Farm impact assessment

Methods for evaluating, communicating and improving the farm's environmental, social and economic outcomes.

ACCESSTOLAND

A European network of grassroots organisations securing land for agroecological farming

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About the authors:

This guide has been written by members of the European Access to Land Network, as part of a European Erasmus + partnership focused on developing a Learning Platform for supporting access to land for agroecology in Europe.

The European Access to Land Network brings together grassroots organisations from across Europe to share experiences and promote the significance of access to land for agroecological farming and generational renewal. Established in 2012, it functions as an informal network of about 20 organisations. The Network's main objectives are to consolidate and disseminate initiatives on access to land, and to put land issues in the spotlight. To that end, it organises information and experience-sharing, fosters cooperation between members, and facilitates broader communication.

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Report coordinators: Mireia Ercilla and Maria Diaz de Quijano, Associació Rurbans – School of Shepherds of Catalonia / Access to Land Network.

Authors: Clara Blasco, Xarxa de Conservació de la Natura; Véronique Rioufol and Thibaud Rochette, Terre de Liens; Hannes Gerlof, Regionalwert AG; Mireia Ercilla and Maria Diaz de Quijano, Associació Rurbans – School of Shepherds of Catalonia.

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INTRODUCTION

From the green revolution to the present day, Europe's agriculture has undergone a significant transformation. Farm technification, size of exploitations and use of chemical products have been increasing year after year. This transformation has generated **substantial negative impacts on climate change, biodiversity and different environmental resources such as water, soil, and air. Moreover, the socioeconomic impacts for farmers and their surroundings are also negative** because agricultural transformation does not consider the consequences on the local dynamics and its economy.

However, at the same time, **other initiatives arose around the world to propose alternative ways to produce** while being respectful with the local context and beyond. Agroecology, peasant agriculture or sustainable agriculture are different approaches to food production, which enable the maximum of farmers in one territory to live decently with their work by producing healthy and quality food without compromising the natural resources of tomorrow. They use an equilibrated level of input to ensure the long-term balance between food production and the sustainability of natural resources. In addition, they involve local residents to bring the rural area to life and make a welcoming environment for everyone.

At the beginning of the Setting up a Learning Platform for Farmers' Access to Land", 2018 – 2021 project, we developed a survey with the aim of better identifying the needs of European groups dealing with the preservation and management of farmland for agroecological purposes. The results of this survey show that increasing our knowledge of impact assessment tools would be very useful for the A2L Network members and other similar organisations.

What's the point of assessing a farm's impact?

Globally, food systems have some deficiencies concerning sustainability. This applies to environmental aspects such as greenhouse gas emissions, soil erosion and biodiversity loss, to name but a few. Social issues, such as poor labour conditions and lack of rural vitality, receive ever greater attention. From an economic standpoint, food systems need to be viable and resilient.

The evaluation of the sustainability of agroecosystems requires transforming complex aspects into clear, objective and general elements that allow detecting trends at the system level. The usefulness of these tools lies in their ability to identify the strengths and weaknesses of the different agricultural practices carried out on a farm in order to progress towards an agriculture that is of common interest to society and the farmer.

What do you have in your hands?

Our original aim was to create a standardized and straightforward tool by trying to take advantage of the hundreds of tools and indicators that already exist. Nevertheless, a complex methodology is required to assess farm impacts, and sometimes, methodologies took years to be properly developed and tested. Therefore, creating our own tool was beyond the scope of this project. Therefore, and considering our possibilities, we decided that it would be more useful for A2L members to develop **a guide focused on a selection of existing tools. This document aims to give a critical evaluation and guidelines for the efficient use of impact assessment tools**. Our first approach on this topic started by doing a review of some existing tools; among a large number of existing tools, we have chosen to present 8, according to the following criteria:

- They are already being used by members of A2L or members who wish to use them.
- They are public access tools or private from non-profit associations.
- They are tools easy to use by volunteers and technicians of our organizations without needing a large technical formation.
- The methodology and criteria used to develop the tool are public.
- They are diverse in terms of the aspect being assessed (true cost accounting, environmental, global system).

In particular, some of these tools give us an overall assessment, an overview of the benefits in the social, economic and environmental spheres that these farms produce with their activity concerning society (Diagnostic of Peasant Agriculture, IDEA and SAFA). Others are more focused on assessing the environmental impact of management and farming practices in a more or less specific field, such as ECODIAG (that assess the potential biodiversity that a farm can create around it), HUMUS (that assess soil conditions and soil biodiversity) and DIALECTE (that set the general environmental performance of farms). In the same line, we find the CFT that assesses specifically the greenhouse gas emissions per surface of production. Finally, Richtig Rechnen calculates the extra expenses that an agroecological farm has in order to undertake sustainability practices. This gives an idea of how much these farms should be compensated for undertaking these practices.

All tools reviewed in this guide are intended to assess the impact of farms that already exist. Still, other tools are designed to evaluate/evaluate how suitable a farm project is to be created in a particular place (focused on a future project).

Why should you read this guide?

Since the late 1990s, numerous methods and indicators covering the main environmental, economic and social issues have emerged. Assessment tools differ in terms of scope, complexity and format. Some of them are designed to support policymaking, while others are developed to improve farm management or have dissemination purposes. At the same time, some tools focus on specific farm dimensions (environmental, economic or social) while others conduct global assessments. Additionally, some methods rely on online platforms or applications, and others only provide a methodological framework. Each one of these tools has a different way to approach the system and uses various indicators.

The large number of tools and indicators available could be a bit confusing for both farmers and technicians who rely on these indicators to make strategic choices and for R+D actors with missions of general interest. As each tool presents some advantages and limitations, **our objective is to help find the best tool for each situation** (the aim of the assessment, scale, country, available time...). Hence, this guide identifies and analyses existing tools to enable you to choose the tool that best fits your needs.

How can this guide contribute to the performance of land organisations?

Assessing and communicating farms' impacts is crucial for several reasons:

- For an organization that buys farmland with the financial means of shareholders and/or donors, it is essential to communicate about the impact of farms on the common farmland towards the shareholders and donors. Hence, they stay loyal to the organization and keep supporting. Communication on impact assessment is also essential to attract new shareholders and donors.
- For farmers to reflect on the impact of their farm on the social, economic and environmental environment in order to improve year-on-year.
- For citizens to better understand the story behind their food, engaging reflection and fostering support to agroecological farms.
- It gives an overview of the eco-systemic services that agroecological farms provide, which helps acknowledge their importance in the local context.
- It is helpful to convince the public and non-profit organization to orient policies based on objective information.

How can you use this guide?

The tools presented and the attached information should help support access to land initiatives for both A2L members and several similar organizations throughout Europe. More specifically, this document is structured in 5 parts where the various tools are summarized, a detailed description is given, and an example of its use is presented. However, **it is not necessary to read**

it linearly. The guide allows you to go directly to the selected tools using the information of the first summary table.

- **Summary table of the tools** showing the most relevant information of each tool, to facilitate choosing those tools that are likely to be more useful in your specific case (considering the type of farming, the available time, the studied issue…).
- **8 different tool sheets**. 2-3 pages for each tool are used to describe the tools in greater depth: creation context, methodology used, description of some representative indicators to show how they work, results obtained, strengths and weaknesses. Do not hesitate to take a look at the table before deciding on a tool.
- **8 case studies**, where an example for each tool is developed. Tools' direct application can be better understood through these case studies.
- **Summary table with other interesting tools.** During the screening process to look for the most relevant tools, we detected that other interesting tools did not fit in the objective of this document (they are not presented in the guide). Still, they could be useful for A2L members. For this reason, we decided to include an extra table to disseminate their existence.

Some recommendations

Before you start looking for the best tool for your objective, we would like to share with you some recommendations that have arisen from the experience of reviewing and using these tools:

- Most of the presented tools are conceived to be used in the context within which they were created. It is good to adapt the tools to our specific contexts if we want them to keep being performant. By modifying the structure and indicators, the presented tools will be very useful in many different contexts. Tools that use open-source software make this adaptation easier. For example, an indicator that measures the recognised quality of farm products by giving various points to several quality labels will need to be reformulated in case the labels used as reference are different or just do not exist in another country.
- The benefit of applying these tools only once is an excellent way to evaluate the status quo. We recommend you use it periodically (every one, two or five years, for example, depending on the tool) in order to assess the impact of the improvements implemented. Questions that generate debate and curiosity among farmers usually foster their willingness to implement changes and improve their practices. Finally, seeing in raw numbers what one has achieved in terms of social and ecological improvements of your practice is always a good motivation to do more and keep improving.
- Although all the presented tools are easy to use, we highly recommend you thoroughly read the supporting materials and guidelines ahead of time. We usually needed a longer time than expected.
- Once your organisation has chosen a tool tailored to its purposes, do not hesitate to enrol a specific training for using the tool, in case this is available. This will increase the efficiency of the assessment process and the relevance of its results.
- Make sure farmers (and you) have enough time to answer all questions calmly. It is a good idea to tell farmers in advance what kind of information and /or documents you will need from them.

We wish you our best in your process of sharing the good impacts of agroecological farms and promoting agroecological practices! Do not hesitate to contact us for further information or clarifications if you need them.

SUMMARY TABLE

NAVIGATE between different tools **THROUGH INTERACTIVE BUTTONS**:

Review of existing tools to assess the agroecological impact of farms.

	Name of the assessment tool/Created by	Type of the assessment	Concrete issues assessed (humus, birds, etc.)	Purpose	Required skills	Who uses the tool? How are farmers involved?	Output	Strengths	Potential limitations	What are the conditions for using the tool	Temporal scope*	Estimated time to perform the assessment	Language	Availability	Year of publication	Comments	Link to get more information
Tool / Case	**Cool Farm Tool**	Environmental (complemented with economic indicators)	Greenhouse gas emissions	Systematically record farm processes' data and their emissions.	Organisation / Specific knowledge on processes occurring within the farm	Farmers, self-assessment	Absolute and relative amount of carbon emissions (in kilograms CO_2 equivalent) per total and weight units are complemented with graphs and tables.	Easiness / quickness / practicality / systematization / identification of practices to be improved	Not equally developed depending on the type of exploitation / does not directly allow for a whole farm assessment / few of the data required might be tedious to collect	Free signing up for the website. Commercial use by supply chain businesses requires a fee.	Annually, as footprint assumes all data entered are for 1 year. Running CFT after implementing improvement measures can also allow the user to check their effectiveness.	15-20 min	English and 12 other languages in beta version)	Free online-tool, available once signed in. Free use up to 5 assessments that are changeable	2013	Beyond GHG emissions, Cool Farm Alliance Community Interests Company has also developed similar assessment frameworks for water and biodiversity.	https://app.coolfarmtool.org/
Tool / Case	**Diagnostic of peasant agriculture / FADEAR**	Global	Work with nature, Product's quality, Local development and territorial dynamics, Farm autonomy, Repartition of volume and means of production, Transferability	It is a global diagnostic tool to understand a farm operation and propose innovations to progress in agroecological practices through 6 interdependent themes	Facilitator: interviewing skills Farmer: deep knowledge of the farm conditions. There is training available	Designed by farmers and for farmers. This tool is intended to be accompanied by a facilitator with farming knowledge. The simplicity of showing the results encourages dialogue with the farmer	Results for each criterion and theme, and global result with the form of a flower with 5 petals (one for each theme/issue)	Easy in the conduction / oriented to engage reflection and take decisions / Concerns the global functioning	Focused on French reality/ Little level of detail in some indicators	The diagnostic can be used following indications from the manual. The use of the software requires a previous official demand that needs to be approved, following a training session and paying a fee.	It is analysed the data of all year long.	0.5 days for the interview, 2 days in total counting with the interview preparation, interview, analyse and feedback to the farmer	French	Printed manual can be ordered on the internet. Software accessible after being admitted by the FADEAR and paying a fee.	1998		http://www.agriculturepaysanne.org/les-outils-de-l-agriculture-paysanne To order the manual: https://issuu.com/fadear/docs/manuelap_extraits
Tool / Case	**DIALECTE / SOLAGRO**	Environmental	System (diversity) and agricultural practices (management of inputs), as well as 4 fundamental environmental themes: water, biodiversity, soil, consumption of non-renewable resources.	This diagnostic describes farming systems and assesses the environmental performance of farms.	Facilitator: agronomic skills	Usually used by technicians with agronomic skills. Farmers must also be available for half a day	At the end of the diagnosis, a 10-page report (ready to print) presents the results in detail. Its presentation allows quick visualization of the main assets and levers of action of the operation.	Very precise and concrete; possibility to compare performance to other farms with a consequent database (2300 farms); systemic approach	It could be challenging to get all the dates necessary to run the tool; it is not possible to adapt to specific regions/country characteristics	Training prior to the use of the tool is recommended; the results should be shared online on the platform	The diagnostics tool may be used in several ways: situation at an instant in time T0; situation at an instant in time T+ 3 or T+ 5	1 day	French and available into English, Spanish, Portuguese, Romanian, Italian, Hungarian, German	Free online-tool, available once signed in.	1994	Very interesting tool to compare to other systems or different production methods	http://dialecte.solagro.org/index.php
Tool / Case	**ECODIAG. Diagnosis of biodiversity for farms / CEN Languedoc-Roussillon and SupAgro Florac**	Environmental	Potential biodiversity, inferred from semi-natural elements' features.	A methodological framework to assess serves as a process to design a management plan to promote farm biodiversity.	Flora identification, biological indicators knowledge, basic GIS.	Usually used by land stewardship organisations. Farmer is involved in the process of semi-natural elements' identification and the process of designing management measures according to results analyses.	Quantitative indicators classified into three general categories (structure, composition and disturbances) and translated into qualitative indicators (good, average and unfavourable).	Establishes a common language between farmers and technicians / Guides management measures / Tackles a complex issue (ecological functionality) in a rather easy manner	Season-dependant / Limited comparability / Expertise needed at the beginning	Implementation manual is available on the internet. Yet, the user must create the tables for data analysis.	One-time process per farm. If repeated annually or regularly, it enables to assess changes through time.	3 to 5 days per farm and process	French, translated into English, Spanish and Romanian.	Manual of implementation free downloadable (not software-supported)	2012	It is a methodological framework rather than a specific method.	http://documents.cdrflorac.fr/Ecodiag_Diagnostic.pdf
Tool / Case	**HUMUS. Participatory diagnostic of soils / TDL**	Environmental	Soil and soil biodiversity, agroecological infrastructures, bio-indicator plants	Take the most accurate picture of the environmental condition of the soil and involve citizens in its creation.	Have a person trained and initiated in soil science to lead the diagnosis; have a group of citizens and farmers available	Mainly Terre de Liens, as an inventory of the farm but also different landowners such as: a local authority, a farmer or an association of citizens	Results for each indicator by a score and a colour. An assessment allows the 5 goals studied to be evaluated according to a colour code.	A tool that is both scientific and participatory. Creates an opportunity for dialogue between citizens, farmers but also environmental associations.	Difficulty in training people to be autonomous in carrying out the diagnosis; time needed to carry it out; less interesting on a market gardening system	Instructions for use freely available on the internet.	It can be done every 5 years	3 days	French	Manual edited by Terre de Liens free downloadable.	2018	La dimension éducation populaire de l'outil en fait vraiment sa spécificité.	https://ressources.terredeliens.org/les-ressources/notice-d-utilisation-du-diagnostic-humus-2
Tool / Case	**IDEA**	Global	Agroecology, socio-territorial and economic sustainability	This method provides operational content for the assessment of agricultural sustainability.	Facilitator: interviewing skills Farmer: deep knowledge of the farm conditions	Teachers, technicians and agricultural consultants and farmers. If an external consultant does the assessment, the simplicity of the method and expression of the results encourages dialogue with the farmer	The results are summarized in a "radar" form/ histograms plot for global analysis, components and indicators	A survey guide and a grid of indicators are available online/ results easy understandable/ transparent/ widely used	It is necessary to adapt to the local context and specific agriculture /Some difficulties with ratings and weights were detected by the developers	Public free access	Annually	1.5 day	French	A survey guide and a grid of indicators are free downloadable online.	2000	IDEA v4 is being tested in 2020. It is among the 4th most used tools of the same type in Europe.	http://methode-idea.org/
Tool / Case	**Richtig rechnen / RWAG**	Environmental, social and regional economy	Monetary assessment of externalities- those services of business actions that are not compensated.	Sustainability performance of farms can be recorded, evaluated and monetised, making it possible to draw up a sustainability balance based on ordinary accounting	Access to and knowledge of the relevant information about the farm to record the sustainability performance of the enterprise. Some skills in using online-based recording software	Farm managers, especially in enterprises involving many stakeholders (e.g., community-owned farms)	Sustainability balance sheet integrable in the regular annual balance sheet	Easy to understand results, clear view about the extra expenses for sustainability performances of the farms, low effort involved in recording data (80% once a year)	No funding instrument currently present compensating the assessed extra costs for sustainability performances of the farms	Currently, only partner farms of the Regionalwert Network can use the tool	Performance of one year is assessed	Estimated is one hour per week for a farm with 15 employees	German	Excel and online tool for assessing the sustainability indicators	Probably 2021	First farms start testing the tool October 2019, translation possible not prior first quarter of 2020, second testing phase with 100 farms in 2020	Report in English: https://www.regionalwert-ag.de/wp-content/uploads/2020/11/Calculate-it-right-oct20.pdf More info in German: https://www.regionalwert-ag.de/forschungsprojekte-der-regionalwert-ag-freiburg/richtig-rechnen/
Tool / Case	**The SAFA Smallholders App**	Global	Governance, environment, economy and social themes	The SAFA Smallholders App is a free-of-charge mobile application created by FAO and partners to address the specificities of smallholders, following the principles and framework of the SAFA Guidelines for sustainability assessment.	No one, simple and easy way to record on-farm practices.	It is developed as an application for conducting assessments by smallholder farmers in a practical way through smartphones and tablets.	Quick overview of all 21 Themes scores in the SAFA Small histogram / overall analysis of scoring / Survey report	Indicators have been contextualized so that they better fit the needs of small-scale producers/ easy to use/there is the option of sending the results to FAO	Focused on the international context/Little level of detail	Public access	Annually?	1-3 hours (check!!!)	English	The App version and the User's Manual are free downloadable at the FAO website.	2015		www.fao.org/nr/sustainability/sustainability-assessments-safa

TOOL SHEETS

COOL FARM TOOL - Ideal to identify a farm's greenhouse gas emissions and how these can be reduced

2. Type of the assessment: Environmental
Keywords: Greenhouse Gas (GHG) emissions, farm processes, sustainability, yield, improving practices.

3. Language: Available in 13 languages: English and German; additionally (in beta version) Greek, Finish, French, Spanish, Romanian, Czech, Lithuanian, Latvian, Hungarian, Dutch, Swedish.

4. Summary: The Cool Farm Tool (CFT) is a practical, easy to use web-based software tool that enables farmers to measure and understand the carbon footprint of crop and livestock products and to improve sustainability on their farm. It is implemented annually and can be used to check the effectiveness of improvement measures. It takes about 15 minutes, provided the user has gathered all the required data.

5. Context and objectives:

Although CFT covers metrics of water, biodiversity, waste and greenhouse gas emissions (GHE), this tool sheet focuses on the latter. GHG at a global level have been increasing in recent decades. One of the main causes of this phenomenon is the conversion of forests into farmland. Moreover, intensive agriculture is contributing to carbon emissions and the loss of soil carbon and soil health.

CFT helps farmers evaluate farms' carbon emissions and identify measures to reduce them by improving farming and management practices. The tool, owned and operated by the Cool Farm Alliance Community Interest Company[1], tackles all the potential GHG sources on a farm, field operations, pesticide and fertilizer application, irrigation, storage and processing, transport, waste management, supplies, herd and manure management, enteric fermentation feed production, etc.

6. Tool's users and use conditions:

The CFT is free for farmers to use and has over 12,000 user accounts across 120 countries worldwide, as well as multiple software-to-software "API"[2] connections. The tool is designed to be used by farmers or field technicians. Much of the data will just require a general knowledge of the crop, animal, field, and farming practices. Other data will require more specific information; likely sources for these are yield records, in-field soil assessments or lab tests (e.g., for soil organic matter content), fuel use records, fertiliser records, and irrigation records. The program is based on a free-of-charge online platform, allowing for 5 free assessments that can be changed unlimitedly. The only requirement to use it is signing up for the tool.

1 An industry platform for sustainable agriculture metric development and use, whose members comprise of food retailers, manufacturers, input suppliers, NGOs, universities and consultancies. It aims at enabling growers globally to make more informed on-farm decisions that reduce their environmental impact.

2 Application Programming Interface; a specific set of rules and protocols which the software programs follow to maintain effective communication with each other and with backend systems.

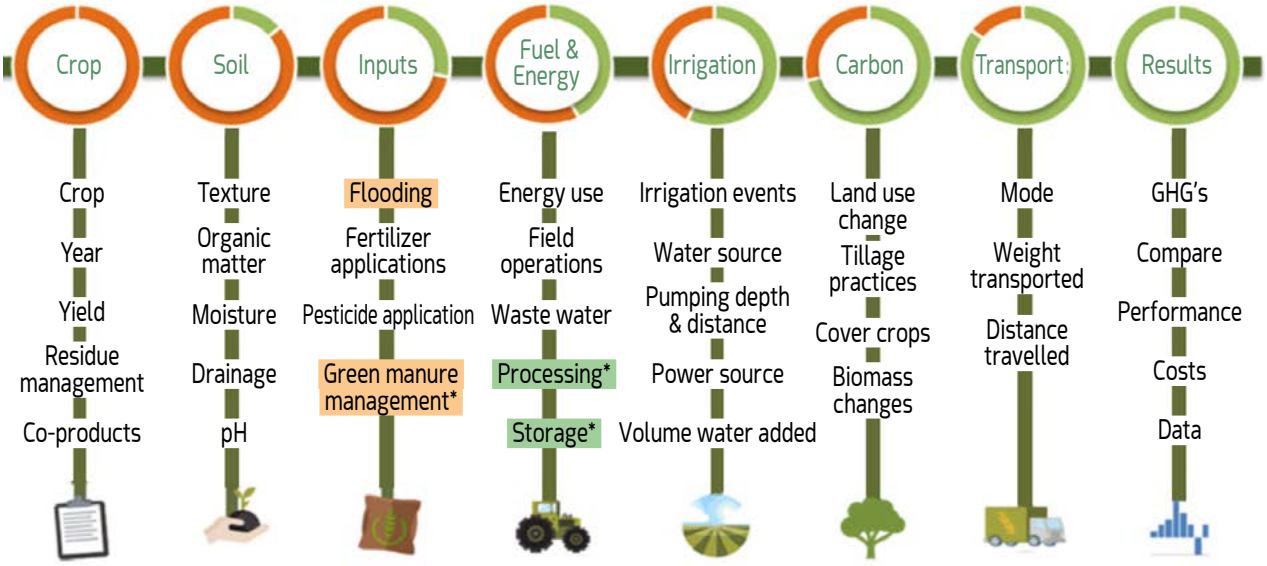
7. Methodology:

The CFT is based on leading academic research[3] and includes a broad range of published data sets and IPCC[4] methods. It is a questionnaire about farm management, farming practices and crop/herd characteristics; most quantitative data (e.g., litres of fuel) is expected to be entered manually, while some default data suggestions are available (e.g., residues). Climate data is based on location indicated in farm settings. The questionnaire tackles different management dimensions, according to the type of exploitation being assessed:

- Crop: area, harvest year, kind of crop, gross, net yield, etc.
- Soil: texture, organic matter, moisture, pH, etc.
- Inputs: application rates and methods, composition of fertilisers, emission inhibitors, etc.
- Fuel and energy: direct use energy, field operations energy use and wastewater emissions.
- Irrigation: amount, irrigation method, water sources, distance, power sources...
- Carbon: land-use changes on the farm during the last 20 years (since this affects soil carbon sequestration) and crop biomass changes.
- Transport: inbound and outbound transportations for inputs and outputs of the farm, based on the type of vehicle and distance.
- Livestock characteristics (number of animals, age, weights, type of activity, production, etc.).
- Feed and Manure management

Crop data inputs

The data needed to calculate Crop GHG & Water assessments are summarised here at a glance.
Find detailed explanations for each item in the Data Inputs Guide.



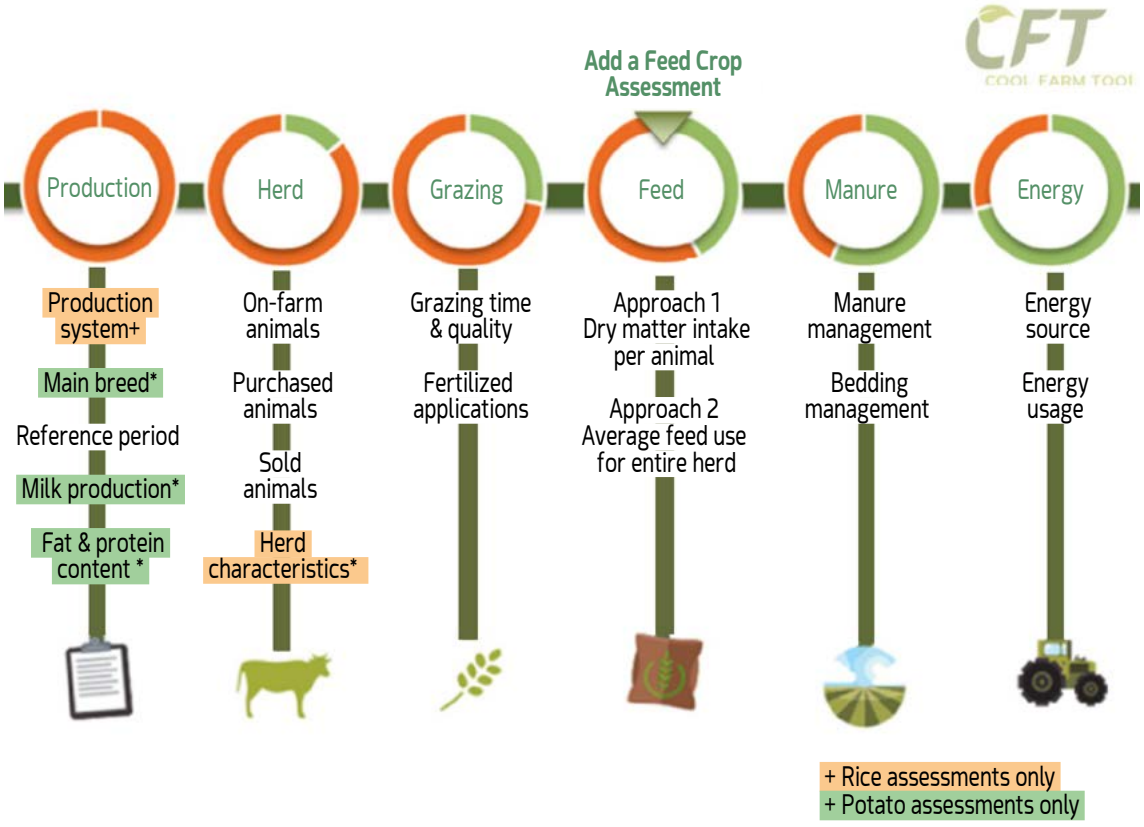
+ Rice assessments only
+ Potato assessments only

3 Research conducted amongst others by the Universities of Aberdeen, Cambridge, Edinburgh and Wageningen.

4 Intergovernmental Panel on Climate Change

Livestock data inputs (Beef & Dairy)

The data needed to calculate Livestock GHG assessments are summarised here at a glance. Find detailed explanations for each item in the Data Inputs Guide.



8. Results:

For each management dimension, CFT calculates the absolute and relative amount of carbon emissions (in kilograms). Emissions data is also displayed per crop unit (weight or area) or per unit of milk (FPCM)/kg live weight added.

The final output is a report that shows assessment results according to various aspects:

- GHGs: total emissions are calculated at farm level and broken down into specific actions (seed production, residue management, fertilizer production...).
- 'Compare': GHGs emissions of 2 assessments can be compared, e.g., to monitor the effect of implemented changes.
- Performance: a list of key indicators (nitrogen use efficiency, carbon sequestration, energy use, etc.) is displayed. Efficiency for each input (per area and per-unit cost) is also calculated.
- Costs: if the user indicates the material costs and income, CFT automatically calculates each crop's expenditure and profit margin.

The information is displayed visually and understandably through graphs and tables.

9. Analysis of the tool:

Cool Farm Tool advantages:

- Info buttons for most data fields give helpful contextual information about the questions.
- Short and easy-to-understand user's guide. This 13-page document elaborates on the questions asked in the CFT and indicates how to respond according to specific contexts. Threshold values, units used, and precise meaning of each question category are clearly defined.
- Quick to use. If the questions are previously known, answers can be checked before, and the questionnaire can be completed in 15 minutes.
- The program interrelates data from different activities to conduct a global farm assessment, smoothing the data-entering process.
- Easy to compare individual fields or crops or livestock types.
- Unlike many other GHG emissions calculators, the CFT includes calculations of soil carbon sequestration. Carbon stored in or released from the soil and above-ground biomass is estimated based on recent changes in management practices, changes to land-use, changes to soil management, as well as changes in the biomass of trees.
- It can support an assessment following the Product Life Cycle Accounting and Reporting Standard (GHG Protocol for products) and other GHG protocol standards.

Cool Farm Tool limitations:

- The tool does not directly allow for a whole farm assessment of multi-crop (rotation) or mixed farm businesses. To create an entire farm assessment, results must be combined offline (paying attention to not double count). Plus, if running a small-scale farm, the assessment results might not provide such relevant information since the room for improvement is narrower in these cases.
- External help may be needed to answer some specific questions (e.g., in soil characteristics) and the process can be tedious if the user is not aware of the questions asked (e.g., often the most time-consuming part is estimating kWh and fuel for the year for the given crop from electricity and fuel bill, or the average number of animals on-farm/sold/purchased).
- The tool does not facilitate the process of comparing one's results to the results of similar exploitation assessed by other users, which would be very useful.
- The tool is not equally developed depending on the type of exploitation. There are also areas, which are only partly covered, such as seed production (only for potatoes), or not covered at all, such as the production of machinery or built infrastructure. The latter are not covered to simplify the pathways as their emissions may only have a minor impact on the overall results.
- It does not replace a full Life Cycle Assessment, including a scope definition, uncertainty assessment, and reporting.

This tool has been used by various actors, such as wholesale companies, organised productive sectors, applied research centres, groups of smallholders or companies. All in all, CFT can be used once to simply gather knowledge about farm emissions and with the ultimate purpose of reducing emissions. That is, implementing measures according to results obtained and use the tool once again to check the impact of such measures.

10. See further:

CFT user guide can be downloaded here[5] in English. It includes a detailed explanation of the data required to conduct the assessment. An interesting pool of large-scale, multi-farm study cases can be consulted here[6]

The following websites gather information about GHG emissions and measures to reduce them:

- 4 per mille initiative[7]
- Estimating Greenhouse Gas Emissions in Agriculture4 per mille initiative[8]

Other similar tools enable farmers to assess GHG emissions:

- Solagro, Carbon Calculator: calculator of GHG at farm level[9]
- Solagro, ACTT: diagnosis of energy and GHG at the farm scale[10]

Beyond GHG emissions, Cool Farm Alliance Community Interests Company has also developed similar assessment frameworks for water, biodiversity, food loss, and waste.

5 https://coolfarmtool.org/coolfarmtool/greenhouse-gases/

6 https://coolfarmtool.org/category/resources/case-studies/

7 https://www.4p1000.org/

8 http://www.fao.org/3/a-i4260e.pdf

9 https://solagro.com/works-and-products/outils/carbon-calculator

10 https://solagro.com/works-and-products/outils/acctool-acct-simplified-version-acct-dom

DIALECTE - To describe farming systems and to assess the environmental performance of farms. A comprehensive approach at farm scale

2. Type of assessment: environmental
Keywords quantitative and qualitative analysis, agro-environmental diagnosis, database, site use

3. Language: French and available in: English, Spanish, Portuguese, Romanian, Italian, Hungarian, German

4. Summary:

DIALECTE is an agro-environmental assessment tool for describing production systems and enabling evaluation of the impact of agricultural practices on the environment. It provides a comprehensive approach at farm scale and is applicable to most production systems.

To carry out a DIALECTE assessment, farm data collected over a one-year period is compiled and analysed. One day of work is necessary for this, including the farm visit, data collection and data input into the DIALECTE website.

This website serves as a database which compiles all DIALECTE assessments carried out to date, enabling comparative analysis with other farms, whether they use the same system or a different method of production. This comparative analysis provides an understanding of the performance of farms which achieve good results and helps identify avenues for improvement for farms which are not doing as well.

5. Context and objectives:

DIALECTE was developed by SOLAGRO association in collaboration with the Regional Chamber of Agriculture of Midi-Pyrénées, Haute-Garonne Chamber of Agriculture and the ADVA (Departmental Association of Agricultural Extension - Haute-Garonne). Based on the principles of agronomy and agroecology, DIALECTE recognizes the importance of:

- promoting diversity in all its forms as the basis of the productivity and multifunctionality of agriculture
- promoting optimal management of inputs (fertilization, plant protection products, water, direct energy)
- developing agriculture linked to the soil and adapted to local conditions
- placing more emphasis on preventive actions rather than curative actions
- conserving both animal and plant biodiversity
- enhancing the abundant resources available locally and saving scarce resources.

6. Tool's users and use conditions:

To carry out a DIALECTE assessment, optional training can be provided and is strongly recommended by Solagro. However, anyone can carry out a DIALECTE assessment by signing up to dialecte.solagro.org.

All DIALECTE assessments are filled in online on the website and are anonymous. Anyone with an account can therefore access this database. There are currently more than 2300 assessments on the platform which have been carried out all across France, which allows comparison of results for each production system.

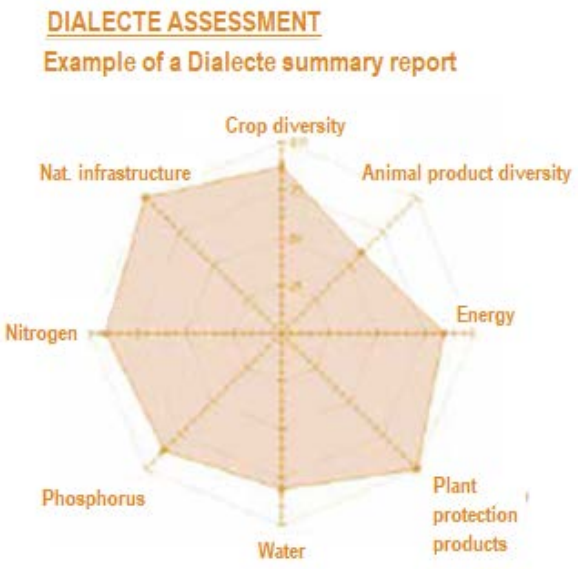
A DIALECTE is rarely carried out at the request of a farmer: in general it is a joint effort with specific objectives. For example, Pilat Regional Natural Park has started carrying out DIALECTE assessments within its territory to provide a better understanding of how dairy farming systems work, to identify fodder resources, etc. The objective of this is to determine a typology of farms and identify possible actions to preserve the Park's wet meadows.

7. Methodology:

DIALECTE is based on a quantitative analysis of 40 agro-environmental indicators, combined with a qualitative analysis by the person leading the assessment. DIALECTE makes it possible to understand and analyse the impact of agricultural practices on the environment and natural areas.

It takes a comprehensive approach, analysing how a farm works from two different perspectives[11]:

- Farm diversity (diversity of crops and animal products, feed autonomy, the percentage of pulses grown, organic maintenance and land cover, agroecological infrastructure, etc.)
- Low input use (nitrogen, phosphorus, plant protection products, water and energy).
- It also takes a thematic approach which measures the impact of agricultural activity on different facets of the environment:
- Preservation of water resources (nitrogen waste, phosphorus waste, water management, plant protection product residues, agricultural wastewater residues, land cover in winter, size of parcels, protected boundaries, protection by natural elements)
- Soil protection (permanent grassland, multiannual grassland, land receiving organic material, land covered in winter, no-till planted land)
- Biodiversity (land with natural features, permanent grassland with little fertilisation, high nature-value areas, areas of biological importance, absence or low use of pesticides)
- Resource consumption (direct energy, indirect energy, phosphates purchased, potash purchased, water consumed)



11 Théma, Transition écologique agricole, l'exemple de Terre de Liens, juin 2017

The environmental impact is evaluated on the basis of agro-environmental indicators from quantitative or qualitative variables. The indicators are grouped together and transcribed in document format. The result of the agro-environmental assessment takes the form of a score out of 100 points for the general approach of the farm, and a score out of 20 for each of the environmental themes, which allows potential for improvement to be identified.

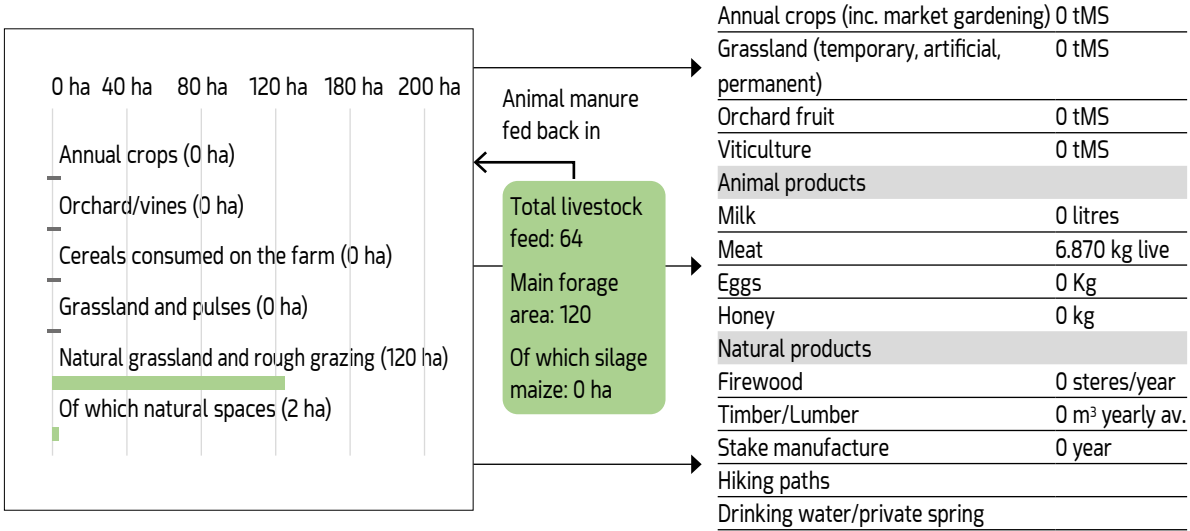
Example – The ecological infrastructure indicator

This indicator measures the surface area occupied by agroecological infrastructures such as hedges, isolated trees, ponds, peat bogs, grassed strips, etc. on a farm. The best way to calculate this is using the Registre Parcellaire Graphique[12]: this allows precise and rapid calculation of the length of hedges or surface area of large expanses of grassland, for example. The indicator measures the surface area occupied by ecological infrastructures compared with the total utilised agricultural land. This indicator corresponds to 11 points out of 100 in the overall score. It is therefore a key indicator in the overall score and a decisive factor for biodiversity. The maximum score is awarded when areas occupied by ecological infrastructures represent 10% or more of the utilised agricultural land.

Agricultural system function

Inputs							
Mineral fertiliser		Water consumed	Direct energy	Feed purchases		Other	
Nitrogen	0 units	0,000 m³/year	3,934 eq-lit fuel oil	Fodder	0 tons/year	Veterinary products	0/year
Phosphorus	0 units	Plant protection products		Concentrate	8 tons/year	Rearing costs	0/year
Potash	0 units	0,0 ha/ha UAL					

Crop rotation UAL 120 ha	Livestock	Production



Crops sold	
Annual crops (inc. market gardening)	0 tMS
Grassland (temporary, artificial, permanent)	0 tMS
Orchard fruit	0 tMS
Viticulture	0 tMS
Animal products	
Milk	0 litres
Meat	6.870 kg live
Eggs	0 Kg
Honey	0 kg
Natural products	
Firewood	0 steres/year
Timber/Lumber	0 m³ yearly av.
Stake manufacture	0 year
Hiking paths	
Drinking water/private spring	
Area of biological importance	
Cork	0 tMS/year

12 Geographical database used as a reference for granting subsidies under the Common Agricultural Policy.

8. Results:

At the end of the diagnosis, a 10-page report (ready to print) presents the results in detail. Its presentation allows a quick visualization of the main assets and levers of action of the operation. Four reviews provide a better understanding of the results obtained:

- Fertilization report (CORPEN method)
- Fodder report
- Energy balance
- Greenhouse gas balance

The assessment tool may be used in several ways: situation at an instant in time T0; situation at an instant in time T+ 3 or T+ 5 (On the Solagro platform, there is an option to replicate the assessment – this allows the data which has changed to be modified and gives access to comparative information with just one click); comparison of scenarios; comparison of systems.

9. Analysis of the tool:

It is important to set out the specifications beforehand: what is the objective of carrying out the assessment? What are the needs? DIALECTE is particularly useful for a reporting strategy in order to improve the environmental situation of a farm, with measurements taken at a particular time (T).

DIALECTE's strengths

- A great deal of information available on the website
- Very precise and specific
- Open access
- Enables comparison of performance with other farms (2300 farms in the database)
- Extraction of input data and results in Excel
- Systemic approach providing a general vision of the environmental challenges of the farm and making it possible to understand the complex interactions existing within an agrosystem

DIALECTE's potential limitations:

- In some cases is very difficult to obtain all the data necessary to run the tool
- It is not possible to adapt to specific regional/country characteristics.
- The assessment is based on statements provided by the farmers.
- The tool is available in 8 languages, but this requires the presence of an "ambassador" in each country who can develop the tool and ensure that translations are carried out as and when needed to ensure that the tool can be used by people in this country.

10. See further:

On the DIALECTE website you can find many documents related to the tool as well as a complete guide and a survey proposal to obtain all the necessary values.

Comparative study on the impact of Terre de Liens farms with regard to sustainability on a group of 27 farms (see the case study on this topic).

SUMMARY TABLE
CASE STUDY

ECODIAG - An assessment leading to action for farm resilience

2. Type of the assessment: potential biodiversity assessment
keywords: farm resilience, semi-natural elements, ecosystem services, management plan.

3. Language: French, also translated into English, Spanish and Romanian.

4. Summary: ECODIAG is a methodological framework used to assess the potential biodiversity within a farm. This is achieved by observing in-situ indicators systematically and in a one-time process of 3 to 5 days per farm. Ultimately, that allows the farmer to develop a management plan to protect and promote farm biodiversity.

5. Context and objectives:

In addition to its intrinsic value, biodiversity also accounts for various ecological processes crucial for **agro-ecosystems functionality**. Nevertheless, the current global food model has had tremendous negative impacts on farmland biodiversity, mainly due to three phenomena: agriculture intensification, land abandonment and landscape homogenization. It is urgent to promote practices and elements that support biodiversity, natural resources and, ultimately, **farm resilience**.

Biodiversity fosters farm resilience because it enables and sustains plant and animal growth and production and maintains key ecological processes needed for human life in general and food production in particular, such as pollination, water cycle or nutrient cycle.

With the purpose of contributing to farm biodiversity assessment and management, the Conservatoire des Espaces Naturels of Languedoc Roussillon developed ECODIAG. This is an **in-situ-based approach** that complements the already-existing methodologies based merely on administrative items or cartographic data. In the same line, ECODIAG was also designed to contribute to the implementation and monitoring of the agri-environmental measures (AEM) of the Common Agricultural Policy (CAP).

6. Methodology:

Directly assessing biodiversity in different contexts by using a unique method is a complex mission. Instead, inferring the **potential biodiversity** is simpler and more accessible. ECODIAG approach is precisely based on the fact that biodiversity on a farm is highly influenced by the presence of **semi-natural elements** (ponds, hedges, buffer strips, forests, etc.) and by their features (extension, structure, composition and damages). Being so, this methodological framework aims to assess semi-natural elements to indirectly draw information about ecological farm processes and hence farm potential biodiversity.

ECODIAG implementation mostly takes place during a **field visit**, but complementary information is also gathered during a face-to-face interview with the farmer or by reviewing and analysing existing datasets. Essentially, this methodological framework follows these steps:

- The identification and location of **species and habitats of interest** and assessing their relative importance are achieved during the visit and/or by consulting specific datasets or experts. According to the habitats and species identified as a priority, key types of semi-natural elements are also listed.
- The **preliminary identification** and location of semi-natural elements on the farm (buffer strips, ponds, isolated trees, hedgerows, moors...) is achieved by using aerial photos and Geographic Information Systems. This allows for the clear determination of key features (total surface area, length of linear elements, surface percentage...) that will be later translated into indicators.
- The evaluation of the state of conservation of semi-natural elements is carried out by taking into account numerous **quantitative indicators** (around 12 for each kind of semi-natural element) classified into three general categories (structure, composition and damages).
- Quantitative indicators are translated into **qualitative indicators** (good, average and unfavourable) according to specific **threshold values**. This process allows the comparison[13] amongst element-types and amongst farms.
- The identification of **farming practices** that interact with or influence the state of these semi-natural elements is carried out together with the farmer using a survey template that allows for systematization.

7. Results:

The output obtained at the end of the assessment process is a set of completed information sheets and evaluation grids containing the indicators assessed in an organized manner. The integration and analysis of all the data are conducted to establish causalities between type and intensity of farming practices and the state of conservation of semi-natural elements. Finally, results contribute to the design and implementation of **management measures** to improve a farm's potential biodiversity.

Results can be compared to specific reference values tailored to the farm conditions in order to check if the results obtained are satisfactory. If repeated regularly, the process enables the user to monitor potential biodiversity throughout time and verify whether the management plan, implemented as a consequence of the first assessment, is working effectively. A goal can be set considering the type of production, the biotic and abiotic determinants, and the system's capacity to integrate new semi-natural elements without dwindling its economic viability.

The results obtained can be used for various purposes beyond the ones mentioned above, such as raising awareness amongst consumers, adding environmental value to the farm products, improving farmers' and landowners' sensitivity or understanding the functionality of a specific agro-ecosystem.

8. Analysis of the tool:

ECODIAG's strengths:

- It acknowledges the importance of establishing a common language between farmers and technicians; therefore, the method is relatively easy to understand and implement for both parts.

13 A threshold value must be defined for each indicator. For instance, when assessing hedgerows features, the following attributes can be considered: http://www.hedgelink.org.uk/index.php?page=16

- The indicators proposed are a good compromise between relevance and ease of implementation, and the results might be complementary to those of other assessments analysing agronomical, economic or social characteristics.
- It is oriented to enriching a decision-making process and the management plan design.
- The results obtained can be disseminated for a variety of purposes and targeted to a variety of stakeholders.
- It has proved particularly useful in Natura 2000 sites, where it has been used to design management measures according to targeted species and habitats. It can also be used for results-based payments approaches and AEM implementation.

ECODIAG's potential limitations:

- ECODIAG is not a ready-to-use tool since the user has to invest knowledge and time in different processes: overcoming some ambiguity in element-type definitions and adapting them to the local context, understanding the indicators, adjusting some errors in measurement units and threshold values, adapting some indicators' background information (i.e., nitrophile species in the local context) and define and implement a method for data analyses.
- As with other in-situ observation approaches, its implementation success mainly depends on the season (the optimal one being summer or spring) and the expertise of the person involved.
- The results obtained do not compare different types of farms or those located in significantly different territories.
- Threshold values and nitrophile and exotic species must be defined for each biogeographical context.

9. See further:

ECODIAG implementation manual can be downloaded here[14] in its French, English, Spanish and Romanian versions. It includes the complete methodology, as well as some examples of assessment grids and results.

The following websites gather publications into semi-natural habitats ecosystem services and management needs:

- HedgeLink[15]
- High Nature Value Farming Link[16]
- Result-Based Agri-environmental Payment Schemes[17]

14 http://documents.cdrflorac.fr/Ecodiag_Diagnostic.pdf

15 www.hedgelink.org.uk

16 www.hnvlink.eu

17 www.rbaps.eu

FADEAR – Peasant agriculture diagnosis to assess farm impact in your annual report

2. Type of the assessment: global.
Keywords: peasant agriculture, aggregation method, global assessment, management improvement.

3. Language: French.

4. Summary: It is a global diagnostic tool to understand a farm operation and its social and economic environment. It proposes innovations to make progress in agroecological practices through 6 interdependent themes: work with nature, product quality, repartition of volume and means of production[18], local development, autonomy and transmissibility[19]. One all-year-long data is analysed, and it takes 2 days of work, in total, counting the interview preparation, the interview itself, its analysis and feedback to the farmer.

5. Context and objectives:

In the actual context of French agriculture, but also European, it is detected that, more than ever, it is necessary to rethink the role of agriculture in society. ADEARs (Associations pour le développement de l'emploi agricole et rural) are associations that work at French national (FADEAR), regional (ARDEAR) and departmental/local (ADEAR) scale for the development of agricultural and rural work. They are regrouped in FADEAR (Féderation Associative pour le Développement de l'Emploi Agricole et Rurale) created in 1984 by peasant farmers that refused the productivism in agriculture (i.e., agriculture that no longer responds to a need, but to a surplus of raw materials for an industry that leads to the concentration of large farms and the disappearance of peasants). FADEAR aims to educate peasants, accompany new farmers to install and promote peasant and small-scale farming. They define peasant agriculture as a productive way that permits a maximum of peasants spread across the territory to live decently off their work producing on a human-size farm healthy and quality food without compromising the natural resources of tomorrow. It engages the inhabitants to make the rural area alive in an environment of general gratitude. In 1998 the peasant charter was born, and the last version of the "Agriculture paysanne, le manuel" was published in 2013. The tool is based on the charter of peasant agriculture (FADEAR, 1984). This charter is composed of three parts: a definition of peasant farming, ten principles and six themes. The tool aims to promote the understanding of the functioning of their own farm and give the farmer the means to progress in the process of peasant agriculture, which is in the common interest of society and the peasant.

18 It refers to the repartition of the quantity of production and the means needed to produce (e.g. land) with the aim of allowing au maximum number of peasants to access the profession and make a living from it. The Peasant Agriculture project is a project with many peasants, and it is necessary to evaluate the "physical" place that each peasant takes in what is globally limited, i.e.: production volumes per worker, surface areas per worker, European Union Common Agricultural Policy subsidies received per worker.

19 There is a specific theme (transmissibility) that refers to the farm's capacity to be transferred to next generation. This theme was developed to take into account the needs of peasants approaching the retirement.

6. Tool's users and use conditions: It has been conceived as a tool to foster the exchange and reflection between farmers and ADEAR technicians to help farms head towards peasant agriculture. Therefore, it is usually used by the ADEAR technicians together with farmers.

7. Methodology:

Nature

Product's quality	Work with nature
1. Quality related to production methods (1 indicator)	1. Biodiversity
2. Official recognition (1 indicator)	2. Fertility management (8 indicators)
3. Transparency (1 indicator)	3. Pesticide management (5 indicators)
4. Respect (1 indicator)	4. Water protection recourses (4 indicators)
5. Use or not of GMOs (2 indicators)	5. Pollution risk management (4 indicators)

Social

Local development	Repartition of volume and means of production
1. Peasant involvement in local life (4 indicators)	1. Surface of the farm (1 indicator)
2. Collective or social form of production and marketing (1 ind.)	2. Added value released per hectare (1 indicator)
3. Open activity and enhancement of the territory (2 indicators)	3. Available income (1 indicator)
4. Production Sharing (3 indicators)	4. The farmer's feeling about the size of his farm (1 indicator)
	5. Land relocation, intallation of another farmer (1 indicator)
	6. Job creation (1 indicator)

Economic

Autonomy	Transmissibility
1. Decision-making autonomy (6 indicators)	1. Livability in the farm (5 indicators)
2. Economic and financial autonomy (7 indicators)	2. Land security (1 indicator)
3. Technical autonomy (5 indicators)	3. Adaptability of the farm (1 indicator)
	4. Economic viability (2 indicators)
	5. Valor of the capital to be tranmitted (2 indicators)

Figure 1 Summary of the themes and criteria assessed in FADEAR tool.

Instead of using the three pillars of sustainability to assess the farms, the tool uses the 6 themes defined in the peasant charter: working with nature, product quality, repartition of volume and means of production, local development, autonomy and transmissibility of the farm[20]. These six themes represent peasant agriculture and the conditions to promote its implementation. They take up the ten principles of peasant agriculture contained in the charter, as well as the social, economic and environmental dimensions, to precisely define peasant agriculture. Identifying these themes and the links between them is one of the main issues. To answer this question, farmers and researchers have worked together since 1998 to build this tool, being careful to 1) the scientific relevance, 2) the respect of the peasant agriculture charter, and 3) the ease of use.

Different criteria are composed of a group of indicators for each theme, and each indicator has a score. The indicators are composed of a title, the way to calculate it, argumentation regarding its choice and some clarification.

For example, the "Water protection resources" criteria, included in the "Work with nature" theme, is defined by four indicators. One of these indicators is the volume of water used to irrigate, which can be noted with three different notes.

What volume of water is used to irrigate each year?	2 pts
Less than 1000m³/farm/year	2/2
Less than 1200m³/hectare/year	1/2
More than 1200m³/hectare/year	0/2

Figure 2. Example of a "Work with nature" indicator. Score of the "volume of water used to irrigate" indicator.

20 Farm's capacity and easiness to be transmitted to an entrepreneur.

8. Results:

The final output is a result for each criterion and theme and a global result.

FADEAR has developed software to report the scores and give the final result in the shape of a flower with six petals. The petals are bigger or smaller depending on the score obtained in each theme.

The diagnosis does not end once the flower is made. The objective is to understand the farm operation system and identify its strengths and weaknesses. For this reason, it is essential to evaluate the results theme by theme.

Figure 3. Outlook of the results of FADEAR evaluation.

9. Analysis of the tool:

Strengths:

- Designed by farmers and for farmers. Used for 20 years in more than 600 cases.
- It is easy to make the assessment and the result interpretation.
- It is oriented to engage in reflection and take decisions to improve agroecological farm practices and head towards peasant agriculture. It can be used as a one-shot assessment but also as an ongoing monitoring tool (a 2nd assessment after some years to monitor the improvements).
- Concerns the global functioning of the farm and its link with the territory.
- The tool can be used for various stakeholders: peasants, students and teachers of agrarian studies from public or private non-profit organizations that foster peasant agriculture.
- It can be adapted to different kinds of productions: crops, livestock breeding, market gardening, viticulture, arboriculture, beekeeping.

Potential limitations:

- Private access: the manual can be bought through the website, but it is recommended to be used by trained technicians that share the charter of peasant agriculture. The software is private access.
- Focused on French reality. It is necessary to adapt some of the social and economic indicators to use in other countries.
- It is a very complete and straightforward methodology. However, this simplicity implies less detail in the characterization of some indicators.
- FADEAR does not consider the option of giving a null answer. Sometimes none of the possible solutions is appropriate, and you are obliged to choose the one that fits better. The indicators of the agro-ecological scale are pressure indicators and not impact indicators. They focus on management tasks but not on the quality of the environment due to these tasks (biodiversity level, pollution level, etc.)

10. See further:

"Agriculture paysanne le manuel" is created and distributed by FADEAR and can be ordered on their webpage.[21]

21 https://www.agriculturepaysanne.org/les-outils-de-l-agriculture-paysanne

HUMUS - A participative tool for assessment of soils and biodiversity

To be used when carrying out farm analyses and/or to make soil science accessible to non-experts and to link environmental and agricultural issues.

2. Type of assessment: environmental
Keywords: soil, educational gap, agroecological infrastructure, education of the public

3. Language: French

4. Summary: HUMUS is a **participative scientific** assessment tool: with the help of a specialist, farmers and citizens can observe and analyse the state of the soil on a farm. This assessment covers three objectives:

- **analyse** or **monitor** the environmental status of a farm at a given moment (T)
- raise awareness and **make the issue of soil accessible** to non-specialists,
- serve as a bridge between agricultural and environmental stakeholders

A HUMUS assessment can be carried out every 5 years on a farm.
This is not an agricultural advice tool

5. Context and objectives: HUMUS is a tool developed by Terre de Liens, which owns more than 3000 ha of agricultural land. For Terre de Liens, purchasing this land serves two purposes: providing access to land for candidates wishing to set up in organic farming, and to preserve the land for its agricultural use, maintaining its fertility. Maintaining the fertility of land purchased is an objective shared by the citizens working with Terre de Liens, the farmers and the ownership structures (Terre de Liens Land and Foundation). With this in mind, Terre de Liens in conjunction with the Nancy School of Agronomy, ENSAIA, developed a participative tool for assessment of the environmental status of soils: HUMUS.

Originally, the tool was intended for use by several different groups:

- Terre de Liens as a landowner, as the assessment means that certain environmental clauses of the rural lease signed with farmers can be monitored.
- The farmers, to help them gain better knowledge of their soil.
- Volunteers and the public, to learn about soil and get involved in the issue.

Now, it is aimed more widely at other owners of agricultural land, whether they be a local authority, a farmer or a group of citizens who have bought an agricultural property.

6. Tool's users and use conditions:

The HUMUS assessment tool is currently mainly used by Terre de Liens regional associations to carry out analyses and/or to mobilise citizens on the issue of soil and farm biodiversity. Citizen groups and local authorities have also used the tool to analyse land opportunities, meaning that HUMUS assessments have also been carried out outside of the Terre de Liens network. Around 20 assessments have been carried out to date since 2017.

The assessment is carried out by a trained person with the help of a group of volunteers and the farmer. Terre de Liens also provides training on using the tool for its volunteers and employees. If there is no trained person available, Terre de Liens brings an expert for 7 days of work, which costs around €3000.

The assessment tool can be used by anyone; the user manual is freely accessible here.

7. Methodology:

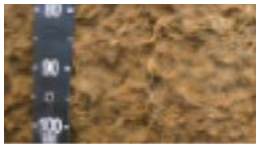
The HUMUS assessment comprises of 17 indicators (amount of organic matter, carbon-to-nitrogen ratio, density of earthworm tunnels, etc.) in order to evaluate the fertility of the soil, with regard to five objectives pursued by Terre de Liens:

- preservation of soil against erosion
- preservation of soil structure
- maintenance and improvement of soil biodiversity
- maintenance and improvement of the amount of organic material
- retention of soil minerals

Each indicator was selected on the basis of two criteria: its scientific value and ease of evaluation by non-specialists.

Example of indicator 6: - soil structure: instructions and evaluation table from the user manual:

Using a spade, lift a clod of earth and observe how it breaks down. Then, look at the size of the aggregates, their appearance (porous, smooth, etc.), and evaluate the effort needed to crumble them to reveal the small structural elements. Be sure not to crush the soil too much between your fingers as this may destroy its structure.

		Pit 1	Pit 2		
Sandy				Lack of cohesion between particles, rapid breakdown of organic matter.	2
Granular				Good water and air circulation, good biological activity.	5
Subangular blocky				Good water and air circulation, good biological activity. Clay cracking.	4
Angular				Clay and silt cracking.	3
Platy				Risk of surface crusting and waterlogging.	2
Massive				Compact soil, impermeable to water. Little biological activity.	0

A HUMUS assessment is carried out over three days, in the following stages:

- Day 1: deep soil analysis via assessment of soil pits and samples taken with an auger (requires the presence of the assessment leader, a few volunteers and the farmer).
- Day 2: biodiversity analysis via observation of agroecological infrastructure and bio-indicator plants. For Terres de Lien, this day links in with the environmental clauses of the rural lease signed between the farmer and Terre de Liens (requires the presence of the assessment leader, a few volunteers and the farmer).
- Day 3: open day on the farm, during which the main results observed are presented, certain indicators and protocols are tested and a landscape analysis is carried out (all citizens interested in the issue of soil can attend).

Before the assessment, map data should be collected on the farm, and soil samples should be taken for the laboratory.

Afterwards, the results are written up in a report which can be sent to the participants, farmers and to the Terre de Liens Resources Centre which collects all assessments carried out for future reference.

8. Results:

A paper report is produced at the end of the assessment and sets out all results in detail, including:

- a presentation of the farm's map data
- a set of photos of the landscape analysis
- an analysis of the bio-indicator plants
- the observations made on the surface and deep levels of the soil
- a summary with a colour-coded score on the five objectives studied (see summary in the case study)

These results form the basis for assessment of a farm, and also for obtaining a snapshot of a farm's environmental status at a given moment, so that further assessments five or ten years later can be carried out to see if there have been any improvements.

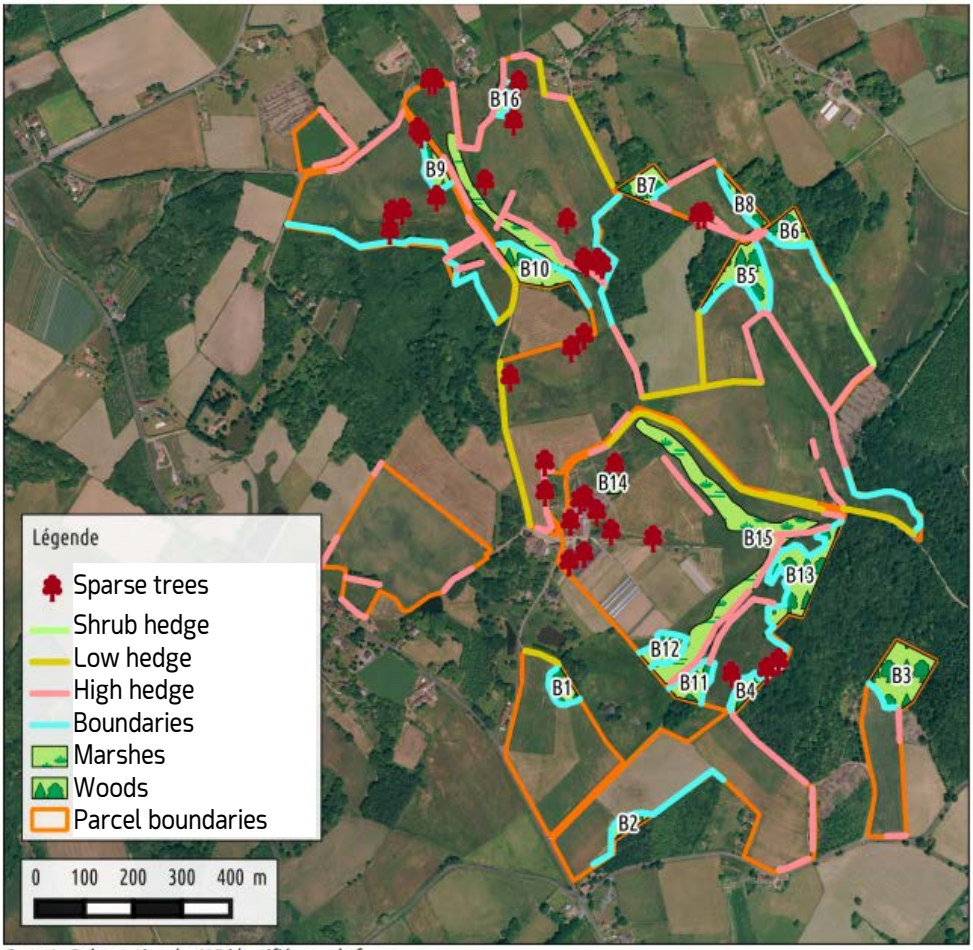
9. Analysis of the tool:

Advantages of the HUMUS assessment:

- a tool which is both scientific and participative
- provides an opportunity to create dialogue between citizens, peasant farmers and environmental associations on soil management and environmental monitoring

Disadvantages:

- the difficulty of training non-experts as assessment leaders, even though the indicators were chosen for their relative ease of application and interpretation - drafting of the report is still almost exclusively carried out by an expert to limit errors in interpreting the results.
- the time needed to carry out the assessment



Carte 1 : Présentation des IAE identifiées sur la ferme

10. See further:

Contact: humus@terredeliens.org

User manual freely accessible at Terre de Liens Resource Centre.

IDEA - Ideal for assessing the sustainability of your farm in a simple way

2. Type of the assessment: global.
Keywords: sustainable agriculture, self-assessment for decision making, support tool, annual assessment.

3. Language: French.

4. Summary: The IDEA method seeks to give practical content to the concept of sustainability. This method, designed as a self-assessment tool for farmers in 2000, provides operational content to assess agricultural sustainability. Through 42 indicators, IDEA aims to characterize the fundamental concepts of sustainable agriculture: economic viability, liveability and environmental sustainability. It analyses the data from one year and takes 1 day and a half of work, including data collection, computer input, analysis and development of an action plan and feedback to the farmer.

5. Context and objectives:

The last reform of the Common Agricultural Policy expresses its intention to integrate sustainable development as one of the key aspects of European agrarian policies. Nevertheless, it remains challenging to operationalize the concept of sustainability at the farm level. The research for sustainability indicators, which could help transition towards sustainable agriculture and rural development, constitutes a strong challenge for Europe and the World. The IDEA method (Indicateurs de Durabilité des Exploitations Agricoles or Farm Sustainability Indicators) was developed in 2000 by IRSTEA (the National Research Institute of Science and Technology for Environment and Agriculture in French) to assess the sustainability of a farm. It was designed to be used as a teaching tool, a decision support tool, and support policymakers in implementing sustainable agriculture policies.

6. Tool's users and use conditions:

It can be used in several situations: a farmer with an agrarian consultant or technician, in groups to discuss the sustainability between farmers with the same production, in agricultural training and formations with students. Farmers themselves without any technician can also use it. The access is public.

7. Methodology:

The IDEA method was developed in five main stages based on academic recommendations:

1. Define clear objectives
2. Choice of hypothesis and motor variables
3. Create indicators
4. Determining the calculation method rules (with thresholds and choosing standards)
5. Testing the method

As a result, the IDEA method was structured around 16 objectives grouped in three sustainability scales. The three sustainability scales have the same weight and range from 0 to 100 points. Each of these three scales was subdivided into three or four interdependent components (making a total of 10 components) and grouped in 42 indicators. All information describing the farm is scored with points that determine the punctuation for each indicator. Each component groups some indicators, and each indicator evaluates more than one objective. For example, to assess the "Diversity" component, four indicators were used, one of them is "Diversity of annual or temporary crops", which takes into account "Coherence", "Biodiversity", "Soil preservation" and "Land preservation" objectives. Below, an example that explains how to calculate this indicator can be found.

Three Scales of the IDEA Method	Combined with →	Objective of the sustainability assessed in IDEA Method
Components	**Agroecological sustainability scale** 1. Diversity (4 indicators) 2. Organization of space (7 indicators) 3. Farming practices (7 indicators)	1. Coherence 2. Biodiversity 3. Soil reservation 4. Water preservation 5. Atmosphere 6. Food quality 7. Ethics 8. Local development 9. Land preservation 10. Citizenship 11. Management of non-renewable resources 12. Human development 13. Quality of life 14. Adaptability 15. Employment 16 Animal well-being
Components	**Socio-territorial sustainability scale** 1. Quality of the products and land (5 indicators) 2. Employment and services (6 indicators) 3. Ethics and human development (7 indicators)	
Components	**Economic sustainability scale** 1. Economic viability (2 indicators) 2. Independence (2 indicators) 3. Transferability (1 indicator) 4. Efficiency (1 indicator)	

Figure 1 Summary of the scales, components and objectives assessed in IDEA tool.

Diversity of annual or temporary crops	Range from 0 to 14
Determination modalities	
For each cultivated species:	2
If more than six varieties in total:	2
If presence of legumes in the rotation: 5-10%	1
10-15%	2
>15%	3

Figure 2 Example of a "Diversity" indicator. Score of the "Diversity of annual or temporary crops" indicator.

8. Results:

The sustainability analysis can be done both at the farm level (using the 42 indicators, the 10 components and the 3 scales) or aggregated when analysing groups and comparing different production systems. The diagnostic is valid for one year and it can be used to monitor improvements in farms (it is then recommended to leave 2-3 years between two diagnostics). IDEA method is supported in an excel file to report the scores and give the final result. The results are summarized in a "radar" shape and/or histogram plots for global analysis, components and indicators.

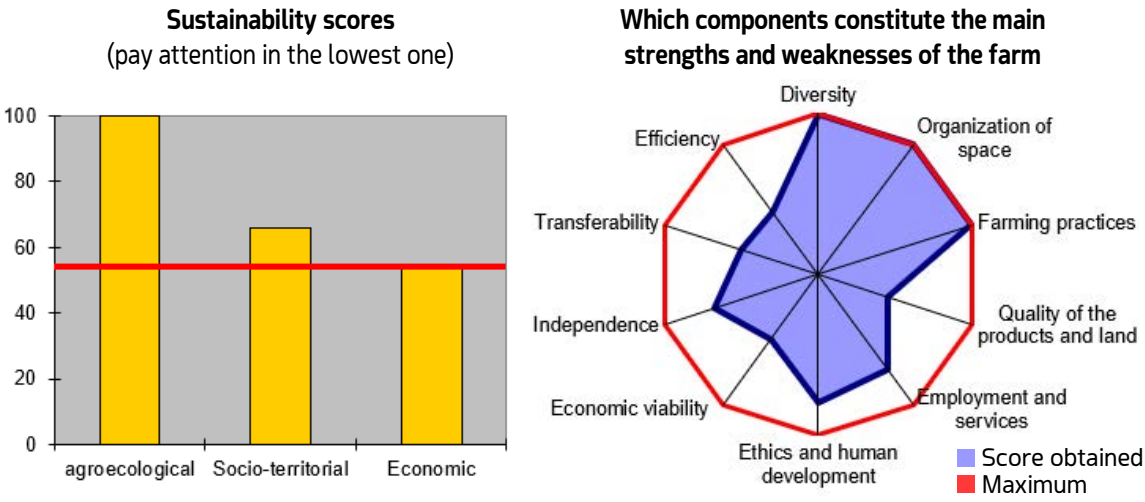


Figure 3 Outlook of the results of IDEA evaluation.

9. Analysis of the tool:

IDEA's strengths:

- Data can be obtained from a simple survey. A survey guide and a grid of indicators are available online.
- The global result and the result of each indicator are directly understandable.
- Public access and transparent calculation method: the calculation method is transparent and simple. Each indicator is presented in the form of a detailed sheet explaining its calculation mode, supplemented by an example and a justification of the indicator's choice.
- Used in thousands of farms around France and used to evaluate sustainability in a significant number of academic papers.

IDEA's potential limitations:

- It is necessary to adapt the method to the local context and specific agriculture.
- In certain situations, the impact is not entirely taken into account (e.g., a farm that contracts an external service, the wine made in a cooperative does not account for the energy consumed in the farm, etc.).
- Some difficulties with ratings and weights were detected. Nevertheless, they were mitigated by testing. These tests also verified that the method allowed fruitful exchanges with the farmer, which conduct to experimental validation of its use-value and recent improvements for future versions.

10. See further:

IDEA tool and Blank table for recording farm data and calculating indicators can be downloaded on the IDEA webpage[22].

VILAIN L. (dir); BOISSET K.; GIRARDIN P., GUILLAUMIN A.; MOUCHET C., VIAUX P., ZAHM F.,2008, La méthode IDEA – Indicateurs de durabilité des exploitations agricoles – Guide d'utilisation, 3èmeédition, Ed. E

22 https://idea.chlorofil.fr/utilisation/outils-dapplication.html

RICHTIG RECHNEN – Accounting sustainability of farms as part of the annual business results

2. Type of the assessment: social and environmental assessment as part of the annual financial report
keywords: yearly balance sheet, accounting, business results, social judgement, environmental assessment, social overhead capital, **true-cost assessment**

3. Language: German

4. Summary: Richtig Rechnen (Calculating Right) is a tool to connect the sustainability report with the annual accounts for farm businesses. The overall goal of the tool is to merge the two spheres of Corporate Social Responsibility and economic performance. By capturing the required time needed to produce ecological and social services with the help of sustainability indicators, this extra effort can be monetized. A comprehensive financial accounting is generated with an additional examination of conventional accounting and a monetary assessment of the ecosystem services maintained through farm work. The final sustainability report (sustainability analysis and extended annual accounts) shows the extra money spent on sustainability services. This can be utilized to argue for compensation, either on a stakeholder level of access to land organizations or for political lobbying towards the true-cost settlement of sustainability services provided through farms)

5. Context and objectives:

Richtig Rechnen's primary goal is to illustrate the social and environmental impact of farms in the language of the economy (from now on, "extended accounting"). The basis of all economic decisions is business accounting, in which its economic power is shown through accounting methods within the annual balance sheet. The problem here is that in traditional accounting, neither ecological and social services, as essential foundations for the economy, nor the negative externalities, aggravating environmental and social systems, are taken into account. To give a bigger picture of the farm's performance (economically, environmentally and socially), extra effort has to be measured (often referred to as true-cost calculation)- those services of business actions that are not compensated. The annual balance sheet is assessed in terms of social and environmental value added (or a decline in value) in addition to the actual cost assessment. As the third pillar, ecosystem services are assessed and monetized. Natural resources limit the means of production in farming. This is only sustainable when the regeneration of these is secured.

On the other hand, farms not only provide food but create and maintain ecosystems within the cultural landscape if certain farming and management practices are implemented. Corporate social responsibility reporting and financial accounting are merged so that the correct figures can be presented to the shareholder of farms, particularly for community-owned farms. That is why the Regionalwert Freiburg started developing sustainability indicators for their farms in 2008. These sustainability indicators are used to create a sustainability analysis culminating in developing "right figures" as a comprehensive and easily accessible tool for comprehensive accounting. The tool was first tested on four farms in 2019.

6. Tool's users and use conditions:

Richtig Rechnen is used by farmers, mostly in a managerial position, but essentially those with access to all relevant information. Now, the use is strictly limited to the partner farms within the testing phase; the first phase was implemented on 4 farms, the second phase will involve 100 farms. The results are also used to research and develop the tool further. Within the first phase, results were also shared with the shareholders of the Regionalwert AG Freiburg. About €3000 for each of the 100 farms in the next testing phase 2020/1 is needed for implementing the assessment.

7. Methodology:

The foundation of comprehensive financial accounting is the existing data in the balance sheet added up with the newly captured data for sustainability services. The methodology of Richtig Rechnen consists of four consecutive steps:

- The collection of sustainability services by the farm (everything that has a social, environmental or economic value but payments don't compensate). This is done with the aid of sustainability-indicators (3 dimensions, 10 categories, each consisting of about 50 subcategories, 180 indicators) and tracking accounts proposed by the developed software (see infographic further down).
- The booking and integration (monetization) of the sustainability services, found in the annual balance sheet.
- The interpretation of the data.
- The generation of comprehensive financial accounting, including the calculation of additional expense in the balance sheet.

For example, the percentage of skilled workers is an indicator within the category "Expertise". The number of skilled workers employed in the company is compared with the number of permanent employees (given as full-time employees), and the ratio evaluated. In this case, the rate represents a performance indicator. The evaluation key classifies a skilled worker share of 40% or more as sustainable, a percentage between 20-40% as moderately sustainable, and anything below 20% as non-sustainable. The amount of the skilled worker's wage varies depending on whether the result is in the green or yellow range. More skilled workers mean more local and secure jobs, giving a perspective for people and the possibility to root in the region, starting families that can result in a high motivation to develop the farm and its land in a sustainable way to secure the farm and "my" job. Monetization refers to the wages paid to skilled workers. In this case, three farms are in the green zone, and one farm is in the yellow area. The different euro values are due to the company-specific wage payments.

8. Results:

The final result of the process is comprehensive financial accounting (so-called sustainability balance sheet). The "cause-related allocation of expenses and revenues" based on accounting documents and their utilization in comprehensive financial accounting makes ecological, social and regional economic performance values visible and enables farms to draw up a sustainability balance based on ordinary accounting. The results provide evidence of the operational added value that had been created but no evidence of a reduction in expenditure with the consequence of economic risks and asset losses. Nevertheless, throughout the first testing phase, it was shown that the developed method and the instruments are also suitable for risk analysis and evaluation concerning sustainable operational management. The main output of the tool is a clear view of sustainability services cost (the first four farms had an average price for the extra expenses of 10% of the total turnover). RR should be used for ongoing monitoring. It will give

the first insight into the sustainability performance of the farm, but the impact of changes and improvements can only be identified when implemented annually.

9. Analysis of the tool:

Although there is no financial equivalent (funding scheme) to the calculated additional expenses of farms providing sustainability service for nature and the social environment, the tool might help lobby for accurate cost compensation.

Strengths:

- It communicates the social, environmental and (regional) economic benefit of farms in the language of accounting (primarily to the shareholders within the Regionalwert AG).
- It clarifies what and how such services should be compensated within a community-based model for farm ownership and infrastructure investments.
- The online-tool to track and record the comprehensive sustainability accounting data helps the farm-managers input their data efficiently.
- It enables an in-depth assessment of the status quo in terms of sustainability, a model for annual repeating to see progress and challenges.

Potential Limitations:

- At present, the tool's implementation needs professional support, about €3000 for each of the 100 farms in the next testing phase 2020/21.
- It is a complex assessment with the need for in-depth knowledge of farm processes and financial flows.
- For the time being, it shows the extra effort for sustainability services in the language of money, without the perspective of compensation through EU or national funding schemes.

If the agricultural policy on a European but also a national level is willing to compensate for such services, Right Figures might act as a comprehensive tool for evaluating farms that would benefit from the respective subsidies.

10. See further:

To come

Link to Richtig Rechnen Report English
Link to website of Richtig Rechnen

Link to Explanation Video RR English (to come)

SAFA – Sustainability Assessment of Food and Agriculture systems

2. Type of the assessment: assessing the impact of food and agriculture operations on the environment and people (social and ecological evaluation).
Keywords: sustainable cropping, livestock husbandry, post-harvest, processing, distribution, marketing, holistic approach.

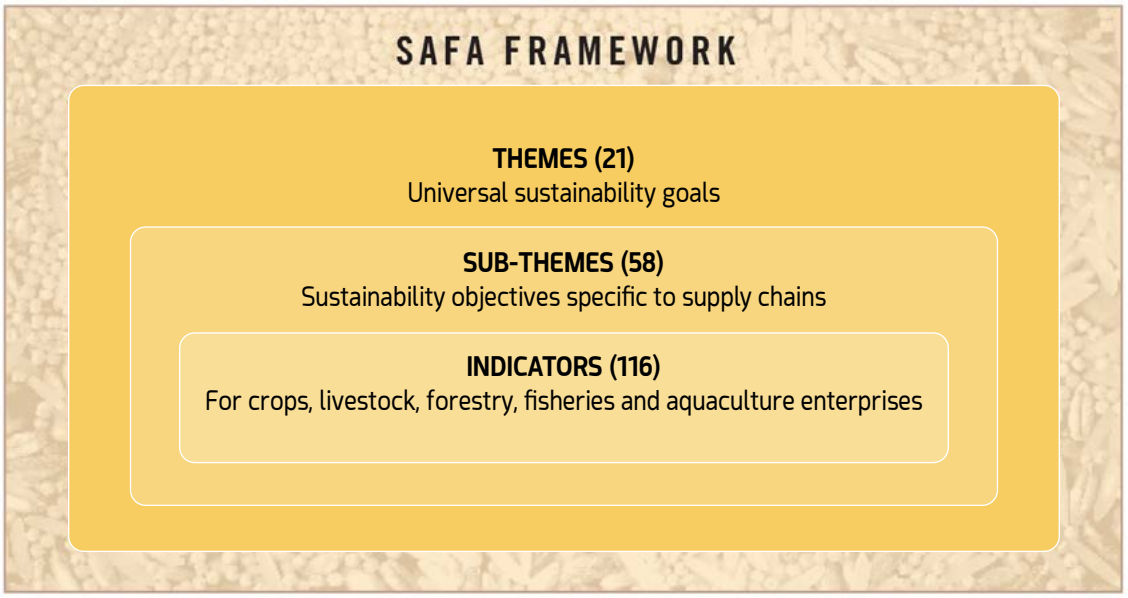
3. Language: English, French, Spanish, Italian (Guidelines, Tool is only available in English)

4. Summary: SAFA is a holistic global reference framework for assessing sustainability along with agriculture, forestry and fisheries value chains. SAFA was developed as an international reference document, a benchmark that defines the elements of sustainability, as well as a framework for assessing trade-offs and synergies between all dimensions of sustainability. It measures the performance of enterprises in terms of sustainability but does not assess products or processes. Its primary use is business-to-business sustainability assurances and is therefore not intended for business-to-consumer communication. Through offline tools, enterprises and independent assessors can walk through the process of mapping, contextualization and choosing indicators to finally report on areas of improvement with the help of data visualization as a method of presenting information in a graphical form.

5. Context and objectives:

SAFA is a holistic global framework for the assessment of sustainability along food and agriculture value chains. SAFA establishes an international reference for assessing trade-offs and synergies between all dimensions of sustainability. It has been prepared so that enterprises, whether companies or small-scale producers, involved with the production, processing, distribution and marketing of goods have a clear understanding of the constituent components of sustainability and how strength, weakness and progress could be tackled. By providing a transparent and aggregated framework for assessing sustainability, SAFA seeks to harmonize sustainable approaches within the food value chain and other good practices. Enterprises and actors involved in the production, processing, distribution and marketing of food and agricultural goods are getting a clear understanding of the constituent components of sustainability and how strengths, weaknesses and signs of progress could be assessed through SAFA. As with many other impact assessment tools, SAFA structures the process with the help of different levels, which also act as entry points for different users.

The SAFA Framework begins with the high-level, overarching dimensions of sustainability: good governance, environmental integrity, economic resilience and social well-being. These are translated into a universally agreed definition of sustainability through themes and sub-themes for each sustainability pill. Goals are established for the themes, while objectives are defined for the subthemes. These are measurable and verifiable through indicators applicable to food and agriculture supply chains, with example indicators. The SAFA Guidelines guide the application (calculation) of the indicators and implementation of the whole assessment process. Two levels of a critical review of a SAFA assessment are available. Level 1 is for use where a SAFA has a less



formal application such as for internal use and self-improvement, while level 2 - which requires an external audit of the assessment - is used where SAFA results have a more formal application, such as when a SAFA is used to provide business-to-business sustainability assurances.

The SAFA Framework can be used by practitioners, NGOs and communities working on sustainability standards and tools, as well as governments, investors and policymakers.

6. Methodology:

SAFA will cover a clear scope within the assessment. In terms of supply chains, it encompasses all processes that are part of production or distribution; that generate significant impacts on sustainability in the surrounding environment and community. The assessed entity has control or significant influence in terms of financial and operating policies and practices. The assessment is intended to cover the entity's activities for one year, evaluating 21 high-level themes on sustainability in general and 58 sub-themes tailored to food supply chains. Default indicators are defined to facilitate measuring progress towards the objectives. These default indicators are provided as examples and can be replaced where more appropriate indicators are identified. Assessors will find guidance in the SAFA Guideline as well as in the user manual for the tool. The procedure of assessing is structured in 4 steps:

Mapping
Mapping the supply chain clarifies the scope of the assessment, in which areas or not the farm has direct control or influence. Stating clear boundaries of the organization and the connected interactions with the production network frames the further assessment.

Contextualization
Information about geographic or regional circumstances, such as resource availability, and their socio-political circumstances such as labour trends, legal framework and other details are collected. By doing this, these measurements are refined, and ratings can be appropriate based on the circumstances surrounding the entity assessed. Sub-themes can be selected or deselected to adapt the assessment to the context of the farm.

Selecting tools and indicators
Selecting the various indicators helps define the accuracy score; rating the assessed entity's indicator performance on a range from "best" to "unacceptable" will make the assessment more suitable to the specific context of the farm.

Reporting
The SAFA Report creates transparency on a single SAFA assessment result. It is a synthesis based on the information entered. Furthermore, it provides space for the user to describe the assessment process, hotspot issue details and areas for improvement.

7. Results:

SAFA is intended primarily for self-evaluation and internal communication about sustainability performance for self-improvement. It is possible to use the SAFA Performance Report to communicate and establish a common understanding of sustainability aspects with other businesses. In these cases, the use of the Level 2 compliance review is encouraged.

The results are presented within the final report, being a synthesis of the SAFA assessment, including definition of scope, boundary setting, qualified themes' ratings (with the Accuracy Scores), hotspot issues details, irrelevant sub-themes justified and areas for improvement identified. To make the results more accessible, the data is also visualized in a graphical form showing the different theme performances and ratings following a traffic light colour code.

8. Analysis of the tool:

The SAFA tool provides an accessible assessment instrument for smaller enterprises in the food sector. Through the detailed description of the underlying principles, sustainability indicators and the process of a SAFA assessment given in the Guidelines, even inexperienced assessors can walk through the different steps in the process. There is also a detailed manual for the software, helping with installation and usage. The SAFA Smallholder App has been tested and is currently in development, making the data entry easier and enabling small farmers without access to further IT resources to use the assessment tool on their smartphone. The visualization of the final results helps to find hot spots for improvements. It gives an overview of the enterprise's overall sustainability performance, weaknesses, potentials, and strengths. Unfortunately, the tool's mobile app is not available right now, though it was tested in 2014 in Colombia and Kenya. The holistic approach assesses all four dimensions of sustainability. The sub-themes tailored to the agricultural and food sector enable farm-managers (or other experts for the respective enterprise) to evaluate their performance, review their objectives and identify weak spots in governance, environmental integrity, economic resilience and social well-being. Although the Guidelines, with their 208 pages, seem overwhelming, they help learn the relevant aspects of the assessment by implementing it. The software is straightforward to use and install, unfortunately only Windows is currently suitable to run it, being a problem for small-enterprises who switched to open-source operating systems such as Linux.

9. See further:

SAFA Webpage of the FAO
SAFA Webpage of the FAO
SAFA Guidelines (version 3.0)

CASE STUDIES

COOL FARM TOOL – A milk goat farm

1. Farm or practice short presentation:

Figure 1. Marc feeding a kid goat (left) and a tribe of goats grazing in Riudaura Valley (right).

"El Pastor de Riudaura" is a milk goat-rearing farm run solely by Marc and located in Riudaura (la Garrotxa, Catalonia). The herd is composed of over 70 Saanen goats, which graze daily in the mountains surrounding the valley, using around 5 hectares of meadows and 8 hectares of oak trees forest. Animals have a small complementary diet based on fodder grain, alfalfa and hay, especially in wintertime. The production is seasonally planned, taking into account the animals' natural cycles. All steps of the process are carried out manually, and appropriate measures are undertaken to ensure animal welfare. The final products are pressed cheeses made out of vegetable rennet that has to ripen for 1 to 5 months on wooden shelves. Distribution occurs through direct sales and short supply chains.

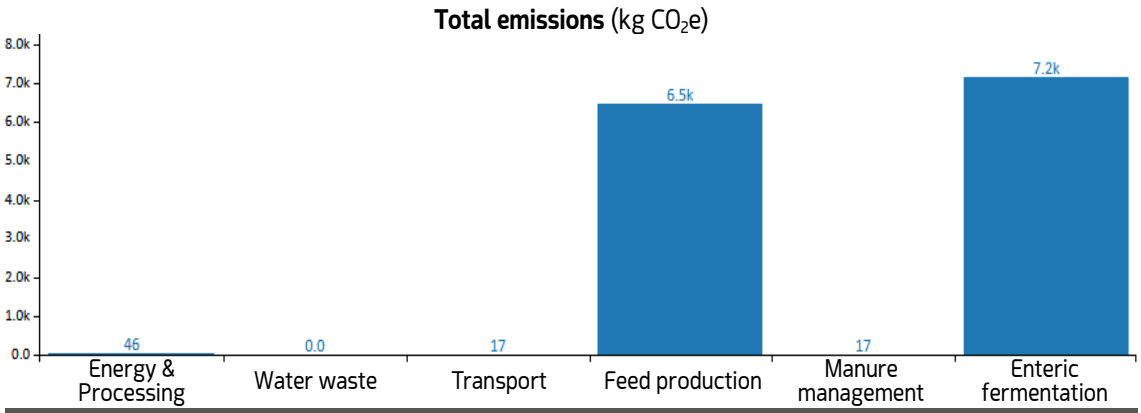
2. Results of the impact assessment tool:

Marc filled in the CFT online questionnaire to know more about the GHG emissions taking place on his farm. Although some external help has been required to understand a few specific questions better, most of the process has been carried out by the farmer.

The results show that the whole farm activity accounts for the emission of 13,699 kg of CO_2 equivalents. These mainly stem from 2 sources: the enteric fermentation occurring inside the animals (7,200 kg) and feed production (6,500 kg), which complements the grazing and does not happen within the farm.

As for the emissions stemmed from energy use, 58% of them come from the electrical grid. Emissions related to manure management, feed production or enteric fermentation are mostly (between 74 – 82%) due to productive adult animals, as they constitute a significant part of the herd. Finally, transport and manure management result in very low emissions, 16.92 and 17.20 kg respectively.

Results can be checked on-line and shared with customers or other target public via a link to the website.



Detailed data (all values in kg)

Sources	CO_2	N_2O	CH_4	Total CO_2 eq	Per kg
Energy use (field)	0	0	0	0	0
Energy use (processing)	46,45	0	0	46,45	0,05
Water waste	0	0	0	0	0
Transport	16,92	0	0	16,92	0,02
Feed production	6,46k	0	0	6,46k	6,46
Manure management	17,20	0	0	17,20	0,02
Enteric fermentation	0	0	286,36	7,16k	7,16

Figure 2. Graph indicating the distribution of emissions (kg of CO_2 equivalents) amongst the different farm dimensions.

3. Analysis of the output:

The farmer can use CFT results to monitor processes, distinguish which of them are more pollutant and identify room for improvement.

In this case, since most of the work is manual and the product is distributed locally, farm emissions are relatively low, and the farmer does not have many options to reduce it further. Emissions stemmed from energy consumption in the exploitation and transport are negligible. Some of the measures that could be implemented to minimise farm emissions are related to goats' diet. Still, this can be delicate as it may change the taste and scent of the milk, and therefore the cheese.

The farmer seemed really engaged in the development of this case-study and considers that the information obtained is valuable. Additionally, similar data is sometimes required by the administration in public calls application processes. He also found the information obtained could be used as an incentive to customers, and he is planning to communicate results with his clients.

4. Recommendations:

Some of the data are indeed difficult to collect by farmers that have not specifically prepared to undertake this assessment. Marc decided to make an estimated calculation when answering some of the questions (e.g., water biological oxygen demand). It is advisable to research this and other complex information to obtain more relevant results. However, Marc argues that filling up the questionnaire has been an interesting exercise that has enabled him to reflect upon the processes taking place on his farm. Therefore, different approaches can be taken according to the users' purpose.

Marc found it difficult to grasp some of the "transport part" questions in terms of understanding. While the complexity of some questions is an issue, excessive simplification is found in some parts of the questionnaire. For instance, more useful results would be obtained if the user could specify the purpose of each of the transportation processes (i.e., grain fodder inputs, commercialisation outputs, etc.). Additionally, the goat herder encountered difficulties when introducing "Herd&Feed" and "Manure Management" data since there were few options to choose from. Marc found that CFT should distinguish dry fodder from a compound feed to provide more accurate results. In the same vein, it would be suitable if the CFT platform considered whether the grain fodder and the dry grass are produced on the farm or bought from external suppliers instead. All things considered, when using this tool and completing the "Herd&Feed" part, it is advisable to simply provide rough data if the questions are not detailed enough.

5. Conclusions:

CFT might be helpful to improve the sustainability of a farm. This tool is easy and quick to use, although some parts of the questionnaire are not clear enough and may confuse the farmer and hamper the assessment process. Beta versions in other languages are not entirely translated, and some words are in English, which represents an obstacle for farmers who cannot read it. In small farms or farms with a large proportion of manual work, the tool provides valuable information about the amount of GHG emissions but leaves little room for practice improvement. That is, CFT might be more suitable for relatively large-scale farming since more relevant results would be yielded in such a context. All in all, given its flexible, accessible and consistent nature, the tool will be worth trying for any farmer willing to learn about his or her activity's emissions.

SUMMARY TABLE

TOOLSHEET

DIALECTE - Use of the assessment on 27 Terre de Liens farms

The results presented below are from the following source:

1. Farm or practice short presentation:

This case study provides an overview of 27 DIALECTE assessments carried out on Terre de Liens farms, enabling analysis of the environmental performance of these farms in comparison to farms using conventional agriculture and organic agriculture practices.

The majority of the 27 farms which underwent a DIALECTE assessment are located in the southern half of France. Two thirds of the samples are located in mountainous and foothill areas, which have very restrictive soil and weather conditions.

A large number of Terre de Liens farms are mixed crop and livestock farms. Vegetable growing alone represents a quarter of the sample.

2. Results of the impact assessment tool:

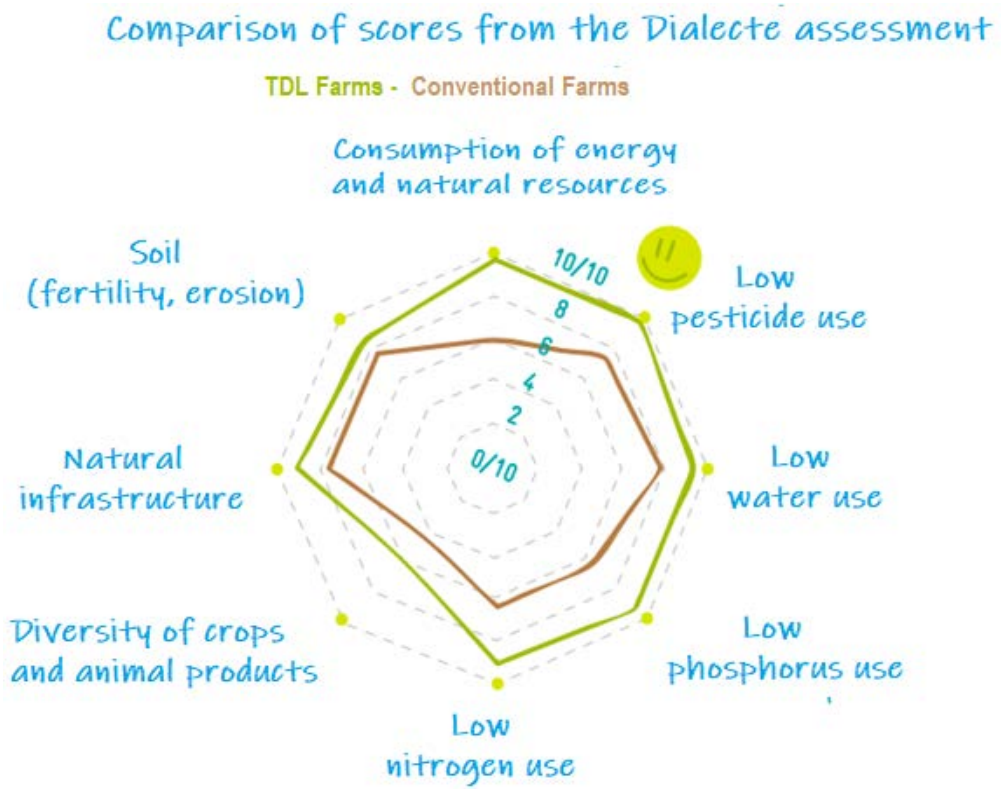
The study compares the general functioning of farms and their impact on the environment. The results of the 27 DIALECTE assessments undertaken on the Terre de Liens farms were compared with the results of two reference groups which had also undergone a DIALECTE assessment: conventional farms and organic farms. The data on these two reference groups is available on the Solagro website, as soon as you add a diagnosis online.

The study can be used to:

- draft a first evaluation of the environmental performance of farms supported by Terre de Liens
- compare the performance of these farms and assess their degree of involvement in agroecology

The assessment, based on the farmers' statements, can be used to:

- take stock of the practices used
- highlight unexpected factors in the farm systems, for example regarding fossil fuel consumption
- draft a review of biodiversity issues on the farm



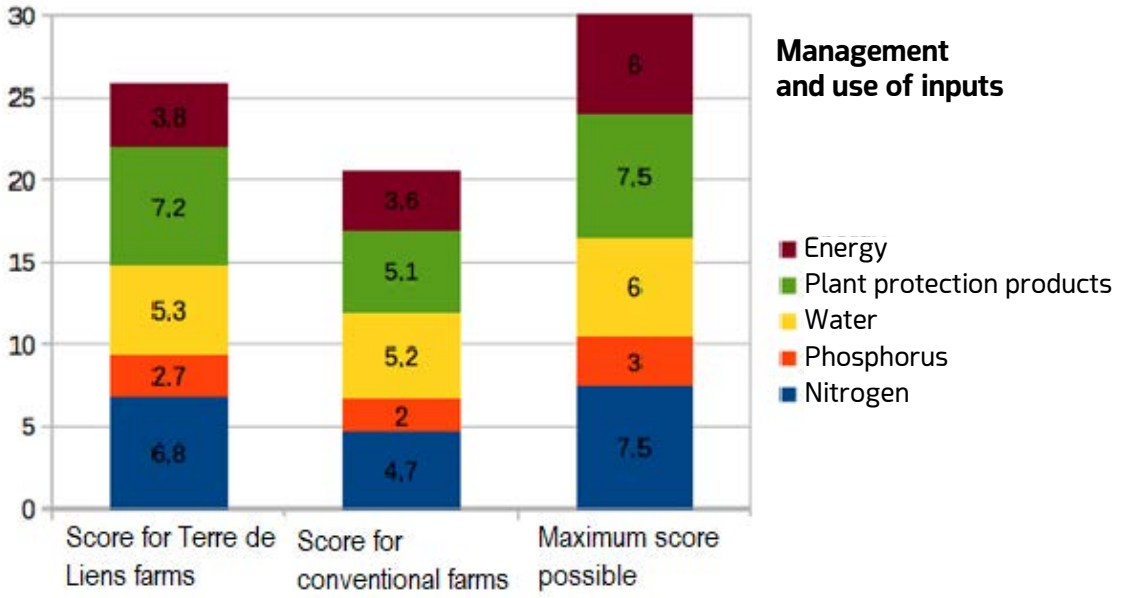
3. Analysis of output:

The study clearly shows that the farms assessed have a low environmental footprint.

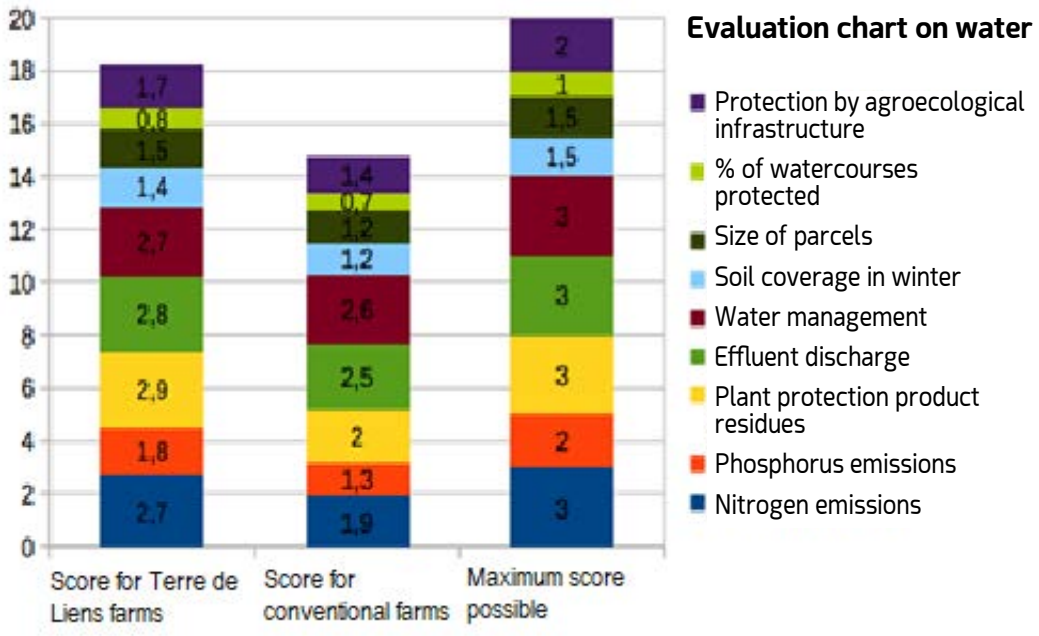
These farms are characterised by high crop diversity (score of 9/10), a high proportion of pulses throughout all utilised agricultural land (21%), significant soil coverage in winter (96% of utilised agricultural land), high feed (roughage) autonomy (79%) and areas occupied by agroecological infrastructure representing on average 50% of utilised agricultural land.

Compared with conventional farms, these farms:

- have greater diversity (score of 50/100 compared with 43/100)
- use less energy (in equivalent litres of fuel per hectare of agricultural land)
- show good use of nitrogen and do not have a nitrogen surplus
- use low-input production systems with regard to nitrogen and phosphorus indicators



The study shows the positive impact of agricultural practices on water protection on Terre de Liens farms, with a very high score in this area (18/20), (low nitrogen and phosphorus emissions, low use of irrigation, high degree of soil coverage and presence of hedges).



The agricultural activity of these farms also contributes to preserving biodiversity, with a significant share of agroecological infrastructure, giving an average score in the area of biodiversity of 51/100.

This allows Terre de Liens, which to date has carried out around 50 DIALECTE assessments on its farms, to do the following (as illustrated in this study):

- obtain scientifically verifiable information and analyse Terre de Liens farms alongside other farms (different labelling or production system)
- help create detailed information for communication on farms, with the aim of making the results of these assessments accessible.

4. Recommendations:

To facilitate information collection, some time should be taken before visiting the farm to fill in data or request this information from the farm (crop rotation, livestock, etc.). It is also important to make sure that the farmer is available for a half-day to provide factual and quantitative data and also for a tour of the farm to glean more qualitative information (farm development, project history, marketing, etc.).

Although DIALECTE includes a number of questions on biodiversity, farmers have pointed out that it does not provide scope for further detail on these questions, and therefore other assessments are required for this (Agricultural Biodiversity Observatory protocol, peasant agriculture assessment, etc.).

5. Conclusions:

In this case study, Terre de Liens used DIALECTE for reporting and to build a scientific argument, as landowner and stakeholder in these farms.

For organisations or farms outside France, carrying out a comparison with the DIALECTE database is also worthwhile, as long as similar production systems are compared. Although these comparisons should be carried out with caution, the aggregation of data from all DIALECTE assessments provides a certain degree of representativeness.

DIALECTE can be used in very different manners, depending on the objective pursued. For example (non-exhaustive list):

- it can be used on any farm employing extensive livestock farming practices: as well as environmental indicators, DIALECTE can be used to analyse total feed needs for the herd and feed autonomy.
- it can be used by a group of farmers using the same production system, with the aim of comparing the farms to understand the factors contributing to results.
- it can be used for a certain area in order to gather information on the strong and weak points of the farms present there.

This study enabled comparison of the environmental performance of Terre de Liens' farms with conventional or organic farms. The information generated can be used in advocacy and shared with Terre de Liens' shareholders and donors. The study shows that the 27 sample farms broadly comply with public policy on preservation of biodiversity and protection of water resources.

SUMMARY TABLE

TOOLSHEET

ECODIAG – An horticultural organic farm of 4 ha

1. Farm or practice short presentation:

Maria Riera runs a horticultural organic farm of 4 hectares located in the Maresme area, Catalonia. Together with 3 employees, she produces a wide range of vegetable products and commercialises them. The farm has both open-air crops and greenhouses, and it also has a small industrial refrigerator used to keep the harvest fresh and store seeds. Fundació Emys, a local land stewardship organisation, has been collaborating with the farmer since 2010, intending to consolidate ecological practices and implement measures to enhance the farm's specific environmental processes. While the area shows a high level of fragmentation and artificialisation due to the road and industrial infrastructures, the farmland is still connected to Molí d'en Verd, a protected wetland.

2. Results of the impact assessment tool:

In order to facilitate the fieldwork, semi-natural elements were previously identified and classified in a map. Once on the farm, indicators suggested in ECODIAG methodological framework were assessed. Being this the first time for practitioners, the sampling took about one day and a half and involved 4 people.

The output obtained is a set of qualitative indicators. The tool does not facilitate data processing and analyses; hence, some hours had to be invested in these processes after the fieldwork. The results will be used to prioritise and guide management measures in the future.

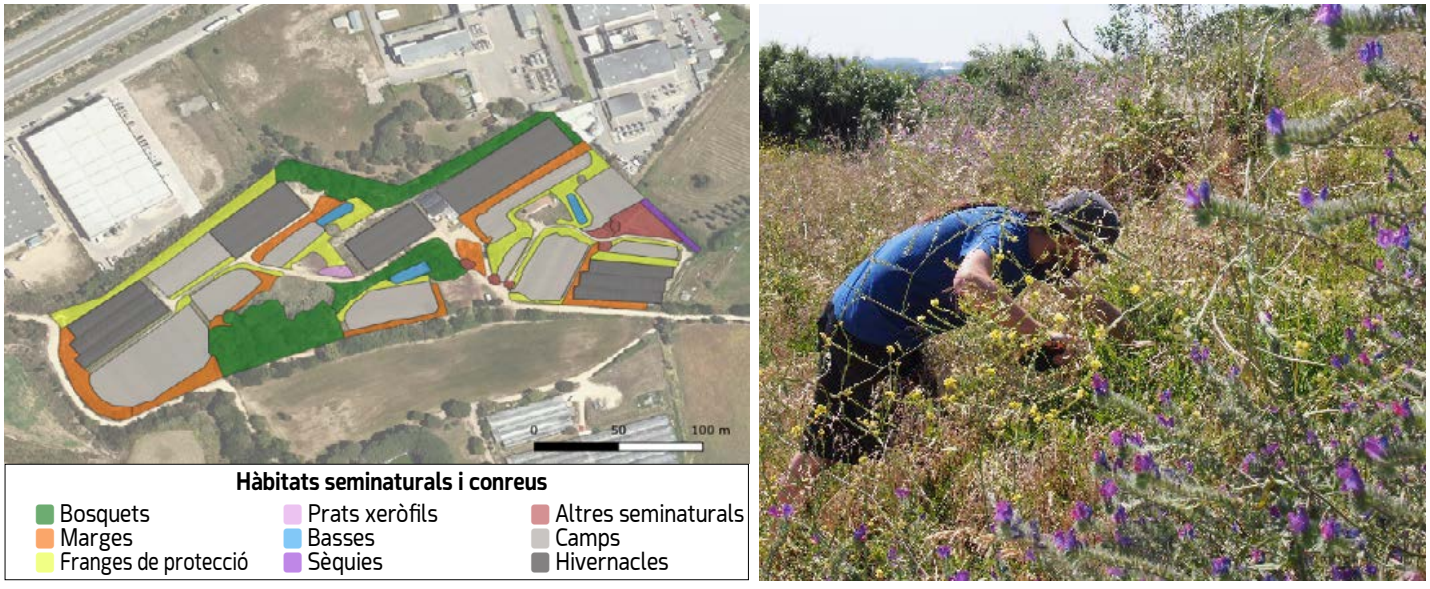


Figure 1. Left: Ander Achotegui (Fundació Emys) assessing the composition of a hedge. Right: map identifying the various elements within Maria Riera's farm.

3. Analysis of the output:

After processing data[23], one can generate a table to summarise the most relevant outcomes.

PRESENCE OF SEMI-NATURAL ELEMENTS					STATE OF CONSERVATION							
Type of element	Number of elements		Surface		GLOBAL		STRUCTURE		COMPOSITION		LACK OF DAMAGES	
	absolute	relative (%)	absolute (ha)	relative (%)	average	range	average	range	average	range	average	range
Hedgerow	8	29	0,5	12,8	5,8	[4,6-7,1]	4,6	[2,5-7,5]	6,1	[5-8,8]	7,5	[0-10]
Buffer Strip	13	46	0,2	4,5	6,6	[4,3-8,6]	8,3	[0,0-3,8]	5,5	[2,5-6,7]	5,8	[0-10]
Pond	3	11	0,0	1,2	3,3	[2,3-3,5]	3,2	[2,5-3,8]	4,2	[2,5-5]	2,5	[0-5]
Ditch	1	4	0,0	0,5	5,6	-	5,0	-	10,0	-	10,0	-
Dry meadow	1	4	0,4	10,8	6,3	-	5,0	-	6,7	-	10,0	-
Forest	2	7	0,6	14,1	10,0	[10-10]	10,0	[10-10]	10,0	[10-10]	10,0	[10-10]
Tree alignment	0	0	0,0	0,0	-	-	-	-	-	-	-	-
Pasture	0	0	0,0	0,0	-	-	-	-	-	-	-	-
Other SN elements	-	-	0,1	1,7								
Antropic elements	-	-	2,1	53,2								

Figure 2. The general results table describes each semi-natural element type's coverage. It summarises the assessment results for each element type, globally and for each of the different aspects (structure, composition and lack of damages).

Semi-natural elements account for 46% of the estate's total surface, which is a good result in horticultural contexts. In what conservation status is concerned, each type of element differs significantly. Forests are the most extensive element type, and they present a very favourable conservation status for any of the aspects assessed. All the types of elements, except for the ponds, obtain a global result equal or greater than 5, and the same occurs regarding their composition and the absence of damages. This all indicates a promising current estate for most of the element's type. Additionally, buffer strips also present a good structure, while the ditch and the dry meadow obtain a 5.

Figure 3. Ander Achotegui (Fundació Emys) and Carla Juvinyà (Xarxa per a la Conservació de la Natura) assessing a pond (left) and a hedgerow (right) in Maria Riera's farm.

The estate of conservation and thus the farm's ecological processes would significantly improve if specific management measures were implemented. Outstandingly, ponds obtain an awful result in structural, composition and degradation aspects. Improving the result of some indicators is

23 Beyond indicators and threshold values, the data analysis process is not defined by ECODIAG. In this case, practitioners have opted to give 2 points to Favorauble results, 1 to Average and none to Unfavorable. Points were added up and final punctuation was relativised to a 0 to 10 range.

critical. For instance, by placing different structures (piles of stones or branches in the margin) to increase micro-habitat heterogeneity or reduce the number of fertilisers in input water to halt the eutrophication process detected. Other mid-term measures would include reducing the margin steepness, planting a tree nearby to reduce sun incidence, modify pond shape to make it less regular or allocate floating islands.

Beyond the ponds, attention should also be paid to hedges since these elements account for 25% of the total elements in the estate, and their structure presents an unfavourable conservation status. This could be improved by allowing a greater distance between hedges and cropping areas, by placing structure to increase micro-habitat heterogeneity or preserving trees within the hedgerows. In what their composition is concerned, fruit bushes could be planted. In some cases, hedges are adjacent to areas covered by an invasive perennial cane. These non-productive areas could be managed towards a semi-natural habitat, such as a buffer strip.

Buffer strips have an average result and efforts should be made to improve their composition. The predominance of nitrophile species should be reverted by properly planning and controlling fertilization in the adjacent cropping areas. Also, reaping frequency should be reduced to allow an increase in perennial species cover. Finally, both the ditch and the dry meadow are distinct elements within this estate and their structure and composition should be improved.

Beyond this generic analysis based on element-types, more in-depth outcomes have been obtained by analysing each of the semi-natural elements' results.

4. Recommendations:

For a first-time implementation, an expert is needed at least to adapt ECODIAG to the local context and to prepare the assessment materials needed (tables for data collection and data analyses). Yet, once this first effort is made, subsequent assessments will be more accessible. After a relatively simple training period, a less experienced person can take care of conducting it.

Before implementing the tool on the field, it is essential to ensure that the users understand all types of semi-natural elements and the criteria used to assess them. Also, it is key to have some material ready beforehand, such as a list of common nitrophilous species within the area, a list of common exotic invasive species within the area and a map that preliminarily identifies the semi-natural elements throughout the estate. Fieldwork will be more straightforward if performed early morning during springtime.

5. Conclusions:

ECODIAG is a practical and relevant methodological framework that will guide any organisation to assess and improve the ecologic functionality of a farm. By implementing this assessment tool, Fundació Emys has better understood the factors interacting with Maria Riera's farm's ecological processes. They have also identified critical management measures to be implemented in the short and medium-term. Even if an initial effort is required to understand and adapt the method, it is worthwhile. That is why the land stewardship organisation is now conducting an adapted version of this assessment on other farms.

SUMMARY TABLE
TOOLSHEET

FADEAR – Peasant Agriculture Diagnostic. An extensive organic milk goat-rearing farm

1. Farm or practice short presentation:

La Gavasenca is an extensive organic milk goat-rearing farm that includes cheese production with a direct sale on the farm. It is located in Gavàs, in the municipality of La Guingueta d'Àneu, in the Catalan Pyrenees. It is a cooperative consisting of 3 members, soon adding their current worker as a 4th one. This farm was transferred 2 years ago by a couple who worked there for 20 years. The herd is composed of over 135 heads, most of them of the Alpine breed, and the farm includes 240 ha of natural pastures, meadows and forests.

The main activity is cheese production, although kids are sold to particular customers also through direct sale. In summer, they offer tourists an activity consisting of herding the flock and visiting the cheese factory. All these activities give dynamism to the surrounding area and sustain an almost abandoned town.

The basis of the La Gavasenca project is agroecology and the preservation of the environment. They follow traditional management of their own herd that grazes daily in the Alt Pirineu Natural Park. During summer, the herd feeds mainly on pasture and meadows, and in winter, the animals feed with the fodder collected during summer from the natural fields and the dry leaves of ash trees. They pay extra attention not to exceed pasturing and maintain open spaces from being overrun.

Figure 1 Farmers preparing ash tree leaves for winter food.

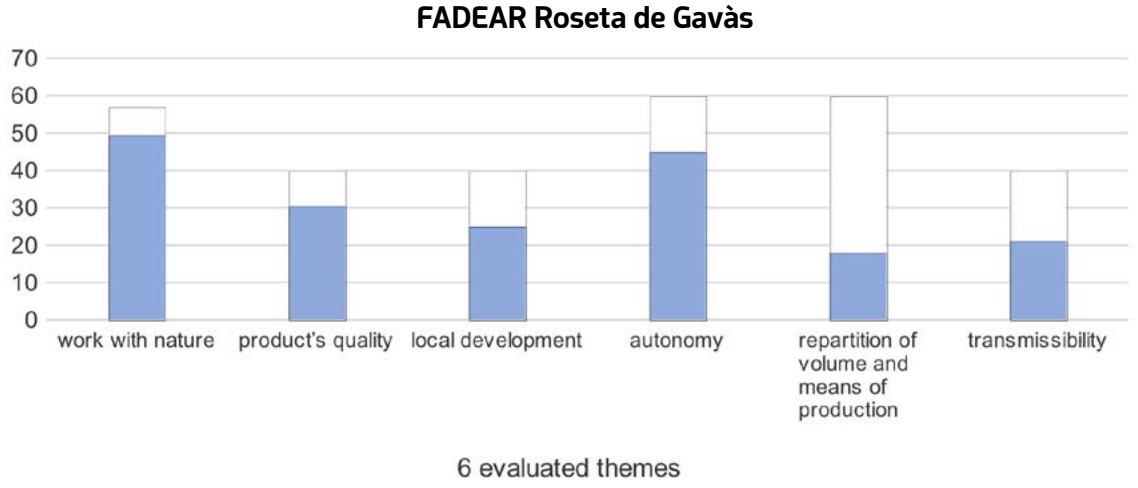
2. Results of the impact assessment tool:

A visit to the farm and an interview with the farmers were necessary to diagnose peasant agriculture. The interview enabled us to obtain the required data to make the quantitative analysis, but it also encouraged farmers to reflect on future improvements in the farm. Some of the information could not be obtained during the interview because farmers did not have the precise information in their minds (e.g., consumption of inputs, exact economic balance). Therefore, the second round of collected data was performed by telephone to get the remaining needed data.

The results show that the great results obtained in work with nature and product quality are related to the desire and implication to preserve the environment, the natural one and the social one. Nevertheless, the farm is in a very isolated village, which means that there is not much collective work, and for this reason, the farm obtained a lower result in the social themes than in natural themes.

In terms of autonomy, a good score stands out, mainly due to the ability to decide what and how to produce. Economically the farm is more dependent as they sustain a loan, but on the contrary, it has a great technical autonomy (e.g., almost all the food comes from the farm itself and pastures in the mountains).

Instead, a meagre result is obtained in the Repartition of volume and means of production as they use many hectares of pasture. The transmissibility is also a bit low, mainly due to economic aspects. This theme shows the perception that current farmers have of the conditions in which the farm was transferred to them.



3. Analysis of the output:

La Gavasenca obtains a high score in the natural themes *Work with nature* and *Product's quality*. The aspects that they could improve in these areas are related to water management. The FADEAR tool does not contemplate the possibility that a farm has most of its surface dedicated to pasture meadows and that these meadows are not irrigated. At the same time, it does not distinguish whether the farm is only a livestock project or includes the transformation of the product. For this reason, this farm obtained a low score in this indicator. However, during the interview, the farmers concluded that whey management was one of the main problems to be solved, and this weakness is also shown in the results.

In the *Repartition of volume and means of production* and the *Transmissibility of the farm*, they obtained a shallow score. However, we do not consider this to be a bad result. It is La Gavasenca's first year of existence since they took over from the old couple. Therefore, it is expected that these two aspects are not yet developed. This tool makes it visible that they should put their future efforts into economically stabilizing the project to become more financially solid and get an appropriate remuneration as farmers.

Therefore, this tool allows us to understand the totality of the exploitation and think about future improvements. It focuses on what is not being done right or what is yet to be done to make projects sustainable in all dimensions.

Figure 2 Goats pasturing the natural meadows.

Figure 4 Products made at La Gavasenca.

4. Recommendations:

Some of the questions (especially the economic ones) are easier to answer if the farmer has previously prepared the documentation of the farm (accounting documents, agricultural declaration for the EU, declaration of livestock leaves, etc.)

It is highly recommended to evaluate with a certain periodicity (annual, biannual...). Thus, it is possible to know if the farm goes in the right direction, what weaknesses they have and whether they are improving.

This tool uses some precise indicators for the French context, and it could be challenging to be used elsewhere. Therefore, it should be adapted to other regional contexts before used out of France.

Figure 5 Village of Gavàs.

5. Conclusions:

The FADEAR diagnostic is easy to be used by everyone. It uses plain language, and many indicators are not numerical but qualitative. Thus, the interviewee can score according to what he/she considers. However, this simplicity makes it difficult to delve deeper into some sections.

Although some of the practices of extensive livestock farming should be included in the tool, the most significant strength is that it broadly captures the sensitivity of agroecology.

Finally, this tool distinguishes it from other tools because it promotes thinking about future improvements, but it also considers installing or transmitting a "new" project.

Figure 6 One of the cooperative members talking with an old shepherd of the same village and getting the names of the rivers, mountains and pastures back.

SUMMARY TABLE
TOOLSHEET

HUMUS – A free-range pig farm

1. Farm or practice short presentation:

HUMUS assessment on Les Eygageyres farm (Haute-Loire, Auvergne – France)

Les Eygageyres is a 33.5 hectare pig farm. Historically, it was used for mixed crop and dairy farming, but was abandoned over the years, as was the soil: the soil was worked on very little and was no longer improved or farmed. The parcels became more and more broken up. When Romain took over Les Eygageyres in 2015, he carried out a lot of clearing work and joined the parcels up again.

Romain, now joined by his partner (equivalent to 2 AWU on the farm), set up a free-range pig farm (110 animals) and a processing plant was built on the farm.

Carte 8: Vue aérienne de 1948 - source: Géoportail

Carte 9 Vue aérienne de 1977 - source: Géoportail

Carte 10: Vue aérienne de 1994 - source: Géoportail

Carte 11: Vue aérienne actuelle - source: Géoportail

This means that some meat products can be sold directly on the farm or at markets. The remainder is delivered within a 20km radius of the farm (farm shops, community supported agriculture, restaurants).

The farm is located at an altitude of 800m, in a low mountain region, in the protected area of Haute Vallée de la Loire. This area is known for the major citizen mobilisation which took place in the 80s to halt a development project in the valley. There is therefore a strong voluntary sector involved in environmental issues in the area

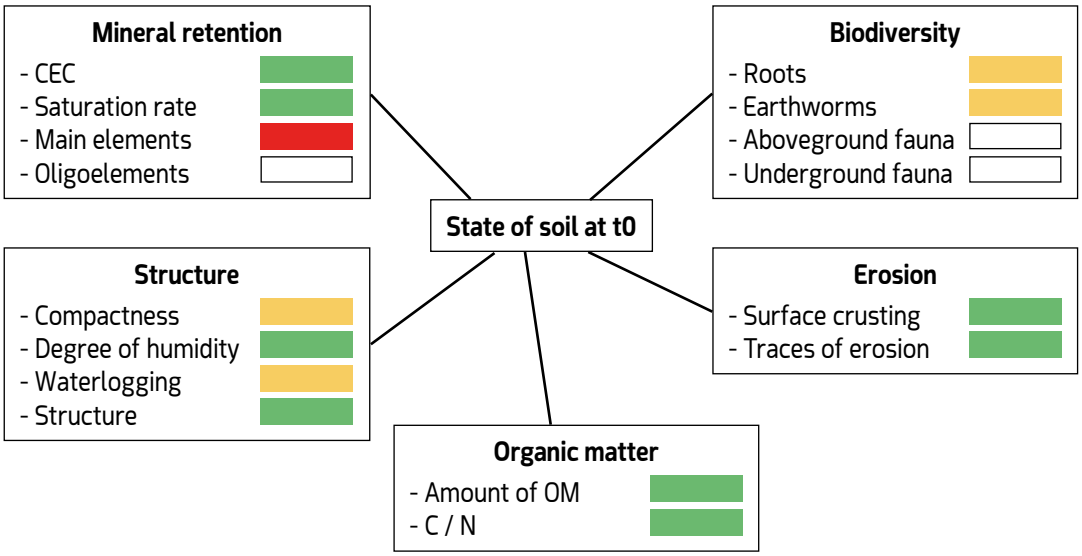
The farm is partially located in a Natura 2000 zone. It is also next to a natural area of ecological value for its flora and fauna. This indicates that this is a zone of particular importance for the protection and conservation of nature.

2. Results of the impact assessment tool:

Initially, there were two reasons for carrying out a HUMUS assessment on this farm: the need for a complete land assessment for this farm which had just been bought by Terre de Liens, and the observation of the poor soil quality on the farm after Romain's first few years on the site.

In the end, the HUMUS assessment on Les Eygageyres farm produced three important results:

- Implementation of monitoring of the agro-environmental situation of Les Eygageyres farm, using the evaluation and report from the HUMUS assessment, for the provision of agricultural advice due to the low yield observed on certain parcels.
- Creation of a connection between agriculture and the environment – carrying out this assessment brought together different environmental associations working in the area and helped them envisage new ways of working together in the future.
- Education and training of around twenty participants present during the assessment (Terre de Liens volunteers, environmental association volunteers, farmer).



Advantages	Limitations
- Deep soil - No erosion or surface crusting - Rich in balanced organic matter	- Low calcium content, remplaced by magnesium in the CEC calculation - Low biological activity (to be checked) - High level of compactness which goes deep, as well as waterlogging in the plateau area

Presentation table of advantages and limitations of soil studied

3. Analysis of the output:

The results of the assessment report showed that the farm's soil was in poor condition. The year after the HUMUS assessment, another assessment was carried out on all parcels with a focus on agricultural advice, to understand the problems and help Romain to adapt his practices. A monitoring system was also set up with a group of students to observe the changes in farming practices and the condition of the soil.

In an approach based on educating the public, a new event open to the public was organised on the farm to present and share the results of the assessment with the widest possible audience.

4. Recommendations:

Difficulties encountered in using the tool:

- Density of the content of the assessment
- Accessibility of soil pit evaluations for non-experts
- Soil pit evaluations may be unrepresentative of the state of a parcel

5. Conclusions:

On Les Egageyres farm, carrying out a HUMUS assessment gave rise to broader environmental monitoring and agricultural advice work. It also provided the different participants with an insight into the complexity of the soil. Finally, the assessment provided impetus for dialogue with environmental associations, in a partnership approach.

SUMMARY TABLE
TOOLSHEET

IDEA – A mixed sheep and cow farm

1. Farm or practice short presentation:

Cal Tomaso is a mixed sheep and cow farm located in the municipality of Àger, in the Noguera region. It is a farm of 40 ha where they make organic meat for direct sale. Ten cows, 1 bull and approximately 300 adult sheep compose the herd. Most of the animals are native breeds from Pyrenees. It is a farm with a single owner who carries out all the tasks and has no workers.

Animal feeding is based on pastures, except in drier seasons, when they also eat some fodder. Sheep also have grain as a supplement during the breeding season, and lambs and fattening calves are given pasture as well as concentrate and fodder as food supplements. The fodder and cereals are produced in the same farm and are cultivated trying to maintain a good rotation of cultures.

2. Results of the impact assessment tool:

The tool has an excel file to facilitate the recording, calculation and presentation of results.

The first sheet serves to record the results untreated. In this case study, a survey was carried out to answer each of the indicators with the help provided in the guide. This guide details each of the indicators, justifies their purpose and guides in order to score the indicator correctly. All graphics in the excel file are made automatically using this data.

The second sheet invites the user to complete a description of the farm in a suggested format. The aim is to expand the reflection around the results. The third sheet is called the "rotation plane." It is intended to insert a cartographic representation of crop rotation corresponding to the campaign in which the diagnosis was made. We did not develop it since it does not make sense for the type of production that we analysed.

The rest of the pages of the file generate graphical representations of the results of the diagnosis in an increasingly specific way. First, a graph with the three axes of sustainability is obtained *(Figure 1)*. As we can see, Cal Tomaso obtained a great punctuation in the Socio-territorial and Agroecological axes. Nevertheless, the punctuation in the economic aspects is really low (30% of the maximum punctuation of this axes). Then, we obtain a radar of the 10 main components of the tool *(Figure 2)*. This graph raises which themes must be improved: Independence, Efficiency and Viability. It also shows which themes have room for improvement: Employ and services and Quality of the products. Finally, we obtain a histogram for each of the axes of sustainability that shows the detail for the indicators contained in each axe *(Figure 3)*.

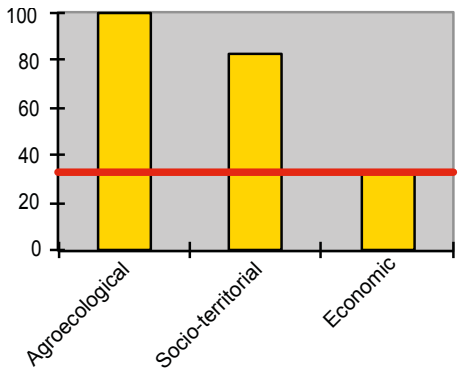


Figure 1 The three axes of sustainability

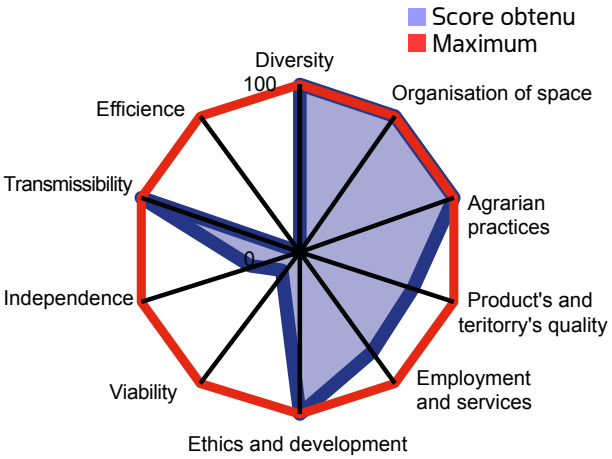


Figure 2 Radar with the 10 main components of the tool.

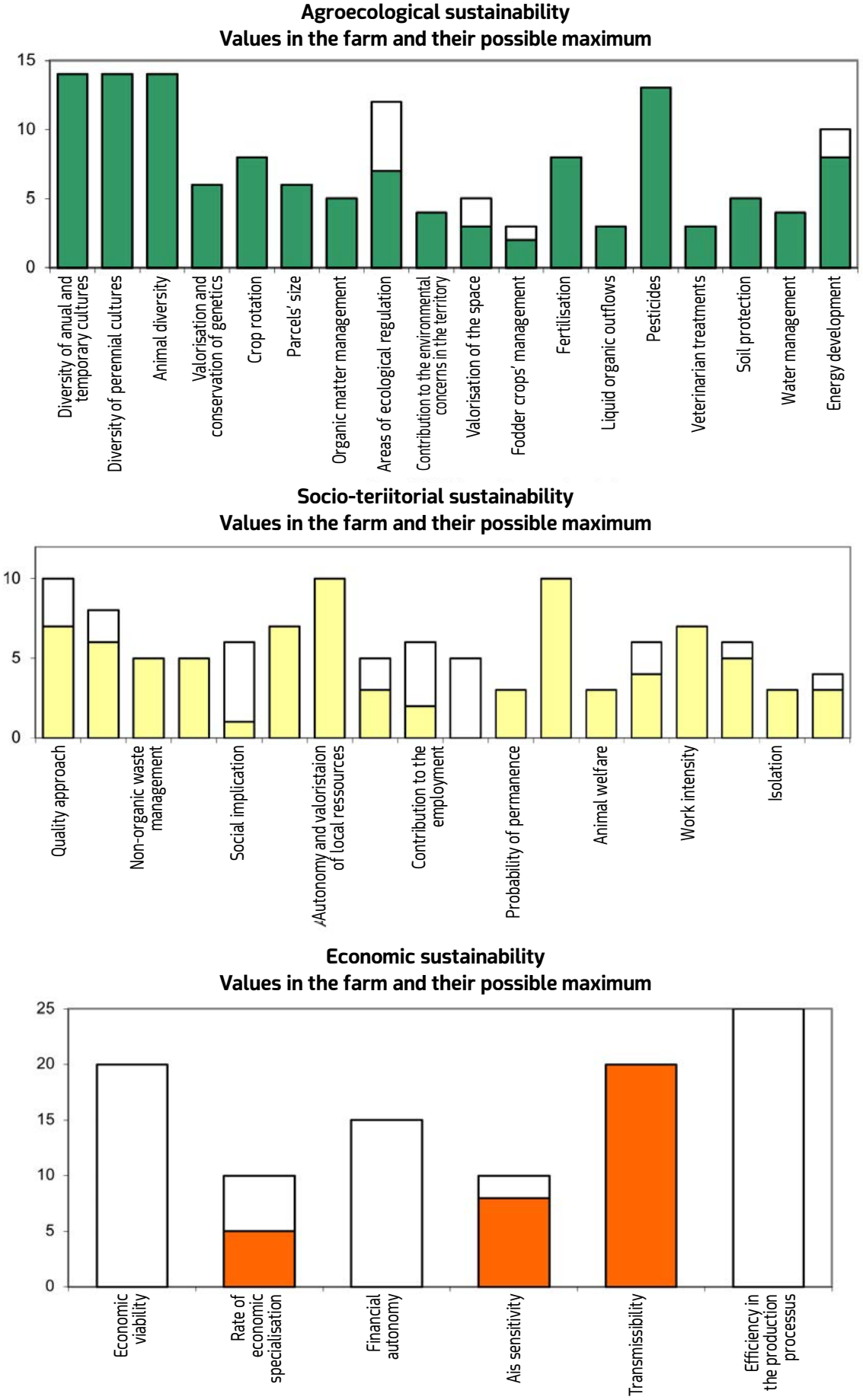


Figure 3 Histograms of the indicators that compose each sustainability axe

Xisqueta sheep from Cal Tomaso.

Pirinean and Bruna cows from Cal Tomaso.

3. Analysis of the output:

Results encourage the farmer to reflect and show technical weaknesses and possible avenues for improvement by promoting actions at the local level and decision-making.

Cal Tomaso was conceived as a project that, through livestock, protects the environment and puts the focus on conservation of nature, producing a high-quality food. For this reason, as we see in the results, the agroecological questions have obtained a very high score. However, especially in economic matters, a great need for improvement is detected. Specifically, the economic viability of the project, the financial autonomy and the efficiency of the productive project show the economic weakness of the farm. During the interview and in the calculation of the indicators we detected that the products are sold at the same price that they cost to produce -without adding value to the farmer work-. The economic remuneration that the farmer receives comes from the European grants and these are very low compared to other farmers in the area.

Finally, this document is intended to provide a "standard" for comparisons of IDEA diagnostic results between users. Thus, this workbook could be shared via the website dedicated to the IDEA method in a homogeneous format and compared with other similar farms (most of them in France).

Sheep grazing in rotational parcels.

4. Recommendations:

Some data are difficult to collect as they are precise. This is especially relevant in the economic indicators because the farmer just knows the "big" numbers of its economy. Cal Tomaso farmer gave us an approximation of these values since he could not check in the accounting documents. Sometimes, the owners of small farms do not know the exact accounting of the farm. This makes difficult the calculation of some indicators. Nevertheless, there is the possibility of responding null to an indicator, if needed. In these cases, indicators are not scored and the tool auto-adjusts the graphs of results. We proceeded in this way when indicators did not make sense in the regional context or when we did not obtained the necessary values. Moreover, there are other

indicators – for example: concretion of the areas of forest, trees, meadow, shrub- that take a long time to be evaluated and a simplified question could represent the same indicator. In the case of the agro-ecological indicators, it should be noticed that they are pressure indicators and not impact indicators.

5. Conclusions:

IDEA is a simple and effective tool to evaluate a farm. It can be used directly by farmers and files available in the web site enable to save time by facilitating data collection and graphics production for processing diagnostic information. As each indicator has a text with an argumentation, this tool does not only measure the sustainability but it also invites to a deep reflection and understanding of the relation between the indicator and the parameters measured.

Nevertheless, IDEA should be adapted to regional contexts if used in other countries, since some indicators are specifically from France (quality labels, restricted areas, type of association, minimum French wage...). Another weakness is that it does not consider alternatives to conventional agriculture neither projects that have one unique farmer. The indicator *Reception, hygiene and safety* considers that, at least, there is always one employee plus the farmer. IDEA can also put the focus on the technique used but does not consider the livestock specificities. For example, when you want to assess rotations, meadows and pastures are not considered and the indicators must be re-interpreted.

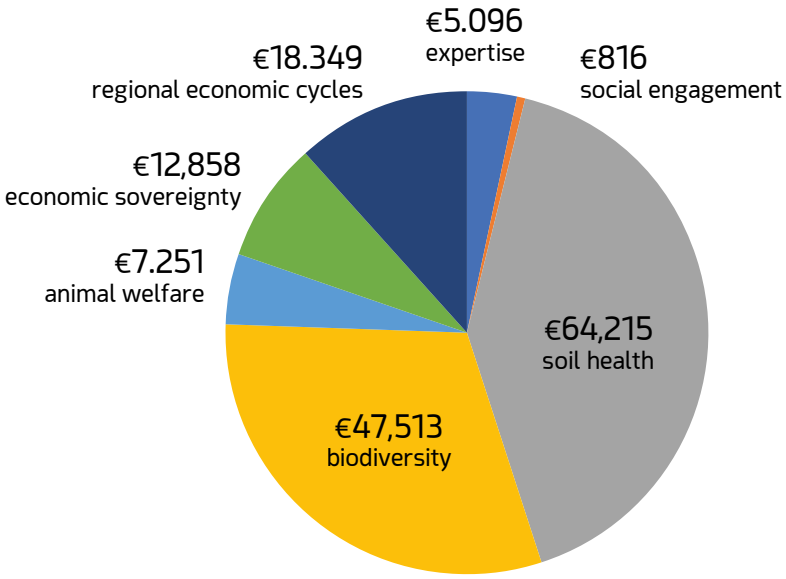
Sheep and shepherd from Cal Tomaso.

SUMMARY TABLE
TOOLSHEET

RICHTIG RECHNEN – A fruit and vegetable farm

1. Farm or practice short presentation:

Monetized values fruitfarm



"Naturgut Hörnle" is a fruit and vegetable farm run by Joel and Gabriele Siegel and located in Baden-Würtemberg, close to the city of Freiburg. The farm was founded in 2009 and got certified for biodynamic production in 2014. The farm is about 70 hectares large with a very high soil quality (92 out of 100 soil points). It consists of several hectares of open land, fruit orchards (13 hectares), plastic tunnels for fruit and vegetable production, and a mobile chicken house (500 chickens), producing eggs. The production is focused on fruits, berries and vegetables (8 vegetable crops, 10 fruit crops and 52 fruit varieties, cereals). The marketing of the product is mostly through regional organic shops and an on-farm shop. The team consists of about 13 permanent employees, complemented by approximately 80 seasonal workers. The farm is also part of a research project for seed multiplication of old varieties.

2. Results of the impact assessment tool:

Naturgut Hörnle was one of the first four farms implementing the tool Rictig Rechnen, being one of the Regionalwert AG Freiburg partner-farms. The testing of the tool on four farms was part of a research and development project finalising the tool for broader implementation.

The companies involved in the project recorded the input values relevant to their operations for one year (July 2018 to June 2019). Some of the values were recorded once, i.e., annually; others were recorded monthly, and a small proportion of the input values record hours worked for specific services. The input values to be recorded are clearly defined in the recording tool filled in by the farm-managers so that the data is recorded correctly and can therefore be compared and evaluated.

According to the methodology of Rictig Rechnen, the overall extra value created through the farm, in terms of sustainability performance, was €156,096. The following pie chart shows the distribution of the monetized values throughout the different areas of sustainability performances.

Operation	Organic vegetable gardening	Organic fruit growing	Vegetable growing conv.	Mixed organic
Skilled workers	3,77	3,3	2	6,5
Percentage of permanent employees	57%	26%	86%	100%
Rating green-yellow-red	>40%	20-40%	>40%	>40%
Monetization factor	professional wage	professional wage	professional wage	professional wage
Value in €	4.161	2.816	2.611	8.057

Within the social dimension, there were some results providing information on where to improve. For example, the number of skilled workers employed in the company is compared with the number of permanent employees (given as full-time employees), and this ratio is evaluated. In this case, the ratio between skilled workers and employed workers (meaning, how many skilled workers have stable employment) represents a performance indicator. The evaluation key classifies a skilled worker share of 40% or more as sustainable, a percentage between 20-40% as moderately sustainable, and anything below 20% as non-sustainable.

The assessed farm had a ratio of under 40%, rated as yellow (moderately sustainable, see table above). On the side of training (the number of trainees employed in the company compared with the number of permanent employees), the assessed farm was rated red (below 5%), meaning a need for action in terms of sustainability of young, trained employees not only for the respective farm but for the whole organic sector. The performance indicator "Variety of crops" within the ecological dimension of the assessment was rated red (below 15 varieties; the threshold is defined in function of total farm area) concerning vegetables, but green in fruits, which is partly due to the fact that the main focus of the farm are perennials. Putting these two ratings together, the farm tends to a green rating. On the other hand, the soil fertility was rated among other things through the indicator "Area with legumes", which resulted from a green rating and about €10,000 extra costs for this sustainability performance. The indicator is calculated by putting the average area of leguminous crops on a farm during the whole financial year compared to the area of arable land. Within the economic dimension, the regional turnover is assessed, among others. The share of regional sales is linked to the total sales of the farm in the fiscal year to evaluate the ratio. The assessed fruit-farm was rated green with an extra value created of €7750 through their regional marketing (86% regional turnover).

The share of sustainability services in the turnover of the farm was almost 8%. Comparing the calculated added value of the sustainability services according to Richtig Rechnen with the farm's public subsidies, the sustainability services would need about four times more money to be compensated as the received subsidies pay for.

3. Analysis of the output:

The evaluated indicators connected with the monetized value of the respective performance give a first idea about the extra values created through sustainable farm-management and agroecological production. As of right now, there is no financial instrument to compensate for these sustainability performances. Nevertheless, the output gives an idea about the externalities on the farm. Like in many tools, the emphasis on gaps, challenges and drawbacks in farm management leads to a focus on red-rated values. For example, the ratio of employed and skilled workers to trainees is very small, which may push for more training opportunities on the farm.

On the other hand, many interns visit the farm through the year, which is not counted as formal training, but may lead to a particular career choice on a personal level of the interns. They do influence the monetized output, which is assessed under "social engagement". Some of the indicators evaluated did not apply to the fruit farm, first and foremost the diversity of crops, which is under 15 varieties and rated red, due to the fact the farm does not cultivate vegetables as its main branch of business but are rated green when it comes to fruits (perennials).

Overall, the increased output (if monetized with the tool) of the farm exceeds the existing public subsidies by 420%, being the second-highest result of the four farms. Compared to one of the other four farms, a mixed farm, there is a huge difference in the ratio between public subsidies and the calculated monetary value for the farm's sustainability services. The mixed farm was able to cover much more of its sustainability services through public subsidies. This means there might be a potential for compensation by better understanding possibilities of public funding for the Naturgut Hörnle. Fruit farming is always very dependent on seasonal workforces; on the other hand, the biggest customer/reseller had a 40% share of turnover, making the farm less economically sovereign. Developing strategies to re-localize seasonal work and diversifying marketing would enable the farm to be more adaptable to changing regional and global situations.

4. Recommendations:

Richtig Rechnen was developed in a highly participative process involving many farm managers. Due to this, all of the assessed farms, especially the Naturgut Hörnle, found their farms well reflected in the assessment results. The Siegel Family took over the farm and converted from conventional to organic farming, differentiating significantly from the other farms that have been assessed. The farm has a high workload and is dependent on many seasonal workers; finding permanent employees in the gardening sector is very hard, which all leads to rather high responsibilities of the farm manager. Richtig Rechnen evaluated the farm's social and ecological positive impact and translated it into the language of economy. The Naturgut Hörnle, with its Farm Manager Joel Siegel, was part of the first test assessment because monetizing the extra added value would make lobbying for compensation easier. The hope is to level the playing field for new financing instruments, compensating for specific farming methods' social and ecological benefits. In the case of the Naturgut Hörnle, compensation would make possible a quantum leap towards sustainability in terms of soil health and more permanent workers taking over responsibilities within the farm-management.

The data collection was an extra burden to the farm's already high workload; especially questions about staff (age structure, company affiliation) were hard to collect. Some of these key figures were therefore dropped during the collection phases. In the future, extra capacities need to be in place before starting the assessment. The assessment required them to record data that was never recorded before. In the future, data collection can be easier implemented into standard accounting through interfaces to accounting software. Being part of the four testing farms for the tool, the data entry effort was much higher (monthly recording) than the future assessment will be (in the latest version of the tool, 85% of data will be collected annually, whereas in the old one most of the data needed to be collected monthly).

5. Conclusions:

Richtig Rechnen's evaluation criteria were developed together with farmers. Therefore, a high degree of accuracy with a practical perspective is achieved. Social and natural capital can be valued and monetized and finally be put into the annual accounting. In general, the companies found that the monetization of the performance indicators was appropriate for their companies.

The next step will be a pilot phase with up to 100 companies to validate the method. Whether the Obstgut Siegel will participate in the pilot phase is questionable due to the still extremely high workload.
On the one hand, the farmers see the method as a recognition of their social-ecological achievements. Still, they also say that the presentation of the achievements without financial compensation is not satisfactory.

The aim in Germany is to pay for the proven achievements of the farmers; from this point on, it is also interesting for the farmer to tackle his development potentials.

SUMMARY TABLE
TOOLSHEET

SAFA – An extensive cattle farm for meat production

1. Farm or practice short presentation:

Brunec is an extensive cattle farm located in Pobellà, in the municipality of Torre de Capdella, in the Catalan Pyrenees. The farm has 120 adults and 30 replacement heads, 5 males and about 95 calves, all of them from a native breed belonging to the Pyrenees: the Bruna del Pirineu. It is a family farm with two owners. They have three children that do not know yet if they will continue with the project.

Cows live mainly on meadows and natural pastures. Livestock health is based on prevention, good nutrition and good management. In wintertime, the group of transhumant cows without calves move to the forests of the Pre-Pyrenees. The rest of the cows, with their respective calves, stay at home, where farmers take care of them. At the end of May, they get together the entire herd, and they move to the summer pastures of the high mountains in the Pyrenees.

On the farm, they produce certified organic meat that they (farmers) process in a workshop. A big part of the production is distributed by direct sale and the other part in 5 butchers. They are networked with the most important platforms and associations in Catalonia.

2. Results of the impact assessment tool:

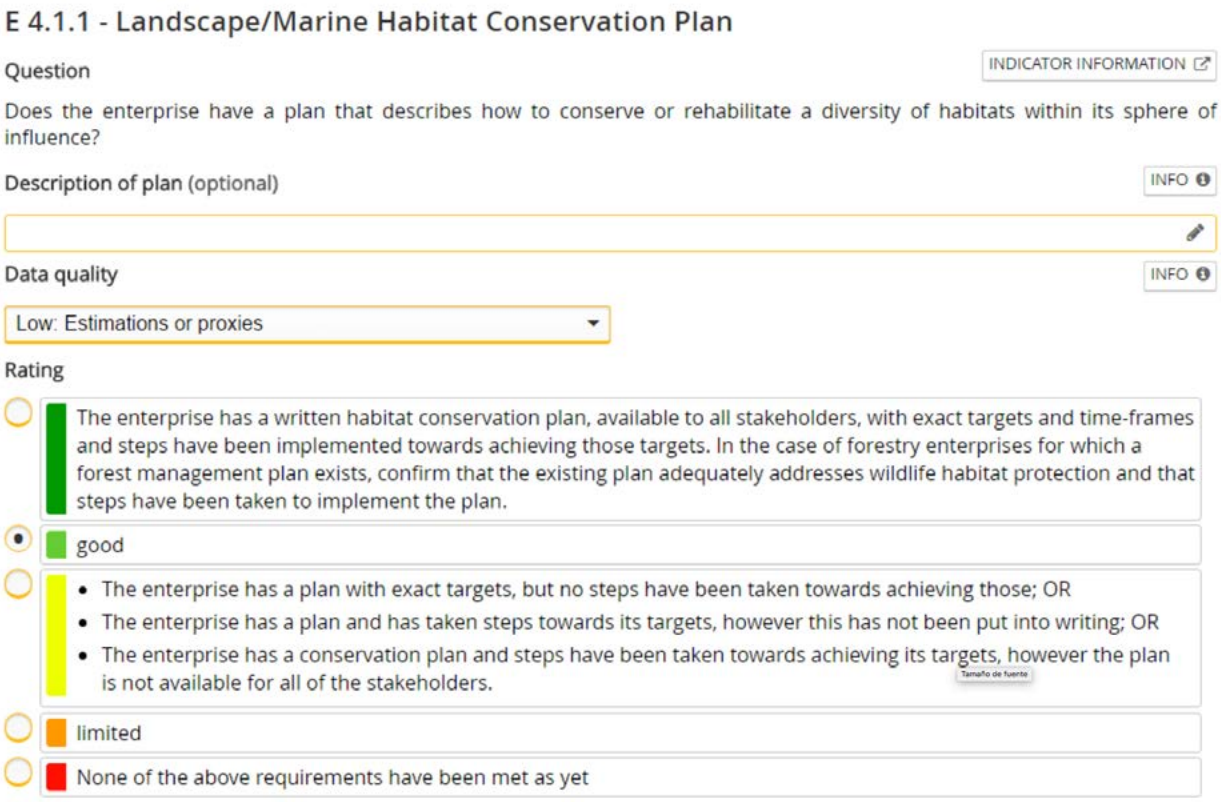
This tool could not be completed 100%, as the owners were unable to provide us with the financial information. However, we have completed as much as possible to show which results you can obtain using this tool.

In order to obtain all the information to define the indicators, we needed to do an interview as well as consult many documents:

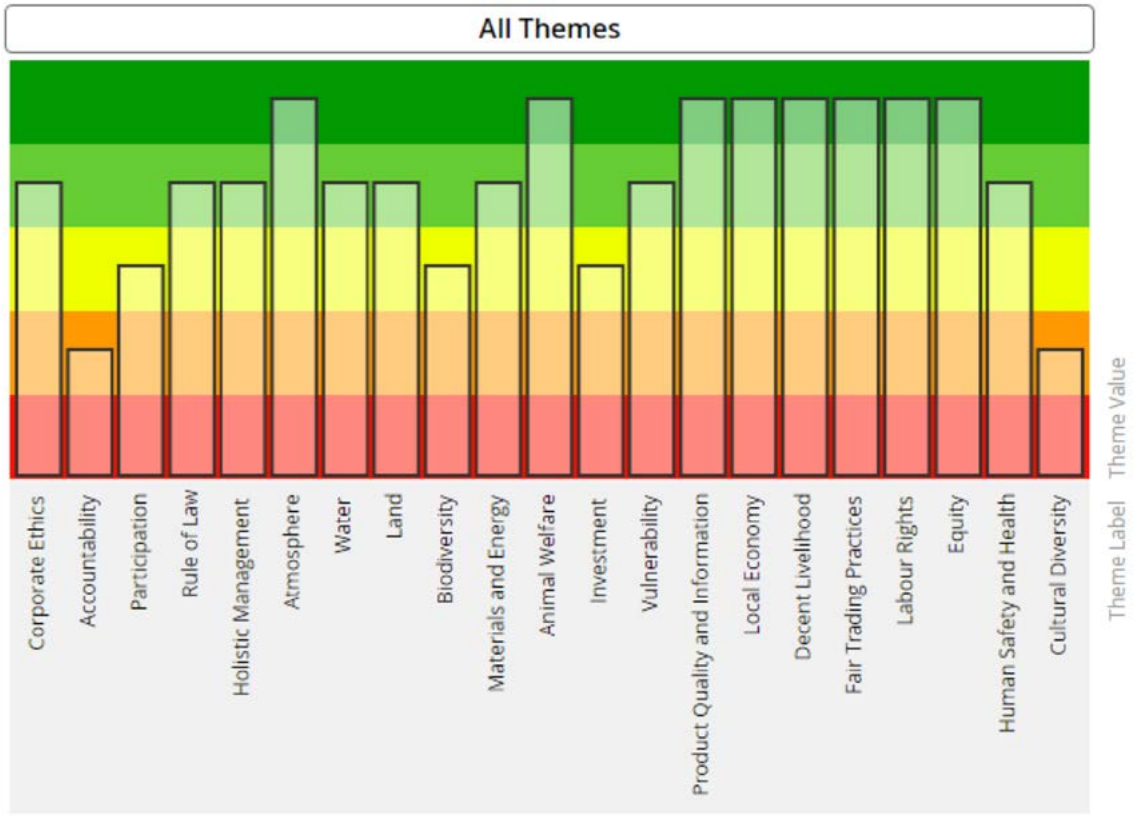
- Current business documents or records (personnel manuals, organizations by law).
- Direct sampling or testing in environmental issues.
- Review of employee files and related paperwork such as pay-stubs, inspections in the place, etc.
- Review of actual company records and book-keeping.
- Current business plan or other financial planning documents.

Nevertheless, all SAFA default indicators can be found in a separate document where each is detailed; SAFA offers a 5-scale rating for performance linked with a colour scale.

For each indicator, there is a description of the necessary characteristics to obtain the highest possible score. It describes what concepts should be included to get a "very good" or "very bad" score, and it is possible to add more characteristics manually to adapt the tool for the context. This facilitates the awarding of points since the description of each indicator is more general *(see Figure 1)*.



After completing all the indicators, the results are shown in a histogram where colours help interpret whether the farm performs well in that aspect.



3. Analysis of the output:

Brunec is a farm that promotes agroecology, although some themes have not been scored very performantly. In social issues, well-being gets a good score (*product quality, local economy, decent livelihood, fair trading practices, labour rights, equity and human safety*), consistent with the project philosophy. Nevertheless, the results show that the environmental aspects still need to be improved, probably due to the lack of data. Labour and economic issues are recorded in written documents more often than other matters, while environmental issues are seldom documented. This tool focuses on knowing if a farm has ecological plans. In many agroecological projects, like this one, this information is not collected anywhere, and this is penalised. In the case of biodiversity, a low score is obtained because it wasn't possible to get data on biodiversity. There are no plans and measures to protect nature, and they do not check their effect periodically. However, this does not mean that the protection of the environment is not fundamental to Brunec; in fact, it is the basis of the project. Thus, the absence of this environment impact plan is reflected in the results as if the impact on the environment was not taken into account, blurring the reality of the case.

On the subject of accounting, the values obtained are moderate because they do not carry out internationally recognized audits or regularly review their mission despite being transparent with stakeholders.

Finally, the issue of cultural diversity does not get a good score. In this case, cultural diversity is composed of two indicators. Still, the second indicator had to be removed because it refers to indigenous communities, and it did not make sense in our context. This indicator sums with the promotion of food sovereignty, where a good result has been obtained.

4. Recommendations:

For first-time users, it is highly useful to read the entire Guidelines to understand the foundation and rationale of SAFA. This will help identify the roles, purpose and scope of SAFA and maximize the benefits of adopting the framework. This tool is not intended to dump all data on indicators. We must first consider what is being assessed, the system boundaries and decide where the data will be obtained from (internal documents, public documents, interviewees, tax documents, business plans...).

When analysing an agroecological farm, it should be borne in mind that this tool was not created in the context of agroecology. The questions are not addressed to evaluate the farm under agroecology, and sustainability is defined differently.

5. Conclusions:

SAFA aims to be applicable to both large and small-scale enterprises. Small-scale producers face many unique challenges in sustainability assessments, including limited existing data, the relevance of global indicators, lack of capacity to complete the assessment independently and lack of resources. Small-scale operators may lack the resources to conduct testing or other expensive means of collecting primary data. SAFA considers the possibility of being a small farm and asks it before answering the indicators to adapt the calculations and the result shown.

Using objective information and data is the central factor. Other sustainability assessment tools aim to generate debate and reflection with livestock farmers, encourage self-review and self-criticism to make changes, and improve sustainability. This tool does not invite discussion. Instead, it promotes writing down everything that happens on the farm: environmental action plans, investment plans, company values and actions being (or not) undertaken. Small businesses like Brunec do not have much of this documentation. Nevertheless, many of the indicators can be answered from an interview because the tool does not include calls for numeric values. However, extracting information from the interview with the owner may lead to subjectivity and less rigor in the results.

OTHER TOOLS

That are not descrived in the guide but are intessting to know their existance

Name of the assessment tool/Created by	Type of the assessment	Concrete issues assessed (humus, birds, etc.)	Purpose	Required skills	Who uses the tool? How are farmers involved?	Output	Strenghts	Potential limitations	What are the conditions for using the tool	Temporal scope*	Estimated time to perform the assesment	Language	Availability	Link to get more information
Farm carbon calculator	Environmental	Greenhouse emission	It enables to take steps to reduce the carbon footprint. It will be updated periodically, it uses the most up-to-date information	Deep knowledge of the farm conditions and building characterisitcs	Farmers	For each item: C02 emissions (kg/ year) and % total emissions; CO_2 sequetration (kg/ year) and % total sequestration. Carbon balance diagram	Tailored Carbon Calculators are a way of measuring the amount of carbon generated by farming and growing businesses, and the carbon absorbed by the soil and biomass on the land.	It is a calculator, it does not assess the impacts of a farm / Several calculations and results are strong conditioned by the references used	Public access	Annually	?	English	Online excel and online tool	https://www.farmcarbontoolkit.org.uk/
Boussole	Global	It is a framework to construct your own assessment	The farmer defines what a viable project means. It takes into account that the viability of a project is linked to personal satisfaction	Facilitator: interviewing skills and dynamization and group participation skills	The aim is to enable the farmer to identify what he considers as a problem to be solved, with the objectives that he has defined according to his professional and personal aspirations.	Double-entry table with scores in each cell	It is double-entry table, allowing to compare the aspirations (in terms of needs and values) of a farmer, with the practices that he/she chooses to implement to achieve them and to analyze together the impact of both.	The contribution of this tool varies depending on farmer's personality: some of them find very difficult to follow the approach of the tool	It is a methodological proposal. In each case, a hand-filled table is made	Annually	1-2 days, in group	French	Online guide	http://www.cocreate.brussels/-UltraTree?type=article&id=91&lang=fr
SMART – Sustainability Assessments in the Food and Agriculture Sector	Environmental and social	Sustainability performance	It considers the entire sphere of influence and responsibility of the farm	High expertise in this methodology	For primary producers, food processing companies and complex food corporations. The analysis is conducted by experts and include a tour in the farm and an interview with the farmer	Global result in a radar diagram with 4 areas (economy, environment, social and managing/leading). Detailed radar diagrams for the indicators in each area	It allows the sustainability assessment of primary producers and food processing companies. It is based on the 58 themes defined in the SAFA Guidelines using 327 indicators and 1769 relations between sustainability themes and indicators	No agroecological perspective. No public information about the calculation.	Not open source, need to pay to use it. The Sustainable Food Systems GmbH (SFS) spin-off is the owner of the lincense rights and rights of use of SMART	Annually	2-3 hours with the expert	German	Private tool	https://www.fibl.org/en/themes/smart-en.html
Couprod	Economic	Economic results of a farm	It popularizes in a simple way, a national method that includes the methods used by international networks / Upgradeable information system / Comparative analysis with references from French farming context	Basic accounting notions	The tool is used by management consultants and farmers and is usually done as part of a production costs analysis	Column chart and comparison with reference farms	It is a software for calculating the cost of production, the cost price and the remuneration for the work	Only for herbivore husbandry. In mixed farms, it includes the benefits and expenses of other products but it does not calculate its cost of production	The access is managed by organizations that hold a version of the programme	Annually	From an accounting file: 1h to 3h	French	Online tool	http://diapcpsrvw.idele.fr/CouProd
Sustain FARM Public Goods Tool	Global	Public goods	Easy to compare different scenarios /Results easy understandable / Online guide available / Refers to the global functioning	Deep knowledge of the farm conditions. Use information that a farmer would already have in their farm records.	Farmers and land managers	"Radar diagram and a detailed bar chart showing the scores of the activities within each spur."	The project aimed to produce an excel-based tool which can be used to assess the public goods provided on a farm.	Little level of detail in some environmental indicators. Use some data range for UK context	No one. Public access	Annually	30'-1h	English	Online excel and instruction manual	http://www.sustainfarm.eu/en/decision-support-tool

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A European network of grassroots organisations securing land for agroecological farming

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