	100	235	61
=	Family Farm Income	338	518	1,087	2,895	13,806	2,374

Source: Reprinted from the Serbian FADN data for 2013 (Rakic M., 2014, s.7)

The FADN database contains information about output and subsidies per product, but as far as costs are concerned it only provides information relating to the farm as a whole. The analysis shows that the relationships between size and income, intensity of land use, efficiency and many other aspects of businesses are dependent on the criterion of size chosen.

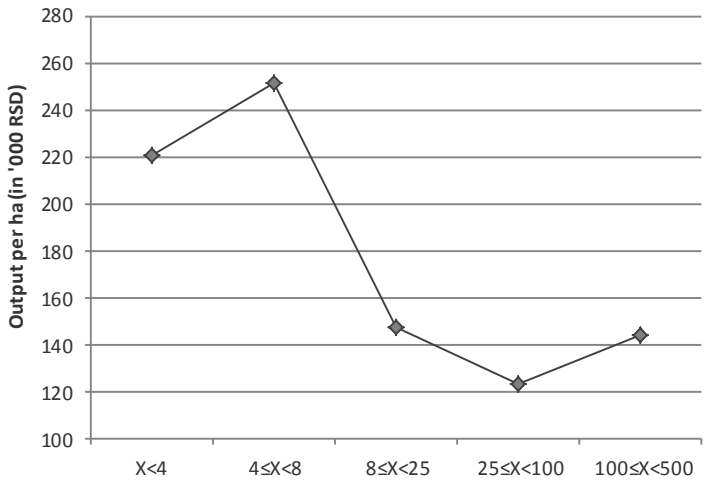


Figure 6:4 **Output per ha of UAA by economic size classes**
Source: Author's own elaboration based on data from the Serbian FADN data for 2013 (Rakic M., 2014, s.8)

This is easily illustrated in Figure 6:4 Output per ha of UAA by economic size classes, on the basis of economic size class of holding area.

Agricultural holdings belonging to the small and very small economic size classes are more intensive users of land, achieving a higher output per hectare of UAA than holdings belonging to the larger economic size classes with more hectares.

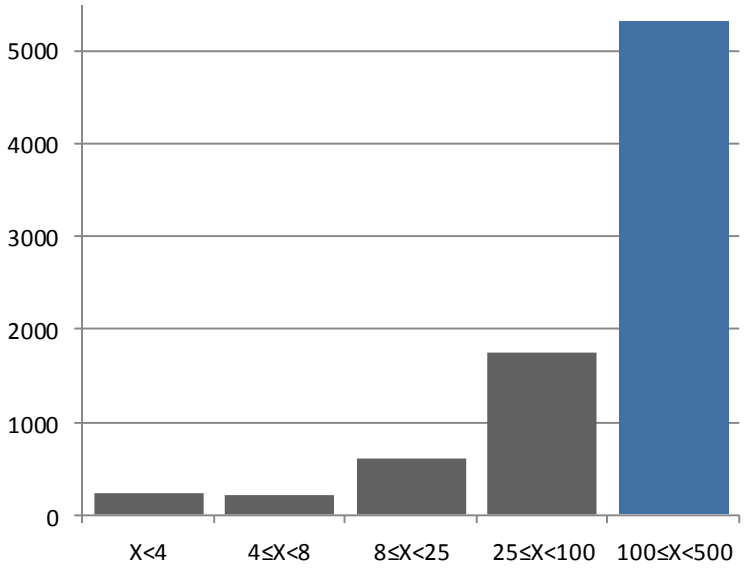


Figure 6:5 **Farm family income/FWU by economic size classes**
Source: Author's own elaboration based on data from the Serbian FADN data for 2013 (Rakic M., 2014, s.5,7)

The result is that Farm family income per worker (unpaid labour) increases significantly with increasing farm size.

On average of 10 agricultural holdings, the Farm family income per work unit of the largest farms (size class with EURO 100,000≤X<500,000) was around 7,000,000 RSD, which is more than 30 times the figure for the smallest farms (size class with EURO X<4,000).

This is partially explained by differences in farm structure. In the largest size class, the average amount of land (around 215 ha) is 45 times higher than in the smallest, while the number of workers is only two times greater.

Interestingly, Figure above displays that the results based on FFI (per FWU) showing that those agricultural holdings with the lowest incomes were not actually, on average, the agricultural holdings belonging to the very small economic size class.

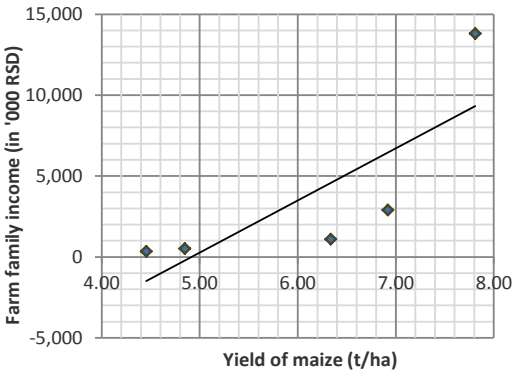


Figure 6:6 **Farm family income and yield by economic size classes-maize**
Source: Author's own elaboration based on data from the Serbian FADN data for 2013 (Rakic M., 2014, s.5,7)

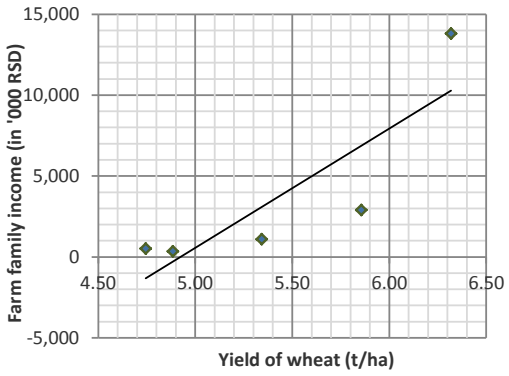
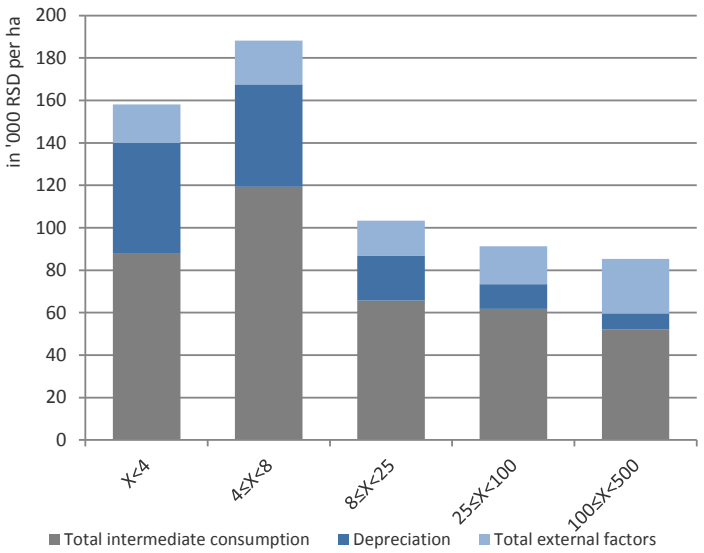


Figure 6:7 **Farm family income and yield by economic size classes-wheat**
Source: Author's own elaboration based on data from the Serbian FADN data for 2013 (Rakic M., 2014, s.5,7)

Analysis found that the significant influence on the level of Farm family income, as more than 60% of the variation in Farm family income depends on yield of maize, while as more than 70% of the variation in Farm family income depends on yield of wheat.

Yields are a parameter that can be easily measured and compared. The factors that influence yields can be divided into two groups:

- factors that cannot be changed by the farmer: soil type, geographical area, weather conditions;
- factors that can changed by the farmer: inputs (the type and level of seeds, fertilizers and pesticides used), management (a wide group of factors including the timing, quality and accuracy of each field operation and quality of tasks done, as well as many other things which were not be covered by FADN).



Furthermore, agricultural holdings belonging to the large economic size classes have lower inputs per hectare: they use inputs more efficiently.

The Figure 6:8 Input structure by economic size classes shows that the highest investments per hectare have agricultural holdings belonging to the small economic size classes.

Figure 6:8 **Input structure by economic size classes**
Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.7)

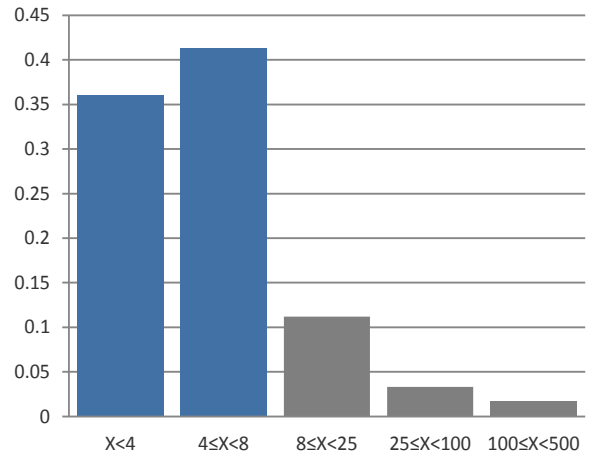
Table 6:6 **Structures of farms of different sizes in the Republic of Serbia, 2013**

Economic Size (in '000 EUR) / 2013	X<4	4≤X<8	8≤X<25	25≤X<100	100≤X<500	AVERAGE
Number of holdings	**13**	**16**	**76**	**76**	**10**	**191**
Total utilised agricultural area (UAA) - ha	4.71	7.31	20.70	71.37	214.50	48.80
Labour input - AWU	1.70	3.02	2.32	2.37	3.63	2.42
Share of paid labour (%)	21.27	17.38	24.70	35.13	46.28	29.52
Rent paid (RSD)	12	31	188	1,043	4,703	739
Share of lialabilities in assets – Debt ratio (%)	0.00	0.08	1.25	3.12	5.85	2.91

Source: Adopted from the Serbian FADN data for 2013 (Rakic M., 2014, s.5-7)

Share of external factors is also much higher in large agricultural holdings. These have two times higher share of paid labour than the smallest one: have mainly paid labour and they rent most as well as tend to increase their debt ratio in order to buy assets.

The average number of workers employed per agricultural holding stood at 2.42 AWU. However, it varied significantly across agricultural holdings belonging to different economic size classes, ranging from 1.70 AWU in the smallest one to 3.63 AWU in the largest.



On the other side, agricultural holdings belonging to the smaller economic size classes have higher labour input - AWU per hectare in comparison to agricultural holdings belonging to the larger economic size classes, which use their labour force more efficiently.

Figure 6:9 **Labour input - AWU per ha by economic size classes**
Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.5)

Table 6:7 **Additional data for Specialist and general field cropping, 2013**

Economic Size (in '000 EUR) / 2013 ADDITIONAL DATA	X<4	4≤X<8	8≤X<25	25≤X<100	100≤X<500	AVERAGE
Number of holdings	**13**	**16**	**76**	**76**	**10**	**191**
Total output per hectare of UAA (RSD/ha)	220,475	251,841	147,037	122,930	143,892	134,081
Total inputs per hectare of UAA (RSD/ha)	158,156	188,119	103,355	91,298	85,251	93,594
Output-input ratio (total output/total input)	1.39	1.34	1.42	1.35	1.69	1.43
Total subsidies (excl. on invest.) per ha of UAA (RSD/ha)	8,159	9,187	9,048	10,092	8,060	9,363
Gross Investment in fixed assets per ha of UAA (RSD/ha)	25,797	-251	9,439	13,588	8,756	11,356
Debt ratio (total debt/total assets) (%)	0.00%	0.08%	1.25%	3.12%	5.85%	2.91%
Family Farm Income /Net worth (%)	4.95%	4.66%	7.12%	8.03%	20.27%	9.35%

Source: Reprinted from the Serbian FADN data for 2013 (Rakic M., 2014, s.8)

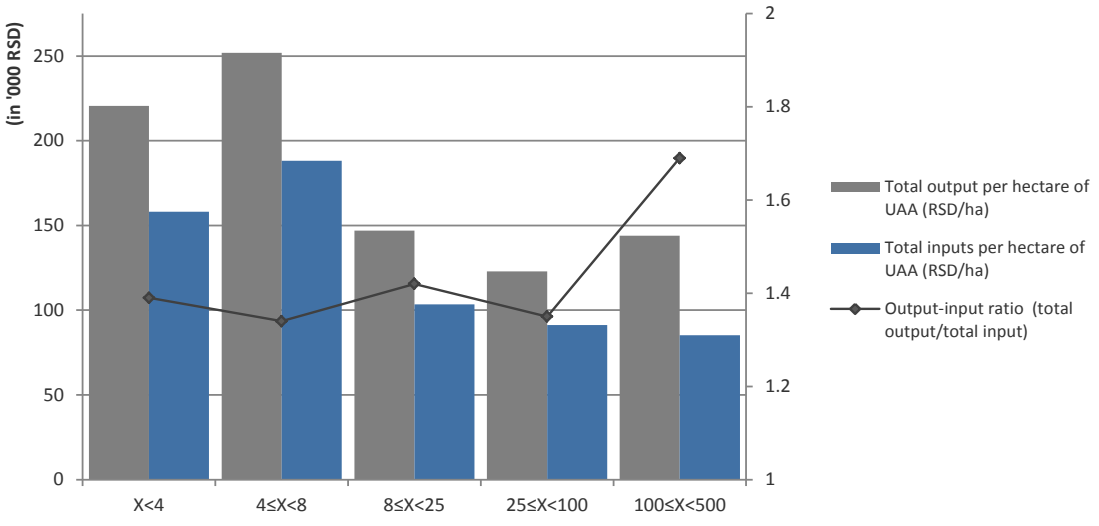


Figure 6:10 **Input-output coefficients by economic size classes**
Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.8)

Differentiation by farm size shows that the production costs of agricultural holdings belonging to the small economic size classes are highest, followed by the middle sized agricultural holdings. Large agricultural holdings have the smallest inputs per hectare and largest output-input ratio.

6.2.2 Specialist dairying agricultural holdings

This part of study provides an overview of Serbian agricultural holdings mainly oriented towards milk production, based on the first public available FADN data for 2013. The FADN sample includes 77 agricultural holdings belonging to the Specialist dairying type of farming and according to the standard output per holding it was presented through three different economic size classes.

There are large differences among milk agricultural holdings across the different economic size classes. These data reflect the variety of milk holdings structures in the Republic of Serbia.

Table 6:8 **General Indicators for Specialist dairying, 2013**

Economic Size (in '000 EUR) / 2013 GENERAL INDICATORS	4≤X<8	8≤X<25	25≤X<500	AVERAGE
Number of farms in sample	**6**	**48**	**23**	**77**
Labour input - AWU	2.54	2.63	3.88	3.00
of which paid labour input - AWU	0.15	0.05	1.07	0,36
Total utilised agricultural area (UAA) - ha	11.18	15.01	42.68	22.98
Maize	0.88	2.30	9.90	4,46
Wheat	1.23	1.59	8.21	3,54
Other cereals	0.58	0.84	1.94	1,15
Potatoes	0.00	0.06	0.00	0,04
Forage crops	4.74	9.35	15.90	10,94
Vegetables	0.00	0.00	0.00	0,00
Permanent crops	0.72	0.19	0.00	0,18
Other agricultural land	3.03	0.68	6.73	2,67
Average number of livestock				
Dairy cows	4.52	9.61	27.90	14,68
Breeding sows	0.00	0.38	0.87	0,50
Pigs for fattening	0.00	1.22	2.72	1,57
Ewes	0.00	1.39	0.39	0,99
Yield of maize - t/ha	7.22	6.22	6.03	6.21
Yield of wheat - t/ha	4.74	4.48	4.26	4.43
Milk production per cow - kg/cow	4,514	4,144	5,356	4,535

Source: Reprinted from the Serbian FADN data for 2013 (Rakic M., 2014, s.14)

Figure 6:11 Share of different types of livestock production by economic size classes shows the share of different types of livestock production by different economic size classes.

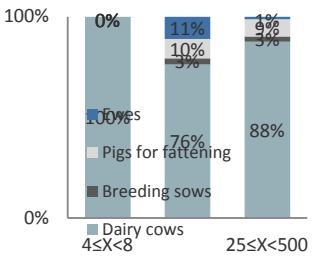


Figure 6:11 **Share of different types of livestock production by economic size classes**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.14)

Agricultural holdings belonging to the first-smallest economic size class, had been only based on milk production, while the last two economic size classes had diverse share of different types of livestock production, but mostly based on milk production (more than 80% on average of these two classes). Medium holdings immediately after dairy cows (76% of total number of livestock) had the largest share of pigs for fattening and ewes (both with around 10% of total number of livestock), while the largest holdings immediately after dairy cows (88% of total number of livestock) had the largest share of pigs for fattening with 9% of total number of livestock.

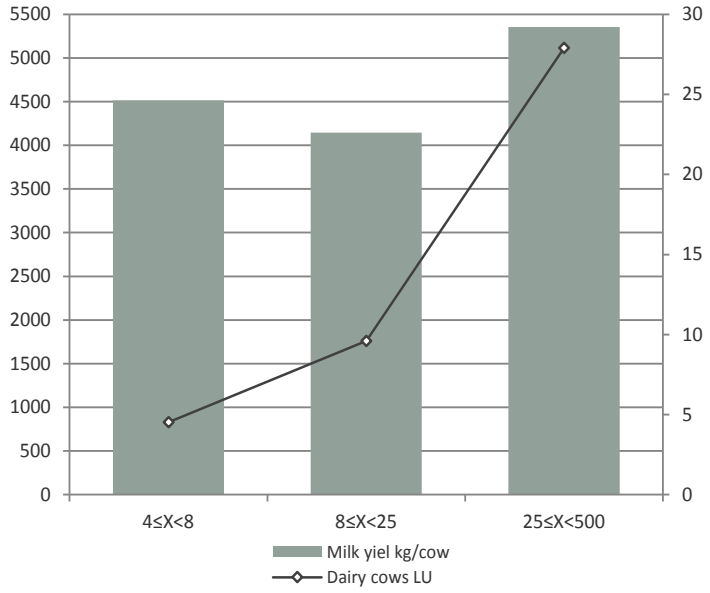


Figure 6:12 **Dairy cows LU and Milk yield by economic size classes**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.14)

Figure 6:12 Dairy cows LU and Milk yield by economic size classes displays that Specialist dairying agricultural holding in the Republic of Serbia have 15 dairy cows on average, with a milk yield of 4,535 kg/cow, producing around 67 t of milk per year.

Larger holdings have more dairy cows - 28, higher yields – 5,355 kg/cow, and produce 149,435 t of milk per year, while the smallest holdings have around 5 dairy cows, with a yield of 4,514 kg/cow, and produce 21 t of milk per year.

Interestingly, middle holdings have two times more dairy cows than the smallest one, but in contrary have smaller yield for 8.2% than the smallest holdings and certainly due to the higher number of cows per holding they have higher milk production on the holding level – 39,812 t per year.

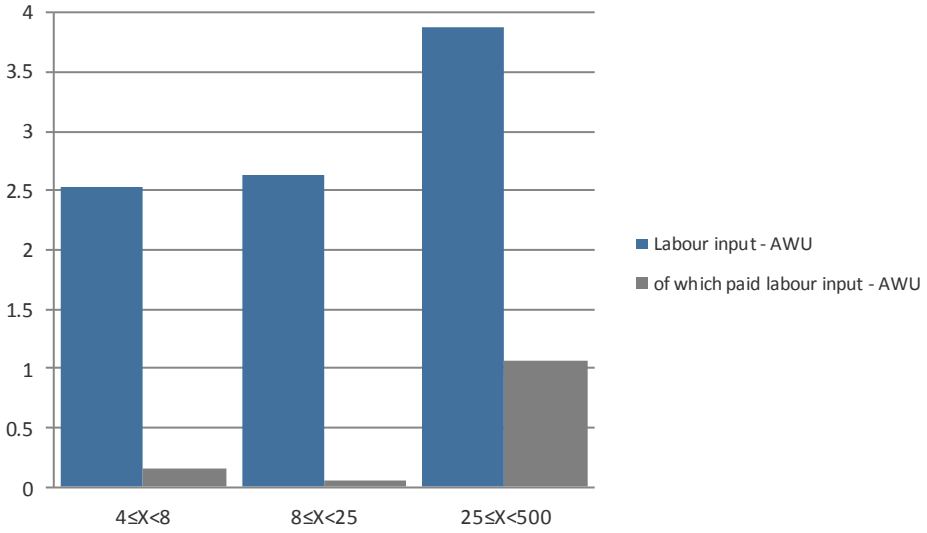


Figure 6:13 **Labour input by economic size classes**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.14)

The average number of workers employed per agricultural holding stood at 3 AWU. However, it varied, but not significantly across agricultural holdings belonging to different economic size classes, ranging from 2.54 AWU in the smallest one to 3.88 AWU in the largest. The largest holdings have largest share of paid labour (around 30%) in total labour input while the smallest one have share of 5%.

On the other side, agricultural holdings belonging to the smaller economic size classes have higher labour input - AWU per hectare in comparison to agricultural holdings belonging to the larger economic size classes, which use their labour force more efficiently.

Table 6:9 **Balance sheet Specialist dairying, 2013**

	Economic Size (in '000 EUR) / 2013 BALANCE SHEET (in '000 RSD)	4≤X<8	8≤X<25	25≤X<500	AVERAGE
	Number of farms in sample	**6**	**48**	**23**	**77**
+	Total fixed assets	27,024	13,460	27,310	18,654
	Land, permanent crops & quotas	22,784	5,861	10,138	8.457
	Buildings	2,065	3,767	6,671	4.502
	Machinery	1,570	2,322	5,921	3.339
	Breeding livestock	605	1,511	4,580	2.357
+	Total current assets	702	1,194	4,412	2,117
=	Total assets	27,727	14,655	31,723	20,772
-	Total liabilities	0	29	1,763	545
	Long & medium-term loans	0	20	1,523	467
	Short-term loans	0	9	240	77
=	Net worth	27,727	14,626	29,960	20,227

Source: Reprinted from the Serbian FADN data for 2013 (Rakic M., 2014, s.15)

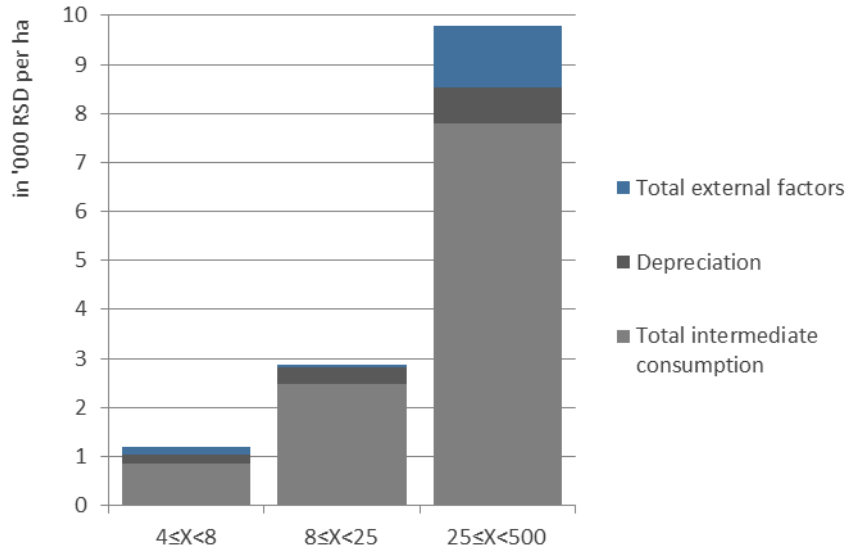
The average farm size in terms of asset value, based on the 2013 data, was highest in agricultural holdings belonging to the largest economic size classes (around 31,723,000 RSD). Interestingly, not the smallest, but agricultural holdings belonging to the medium economic size classes demonstrated the lowest values of total assets (around 14,655,000 RSD). The largest holdings have the

biggest amount of long & medium-term loans as well as short-term loans. In contrast, the smallest holdings do not have any liabilities.

Table 6:10 **Financial indicators for Specialist dairying, 2013**

	Economic Size (in '000 EUR) / 2013 FINACIAL INDICATORS (in '000 RSD)	4≤X<8	8≤X<25	25≤X<500	AVERAGE
	Number of farms in sample	**6**	**48**	**23**	**77**
+	Total output	1,745	3,669	11,228	5,777
	Crop production	826	1,632	3,749	2,201
	Livestock production	919	2,023	7,478	3,566
	Other production	0	15	0	9
-	Total intermediate consumption	850	2,486	7,803	3,946
	Specific costs	655	2,139	6,431	3,306
	Farming overheads	195	347	1,371	641
+	Balance current subsidies & taxes	141	410	1,945	847
=	Gross Farm Income	1,036	1,593	5,370	2,678
-	Depreciation	199	326	737	439
=	Farm Net Value Added	837	1,267	4,633	2,239
+	Balance subsidies & taxes on investments	0	4	0	2
-	Total external factors	152	71	1,260	432
	Wages paid	124	20	263	101
	Rent paid	29	45	675	232
	Interest paid	0	6	322	100
=	Family Farm Income	684	1,200	3,372	1,809

Source: Reprinted from the Serbian FADN data for 2013 (Rakic M., 2014, s.16)



Agricultural holdings belonging to the large economic size classes have the highest inputs (total, per hectare or per LU and/or dairy cow).

The Figure Input structure by economic size classes shows that the highest investments (per hectare) have agricultural holdings belonging to the largest economic size classes.

Figure 6:14 **Input structure by economic size classes**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.15)

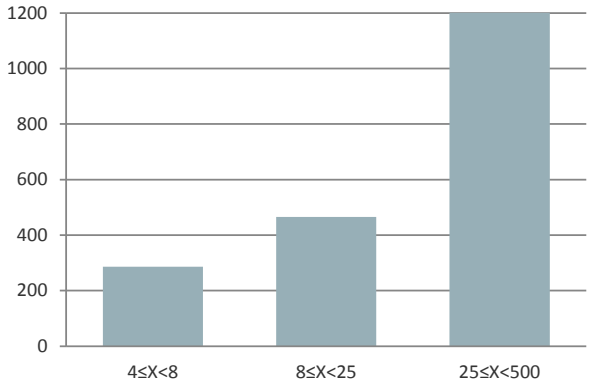
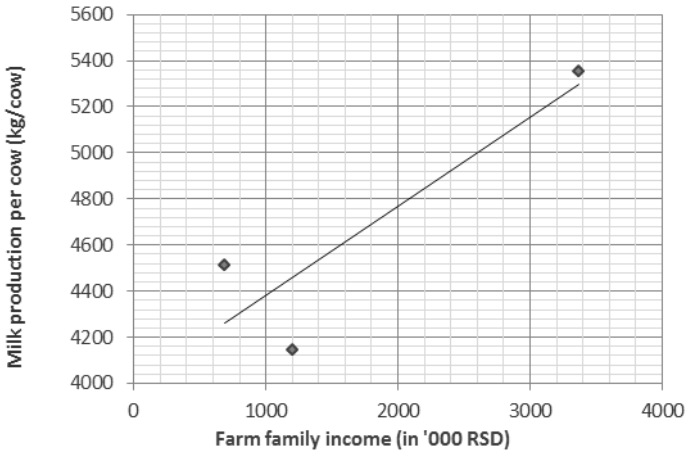


Figure 6:15 **Farm family income/FWU by economic size classes**
Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.14, 16)

The result is that Farm family income per worker (unpaid labour) increases significantly with increasing farm size.

On average of 23 agricultural holdings, the Farm family income per work unit of the largest farms (size class with EURO 25,000≤X<500,000) was around 1,200,000 RSD, which is more 4 times than the figure for the smallest farms (size class with EURO 4,000≤X<8,000).

This is partially explained by differences in farm structure. In the largest size class, the average amount of land (around 43 ha) is 4 times higher as well as the average number of dairy cows (around 28) is around 6 times higher than in the smallest holdings, while the number of workers is only 1.5 times greater.



Analysis found that the significant influence on the level of Farm family income, as around 80% of the variation in Farm family income depends on milk production per cow.

Figure 6:16 **Farm family income and milk production by economic size classes**
Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.14, 16)

Table 6:11 **Additional data for Specialist dairying AH in the Republic of Serbia, 2013**

Economic Size (in '000 EUR) / 2013 ADDITIONAL DATA	4≤X<8	8≤X<25	25≤X<500	AVERAGE
Number of holdings	**6**	**48**	**23**	**77**
Total output per hectare of UAA (RSD/ha)	156,129	244,377	263,040	251,387
Total inputs per hectare of UAA (RSD/ha)	107,530	191,991	229,592	209,651
Output-input ratio (total output/total input)	1.45	1.27	1.15	1.20
Total subsidies (excl. on invest.) per ha of UAA (RSD/ha)	15,278	32,881	49,755	36,549
Gross Investment in fixed assets per ha of UAA (RSD/ha)	3,279	5,986	20,008	9,964
Debt ratio (total debt/total assets) (%)	0.00%	0.20%	5.56%	2.62%
Family Farm Income /Net worth (%)	2.47%	8.20%	11.26%	8.94%

Source: Reprinted from the Serbian FADN data for 2013 (Rakic M., 2014, s.17)

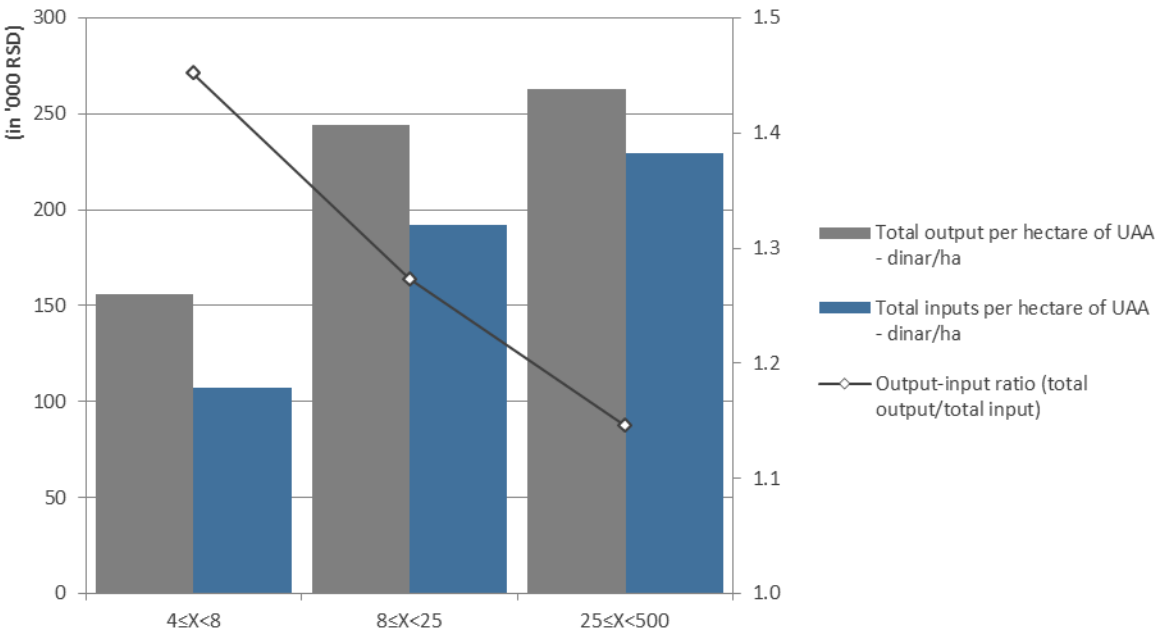


Figure 6:17 **Input-output coefficients by economic size classes**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.17)

Differentiation by farm size shows that the production costs of agricultural holdings belonging to the smallest economic size classes are smallest, followed by the middle sized agricultural holdings. Agricultural holdings belonging to the largest economic size classes have the highest inputs and outputs per hectare as well as the smallest output-input ratio, which is completely in contrast with the agricultural holdings belonging to the specialist and general field cropping type of farming.

Chapter 7 Comparison with Polish/Estonian/ neighboring countries (Slovenian, Bulgarian, Romanian) FADN results in 2013

The content-related uniformity of the FADN system makes it possible to compare the results of agricultural holdings. On this basis, the first Serbian FADN results for 2013 were analysed and interpreted in EU frame, by comparison with a few selected EU Member States (Poland, Estonia and neighboring countries Slovenia, Bulgaria, Romania). Two predominant types of farming (specialized farms for field crops and for dairying) were observed.

Further, this analyses included average standard results of EU 27 based on 2012 data, the latest available in the EU FADN.

In 2012, there were approximately 83,000 agricultural holdings in the European Union covered by FADN, and they represented nearly 5 million commercial agricultural holdings from 27 Member States, out of total of 12.2 million holdings included in Farm Structure Survey.

7.1 Comparison of the FADN key features

Table 7:1 **FADN key features of observed countries, 2013**

FADN KEY FEATURES	SERBIA	POLAND	ESTONIA	HUNGARY	SLOVENIA	BULGARIA	ROMANIA
Universe	631,552	1,506,620	19,610	576,810	74,650	370,490	3,859,040
Number of farms represented-Field of observation	200,087	720,630	8,090	107,253	39,953	115,650	1,041,997
Number of participating farms	497	12,321	660	1,974	945	2,239	5,901
Threshold of economic size (EUR of SO)	4,000	4,000	4,000	4,000	4,000	2,000	2,000

Source: Adopted from the Serbian FADN data for 2013 (Rakic M., 2014, s.3, 4) and the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.2)

Figures above indicate that the Serbian universe (631,552 agricultural holdings according to the Agricultural Census 2012), compared with the observed countries, has the biggest similarities with the Hungarian one (576,810 agricultural holdings according to the Agricultural Census 2010). On the other side, this cannot be said for number of farms of the field of observation. In this respect, Serbian number of agricultural holdings of the field of observation (around 200,000) is the closest to Bulgarian one (more than 115,000 agricultural holdings).

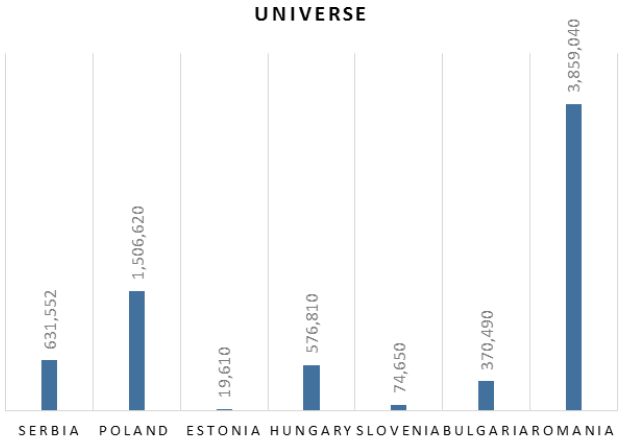


Figure 7:1 **Farm universe**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.3, 4) and the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.2)

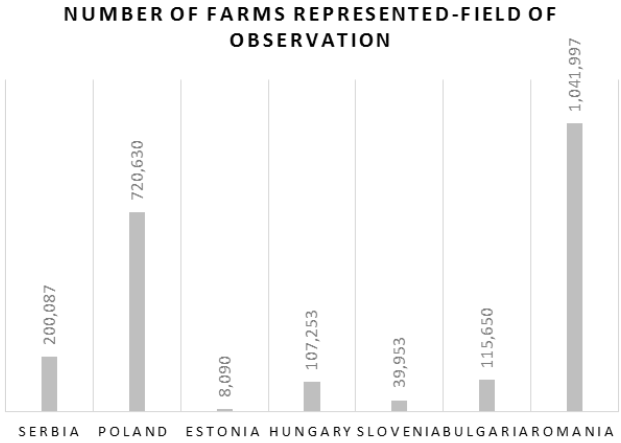


Figure 7:2 **Farm field of observation, 2013**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.3, 4) and the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.2)

In the moment of Serbian integration into European Union, the sample should be around 2,000 agricultural holdings. This number represents 1% of field of observation of about 200,000 agricultural holdings in the Republic of Serbia. In that context the following Figure indicates deviations of 1% from field of observations in observed countries.

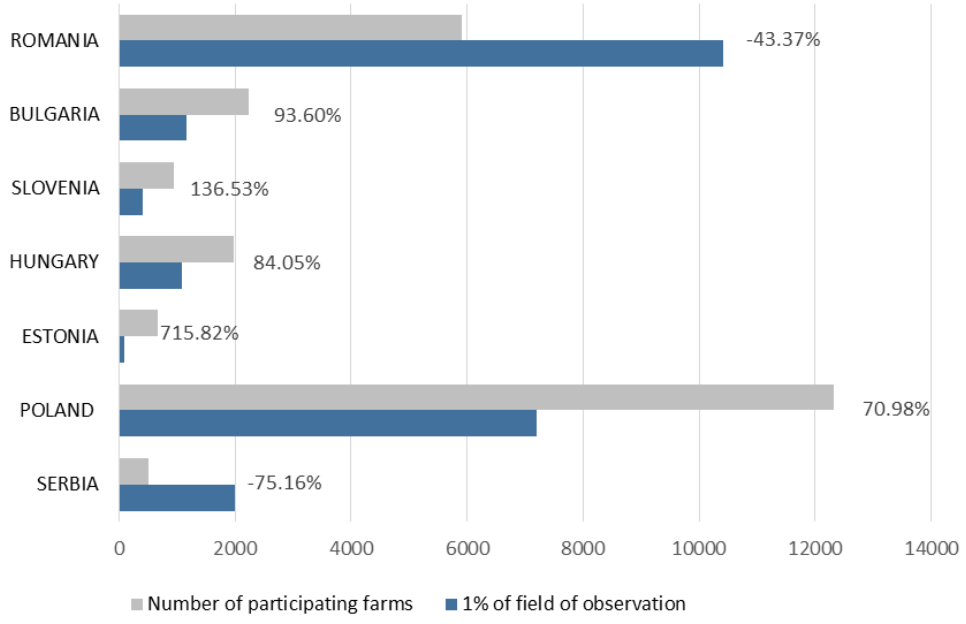


Figure 7:3 **Deviations of 1% from field of observations, 2013**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.3, 4) and the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.2)

It is interesting that Romania has a huge negative deviation of number of participating agricultural holdings in comparison with the assumed percentage, which is 1% of number of holdings in field

of observation. For Romania, threshold should be higher than 2,000 EUR. In that term Hungary will have less number of agricultural holdings under the field of observation and FADN sample, as well as this devotion automatically will be less or even there will not be any deviation.

The majority of observed countries including the Republic of Serbia have the threshold of 4,000 EUR of SO. Only Bulgaria and Romania have threshold of 2,000 EUR of SO.

7.2 Comparison of the major FADN indicators of specialised farms for field crops

Table 7:2 **FADN indicators of specialised farms for field crops, 2013 (average per farm in EUR)**

FADN INDICATORS	SERBIA*	POLAND	ESTONIA	HUNGARY	SLOVENIA	BULGARIA	ROMANIA
Labour input - AWU	2.4	1.6	1.4	1.3	1.3	3.5	1.5
Unpaid labour input - FWU	1.7	1.4	0.3	0.6	1.3	3.1	1.5
Total output	57,828	28,473	94,404	62,655	20,387	95,810	41,212
Total output crops	55,219	26,488	78,725	56,372	17,271	92,262	40,477
Total output livestock	1,723	1,408	1,073	1,101	937	872	429
Intermediate consumption	26,364	17,481	78,322	41,451	14,620	56,995	21,486
Balance subs and taxes	3,374	7,523	30,751	18,879	8,311	30,916	8,621
Gross farm income	34,839	18,515	46,833	40,082	14,079	69,731	28,347
Farm net value added	29,241	13,613	27,399	33,596	5,970	55,776	24,839
Farm net income-Family Farm Income	20,980	10,768	17,689	21,780	4,618	21,891	17,932
Farm net value added/AWU	12,070	8,482	20,088	25,741	5,145	16,066	16,740
Farm Net Income/FWU	12,287	7,688	50,775	37,092	3,544	7,039	11,988
Total assets	231,092	179,671	275,806	196,245	151,844	161,347	85,126
Total liabilities	6,726	14,553	72,701	25,943	4,811	37,513	4,246
Net worth	224,366	165,117	203,106	170,302	147,033	123,834	80,880

*Average EUR exchange rate: RSD 113.136 in 2013

Source: Adopted from the Serbian FADN data for 2013 (Rakic M., 2014, s.5-7) and the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1)

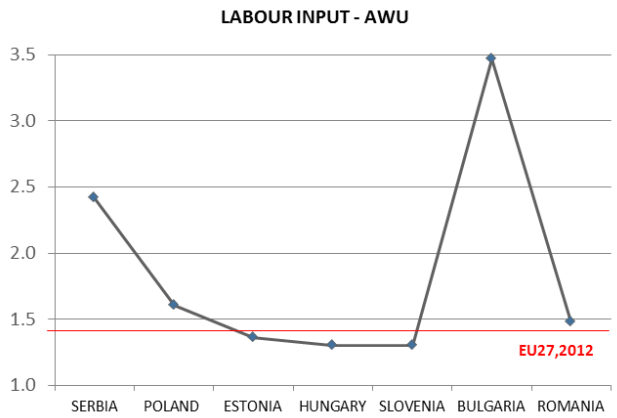


Figure 7:4 **Labour input - AWU, specialised farms for field crops, 2013**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.5), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU Farm Economics Overview (2015, p.42)

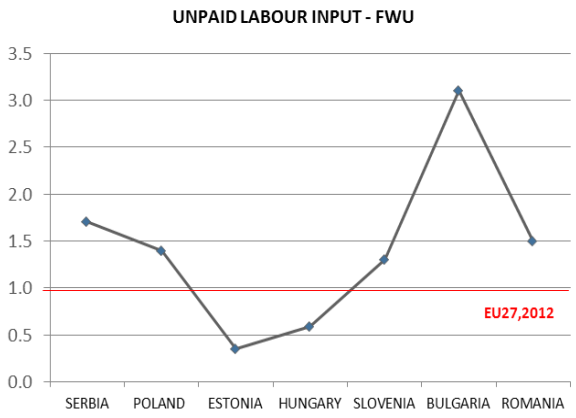


Figure 7:5 **Unpaid labour input - FWU, specialised farms for field crops, 2013**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.5), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU Farm Economics Overview (2015, p.44)

The average workforce on specialised farms for field crops in EU27 in 2012 (there are no data available for 2013) was 1.4 AWU. This indicator in Estonia, Hungary and Slovenia was slightly less than the average in EU27. On the other side, in Poland and Romania, it was slightly higher than the average in EU27. The highest average workforce was in Bulgaria 3.5 AWU. Serbia's AWU of 2.4 was in the middle of highest and average workforce in EU27.

In addition, average unpaid (family) workforce on specialised agricultural holdings for field crops in EU27 in 2012 was 1 FWU. This indicator has the same story as previous one with one exception for Slovenia, which FWU is higher than EU27 average. Moreover, Slovenia is the only country that does not have paid labour force on specialised farms for field crops: its AWU is equal as its FWU (1.3).

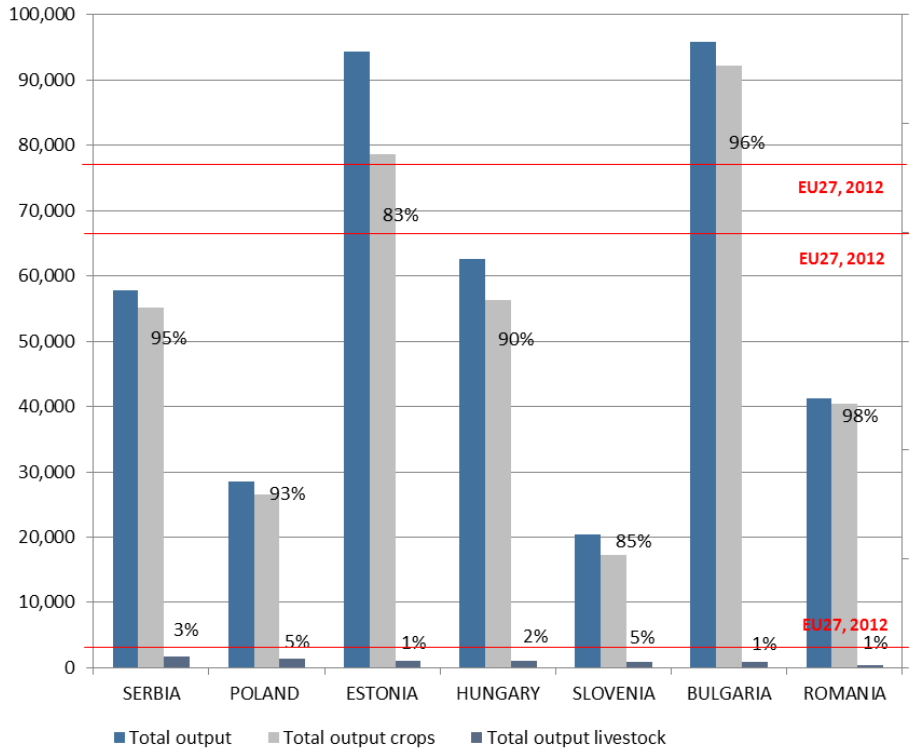


Figure 7:6 **Total output, specialised farms for field crops, 2013 (EUR)**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.7), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU Farm Economics Overview (2015, p.24)

Over 90% of total output of holdings in observed countries including the Republic Serbia came from crop production. Estonia and Bulgaria are only countries with higher value of total, as well as output of crop production than average EU27 of these indicators.

The farm net value added indicator (FNVA) for an average EU27 specialised farms for field crops reached more than 39,000 EUR in 2012.

FNVA = OUTPUT + SUBSIDIES AND TAXES - INTERMEDIATE CONSUMPTION – DEPRECIATION
(This indicator depends on the size of the agricultural holdings concerned)

Bulgaria is the only country having higher FNVA than average EU27, as well as the highest in comparison with other observed countries, around 56,000 EUR. Serbian FNVA is similar to an average FNVA of observed countries.

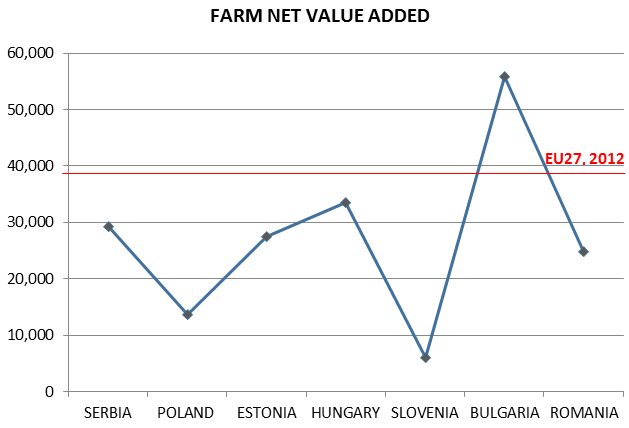


Figure 7:7 **Farm net value added, specialised farms for field crops, 2013 (EUR)**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.7) the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and and EU Farm Economics Overview (2015, p.13)

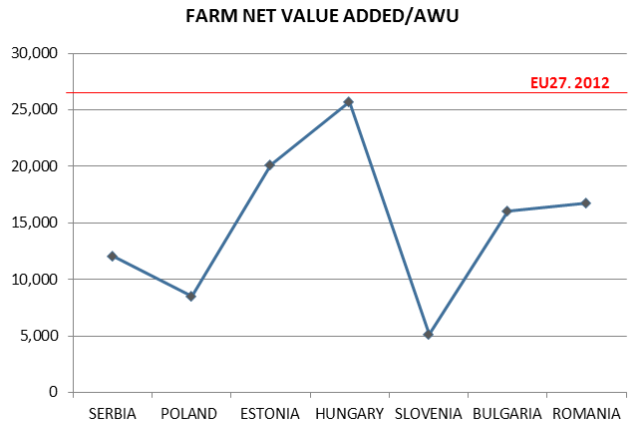


Figure 7:8 **Farm net value added/AWU, specialised farms for field crops, 2013 (EUR)**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.5, 7), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU Farm Economics Overview (2015, p.14)

When the FNVA is expressed per AWU, this indicator is less dependent on the size of the holdings concerned, and can thus be compared irrespective of agricultural holdings structures. The average EU27 FNVA per AWU was 27.1 thousand EUR in 2012. Obtained results of FNVA/AWU of agricultural holdings in the observed countries including the Republic of Serbia were below the EU27 average.

Slovenian agricultural holdings had the lowest FNVA values, as well as FNVA/AWU.

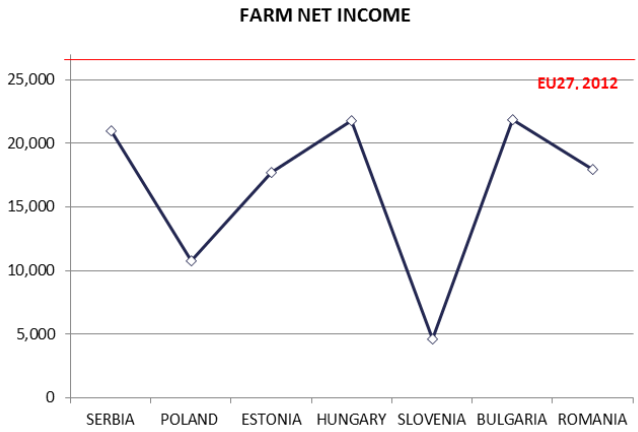


Figure 7:9 **Farm net income, specialised farms for field crops, 2013 (EUR)**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.7), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU Farm Economics Overview (2015, p.13, 24)

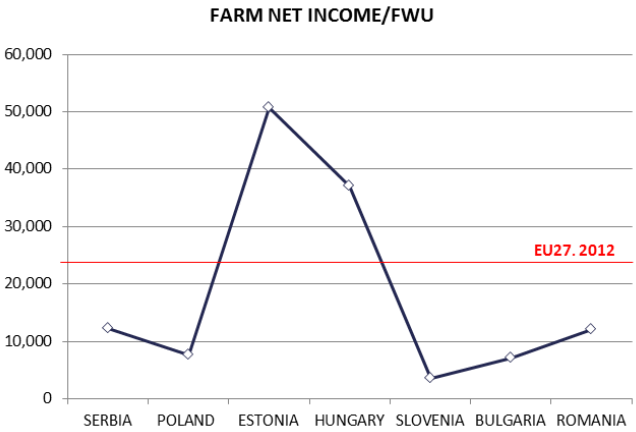


Figure 7:10 **Farm net income/FWU, specialised farms for field crops, 2013 (EUR)**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.5, 7), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU farm economics update 2012 (2014, p.2)

In Bulgaria, which is the country having the highest FNVA, in comparison with other observed countries, rental costs and debt servicing costs were so high that agricultural holdings with a top FNVA rank, performed in the rank of Hungary and Serbia in terms of farm net income (FNI). On the other side, Hungarian and Serbian agricultural holdings did not experience anything like this and, and were at the top of the FNI ranking.

FARM NET INCOME (FNI) = FNVA + INVESTMENT (SUBSIDIES - TAXES) - EXTERNAL FACTORS

Obtained results of FNI of agricultural holdings in the observed countries including the Republic of Serbia were below the EU27 average.

In addition, because of the low indicator of unpaid labour, Estonia and Hungary are only country with higher value of Farm net income/FWU than EU27 average.

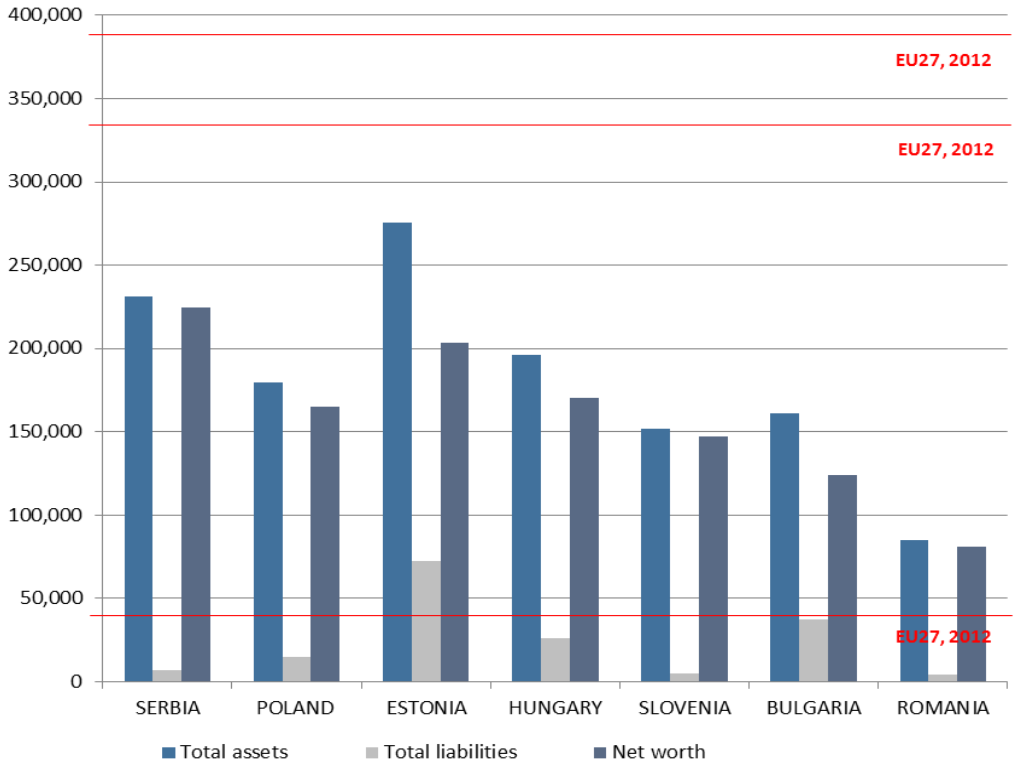


Figure 7:11 **Total assets, total liabilities, net worth, specialised farms for field crops, 2013 (EUR)**
Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.6), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU Farm Economics Overview (2015, p.34-36)

The average total asset value in observed countries in 2013 was the highest in Estonia (around 271 thousand EUR), reflecting relatively high land prices in this observation, but this value is still much lower than the average total assets on specialised farms for field crops in EU27 in 2012. In contrast, agricultural holdings in Romania had the lowest total asset values (around 85 thousand EUR) due to low land prices, small farm sizes and less capital-intensive types of farming. In the EU27, average liabilities per agricultural holding specialised for field crops was approximately 46 thousand EUR. Estonian agricultural holdings had, on average, the highest total liabilities within the observed countries, even highest than EU27 average. On the other side, total liabilities per agricultural holding remained low in other observed countries. In 2012, the average farm net worth stood at around 341 thousand EUR in the EU27 in 2012.

It is noteworthy that the average net worth per agricultural holding specialised for field crops was highest in the Republic of Serbia (above 224 thousand EUR). Romanian and Bulgarian agricultural holdings had the lowest values of this indicator.

7.3 Comparison of the major FADN indicators of specialised farms for dairying

Table 7:3 **FADN indicators of specialised farms for dairying, 2013 (average per farm in EUR)**

FADN INDICATORS	SERBIA*	POLAND	ESTONIA	HUNGARY	SLOVENIA	BULGARIA	ROMANIA
Labour input - AWU	3.0	1.8	4.1	2.8	1.9	2.2	1.1
Unpaid labour input - FWU	2.6	1.8	2.7	1.4	1.9	1.7	1.0
Total output	51,062	35,288	270,047	123,517	51,983	20,425	7,836
Total output crops	19,458	5,537	72,076	31,706	14,660	4,251	2,752
Total output livestock	31,522	29,537	182,293	81,254	34,445	16,071	5,069
Intermediate consumption	34,882	20,142	202,596	101,548	39,054	14,192	3,531
Balance subs and taxes	7,489	6,288	39,665	36,524	11,553	4,700	898
Gross farm income	23,669	21,433	107,115	58,492	24,482	10,933	5,203
Farm net value added	19,789	15,648	78,860	48,208	12,004	9,208	4,327
Farm net income-Family Farm Income	15,987	14,873	30,659	20,493	11,354	6,473	3,988
Farm net value added/AWU	6,607	8,658	19,110	17,113	6,345	4,256	4,060
Farm Net Income/FWU	6,069	8,100	11,389	14,462	5,943	3,722	4,140
Total assets	183,598	214,319	515,975	288,949	296,664	44,255	26,899
Total liabilities	4,813	11,755	214,837	60,121	6,179	8,509	81
Net worth	178,785	202,564	301,138	228,828	290,485	35,746	26,818

*Average EUR exchange rate: RSD 113.136 in 2013

Source: Adopted from the Serbian FADN data for 2013 (Rakic M., 2014, s.14-16) and the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1)

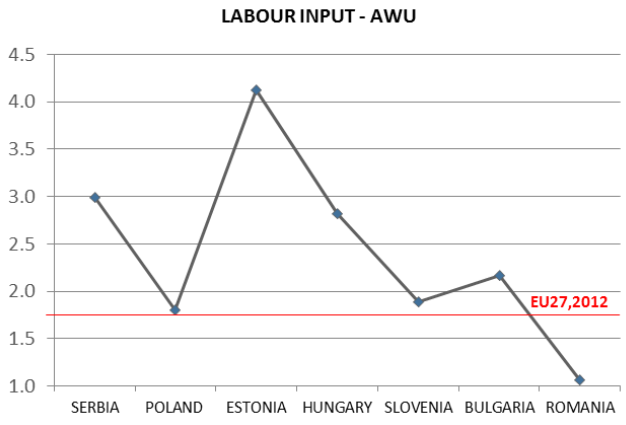


Figure 7:12 **Labour input - AWU, specialised farms for dairying, 2013**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.14), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU Farm Economics Overview (2015, p.42)

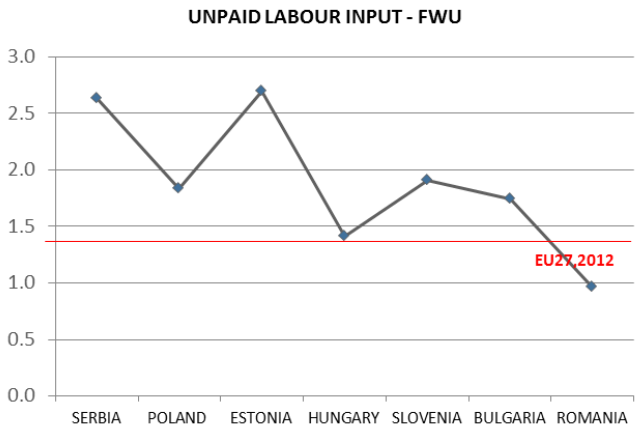


Figure 7:13 **Unpaid labour input - FWU, specialised farms for dairying, 2013**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.14), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU Farm Economics Overview (2015, p.44)

The average workforce on specialised farms for dairying in EU27 in 2012 (there are no data available for 2013) was 1.7 AWU. This indicator was only in Romania less than the average in EU27. It was around 1 AWU. On the other side, in all other observed countries, it was higher than the average in EU27. The highest average workforce was in Estonia 4.1 AWU. Serbia's AWU of 3 was first bellow of highest workforce in Estonia.

In addition, average unpaid (family) workforce on specialised farms for dairying in EU27 in 2012 was 1.4 FWU. There is no contrast in comparison with the story of AWU. It should be noted that Poland and Slovenia are countries that does not have paid labour force on specialised farms for dairing: its AWU is equal as its FWU (1.8 AWU and 1.9 AWU, respectively).

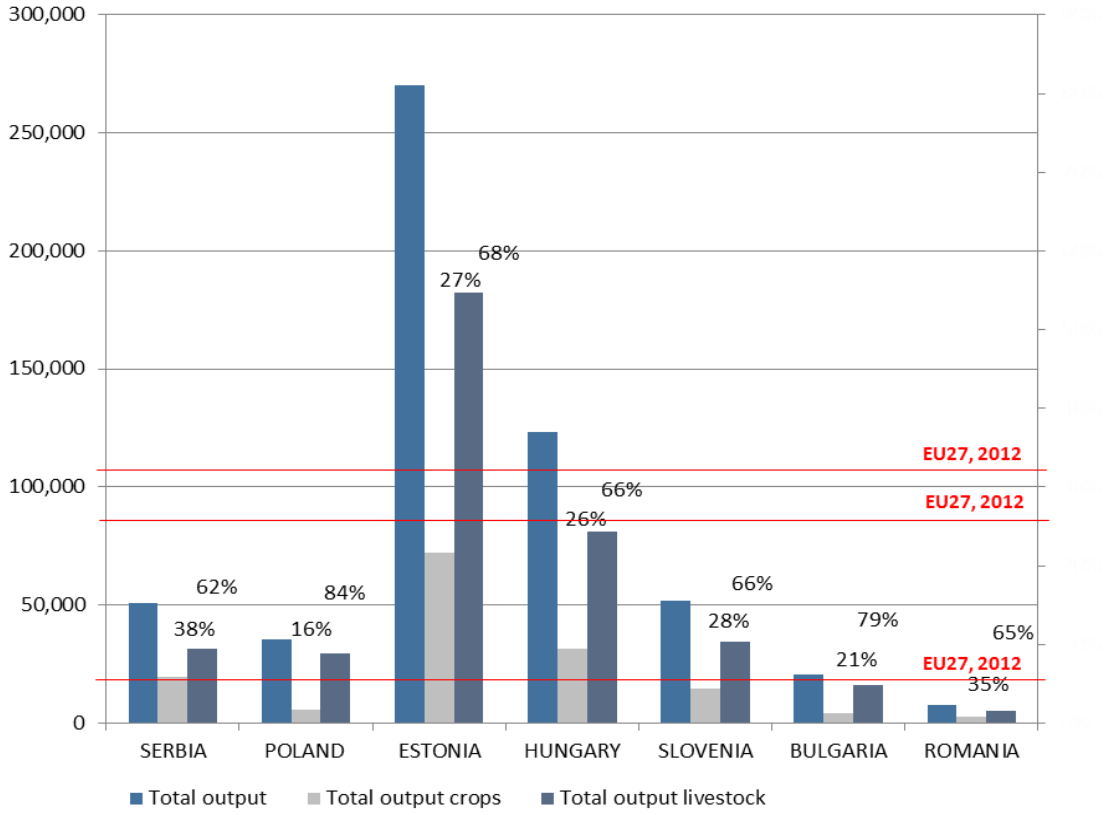


Figure 7:14 **Total output, specialised farms for dairing, 2013 (EUR)**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.16), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU Farm Economics Overview (2015, p.24)

Figure above indicates that around 27% of total output of holdings in observed countries including the Republic Serbia came from crop production and over the 70% from livestock production.

Estonia and Hungary are only countries with higher value of total output than average EU27 of this indicator. Estonia has also higher value of total output from livestock production than average EU27 of the same indicator.

In addition, Estonia and Hungary are countries with higher value of total output from crop production than average EU27 of the same indicator.

The Figure below indicates the value of the farm net value added indicator (FNVA). Average FNVA of EU27 specialised farms for dairing reached around 35 thousand EUR in 2012.

FNVA = OUTPUT + SUBSIDIES AND TAXES - INTERMEDIATE CONSUMPTION – DEPRECIATION
(This indicator depends on the size of the farms concerned)

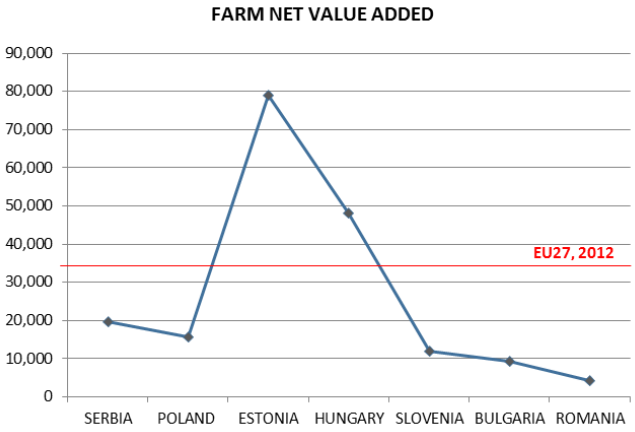


Figure 7:15 **Farm net value added, specialised farms for dairing, 2013 (EUR)**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.16), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and and EU Farm Economics Overview (2015, p.13)

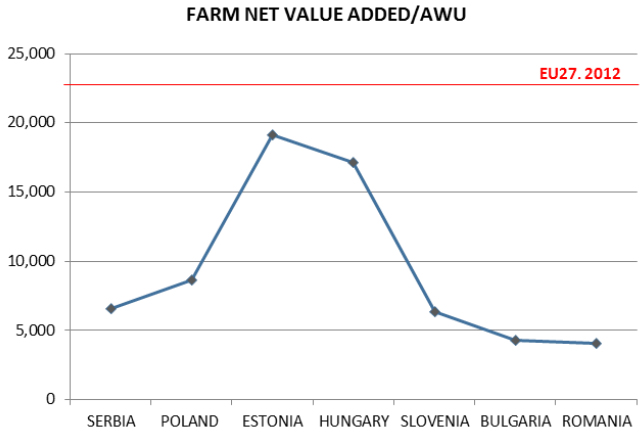


Figure 7:16 **Farm net value added/AWU, specialised farms for dairing, 2013 (EUR)**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.14, 16), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and and EU Farm Economics Overview (2015, p.14)

Estonia and Hungary are the only countries having higher FNVA than average EU27, as well as the highest in comparison with other observed countries (79 thousand EUR and 48 thousand EUR, respectively). Serbian FNVA is most similar to FNVA of Poland.

FNVA per AWU indicator is less dependent on the size of the farms concerned, and can thus be compared irrespective of agricultural holdings structures.

The average EU27 FNVA per AWU was 23 thousand EUR in 2012. Obtained results of FNVA/AWU of agricultural holdings in all observed countries including the Republic of Serbia were below the EU27 average. The highest value of FNVA/AWU had again Estonia (around 19 thousand EUR), than Hungary (around 17 thousand EUR). Romanian agricultural holdings had the lowest FNVA values, as well as FNVA/AWU.

FNI story is the same as for the FNVA. The Figures are pretty similar. In Estonia, agricultural holdings with a top FNVA rank again performed in the top rank in terms of farm net income (FNI). On the other side, Romanian agricultural holdings had the lowest FNI values.

FARM NET INCOME (FNI) = FNVA + INVESTMENT (SUBSIDIES - TAXES) - EXTERNAL FACTORS

Obtained results of FNI of agricultural holdings in the observed countries including the Republic of Serbia and excluding Estonia were below the EU27 FNI average.

In addition, because of the low indicator of unpaid labour, Hungary has the highest value of Farm net income/FWU.

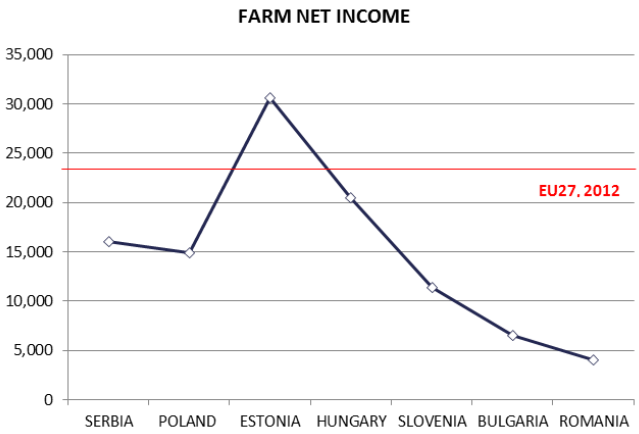


Figure 7:17 **Farm net income, specialised farms for dairing, 2013 (EUR)**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.16), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU Farm Economics Overview (2015, p.13, 24)

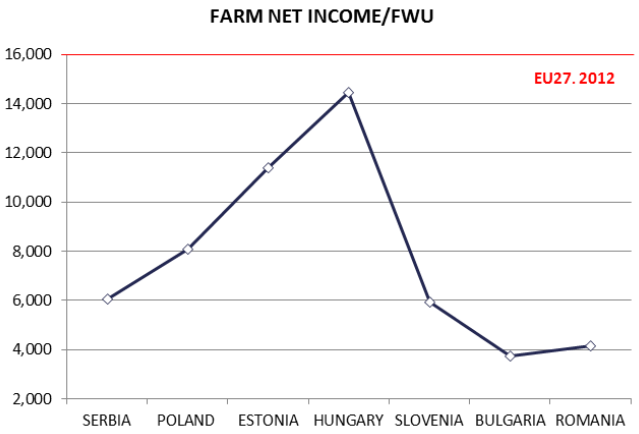


Figure 7:18 **Farm net income/FWU, specialised farms for dairing, 2013 (EUR)**

Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.14, 16), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU farm economics update 2012 (2014, p.2)

The average total asset value in observed countries in 2013 was the highest in Estonia (more than 515 thousand EUR). This value is even higher than the average total assets on specialised farms for dairing in EU27 in 2012. In contrast, agricultural holdings in Romania had the lowest total asset values (around 27 thousand EUR).

In the EU27, average liabilities per agricultural holding specialised for dairing was approximately 97 thousand EUR. Estonian agricultural holdings had, on average, the highest total liabilities within the observed countries. On the other side, total liabilities per agricultural holding remained low in other observed countries and also they are below the EU27 average.

In 2012, the average farm net worth stood at around 372 thousand EUR in the EU27 in 2012.

FARM NET WORTH = TOTAL ASSETS - TOTAL LIABILITIES

Estonian agricultural holdings again had, on average, the highest value of net worth within the observed countries. On the other side, value of net worth per agricultural holding remained low in other observed countries. Romanian and Bulgarian agricultural holdings had the lowest values of this indicator.

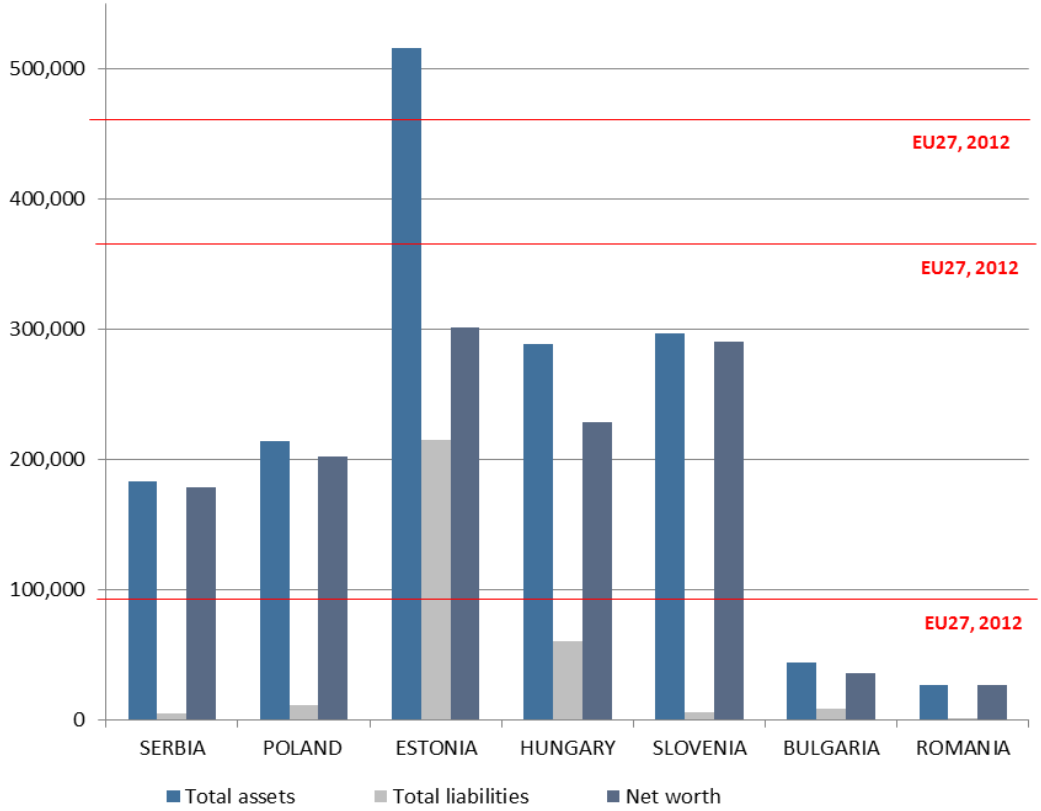


Figure 7:19 **Total assets, total liabilities, net worth, specialised farms for dairing, 2013 (EUR)**
Source: Author's own elaboration based on information from the Serbian FADN data for 2013 (Rakic M., 2014, s.15), the Fact sheets of Farm economy focus of Poland, Estonia, Hungary, Slovenia, Bulgaria and Romania (2015, p.1) and EU Farm Economics Overview (2015, p.34-36)

Chapter 8 Conclusions

8.1 SWOT analyses as a pre-conclusion

The following SWOT analysis is used as an analytical method for assessment, in view of highlighting some of matters, by clarifying what are the strengths, weaknesses, opportunities and threats of the FADN system implementation in the EU and in the Republic of Serbia, and trying to look forward to further improvements of future work.

NOTE:
Matters clarifying the strengths, weaknesses, opportunities and threats in the EU are recognized in the Republic of Serbia as well.

Table 8:1 **SWOT analyses of FADN system implementation**

STRENGTHS		WEAKNESSES	
EUROPEAN UNION	REPUBLIC OF SERBIA	EUROPEAN UNION	REPUBLIC OF SERBIA
– FADN is the only source of microeconomic data based on harmonised bookkeeping principles. – FADN system is well developed. – It is continually being upgraded. – FADN system is the systematic and high coverage of agricultural holdings in the sample. – Improved farm management.	– Existence of accounting system in agricultural sector. – Harmonisation between national and the EU definitions requirements. – Community typology in line with the EU. – Commitment of involved human resources. – Better communication and cooperation among involved human resources. – Direct contact and better communication and cooperation between agricultural holders and data collectors. – Expansion of data collectors. – Increased number of agricultural holdings. – Agricultural holders have better view of their own holdings situation by accessing detailed and exact data.	– FADN sample is not sufficiently representative of all environmentally relevant holdings. – Untimeliness of FADN data publication. – Constant updates and upgrades of FADN software at national as well as EU level.	– Current Serbian FADN organizational infrastructure is inconsistent and changeable. – Insufficient resources (appropriate equipment). – Farmers are still afraid of taxes. – A lack of defined control parameters in the Serbian FADN software. – Current FADN sample is not representative for the Republic of Serbia.

OPPORTUNITIES		THREATS	
EUROPEAN UNION	REPUBLIC OF SERBIA	EUROPEAN UNION	REPUBLIC OF SERBIA
– FADN is the only data source with EU wide comparable micro-economic data on agricultural holdings. – Powerful tool used for both micro and macro purposes.	– Fulfilling the EU requirements. – Important resource for managerial and policy analyses. – Important resource for agricultural holders (feedback form). – Comparison with the agricultural holdings belonging to the identical economic size classes in the Republic of Serbia as well as with the EU Member States. – Strengthening FADN through promotion. – Established FADN system can be used as a basis for other research projects. – The FADN data can be used for the annual reports, and evaluations.	– Too frequent FADN legislation changes. – The rotation of agricultural holdings in the sample.	– Too frequent policy changes. – Lack of motivation of agricultural holders. – Financial resources. – FADN is not among major priorities in the Ministry of Agriculture. – End of FADN in Serbia.

8.1.1 Strengths

8.1.1.1 Strengths of the EU FADN system

FADN is the only source of microeconomic data based on harmonised bookkeeping principles (the bookkeeping principles are the same in all Member States) and is demonstrated by the commercial agricultural holdings in the European Union. Therefore, it is the only data source with EU wide comparable micro-economic data on agricultural holdings.

FADN is already well developed, and is continually being upgraded, therefore presents a good opportunity for combination of different as well as new indicators on farm-level.

Nevertheless, one of the main strengths of the FADN system is the systematic and high coverage of agricultural holdings in the sample. The annual sample covers in 2012 approximately 83.000 holdings. They represent a population of about 5,000,000 commercial agricultural holdings in the EU, which covers approximately 90% of the total utilised agricultural area (UAA) and account for about 90% of the total agricultural production.

It is generally believed that accounting can improve farm management and lead to better farm performance. Practical work with agricultural holdings belonging to the FADN system found that holders who used a record system over time improved their ability to use the kind of information the system produced. Thus, FADN is a good supplement for farm management.

8.1.1.2 Strengths of the Serbian FADN system

Before FADN establishment Serbia did not have farm accounting legal base, as well as similar system like this. The importance of existence of such accounting system in agricultural sector is justified by the fact that the role of micro-economic information is substantial in both on-farm and agricultural policy decision making processes.

One of the strengths for the Serbian FADN system is harmonization between national and EU definitions requirements. In order to collect and compare data from multiple sources it is important to emphasize the significance of definitions harmonization, including basic definitions like the agricultural holding definition.

Implemented Community typology (type of farming and economic size) in the Republic of Serbia, which allows a common classification of holdings and therefore constitutes the basis for FADN data extrapolation, is in line with the EU requirements.

Commitment of involved human resources at the national, regional, as well as local level could potentially become valuable results for the FADN organization-current organizational infrastructure. A lot of human resources practices such as trainings, workshops, study visits, especially those obtained during the life cycle of the Project “Establishment of Serbian FADN”, provides powerful devices for enhancing FADN human resources engagement.

Group meetings such as trainings, workshop, etc. provide an opportunity for participants to practice effective communication and later on cooperation in order to help and support each other in the FADN system.

Based on the fact that reliable data can be collected only with intensive contact between the collectors and the holders, one of the strengths of the FADN system is that it causes the direct contact between agricultural holders and data collectors and thus enables better communication and cooperation among them.

Expansion of data collectors: currently 100 out of 257. There are minimum 3 data collectors per Agricultural Extension Service. This huge number of data collectors ensures accurate and appropriate data collection since each of them has, for example in 2014, 10 agricultural holdings per year. Moreover, plus 94 data collectors are in the process to be trained for FADN in order to stay in level of 10 agricultural holdings per data collector, as well as in order to ensure accurate and appropriate data for FADN sample of around 2,000 agricultural holdings.

Past experience and expected results lead up to increased number of agricultural holdings. During the four-year period the number of agricultural holdings in the Serbian FADN system is significantly increased from 41 when Serbia started a pilot project to introduce the FADN. Number of participating agricultural holdings grew and in 2015 totaled around 1,000, which exceeds the half of minimum number of agricultural holdings in the sample. It is expected to have 2,000 farms in the moment of EU integration.

It is certain that agricultural holders have better view of their own holdings situation by accessing detailed and exact FADN data. The data enable them firstly to understand and then to monitor the income situation of holding.

8.1.2 Weaknesses

8.1.2.1 Weaknesses of the EU FADN system

FADN is completely based on economics and includes only commercial holdings that counts around 40-50 % of FSS agricultural holdings. Therefore, the FADN sample is not sufficiently representative of all environmentally relevant agricultural holdings as it eliminates non-commercial holdings, especially those located in High Nature Value farming areas in the whole EU.

The weakness of FADN system is the untimeliness of data publication. FADN data is usually collected only once a year and published with some delay of 2 years. Such data are therefore mainly relevant for research rather than for immediate policy decisions.

With regard to the FADN software, there is a need to be constantly upgraded and updated in order to be able to process data with the latest versions of EU Regulations.

8.1.2.2 Weaknesses of the Serbian FADN system

Current Serbian FADN organizational infrastructure is inconsistent and changeable in the context of changeable competence of institutions involved in system or their replacement by new institutions as provided by Serbian FADN legal acts that are already prepared, but not adopted.

FADN system functions are not appropriately supported due to insufficient quality of equipment such as the personal computers and/or field cars. They are too old to support the system.

Agricultural holders are still afraid of taxes and as a result they hesitate to disclose information.

One of the weaknesses is a lack of defined control parameters in the Serbian FADN software.

It is obvious weakness that current FADN sample is not representative for the Republic of Serbia. Until the EU integration the number of holdings in the sample should be doubled.

8.1.3 Opportunities

8.1.3.1 Opportunities of the EU FADN system

A huge opportunity is that the FADN is the only data source with EU wide comparable micro-economic data on agricultural holdings.

Furthermore, FADN is a powerful tool used for both micro and macro purposes satisfying agricultural holders' accountancy needs for better farm management as well as satisfying public sector needs for policy evaluation and design.

8.1.3.2 Opportunities of the Serbian FADN system

Established FADN system means that the Republic of Serbia is fulfilled one of the many EU requirements, which is the yearly transmission of the accountancy data that are important for the annual determination of the incomes of agricultural holdings and analysis of their business operation.

It is a huge opportunity that FADN data can be used as important resource for managerial and political analyses. Agricultural policy makers and leaders have more and better micro-economic information. FADN results make a significant contribution to clarifying, calculating, as well as predicting agricultural holdings benefits.

Agricultural holders belonging to the FADN system learned by themselves that FADN system is important resource through which they can improve their farm management. Thus, FADN standard results presented through the FADN Feedback form is a necessary precondition to generate useful information for decision making. Through this individual Feedback form data collectors evaluate the financial performance of the agricultural holding.

This system enables comparison with the agricultural holdings belonging to the identical economic size classes in the Republic of Serbia as well as with the EU Member States. Additionally, whole Serbian agricultural sector has the opportunity to be comparable on micro-economic level with other EU Member States in terms of FADN results since the FADN is the only data source with EU wide comparable micro-economic data on agricultural holdings.

Strengthening FADN through promotion is a huge opportunity for system to be improved and superior. Promotion of Serbian FADN system has been made in the different media such as television, radio and newspaper. Additional promotional activities have been made for agricultural holders at the Agricultural Fair in Novi Sad.

Established FADN system can be used as a basis for other research projects. An advantage of the FADN use in research projects is the availability of a set of standard results indicators on agricultural holdings organization, characteristics of the farm management and the financial performance of the holding.

One of the opportunities is that the FADN enables data for the annual reports and evaluation surveys or scientific research.

8.1.4 Threats

8.1.4.1 Threats of the EU FADN system

Too frequent FADN legislation changes lead to difficult management of the whole system. It is the most problematic to monitor changes in FADN software, which is based on EU FADN legislation, at EU level, and even more at national levels.

The rotation of agricultural holdings in the sample could lead to a discontinuity in observations. The sample design uses a rotating panel technique, which provides that a part of the FADN sample is periodically updated. Holdings are replaced in the sample every 4-5 years, with annual renewal of 20-25% of the sample units, by similar holdings in terms of some characteristics such as position, economic size classes, and type of farming. However, these holdings may have different efficiency and productivity levels that are not directly observable, and thus the rotating nature of the FADN panel creates an unbalanced panel dataset.

8.1.4.2 Threats of the Serbian FADN system

Too frequent political changes, in describing Serbia's political scene, seem a quite naturally and often bring major changes. In terms of sustainability of the FADN system, it could be possible not to be accepted by the new Government structure since it is not among the main priorities in the agricultural sector.

For agricultural holders who are not interested in the FADN system, limiting factors are recognized as the lack of motivation.

Financial resources might present the threat. The Ministry of Agriculture has envisaged sum for the future FADN system implementation throughout the Financial Plan, which should be adopted by the Parliament, but having in mind that the FADN is not priority in the Ministry of Agriculture, it seems that there might be a financial gap between the period of time after the Project "Establishment of the Serbian Farm Accountancy Data Network" finalization and the integration to EU.

Even the FADN is one of the requirements for the EU accession, it is not among major priorities in the Ministry of Agriculture since it faces a lot of more crucial issues such as strengthening of administration in charge of accreditation of Paying Agency for Agriculture, etc.

The biggest threat is "end of FADN in Serbia". After Project "Establishment of the Serbian Farm Accountancy Data Network (FADN)" finalization, and in terms of avoiding a fiasco of the FADN system, it has been foreseen that the FADN will be given to the new institution: Institute for Agricultural Economy. The reasons could be understandable. The Republic of Serbia is a beautiful and modern country in transition, where the agricultural sector has extremely strong economic impact. On the other hand, the Republic of Serbia has a lot of political and financial obstacles, where the FADN is just a little part among them.

8.2 Recommendations

It has to be noted that the FADN system is an annual survey and it is carried out on a continual basis. Once the FADN starts, plans should be put in place to make sure the system continuation. Any disruption of the operations during the FADN system implementation is unacceptable as the direct contact has been established with a network of agricultural holders who have agreed to cooperate and provide the information on the voluntary basis. System interruption would compromise the cohesion of the FADN network and it would be expected that the whole operations

would have to start once more at the beginning. In that order the following recommendations are given:

- Recommendations about the Serbian Liaison Agency
- Recommendations about the Serbian FADN Regions
- Recommendations about the motivation of agricultural holders

8.2.1 Recommendations about the Serbian Liaison Agency

In order to assure the sustainability of the Serbian FADN organizational infrastructure, it is important, that the Ministry of Agriculture, which is appointed as the Liaison agency, continues with the efforts on strengthening this organizational infrastructure, to adopt the Serbian FADN legal bases, to continue the management of data collection, validation and processing, as well as to ensure national data use.

This includes:

- Continuation of the regular meetings of the National Committee.
- Strengthen the FADN coordination group at the Ministry of Agriculture as well as the regional coordination bodies.
- Continue the activities of the established regional coordination bodies and local accountancy offices (PSAWEF, IPN, and Agricultural Extension Services).
- Continue training activities for staff at all levels in the Serbian FADN organizational infrastructure.
- Adopt the FADN legal/sub-legal acts (Rulebook, 5 year National Plan, and supporting documents).
- Implement the selection plan.
- Collect data from the FADN participating agricultural holdings.
- Enter the collected data into the FADN software.
- Validate data.
- Upload data to RICA-1.
- Use the FADN data at farm and national level, which includes preparation of Feedback form for agricultural holdings, as well as elaboration of special analysis for decision makers at the Ministry of Agriculture.
- Use FADN data for research at the Agricultural Faculties and Research Institutions.
- Participate in international networks for FADN, with the main focus on the Pacioli network.
- Assure the funding of these activities as well as continue the work on exchanging experience with Liaison Agencies in EU Member States.

8.2.2 Recommendations about the Serbian FADN Regions

According to Regions it is hard to say that it was bed decision, bat for the authors point of view it would be better to have one Region as the majority of Member States have. It could be better to have one region as Serbia Region for the purpose of EU requirements, as well as to have 2 regions for the purposes of national-State level requirements.

8.2.3 Recommendations about the motivation of agricultural holders

Based on the experience of other EU Member States it could be certainly said that the payment to the agricultural holders will only motivate the small holdings to participate in the FADN system.

Due to the lack of resources, in the Republic of Serbia it was decided not to pay the agricultural holders for their participation in the FADN sample. In order to avoid agricultural holders' indifference of participation, the following could be taken into consideration:

- Agricultural holders should be invited for a conference with participation of national level officials and the staff at regional level in order to learn more about the importance of FADN.
- Letter of Acknowledgement should be delivered to each agricultural holder.
- The benefits of the FADN for farm management should also be explained in detail.
- Small motivational items (pens, calendars) should be distributed on these occasions.

During the forthcoming implementation of the FADN system in the Republic of Serbia, the following fundamental recommendations should be taken into consideration in order to achieve proper motivation of agricultural holders:

- Agricultural holders should have a certain level of knowledge that contribute to the FADN system implementation.
- Agricultural holders should understand their direct benefits by having FADN Feedback form, which is exceptional for farm management.
- Feedback form based on the data collected in a previous year should be given to the agricultural holders during the current year.

It is also important to use holder-to-holder motivation in terms that agricultural holders also need to be interested in giving their recommendations.

Motivational meetings obtained by the local level institutions belonging to the FADN organizational infrastructure should be planned at least once a year for all participating agricultural holders. The best period of time for these meetings is late winter, or in the period from January to mid-March, when agricultural holders do not have a lot of field activities.

It is of great importance that such meetings are combined with subsidy presentations obtained by the Ministry of Agriculture, as the participating agricultural holders will get the feeling that they are getting additional benefits over other holders who are not in the FADN system.

Finally, during these meetings it is significant to emphasize that the information collected will be retained private and will not be used for any tax purposes. Agricultural holders need to get additional assurance from the Ministry of Agriculture about this issue as they may still be afraid of some taxes and therefore provide inaccurate data. It must be explained that data analysis will only be possible at an aggregate level of at least 5 agricultural holdings and only be used for FADN purposes according to the EU FADN legislation.

8.3 Discussion

This deliverable is an earliest attempt to examine the usefulness and suitableness of the FADN system implementation in the Republic of Serbia, thus, there have been no similar literature in this particular field.

Taking into consideration the aforementioned, as well as the fact that the source of research ideas is the personal experience in this field, a review of this deliverable findings cannot be set into the context of the literature.

8.4 Final conclusion

The final conclusion can be summarized in the following points:

- It is used unique replicable European Union (EU) methodology that has been applied and adjusted in accordance with national conditions in the Republic of Serbia. In other words, the Serbian FADN system fits to the EU FADN methodology requirements.
- It is of great importance that the Rulebook on FADN as well as 5-year National plan should be undoubtedly adopted at the earliest opportunity since they are the specific sub-legal acts that prescribes the functioning of the whole FADN system in the Republic of Serbia.
- In the Republic of Serbia, the Ministry of Agriculture is appointed to be the Liaison Agency – competent authority for the data transmission to the European Commission as this entities is appointed in the majority of EU Member States.
- Current Serbian FADN organizational infrastructure is inconsistent and changeable.
- Serbian FADN data confidentiality is ensured by written declaration stating the obligations of keeping all information on individual holdings confidential.
- In the Republic of Serbia, the individual data are provided only in form of Feedback to the agricultural holders. This Feedback form is not compulsory within the EU FADN system, and it is considered as an integral part of good Serbian FADN practice for superior farm management.
- The success of Serbian FADN implementation depends a lot on the motivation of participating agricultural holders.

- Current number of agricultural holdings belonging to the FADN sample (in 2015 sample counts 1,200 holdings) is not representative since it has been planned that definitive sample for monitoring and recording the accountancy data on the holdings in the Republic of Serbia amounts around 2,000 agricultural holdings.

- The sample stratification according to three criteria: region, economic size and type of farming is ensured and meets the EU requirements. In this respect, it has been decided that the Republic of Serbia for FADN purposes has:

  – 2 FADN regions according to NUTS 1 regions: SERBIA - NORTH and SERBIA – SOUTH.
  – 10 Clusters of types of farming applied (plus Non-classified cluster).
  – 6 Clusters of economic size classes applied.

- The FADN sample for the accounting year 2013 counts 500 agricultural holdings while the number of FADN holdings delivering data is 497, which present the slight deviation of -0.6% in comparison with planned number under the FADN sample.

- Predominated types of farming in the FADN sample for 2013 are Specialist and general field crop-ping (119 agricultural holdings) and Specialist dairying types of farming (77 holdings). Although milk specialized holdings may not have appeared the most attractive in terms of income in 2013 in comparison with field crops in the Republic of Serbia, the author believes they were in a better situation than some other types of farming such as horticulture and/or other grazing livestock.

- The first Serbian FADN results were analysed by comparison with a few selected EU Member States (Poland, Estonia and neighboring countries Slovenia, Bulgaria, and Romania). The following observations are therefore extracted:

  – Serbian universe of holdings (631,552 according to the Agricultural Census 2012) has the biggest similarities with the Hungarian one (576,810 according to the Agricultural Census 2010).
  – Serbian number of farms of the field of observation (around 200,000 agricultural holdings) is the closest to Bulgarian one (more than 115,000 agricultural holdings).
  – The majority of observed countries including the Republic of Serbia have the threshold of 4,000 EUR of SO.
  – It could be said that Serbian FADN indicators in 2103 for specialized farms for field crops are the closest to the average value of indicators of the all observed countries, with the an exception for the balance subsidies and taxes per holding where this indicator reached the minimum value in the Republic of Serbia. Further, it is noteworthy that the average net worth per agricultural holding specialised for field crops was highest in the Republic of Serbia (above 224 thousand EUR) in comparison with the value of this indicator for all observed countries.
  – Some of values of Serbian FADN indicators (such as total output, intermediate consumption, gross farm income, FNVA/AWU, FNI/FWU and total liabilities) in 2103 for specialized farms

for dairying are the closest to the values of Slovenian indicators, other observed indicators are the closest to the values of Poland indicators.

- The successful implementation of this system in the Republic of Serbia as well as obtained FADN data are of great interest not only as precondition for the EU accession and future process of collaboration with the EU, but also for the purposes of both on-farm and agricultural policy decision making processes.

Consequently, implementation of FADN system in the Republic of Serbia provides a lot of benefits, but also on the other side, provides a lot of challenges and obstacles that should be overcome.

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Annexes

Annex 1 – Groups of indicators for standard result in EU

Income	
SE131	Total output-EURO
SE132	Total output / Total input
SE275	Total intermediate consumption-EURO
SE360	Depreciation-EURO
SE365	Total external factors-EURO
SE405	Balance subsidies & taxes on investments-EURO
SE410	Gross Farm Income-EURO
SE415	Farm Net Value Added-EURO
SE420	Farm Net Income-EURO
SE425	Farm Net Value Added / AWU-EURO
SE430	Farm Net Income / FWU-EURO
SE600	Balance current subsidies & taxes-EURO
SYS04	Exchange rate
Sample and population	
SYS02	Farms represented
SYS03	Sample farms
Structures	
SE005	Economic size-ESU
SE010	Total labour input-AWU
SE015	Unpaid labour input-FWU
SE020	Paid labour input-AWU
SE025	Total Utilised Agricultural Area-ha
SE030	Rented U.A.A.-ha
SE035	Cereals-ha
SE041	Other field crops-ha
SE046	Vegetables and flowers-ha
SE042	Energy crops-ha
SE050	Vineyards-ha
SE055	Orchards-ha
SE060	Olive groves-ha
SE065	Other permanent crops-ha
SE071	Forage crops-ha
SE072	Agricultural fallows-ha

SE073	Set aside-ha
SE080	Total livestock units-LU
SE085	Dairy cows-LU
SE090	Other cattle-LU
SE095	Sheep and goats-LU
SE100	Pigs-LU
SE105	Poultry-LU
SE110	Yield of wheat-100kg/ha
SE115	Yield of maize-100kg/ha
SE120	Stocking density-LU/ha
SE125	Milk yield-kg/cow
Production	
SE131	Total output-EURO
SE135	Total output crops & crop production-EURO
SE140	Cereals-EURO
SE132	Total output / Total input
SE145	Protein crops-EURO
SE146	Energy crops-EURO
SE150	Potatoes-EURO
SE155	Sugar beet-EURO
SE160	Oil-seed crops-EURO
SE165	Industrial crops-EURO
SE170	Vegetables & flowers-EURO
SE175	Fruit-EURO
SE136	Total crops output / ha-c.u.
SE180	Citrus fruit-EURO
SE185	Wine and grapes-EURO
SE190	Olives & olive oil-EURO
SE195	Forage crops-EURO
SE200	Other crop output-EURO
SE206	Total output livestock & livestock products-EURO
SE216	Cows' milk & milk products-EURO
SE220	Beef and veal-EURO
SE225	Pigmeat-EURO
SE230	Sheep and goats-EURO
SE235	Poultrymeat-EURO
SE240	Eggs-EURO
SE245	Ewes' and goats' milk-EURO
SE251	Other livestock & products-EURO
SE256	Other output-EURO
SE207	Total livestock output / LU-c.u.

SYS04	Exchange rate
Costs	
SE270	Total Inputs-EURO
SE275	Total intermediate consumption-EURO
SE281	Total specific costs-EURO
SE285	Seeds and plants-EURO
SE295	Fertilisers-EURO
SE300	Crop protection-EURO
SE305	Other crop specific costs-EURO
SE310	Feed for grazing livestock-EURO
SE320	Feed for pigs & poultry-EURO
SE330	Other livestock specific costs-EURO
SE331	Forestry specific costs-EURO
SE336	Total farming overheads-EURO
SE340	Machinery & building current costs-EURO
SE345	Energy-EURO
SE284	Specific crop costs / ha-c.u.
SE350	Contract work-EURO
SE356	Other direct inputs-EURO
SE360	Depreciation-EURO
SE365	Total external factors-EURO
SE370	Wages paid-EURO
SE375	Rent paid-EURO
SE380	Interest paid-EURO
SE309	Specific livestock output / LU-c.u.
SYS04	Exchange rate
Subsidies	
SE605	Total subsidies - excluding on investments-EURO
SE610	Total subsidies on crops-EURO
SE611	Compensatory payments/area payments-EURO
SE612	Set aside premiums-EURO
SE613	Other crops subsidies-EURO
SE615	Total subsidies on livestock-EURO
SE616	Subsidies dairying-EURO
SE617	Subsidies other cattle-EURO
SE618	Subsidies sheep & goats-EURO
SE623	Other rural development payments-EURO
SE625	Subsidies on intermediate consumption-EURO
SE626	Subsidies on external factors-EURO
SE630	Decoupled payments-EURO
SE631	Single Farm payment-EURO

SE632	Single Area payment -EURO
SE640	Additional aid -EURO
SE650	Support_Art68-EURO
SE699	Other subsidies-EURO
SYS04	Exchange rate
Balances subsidies and taxes	
SE390	Taxes-EURO
SE395	VAT balance excluding on investments-EURO
SE405	Balance subsidies & taxes on investments-EURO
SE406	Subsidies on investments-EURO
SE407	Payments to dairy outgoers-EURO
SE408	VAT on investments-EURO
SE600	Balance current subsidies & taxes-EURO
SE605	Total subsidies - excluding on investments-EURO
SYS04	Exchange rate
Balance sheet	
SE436	Total assets-EURO
SE441	Total fixed assets-EURO
SE446	Land, permanent crops & quotas-EURO
SE450	Buildings-EURO
SE455	Machinery-EURO
SE460	Breeding livestock-EURO
SE465	Total current assets-EURO
SE470	Non-breeding livestock-EURO
SE475	Stock of agricultural products-EURO
SE480	Other circulating capital-EURO
SE485	Total liabilities-EURO
SE490	Long & medium-term loans-EURO
SE495	Short-term loans-EURO
SYS04	Exchange rate
Financial situation	
SE501	Net worth-EURO
SE506	Change in net worth-EURO
SE510	Average farm capital-EURO
SE516	Gross Investment-EURO
SE521	Net Investment-EURO
SE526	Cash Flow (1)-EURO
SE530	Cash Flow (2)-EURO
SE532	Cash flow / farm total capital
SYS04	Exchange rate

Source: Adopted from Agriculture – FADN: http://ec.europa.eu/agriculture/rica/definitions_en.cfm#8978. (accessed 22 December 2015)

Annex 2 - Groups of indicators for standard result used in Serbian FADN

Groups of indicators for standard result	
1. Sample and population	
SYS 02	**Farms represented** Number of holdings in the field of survey of the FADN, which exceed the threshold of the minimum economic size.
SYS 03	**Sample farms** Number of holdings in the sample for the accounting year.
2. Structure and yields	
SE 010	**Total labour input - AWU** Total labour input of holding expressed in annual work units (AWU) = full-time person equivalents. One AWU corresponds to the work performed by one person who is occupied on an agricultural holding on a full-time basis. One AWU is fixed at 1800 working hours (equivalent to 225 working days of 8 hours each) in Serbia.
SE 015	**Unpaid labour input - AWU** Unpaid labour input (refers generally to family labour) of holding expressed in annual work units (See also SE 010)
SE 020	**Paid labour input - AWU** Paid labour input of holding expressed in annual work units (See also SE 010)
SE 025	**Total utilised agricultural area - ha** Total area of utilized agricultural land (arable land, grassland and permanent pasture, permanent crops). The figure is informed by the farmer and recorded as the sum of all utilized agricultural land, regardless if it is owned or rented, used for own agricultural production during the accounting year.
SE 030	**Rented utilised agricultural area - ha** Utilised agricultural areas rented by the holder under a tenancy agreement for a period of at least one year (remuneration in cash or in kind).
SE 035	**Cereals - ha** Common wheat and spelt, durum wheat, rye, barley, oats, summer cereal mixes, grain maize, other cereals.
SE 041	**Other field crops - ha** Dry pulses, potatoes, sugar beet, herbaceous oil seed and fibre crops including seed (excluding cotton), hops, tobacco, other industrial crops (including cotton and sugar cane).
SE 046	**Vegetables and flowers - ha** Fresh vegetables, melons, strawberries, flowers and ornamental plants (grown in the open or under shelter). Basic area is taken into account (not cropped area) even if it is used successively during one and the same farm year.
SE 054	**Permanent crops - ha** Fruit and berry orchards (including tropical fruit), citrus fruit orchards, olive groves, nurseries and other permanent crops (osier, rushes, bamboos). Including young plantations and permanent crops grown under shelter. Vines are not included.
SE 071	**Forage crops - ha** Fodder roots and brassicas, other fodder plants, temporary grass, meadows and permanent pastures, rough grazing.
SE 080	**Total livestock units - LU** Number of equidae, cattle, sheep, goats, pigs and poultry present on holding (annual average), con-verted into livestock units. One head of livestock = the presence of one animal on the holding for one year. Animals present for less than one year are assigned the relevant fraction of a head. The average number is determined either by means of periodical inventories or by the recording of arrivals and departures. The animals raised or fattened under contract are included for the period of the year dur-ing which they are present on the holding.
SE 085	**Dairy cows - LU** Female bovine animals (including female buffaloes) which have calved and are held principally for milk production for human consumption.

SE 090	**Other cattle - LU** All other cattle.
SE 095	**Sheep and goats - LU** Goats, other goats, ewes and other sheep.
SE 100	**Pigs - LU** Piglets, breeding sows, pigs for fattening, other pigs.
SE 105	**Poultry - LU** Table chickens, laying hens and other poultry.
SE 110	**Yield of wheat - 100 kg/ha** Production of common wheat and spelt in quintals (100 kilogrammes) per hectare.
SE 115	**Yield of maize - 100 kg/ha** Production of common maize in quintals (100 kilogrammes) per hectare.
SE 125	**Milk yield - kg/cow** Average production of milk per dairy cow. Production includes farmhouse consumption and farm use.
3. Production	
SE 131	**Total output - dinars** Total of output of crops and crop products, livestock and livestock products and of other output.
SE 135	**Total output crops & crop production - dinars** Total value of crop production (calculated as the market value of the total yield, regardless if it is sold, stored at the farm, or used for house or farm consumption).
SE 206	**Total output livestock & livestock products - dinars** Total value of livestock production (calculated as the market value of the total production of livestock, including the value of increase in weight and number of animals caused by rearing animals, and the value of livestock products, such as milk, wool, eggs etc. All production is included in the calculation of the output regardless if the animals and products are sold, kept or in storage by the end of the year, or used for house consumption).
SE 256	**Other output - dinars** Other output from the agricultural business as for example forestry products, contract work for others, rural tourism.
4. Costs	
SE 270	**Total Inputs - dinars** Costs linked to the agricultural activity of the holder and related to the output of the accounting year. Included are amounts relating to inputs produced on the holding (farm use) = seeds and seedlings and feed for grazing stock and granivores, but not manure.
SE 275	**Total intermediate consumption - dinars** Total specific costs (including inputs produced on the holding) and overheads arising from production in the accounting year = SE 281 + SE 336.
SE 281	**Total specific costs - dinars** All expenditures related directly to a particular type of production, such as seeds, crop protection products and fertilizers for the crop production, or feeding stuffs for livestock, detergents used for cleaning livestock equipment etc. Those costs are sometimes gathered with other definitions: variable costs, direct costs etc.
SE 336	**Total farming overheads - dinars** Costs that cannot be allocated to a specific production and therefore are considered as common for a number of farm production lines. Includes also supply costs linked to production activity but not linked to specific lines of production. Costs such as maintenance of machinery and buildings, contract work, rent of machinery and buildings, costs of energy, telephone charges, water charges, insurances etc. These refer only to expenditures for the farming activities, not for private purposes. The overheads are sometimes gathered with other definitions: fixed costs, indirect costs etc.
SE 360	**Depreciation - dinars** Depreciation of capital assets over the accounting year.
SE 365	**Total external factors - dinars** The costs of labour hired and capital borrowed i.e. wages for employees (regardless if it is paid in cash or

	kind), rent for land and interest for credits related to the accountancy year. Formula is: SE 370 + SE 375 + SE 380.
SE 370	**Wages paid- dinars** Wages and social security charges (and insurance) of wage earners.
SE 375	**Rent paid - dinars** Rent paid for farm land and buildings and rental charges.
SE 380	**Interest paid - dinars** Interest and financial charges paid on loans obtained for the purchase of land, buildings, machinery and equipment, livestock, circulating capital, interest and financial charges on debts.
5. Subsidies	
SE 605	**Total subsidies (excluding on investment) - dinars** Subsidies (excluding on investments) on current operations linked to production.
SE 406	**Subsidies on investments - dinars** Total subsidies on investments received during accounting year.
6. Income	
SE 410	**Gross Farm Income - dinars** Total farm income, before payment of wages, rent and interest contributions and costs of deprecia-tion.
SE 415	**Farm Net Value Added - dinars** Farm net value added indicates the remuneration of all production factors (land, capital and labour), both owned by the farm and external. It equals total outputs (production value) plus public support (current subsidies minus taxes) minus both intermediate consumption (specific costs and farming overheads) and depreciation. Thus, it is an indicator of the economic performance of the farms from which wages, rents and interest still need to be paid and own factors remunerated. When expressed per annual work unit (AWU) it takes into account differences in the labour force to be remunerated per holding.
SE 420	**Family Farm Income - dinars** In individual farms, it represents the income left for the farmer and his family after all costs are covered.
7. Balance sheet	
SE 436	**Total assets - dinars** All assets the farm possesses, it is equal to: Total assets = total fixed assets + total current assets
SE 441	**Total fixed assets - dinars** Assets of significant value that are meant to be used for a number of years. Includes agricultural land and farm buildings, forest capital, buildings, machinery and equipment and breeding livestock i.e. value at clos-ing valuation of breeding heifers, dairy cows, other cows, breeding goats, ewes, breeding sows. Only assets in ownership are taken into account.
SE 465	**Total current assets - dinars** Total current assets are equal to: Total current assets = Non-breeding livestock + Stocks of agricultural products + Other circulating capital.
SE 485	**Total liabilities - dinars** Value at closing valuation of total of (long- and short-term) loans still to be paid.
8. Financial indicators	
SE 516	**Gross Investment in fixed assets - dinars** According to the methodology of FADN a gross investment means the value of purchased and pro-duced fixed assets decreased by the value of sold and handed over fixed assets free of charge in the accounting year plus the breeding livestock change of valuation.

Source: Adopted from the Serbian FADN data for 2013 (Rakic M., 2014, s.5-8, 14-17), RI/CC 882 Rev.9.2 - Definitions of variables used in FADN standard results, p.16-33 and Agriculture – FADN: http://ec.europa.eu/agriculture/rica/definitions_en.cfm#8978. (accessed 22 December 2015)

Annex 3 – FADN Liaison Agencies website addresses and logos

Country	Website	Logo
EU	http://ec.europa.eu/agriculture/rica/	
FRANCE		
GERMANY		
ITALY	http://www.rica.inea.it/public/it/index.php	
BELGIUM		
NETHERLAND		
LUXEMBOURG		
IRELAND		
UK		
DENMARK	http://www.dst.dk/da/Statistik/dokumentation/kvalitetsdeklarationer/regnskabsstatistik-for-landbrug.aspx	STATISTICS DENMARK Informationsnettet for Landøkonomisk Bogføring, INLB
GREECE		
PORTUGAL		
SPAIN		
AUSTRIA		
FINLAND		
SWEDEN		
CYPRUS	http://www.moa.gov.cy/moa/da/da.nsf/page66_en/pag66_en?OpenDocument	Δίκτυο Γεωργικής Λογιστικής Πληροφόρησης
CZECH REPUBLIC	http://www.vsbox.cz/fadn/	FADN CZ ZEMĚDĚLSKÁ ÚČETNÍ DATOVÁ SÍŤ KONTAKTNÍ PRACOVIŠTĚ FADN CZ
ESTONIA	http://www.maainfo.ee/index.php?page=7	MAAMAJANDUSE INFOKESKUS Põllumajandusliku raamatupidamise andmebaas
HUNGARY	https://www.aki.gov.hu/publikaciok/menu/a:305	AKI FADN Tesztüzemi rendszer (FADN)
LATVIA		
LITHUANIA		
MALTA		
POLAND	http://fadn.pl/	POLSKI FADN SYSTEM ZBIERANIA I WYKORZYSTYWANIA DANYCH RACHUNKOWYCH Z GOSPODARSTW ROLNYCH
SLOVAKIA		
SLOVENIA	http://www.kmetijskizavod-nm.si	Kmetijsko gozdarska zbornica Slovenije KMETIJSKO GOZDARSKI ZAVOD NOVO MESTO
BULGARIA	http://www.mzh.government.bg/MZH/bg/Short-Links/SelskaPolitika/Agrostatistics/Farm_accounting_information.aspx	СИСТЕМА ЗА ЗЕМЕДЕЛСКА СЧЕТОВОДНА ИНФОРМАЦИЯ
ROMANIA	http://www.maap.ro/ro/reteaua-de-informatii-contabile-agricole-rica.html	RICA
CROATIA	http://www.savjetodavna.hr	
SERBIA	http://www.fadn.rs/	FADN Србија

Source: Author's own elaboration