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THE SCOPE OF FARMS SUSTAINABILITY TOOLS BASED ON FADN DATA

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Abstract

This paper reviews recent reports on the farm sustainability assessment, in particular, the farm sustainability assessments based on EU Farm Accountancy Data Network (FADN). The most commonly-used data source for evaluation of farms economic, social and environment sustainability is farmers' survey, employing structured questionnaire or/and in-depth interview. Therefore, recently the available databases as information sources such as EU FADN have been employed. As FADN originally was developed for measuring farms' income and economic performance, the developed farms' sustainability tools based on FADN data should be verified in the new context. The analysis is presented in two steps. First, an analytical overview of farm sustainability tools in terms of their research purpose, subject, developed indicators by economic, environmental and social dimensions of sustainability and the key elements of the methodology is presented. In a second step, the economic, environmental and social subthemes of the Sustainability Assessment in Food and Agriculture Systems (SAFA) Guidelines were employed. The results of analysis revealed, that tools differ and this limits the possibilities to compare the research results. FADN data in terms of coverage the SAFA developed subthemes revealed medium coverage of the SAFA economic and environmental subthemes, and low coverage of social SAFA subthemes. The presented analysis opens the scientific discussion about the need and possibilities to develop a tool for farm sustainability assessments using FADN data and to assess sustainability of farms across Europe.

Key words*: *FADN data, SAFA guidelines, sustainability assessment tools

INTRODUCTION

Over the past four decades interest in conceptualization of the sustainable development and methodological issues of its assessment has been increasing. Over the past ten year period sustainability has been frequently mentioned in the governmental, non-profit organizations, corporate objectives. International, national and local governmental institutions as well as business enterprises more often use triple bottom line (3Ps: people, planet and profits) system as decision making and quality control measures. Farm case analysis shows that the societal demand for this kind of assessment is increasing [22].

In Chapter 40 of the Agenda 21, governments have in 1992 introduced the development of sustainability indicators as a key approach to provide a basis for sustainability-related decision-making processes [14]. This initiated the development of first sets of indicators focusing on the integration of environmental aspects into agricultural policy such as IRENA [5], SEAMLESS [20] and others.

In addition, after 1990, an outbreak of sustainability indicators for agriculture at micro level was monitored. One of the most frequently used methods of farm sustainability studies is based on sustainability indicators ([4], [16], [18], [21], [24], and others).

The original farm sustainability assessment phase dominated by research conducted in farmer surveys/interviews (e.g., [24], [4], and others). Meanwhile, it is possible to identify the subsequent farm sustainability research phase, some estimates were based on existing data, such as the case of the EU - FADN ([2], [12], [15], and others) [22]. The concept of FADN was launched in 1965, when Council Regulation 79/65 of the Commission of the European Communities established the legal basis for the organization of the network. The objective of FADN is to provide micro-economic data in determining the income of family farms and agricultural holdings and the impacts of Common Agricultural Policy for Member States of the EU. The structural and

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accountancy data on farms is collected annually for FADN from a sample of agricultural family farms and holdings across the EU. Standard Results consist of 150 variables on farm structure and yield, output, costs, subsidies and taxes, income, balance sheet, and financial indicators. The survey of FADN refers to farms that due to their size are defined as commercial. The yearly FADN sample covers approximately 80 thousand farms that represent a population of about 5 million farms, covering around 90 per cent of the total utilized agricultural area (UAA), and accounting for more than 90 per cent of the total agricultural production of the EU.

Marchand et al. [13] introduced two working definitions of sustainability assessment tools at farm level, i.e. full sustainability assessment and rapid sustainability assessment. Rapid sustainability assessment is focused on the farmer's knowledge and readily available data as sources of information. As emphasized by Andreoli, Tellarini [1], Gerrard et al. [8], Ryan et al. [15] to justify continued financial support for agriculture in the EU it is necessary to have a practical tool to monitor intervention results and impact of the farm to provide a comparative analysis across the EU.

A number of articles ([3], [7], [13], [14], [17]) perform a review or comparative analysis of sustainability assessment tools. Though, the little attention is paid for farm sustainability assessment tools based on FADN data.

MATERIALS AND METHODS

The main aim of the study is to build a general understanding about how researchers propose assessing the farm sustainability using FADN data. In addition, to analyse developed sustainability tools in terms of their scope. The analysis was performed in two steps. First, an analytical overview of farm sustainability tools in terms of their research purpose, subject, developed indicators by economic, environmental and social dimensions of sustainability and the key elements of the methodology are presented. In a second step, the methodology presented by Schader et al. [17] is employed. The authors used the environmental, social, and economic subthemes of the Sustainability Assessment in Food and Agriculture Systems (SAFA) Guidelines [6] as a reference to analyse the thematic scope of the sustainability assessment tools in terms of impact assessment categories covered in each sustainability dimension.

RESULTS AND DISCUSSIONS

An analytical overview of farms sustainability tools

The 8 farm sustainability tools ([2], [8], [12], [15], [19], [21], [22], [23]) that can be applied at a farm level and address at least the environmental dimension based on FADN data were selected for the assessment of scope (Table 1). One of the attempts to employ FADN data presented by Westbury et al. [23], where the environmental sustainability of English arable and livestock holdings were examined. The aim of the research was to measure the environmental impact of three different types of agriculture (arable, lowland livestock and upland livestock) in England and to identify differences in Agri-Environmental Footprint Index due to participation in agri-environment schemes. In addition, authors tested whether FADN as established data source usage could be extended for the routine surveillance of environmental performance of farming systems. The data of 1995, 2000 and 2005 were chosen. Two sets of indictors were developed. To assess environmental performance for arable farms thirteen indicators were developed: fertiliser units (tonnes) per ha UAA; crop protection costs per ha UAA; per cent of UAA that is irrigated; electricity costs and machinery, heating and vehicle fuels and oil per ha UAA; fertiliser units (tonnes) per ha UAA; crop protection costs per ha UAA; crop diversity; per cent of spring crops; land use diversity; per cent of total farm area that is woodland; per cent of total farm as uncropped land; land use diversity. Eight livestock farms' environmental performance assessment indicators were developed: fertiliser units (tonnes) per ha UAA; average number of grazing livestock units per ha of forage; water units per ha UAA; electricity costs and machinery, heating and vehicle fuels and oil per ha UAA; percentage of grassland area that is temporary grassland; percentage of UAA that is classified as rough grazing; land use diversity; per cent of total farm area that is woodland. In order to aggregate the developed indicators to Agri-Environmental Footprint Index the equal weights were given. All indicators and constructed index were scored on a scale of 0 to 10 where 0 represented the lowest farm score for environmental performance and 10 was the maximum.

In their paper, Gerrard et al. [8] used the Farm Business Survey data to compare the environmental performance of organic and conventional farms. As explained by authors, in England and Wales the FADN data is collected through The Farm Business Survey (FBS). The aim of the research was to explore the possibilities to use Farm Business Survey data to derive well-established environmental indicators. In addition, authors analysed developed indicators in terms of ability to provide a reasonable comparison of the environmental performance of organic and conventional farms. The environmental performance of organic and conventional farms was the subject of the study. The FBS data from 2008–2010 was employed for the research. The indicators were identified on the basis of the literature study. The indicators used for assessment included cost of fertiliser per ha UAA and per output, cost of pesticide per ha UAA and per output, purchased feed per UAA and per livestock units, an intensification indicator, monetary receipts from agri-environmental schemes per ha UAA, average number of grazing livestock units per ha of forage area, crop diversity index. Authors presented a statistical analysis of each indicator across farm types (cereals, general cropping, horticulture, pigs, poultry, dairy, less favoured area grazing livestock, lowland grazing livestock, mixed) detecting statistically significant differences between farms managed under organic or conventional methods.

One of the farm sustainability assessments was presented by Longhitano et al. [12]. Authors employed the FADN sample for the accounting year 2009 of the Veneto region. The aim of the study was to assess the sustainability at farm level through the calculation of a composite index, using FADN database as the main source of information. The stakeholders were involved in identifying the final list of indicators. The final set of twenty six indicators were chosen under an assessment criteria matrix: nitrogen content, phosphorus content, irrigation area, irrigation system, pesticide expenditure, land use limitations, livestock unit, organic farming, grassland, agri-environmental schemes, economic return to labour, economic return to land, utilized agricultural area, expenditure for service to thirds, expenditure for energy, altitude, other gainful activities, family labour, farmer age, farmer gender, farmer education, distance from inhabited centre, networking, labour supply. After the identification of indicators, the normalization of indicators was made according to the relationships between indicators values and level of sustainability. The different weights to indicators were assigned by stakeholders. This allowed the aggregation of selected indicators into Sustainable Farm Index (SuFI), index which scored on a scale of 0 to 10. Three levels of SuFI sustainability were identified, that were low with SuFI score less than 5, medium from 5 to 6, and high with SuFi greater than 6. The sensitivity analysis was performed to consider different four scenarios: one, when the importance of matrix elements was assigned equally; and the other three, when one of sustainability dimensions got 80 per cent, while the other two dimensions shared the remaining 20 per cent.

Van Passel, Meul [21] combined the sustainable value approach (SVA) and Monitoring Tool for Integrated Farm Sustainability (MOTIFS) to perform a sustainability evaluation of farming systems in Flanders (Belgium). SVA was used to evaluate sustainability at sector level, while MOTIFS was proposed to measure the progress towards sustainability at farm level. FADN data from specialized dairy (14) and arable (14) farms in Flanders were used for research. For the specialized dairy farms, the following indicators were calculated: nitrogen surplus, nitrogen use efficiency, direct and indirect energy use efficiency, labour productivity, capital productivity, land productivity, labour profitability, return on equity, and return on assets. The lowest, highest and average values of indicators values were converted into a score between 0 and 100 for each indicator, employing the results of the lowest-performing and best performing case-study farm as benchmark values. The main results of the research were presented in Radar graph and the discussion of farmers and an expert was involved.

Van der Meulen et al. [19] used the FADN data to quantify the economic, environmental and societal performance for 160 Dutch specialized dairy farms in the year 2011. To provide information on the economic, environmental and social sustainability of farm the indicators included labour productivity, net farm income, solvency, energy use, GHG emissions, phosphorus surplus, pesticides use, somatic cell count, cow lifetime, grazing hours. These indicators were normalized on a scale from 0 through 100, whereby a score of 100 per indicator was assumed to be sustainable. To explore the impact of farm size on integrated economic, environmental and societal performance the results of 15 per cent of largest farms were compared with the rest of the group.

In their paper, Barnes, Thomson [2] provided a methodology for assessing sustainable intensification over time using FADN data. Authors used the data of 42 beef farms over the period 2000–2010. In the paper, thirteen indicators capturing sustainability intensification aspects were developed: interest cover to total debt, total subsidies to farm gross margins, total rent and interest paid to farm gross margin, total costs of paid labour to gross margin, total costs of contracting to total variable costs, total output value to total fixed and variable costs, total rough grazing area to total area, total (farmed) woodland area to total area, ratio of permanent to temporary grass area, total output value to total area, value of livestock output to total output, total farmer hours to total hours worked and total hired labour to total hours worked. These indicators were weighted using positive matrix factorisation. In order to calculate an overall index of sustainable intensification the geometric mean of individual weightings was chosen.

In their study, Ryan et al. [15] presented the development of Irish farm-level indicators for economic, environmental, social and innovation indicators using National Farm Survey (the NFS is part of the FADN) data in the year 2012. Economic, environmental and social sets of indicators included productivity of labour, income per unpaid labour unit, productivity of land, profitability, market orientation, farm viability, GHG emissions per farm, GHG emissions per kg of output, nitrogen balance, emissions from fuel and electricity, household vulnerability, education level, isolation risk, demographic viability, work life balance. In addition, these developed indicators are employed by Jane Dillon et al. [10] for assessing dairy farms sustainability in the milk quota abolition context. In capturing farms innovation aspects appropriate indicators to each of the farm systems (dairy, cattle and sheep, tillage) were developed. The indicators were normalized using min-max approach and then scaled from 0 to 100, where 0 indicated the poorest performance and 100 indicated the best performance.

Vitunskienė, Dabkienė [22] presented an analytical tool to assess relative sustainability of family farms using FADN data. The tool consists of a farm relative sustainability index (FRSI), three sub-indices and twenty three indicators related to the economic, environmental and social dimensions of sustainability. The economic indicators include labour productivity, capital productivity, land productivity, solvency, family farm income per family work unit, fixed capital formation, farm diversification, farm risk management. The environmental indicators include the following: use of chemical fertilizers, use of pesticides, GHG emissions, energy intensity, biodiversity, meadows and pastures, livestock density, environment-friendly farming.

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Table 1. Details of the farms sustainability tools based on FADN data

Authors	Country, surveyed year	Subject	Sustainability dimension	Developed indicators	Output form
Westbury et al. [23]	England, 1995, 2000 and 2005	64 arable 43 lowland livestock 23 upland livestock holdings	Environmental	*Indicators for arable farms:* fertiliser units (tonnes) per UAA; crop protection costs per ha UAA; per cent of UAA that is irrigated; electricity costs and machinery, heating and vehicle fuels and oil per ha UAA; crop diversity (Shannon diversity); per cent of spring crops; land use diversity (Shannon diversity); per cent of total farm area that is woodland; per cent of total farm as uncropped land (including fallow and set-aside). *Indicators for livestock farms:* fertiliser units (tonnes) per ha UAA; average number of grazing livestock units per ha of forage; water units per ha UAA; electricity costs and machinery, heating and vehicle fuels and oil per ha UAA; percentage of grassland area that is temporary grassland; percentage of UAA that is classified as rough grazing; land use diversity (Shannon Diversity); per cent of total farm area that is woodland.	Differences in calculated index values according to education, region and participation in agri-environment schemes were analysed. Indicators were weighted equally for index construction.
Gerrard et al. [8]	England, Wales, 2008-2010	Organic Conventional farms	Environmental	Cost of fertilizer per ha UAA and per output; cost of pesticide per ha UAA and per output; purchased feed per UAA and per livestock units; an intensification indicator, monetary receipts from agri-environmental schemes per ha UAA; average number of grazing livestock units per ha of forage area; Shannon crop diversity index.	Indicators comparisons across analysed farm types detecting statistically significant differences between farms managed under organic or conventional methods are presented.
Longhitano et al. [12].	Italy, Veneto region, 2009	853 farms: intensive arable, other crops, viticulture, permanent crops, mixed crops, bovine, other livestock, mixed farms	Environmental	Nitrogen content; phosphorus content; irrigation area; irrigation system; pesticide expenditure; land use limitations; livestock unit; organic farming; grassland; agri-environmental schemes.	Index values according to farm type and developed scenario are presented. Stakeholders were involved in selecting indicators and assigning weights to them. Three levels of index value were identified.
			Economic	Economic return to labour; economic return to land; utilized agricultural area; expenditure for service to thirds; expenditure for energy; altitude; other gainful activities; distance from inhabited centre.	
			Social	Family labour; farmer age; farmer gender; farmer education; altitude; distance from inhabited centre, networking, labour supply.	
Van Passel, Meul [21]	Belgium, 2000	14 specialized dairy 14 arable farms	Environmental	Nitrogen surplus, nitrogen use efficiency, direct and indirect energy use efficiency.	Results of developed indicators are presented using radar graphs.
			Economic	Labour productivity, capital productivity, land productivity, labour profitability, return on equity, return on assets.	
Van der Meulen et al. [19]	Netherlands, 2011	160 specialized dairy farms	Environmental	Energy use, GHG emissions, phosphorus surplus, pesticides use.	Results of developed indicators are presented using radar graphs.
			Economic	Labour productivity, net farm income, solvency.	
			Social	Somatic cell count, cow lifetime, grazing hours	
Barnes, Thomson [2]	Scotland, 2000-2010	42 beef farms	Environmental	Total rough grazing area to total area, total (farmed) woodland area to total area, ratio of permanent to temporary grass area, total output value to total area, value of livestock output to total output.	Index values for analysed years are presented. The indicators were weighted using positive matrix factorisation. Weights for indicators were assigned using the geometric mean of individual weightings.
			Economic	Interest cover to total debt, total subsidies to farm gross margins, total rent and interest paid to farm gross margin, total costs of paid labour to gross margin, total costs of contracting to total variable costs, total output value to total fixed and variable costs	
			Social	Total farmer hours to total hours worked and total hired labour to total hours worked	
Ryan et al. [15]	Ireland, 2012	Dairy, cattle, sheep, tillage farms	Environmental	GHG emissions per farm, GHG emissions per kg of output, nitrogen balance, emissions from fuel and electricity.	Results of developed environmental, economic and social indicators are presented using radar graphs.
			Economic	Productivity of labour, income per unpaid labour unit, productivity of land, profitability, market orientation, farm viability.	
			Social	Household vulnerability, education level, isolation risk, demographic viability, work life balance	
			Innovation	*Indicators for dairy farms:* participation in a milk recording programme; membership of a dairy discussion/knowledge transfer group; farmers who have changed the timing of slurry spreading to avail of greater uptake of nutrients during the early growing season. *Indicators for cattle and sheep farms:* membership of a beef or sheep Quality Assurance Scheme; undertaking of reseeding to improve grassland within the last three years; the undertaking of soil testing within the last three years. *Indicators for tillage farms:* availing of forward selling of tillage crops; usage of Information and Communication Technology on the farm; the undertaking of soil testing within the last three years.	
Vitunskienė, Dabkienė [22]	Lithuania, 2012	450 family farms	Environmental	Use of chemical fertilizers, use of pesticides, GHG emissions, energy intensity, biodiversity, meadows and pastures, livestock density, environment-friendly farming.	The results at the indicator, sub-index and index level across counties are presented.
			Economic	Labour productivity, capital productivity, land productivity, solvency, family farm income per family work unit, fixed capital formation, farm diversification, farm risk management.	
			Social	Family work, jobs on farm, wage ratio on farm, pluriactivity, workload exceeded, continuity of farming, farmer's age.	

The social indicators include family work, jobs on farm, wage ratio on farm, pluriactivity, workload exceeded, continuity of farming, farmer's age. The indicators to be used and the rationale behind their selection are presented. The min-max approach was employed to normalise the selected indicators. The factor analysis was used to estimate weights for the developed indicators to construct sub-indices. Then assignments of the weights to the sub-indices were based on the triple bottom line approach. The FRSI and sub-indices ranged from 0 to 1. Three levels of family farm sustainability were suggested, that were low with FRSI score less than 0.33, medium sustainability from 0.34 to 0.66, and

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high with index greater than 0.67.

Overview of the scope of sustainability tools

SAFA is a globally applicable guiding framework for the food and agricultural sector sustainability assessments at micro level. Binder et al. [3] noticed, there is little consensus on how sustainable development in agriculture should be defined and pursued. SAFA guidelines provide a standard set of sustainability themes and goals that all enterprises in the sector should pursue, they allow for flexibility in selecting indicators for measuring sustainability performance. In this way, the SAFA [6] guidelines establish a comprehensive, widely accepted language for sustainability in agriculture and food [17]. SAFA framework becomes widely accepted tool as the basis for sustainability assessments used in scientific studies presented by Hřebíček, Trenz, Vernerova [9], Jawtrusch et al. [11] and others. SAFA framework is characterized by four dimensions of sustainability: good governance, environmental integrity, economic resilience and social well-being [6]. The second level of the SAFA framework contains a set of 21 core sustainability goals or universal themes. On the third level of the SAFA framework 58 objectives or sub-themes are presented and within each sub-theme 116 indicators are identified. As noticed by Schader et al. [17], the themes of the governance dimension refer to companies rather than farms, therefore the base of the thematic scope of the sustainability assessment tools analysis is based on the tree main sustainability dimensions.

Scope of economic subthemes

Comparing the scope of the tools in assessing the economic dimension of farm sustainability tools based on FADN data, it revealed that tools presented by Ryan et al. [15] and Dabkienė, Vitunskienė [22] covered the most of economic SAFA subthemes. Whereas tools presented by Longhitano et al. [12], Van Passel, Meul [21], Van der Meulen et al. [19], Barnes, Thompson [2] covered from 20.0 per cent to 6.7 per cent of the economic subthemes defined in the SAFA. It should be noted, that originally some indicators are developed by their authors to assess another dimension of sustainability (Table 2).

Table 2. Coverage of economic subthemes of the SAFA Guidelines by sustainability tools based on FADN data

Theme	Sub-theme	Longhitano et al. [12]	Van Passel, Meul [21]	Van der Meulen et al. [19]	Barnes, Thompson [2]	Ryan et al. [15]	Vitunskienė, Dabkienė [22]
Investment	Internal investment						
	Community investment						
	Long-ranging investment						x
	Profitability	x	x	x	x	x	x
Vulnerability	Stability of production						
	Stability of supply					x	
	Stability of market						x
	Liquidity			x	x	x	x
	Employment						x
	Risk management	x					x
Product safety and quality	Food safety						
	Food quality			**x**		**x**	
	Product information						
Local economy	Value creation				**x**		x
	Local procurement						
	Number of topics covered	2	1	3	3	4	7
	Per cent of topics covered	13.3	6.7	20.0	20.0	26.7	46.7

Note: In bold indicators originally developed for another dimension of sustainability.

The environmental dimension of sustainability is covered by 6 themes in the SAFA guidelines. The analysis revealed that three of analysed sustainability tools cover 50 per cent of proposed SAFA subthemes and the other tools cover less than half of the SAFA subthemes. Barnes, Thompson [2], Ryan et al. [15], Van Passel, Meul [21] tools have a least extent of covering SAFA environmental subthemes (Table 3). Though Ryan et al. [15] presented a deep analysis of GHG emissions, Van Passel, Meul [21] focussed on nitrogen and energy use and Barnes, Thompson [2] concentrated on biodiversity analysis on farms.

Social indicators were not included by Van Passel, Meul [20] due to limited availability of data. Van der Meulen et al. [19] proposed three social indicators related to animal health and welfare. In this analysis these indicators were attributed to economic (food quality) and environmental (animal health, freedom from stress) subthemes of the SAFA guidelines (Table 4).

Table 3. Coverage of environmental subthemes of the SAFA Guidelines by sustainability tools based on FADN data

Theme	Sub-theme	Westbury et al. [23]	Gerrard et al. [8]	Longhitano et al. [12]	Van Passel, Meul [21]	Van der Meulen et al. [19]	Barnes, Thompson [2]	Ryan et al. [14]	Vitunskienė, Dabkienė [22]
Atmosphere	GHG					x		x	X
	Air quality								
Freshwater	Water withdrawal	x	x	x					
	Water quality	x	x	x	x	x		x	X
Land	Soil quality	x		x	x	x	x	**x**	X
	Land degradation								
Biodiversity	Ecosystem integrity	x		x			x		X
	Species diversity	x	x	x			x		X
	Genetic diversity								
Materials and energy	Material use		x						
	Energy use	x		**x**	x	x			X
	Waste reduction and disposal								
Animal welfare	Animal health	x	x	x		**x**			X
	Freedom from stress					**x**			
	Number of topics covered	7	5	7	3	6	3	3	7
	Per cent of topics covered	50.0	35.7	50.0	21.4	42.9	21.4	21.4	50.0

Note: In bold indicators originally developed for another dimension of sustainability.

The tool developed by Ryan et al. [15] covered the most of the social SAFA subthemes. The possibility to assess the educational level of farm household members' within NFS extended the coverage of the social SAFA subthemes.

Shader et al. [17] analysed the coverage of the six sustainability approaches of food systems by the SAFA Guidelines subthemes. The results revealed that the highest coverage of economic subthemes reached 50 per cent, of environmental subthemes the highest coverage was equal to 100 per cent and of social subthemes highest coverage was achieved at 75 per cent. Comparing the coverage of economic SAFA subthemes of analysed tools based on FADN data and obtained research results by Shader et al. [17] it can be stated that farm sustainability tools based on FADN data achieved medium coverage of the SAFA economic and environmental subthemes, and low coverage of social SAFA subthemes.

Table 4. Coverage of social subthemes of the SAFA Guidelines by sustainability tools based on FADN data

Theme	Sub-theme	Longhitano et al. [12]	Barnes, Thompson [2]	Ryan et al. [15]	Vitunskienė, Dabkienė [2]
Decent livelihood	Quality of life			x	x
	Capacity development	x		x	
	Fair Access to means of production				
Labours rights	Employment relations				
	Forced labour				
	Child labour				
	Freedom of association and right to bargaining				
	Working hours	x	x	x	x
Equity	Non discrimination				
	Gender equality				
	Support to vulnerable people				
Human safety and health	Physical and psycho-social health			x	x
	Public health				
Cultural diversity	Indigenous knowledge				
	Food sovereignty				
	Number of topics covered	3	1	4	3
	Per cent of topics covered	20.0	6.7	26.7	20.0

CONCLUSIONS

Analysis of literature research on application of FADN data to farms sustainability assessment revealed that they differ by their purpose and subject of research, their methods, and the final sets of indicators. These multiple differences limit possibilities to compare results of conducted studies.

The analysis of the thematic scope of the sustainability assessment tools based on FADN data in terms of coverage the SAFA developed subthemes revealed medium coverage of the SAFA economic and environmental subthemes, and low coverage of social SAFA subthemes.

The CAP reforms shift towards an agricultural policy more attuned to the need to promote sustainability of agriculture. The FADN data proved to be valuable source of readily available information to assess sustainability of farms in analysed research papers. The extension of collected variables, i.e. the collection of additional variables or/and calculation of proxy indicators, related to environmental and social concerns by FADN is necessary within farm sustainability assessment. The improved data network could be used for farms sustainability assessment and for monitoring the impact of policy decisions across Europe.

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