



Deliverable Title

Report on operational manual of Simplified Balance Sheet online

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List of acronyms and abbreviations

AWU	Annual Work Unit
BP	Business Plan
BS	bare soil
CA	Current Assets
CAP	Common Agricultural Policy
CC	Current Costs
clc	Crops and Livestock costs
CREA-PB	Consiglio per la Ricerca in Economia Agraria – Politiche e Bioeconomia
CUAA	Codice Unico di Identificazione Aziende Agricole
depr	Depreciation
DSS	Decision Support System
EC	European Commission
ES	Economic Size
etc.	<i>Et cetera</i>
EU	European Union
FA	Fixed Assets
FADN	Farm Accountancy Data Network
FS	Financial Statement
FSS	Farm Structure Survey
FUAA	Fodder Agricultural Area
FWU	Familiar Work Unit
GAIA	Gestione Aziendale delle Imprese Agricole
GSP	Gross Saleable Production
ha	hectares
hp	Horsepower
<i>i.e.</i>	<i>Id est</i>
IAS	International Accounting Standards
INEA	Istituto Nazionale di Economia Agraria
IPM	Integrated Pest Management
kW	Kilowatt
LFA	Less Favoured Areas



LTD	Long-term debts
LU	Livestock Units
LV	Land Value
ME	Machinery and Equipments
NI	Net Income
NP	Net Product
OGA	Other Gainful Activities
ogac	OGA costs
OI	Operating Income
or	Other revenues
osr	Other subsidies and revenues
OTE	Ordinamento tecnico-economico
PC	Pluriannual costs
rcs	Revenues from Crop Sale
RDP	Rural Development Programmes
RICA	Rete di Informazione Contabile Agricola
rliv	Output from livestock
sc	Stock changes
SFS	Simplified Financial Statement
SO	Standard Output
subs	Subsidies
TF	Type of Farming
toc	Taxes and other costs
TR	Total Revenues
TUAA	Total Utilized Agricultural Area
TUAAp	TUAA owned
TWH	Total Worked Hours
UAA	Utilized Agricultural Area
USA	United States of America
VA	Value Added
VAT	Value-Added Tax
wr	Wages and Rents



Executive summary

The deliverable is structured as an operational manual for the use of a Decision Support System (DSS) implemented by CREA-PB as a support for the farm management. This tool is available online in Italian and in English and is a Simplified Balance Sheet developed inside the Italian Farm Accountancy Data Network (FADN). One of the main goals of CREA-PB is the increase of accounting knowledge's among the Italian farms, making available several support tools used for the assessment of farm performance, for impact and scenario analysis and evaluation of the farm economic sustainability.

The main instrument developed inside this framework is the software GAIA by means of which FADN survey is carried out in Italy: GAIA is based on the double bookkeeping system which allows the detection, allocation, control, processing and analysis of farm's costs and revenues. The methodology is aligned with the European regulations, with the Italian law and with the International Accounting Standards for agriculture (IAS41). FADN is the basis of the survey: it was launched in 1965 with Council Regulation 79/65 and as an instrument for evaluating the income of agricultural holdings and the impacts of the Common Agricultural Policy. It is the only microeconomic survey carried out in Europe and is based on a harmonized accounting methodology, crucial to implement comparative analysis during the year, between different areas or among different farm typologies. The number of information satisfy the increasing need of accounting information coming from various users (researchers, universities, practitioners): the evaluation of the farm sustainability (economical, environmental and social) and the innovation impact is becoming even more important in the European and global context and cannot disregard the microeconomic analysis of involved farms.

The web application of the Simplified Financial Statement inside the Italian FADN (SFS-RICA) can be adapted to several analysis, and in particular those having as objective the assessment of the farm productivity and profitability: the results can be compared in different moment and for different farm typologies in order to evaluate and plan the farm business. The logic behind the scheme of SFS-RICA is the same of a Business Plan.

SFS-RICA is normally used by farmers but also by private or public institutions in the measurement of the economic effects of an investment or an innovation. It is a tool used to evaluate also the introduction of a public support scheme or a determined set of production factors and services. Advisory and consulting services are becoming more interested to the SFS-RICA to provide a further support service to their associates and the universities are using this approach for educational purposes. SFS-RICA does not require deep accountancy expertise, but a minimum knowledge of the economic and patrimonial aspects and of the most important events in the farm management, especially to interpret the results and the set of indicators. The deliverable is structured as an operative manual with the instructions for the use of the SFS-RICA online. All the contents will be illustrated with the most important tables. The working version of the SFS-RICA is available in Italian and a beta-version is currently under test only for the interested partners and it will be available for all the users in a few months.

1. The accounting in agriculture: Farm Accountancy Data Network (FADN)

There is a gap between the low level of accounting practice in the agricultural sector and the importance to gather accounting information. One of the institutional goals of CREA-PB is to fill this gap with the dissemination of the accountancy in the agricultural sector. The accountancy aspects of the farm management do not receive much attention, not only from the farmer but also from accounting researchers and practitioners (Vazadikis *et al.*, 2010). In general, there is a lower level of managerial and accountancy knowledge among farmers: even in the highly industrialized Western countries, the predominance of the small family farms makes clear the limited use of accounting in agriculture (Olson, 1988) and the preparation of accounting reports is not a common practice. Because of their size or legal form, most European farms have no legal obligation to publish financial statements and their only task is to prepare accounts in order to comply with tax framework and subsidies (Kroll, 1987; Andre, 1987). In France and the European Union (EU) tax related to economic schemes encourage authorities to promote the use of accounting in agriculture (Pellerin, 1985).

On the other hand, it is generally believed that accounting can improve farm management and lead to better performance (Luening, 1989). Furthermore, the accounting procedures make a significant contribution to prediction and explanation of negative economic results (Argiles and Slob, 2001). In the European context, the need to evaluate the consequences of the different interventions and measures of the Common Agriculture Policy (CAP) and the Rural Development Policies has led to the implementation of a standardized survey methodology named FADN, collecting accounting information of a sample of EU farms. The evaluation of the impact of LFA (Less Favoured Area) payments of farms economic results on the basis of FADN data has been the object of an analysis implemented in Czech Republic (Stolbova and Hlavsa, 2008) where different kind of Less Favoured Area (LFA) payments have been compared. The impact has been evaluated for the Gross Farm Income, the Farm Net Value Added, and the Family Farm income. The result was to define the winners and the losers in the current system. Zorn *et al.* (2018) have applied financial ratios to analyse the economic sustainability of Swiss dairy farms on FADN basis.

The accounting information can improve farm management, but also provide information for the implementation of models or other analysis as the technical efficiency or the investments/innovation impact.

The accounting principles in agriculture are not applied in the same way in all the countries and this make difficult sometimes the comparison among countries. An informal cash bookkeeping system is the most common accounting method used in Canada even if this does not present a fair performance of the farm (Colwell and Koroluk, 1990). Seger and Lins (1986) present similar outcomes in the USA. Crane and Leatham (1995) consider standardized accrual accounting necessary for the growth rate of agricultural entrepreneurship in the USA. In the European scheme of FADN, the fair value and the



accrual principles are considered as pillars for the survey. The Farm Accountancy Data Network (FADN) was launched in 1965 with Council Regulation 79/65 as an instrument for evaluating the income of agricultural holdings and the impacts of the Common Agricultural Policy (CAP). The field of survey in FADN is based on the Farm Structure Survey (FSS) managed by Eurostat.

FADN is a mandatory survey for all the EU Member States and is based on accounting harmonised bookkeeping principles that make comparable data and economic results of all the countries every year. Starting for the field of observation defined in a Selection Plan, a sample is selected in each country, representing the national structure of agriculture and reflecting the diversity. The sample is set up on the basis of the typology classification aligned with the FSS and an individual weight is applied to each farm in order to guarantee the representatives. FADN sample includes approximately 80,000 holdings in Europe, representing a population of about 5 million farms (90% of Utilized Agricultural Area and 90% of production). The survey does not cover all the agricultural holdings but only those which, due to their size, can be considered “commercial” on the basis of a minimum threshold (different in the FADN countries) represented by the Standard Output (SO). The SO of each crop and livestock is the regional average monetary value of the agricultural output at farm-gate price over the reference period. It can be obtained by multiplying the quantity of each production obtainable from a certain crop or livestock by its unit price.

Farms participating in FADN are classified according to Community Typology for Agricultural Holdings (rules defined in the EC Council regulation 1217/2009). This classification is made according to two criteria (Economic Size and Type of Farming) based on the SO:

- the Economic Size (ES) of a holding is the value of its total SO, *i.e.*, it is the sum of the individual SO of all the agricultural characteristics present on the holding, expressed in euro per hectare or per head of livestock;
- the Type of Farming (TF) of a holding is the production system which is characterised by the relative contribution of different enterprises to the holding's total SO.

The SO of each crop and livestock is the regional average monetary value of the agricultural output at farm-gate price over the reference period. It can be obtained by multiplying the quantity of each production obtainable from a certain crop or livestock by its unit price. The information concerns about 1,000 variables, described in a specific questionnaire called Farm Return that refers to:

- physical and structural data (location, crop areas, livestock numbers, labor force);
- economic and financial data (value of production of crops, stocks, sales and purchases, production costs, assets, liabilities, production quota, subsidies).

Data are transmitted to the Commission and published in the Standard Results database, a set of statistics, calculated for the Farm Returns that describes the economic situation of farmers by different groups.



The set of variables required by FADN is the same of the Simplified Financial Statement, with some adjustment to consider the national research needs and with additional information not required by the EU Farm Return but useful to analyze specific aspects of the Italian agriculture (like the set of indicators or the Financial Statement scheme).

The SFS suggested as instruments for the evaluation of the innovation impact at a farm level, has its basis in a software, named GAIA (“Gestione Aziendale delle Imprese Agricole” - Farm Management in Agricultural Enterprises), implemented in 2008 by CREA (ex-INEA) as a tool to collect data for the Italian FADN (RICA) and to help farmers in the implementation of the farm accountancy. The methodology behind GAIA is a double-entry book-keeping system that follows the national accountancy principles, integrated with the International Accounting Standards (IAS). Besides the information needs coming from the FADN regulation, GAIA collect data on other farm management aspects like labor (family workers and contract workers) and off-farm activities (including forestry). Moreover, it produces a set of technical and economic indicators that permit specific analysis on the productivity, profitability, level of investments.

The scheme of the SFS-RICA proposed to analyze the impact of the innovation in the short period, has its basis in a list of information necessary to define the structure of the holding in a moment:

- farm context: general data on the farm (localization, farm type, economic size, information on farm holder);
- assets: land, buildings, machinery, livestock;
- technical management of land, agricultural permanent crops, storage, workforce, breeding and fattening livestock;
- accountancy management: double-entry registration of receipts (sales and purchases), subsidies, other financial accounts (loans, interest payments, taxes);
- closing procedures: allocation of operational costs (calculation of gross margins).

2. The Business Plan and the Financial Statement

A Business Plan (BP) includes a section for the financial analysis that contains useful information to assess how the holding is financed at the present, what will be the need in the future and what will be the expenses.

The financial analysis section in a Business Plan includes these elements:

- Financial Statement (Balance Sheet and Income Statement);
- Cash-flow analysis;
- Break-even analysis.

The financial statement reports on the economic and financial position of the holding in a specific time point. It summarizes the farm management in a given account year and include three documents:

- Balance Sheet (assets and liabilities);
- Income Statement (revenues and expenses);
- notes to the Financial Statement.

The Financial Statement permits to know the income of the agricultural activity at the end of the productive cycle. It helps to improve the farm management and its technic and economic organization (*i.e.* new machinery, new assets, and different cultivations) or to estimate the value of the farm (*i.e.* to get loan from bank).

The Financial Statement is normally drawn up at the end of the year, reporting all the incomes and expenses observed during the accounting year.

The Balance Sheet shows what an entity owns (assets) and how much it owes (liabilities) as well as the amount invested (equity) (Figure 1). The information displayed in this document can be used for multiple purposes and to satisfy different needs. One of this uses is the analysis of an investment or the scenario analysis.

The Income Statement is a summary of revenues and expenses occurred during a specific accounting period. It is a measure of input and output and offers a view of the value of farm production and the costs to carry out that ordinary activity. All the data related to the Income Statement should correspond to the production in the accounting year. Costs recorded are those used in the year's production, even if the inputs were not purchased during the accounting year (*i.e.*: it is possible to spend money for the purchase of input that will be used for the production of the next year). The scheme is illustrated in Table 1: Description of cost categories in the FS-RICA scheme.

Revenues can be referred to:

- agricultural activities (crops and livestock that give the amount of the Gross Saleable Production – GSP);
- other revenues from complementary activities (contract work, other revenues or Other Gainful Activities – OGA as agriturismo or social agriculture).

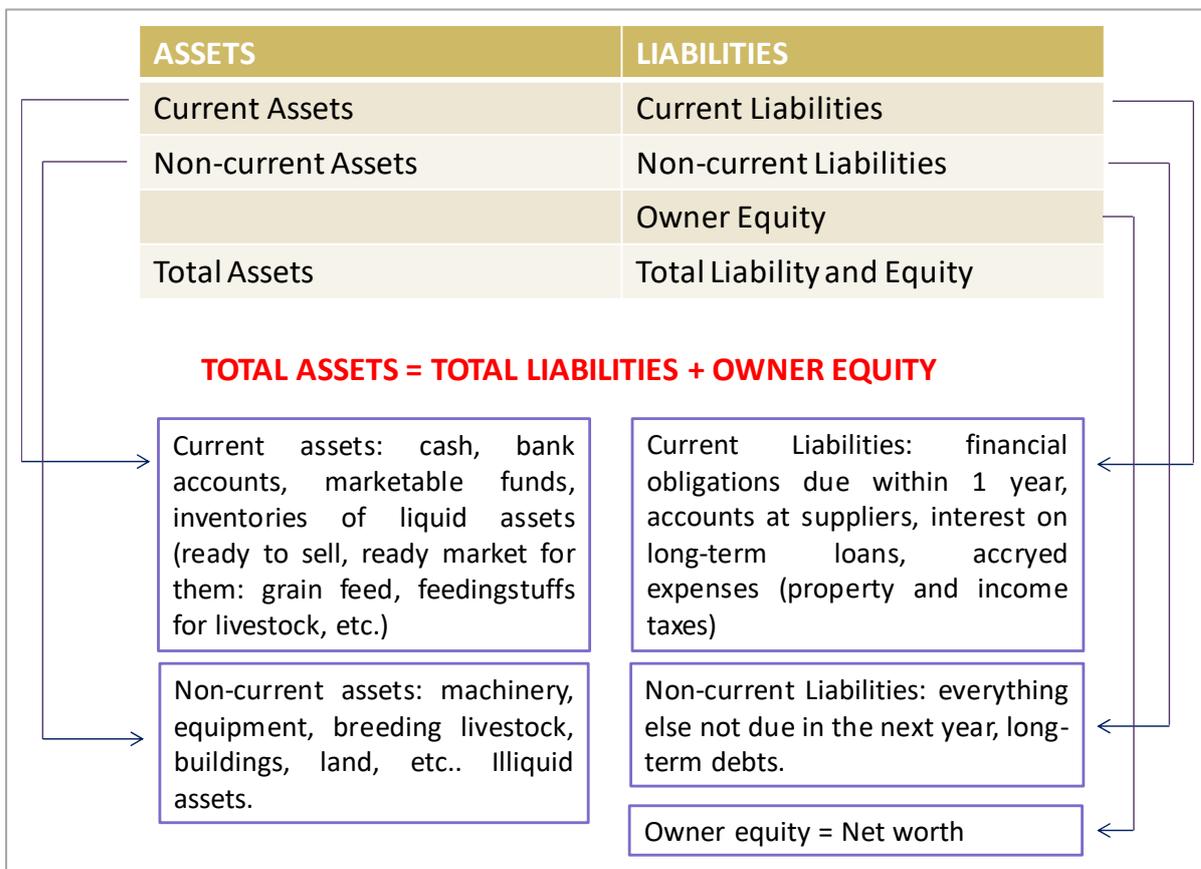


Figure 1: Structure of assets and liabilities in the Balance Sheet.

The costs can be classified in two categories:

- current costs or short-term costs (1 year): the costs for crops and livestock related to the yearly production are included in this category, as the costs for OGA;
- pluriannual costs or long-term costs (> 1 year): the costs incurred by the farm for long-term assets considered as investments for the holding that will benefit of them for many years. Long-term assets can include fixed assets (machinery, buildings, plant and equipment) or other assets like particular investment in research, patents or trademarks. These assets are reported on the Balance Sheet while in the Income Statement must be attributed only the yearly quota, established on the basis of an amortization plan. The depreciation is the accounting method to allocate these costs over their useful life, and represents how much of an asset's value has been used. It is calculated to consider the use, wear, aging and technical obsolescence of an asset. If not taken into account, the profits can be influenced. In an agricultural holding, are subject to depreciation machinery, equipment, buildings, breeding livestock, perennial crops, irrigation wells, land improvements (drainage, wells, etc.). The land is not depreciated because its life is considered infinitive.

Table 1: Description of cost categories in the FS-RICA scheme.

Income Statement Scheme	
Revenues from Crop Sale	r _{cs}
Subsidies	sub _s
Stock changes	sc
Output from livestock	r _{liv}
Gross Saleable Production	$GSP=r_{cs}+sub_s\pm sc\pm r_{liv}$
Other revenues (incl.OGA)	or
Total Revenues	$TR=GSP+or$
Crops and Livestock costs	cl _c
OGA costs	og _{ac}
Value Added	$VA=TR-cl_c-og_{ac}$
Depreciation	depr
Net Product	$NP=VA-depr$
Wages and Rents	w _r
Operating income	$OI=NP-w_r$
Taxes and other costs	to _c
Other subsidies and revenues	os _r
Net Income	$NI=OI-to_c+os_r$

The Net Income is the most important economic result of the farm accountancy. It is a measure of the farm profitability and the remuneration of family labour, own land and own capital. The Net Income is an important parameter in the definition of important farm indicators, like the income per work unit, the farm profitability per hectare.

3. The Simplified Financial Statement (SFS-RICA)

3.1. Technical information

The web application SFS-RICA is available (only in Italian) to this link:

<https://bilanciosemplificatorica.crea.gov.it/>

To use the web tool is necessary to login with username and password.



The application has been realized in Windows, with “.NET” platform technologies and using objects and programming instruments of MS Visual Studio 2010. The database runs under MS SQL Server 2016 Standard.

The web application is structured on more levels:

- Presentation (user-interface);
- Control (data-entry and data-flow checking);
- Business (information analysis);
- Data (data-access).

SFS-RICA does not require particular accounting and informatic competences. A minimum knowledge on agricultural economics nomenclature and the farm management is opportune (allocation of Utilized Agricultural Area, livestock management, products and productions processed or not).

The following instruction refers to a beta-version of the SFS not yet available to all the users (in testing phase). Figure 2 shows the summary of the data collected. In the right side there is the typological classification in Farm Type (OTE – “ordinamento tecnico-economico”) and Economic Size (“Classe Dimensione Economica”) applied for the FADN farms. The classification is based on the calculation of national SO for each agricultural activity. This means that it cannot be applied to classify farms operating in other countries. The classification is pointless for external farms because is based on the calculation of national SO for each agricultural activity.

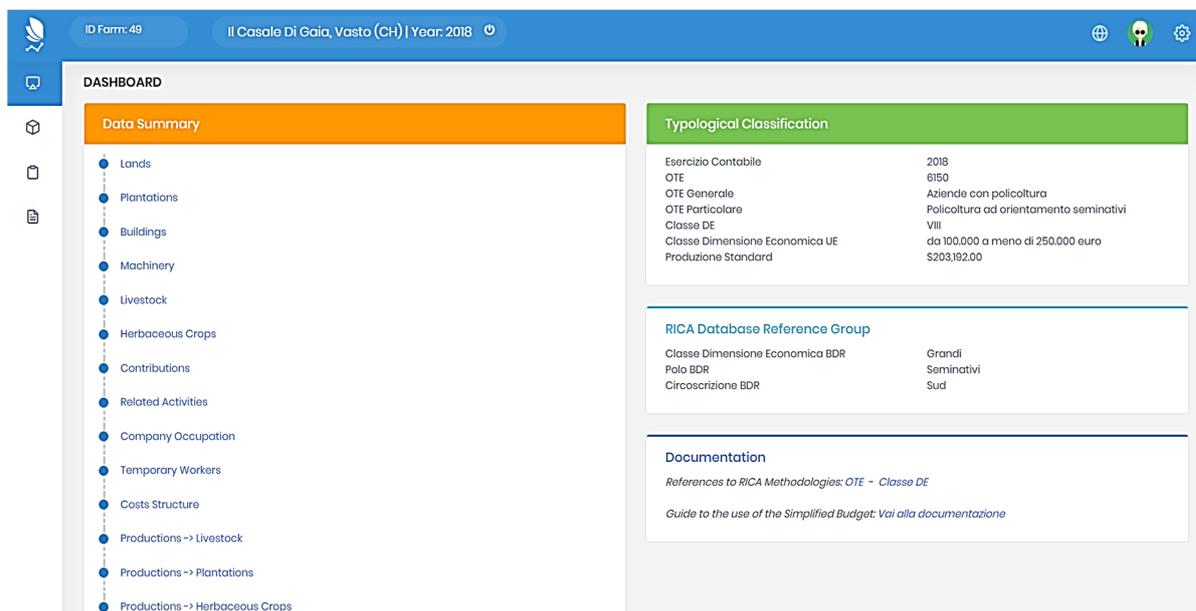


Figure 2: Dashboard of the SFS-RICA online.

3.2. Identification data (holding and holder)

The first information is related to the farm identification data: name and surname, identification code (in Italy, every farm has a CUAA – “Codice Unico di Identificazione Aziende Agricole”, that correspond to the fiscal code and is used sometimes to find information in other administrative databases), ownership, *etc.*

3.3. Farm Assets

The section Farm Assets (“Dati Patrimoniali”) is dedicated to the registration of the monetary value of the capital (fixed, current, tangible or intangible) owned or not by the holding. All the components used in the production process and in the ordinary farm activity must be described and measured.

Normally, the evaluation of the total asset is made at the beginning of the accounting year: all the accounting movements (purchases, sales, acquisitions, debts) are recorded during the year and, on their basis, the final evaluation is made at the end. In this simplified version of the Financial Statement, the value is calculated directly at the end of the year.

This inventory covers all the material and the tangible and intangible assets available in the farm, regardless the ownership (property, rent, other loans) used in the production process. The Farm Assets includes the evaluation of:

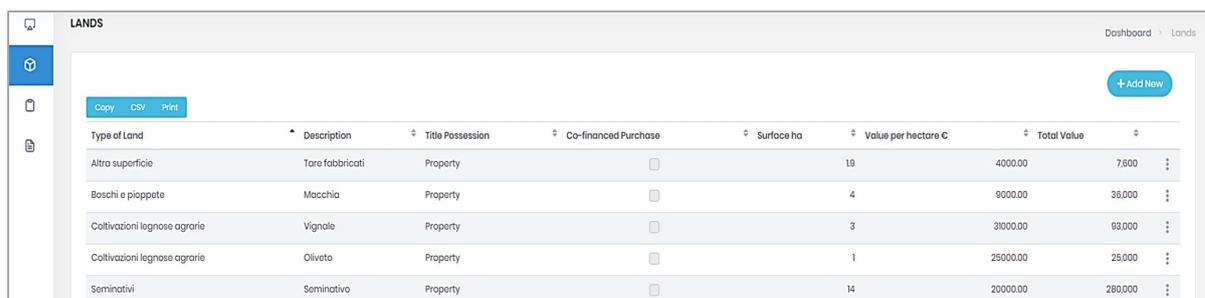
- land;
- perennial crops;
- buildings;
- machinery and equipment;

- cash and claims;
- debts;
- quotas and other rights.

3.3.1. Land

The land must be distinguished according to the agricultural use (arable land, perennial crops and grasslands/pastures) and ownership (property or rented). Non-agricultural land is indicated separately as land temporarily not cultivated during the year or cultivated for one small period. In each registered typology, it must be indicated the extension in hectares and the market value per hectare (on the basis of the local prices). This last value corresponds to the value of the bare soil excluding the buildings or other plantations existing on the land (recorded in another section of the BS-RICA). The total value of the land belonging to the holder determines the item Land in the Balance Sheet.

Example: Typology, Description (optional), Ownership, Surface (ha), Value (per hectare and total).



Type of Land	Description	Title Possession	Co-financed Purchase	Surface ha	Value per hectare €	Total Value
Altro superficie	Tare fabbricati	Property	<input type="checkbox"/>	19	4000.00	7600
Boschi e pioppete	Macchia	Property	<input type="checkbox"/>	4	9000.00	36000
Coltivazioni legnose agrarie	Vignale	Property	<input type="checkbox"/>	3	3000.00	9000
Coltivazioni legnose agrarie	Oliveto	Property	<input type="checkbox"/>	1	25000.00	25000
Seminativi	Seminativo	Property	<input type="checkbox"/>	14	20000.00	280000

3.3.2. Perennial crops

The section refers to the perennial crops cultivated in the farms, excluding wooded land and poplar groves. Perennial herbaceous crops (excluding fodder plants) are considered as perennial crops, being the planting cost subject to depreciation (it is the case of asparagus, artichoke or strawberries).

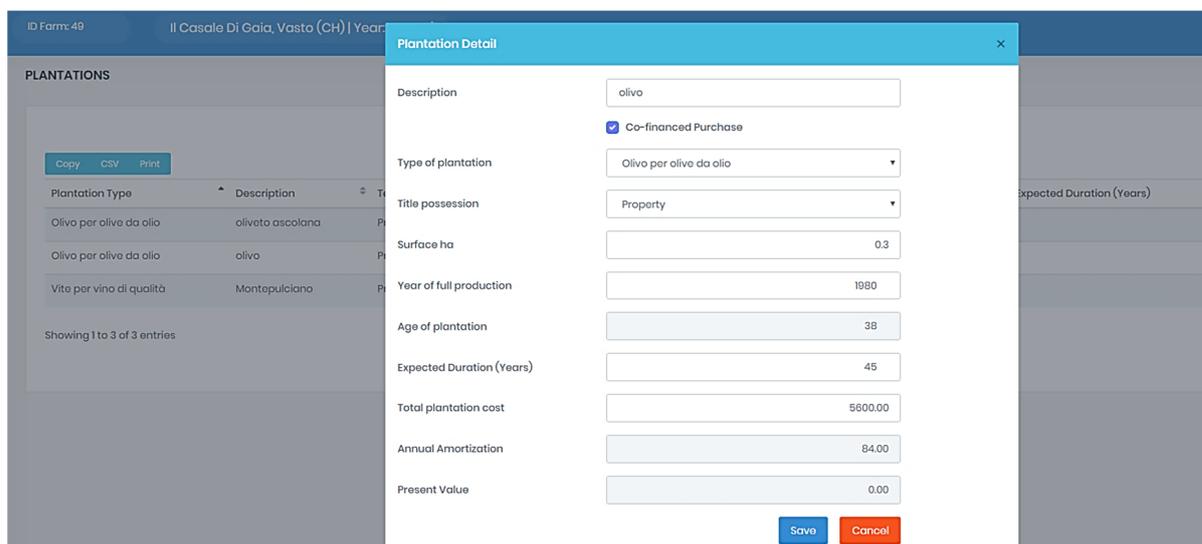
Perennial crops must be distinguished by species, ownership and age (planting year) in order to calculate the annual depreciation. More than one plantation must be recorded for each kind of crops (*i.e.* two citrus plantations having the same ownership and the same age must be recorded as one). The total UAA is indicated in hectares: the sum of the total acreage of perennial crops in this section must be the same that the one recorded in the Land section. Crops not yet productive must be recorded in any case, indicating the first year of full production. Plantations purchased or stopped during the year but originating a production, must be recorded too.

The planting cost include the expenses incurred by the farm from the first plantation to the first fully production, including the indirect costs and the loss of income. All these costs must be recorded only in this section (to avoid the duplication in the Costs section) and only for plantation owned by the farmer.

The annual depreciation is calculated in a linear way, on the basis of the ratio between the planting cost and its economic life. The percentage is predefined in the system in order to assure the comparability among different farms (and respecting the accounting principles of Italian fiscal regulation) and is equal to 20 years (5% of historical cost). However, the user can indicate a different technical life of the plantation that can be higher than the economic life.

The total value of the perennial crops owned by the farm determines the item Perennial crops in the Balance Sheet.

Example: description (optional), typology, ownership, UAA (ha), year of the full production, age, total plantation cost, annual amortization or depreciation and present value (=0 because the technical life is higher than the predetermined economic life).



3.3.3. Buildings

In this section, the buildings belonging to the holder and used for the agricultural activities must be registered, including the buildings purchased or sold during the accounting year and used for the ordinary activity. Buildings are distinguished by type, ownership and age (more than one building can be recorded within the same classification). The building size is indicated with a specific unit of measurement. The field Description is optional and is possible to add further information about the characteristics of the building. If farm buildings are co-owned with third parties, only the value pertaining to the holder must be recorded.

Only for the buildings owned by the holder, the construction cost must be indicated: this value corresponds to the historical purchase cost or to the total cost incurred by the farm during the accounting year for its construction (in case of new farm structures built in the year). These expenses must be recorded in this section and not as a farm costs in order to avoid the duplication.

The annual depreciation of the buildings is calculated as a linear depreciation of the construction or purchase cost, on the basis of a predetermined economic life of the building: the system indicates 40 years (2.5% of the historical cost) in order to make possible the

comparison among different farms. However, users can indicate a different technical life of the building that can be higher than the economic one.

All the values determine the item Buildings in the Balance Sheet.

3.3.4. Machinery and equipment

Tractors, moto cultivators, lorries, vans, cars, major and minor farming equipment used in the ordinary activity of the farm must be recorded here, including those sold or purchased during the accounting year.

The different items must be recorded on the basis of the typology, ownership and age; even in this case, more than one item can be included in the same classification. It is possible to add a description and for machinery and equipment co-owned with third parties, only the value pertaining to the holder must be recorded.

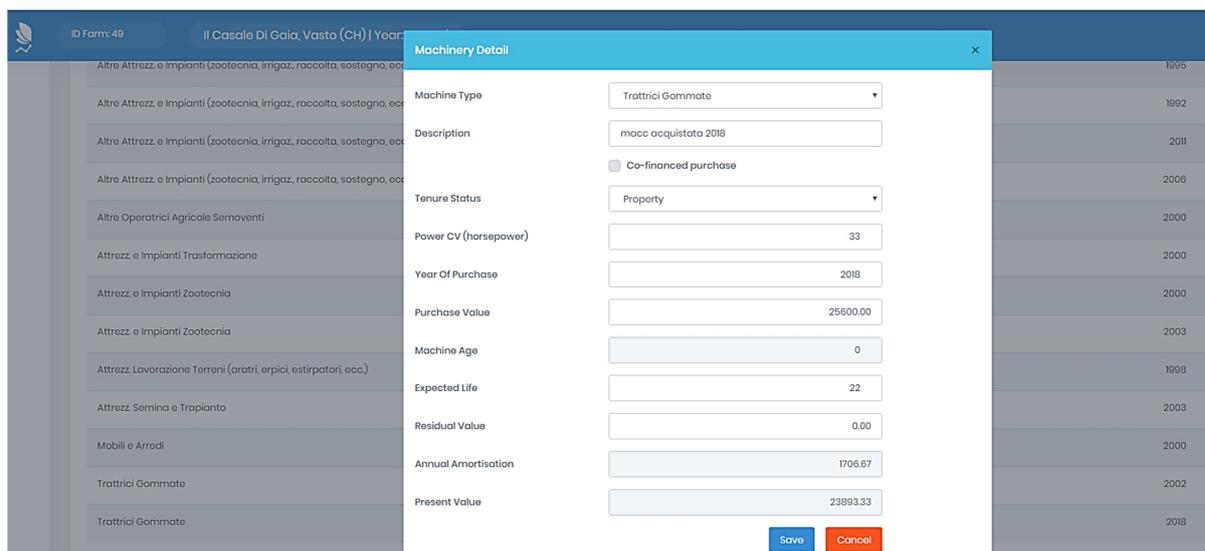
The power output of tractors and moto cultivators must be indicated (1 hp = 0.7355 kW): this information has not an accounting value but is used to evaluate the total power output of the farm in specific farm indicators calculated at the end of the year.

The monetary value is the purchasing cost, *i.e.* the historical cost, or the total costs incurred by the farm in case of construction of a plant (the installation of a drip irrigation, for instance).

The annual depreciation is calculated as a linear depreciation on the construction or purchase cost, based on the economic life: the system indicates this life in 15 years (6.6% of the historical cost) in order to make possible the comparison among different farms. However, users can indicate a different technical life that can be higher than the economic one.

All the values determine the item Machinery and equipment in the Balance Sheet.

Example: machine type, description (optional), ownership, power output (hp), year of purchase and purchase value, age, expected life, residual value (=0 when it has been purchased during the accounting year), depreciation and present value.



Machine Type	Description	Tenure Status	Power CV (horsepower)	Year Of Purchase	Purchase Value	Machine Age	Expected Life	Residual Value	Annual Amortisation	Present Value
Trattrici Gommate	macc acquistata 2018	Property	33	2018	25600.00	0	22	0.00	1706.67	23893.33

Buttons: Save, Cancel

3.3.5. Cash and claims

This section is divided in two sub-sections.

The first (Claims) records the farm's claims, *i.e.* the sums owed by third parties (customers, cooperatives) for operations related exclusively to the farm management, still not claimed at December 31st. For each claim it must be indicated the start date and the extinction date (which must be after the 31/12 of the accounting year). Within the same type of credits and competence period, more than one claim can be recorded. The field Description allows to add details about the claim. Once the claim is defined, the user must indicate the total amount at the start date, and the quota received during the year: the residual amount is calculated automatically on the basis of the extinction date.

In the second sub-section, it must be recorded the cash and other account of the farm, at the end of the year (Cash and Current accounts).

3.3.6. Debts

This section is dedicated to the registration of the sums owed to third parties, related exclusively to the farm management activity. It is divided into two sub-sections.

In the first, financing debts as mortgages and loans can be recorded: these debts have a medium-long-term (1 year and more). For each remaining debt, identified by source of financing, must be indicated the periodicity of installments and the number of installments already paid at December 31st. The duration of the loan, the amount of the single installment, the number of installments and the remaining amount are calculated automatically.

In the sub-section of operating debts another type of debt is recorded: the operating debts arose when the supplier gives the farm a limited period of time (30/60/90 days) for the payment. The registration is the same that in the previous case.

3.3.7. Quotas and other rights

The quotas and the other rights provided from the Common Agricultural Policy (CAP) must be recorded here, indicating the historical value. The values of patents and trademarks owned by the company can also be registered in this form.

3.4. Technical management

The technical management section of the SFS-RICA online refers to all the accounting movements related to the ordinary activity of the farm. Here, all the crops and livestock productions and all the costs are reported, together with the cost for the workforce, the subsidies and the other gainful activities.

- Livestock
- Annual crops



- Workforce
- Production
- Cost structure
- Subsidies
- Other gainful activities

3.4.1. Livestock

It is a section dedicated to the livestock management, differentiated by categories, finalized to the estimation of the monetary value of breeding livestock (Balance Sheet) and the livestock growth and appreciation (component of the Profit and Loss). Only the animals owned by the farm are included in this section.

The indication of the species and category, the number of heads and value must be recorded here. The average number of animals is calculated by the system depending on the internal movement. An internal control procedure checks if the data in the single categories has been correctly recorded.

The total value is the sum of the animals in each category at the end of the year and determines the value of Livestock in the Balance Sheet.

The Livestock gross margin (named "Utile Lordo Stalla") is calculated as difference between livestock value at the end of the year + sales minus livestock value at the beginning of the year + purchases, and gives the estimation of the livestock growth and appreciation. This value is a component of the Profit and Loss.

3.4.2. Annual crops

Together with the perennial crops, this section completes the general picture of the Utilized Agricultural Area. The annual crops and the fodder crops (permanent pastures and grasslands) must be recorded here, classified in species and distinguished according to their management in terms of crop rotation (main crop, successive crop, intercropping). All the crops sown in the year but harvested the following year are not recorded here.

The sum of the UAA of all the herbaceous and fodder crops must be lower than the UAA in the section Land, under the item Arable crops.

Crops under greenhouses are specifically identified.

3.4.3. Workforce

This section contains all the information relatives to the workforce occupied in the farm during the accounting year. The registrations are made on two sub-sections.

The first is the Farm workforce and include the familiar work (unpaid labour) and the external employees (paid labour). Occasional workers are recorded in the second sub-section. The structure of the farm workforce is described in Figure 3.

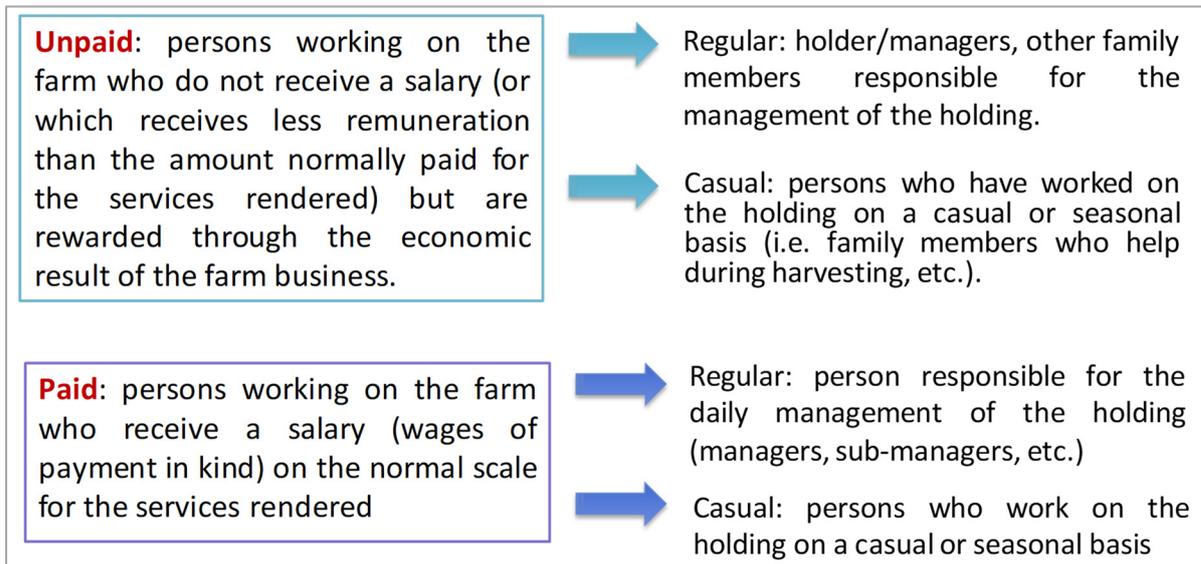


Figure 3: Characteristics of the farm workforce.

About the unpaid labour, it includes the work done by the family's members during the year: the number of days and hours of work must be indicated together with the social charges. For paid labour, the information relates to the days and hours of work, the cost of the service (represented by the salary and the social charge) and when present, the quota of the severance indemnity.

For the occasional work (as the seasonal work occupied, for instance, during the harvesting of the orchards), the number of workers, the number of days and hours must be recorded. The total cost is represented by the sum of the salary and the social charge.

It is important to indicate in a precise way the composition of the workforce in the farm because it is the basis for the calculation of the Annual Work Units (AWU) used to evaluate some farm indicators (like the profitability or productivity per AWU). For the family members, an AWU is equal to 2,200 hours per year while for the paid and occasional work, the parameter is 1,800 hours.

3.4.4. Productions

In this section, all the production (main or secondary crops, processed or unprocessed) coming from the farm activity during the accounting year must be recorded.

Differently from the normal accounting procedures, products obtained from production processes started in the previous accounting year are not considered, according to the accrual principle.

The farm production are recorded in three separate sub-sections, according to the division between crops and livestock already defined in the section of Perennial crops, Livestock and Annual crops: this means that the data-entry in this section is dependent by the data-entry performed previously, that must be completed in each part. For instance: the

production of oranges cannot be recorded if, previously, the plantation has not been indicated as Perennial crop. In all the sub-sections, the field Description permits the optional indication of further characteristics of the productions.

Under Livestock, the volume and values of the livestock products, distinguished between unprocessed (*i.e.* milk) and processed (*i.e.* cheese) must be indicated.

Under Perennial crops it must be recorded the volume and value of the harvesting of orchards or other plantations. Even in this case there is the separation between unprocessed (*i.e.* grapes, oil, oranges) and processed products (*i.e.* wine, oil, juices).

In Annual crops, following the same scheme of the previous categories, are recorded the volume and value of the production obtained by annual crops, unprocessed (*i.e.* hay, vegetables, flowers) and processed (*i.e.* wheat flour), with an optional description if necessary.

The data-entry structure is identical for the three sub-sections and it requires the indication of the initial stock at the beginning of the year, the production realized, the sales (including farmhouse consumption), the volume and value of the production processed or destined to the farm use and the final stock at the end of the year.

In case of revenues coming from processed products, it is not necessary to record the volume and value of the production processed. For instance: if a farm is a wine-maker, only the quantity of wine must be recorded as initial value, sales and final value. For the production destined to the farm use (*i.e.* hay produced and used to feed the livestock), the production must be always recorded.

Revenues must be recorded net of VAT.

3.4.5. Cost structure

In this section all the expenses and cost incurred by the farm during the accounting year (accrual principle) must be recorded. The section is divided in more sub-sections (Table 1):

- specific crop costs and inputs;
- specific livestock costs;
- machinery costs and inputs;
- processing activities and OGA costs;
- farming overheads.

For some kind of annual crop, and more specifically those originating a production in autumn and winter, the expenses incurred in the current year for a production that will be harvested one year later are not recorded but postponed in the next year.

Under the costs for seeds and seedlings purchased, are included also the costs of preparation and treatment processing of seed (sorting, disinfection). The cost of young trees and bushes for a new plantation represents an investment and, as already mentioned, should be recorded as Perennial crops. Under livestock costs, the costs to restock cow herds are not included because already considered in the section Livestock.

Only the costs for current upkeep of machinery and equipment are recorded in this section: the expenses for the extraordinary up keeping appear directly in the value of the single machine.

All the cost for fuel used to heat the greenhouses or the buildings must be recorded as a cost for good and services for crops and livestock or as general costs (overheads) if is not possible to allocate the total heating fuel cost in the specific production process (the same for electricity).

Under crop protection products, all the materials for the protection of crops and plants against pests and diseases, wild animals, bad weather condition are included (insecticides, fungicides, herbicides).

Farming overheads include all the costs relative to the general farming activity. In other costs, are included the taxes for land, the expenses for technical advisors or the costs for transport and commercialization of the unprocessed farm production, while in case of processed products, the same costs must be recorded as Processing costs.

Direct taxes include business taxes, local taxes, social charges, insurances for the farmers, taxes on company products.

Among the interests must be recorded the share of interest paid annually on mortgages and banks loans while all the cost for the banking services are considered as overheads.

Table 1: Description of cost categories in the FS-RICA scheme.

Description of costs categories	
Specific crop costs and inputs	Processing activities and OGA costs
Seeds and seedlings purchased	Processing services
Fertilizers and soil improvers	Processing technical means
Crop protection products	Processing costs
Goods and services for crops	OGA cost
Other specific crop costs	Farming overheads
Specific livestock costs	Electricity and heating fuels
Purchased feedstuffs	Water
Purchased coarse fodders	Crop and livestock insurances
Veterinary expenses	Land insurance costs
Goods and services for livestock	Farm taxes and other dues
Other specific livestock costs	Taxes on land and buildings
Machinery costs and inputs	Rent paid
Current upkeep of machinery and equipment	Rent paid for land
Other machinery costs	Interest and financial charges
Motor fuels	Other farming overheads
Lubricants	



3.4.6. Subsidies

The section of subsidies is implemented considering several kinds of subsidies: European, National or Regional contributions. In general, there are four kind of subsidies: first pillar of CAP, compensatory payments defined inside the Rural Development Programmes in the second pillar of CAP, agro-environmental measures and other subsidies (here are included all the other subsidies provided for the RDP and the National and Regional ones).

Capital subsidies must be recorded applying the accrual principles on the basis of the quota pertaining to the accounting year (*i.e.* a contribution for the young farmers equal to 36,000 Euro must be recorded for a quota of 4,000 Euro because the European regulation indicates a period of 9 years to carry out the farm. The same for the medium-long term investment: the contribution is given for 5 years and these periods must be considered in the calculation of the quota of the year).

3.4.7. Other gainful activities (OGA)

In case of presence of OGA, the total revenues and the total costs must be recorded separately from the rest of the agricultural activity (*i.e.* agriturismo, food services, social farming).

4. The SFS-RICA online final reports

The outputs of the SFS-RICA online are three: the Balance Sheet, the Income Statement and a set of financial statement ratios elaborated on the basis of the structural and economic data.

4.1. Balance Sheet and Income Statement

Figure 4 shows the scheme of the Balance Sheet and the Income Statement originated by the SFS-RICA online at the end of the accounting year. This represent the first and most important element of a Business Plan and permits to implement other kind of analysis (as the cash-flow or the break-even analysis) when required for the evaluation of the farm profitability or for the investment impact. Both schemes refer to one year.

Balance Sheet		Income Statement	
	Values as of 31/12		
Company Lands	463600.00	Revenue Sale	335528.00
Plantations	7791.75	Subsidies I Pillar	10.00
Buindigs	166003.83	Stock Changes	8314.00
Quotas and other rights	114180.00	Gross Profit Liv	4545.00
Land Capital - KF	751575.58	Gross Saleable Production - GSP	348397.00
Machinery and equipments	30147.43	Other Revenues	20.00
Livestock	44645.00	Total Revenues - TR	348417.00
Fixed Capital - KA1	74792.43	Cultivation Costs	10860.00
Warehouse Stocks	14250	Livestock Costs	1320.00
Credits	0.00	Machinery Costs	3100.00
Cash Bank c/c	2000.00	Processing Costs	250.00
Current Capital - KA2	16250.00	General Costs	610.00
Operatig Debts	0.00	OGA Costs	10.00
Financing Debts	54083.33	Value Added	332267.00
Work Capital Found	2580.00	Depreciation	14859.64
Net Assets	788534.67	Net Product	317407.36
		Wages	93050.00
		Rent Paid	100.00
		Operative Revenue	224257.36
		Taxes	0.00
		Other Subsidies	0.00
		Extra Costs	0.00
		Extra Revenues	10.00
		Net Revenue	224267.36

Figure 4: Balance Sheet and Income Statement scheme in SFS-RICA online.

4.2. Financial Statement Ratios

One output of the SFS-RICA online is the set of financial and technical indicators calculated using the parameters measured during the accounting year and recorded in the Balance Sheet and in the Income Statement. These ratios calculated by dividing one number by another, represent the relationship among the several information collected and can be used to analyse the profitability and efficiency of the farms or for comparison purposes. Financial ratios are used for multiple purposes. One of the most relevant is the assessment of the economic sustainability at farm level, which requires detailed quantitative data as those offered by the FADN dataset (O'Donoghue *et al.*, 2016; Zorn *et al.*, 2018).

The set of ratios provide information about the holding's financial status and are used by the farm to monitor the situation (in a moment or over the time) or by banks or other subjects interested to this kind of analysis (*i.e.* in case of financial evaluation for the provision of money for a specific investment). The technical relationship between productive factors measures the characteristics of the farming activities and, if compared, represents useful information about the usage efficiency. Some financial ratios are time sensitive: they present a picture of the holding in a given moment that can change as a consequence of a new investment, a new cultivation practice, a change in the crop.

The parameters used to calculate the ratios in the SFS-RICA online are divided three groups:

1. Technical Parameters: are referred to the farm structure in term of land, work and operating capital.
 - TUAA – Total Utilized Agricultural Area
 - UAA – Utilized Agricultural Area
 - FUAA – Fodder Agricultural Area
 - TUAAp – TUAA owned
 - AWU – Annual Work Unit
 - FWU – Familiar Work Unit
 - TWH – Total Worked Hours
 - LU – Livestock Units
 - hp – Horse power

2. Economic parameters: are referred to the most important farm result (final and intermediate).
 - TR – Total Revenues
 - GSP – Gross Saleable Production
 - CC – Current Costs
 - VA – Value Added
 - NP – Net Product
 - PC – Pluriannual costs
 - OI – Operating Income

3. Asset parameters: are the results of the different items in the Balance Sheet and give an idea about the total capital invested in the farm.

- LV – Land Value
- CA – Current Assets
- FA – Fixed Assets
- ME – Machinery and Equipments
- LTD – Long-term debts

The set of indicators are grouped in four categories.

Technical indicators: these ratios provide information about the use of the production factors and their mutual relationship, giving a measure of the intensity in the use of land, work and mechanization.

- UAA/AWU – Land intensification
- TUAAp/TUAA – Incidence of land ownership
- AWU/UAA – Work intensity
- LU/AWU – Livestock management intensity
- LU/UAA – Animal density
- FUAA/UAA – Forage availability
- FWU/AWU – Familiar work rate
- hp/AWU – Mechanization intensity

Figure 5 shows an example of output of the SFS-RICA web application. The land is completely owned by the farm and 18% of work is familiar. The breeding livestock farming seems to be very intensive, considering the relative indicators.

UAA/AWU – Land intensification	14.82
TUAAp/TUAA – Incidence of land ownership	0
THW/UAA – Work intensity	119
LU/AWU – Livestock management intensity	8.12
LU/UAA – Animal density	0.55
FUAA/UAA – Forage availability	0.2
FWU/AWU – Familiar work rate	0.18
HP/UAA – Mechanization land intensity	5
HP/AWU – Mechanization work intensity	53554

Figure 5: Technical indicators in the SFS-RICA online.

Economic indicators: provide information about management's performance in the use of the resources. They give a measure of the return on the money invested in the farm and permit comparison with alternative activities. This set of ratios is influenced by the prices, the production volume and the expenses.

- GSP/AWU – Gross work productivity
- GSP/UAA – Gross land productivity
- GSP/FA – Fixed capital efficiency
- CC/GSP - Current costs incidence
- PC/GSP – Pluriannual costs incidence
- VA/UAA – Net land productivity
- VA/CA – Current capital efficiency

GSP/AWU – Gross work productivity	204939.41
GSP/UAA – Gross land productivity	13825.28
TR/KFIX - Fixed capital efficiency	0.4216
CC/TR - Current costs incidence	0.05
PC/TR - Pluriennial costs incidence	0.31
VA/UAA – Net land productivity	13185.20
VA/KCUR - Current capital efficiency	3.6495

Figure 6: Economic indicators in the SFS-RICA online.

Asset indicators: give the measure of the efficiency and intensity of the use of farm assets.

- FA/AWU – Capitalization of fixed assets
- FA/UAA – Fixed asset intensity
- CA/AWU – Capitalization of current assets
- CA/VA - Current asset efficiency
- CA/UAA – Current asset intensity
- hp/UAA – Power output level

Profitability indicators: are calculated comparing the intermediate results of the Income Statements. Are the most common indicators used to evaluate the general farm performance.

- VA/AWU – Farm work performance
- NP/TR – Profitability of total revenues
- OI/AWU – Gross work profitability
- OI/FWU – Gross familiar work profitability
- OI/UAA – Gross land profitability



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VA/AWU – Farm work performance	195451.18
NP/TR – Profitability of total revenues	0.91
OI/AWU – Gross work profitability	131916.09
OI/FWU – Gross familiar work profitability	747524.54
OI/UAA – Gross land profitability	8899.10

Figure 7: Profitability indicators in the SFS-RICA online.



5. Conclusions

The evaluation of an innovation in terms of economic results requires the collection of all the data regarding the structure and the economic characteristic of the farm. For the purposes of TROPICSAFE project, the proposed Simplified Financial Statement available online can represent a useful tool to carry out this kind of analysis. Under the functioning of the SFS-RICA online there is the FADN methodology, that is receiving increasing interest from the analysts of the innovation impact. Farm-level indicators have been used to evaluate the level of innovation in the EU farms using FADN in the FLINT project (van der Meulen *et al.*, 2016).

A recent study (Cristiano and Proietti, 2019) analyses the potential of FADN in terms of availability of indicators to measure the performances of different types of innovations at the farm level and the assessment of the innovation's effects.

Depending on the specific innovation, there are several impacts on the farm Financial Statement and many indicators that can give a measure about the impact and sustainability.

An innovation with refers to the introduction of a specific IPM strategy, concern more the cost and revenues components of the farm management than the asset situation and, probably, the economic parameters like the current costs, the gross saleable production, the operating and net income will be more influenced. An innovative strategy to manage the disease can be seen as a process innovation in the management of a crop and the expected results are a reduction in the production costs and the increase of a profit margin.

In some analysis, FADN microeconomic data have been used to assess the environmental performance of the holdings (Westbury *at al.*, 2011) measuring the environmental impact of three types of agriculture adherent to different agro-environmental schemes (with several levels of pesticides use).

The introduction of a new plantation could influence also the fixed assets of the farm and, in this case, the sustainability assessment will require an evaluation in the medium-long run in order to establish the investment profitability or risk.

Spending money for external advisors or for specific research will be a further cost for the farm, influencing the final income and the total profitability.

Even a situation in which any innovation is carried out can be analysed by this instrument because, in this case, it will be possible to analyse the point beyond which the plantation is not more convenient because the revenues (lower yields) are not covering the costs.

Once all the information of the farm are entered in to the system, it is possible also to make a simulation in different scenario analysis: how the net revenue change in case of increase of price, how the farm performance is modified if the yields decrease for the disease, how OGA can help the farmer to have a revenue in case of problems in the management of the ordinary agricultural activities.



6. References

- Andre F (1987) Towards a revival of economic education of farmers. *Rural Economics* 177, 53-56.
- Argiles J, Slof E (2001) New opportunities for farm accounting. *European Accountant Revue* 10, 361-383.
- Colwell M, Koroluk R (1990). Differences in farm incomes using cash or accrual accounting methods on Canadian crop farms and implications for farm management decision making. *Canadian Journal of Agricultural Economics* 38: 655-665.
- Crane LM, Leatham DJ (1995) External equity financing in agriculture via profit and loss sharing contracts: A proposed financial innovation. *Agribusiness* 11, 223-223.
- Cristiano S, Proietti P (2019) Evaluating the effects of interactive innovations at farm level: the potential of FADN. *The Journal of Agricultural Education and Extension* 25(2), 103:116.
- EC Council Regulation 1217/2009 of 30 November 2009 setting up a network for the collection of accountancy data on the incomes and business operation of agricultural holdings in the European Union.
- Kroll JC (1987) The new accounting: The lost opportunities. *Rural Economy* 180, 20-25.
- Luening RA (1989) Farms records can improve profitability. United States Department of Agriculture, *Farm Management: How to Achieve Farm Business Goals*. Washington, Government Printing Office, US, pp: 103-112.
- O'Donoghue C, Devisme S, Ryan M, Conneely R, Gillespie P, Vrolijk H (2016) Farm economic sustainability in the European Union: A pilot study. *Studies in Agricultural Economics* 118, 163-171.
- Olson R (1988) Management for success in modern agriculture. *European Revue of Agricultural Economic* 15, 239-259.
- Pellerin JL (1985) Farmers and keeping the records. *French Revue Account* 154, 26-32.
- Seger DJ, Lins DA (1986) Cash versus accrual measures of farm income. *North Central Journal Agricultural Economy* 8, 219-226.
- Stolbova M, Hlavsa T (2008) The impact of the LFA payments on the FADN farms in the Czech Republic. *Agricultural Economics (AGRICECON)* 54(10), 489-497.



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- van der Meulen H, van Asseldonk M, Ge L (2016) Adoption of innovation in European Agriculture, Del. 5.2, Wageningen Economic Research, FLINT project.
- Vazadikis A, Athianos S, Ekaterini CL (2010) The importance of information through accountancy practice in agricultural sector-European Data Network. *Journal of Social Sciences* 6(2), 221-228.
- Westbury DB, Park JR, Mauchlin AR, Crane RT, Mortimer SR (2011) Assessing the environmental performance of English arable and livestock holdings using data from the Farm Accountancy Data Network. *Journal of Environmental Management* (92), 902-909.
- Zorn A, Esteves M, Baur I, Lips M (2018) Financial ratios as indicators of economic sustainability: a quantitative analysis for Swiss dairy farms. *Sustainability* 10, <https://doi.org/10.3390/su10082942>.