Economia agro-alimentare /
Food Economy

An International Journal on Agricultural and Food Systems

Vol. 23, Iss. 3, Art. 10, pp. 1-21 - ISSN 1126-1668 - ISSNe 1972-4802
DOI: 10.3280/ecag3-oa12770

Use and users of FADN data in Italy

Sonia Marongiu[*,a], **Barbara Bimbati**[a], **Mauro Santangelo**[a]

[a] CREA, Council for Agricultural Research and Economics,
Research Centre for Agricultural Policies and Bioeconomy

Abstract

The Farm Accountancy Data Network (FADN) is a sample survey that annually gathers information from more than 80,000 European farms. Its main aim is to provide data to the EU Commission used in the assessment of farm profitability and in the evaluation of Common Agricultural Policy (CAP) impacts. FADN results are also used and published nationally in almost all the Member States. The Italian FADN (named RICA - Rete Italiana di Contabilità Agricola) provides data for stakeholders and researchers, serving as an important source of information for specific analysis and meeting a wide range of policy needs. Data are stored in an online database, available for institutional users under an agreement or a formal accession request. For non-institutional users, a public Datawarehouse supplies/ provides selected information already aggregated by farm type, economic size, and region. Like other surveys, FADN can be considered as a public good, whose general benefit and utility depends also on its impact on users. One way to evaluate these benefits is the identification of users, the data used and their level of satisfaction. This monitoring activity is not performed in the Italian FADN: users and usage are not always tracked and the information about their satisfaction is lacking. The paper investigates this aspect (which has been called "inherent data dissemination" for the first time, focusing on the extent and ways in which FADN is made available: the most important area of analysis covered by the data. Two instruments are

Article info

Type:
Article
Submitted:
28/04/2021
Accepted:
20/09/2021
Available online:
12/01/2022

JEL codes:
M41, Y1

Keywords:
FADN
RICA
Informative needs
Users' analysis

Managing Editor:
Lucia Briamonte,
Luca Cesaro,
Alfonso Scardera

* *Corresponding author*: Sonia Marongiu - Researcher - CREA, Research Centre for Agricultural Policies and Bioeconomy - Via dell'Università, 14 - 35020 Legnaro (PD), Italy - E-mail: sonia.marongiu@crea.gov.it.

examined: the FADN database online (BDR) and the request forms submitted to CREA to ask for customized tables based on a set of selected variables. The first tool has been analyzed by submitting a questionnaire to the list of users, while for the request forms, all the submissions processed during the period 2011-2020 have been examined.

Introduction

The Farm Accountancy Data Network (FADN) is a sample survey that annually gathers information from more than 80,000 European farms representing around 90% of production. European Union (EU) is responsible for the regulatory framework in which FADN operates as well as for funding it with public money. The overall public cost of FADN in EU-28 was identified as some 59 million euros per year (Hill and Bradley, 2016). Information is collected according to a questionnaire (Farm Return) and following legal requirements specified in the EU Regulation 1217/2009, supplemented by implementing legislation. FADN is one of the most important agricultural surveys deployed in European Union: it is the only source of microeconomic data, based on harmonized bookkeeping principles, and gathers structural and economic information of agricultural holdings (stratified by region, economic size and type of farming), comparable in space and time. The first aim of this survey is to provide data to the EU Commission for the assessment of farm profitability and the evaluation of the Common Agricultural Policy (CAP) impacts. The enlargement to new Member States, the increasing supply of data and wider informative needs have made FADN worthwhile for purposes that go beyond those contemplated at the beginning. There are four main methods by which the results of FADN are communicated by the Commission (Hill *et al*., 2016): (i) Standard Results, periodically produced and published to describe in detail the economic situation of farmers by different groups; (ii) FADN public database; (iii) specific works and publications (by Member States or type of farming, reports on income evolution, ad hoc analysis regarding CAP evaluations, etc.); (iv) contributions to research projects (as 7th Framework Programme, Horizon2020, etc.) or specific evaluation (policy impact, policy prospective, economic studies, models, climate change, etc.).

FADN is used not only by the Commission but also by Member States governments and other policy analysts for research purposes. The Italian FADN (named RICA - *Rete Italiana di Contabilità Agricola*) provides data to the EU Commission (mandatory by regulation) but also for a broad category of stakeholders (public institutions, Universities, public and private

research, individual researchers), serving as an important source of data for the national research system and meeting a wide range of informative needs. FADN dataset is produced, managed, and disseminated by the Policy and Bioeconomy Unit of the Council for Agricultural Research and Economics (CREA, the FADN Liaison Agency between Italy and the European Commission). Raw data are stored by CREA and most part of the information is made available in an online database (BDR – *Banca Dati RICA*). Ensuring research data are easily accessible, so that they can be used as often and as a widely as possible, is a matter of sound stewardship of public resources (Arzberger *et al.*, 2004). Being a publicly funded survey, both data and research itself have strong public good characteristics (Kaul *et al.*, 1999) and should be openly available to the maximum extent possible (unless restrictions because protection of confidentiality and privacy). An open and shared public data system increases the opportunity to raise the quality and productivity of research, avoiding the certain lost opportunity cost, difficult to measure (Ulhir and Schröeder, 2007). Moreover, it is more frequently subject to a process of validation and verification coming from the users and this process increase the quality of data and research outcomes.

All the stages of the Italian FADN data production and supply chain is supported by a technical infrastructure which ensure as far as a possible an efficient data management. Being a completely digitalized dataset, it can be shared easily in an extensive way. In terms of access, the Italian FADN can be considered as an open resource, organized in different levels, each with different details, data aggregation and complexity. Users can have a direct access to the online database or obtain FADN data through the submission of a request form limited to a set of variables. For non-institutional users and the general public, a Datawarehouse displays a set of selected information already aggregated by farm typology, economic size and region. In addition, farmers can have a private access to their own FADN data by mean of a specific tool (*Cruscotto aziendale*) available on the web (through an individual password).

The scientific and socioeconomic benefits of a greater openness in the context of public research is not easy to assess because the already mentioned public nature of FADN as a good. Benefits and values related to statistics can be measured considering (i) objective indicators (number of downloads, citations in the media, etc.), (ii) subjective indicators from users' satisfaction survey, (iii) estimation of monetary value (UNECE, 2018). Counterfactual analysis is not easy: judging how less good policy decisions would be in absence of the information provided by the dataset is one such difficulty. In case of FADN, it is instead easier to assess the private benefits for the farmers of having access to FADN results: they may, for example, improve their profits benchmarking their own performance (Hill *et al.*, 2016).

Following the indication of the Task Force on the Value of Official Statistics, established in 2015 by the Conference of European Statisticians bureau and composed of experts from national and international statistical organizations (UNECE, 2018), one way to detect and measure the presence of benefits is through the identification of users' characteristics, data uses and level of satisfaction. This scheme has been followed in an inquiry realized in Italy by the National Institute of Statistics (ISTAT, 2019). The "User Satisfaction" survey is related to the statistical products/services disseminated on the official website. Users are invited to full a form once they access on the website (on a voluntary basis). The investigation gathers information about the informative needs of citizens and institutions, their level of satisfaction, the frequency, and their general profile.

A similar methodology has been applied to monitor for the first time users and uses of Italian FADN. The work is focused on the extent and way in which Italian FADN data are made available and used. Two different level of access are examined: the FADN database online (BDR) and the request forms submitted to CREA by which users ask a set of selected variables, indicating the scope and the area of interest. BDR users have been analyzed submitting a questionnaire by email to all the recorded accounts having access to the platform: aspects like the final use, the level of satisfaction, the clearness and reliability of FADN database have been investigated. Regarding the request form, all the forms submitted during the period 2011-2020 have been examined.

1. Background

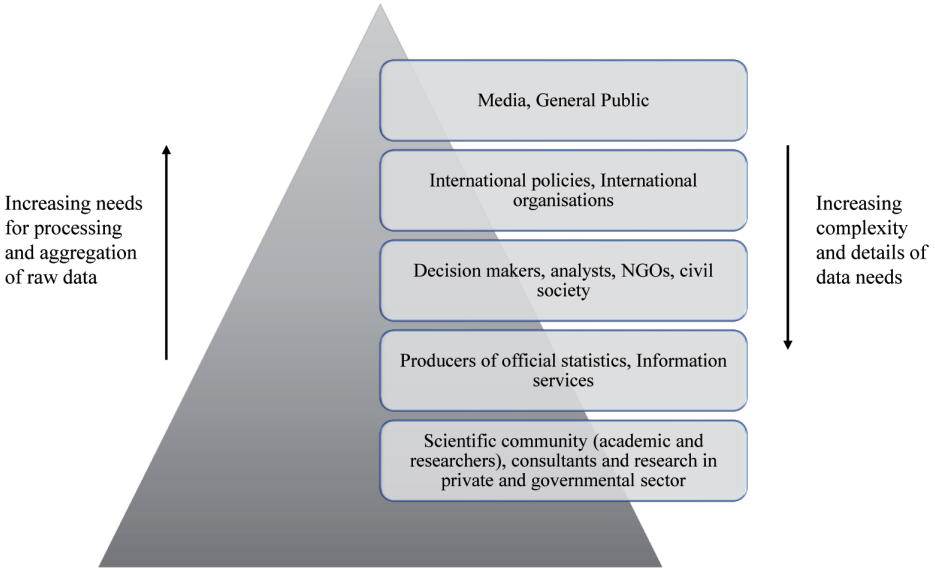
The general structure of Italian FADN can be considered as a combination of data, procedures, resources, and people managing the production, elaboration, and dissemination of information regarding the structural and economic condition of Italian agricultural holdings. This is supported by an information technology (IT) system having an important role in the collection, management, control, transition, and analysis of the primary data directly gathered from the farm and stored in a digital database, processed, and made easily available for the users. The system is set up to fulfill EU requirements (being a mandatory survey for the Member States) but also to satisfy the information needs expressed by several categories of stakeholders (institutions, researchers, etc.).

The whole process is not linear but includes a series of dynamic "chain link" feedbacks characterizing the data trajectory from the data collection to the dissemination: data sharing options are one of the main elements of this trajectory (Ulhir and Schröeder, 2007) and one of the most important

factors characterizing the efficiency of this kind of public good. In economic theory, public goods are formally defined as goods characterized by non-rivalry of consumption (the consumption of one individual does not detract from that of another) and non-excludability (it is difficult if not impossible to exclude one individual from enjoying the goods) (Samuelson, 1954; Stiglitz, 1999). Italian FADN is funded by public money, the information is shared at the lowest possible cost (the marginal cost of dissemination is essentially zero) and with high scientific and socioeconomic benefits. The benefits of this kind of open access data systems are widely recognized (Verschragen and Schiltz, 2007; Ulhir and Schröeder, 2007; Arzenberg *et al.*, 2007). They (i) reinforce scientific inquiry, diversity of analysis and new research, (ii) support studies on data collection method and measurement, (iii) develop different methods of analysis, (iv) enables the exploration of new topics, intersectoral and international research, (v) facilitate the education of new researchers. Moreover, they help to maximize the research potential of the digital technologies and networks, providing greater returns for the public investment in research (Fienberg *et al.*, 1985; National Research Council, 1999).

Measuring the efficiency and benefits arising from the use of FADN is not easy: the nature of FADN as a public good complicates the assessment of worth and is difficult to determine what might have been possible if the data were not open or available. However, an evaluation can be made through specific users' satisfaction surveys. The dissemination strategy of Italian FADN is based on a segmentation of users and the access and details of information is structured according to their different needs. The importance of identifying a list of users' categories has been recognized by the European Statistical Advisory Committee (ESAC) as a basis to create a strong communication strategy. ESAC classifies users into institutional users (such as international organizations, agreements, etc.) and non-institutional users (further divided according to their interest in statistics). The same concept is the core of another classification proposed by the Task Force on the Value of Official Statistics (Figure 1) that identifies (i) users with a general interests (citizens, media and journalists, students and teachers); (ii) users with a pre-defined/structured interest as in the international policies and monitoring frameworks or international organizations; (iii) users with a specific subjects/domain of interest (decision makers, policy makers, marketing analysist, experts in a specific field, private business and NGOs organizations); (iv) users with a reuse and reproduction interest and producers of official statistics; (v) users with a research interest (research centers, scientific community, academic and researchers, etc.) (UNECE, 2018).

Figure 1 - Users and users' needs



Source: UNECE (2018).

The information collected in the Italian FADN is selected, displayed, and supplied as an open data system but according with different categories of users. As mentioned, CREA is the Liaison Agency between Italy and European Commission and is the responsible of the data collection at national level. Like other Member States (Cyprus, Croatia, Estonia, Finland, Germany, Ireland, Latvia, Lithuania, Netherland, Poland, Czech Republic, Slovakia, and Hungary), the organizational setting of FADN relies on a public research institute. As public body, one mission is to promote the public research activity removing any barriers in the use of data, disseminating the results, supporting policy analysis and the whole national research system.

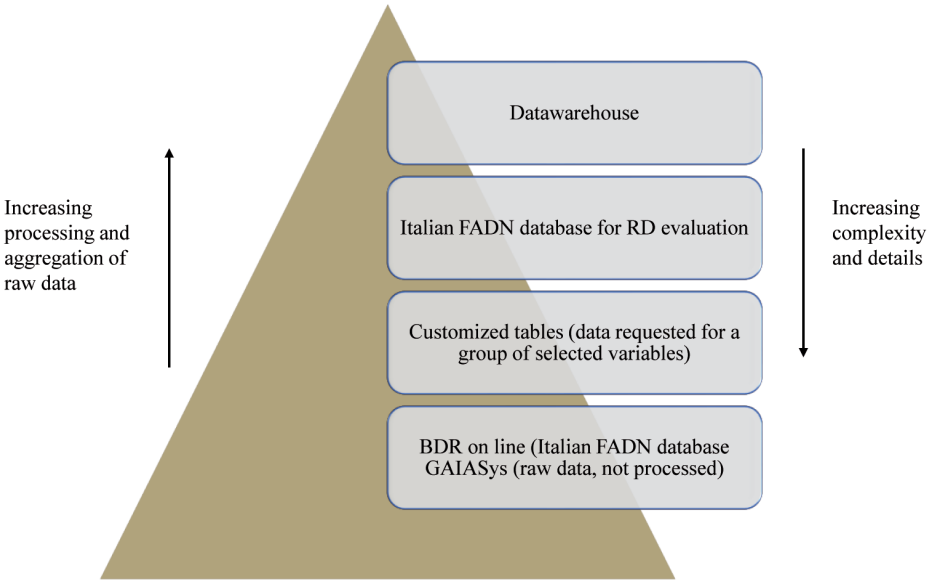
As anticipated, FADN data in Italy are available with different level of access and detail, in compliance with the principle of statistical secrecy and protection of personal data (Figure 2):

- GAIAsys: is the raw FADN dataset of primary data. It contains all the information gathered directly from the farm: data are not processed or aggregated. GAIAsys is used for research purposes when a high detail is required (for instance, when is necessary to separate costs for gasoline, diesel, methane, etc., otherwise aggregated in one item as energy cost).

- FADN Database online: one important process in the Italian FADN is the transformation of raw data in information available for the users. This is realized through the Database online (BDR[1], *Banca Dati RICA*) where information can be downloaded as data or elaborated as reports (available for the sample characteristics, assets, economic results, farm indicators, production processes, specific analysis on land and transformed productions) by Region and year. The access to the BDR is limited to enabled users who obtain a password after the submission of a specific request or under an agreement (as the case of Universities, research centers or public administrations). Only CREA's internal users and all the external stakeholders belonging to the National Statistical System (SISTAN) are automatically enabled. The database has a high level of detail, even if some variables have been processed by homogeneous categories. Confidential information is not displayed. Information is uploaded every year.
- FADN Database for evaluation: the structure is the same of BDR. The access is restricted to the Regional Statistical Offices that can download only the data included in its own regional dataset. Information is used by public administrations or in analysis inherent the evaluation of rural development measures (ex-ante and ex-post).
- Customized tables: users who need specific variables to perform their analysis can ask FADN data submitting a request form to CREA, processed in few days. In this case, the aggregation level and details depend on the specific request: users could ask data referred to a single variable or, for instance, aggregated by economic size or farm type.
- Prepackaged downloaded tables: a public Datawarehouse is prepared and displayed in a format fitting the general public target audience in a specific web page (Area RICA)[2]. The aggregation level is very high and there are few details regarding the single variables.

1. https://bancadatirica.crea.gov.it/default.aspx.
2. https://arearica.crea.gov.it.

Figure 2 - Tools and public availability of Italian FADN data



Source: own elaboration.

In addition, FADN farmers can download the report of the economic and structural situation of their farm, the financial statement, the sum of costs and revenues, etc., using a personal access. Through their login credentials, farmers can enter in their FADN page (*Cruscotto aziendale*). It is a unique tool, that also provide a benchmark analysis of the single farm with similar farms belonging to the survey.

2. Methodology

According to the Task Force on the Value of Official Statistics, public goods and values related to statistics can be measured considering (i) observable objective indicators such as number of downloads, citations in the media, etc.); (ii) subjective indicators from users' satisfaction survey; (iii) attempt to monetize the value of official statistics (UNECE, 2018).

ISTAT (2019) assesses the value of the public information by mean of subjective indicators based on a users' satisfaction surveys. World Bank (2010) defines its global strategy to improve agricultural and rural statistics on the assessment of the available data users' needs. An investigation of

the benefits of FADN has been made through the pattern of publication and known uses (Hill *et al*., 2016). Specific analysis has been developed looking to the economic values of statistical information: Abbott *et al*, (2016) quantifies this value provided to agricultural corn market while Garcia *et al*. (1997) does the same but referring to the commodity future markets.

The methodology applied in this work has as objective the assessment of the Italian FADN value and benefits through the approach based on the use and users' satisfaction survey.

As previously mentioned, once data is collected, verified, and checked, the dataset is transmitted to the EU Commission and made available at national level in different ways. The BDR and the request of customized tables are the most important instruments, not analyzed until now in any kind of users' inquiry.

Regarding BDR, the only information available concerns a short profile of the enabled accounts in term of affiliation (CREA, public administrations, research centers, etc.). To fill this gap, a questionnaire has been submitted to the enabled users with the aim to collect qualitative and quantitative information on their activities, their expectations, the selectiveness, and reliability of the data supplied, the main uses, and how to improve the system in term of contents and documents. The questionnaire has been sent in an on-line mode (from 13 to 23 May 2020) and included open and close-ended questions.

Another way to make Italian FADN data available to the users is throughout the submission of an online request form in which users can ask the downloading of a set of selected variables in customized tables. The form[3] is divided in three sections: (i) general profile of the applicant; (ii) main use of the requested variables (activity, thematic area of analysis, projects); (iii) requested objects (territorial area, stratification, variables). This application is very common among those users that need partially elaborated information or do not know very well the general structure of BDR. The request is transmitted to CREA that, if necessary, gives further explanations regarding the downloaded data. Data can be stratified by year, farm type and economic dimension, region, agricultural area classes, etc. It is possible a maximum of 5 stratifications and 40 variables in each request. The analysis over this group of users has been made examining all the application forms processed during the period 2011-2020 (first semester).

3. https://rica.crea.gov.it/modulo_richiesta_dati.php.

3. BDR online: use and users

As described, the analysis done on the use and users of Italian FADN has been performed through a questionnaire sent to the enabled accounts. The results are summarized in this paragraph, divided by topics: users' profile, reasons for requesting access, final use of data, most important variables downloaded, clearness of the instruments, opinion on the selectiveness and reliability of the information. It is important to point out that the questionnaire (voluntary) has been sent to all the users regardless to their first date of access to the database. A correct analysis would have required its drafting in parallel to the data use (to avoid omissions or less precision in the most detailed questions), as a pre-requisite to download the data.

In 2020, the users list included 258 enabled accounts belonging to several categories of stakeholders. Most part of them (151) were CREA users; 42 users have been recorded as public administration and local bodies; 36 Universities; 15 research and development agencies, 10 private subjects and 4 agricultural organizations.

In the last two years (2019-2020), 127 users have downloaded data from the BDR (64% from researchers of CREA and 20% from Universities) while the rest has never used data. This is an expected evidence: FADN information is made available in the BDR with the highest complexity and detail level and the targeted audience is represented by the scientific community (mainly academic and researchers).

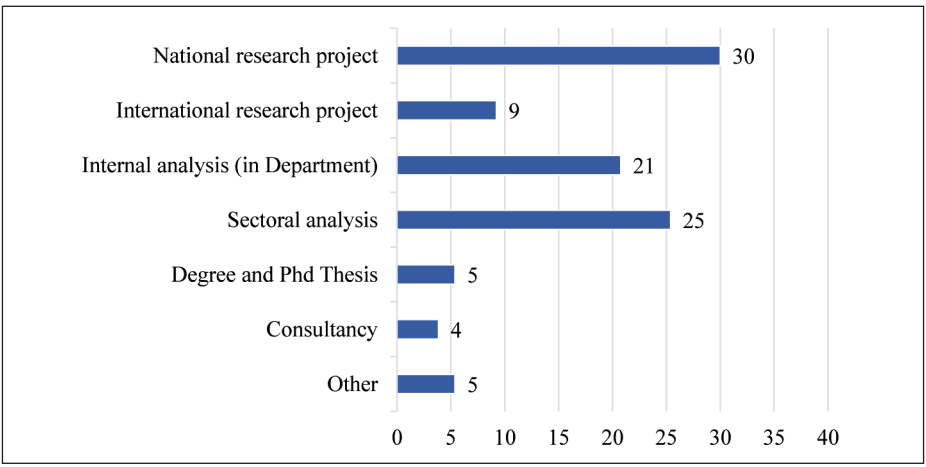
Over 127 users, 59 have replied (47% of the total accession). 88% of them has used directly the BDR data.

The answers are analysed separately.

Use of data: Why did you ask for an access to the BDR?

The Italian FADN is used for several purposes, going from statutory tasks (EU FADN obligations) to policy and impact evaluation analysis. Moreover, the dataset feeds several research projects such as EU FP7, Horizon2020, Phd research, development of models, etc. (Marongiu, 2021). Users were asked to specify this aspect regarding the uses of the FADN in their activity. Over 130 data downloads, 30% have fostered national research projects, followed by sectoral analysis (25%) and internal analysis in specific departments (in Universities or other public administration; 21%). 9% of downloads has fed international research project while is low the use for thesis (5%) or consultancy activities (4%). Probably in this last case, users prefer to get information using the online request form or asking directly to the CREA institute (Figure 3). This result highlights the relevance of the Italian FADN for the public research and, therefore, the importance of the openness policy to guarantee the more widespread and efficient access and the sharing of research data.

Figure 3 - Main uses of the Italian FADN database (% of downloads)



Source: our elaboration on direct survey.

Use of data: Which is the most important information did you have downloaded from the BDR? Which is the most important FADN information in your research sector?

The BDR is organized in tables in which the variables are stored and displayed. The information is grouped by categories (general information about farm, subsidies, livestock, financial statement, certifications, cultivations, labour, buildings and machinery, production, etc.). A close-ended question was addressed to have a general comprehension on the frequency with which the tables were consulted (never, rarely, often) while the information on the most downloaded variables was included in an open-ended question. In general, users are interested to download information regarding (i) general characteristics of the farm; (ii) categories of subsidies; (iii) financial statement (divided in Profit and Loss and Balance Sheet); (iv) cultivations; (v) labour; (vi) farm production. Less interest is played for structural data on buildings, land, and machinery. Tables collecting data on the characteristics of fertilizers and crop protection products are rarely downloaded despite the importance of these variables for environmental analysis. Excluding the annual cost incurred by the farm, collecting specific information is sometimes problematic: differently from the cost, the active ingredients and concentration are not allocated in the single production process, and the toxicity class sometimes can differ for the same products depending on the formulation. For the fertilizers, the unit of nitrogen, phosphorus and potassium is also indicated only for the whole quantity

purchased by the farm. Nevertheless, these difficulties, FADN has been used in several works having the environment as main object of analysis (Kelly *et al*., 2018). Users are often interested in having qualitative information of the seasonal work in terms of country of origin, gender, hours allocated in the production process. Less importance is played by weight and age of livestock, size of the buildings, soil characteristics.

Use of data: Did FADN meet your information needs? Is the general structure of BDR clear and understandable?

Although the Italian FADN collects a wide number of variables (more with respect the EU requirements), the users' information needs result fully satisfied for 58% of respondents. The rest has expressed a partial satisfaction that seems to be not directly linked to the broad spectrum of information available, but rather to methodological issues. The most important concerns elaborated from the open-ended question addressed to the partially satisfied users regard:

- clearness: it is not clear how some variables are calculated, and the unit of measurement is not immediate; for some information there are missing values;
- details: the production costs are not always detailed; the crop variety is not indicated; few information on the water use;
- frequency: the variable has been introduced recently and there is not a time series;
- outliers: many variables have anomalous data that should be deleted;
- reliability: many data seem to be not verified and is not clear if they are reliable and collected in the right way.

This is an important feedback in an improvement perspective. Regarding reliability, it is important to consider the general "environment" in which FADN is developed (Gastaldin and Turchetti, 2021): most part of agricultural holdings have not an accountancy system (compulsory only for the biggest ones). This implies that the whole survey is based on direct interviews, invoices, or related documents, but also on estimations whenever these supporting instruments are not available. Calculating the gross margins by productive process requires the allocation of costs among crops or livestock activities, done by the data collectors often through an estimation of the inputs' distribution. Reliability could be improved adding short methodological explanations where necessary. As concern the outliers, given the high number of variables influencing the agricultural activity, their presence is quite common. To improve this aspect, in 2020 a limited group of significative variables of the BDR (from 2008 to 2019) has been subjected to an outliers' analysis process, performed applying the box-plot method proposed by Tukey (a methodological note is downloadable from the BDR). Users can decide to exclude those farms presenting anomalous data.

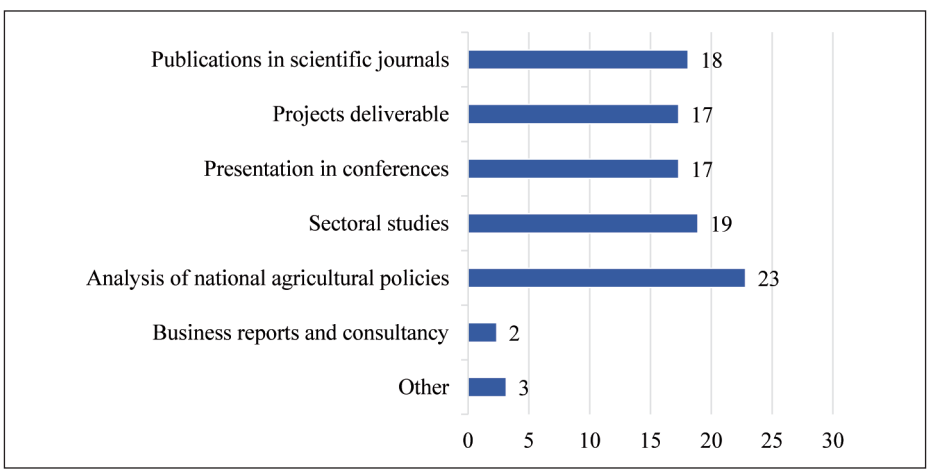
Regarding the clearness, the respondents consider the BDR clear, understandable, and well supported by a documentary system (65%). 35% found some difficulties in a clear comprehension of some sections, because:

- the documentary system is developed outside the BDR so it would be recommended a better integration and/or a direct link of documents with the single table;
- information is stored in different tables with different relationship order (one to one; one to many; many to one);
- the documentary system is clear but not always enough to explain in detail every single variable and the data production (estimation, calculation or derived by other formulas).

Use of data: Which kind of final products and analysis did you perform with FADN data?

40% of respondents use the data as a basis for models or scenario analysis, mainly performed by means of econometric models (44%), efficiency analysis (38%), PMP models (16%). The final scientific production is showed in Figure 4: most part consists in analysis of national agricultural policies (23%) followed by sectoral studies (19%) and publications in scientific journals (18%). Italian FADN is also a basis for project deliverables and presentation in conferences (17%) while is not widespread the use for business reports and consultancy (2%).

Figure 4 - Users' analysis and scientific production based on Italian FADN (%)



Source: our elaboration on direct survey.

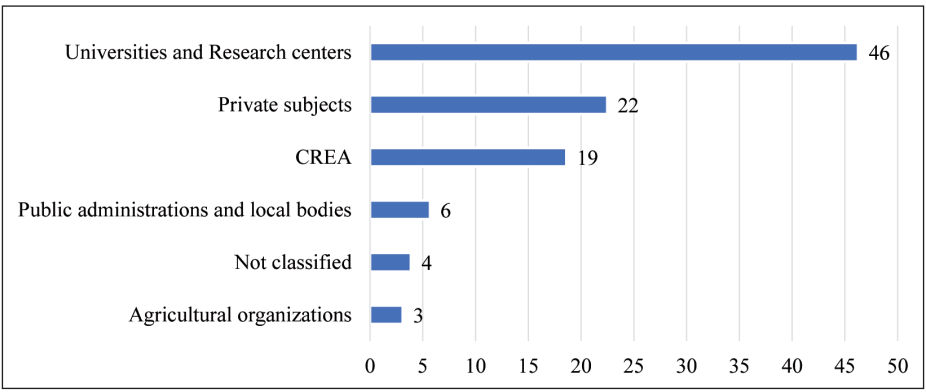
Use of data: Which variables do you consider important for the future research or users' interest?

A specific open-ended question was addressed to have a feedback about the future improvement of the BRD regarding variables not yet collected but potentially valuable in a future perspective. As expected, most of the respondents have mentioned the lack of details concerning environmental and social information. Use of water for irrigation, fertilizers and agrochemicals, data regarding agroecological practices and environmental impact have been claimed as particularly important for the future research needs. For the social analysis, users seem to ask for more details regarding the labour (especially the seasonal work), the social farming, the affiliation to Producers Organizations or other kind of associations, the indication of marketing channels of the single production. In this context, the possibility to add further variables enhancing the analytical and political relevance of FADN and its role in the sustainability assessment is the core of the conversion in Farm Sustainability Data Network (FSDN), an initiative launched within the Farm to Fork strategy, under discussion at European and national level (Gastaldin *et al.*, 2021; Turchetti *et al.*, 2021). This feedback confirms the necessity to improve the current survey framework, adding new variables, deleting those no longer needed or re-arranging and updating those still necessaries.

4. FADN users: analysis of the request forms

The second instrument by which Italian FADN data are disseminated is the request form submitted to CREA. In this case the user has not an access to all the database but can obtain a dataset of selected variables, variously grouped, and organized according to the needs. 387 application forms have been submitted to CREA from 2011 to the first semester of 2020. The profile of users is identified only by means of the affiliation: with respect to the BDR, here the level of detail is lower and users with a specific domain of interests are included like private subjects (22%), national and local public administrations (6%) and agricultural organizations (3%) (Figure 5). Almost half of the requests come from Universities and research institutions (46%) followed by and CREA staff (19%).

Figure 5 - Italian FADN request forms: affiliation of users (%)

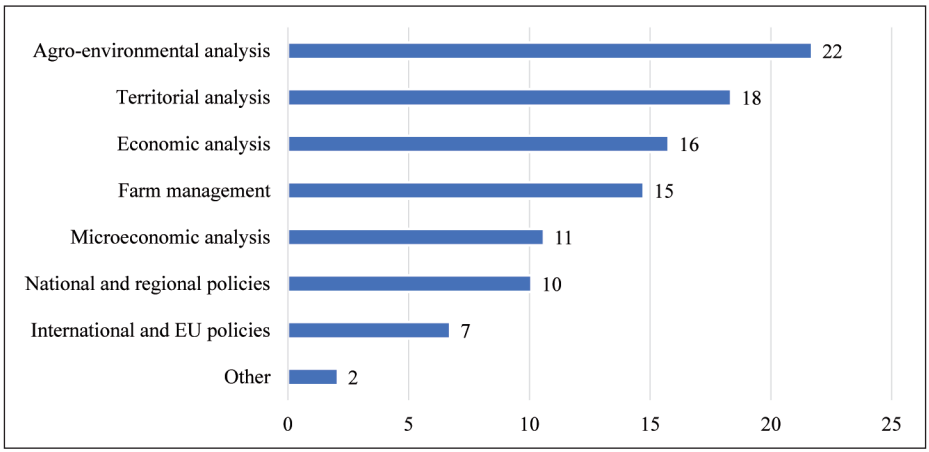


Source: our elaboration on direct survey.

Regarding the final use, 55% of requests has been used for regional analysis and 37% for national analysis. The territorial stratification of the requested variables permits to understand the most frequently analysed local contexts: 25% are required for the north-eastern Italy, 19% for the north-western, 17% for the centre and 39% for southern Italy. The distribution is almost the same among Regions (6-7%).

Differently from what has been highlighted analysing the use of BDR online, in this case data has been exploited mainly for agro-environmental analysis (22%) concerning water management, sustainable productions, emissions and agro-environmental systems. This thematic area has been followed by territorial analysis (18%) focused mainly on farm characteristics. Economic (16%) and microeconomic (11%) analysis and farm management (15%) have been related mainly on farm performance and profitability, production costs and farm assets (Figure 6).

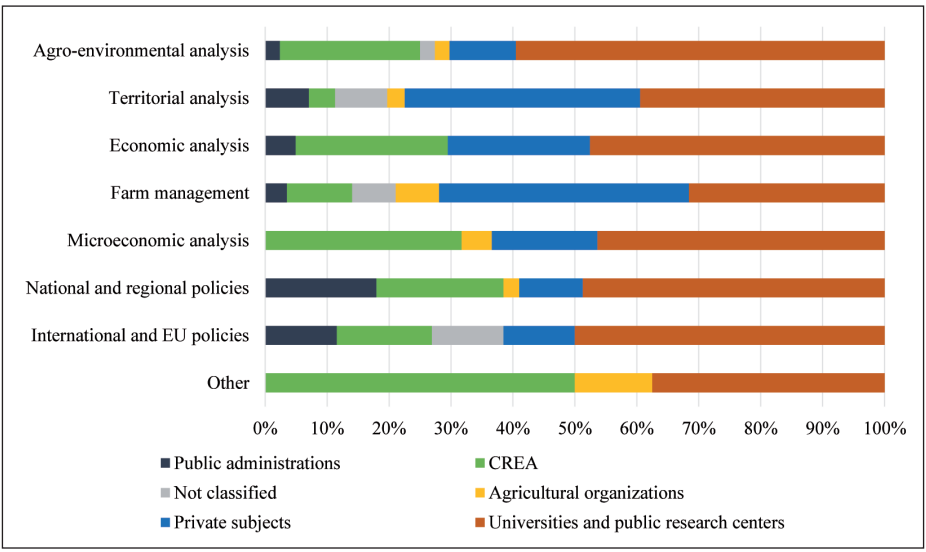
Figure 6 - Use of Italian FADN data by thematic area (2011-2020 first semester; %)



Source: our elaboration on direct survey.

The matching between the affiliation of users and the thematic area under investigation gives an idea about the users' field of analysis. Research from Universities and other bodies covers generally all the thematic areas with a greater attention for the agri-environmental aspects and policies. Administrations and local bodies are focused mainly of the variables for EU, national and regional policy analysis. Advisors (included in the private subjects) and agricultural associations ask for farm management data, economic and territorial analysis while the requests from CREA researchers concern mainly variables for microeconomic and agri-environmental analysis. With respect to the BDR, advisors seem to be more oriented to ask FADN data using the request form, and this is also an important aspect to consider in future: strengthening the use of data in farm advise could reinforce farmer's incentive to participate in the survey.

Figure 7 - Information requested by thematic areas and users



Source: our elaboration on direct survey.

5. Final remarks

The main objective of the Italian FADN is the collection of economic information on the national agricultural sector. This information is mandatorily sent to the European Commission but also made available at national level through several kind of tools characterized by an increasing level of aggregation, detail, and complexity according to the targeted audience. Being funded by public money, Italian FADN is considered as a public good and the information is made available for research, scientific or policy activities. Over the years, the database, and the whole IT system (server, software, data management, etc.) has evolved: (i) new tables and sections have been added, (ii) data are available and downloadable directly by the users or through customized tables grouped by region, type of farming and economic size, (iii) methodological notes and reports clarify the structure of the survey. The survey has gained a greater value since it has been used by a broad range of public and private researchers, for socio-economic and policy analysis, and for knowledge to the general public. Benefits and impacts of this system have been analyzed for the first time in this work through a users' satisfaction survey, that is considered a subjective way to evaluate benefits and value of this kind of public goods. The descriptive analysis of the results confirmed the importance of the Italian FADN in promoting the

public research, encouraging diversity of analysis, and making possible the application of different methodologies and models. Universities and research centers are the most important "consumers" of FADN data, used to perform national and international analysis published often in open access scientific journals, project deliverables and conference proceedings. This increases the benefits and the public importance of data access, giving a contribute to the general knowledge system. The provision of customized tables based on a set of specific variables asked by the users through a request form is another way to obtain FADN data: this dissemination method permits to broaden the base of users, enlarging it also to those who do not have a deep knowledge of the FADN structure. Private subjects, agricultural organizations and local bodies ask accession in this way.

Less frequent is the use for farm advice, that must be strengthen in future not only as incentive for farm's participation in FADN but also to reinforce the use in the Agricultural Knowledge and Innovation System (AKIS). Another important point raised in the survey concerns the opportunity to enable the exploration of new topics and the enhancement of data collection methods and measurement. 58% of respondents was fully satisfied from the use of the FADN database but the partial satisfaction seemed to be more related to methodological issues (clearness and reliability) than on the lack of data. Moreover, several variables have been considered important in future perspective, namely environmental and social information. Despite the higher number of information gathered by the Italian FADN comparing the mandatory scheme, the importance to integrate the actual survey system with additional variables related to the environmental and social aspects of farm management is emerged as an important feedback. This option is currently under discussion and the likely conversion of FADN in FSDN will have implication in all the Member States. Adding further variables means additional efforts in collecting, checking, validating the data and requires a higher trust between farmers and data collectors, as stated in some study (Vrolijk *et al*., 2016). A feedback over the users' satisfaction has been pointed also regarding the clearness of the BDR.

Although this first work has been limited to inquiry some aspects of use and users of the Italian FADN, it is considered an important step to track the uses, better framing the final products. This is a first attempt, but it would be recommended to monitor systematically the FADN users in each access. The questionnaire could be more fully structured to collect further information on specific characteristics of respondents like age, educational level, knowledge of FADN, etc. It may be appropriate also a short inquiry over the Datawarehouse to have some idea about the satisfaction of the general public and the level of dissemination.

References

Abbott, P., Boussios, D. & Lowenberg DeBoer, J. (2016). Valuing Public Information in Agricultural Commodity Markets: WASDE Corn Reports, Annual Meeting, July 31-August 2, Boston, Massachusetts 234902, Agricultural and Applied Economics Association, doi: 10.22004/ag.econ.234902.

Arzberger, P., Schröeder, P., Beaulieu, A., Bowker, G., Casey, K., Laaksonen, L., Moorman, D., Uhlir, P. & Wouters, P. (2006). Promoting Access to Public Research Data for Scientific, Economic, and Social Development. *Data Science Journal*, *3*, 135-152, doi: 10.2481/dsj.3.135.

Fienberg, S.E., Martin, M.E. & Straf, M.L. (Eds.) (1985). *Sharing research data*. Washington DC: National Academic Press.

Garcia, P., Irwin, S.H., Leuthold, R.M. & Yang, L. (1997). The value of public information in commodity futures markets. *Journal of Economic Behavior & Organization*, *32*(4), 559-570, doi: 10.1016/s0167-2681(97)00013-9.

Gastaldin, N., Marongiu, S. & Turchetti, L. (2021). *La RICA e i futuri fabbisogni informativi, in Utilizzi e utilizzatori attuali e futuri della RICA italiana* (a cura di Marongiu, Turchetti). CREA-PB.

Gastaldin, N. & Turchetti L. (2021). *Analisi qualitative della rilevazione RICA, in Utilizzi e utilizzatori attuali e futuri della RICA italiana* (a cura di Marongiu, Turchetti), CREA-PB.

Hill, B. & Bradley, D. (2016). Comparative analysis of the FADN Data collection systems in EU-28. Contributed paper prepared for presentation at the 90th Annual Conference of the Agricultural Economics Society, University of Warwick, England, 4-6 April 2016.

Hill, B., Bradley, D. & Vrolijk, H. (2016). Uses and benefits of FADN information in the EU-28. *Eurochoices*, *15*(3), 11-15, doi: 10.1111/1746-692X.12138.

ISTAT (2019). *Rilevazione sul grado di soddisfazione relativo ai prodotti e ai servizi offerti sul web*. Direzione Centrale per la comunicazione, informazione e servizi ai cittadini e agli utenti, Roma.

Kaul, I., Grunberg, I. & Stern, M. (1999). *Defining Global Public Goods. Global Public Goods: International Cooperation in the 21st century*. New York: Oxford University Press.

Kelly, E., Latruffe, L., Desjeux, Y., Ryan, M., Uthes, S., Diazabakana, A., Dillon, E. & Finn, J. (2018). Sustainability indicators for improved assessment of the effects of agricultural policy across the EU: is FADN the answer? *Ecological indicators*, doi: 10.1016/j.ecolind.2017.12.053.

Marongiu, S. (2021). Rassegna della letteratura: stato dell'arte. In Marongiu, S. & Turchetti, L. (a cura di). *Utilizzi e utilizzatori attuali e futuri della RICA italiana*. CREA-PB.

National Research Council (1999). *A Question of Balance: private rights and public interest in Scientific and Technical Databases*. Washington DC: National Academic Press.

Turchetti, L., Gastaldin, N. & Marongiu, S. (2021). Enhancing the Italian FADN for sustainability assessment: State of art and perspectives. *Economia Agro-Alimentare / Food Economy*, *23*(3), 1-21, doi: 10.3280/ecag3-oa12771.

Samuelson, P.A. (1954). The Pure Theory of Public Expenditure. *Review of Economics and Statistics*, *36*(4), 387-389.

Stiglitz, J.E. (1999). Knowledge as a Global Public Good'. In Kaul, I., Grunberg, I. & Stern, M.A. (Eds.). *Global Public Goods: International Cooperation in the 21st Century* (pp. 308-325). New York/Oxford: Oxford University Press.

Uhlir, P. & Schröeder, P. (2007). Open data for Global Science. *Data Science Journal*, doi: 10.2481/dsj.6.OD36.

UNECE (2018). Recommendations for Promoting, Measuring and Communicating the Value of Official Statistics. *ECE/CES/STAT/2018/2*. United Nations, Geneva (Switzerland).

Verschraegen, G. & Schiltz, M. (2007). Knowledge as a Global Public Good: The Role and Importance of Open Access. *Societies Without Borders*, *2*(2): 157-174, doi: 101163/187219107X203540.

Vrolijk, H., Poppe, K. & Keszthelyi, S. (2016). Collecting sustainability data in different organisational settings of the European Farm Accountancy Data Network. *Studies in Agricultural Economics*, *115*, 138-144, doi: 10.7896/j.1626.

World Bank (2010). Global strategies to improve agricultural and rural statistics. Economic and Sector Work. Report Number 56719-GLB.

Sonia Marongiu
Researcher - CREA, Research Centre for Agricultural Policies and Bioeconomy
Via dell'Università, 14 - 35020 Legnaro (PD), Italy
E-mail: sonia.marongiu@crea.gov.it
Degree in Forestry Science, Phd in Agricultural policies, expert in forestry and agricultural economics and policies, rural development policies, FADN data analysis, coordinator of FADN survey in Trentino Alto Adige.

Barbara Bimbati
Technologist - CREA, Research Centre for Agricultural Policies and Bioeconomy
Via dell'Università, 14 - 35020 Legnaro (PD), Italy
E-mail: barbara.bimbati@crea.gov.it
Degree in Agricultural Science, coordinator of FADN survey in Veneto region, author of regional and national reports based on FADN data analysis.

Mauro Santangelo
Research Technical collaborator - CREA, Research Centre for Agricultural Policies and Bioeconomy
Via Po, 14 - 00198 Rome (Italy)
E-mail: mauro.santangelo@crea.gov.it
Graduated in Agricultural Science, responsible for FADN data extraction, expert in the acquisition, treatment, and processing of FADN data and in the design and development of FADN database.