DEVELOPMENT OF FADN IN SERBIA, MONTENEGRO AND BOSNIA AND HERZEGOVINA (EU CANDIDATE COUNTRIES) AND THE TRANSITION TOWARDS FSDN

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ABSTRACT

All the candidate countries for the European Union accession are obliged to establish Farm Accountancy Data Network as a way of recording and analyzing farm activities, agricultural policy creation and monitoring. Observed countries (Serbia, Montenegro and Bosnia and Herzegovina) are in different phases of establishing that system. The goal of the research was to discuss level of development of Farm Accountancy Data Network in observed countries and readiness of transition to Farm Sustainability Data Network. To achieve that goal qualitative comparative analysis was used. The results indicated the highest level of development in Serbia, while Bosnia and Herzegovina is still at the beginning of the process. Farm Accountancy Data Network development in Montenegro could be estimated as medium. It was concluded that observed countries face certain challenges when it comes to transformation of existing system towards broader concept of sustainability. All the countries should work on capacity-building strategies, particularly in Montenegro and Bosnia and Herzegovina, to provide successful transition to system which is more sustainability-oriented.

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Introduction

The Farm Accountancy Data Network (FADN) is a key tool used in the European Union (EU) to collect, analyze, and report detailed economic data on agricultural holdings. FADN system started in the 1965 (Hill and Bradley, 2016). It was done "by Council Regulation 79/1965, which provided the original legal basis for the organization of the system" (Juračak and Očić, 2021). Acording to Marongiu and Casolani (2026) "FADN has been the basis for economic and accounting information, aiming at the analysis of the impacts of European agricultural policy interventions. The evolution of policies and the inclusion of environmental and social elements in the evaluation of global farm sustainability have led to the conversion of FADN into FSDN".

FADN provides essential information for policy development, monitoring of the Common Agricultural Policy (CAP), and assessing the economic performance and sustainability of farms across EU member states. By offering harmonized data on costs, revenues, and structural characteristics of farms, FADN supports evidence-based decision-making and facilitates cross-country comparisons. According to Pitulice and Gorgan (2013) FADN is "a data analysis tool designed to assess farm income and the impact of CAP". Neuenfeldt and Gocht (2014) stated that "FADN is the only source of micro-economic data that is harmonised using bookkeeping principles". According to Hill et al. (2016) "the benefit of FADN and national farm accounts surveys is dependent on the impact on decisions by users. If the data are unused or ignored, there is no benefit.

When it comes to individual farms involved in the sample, they do not have direct financial benefits, because participation in FADN and FSDN system is voluntarily. On the other hand there could be some additional reasons for farmers to be part of FADN/FSDN such as to obtain their individual financial reports and compare it with data of other farms having similar size and production type in the same region or other regions/countries (not only in Serbia, Montenegro or Bosnia and Herzegovina, but also in other European countries). Farms involved in FADN/FSDN are also able to perform temporal comparison of their individual business results, which enables farm managers to evaluate effects of their previous business decisions. Inclusion of additional indicators in FSDN system will provide farmers with better perspectives when it comes to social and ecological aspects, as well.

Discussing establishment of FADN in new member states (particularly Czech Republic, Estonia, Bulgaria and Croatia) Del'Homme and Aamisep (2009) mentioned some of key factors influencing FADN adoption such as strong organization and good managers (due to authors human resources are the key point for FADN). Authors also discussed the importance of time frame for establishing FADN – they indicated that it takes at least five years for FADN to become relevant.

Developing a functional FADN in candidate countries in the Western Balkans is a primary consideration for harmonizing with EU regulations, enhancing institutional development, and fostering competition in agriculture. At the same time, the FADN is not uniformly developed in these countries due to variations in the institutional, legal, and technical frameworks and statistical resources.

The purpose of this paper is to conduct a comparative study of the institutional development and the status of FADN in Serbia, Montenegro, and Bosnia and Herzegovina. Furthermore, the study examines the preparedness of these countries for the transition to the FSDN, which is a framework for incorporating sustainability metrics into agricultural accounting, thereby recognizing the significance of the environmental, social, and economic aspects of European agriculture. This research identifies the challenges, gaps, and emerging focal points in the region, enhancing the understanding of the regional dynamics of FADN development, as well as informing policy planning and the broader process of EU integration.

Methodology

This study uses qualitative comparative analysis by implementing a systematic cross-country comparison involving the institutional, legal, and technical dimensions of the FADN systems of the countries under study.

The focus of the analysis is the framework that identifies the critical parameters for the FADN evolution and the preparedness for the evolution towards the FSDN concerning institutional, legal, and technical infrastructure as well as human resource capacity and data availability.

Instead of employing an informal qualitative comparative analysis (QCA) methodology that uses calibration and truth tables, the authors prefer a structured qualitative comparative method that is most suitable for policy-related and cross-country oriented studies.

Data Collection

The study incorporates data from various reputable sources to ensure a diversified and triangulated approach:

- Official documents and national legislation: Relevant laws, regulations, and government strategies concerning agricultural data collection, rural development, and FADN governance were reviewed. These documents provided insights into the institutional frameworks, funding mechanisms, and organizational responsibilities for FADN implementation;
- European Commission documents: Progress reports, country analyses, and technical documents from the European Commission offered a regional and policy-level context for the status and evolution of FADN, especially concerning alignment with EU agricultural policies and readiness for transition to the FSDN;
- Scientific literature: Peer-reviewed articles, research reports, and case studies related to FADN methodology, institutional development, and agricultural data management in the Western Balkans enriched the analysis by presenting academic perspectives, methodological critiques, and empirical findings; and
- Statistical data: Where available, official statistical data from ministries of agriculture or statistical offices were incorporated to provide quantitative support for the assessment of FADN coverage, sample sizes, and data collection progress.

Comparative Analytical Approach

The institutional frameworks and legal bases were compared qualitatively across the three countries to identify commonalities, divergences, and gaps in the establishment and operation of FADN systems.

Statistical data were used descriptively to illustrate and summarize key indicators of FADN implementation, including the number of farms covered, sample size, regional distribution, and representativeness.

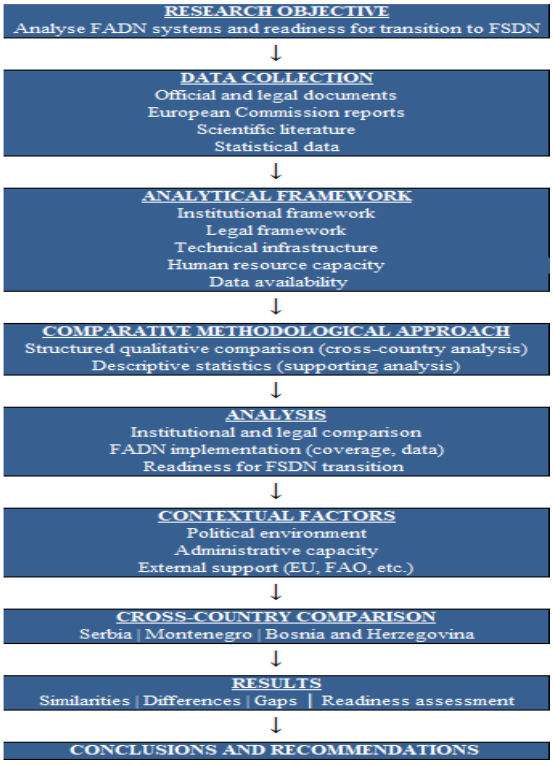
The study also evaluated the countries' preparedness for transition towards the FSDN by analyzing strategic plans, organizational readiness, and identified challenges within the institutional and legal frameworks.

Throughout the analysis, special attention was paid to contextual factors unique to each country, such as political environment, administrative capacities, and external support mechanisms (e.g., EU IPA projects, FAO assistance).

Research Design

Figure 1 illustrates the research design for this study. The figure outlines the steps for analyzing FADN in Serbia, Montenegro and Bosnia and Herzegovina and how information from different sources comes together for a comparative analysis.

Figure 1. Research design – comparative analysis of FADN and readiness for FSDN



As shown in Figure 1 the research process involves data collection, qualitative comparative analysis, and contextual assessment in a structured way. This visual summary helps make the research clear, repeatable and easy to compare across the three countries highlighting both the similarities and differences in FADN implementation and readiness for FSDN.

This approach works well for studies of countries that want to join the EU, where data is limited and requires a mix of comparative analysis methods making FADN and FSDN a good fit for this kind of research. The study focuses on FADN, in Serbia, Montenegro and Bosnia and Herzegovina to draw conclusions.

Certain limitations were faced during this research, primarily concerning data on FADN development in Bosnia and Herzegovina. The reason is division of the country in two entities which have separate FADN authorities and approaches. At the same time, not all data on FADN development are publically available (primarily considering results of certain pilot projects used for developing FADN system in Bosnia and Herzegovina).

The importance of this research is related to FADN system and its improved version (FSDN system), as a database for scientific exploration of various aspects of agricultural production (economic, social and ecological), but also database for broader scientific research (such as measurement of efficiency, discussion and analysis of farm resilience etc). Practical aspects are related to making better informed decisions on farm level as well as appropriate policy development and monitoring of its results in observed countries. The research provides the way for better understanding of processes and challenges related to establishment of FADN system in these countries (within EU integration process) as well as its transformation to FSDN (discussing broad range of topics such as appropriate legal framework, sampling structure, data collection and availability of obtained data etc).

FADN in Serbia

Establishment of FADN system in Serbia was initiated in 2011 with support of EU Instrument for Pre-accession Assistance (IPA) project covering period from 2011 to 2015 (FADN, 2026). According to the same source, in 2011 only 40 farms were involved in FADN, while in 2023 that number significantly increased to 1,825 farms. It could be noticed that there are two statistical regions in Serbian FADN – Serbia North (involving 547 farms in 2023 sample) and Serbia South with much bigger sample (1278 farms in 2023). FADN in Serbia is regulated by the Law on Agriculture and Rural Development (2021) which determines entities involved in FADN system, the way FADN activities are financed etc.

Although FADN data for Serbia covering year 2015 were published by the Ministry of Agriculture in the form of Farm Return and have been publically available (publication prepared by Stojanović et al., 2016) this practice did not continue in following years. One more research was partially related to FADN in Serbia, but it discussed only northern Serbian Province of Vojvodina (Vukoje et al., 2017) and was also based on the data for year 2015. After that, certain set of FADN data has been published every

year by the Ministry of agriculture (as one element of publication called "Report on the situation of agriculture in the Republic of Serbia (the "Green Book"). According to Serbian current legislation on FADN system (Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia, 2023) it is possible to have an access to more detailed FADN data with approval of appropriate Ministry which is in charge for this system.

Number of research has been published by authors from Serbia concerning FADN system and methodology. Analyzing establishment of Serbian FADN Ivkov et al. (2013) concluded that "FADN institutional frameworks in EU member states as well as institutional framework of Serbia as candidate country have been established on the same bases". Ivkov (2016) discussed various aspects of FADN and possibilities of its implementation in Serbian conditions (addressing issues such as organizational infrastructure, legislation problems, data collection, sample selection etc.). Various statistical aspects of Serbian FADN were analyzed by Janković Šoja (2016). It should be mentioned that Janković Šoja (2017) determined that economic size thresholds for commercial agricultural holdings in Serbia should be 2,000 EUR (which is lower than official threshold of 4,000 EUR). At the same time, Janković Šoja (2018) calculated appropriate size of FADN representative sample in Serbia (which is in total 2,000 farms), determining at the same time number of farms necessary for each farm type (and different economic sizes within farm types). Ivanović (2018) discussed some theoretical issues related to FADN in general, analyzed certain data available from Serbian FADN, as well as FADN data describing various types of livestock production in the EU countries. Marković et al. (2014) discussed FADN system in general and its particular features in Serbia, paying special attention to types of costs and determination of production value according to FADN methodology.

Ivanović et al. (2020b) used available FADN data to analyze productivity of Serbian milk producers, while Vukoje et al. (2022) also used FADN data to discuss factors influencing farm profitability. Miljatović et al. (2025) focused on Serbian FADN sample covering "seven-year period from 2015 to 2021" while concluding "that 54.38% of the observed farms in the Republic of Serbia are economically viable".

Researchers in Serbia also compared available Serbian data to EU FADN data in order to make certain conclusions. For example, Ivanović et al. (2020a) apply FADN data do compare investment activity of Serbian farms (of certain types) to some neighboring countries, concluding that "Serbian farms have significant level of gross and net investments". On the other hand, Ivanović et al. (2020c) compared other gainful activities in Serbian and EU farms (using FADN data) and determined that in Serbia "possibilities of agricultural holdings providing additional output through other gainful activities are not used sufficiently".

Besides, authors from Serbia analysed EU FADN data and based on the results suggested certain consequences and advises for Serbian conditions. Ivanović et al. (2023) used FADN data to discuss costs of buildings, machinery and equipment for

European farms. Based on the results, authors suggested direction of future research for Serbian conditions primarily *"*concerning importance of cereals, oilseeds and protein crops production for Serbian agriculture*"*. Investigating economic efficiency of extensive types of livestock production in the EU countries (based on FADN data) Nastić et al. (2017) concluded that sheep and goat producers in Serbia might be able to compete with "other types of livestock production in the future" while "farmers who plan to become involved in cattle production in Serbia (other than dairy production) have to be aware of the necessity to keep investments in this production at a very low level". Similar approach to compare sheep and goat production in Serbia and EU was used by Nastić and Potrebić (2015).

FADN in Montenegro

Establishment of FADN system in Montenegro started in 2016 and was implemented by support of the Food and Agriculture Organization (FAO) of the United Nations (FAO, 2022). At the moment, FADN system in Montenegro is regulated by the Law on Agriculture and Rural Development (Government of Montenegro, 2021), which determines subjects involved in data collection, financing of FADN system, as well as activities and responsibilities of national committee and coordination team. According to a report published by the World Bank (2020) it is necessary to develop data management platforms such as FADN (as well as Integrated Administration and Control System - IACS) to provide Montenegro institutional development and agricultural strengthening. In the Montenegro 2020 report prepared by the European Commission (Commission staff working document, 2020) it was stated that "preparations continued to develop a pilot for the FADN". Long term plans related to FADN (according to Government of Montenegro, Ministry of Agriculture, Forestry and Water Management, 2023) involve agricultural extension service in future data collection and consulting activities for farmers.

FADN system in Montenegro was developed by FAO project "Technical support for the establishment of the FADN system in Montenegro", which was completed in 2021 (European Commission, 2023a). In the same document it was stated: "The Ministry and FAO have developed completely new FADN software, by preparing the software specification with FAO experts, and developing the software with a Montenegrin IT company. During 2022, it was not possible to collect data, because a cyber attack disabled the state network, so the FADN application had to be reinstalled, which caused the loss of certain data.

There are currently 32 farms in the FADN system in Montenegro. These 32 farms were not selected in accordance with the Selection Plan, but representative farms were selected by advisers from advisory services". On the official web site of the Government of Montenegro, Ministry of Agriculture, Forestry and Water Management (2024) it is also stated that appropriate FADN software was implemented in 2021. In 2023 there were 40 farms included in the FADN system, while majority of the data were collected by employees of agricultural extension service. According to the same source, new FADN

sample (which is in line with the EU regulation) would be developed after new agricultural census (and consequently new farm typology and standard output coefficients, as well).

Nevertheless, preliminary results of agricultural census which was conducted in 2024 (MONSTAT, 2025) do not contain data on economic FADN indicators in Montenegro. According to Arias Navarro et al. (2024) the "efforts to further develop the FADN" in Montenegro "needs to continue". Having in mind that FADN data for Montenegro are not available yet, there is almost no research in this field. Only Joksimović (2021) theoretically discussed possibilities of applying FADN methodology in Montenegro for analysis of economic efficiency of milk processing at family farms. Processing of milk produced at farm is considered to be one of other gainful activities (OGA), so that author considered the way relevant costs and revenues are recorded. Author mentioned certain drawbacks of FADN methodology, as well (such as aggregation of data on the level of entire farm, without possibility to analyze economic performance of individual enterprises, including processing activities on the farm).

FADN in Bosnia and Herzegovina

The beginning of FADN establishment in Bosnia and Herzegovina in 2010 was supported by the EU project (Mrdalj and El Bilali, 2020). According to Falan (2021), process of establishing FADN system in Bosnia and Herzegovina started in 2010 through pilot research and continued in year 2012 within another project (devoted to agriculture and rural development). According to this author, activities on FADN were continued in 2013 in form of pilot research (in both entities). The research was continued in 2014 but only in one entity (Republic of Srpska). The same author stated that in 2012 an Action plan was provided concerning establishment and development of FADN (including state level as well as level of separate entities), questionnaires for data collection were improved and manual for FADN research was prepared.

To discuss possibilities of using FADN methodology on territory of Bosnia and Herzegovina Falan and Bogućanin (2021) used data (related to year 2011) from 143 farms. Authors concluded that FADN system could be successfully applied, but it requires long term approach (which should be organized and coordinated on the state level). Analysis of possibilities to establish FADN in Bosnia and Herzegovina was also performed by Falan (2016). Makaš et al. (2018) claimed that Bosnia and Herzegovina "does not have an Agricultural census as the basis for the establishment of the FADN system". According to Bosnia and Herzegovina report (European Commission, 2023b) the progress was not noticed when it comes to development of FADN system, as well as other important systems for Common Agricultural Policy (CAP) (such as Integrated administration and control system or Paying agency). Although fully functioning FADN system is a precondition for the EU integration process, Mujčinović (2022) also stated that FADN is still not developed in Bosnia and Herzegovina.

At the level of one entity of Bosnia and Herzegovina (Republic of Srpska) there is the proposal of Strategy for development of agriculture and rural areas (Government of

the Republic of Srpska, 2021) (covering period from 2021 to 2027). It states that there is necessity to establish FADN comity as permanent professional body. According to this document, FADN system is established as pilot, and should be developed and strengthened through development of procedures, software solutions, sample enlargement etc.

The other entity (Federation of Bosnia and Herzegovina) also has its Strategy for agriculture and rural development prepared by Federal Ministry of Agriculture, Water Management and Forestry (2022) which covers the same period (from 2021 to 2027). In this document FADN was not discussed in details, but it was mentioned as an element of agricultural information system. Certain concerns were also discussed, such as limited financing available for development of such systems, as well as certain political disagreements about this issue.

On the state level of Bosnia and Herzegovina there is the Ministry of Foreign Trade and Economic Relations which prepared (in 2024) an outline of Strategic plan of rural development of Bosnia and Herzegovina (covering period from 2023 to 2027). In this strategic plan it was discussed that FADN does not exist in Bosnia and Herzegovina, although appropriate questionnaires are occasionally conducted on the level of individual entities to acquire such data.

Comparison of FADN in observed countries and transformation to sustainability oriented system

The comparative overview presented in Table 1 indicates significant differences in the level of development of FADN among the observed countries.

Table 1. Comparative overview of the development of the FADN in Serbia, Montenegro and Bosnia and Herzegovina

Indicator	Serbia	Montenegro	Bosnia and Herzegovina
Beginning of FADN establishment	2011	2016	2010
Type of support	EU IPA support	FAO support	EU supported pilot projects
Legal framework	Law on Agriculture and Rural Development	Law on Agriculture and Rural Development	Fragmented legislation at entity level
Current number of farms in the system	1,825 farms (2023)	40 farms (2023)	Pilot samples only. 120 farms (2010) 184 farms (2012)
Sampling structure	Two statistical regions (Serbia North and Serbia South)	Temporary sample	Pilot research conducted periodically
Data collection	Organized national system	Mainly through agricultural advisory service	Limited and irregular

Indicator	Serbia	Montenegro	Bosnia and Herzegovina
Availability of FADN data	Partial public availability	Not publicly available	Not available
Level of system development	Fully operational	Early stage of development	Initial / pilot phase
Key challenges	Data accessibility, expansion of research use	Small sample size, institutional strengthening	Lack of coordination at state level
Number of research based on available FADN data	Medium	None	Low

Source: Authors' compilation based on official documents and national legislation, European Commission reports and country analyses, relevant scientific literature, and available statistical data.

Serbia has established a fully operational system with a relatively large sample of farms, while Montenegro is still in the early stage of development. In Bosnia and Herzegovina, FADN activities are still mainly limited to pilot projects and institutional fragmentation represents a major obstacle for further development.

The FSDN is an evolution of the traditional FADN, aiming to integrate economic, environmental, and social indicators. While FADN primarily focuses on the economic performance of farms, FSDN expands its scope to assess environmental and social practices. This transition reflects the EU increasing emphasis on sustainable agriculture, in line with the European Green Deal (European Commission, 2019). The transition of FADN to FSDN is planed within Farm to Fork Strategy (2020a, 2020b) which calls for improved monitoring of the environmental and social impacts of agricultural production. According to Kwasek and Kowalczyk (2022) "the European Union F2F Strategy has set extremely ambitious challenges in terms of climate and environment. To a major degree, they refer to the agriculture and food production systems". As Marongiu and Casolani (2026) concluded, transformation of FADN to FSDN "will support evidence-based policy decisions, contributing to the future EU benchmarking system and helping farmers in the adoption of more sustainable farming practices as required by the EU strategies". Tomaš Simin et al. (2025) discussed indicators of agricultural holdings sustainability concluding that "sustainability of farms can be measured using the FADN database, and future research will be focused on this direction, evaluating each dimension separately". According to Floriańczyk et al. (2025) future research related to FSDN should include "challenges and implications not only for the EU member countries, but also the candidate countries". Transformation of existing system towards FSDN (in the case of neighbouring country Croatia, which is the latest EU member) requires capacity building "in terms of numbers, skills, and organization of the workforce" (Juračak and Očić, 2021).

In Serbia, the implementation of FSDN will follow preparatory activities for conversion of existing FADN data collection processes into a sustainability-oriented framework.

The transition involves adjustments in data collection protocols, training of field staff, and development of software solutions to handle a broader range of variables. According to Serbian Ministry of Agriculture, Forestry and Water Management (2025), transition of existing Serbian FADN to FSDN system requires "capacity improvement, higher involvement of farmers and development of digital infrastructure". This process in Serbia was supported by the Policy and Legal Advice Centre (PLAC III) project funded by the EU (EU za tebe, 2026; FADN, 2026).

For Montenegro and Bosnia and Herzegovina, the transition to FSDN is still in the early planning stage. Currently, no comprehensive FSDN data collection exists in either country. Future steps are expected to depend on the establishment of fully operational FADN systems, national institutional capacity building, and alignment with EU sustainability reporting requirements. Generally, according to Makaš et al. (2023) "as a country aspiring to the EU, Bosnia and Herzegovina has committed to a stronger obligation to harmonize its environmental protection policy with the EU legal acquis and fulfill the obligations stipulated in the Green Agenda for the Western Balkans." Therefore, the work on development of FSDN system in Bosnia and Herzegovina is expected to be performed within harmonization process. The same conclusion could be made for Montenegro (another candidate country), as well. Nevertheless, Makaš et al. (2025) stated that "Bosnia and Herzegovina remains in the early stages of alignment with the EU acquis" while FADN/FSDN "have not yet been incorporated into agricultural laws at either the Bosnia and Herzegovina or entity levels".

The readiness of Western Balkan countries for the transition from the FADN to the FSDN could be assessed using six key indicators: institutional readiness, technical readiness, farm coverage, staff training, financial support, and implementation of sustainability indicators. Serbia demonstrates the highest overall readiness, with a ministry-led institutional framework, planned FSDN integration starting in 2026, broad farm coverage of 1,825 holdings, ongoing staff training. Montenegro shows moderate readiness, with limited farm coverage and developing technical and institutional capacity. Bosnia and Herzegovina exhibits the lowest readiness across all indicators, reflecting fragmented institutions, minimal technical infrastructure, pilot-level farm coverage, lack of coordinated training and limited resources for implementing FSDN. This analytical evaluation, based on authors' assessment, highlights the varying stages of preparedness in the region and underscores the need for coordinated efforts to align with EU sustainability standards.

Conclusions

Establishment of fully functional FADN system is not only precondition for EU accession, but also an essential tool which provides data for policy making and improving performance and competitiveness of agriculture in each of observed Western Balkans countries. The research indicated different levels of development of FADN in these three countries. While FADN system in Bosnia and Herzegovina is still at the beginning of development, much better results are achieved in Montenegro. On the

other hand, Serbian FADN system is fully operational for number of years, although it faces certain issues, as well.

At the same time, all observed countries face challenges related to transformation of FADN towards broader concept of sustainability. The Serbian FSDN will use the existing FADN infrastructure while incorporating additional indicators necessary for sustainability assessment. Two other countries are only in planning stage of transition to FSDN. Successful implementation of FSDN requires strong coordination between statistical offices, agricultural ministries, advisory services, and farm-level participants, as well as adequate technical and financial resources. Results indicate that FSDN implementation in the region needs targeted interventions to strengthen institutional and technical capacity, expand farm coverage, and integrate sustainability indicators, particularly in Montenegro and Bosnia and Herzegovina. Overall, the transition from FADN to FSDN represents a critical step for Western Balkan countries in aligning with EU sustainability standards, improving evidence-based agricultural policy, and promoting environmentally and socially responsible farming practices.

This analytical assessment highlights the differing stages of FADN development in the observed Western Balkans countries and underscores the need for tailored capacity-building strategies, primarily in Montenegro and Bosnia and Herzegovina, to support a successful transition to sustainability-oriented farm accounting. Future research should be focused on introduction of appropriate indicators measuring social and ecological aspects of sustainability in observed countries.

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Conflict of interests

The authors declare no conflict of interest.

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