



**HAL**  
open science

**MilKey project: 'Decision support system for sustainable and GHG optimised milk production in key European areas' Sustainability assessment of dairy production systems Guide for the collection of farm environmental and economic data**

Vincent Baillet, Lorraine Balaine, Dominika Krol, Barbara Amon, Aurélie Wilfart, Habtamu Alem, Vasileios Anestis, Thomas Bartzanas, James Breen, Cathal Buckley, et al.

► **To cite this version:**

Vincent Baillet, Lorraine Balaine, Dominika Krol, Barbara Amon, Aurélie Wilfart, et al.. MilKey project: 'Decision support system for sustainable and GHG optimised milk production in key European areas' Sustainability assessment of dairy production systems Guide for the collection of farm environmental and economic data. INRAE. 2022. hal-04139525

**HAL Id: hal-04139525**

**<https://hal.inrae.fr/hal-04139525>**

Submitted on 23 Jun 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# **MilKey project: ‘Decision support system for sustainable and GHG optimised milk production in key European areas’**



## **Sustainability assessment of dairy production systems Guide for the collection of farm environmental and economic data**

**Authors:** Vincent Baillet<sup>1</sup>, Lorraine Balaine<sup>2</sup>, Dominika Krol<sup>2</sup>, Barbara Amon<sup>3,4</sup>, and Aurélie Wilfart<sup>1\*</sup>

**Contributors (in alphabetical order):** Habtamu Alem<sup>5</sup>, Vasileios Anestis<sup>6</sup>, Thomas Bartzanas<sup>6</sup>, James Breen<sup>7</sup>, Cathal Buckley<sup>2</sup>, Elisabeth Castellan<sup>8</sup>, Jacek Dach<sup>9</sup>, Federico Dragoni<sup>3</sup>, Astrid Johansen<sup>10</sup>, Grete Jørgensen<sup>5</sup>, Gudbrand Lien<sup>5</sup>, Anna Rychla<sup>4</sup>, Agnieszka Wawrzyniak<sup>9</sup>, and Wilfried Winiwarter<sup>4,11</sup>

<sup>1</sup>Institut National de la Recherche pour l’Agriculture, l’Alimentation et l’Environnement (INRAE), France

<sup>2</sup>Irish Agriculture and Food Development Authority (Teagasc), Ireland

<sup>3</sup>Leibniz-Institut für Agrartechnik und Bioökonomie (ATB), Germany

<sup>4</sup>University of Zielona Góra (UZG), Poland

<sup>5</sup>Norwegian Institute of Bioeconomy Research (NIBIO), Norway

<sup>6</sup>Agricultural University of Athens (AUA), Greece

<sup>7</sup>University College Dublin (UCD), Ireland

<sup>8</sup>Institut de l’Élevage (IDELE), France

<sup>9</sup>Poznań University of Life Sciences (PULS), Poland

<sup>10</sup>Norsk Landbruksrådgiving (NLR), Norway

<sup>11</sup>International Institute for Applied Systems Analysis (IIASA), Austria

\*Corresponding author: [aurelie.wilfart@inrae.fr](mailto:aurelie.wilfart@inrae.fr)

**Funding acknowledgements:** The MilKey project [ID number 39288] was funded under the 2018 Joint Call of the Cofund ERA-Nets FACCE ERA-GAS [grant number 696356], SusAn [grant number 696231], and ICT-AGRI 2 [grant number 618123] on “Novel technologies, solutions and systems to reduce greenhouse gas emissions in animal production systems”. The authors would like to acknowledge the financial support of their national funding agencies, including the French National Research Agency (Agence Nationale de la Recherche) [grant number ANR-19-SUGA-0003] and the Irish Department of Agriculture, Food and the Marine [grant number 2019EN201].

**Sep 2022 – Version 1.1**

Please cite as: Baillet, V., Balaine, L., Krol, D., Amon, B., Wilfart, A., 2022. Sustainability assessment of dairy production systems: Guide for the collection of farm environmental and economic data. Recherche Data Gouv, Version 1.1. <https://doi.org/10.57745/R6EM40>

## Table of contents

<b>SUMMARY</b>	<b>VI</b>
<b>LIST OF FIGURES AND TABLES</b>	<b>VII</b>
<b>INTRODUCTION</b>	<b>1</b>
<b>TEMPLATE PART I: GENERAL FARM INFORMATION AND CROP PRODUCTION</b>	<b>3</b>
<b>General data</b>	<b>3</b>
General information	3
<b>Manure</b>	<b>4</b>
Manure management	4
Storage infrastructure	5
<b>Water and energy consumption</b>	<b>5</b>
Water consumption	5
Energy consumption	5
<b>Arable crop</b>	<b>5</b>
General Information	5
Previous crop	6
Tillage	7
Cover crop	7
Sowing of studied crop	8
Fertilization	8
Phytosanitary product	8
Irrigation	9
Harvest	9
Crop residues	9
Other information	10
<b>Meadow or Alfalfa</b>	<b>10</b>
General Information	10

Tillage	11
Sowing of studied crop	11
Fertilization	12
Phytosanitary product	12
Irrigation	13
Harvest	13
Crop residues	13
Excretion during grazing	13
<b>Biogas plant</b>	<b>14</b>
Input	14
Storage	14
Digester	14
Output	14
Post-storage	15
Use of biogas	16
<b>Biodiversity</b>	<b>16</b>
Habitat: 1.Cultivated and Managed Terrestrial Areas	16
Habitat: 2.Natural and Semi-Natural Terrestrial Vegetation	16
Habitat: 3.Natural and Semi-Natural Aquatic or Regular Flooded Vegetation	17
Grassland management	18
<b>TEMPLATE PART II: DAIRY ENTERPRISE</b>	<b>20</b>
<b>General data</b>	<b>20</b>
General information	20
<b>Herd data</b>	<b>20</b>
Cow breeds	20
Dairy herd inventory	21
Dairy Herd INTRA-SYSTEM	22
<b>Product</b>	<b>23</b>
Milk production	23
Milk composition	23
<b>Diet</b>	<b>23</b>

Herd diet	23
Feed description	24
<b>Housing information</b>	<b>25</b>
General information	25
Housing	26
<b>Manure</b>	<b>26</b>
General information	26
Effluent	27
<b>Milking parlour</b>	<b>28</b>
Milking parlour	28
<b>TEMPLATE PART III: BEEF ENTERPRISE</b>	<b>29</b>
<b>General data</b>	<b>29</b>
General information	29
<b>Herd data</b>	<b>30</b>
Breeding herd inventory	30
Breeding	32
herd INTRA-SYSTEM	32
Fattening system herd inventory	33
Long fattening system – Herd INTRA-SYSTEM	34
<b>Product</b>	<b>34</b>
Breeding system - Milk production	34
<b>Diet</b>	<b>34</b>
Herd diet	34
Feed description	35
<b>Housing information</b>	<b>36</b>
General information	36
Housing	36
<b>Manure</b>	<b>36</b>

General information _____	36
Effluent _____	36
<b>TEMPLATE PART IV: ECONOMIC DATA _____</b>	<b>37</b>
<b>General data _____</b>	<b>37</b>
General information _____	37
<b>Labour _____</b>	<b>38</b>
List of workers: Age _____	38
List of workers: Annual work on the holding _____	39
<b>Assets &amp; Liabilities _____</b>	<b>39</b>
Farm assets: Total investment value / Purchases _____	39
Farm assets: Investment subsidies _____	40
Farm assets: Sales _____	40
Liabilities: Closing valuation _____	41
<b>Costs _____</b>	<b>41</b>
Expenditure _____	41
<b>Crops _____</b>	<b>43</b>
Crop product types: Sales _____	43
Crop product types: Farm use _____	44
Crop product types: Expected value of rental if land were rented out _____	44
<b>Livestock production _____</b>	<b>45</b>
Animal types: Purchases _____	45
Animal types: Sales _____	46
<b>Animal products &amp; services _____</b>	<b>47</b>
Types of animal products and services: Sales / receipts _____	47
Types of animal products and services: Farm use _____	47
<b>Other gainful activities _____</b>	<b>47</b>
Gainful activities: Sales / receipts _____	47
Gainful activities: Farm use _____	48

<b>Subsidies</b>	<b>48</b>
Breakdown of subsidies: Total received	48
<b>INPUTS DESCRIPTION FOR PRE-ENTERED VARIABLE LIST (TEMPLATE PARTS I, II AND III)</b>	<b>49</b>
<b>ADDITIONAL INFORMATION FOR THE LABOUR WORKSHEET (PART IV)</b>	<b>61</b>
<b>REFERENCES</b>	<b>62</b>



## Summary

The MilKey project aims at assessing the environmental, economic, and social sustainability of European dairy production systems, and at identifying ‘win-win’ farming practices for sustainable and greenhouse gas (GHG) optimised milk production.

This data collection guide was prepared to guide stakeholders wishing to conduct a sustainability assessment of dairy production systems. Specifically, the document can be used to facilitate the process of collecting and reporting the farm environmental and economic information necessary to conduct a sustainability assessment based on the MilKey data template. The guide gathers and defines all variables included in the first four parts of the MilKey data template (i.e., Part I: General farm information and crop production, Part II: Dairy enterprise, Part III: Beef enterprise, and Part IV: Economic data).

**Keywords:** Data collection; Sustainability assessment; Environmental sustainability; Economic sustainability; Guide.

## List of figures and tables

Figure 1: System boundaries of the environmental assessment	2
Table 1: General legend of variable cells	1
Table 2: Farm-level variables used in the environmental assessment	3
Table 3: Dairy variables used in the environmental assessment	20
Table 4: Beef variables used in the environmental assessment	29
Table 5: Farm-level variables used in the economic assessment	37

## Introduction

This document is designed to guide the data collector when completing the MilKey data templates at data collection, specifically for the environmental and economic parts (Baillet et al., 2022a). This data can be used to conduct the DEXi-Dairy sustainability assessment described in Baillet et al. (2022b). In addition to this introduction, the document is divided into six sections. The first four sections correspond to the first four parts of the MilKey template (i.e., Part I: General farm information and crop production, Part II: Dairy enterprise, Part III: Beef enterprise, and Part IV: Economic data). They define all variables to be recorded. The last two sections provide additional information to fill out the template, notably regarding the pre-entered variable lists used throughout the MilKey template and guidelines to record labour inputs.

The sustainability assessment is carried out **over an accounting year** (i.e., from January to December). The system boundaries of the study are the farm itself. The data collection and the assessment are divided into sub-systems: while parts I, IV, and V collect information at the farm scale, parts II and III focus on the dairy and beef enterprises, respectively.

Several variables appear multiple times in the templates and are highlighted in the column “X if repeated” of tables 2-5. If there is an “X” in this column, the variable has to be filled out multiple times in the corresponding template part.

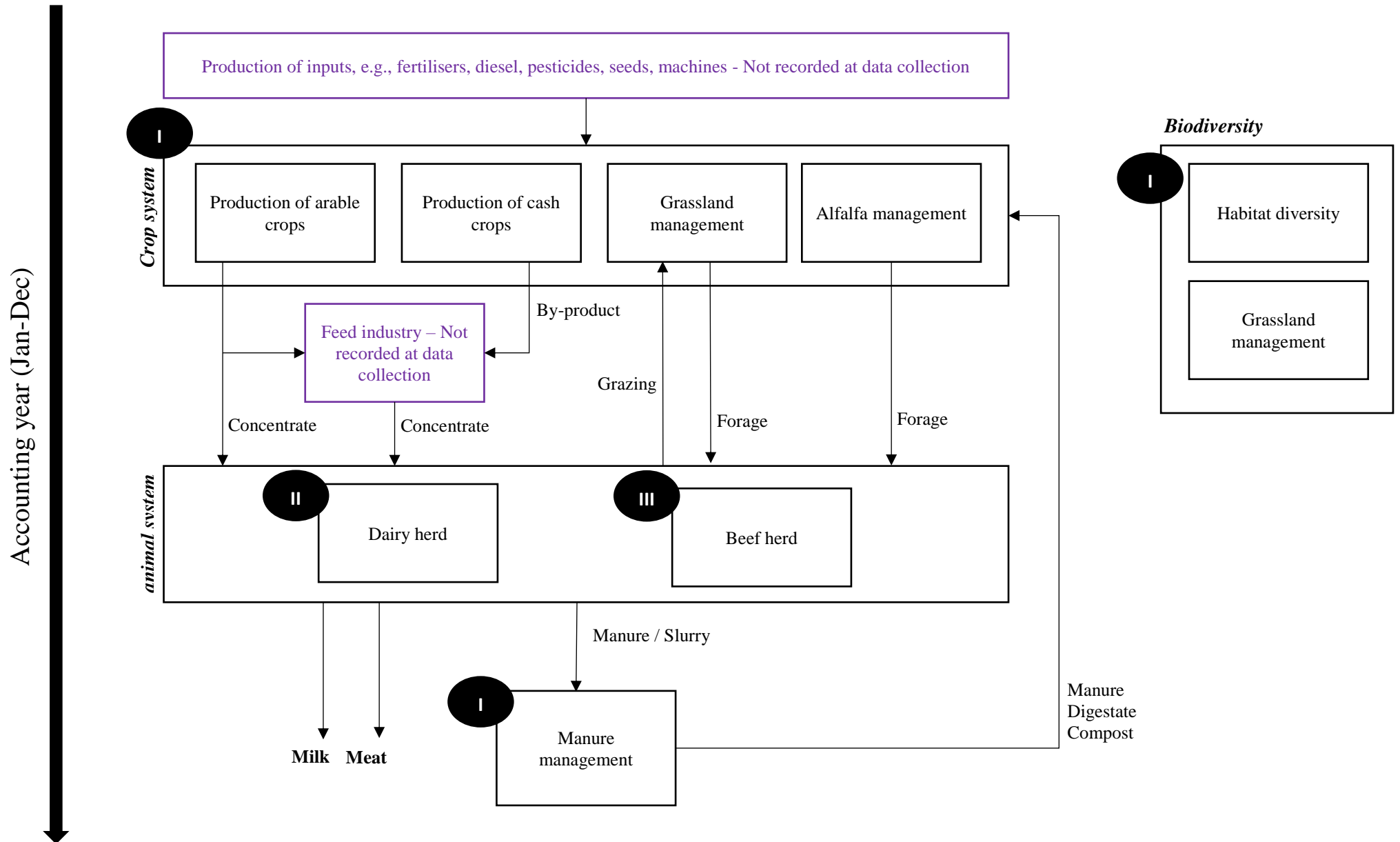
Additionally, to facilitate instructions, variables are colour coded in the template. Table 1 presents this colour code.

*Table 1: General legend of variable cells*

<b>Variables</b>	<b>Colour meaning</b>
Variable w	Mandatory variables. They are necessary to calculate the emissions of case studies. Please respect the unit of measurement while entering values for these variables.
Variable x	Optional variables. Filling out these variables is not mandatory but it allows us to add details in the calculations of GHG emissions.
Variable y	Variables with option list. To fill out these variables, one option has to be selected from the list. A comment column is available to add details if necessary.
Variable z	Variables automatically calculated. These variables are displayed to check the consistency of recorded data. The data recorder does not fill them out.

Finally, Figure 1 represents the different systems and subsystems taken into account in the environmental assessment. It is meant to help users to identify what information is recorded in the first three parts of the data template. Specifically, Part I collects general farm information, common to all the farming enterprises. That is, Part I gathers data related to on-farm crop production (including arable crops, cash crops, and grassland and alfalfa management), buildings for storage, manure management (including manure storage and on-farm biogas production), total water and energy consumption, and farm biodiversity (i.e., assessed through simplified habitats and grassland management). Information specific to the separate farming enterprises is recorded in Part II for dairy, and Part III 3 for beef.

Figure 1: System boundaries of the environmental assessment



## Template part I: General Farm Information and Crop production

Table 2: Farm-level variables used in the environmental assessment

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
General data	General information	<b>Name of the interviewer</b>		Name of the data recorder of this file.	
		<b>Name of the institution</b>		Name of the institution to which the interviewer belongs.	
		<b>Email address</b>		Email address of the interviewer.	
		<b>Tel</b>		Telephone number of the interviewer with the country code.	
		<b>Date</b>		Date of the data collection.	dd/mm/yy
		<b>Farm number</b>		Farm number in the order of interview occurrence per county	
		<b>Country</b>		Country of the case study farm. Country code to input: Fr = France, De = Germany, Gr = Greece, No = Norway, Po = Poland, Ir = Ireland.	
		<b>Farm ID for naming the file</b>		Farm ID generated with the date of the interview, the N° of the scenario, and the country code. The file has to be renamed with the code "Farm ID" followed by "Part n", n being the number of the template part.	
		<b>Utilised Agricultural Area (UAA)</b>		The utilised agricultural area (UAA) is a standardized notion in European agricultural statistics. It includes arable land (including temporary pastures, fallow lands, greenhouse crops, family gardens, etc.), areas under grass cover, and permanent crops (vines, orchards, etc).	ha
<b>Wooded area</b>		Any plot of land of at least 5 acres (i.e., 500 m <sup>2</sup> ) with forest species capable of reaching a height of 5 m or more when adult, and where the space occupied by trees is at least 10% is considered to be a wooded area. When they are young stands covering less than 10%, they must include at least 500 crop trees or, in the case of widely spaced plantations, 300 planting shoots per hectare. These areas are broken down into woods and forests proper (50 acres and over) and copses (from 5 to 50 acres). The latter, with wooded hedges, roadside trees and scattered trees (isolated trees or copses of less than 5 acres) constitute wooded non-forest areas. Poplars, the	ha		

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
				cultivation of which is closer to agricultural production, although classified separately, are part of the wooded area.	
		<b>Total farm size</b>		Total area of the farm (including notably the UAA and wooded areas).	ha
		<b>Main fodder area for dairy enterprise</b>		Surface area under grass, and fodder and arable crop production dedicated to the dairy enterprise.	ha
		<b>Longitude</b>		Geographic coordinate that specifies east-west position of a point on the earth's surface. Please use the World Geodetic System 1984 (WGS84) which is the reference system used by global positioning system.	WSG84
		<b>Latitude</b>		Geographic coordinate that specifies north-south position of a point on the earth's surface. Please use the World Geodetic System 1984 (WGS84) which is the reference system used by global positioning system.	WSG84
		<b>Type of production</b>		It refers to the label of the production.	<i>Please select in the list</i>
		<b>Data origin (if relevant)</b>		If the data used in the template came from an external database, please refer to it here.	
<b>Manure</b>	Manure management	<b>Type of management</b>		Type of management related to manure and/or slurry storage.	<i>Please select in the list</i>
		<b>Type of manure <i>n</i> by selected management</b>		Type of manure corresponding to the type of management selected (e.g., bovine manure for manure pit with cover).	<i>Please select in the list</i>
		<b>Exchange surfaces</b>		Exchange surfaces for the selected type of management. For the liquid effluent: surface between liquid and air. For the solid effluent: soil surface occupied by the manure storage.	m <sup>2</sup>
		<b>Storage time</b>		Storage time for the selected type of management until manure removal.	days
		<b>Total amount of manure exported</b>		This refers to the total amount of manure exported off farm.	kg/year

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
Infrastructure	Storage infrastructure	Type of storage infrastructure		Type of storage infrastructure for concentrate feed, forage, and manure.	<a href="#">Please select in the list</a>
		Total storage capacity		Storage capacity of the corresponding infrastructure.	m <sup>2</sup> or m <sup>3</sup>
Water and energy consumption	Water consumption	Amount		Drinking water table: Amount of water consumed for drinking per different water source. Cleaning water table: Amount of water consumed for cleaning per different water source.	m <sup>3</sup> /year
		Water source		Water source for drinking water and cleaning water (tables 1 and 2).	<a href="#">Please select in the list</a>
		Share of water coming from the source		Drinking water table: % of the total drinking water consumption coming from a specific source. Cleaning water table: % of the total cleaning water consumption coming from a specific source.	%
		TOTAL		Drinking water table: Total amount of water used for drinking. Cleaning water table: Total amount of water used for cleaning.	m <sup>3</sup> /year
	Energy consumption	Type of energy used		Type of energy used on the farm.	<a href="#">Please select in the list</a>
		Source (for electricity and gas)		Source of the corresponding type of energy used.	<a href="#">Please select in the list</a>
		Quantity (in accounting year)		Quantity of energy used for the selected type.	
		Unit (enter unit)		Please enter the measurement unit of the variable “quantity”. The unit can change depending on the energy types.	
Arable crop	General Information	Crop IDs		ID that defines the crop as one item. All the fields having the same main product (e.g., wheat) with a common technical management route have the same ID and will be thus considered as one item (one worksheet). Please enter a number between 1 and the maximum arable crop ID.	

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Total surface area</b>		Total surface area of the item (i.e., crops belonging to the item).	ha
		<b>Average soil type</b>		This refers to the soil's dominant surface texture for the studied crop.	<i>Please select in the list</i>
		<b>Artificial drainage status</b>		Presence of artificial drainage in this item. If more than 50% of the items have an artificial drainage status, please choose "yes".	Yes/No
		<b>Average drainage status</b>		Automatic grading of the drainage status.	
		<b>Main product</b>		This refers to a marketable product resulting from the meadow/arable crop, whose production is the primary objective of the meadow/arable crop. Example: wheat grains = main product, straw can be considered as a co-product.	
		<b>Farm-gate price</b>		This refers to the farm-gate price of the main product, estimated by the farmer.	Local currency/t
		<b>Average yield</b>		Annual gross yield (including losses) of the main product.	t/ha
		<b>Coproduct (input name)</b>	X	Secondary output from the crops belonging to the item, which has an economic value (e.g., straw for litter house).	
		<b>Farm-gate price</b>	X	This refers to the farm-gate price of the coproduct, estimated by the farmer.	Local currency/t
		<b>Average yield</b>	X	Annual gross yield of the coproduct.	t/ha
	<i>Previous crop</i>	<b>Crop species</b>	X	Main species or main product from the previous crop. The previous crop is the crop that was managed where the studied crop is actually managed. (just before the actual crop). The previous crop can be the same as the studied crop.	
		<b>Date of harvest</b>	X	Harvest date of the previous crop. This data is necessary to determine the assessment's starting date for the studied crop. It is possible that there were several different previous crops occupying the same location as the actual studied crop.	dd/mm/yy
		<b>% of total surface area</b>	X	% of surface area occupied by the previous crop to total surface area currently occupied by the studied crop. 100% if the corresponding previous crop occupied all	%



Worksheet	Sub-category	Variable	X if repeated	Description	Unit
				the plots of the studied crop. If several previous crops are referred, the sum of the total surface area must equal to 100%.	
	Tillage	<b>Tillage method</b>	X	It refers to the tillage process (e.g., ploughing, harrowing). The associated tool is specified in the name of the process.	<i>Please select in the list</i>
		<b>% of total surface area</b>	X	% of the total surface area where this operation is applied. Please enter 100% if it concerns every field of the studied crop.	%
		<b>Number of tractor passes in the same row</b>	X	Number of tractor passes in the same row to complete the corresponding tillage operation.	nb
		<b>Yearly frequency</b>	X	Annual occurrence frequency of this operation. For tillage, one pass in the field = one occurrence, so if this operation needs two passes on the crop, you have to count double.	
	Cover crop	<b>Crop species</b>	X	<p>Crop species used as a cover crop AFTER the previous crop and BEFORE the actual studied crop.</p> <p>A cover crop is defined as a close-growing crop that provides soil protection, seeding protection, and soil improvement between periods of normal crop production.</p> <p>If there is no cover crop, please leave this section empty. If the cover crop is harvested, please consider it as a main crop and fill out a new arable crop worksheet with its corresponding technical management route.</p>	
		<b>Sowing date</b>	X	Sowing date of the cover crop (between the previous crop and the actual studied crop).	dd/mm/yy
		<b>Sowing method</b>	X	Type of sowing operation with the associated tool.	<i>Please select in the list</i>
		<b>Number of tractor passes in the same row</b>	X	Number of tractor passes in the same row to complete the corresponding tillage operation.	nb
		<b>% of total surface area</b>	X	% of the total surface where this operation is applied. Please enter 100% if it concerns every field of the studied crop.	%
		<b>Date of removal</b>	X	Date of the removal of the cover crop.	dd/mm/yy

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
	Sowing of studied crop	Seed applied per ha	X	Seed of the actual studied crop applied in kg of Fresh Matter (FM) per ha.	kg/ha
		Sowing date	X	Sowing date of the actual studied crop.	dd/mm/yy
		Sowing method	X	Sowing method refers to the type of sowing operation with the associated tool.	<a href="#"><i>Please select in the list</i></a>
		Number of tractor passes in the same row	X	Number of tractor passes in the same row to complete the corresponding tillage operation.	nb
		% of total surface area	X	% of the total surface where this operation is applied. Please enter 100% if it concerns every field of the studied crop.	%
	Fertilization	Fertilizer type	X	Fertilizer type refers to the category of fertilizer (e.g., organic, pure nitrogen).	<a href="#"><i>Please select in the list</i></a>
		Fertilizer name	X	The fertilizer name refers to the commercial name of the product. The name will be used to find its chemical composition (N, P, K).	
		Fertilizer applied per ha	X	Amount of fertilizer applied by ha. Please state the amount of fertilizer, as opposed to the amount of nitrogen contained in the fertilizer.	kg/ha
		Spreading date	X	Fertilizer spreading date.	dd/mm/yy
		Fertilizing method	X	Fertilizer spreading method with the associated tool.	<a href="#"><i>Please select in the list</i></a>
		Number of tractor passes in the same row	X	Number of tractor passes in the same row to complete the corresponding tillage operation.	nb
		% of total surface area	X	% of the total surface where this operation is applied. Please enter 100% if it concerns every field of the studied crop.	
	Phytosanitary product	Product type	X	Category of the phytosanitary product use for plant protection.	<a href="#"><i>Please select in the list</i></a>
		Product name (input name)	X	This refers to the commercial name of the product.	

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Active substance applied per ha</b>	X	Amount of the active substance from this pesticide applied per ha.	kg/ha
		<b>Spreading method (input name)</b>	X	Pesticide spreading method. Be as precise as possible when you enter the name of the method (name, associated tool).	
		<b>Number of tractor passes in the same row</b>	X	Number of tractor passes in the same row to complete the corresponding tillage operation.	nb
		<b>% of total surface area</b>	X	% of the total surface where this operation is applied. Please enter 100% if it concerns every field of the studied crop.	
		<b>Yearly frequency</b>	X	Annual frequency of this operation.	
	Irrigation	<b>Quantity</b>	X	Amount of water used to irrigate the studied crop.	mm/day
		<b>Irrigation date</b>	X	Date of the irrigation for the studied crop.	dd/mm/yy
		<b>Irrigation equipment</b>	X	Irrigation equipment to irrigate the studied crop.	<a href="#"><i>Please select in the list</i></a>
		<b>% of total surface area</b>	X	% of the crop area where the irrigation process applies.	
	Harvest	<b>Harvest date</b>		Harvest date of the studied crop.	dd/mm/yy
		<b>Harvest method</b>		Harvest operation with its associated tool.	<a href="#"><i>Please select in the list</i></a>
		<b>Number of harvest intervention</b>		Number of times the harvesting operation is applied to harvest the totality of the relevant surface.	
		<b>% of total surface area</b>		% of the total surface where this operation is applied. Please enter 100% if it concerns every field of the studied crop.	%
	Crop residues	<b>Type of crop residues</b>		The list refers to the position of crop residues after harvesting, they can be either underground or above.	<a href="#"><i>Please select in the list</i></a>
<b>Are crop residues exported?</b>			Export of the crop residues for the studied crop. This information is used to take into account their removal from the farm.	Yes/No	

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>% exported</b>		% of crop residues for the studied crop that is exported to another farm/industry.	%
		<b>Crop residue management</b>		Type of crop residue management for the studied crop.	<a href="#">Please select in the list</a>
	<b>Other information</b>	<b>Is this crop a cash crop?</b>		A cash crop is grown to be sold for profit. Hence, if the crop is grown for animal feeding and/or farm consumption, it is not considered as a cash crop.	Yes/No
		<b>% destined to be sold</b>		If the studied crop is a cash crop, % destined to be sold off farm.	%
<b>Meadow or Alfalfa</b>	<b>General Information</b>	<b>Crop IDs</b>		ID that defines the crop as one item. All the fields having the same main product (e.g., ray grass) with a common technical management route have the same ID and will be thus considered as one item (one worksheet). Please input an integer (one unique integer per type of meadows).	
		<b>Total surface area</b>		Total surface area of the item (crops belonging to the item).	ha
		<b>Average soil type</b>		Average soil type refers to the dominant surface texture of soil of the study crop.	<a href="#">Please select in the list</a>
		<b>Artificial drainage status</b>		Presence of an artificial drainage in this item (if more than 50% of the items have an artificial drainage status, choose “yes”).	Yes/No
		<b>Meadow type</b>		Meadow type refers to the two broad categories: <ul style="list-style-type: none"> <li>Permanent (implemented for more than 5 years, or natural without crop rotation), or</li> <li>Temporary (sown for 6 years maximum with crop rotation).</li> </ul>	<a href="#">Please select in the list</a>
		<b>Age of meadow</b>		Estimation of age of meadow (i.e., length of time between 2 reseeding)	Years
		<b>Newly reseeded or recently poached</b>		If the meadow has been poached or reseeded recently, please specify the date in the comment column.	Yes/No
		<b>Main species</b>		Main species of the meadow, with the purpose of feeding the cattle or selling it (e.g., ryegrass with white clover).	
		<b>Yield</b>		Estimation of the annual yield of the main product.	tDM/ha

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Primary purpose of meadow</b>		Primary product obtained from the meadow (e.g., grazed grass, wrapped hay, silage or hay).	<a href="#">Please select in the list</a>
		<b>Farm-gate price</b>		This refers to the farm-gate price of the primary product, estimated by the farmer.	Local currency/tDM
		<b>Secondary product <i>n</i></b>	X	Secondary product is considered as a product being not the main objective of the meadow, but with an economic value.	
		<b>Farm-gate price of secondary product <i>n</i></b>	X	This refers to the farm-gate price of the secondary product, estimated by the farmer.	Local currency/tDM
		<b>Yield <i>n</i></b>	X	Estimation of the annual yield of the secondary product.	tDM/ha
	Tillage	<b>Tillage method</b>	X	It refers to the tillage process (e.g., ploughing, harrowing). The associated tool is specified in the name of the process.	<a href="#">Please select in the list</a>
		<b>Number of tractor passes in the same row</b>	X	Number of tractor passes in the same row to complete the corresponding tillage operation.	nb
		<b>% of total surface area</b>	X	% of the total surface where this operation is applied. Please enter 100% if it concerns every field of the studied crop.	%
		<b>Yearly frequency</b>	X	Annual occurrence frequency of this operation. For tillage, one pass in the field = one occurrence, so if this operation needs two passes on the crop, you have to count double.	
	Sowing of studied crop	<b>Seed applied per ha</b>	X	Seed of the actual studied crop applied in kg of Fresh Matter (FM) per ha.	kg/ha
		<b>Sowing date</b>	X	Sowing date of the actual studied crop.	dd/mm/yy
		<b>Sowing method</b>	X	Sowing method refers to the type of sowing operation with the associated tool.	<a href="#">Please select in the list</a>
		<b>Number of tractor passes in the same row</b>	X	Number of tractor passes in the same row to complete the corresponding tillage operation.	nb
		<b>% of total surface area</b>	X	% of the total surface where this operation is applied. Please enter 100% if it concerns every field of the studied crop.	%

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
	Fertilization	<b>Fertilizer type</b>	X	This refers to the category of fertilizer (e.g., organic, pure nitrogen).	<a href="#"><i>Please select in the list</i></a>
		<b>Fertilizer name</b>	X	The fertilizer name refers to the commercial name of the product. This information will be used to find its chemical composition (N, P, K).	
		<b>Fertilizer applied per ha</b>	X	Amount of fertilizer applied by ha. Please state the amount of fertilizer, as opposed to the amount of nitrogen contained in the fertilizer.	kg/ha
		<b>Spreading date</b>	X	Fertilizer application date.	dd/mm/yy
		<b>Fertilizing method</b>	X	Fertilizer spreading method with the associated tool.	<a href="#"><i>Please select in the list</i></a>
		<b>Number of tractor passes in the same row</b>	X	Number of tractor passes in the same row to complete the corresponding tillage operation.	nb
		<b>% of total surface area</b>	X	% of the total surface where this operation is applied. Please enter 100% if it concerns every field of the studied crop.	
	Phytosanitary product	<b>Product type</b>	X	Category of the phytosanitary product used for plant protection.	<a href="#"><i>Please select in the list</i></a>
		<b>Product name (input name)</b>	X	This refers to the commercial name of the product.	
		<b>Active substance applied per ha</b>	X	Amount of the active substance applied per ha.	kg/ha
		<b>Spreading method (input name)</b>	X	Phytosanitary product spreading method. Be as precise as possible, e.g., specify the type of tool with its capacity, weight, and other traits. <i>Example: Sprayer with capacity of 400l.</i>	
		<b>Number of tractor passes in the same row</b>	X	Number of tractor passes in the same row to complete the corresponding tillage operation.	nb
		<b>% of total surface area</b>	X	% of the total surface where this operation is applied. Please enter 100% if it concerns every field of the studied crop.	

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Yearly frequency</b>	<b>X</b>	Annual frequency of this operation.	
	Irrigation	<b>Quantity</b>	<b>X</b>	Amount of water used to irrigate the studied crop.	mm/day
		<b>Irrigation date</b>	<b>X</b>	Date of the irrigation for the studied crop.	dd/mm/yy
		<b>Irrigation equipment</b>	<b>X</b>	Irrigation equipment to irrigate the studied crop.	<a href="#"><i>Please select in the list</i></a>
		<b>% of total surface area</b>	<b>X</b>	% of the crop area where the irrigation process applies.	
	Harvest	<b>Harvest date</b>	<b>X</b>	Harvest date of the studied crop.	dd/mm/yy
		<b>Harvest method</b>	<b>X</b>	Harvest operation with its associated tool.	<a href="#"><i>Please select in the list</i></a>
		<b>Number of interventions for harvest</b>	<b>X</b>	Number of times the harvesting operation is applied to harvest the totality of the relevant surface.	
		<b>% of total surface area</b>	<b>X</b>	% of the total surface where this operation is applied. Please enter 100% if it concerns every field of the studied crop.	%
	Crop residues	<b>Type of crop residues</b>		The list refers to the position of crop residues after harvesting, they can be either underground or above.	<a href="#"><i>Please select in the list</i></a>
		<b>Are crop residues exported?</b>		Export of the crop residues for the studied crop. This information will be used to take into account their removal from the farm.	Yes/No
		<b>% exported</b>		% of crop residues from the studied crop that is exported to another farm/industry.	%
		<b>Crop residue management</b>		Type of crop residue management on the studied crop.	<a href="#"><i>Please select in the list</i></a>
	Excretion during grazing	<b>Other grazing animal type</b>	<b>X</b>	If the studied meadow is used for grazing, type of grazing animals. Please fill out this section only if there are animals grazing other than from the dairy or suckler herd.	<a href="#"><i>Please select in the list</i></a>

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Number of grazing animals by animal type</b>		Number of grazing animals, other than bovine animals (dairy or beef), by animal type.	Nb
		<b>Length of grazing activity</b>		Length of grazing period for the corresponding type of grazing animals.	Days
Biogas plant	Input	<b>Type of inputs (input name)</b>	X	Type of inputs used to supply the biogas plant. Please enter one type of input per INPUT table.	
		<b>Origin of input</b>	X	Origin of the inputs used to supply the biogas plant (whether produced on or off farm).	<a href="#"><i>Please select in the list</i></a>
		<b>Distance from input production to Digester</b>	X	If the inputs are produced off farm, please estimate the distance between the input production location and the farm.	km
		<b>Amount (specify the measurement unit)</b>	X	Amount of the corresponding type of input used to supply the biogas plant. Please specify the measurement unit.	
	Storage	<b>Capacity</b>		Capacity of the input storage.	m <sup>3</sup>
		<b>Type of storage</b>		Type of the input storage.	<a href="#"><i>Please select in the list</i></a>
		<b>Length of storage</b>		Average length of storage for inputs until they supply the biogas plant.	Days
	Digester	<b>Biochemical methane potential</b>		Biochemical methane potential of the on-farm digester.	%
		<b>Power of the digester</b>		Power of the on-farm digester.	kw
		<b>Phase separator</b>		Presence of a phase separator in the digester.	Yes/No
		<b>Phase separator type</b>		If there is a phase separator in the digester, please choose a type from the list.	<a href="#"><i>Please select in the list</i></a>
	Output	<b>Total biogas production</b>		Total biogas production over 2020.	m <sup>3</sup>
		<b>Production of electricity</b>		Estimation of the electricity produced by the biogas plant over 2020.	Mwh



Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Production of thermal energy</b>		Estimation of the thermal energy produced by the biogas plant over 2020.	Mwh
		<b>Auto-consumption of the process</b>		% of energy produced by biogas plant and used on farm for own consumption over 2020.	%
		<b>Electricity sales</b>		Electricity sales over 2020.	Local currency
		<b>Digestate</b>		Production of digestate over 2020.	t
		<b>Digestate spreading without treatment</b>		% of digestate spread on the farm <u>without</u> post-treatment on crops over 2020 (based on the digestate production variable).	%
		<b>Types of post-treatment (input name)</b>		Type of post-treatment for the digestate.	
		<b>Digestate spreading with treatment</b>		% of digestate spread on the farm <u>with</u> post-treatment on crops over 2020 (based on the digestate production variable).	%
		<b>Digestate export with post treatment</b>		% of digestate exported off the farm <u>with</u> post-treatment on crops over 2020 (based on the digestate production variable).	%
		<b>Digestate export without post treatment</b>		% of digestate exported off the farm <u>without</u> post-treatment on crops over 2020 (based on the digestate production variable).	%
	Post-storage	<b>Capacity</b>		Capacity of post-storage after the digester step. In other terms, storage capacity of outputs from the digester (i.e., digestate).	m <sup>3</sup>
		<b>Type of post-storage</b>		Type of output post-storage.	<a href="#"><i>Please select in the list</i></a>
		<b>Length of liquid output storage</b>		If there is a phase separator, average length of liquid output storage.	Days
		<b>Length of solid output storage</b>		If there is a phase separator, average length of solid output storage.	Days
		<b>Length of storage</b>		If there is NO phase separator, average length of mixed (liquid and solid) output storage.	Days

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
	Use of biogas	% of cogeneration		% of biogas production intended for the cogeneration process. The cogeneration process transforms the biogas in electricity and heat.	%
		% of injection in gas network (from biogas)		% of biogas production intended to be injected in gas network. For this process, the biogas needs to be purified.	%
Biodiversity		Participation in agri-environmental scheme		An environmental management scheme is a policy tool by which landowners and other individuals and bodies responsible for land management can be incentivised to manage their environment.	Yes/No
	Habitat: 1.Cultivated and Managed Terrestrial Areas	Type of habitat		This class refers to areas where the natural vegetation has been removed or modified, and replaced by other types of vegetative cover of anthropogenic origin. This vegetation is artificial and requires human activities to maintain it in the long term. In between human interventions, or before starting crop cultivation, the surface can be temporarily without vegetative cover. Its seasonal phenological appearance can be regularly modified by humans (e.g., tillage, harvest, and irrigation). All vegetation that is planted or cultivated with an intent to harvest is included in this class (e.g., wheat fields, orchards, rubber, and teak plantations).  Following this definition, the selected sub-classes are <b>trees, shrubs, graminoids, and non-graminoids.</b>	
		Area		Area or the corresponding type of habitat in ha.	ha
	Habitat: 2.Natural and Semi-Natural Terrestrial Vegetation	Type of habitat		Natural vegetated areas are defined as areas where the vegetative cover is in balance with the abiotic and biotic forces of its biotope.  Semi-natural vegetation is defined as <b>vegetation not planted by humans but influenced by human actions.</b> These may result from grazing, possibly overgrazing, the natural phytocenoses, or else from practices such as selective logging in a natural forest whereby the floristic composition has been changed. Previously cultivated areas which have been abandoned and where vegetation is regenerating are also included. The secondary vegetation developing during the fallow period of shifting cultivation is a further example. Human disturbance may be deliberate or inadvertent. Hence, semi-natural vegetation includes vegetation due to human influences but which has recovered to such an extent that species composition and environmental and ecological processes are indistinguishable from, or in a process of achieving, its	

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
				undisturbed state. <b>The vegetative cover is not artificial and it does not require human interventions to be maintained in the long term.</b> Following this definition, the selected sub-classes are <b>woody</b> and <b>herbaceous</b> .	
		<b>Area</b>		Area or the corresponding type of habitat in ha.	ha
	Habitat: 3.Natural and Semi-Natural Aquatic or Regular Flooded Vegetation	<b>Type of habitat</b>		<p>This class describes areas which are transitional between pure terrestrial and aquatic systems and where <b>the water table is usually at or near the surface, or the land is covered by shallow water</b>. The predominant vegetation, at least periodically, comprises hydrophytes. Marshes, swamps, bogs, or flats where drastic fluctuations in water level or high concentration of salts may prevent the growth of hydrophytes are all part of this class. <b>The vegetative cover is significantly influenced by water and dependent on flooding</b> (e.g., mangroves, marshes, swamps, and aquatic beds). Occasionally-flooded vegetation within a terrestrial environment is not included in this class.</p> <p>Natural Vegetated Aquatic habitats are defined as biotopes where the vegetative cover is in balance with the influence of biotic and abiotic forces.</p> <p>Semi-Natural Aquatic vegetation is defined as vegetation that is <b>not planted by humans</b> but which is influenced directly by human activities that are undertaken for other, unrelated purposes. Human activities (e.g., urbanization, mining, and agriculture) may influence abiotic factors (e.g., water quality), affecting species composition. Furthermore, this class includes vegetation that developed due to human activities but which has recovered to such an extent that it is indistinguishable from its former state, or which has built up a new biotope which is in balance with the present environmental conditions. A distinction between Natural and Semi-Natural Aquatic Vegetation is not always possible because human activities distant to the habitat may create chain reactions, which ultimately disturb the aquatic vegetative cover. Human activities may also take place deliberately to compensate for effects as noted above with the aim of keeping a "natural" state.</p> <p>Following this definition, the selected sub-classes are <b>woody</b> and <b>herbaceous</b>.</p>	
		<b>Area</b>		Area covered the corresponding type of habitat in ha.	ha

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
	Grassland management	<b>Grassland area (ha)</b>		Total surface of grassland (temporary/permanent/natural).	ha
		<b>Hay meadow (%)</b>		% of total grassland area used for silage, wrapped and dried hay as primary purpose. This may include pastures used primarily for forage production but where some early spring grazing is performed.	%
		<b>Grazed pasture (%)</b>		% of total grassland area intended for animal grazing.	%
		<b>Hay meadow management</b>		<p>Two types of hay meadow management:</p> <ul style="list-style-type: none"> <li>- Silage, or wrapped or dried hay in a barn or on the ground after an early grazing</li> </ul> <p>Grasslands that are the subject of an initial intervention that is both early and intense. In the case of grazing as the first intervention before mowing, we distinguish this early grazing from “early spring grazing” by the fact that the plant cover is sufficiently grazed so that the regrowth contains only a few ears.</p> <ul style="list-style-type: none"> <li>- Dried hay on the ground, with or without topping</li> </ul> <p>This is a real early spring grazing: the grazing is early, fast, and not very intense. The ears of herbaceous species are not or very little cut.</p>	
		<b>Grazed pasture management</b>		<p>Two types of grazed pasture management:</p> <ul style="list-style-type: none"> <li>- Extensively managed pasture</li> </ul> <p>The grass is heterogeneous when the animals come out and the leftover grass is not mown. There may be small woody plants in the plot.</p> <ul style="list-style-type: none"> <li>- Rotating or continuous intense grazing</li> </ul> <p>The grass is short and homogeneous when the animals leave (none or little leftover grass which is mown). If the practices change throughout the year, what happens in spring matters the most.</p>	
		<b>% of surface area</b>	<b>X</b>	% of surface area corresponding to the described types of management (two variables above).	%

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Mineral fertilization (mowing)</b>	X	Mineral fertilization during the mowing period in the 2020.	N unit/ha
		<b>Mineral fertilization (grazing)</b>	X	Mineral fertilization during the grazing period in the 2020.	N unit/ha
		<b>Organic fertilizer use</b>	X	Intensity of organic fertilization use in the 2020.	<i>Please select in the list</i>

## Template part II: Dairy enterprise

Table 3: Dairy variables used in the environmental assessment

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
General data	General information	<b>Name of the interviewer</b>		Name of the data recorder of this file.	
		<b>Name of the institution</b>		Name of the institution to which the interviewer belongs.	
		<b>Email address</b>		Email address of the interviewer.	
		<b>Tel</b>		Telephone number of the interviewer with the country code.	
		<b>Date</b>		Date of the data collection.	dd/mm/yy
		<b>N° of the scenario</b>		In our assessment, a scenario includes all processes within the farm gate, such as the production of farm products (including feed and crop production), biodiversity preservation, and effluent management. Please consult the Milkey handbook (i.e., indicator calculation) and the template “part I” for the system boundaries and the details of the assessment.  Given that all case studies have a unique scenario, the scenario numbers will follow the case study collection order (case study 1 = scenario 1) for each partner. The data recorder has to fill out with a number between 1 and the maximum number of partner’s farms.	
		<b>Country</b>		Country of the case study farm. Country code to input:  Fr = France, De = Germany, Gr = Greece, No = Norway, Po = Poland, Ir = Ireland.	
		<b>Farm ID for naming the file</b>		Farm ID generated with the date of the interview, the N° of the scenario, and the country code.	
Herd data	Cow breeds	<b>Cow breed</b>		Name of cow breed and its % in the dairy herd. If it is a crossbred, please specify both names in the column “name”. A crossbred is counted as one type of breed.  <i>Example: cow breed 1: “Holstein-Friesian” x “Fleckvieh”</i>	Name/% of herd

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
	Dairy herd inventory	<b>Calf births</b>		Total born calves on farm. Average weight of calves less than 8 days.	Count (nb)/Average weight
		<b>Calf sales &lt; 8 days old</b>		Number of calves, among the calves of 8 days, which are sold. Average weight of calves, among the calves of 8 days, which are sold.	Count (nb)/Average weight
		<b>Calf deaths &lt; 8 days old</b>		Number of deaths among the calves that are less than 8 days old (including stillborn calves).	Count (nb)
		<b>Calves which turn 8 days old and are kept on farm</b>		Number of calves which turn 8 days old and are kept on farm. Average weight of calves that are not weaned and older than 8 days old (including bought ones).	Count (nb)/Average weight
		<b>Bought calves &gt; 8 days old</b>		Number of bought calves that are more than 8 days old and still not weaned.	
		<b>Calf sales &gt; 8 days old</b>		Number of sales among the calves that are more than 8 days old.	Count (nb)
		<b>Calf deaths &gt; 8 days old</b>		Number of deaths among the calves that are more than 8 days old.	Count (nb)
		<b>Calves which are weaned and kept on farm</b>		Number of calves that wean and are kept on farm. Average weight of heifers that are less than 1 year old (including bought ones).	Count (nb)/Average weight
		<b>Bought heifers &lt; 1 year old</b>		Number of bought heifers that are less than 1 year old.	
		<b>Heifer sales &lt; 1 year old</b>		Number of sales among the heifers that are less than 1 year old.	Count (nb)
		<b>Heifer deaths &lt; 1 year old</b>		Number of deaths among the heifers that are less than 1 year old.	Count (nb)
		<b>Heifers which turn 1 year old and are kept on farm</b>		Number of heifers that turn 1 year old. Average weight of heifers that are between 1 and 2 years old (including bought ones).	Count (nb)/Average weight
		<b>Bought heifers 1-2 years old</b>		Number of bought heifers that are between 1 and 2 years old.	
		<b>Heifer sales 1-2 years old</b>		Number of sales among the heifers that are between 1 and 2 years old.	Count (nb)

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Heifer deaths 1-2 years old</b>		Number of deaths among the heifers that are between 1 and 2 years old.	Count (nb)
		<b>Heifers which turn 2 years old and are kept on farm</b>		Number of heifers which turn 2 years old and are kept on farm. Average weight of heifer that are more than 2 years old (including bought ones).	Count (nb)/Average weight
		<b>Bought heifers &gt; 2 years old</b>		Number of bought heifers that are more than 2 years old.	
		<b>Heifer sales &gt; 2 years old</b>		Number of sales among the heifers that are more than 2 years old.	Count (nb)
		<b>Heifer deaths &gt; 2 years old</b>		Number of deaths among the heifers that are more than 2 years old.	Count (nb)
		<b>Heifers which calve for the first time and are kept on farm</b>		Number of heifers which calve for the first time and are kept on farm. Average weight of dairy cows (including bought ones).	Count (nb)/Average weight
		<b>Bought dairy cows</b>		Number of bought dairy cows.	
		<b>Dairy cow sales</b>		Number of sales among dairy cows.	Count (nb)
		<b>Dairy cow deaths</b>		Number of deaths among dairy cows.	Count (nb)
		<b>Dairy cows which stop producing (turn in cull cows) and are kept on farm</b>		Number of dairy cows which stop producing milk and are kept on farm (turn in cull cow category). Average weight of cull cows (including bought ones).	Count (nb)/Average weight
		<b>Bought cull cows</b>		Number of bought cull cows.	
		<b>Cull cow sales before slaughter house</b>		Number of sales among cull cows before going to slaughterhouse.	Count (nb)
		<b>Cull cow deaths before slaughter house</b>		Number of deaths among cull cows before going to slaughterhouse.	Count (nb)
		<b>Cull cows going to slaughter house</b>		Number of cull cows going to slaughterhouse. Average weight of cull cows going to slaughterhouse.	Count (nb) /Average weight
	<b>Dairy Herd INTRA-SYSTEM</b>	<b>Average time for which calves are exclusively on a milk diet</b>		Average time for which calves are exclusively on a milk diet (calves < 8 days)	days



Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Average time until weaning (i.e., for which calves drink milk as part of their diet)</b>		Average time until weaning (i.e., for which calves drink milk as part of their diet) (Calves > 8 days)	days
		<b>Average time spent on the farm for cull cows</b>		Average time spent on the farm for cull cows, from the moment they stop producing milk until they are sent to the slaughterhouse or sold.	days
		<b>Size of the dairy herd (including dry cows)</b>		Size of the dairy herd including dry cows in the year of production.	Count (nb)
		<b>Average weight of dairy cows before calving</b>		Average weight of dairy cows before calving.	kg
		<b>Average weight of dairy cows after calving</b>		Average weight of dairy cows after calving.	kg
		<b>% of time in the year spent indoors for dairy cows</b>		% of time in the year spent indoors for dairy cows. The indoors period includes every activities in barn and in milking parlour.	%
		<b>% of time in the year spent outdoors for dairy cows</b>		% of time in the year spent outdoors for dairy cows. The outdoor period includes everything outside of an infrastructure.	%
		<b>Average calving interval</b>		Average period between two calvings for dairy cows.	Days
		<b>Length of calving season</b>		Average length of calving season for dairy cows.	Weeks
<b>Product</b>	<b>Milk production</b>	<b>Total raw milk production</b>		Total raw or unpasteurized milk production.	L
		<b>Milk fed to dairy calves</b>		Milk used to feed dairy calves.	L
		<b>Milk wasted</b>		Milk wasted.	L
		<b>Milk sold</b>		Total milk sold.	L
	<b>Milk composition</b>	<b>Fat content</b>		Average fat content of raw milk.	g/L
		<b>Protein content</b>		Average protein content of raw milk.	g/L
<b>Diet</b>	<b>Herd diet</b>	<b>Diet name (input name)</b>	<b>X</b>	Please give a name to the diet (for convenience purposes).	
		<b>Date of diet beginning</b>	<b>X</b>	Please enter the starting date of the diet for the relevant herd category.	dd/mm

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Date of diet ending</b>	X	Please enter the ending date of the diet for the relevant herd category.	dd/mm
		<b>Time spent in buildings</b>	X	Please enter an estimation of time spent in building for the specific diet through 2020 for the relevant animal categories. For instance, if the animal category spends only 4 weeks indoors on a 8 weeks diet period, you have to input 50% (4/8*100).  Please exclude feeding time spent in the milking parlour.	%
		<b>Diet-relevant herd category</b>	X	Please select the diet-relevant herd category among the list. One diet is attributed to one herd category.	<a href="#"><i>Please select in the list</i></a>
		<b>Average daily milk production</b>	X	Average daily milk production per dairy cow during the diet period. If the data is not available, please input the yearly average.  Leave the cell empty if the diet-relevant herd category is not “dairy cow”.	kg/(day*dairy cow)
		<b>Forage type 1</b>	X	Please select the forage type among the list of the corresponding diets.	<a href="#"><i>Please select in the list</i></a>
		<b>% of originated from on-farm production</b>	X	Please enter the % of corresponding forage coming from on-farm production. 0 means that all the corresponding forage comes from off-farm production and 100 means that all the corresponding forage is produced on the studied farm.	%
		<b>Mass</b>	X	Please enter the amount of forage for the corresponding diet.	kg DM/day
		<b>Concentrate feed name</b>	X	Please enter the concentrate feed name for the corresponding diet. The composition of the concentrate feed name has to be described in the feed description table. Hence, this variable has to be jointly filled out with the feed description section.	
		<b>Concentrate feed mass (Kg FM/day)</b>	X	Please enter the amount of concentrate feed for the corresponding diet.	kg FM/day
	Feed description	<b>Concentrate feed name</b>	X	Please enter the concentrate feed name corresponding to the description table. Please ensure that you input the exact SAME name as the one used in the herd diet section.	

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Raw material</b>	X	This refers to the raw materials included in the corresponding concentrate feed. Please select raw materials available in the list.	<a href="#"><u>Please select in the list</u></a>
		<b>Amount</b>	X	% of the corresponding raw material included in the concentrate feed.	%
		<b>Origin of the raw material (country)</b>	X	This refers to the production of the corresponding raw material. Please input the country origin. If the data is not available, assumptions will be made based on reference values from databases.	
		<b>Protein content (amount)</b>	X	Protein content in the corresponding concentrate feed.	%
		<b>Fat content (amount)</b>	X	Fat content in the corresponding concentrate feed.	%
		<b>DM content (amount)</b>	X	Dry matter content in the corresponding concentrate feed.	%
		<b>Photo</b>	X	Please enter a picture of the corresponding concentrate feed TAG.	
<b>Housing information</b>	<b>General information</b>	<b>All calves &lt; 8 days raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”.  If “Yes” is selected, no housing information is necessary for the corresponding herd category.	Yes/No
		<b>All calves &gt; 8 days raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”.  If “Yes” is selected, no housing information is necessary for the corresponding herd category.	Yes/No
		<b>All heifers &lt; 1 year old raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”.  If “Yes” is selected; no housing information is necessary for the corresponding herd category.	Yes/No
		<b>All heifers 1-2 years old raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”.  If “Yes” is selected, no housing information is necessary for the corresponding herd category.	Yes/No

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>All heifers &gt; 2 years old raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”. If “Yes” is selected, no housing information is necessary for the corresponding herd category.	Yes/No
		<b>All dairy cows raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”. If “Yes” is selected, no housing information is necessary for the corresponding herd category.	Yes/No
		<b>All cull cows raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”. If “Yes” is selected, no housing information is necessary for the corresponding herd category.	Yes/No
	Housing	<b>Type of housing</b>	X	This refers to the livestock building for the corresponding herd category. Please select one type from the list.	<a href="#">Please select in the list</a>
		<b>Building capacity</b>	X	This refers to the maximum number of animals that can fit in the building for the corresponding herd category.	Nb of heads
		<b>Type of ventilation system</b>	X	Please select the type of ventilation system that is installed in the corresponding livestock building.	<a href="#">Please select in the list</a>
		<b>Type of air treatment system</b>	X	Please select the type of air treatment system for the corresponding livestock building.	<a href="#">Please select in the list</a>
		<b>Water-saving system (Yes/No)</b>	X	Please select “yes” if there is any kind of water-saving system in the corresponding livestock building.	Yes/No
	Manure	General information	<b>All calves &lt; 8 days raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”. If “Yes” is selected, no manure management information is necessary for the corresponding herd category.

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>All calves &gt; 8 days raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”.  If “Yes” is selected, no manure management information is necessary for the corresponding herd category.	Yes/No
		<b>All heifers &lt; 1 year old raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”.  If “Yes” is selected, no manure management information is necessary for the corresponding herd category.	Yes/No
		<b>All heifers 1-2 years old raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”.  If “Yes” is selected, no manure management information is necessary for the corresponding herd category.	Yes/No
		<b>All heifers &gt; 2 years old raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”.  If “Yes” is selected, no manure management information is necessary for the corresponding herd category.	Yes/No
		<b>All dairy cows raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”.  If “Yes” is selected, no manure management information is necessary for the corresponding herd category.	Yes/No
		<b>All cull cows raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period (in 2020), please select “Yes”; otherwise select “No”.  If “Yes” is selected, no manure management information is necessary for the corresponding herd category.	Yes/No
	<b>Effluent</b>	<b>Type of manure</b>	<b>X</b>	Please select a type of manure from the list for the corresponding herd category.	<i>Please select in the list</i>

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Type of litter</b>	X	Type of litter used for the corresponding herd category. If the manure is managed as a liquid, it is not necessary to fill out this variable.	<a href="#"><i>Please select in the list</i></a>
		<b>Amount of litter</b>	X	Amount of litter used for the corresponding herd category.	t/year
		<b>Evacuation frequency in the year (from the building to a storage)</b>	X	Annual frequency of evacuation for the corresponding type of manure. It is whether evacuated to an effluent storage or directly spread on crops.	
		<b>Daily evacuation</b>	X	Please select “Yes” if the corresponding type of manure is evacuated on a daily basis from the livestock building to an outdoor use.	Yes/No
<b>Milking parlour</b>	<b>Milking parlour</b>	<b>Is there a milking parlour?</b>		The milking parlour section is used to estimate the cleaning water consumption. Please select “Yes” if there is an on-farm milking parlour.	Yes/No
		<b>Type of milking parlour</b>		Please select among the list the type of milking parlour that there is on the farm.	<a href="#"><i>Please select in the list</i></a>
		<b>Characteristic of the system</b>		Please select the characteristic of the corresponding milking system. This variable depends on the type of milking parlour.	<a href="#"><i>Please select in the list</i></a>
		<b>Number of milking units (milking stalls)</b>		If the characteristic does not specify the number of milking units, please specify it here for the corresponding system.	Count (nb)
		<b>Water consumption for cleaning (estimation)</b>		Estimation of water consumption for cleaning.	<a href="#"><i>Please select in the list</i></a>

## Template part III: Beef enterprise

Table 4: Beef variables used in the environmental assessment

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
General data	General information	<b>Name of the interviewer</b>		Name of the data recorder of this file.	
		<b>Name of the institution</b>		Name of the institution to which the interviewer belongs.	
		<b>Email address</b>		Email address of the interviewer.	
		<b>Tel</b>		Telephone number of the interviewer with the country code.	
		<b>Date</b>		Date of the data collection.	dd/mm/yy
		<b>N° of the scenario</b>		In our assessment, a scenario includes all processes within the farm gate, such as the production of farm products (including feed and crop production), biodiversity preservation, and effluent management. Please consult the Milkey handbook (i.e., indicator calculation) and the template “part I” for the system boundaries and the details of the assessment.  Given that all case studies have a unique scenario, the scenario numbers will follow the case study collection order (case study 1 = scenario 1) for each partner. The data recorder has to fill out with a number between 1 and the maximum number of partner’s farms.	
		<b>Country</b>		Country of the case study farm. Country code to input:  Fr = France, De = Germany, Gr = Greece, No = Norway, Po = Poland, Ir = Ireland.	
		<b>Farm ID for naming the file</b>		Farm ID generated with the date of the interview, the N° of the scenario, and the country code.	
		<b>Breeding system</b>		Please tick the checkbox if there is an on-farm breeding system (i.e., suckler cows). This cell will unhide the variables required to assess the on-farm breeding system. It can be combined with the two other systems.	

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Fattening system (Male or heifer &gt; 2 years old)</b>		Please tick the checkbox if there is an on-farm long fattening system. The long fattening system refers to the production of bulls (generally castrated) or heifers that are more than 2 years old when ready to be slaughtered for meat production. This cell will unhide the variables required to assess the on-farm long fattening system. It can be combined with the two other systems. This system can include animals of dairy breeds.	
Herd data	Breeding herd inventory	<b>Bought calves for fattening</b>		Number of bought calves for fattening. Average weight of bought calves for fattening (including the on-farm born ones).	Count (nb)/Average weight (kg/head)
		<b>Calves born for fattening</b>		Number of calves for fattening born to a suckler cow on farm.	
		<b>Calves for fattening sold before slaughter house</b>		Number of sales of calves for fattening before being sent to the slaughterhouse (including stillborn calves).	Count (nb)
		<b>Fattened calves going to slaughter house</b>		Number of fattened calves that are slaughtered. Average weight of fattened calves when they are sold to the slaughterhouse.	Count (nb) /Average weight (kg/head)
		<b>Calves for fattening deaths before slaughter house</b>		Number of deaths of calves for fattening before being sent to the slaughterhouse (including stillborn calves).	Count (nb)
		<b>Heifers &lt; 1 year old born on farm (including calves born on farm for restocking)</b>		Number of heifers that are less than 1 year old (including calves born on farm for restocking). Average weight of heifers (including bought ones) that are less than 1 year old.	Count (nb) /Average weight (kg/head)
		<b>Bought heifers &lt; 1 year old</b>		Number of bought heifers that are less than 1 year old.	
		<b>Heifers &lt; 1 year old sold</b>		Number of sales of heifers under 1 year of age.	Count (nb)
		<b>Heifer &lt; 1 year old deaths</b>		Number of deaths of heifers under 1 year of age.	Count (nb)
		<b>Heifers which turn 1 year old and are kept on farm</b>		Number of heifers which turn 1 year old and are kept on farm. Average weight of heifers (including bought ones) that are between 1 and 2 years old.	Count (nb)/Average



Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Bought heifers 1-2 years old</b>		Number of bought heifers that are between 1 and 2 years old.	weight (kg/head)
		<b>Heifers 1-2 years old sold</b>		Number of sales of heifers between 1 and 2 years old.	Count (nb)
		<b>Heifer 1-2 years old deaths</b>		Number of deaths of heifers between 1 and 2 years old.	Count (nb)
		<b>Heifers which turn 2 years old and are kept on farm</b>		Number of heifers which turn 2 years old and are kept on farm. Average weight of heifers (including bought ones) that are 2 years old.	Count (nb) /Average weight (kg/head)
		<b>Bought heifers &gt; 2 years old</b>		Number of bought heifers that are more than 2 years old.	
		<b>Heifers &gt; 2 years old sold</b>		Number of heifers more than 2 years old that have been sales.	Count (nb)
		<b>Heifers &gt; 2 years old deaths</b>		Number of deaths of heifers more than 2 years old.	Count (nb)
		<b>Heifers which calve for the first time and are kept on farm for breeding (suckler cow)</b>		Number of calving heifers joining the breeding herd. Average weight of suckler cows after calving (including bought ones).	Count (nb)/Average weight (kg/head)
		<b>Bought suckler cows</b>		Number of bought suckler cows.	
		<b>Suckler cows sold</b>		Number of suckler cow sales.	Count (nb)
		<b>Suckler cow deaths</b>		Number of suckler cow deaths.	Count (nb)
		<b>Suckler cows which do not calve anymore and are kept on farm (cull cows)</b>		Number of suckler cows which do not calve anymore and are kept on farm (turn into the cull cow category). Average weight of cull cows (including bought ones).	Count (nb)/Average weight (kg/head)
		<b>Bought cull cows</b>		Number of bought cull cows.	
		<b>Cull cows sold before slaughter house</b>		Number of cull cow sales before going to the slaughterhouse.	Count (nb)
		<b>Cull cows going to slaughter house</b>		Number of cull cows going to the slaughterhouse. Average weight of cull cows going to the slaughterhouse.	Count (nb)/Average

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
					weight (kg/head)
		<b>Cull cow deaths before slaughter house</b>		Number of cull cow deaths before going to the slaughterhouse.	Count (nb)
		<b>Breeding bulls born on farm</b>		Number of breeding bulls born on farm. Average weight of breeding bulls (including bought ones).	Count (nb)/Average weight (kg/head)
		<b>Bought breeding bulls</b>		Number of bought breeding bulls.	
		<b>Breeding bulls sold</b>		Number of breeding bull sales before going to the slaughterhouse.	Count (nb)
		<b>Breeding bulls going to slaughter house</b>		Number of breeding bulls going to the slaughterhouse. Average weight of breeding bulls going to the slaughterhouse.	Count (nb)/Average weight (kg/head)
		<b>Breeding bull deaths before slaughter house</b>		Number of breeding bull deaths before going to the slaughterhouse.	Count (nb)
	Breeding herd INTRA-SYSTEM	<b>Average time spent on farm for calves for fattening (if slaughtered as calves)</b>		Average time spent on farm for calves for fattening if slaughtered as calves.	days
		<b>Average time spent on farm for cull cows, whether present on farm before 2020 or bought in 2020</b>		Average time spent on farm for cull cows, whether present on farm before 2020 or bought.	days
		<b>Average time spent on farm for breeding bulls, whether present on farm before 2020 or bought in 2020</b>		Average time spent on farm for breeding bulls, whether present on farm before 2020 or bought.	days
		<b>Average weaning weights of calves for fattening (kg/head)</b>		Average weaning weight of calves for fattening.	kg/head
		<b>Average weaning weight of calves to restock cow herd (kg/head)</b>		Average weaning weight of calves to restock cow herd.	kg/head

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Suckler cows</b>		Number of suckler cows (including bought ones).	Count (nb)
		<b>Breeding bulls</b>		Number of breeding bulls (including bought ones).	Count (nb)
		<b>% of time in the year spent indoors for suckler cows</b>		% of time in the year spent indoors for suckler cows. The indoor period includes every activity in barn.	%
		<b>% of time in the year spent outdoors for suckler cows</b>		% of time in the year spent outdoors for suckler cows. The outdoor period includes everything outside of an infrastructure.	%
	Fattening system herd inventory	<b>Bought calves between 8 days and 1 year old / Calves transferred from dairy enterprise</b>		Number of bought dairy calves that are about 8 days for fattening, or number of transfers from dairy enterprise. Average weight of calves that are between 8 days and 1 year old for fattening.	Count (nb)/Weight (kg/head)
		<b>Calves sold between 8 days and 1 year old</b>		Number of sales of calves that are less than 1 year old.	Count (nb)
		<b>Calf deaths between 8 days and 1 year old</b>		Number of deaths of calves that are less than 1 year old.	Count (nb)
		<b>Calves that turn 1 year old and are kept on farm</b>		Number of males or heifers which turn 1 year old and are kept on farm. Average weight of males or heifers that are between 1 and 2 years old (including bought ones).	Count (nb)/Weight (kg/head)
		<b>Bought males or heifers 1-2 years old</b>		Number of bought males of heifers that are between 1 and 2 years old.	
		<b>Males or heifers 1-2 years old sold or slaughtered</b>		Number of sales of males or heifers that are between 1 and 2 years old.	Count (nb)
		<b>Male or heifer 1-2 years old deaths</b>		Number of deaths of males or heifers that are between 1 and 2 years old.	Count (nb)
		<b>Males or heifers which turn 2 years old and are kept on farm</b>		Number of males or heifers which turn 2 years old and are kept on farm. Average weight of males or heifers that are more than 2 years old (including bought ones).	Count (nb)/Weight (kg/head)
		<b>Bought males or heifers &gt; 2 years old</b>		Number of bought males of heifers that are more than 2 years old.	

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
		<b>Males or heifers &gt; 2 years old sold</b>		Number of sales of males or heifers that are more than 2 years old before going to slaughterhouse.	Count (nb)
		<b>Male or heifer &gt; 2 years old deaths</b>		Number of deaths of males or heifers that are more than 2 years old before going to slaughterhouse.	Count (nb)
		<b>Males or heifers going to slaughter house</b>		Number of males or heifers that are more than 2 years old going to slaughterhouse. Average weight of males or heifers that are more than 2 years old going to slaughterhouse.	Count (nb)/Weight (kg/head)
	Long fattening system – Herd INTRA-SYSTEM	<b>Average age at slaughter</b>		Average age at slaughter if animals kept until slaughtering.	Months
		<b>Average weaning weight of calves for fattening</b>		Average weaning weight of calves for fattening.	kg/animal
<b>Product</b>	Breeding system - Milk production	<b>Total raw milk production of suckler cows</b>		Total raw milk production of suckler cows.	L
<b>Diet</b>	Herd diet	<b>Diet name (input name)</b>	X	Please give a name to the diet (for convenience purposes).	
		<b>Date of diet beginning</b>	X	Please enter the starting date of the diet. for the relevant herd category.	dd/mm
		<b>Date of diet ending</b>	X	Please enter the ending date of the diet. for the relevant herd category.	dd/mm
		<b>Time spent in building</b>	X	Please enter an estimation of time spent in building for the specific diet through 2020 for the relevant animal categories. For instance, if the animal category spends only 4 weeks indoors on a 8 weeks diet period, you have to input 50% (4/8*100).  Please exclude feeding time spent in the milking parlour.	%
		<b>Diet-relevant herd category</b>	X	Please select the diet-relevant herd category among the list. One diet is attributed to one herd category.	<a href="#"><i>Please select in the list</i></a>
		<b>Average daily milk production</b>	X	Average daily milk production per suckler cow during the diet period. If the data is not available, please input the yearly average.	kg/(day * suckler cow)

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
				Leave the cell empty if the diet-relevant herd category is not “suckler cow”.	
		<b>Forage type 1</b>	<b>X</b>	Please select the forage type among the list of the corresponding diets.	<i>Please select in the list</i>
		<b>% of originated from on-farm production</b>	<b>X</b>	Please enter the % of corresponding forage coming from on-farm production. 0 means that all the corresponding forage comes from off-farm production and 100 means that all the corresponding forage is produced on the studied farm.	%
		<b>Mass</b>	<b>X</b>	Please enter the amount of forage for the corresponding diet.	kg DM/day
		<b>Concentrate feed name</b>	<b>X</b>	Please enter the concentrate feed name for the corresponding diet. The composition of the concentrate feed name has to be described in the feed description table. Hence, this variable has to be jointly filled out with the feed description section.	
		<b>Concentrate feed mass (Kg FM/day)</b>	<b>X</b>	Please enter the amount of concentrate feed for the corresponding diet.	kg FM/day
	Feed description	<b>Concentrate feed name</b>	<b>X</b>	Please enter the concentrate feed name corresponding to the description table. Please ensure that you input the exact SAME name as the one used in the herd diet section.	
		<b>Raw material</b>	<b>X</b>	This refers to the raw materials included in the corresponding concentrate feed. Please select raw materials available in the list.	<i>Please select in the list</i>
		<b>Amount</b>	<b>X</b>	% of the corresponding raw material included in the concentrate feed.	%
		<b>Origin of the raw material (country)</b>	<b>X</b>	This refers to the production of the corresponding raw material. Please input the country origin. If the data is not available, assumptions will be made based on reference values from databases.	
		<b>Protein content (amount)</b>	<b>X</b>	Protein content in the corresponding concentrate feed.	%
		<b>Fat content (amount)</b>	<b>X</b>	Fat content in the corresponding concentrate feed.	%
		<b>DM content (amount)</b>	<b>X</b>	Dry matter content in the corresponding concentrate feed.	%
		<b>Photo</b>	<b>X</b>	Please enter a picture of the corresponding concentrate feed TAG.	

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
Housing information	General information	<b>“Herd category” raised 100% outdoors (Yes/No)</b>		If the corresponding herd category is raised outdoors during all the period, input “Yes” otherwise input “No”. If “Yes” is selected, no housing information is necessary for the corresponding herd category.	Yes/No
	Housing	<b>Type of housing</b>	X	Refers to the livestock building for the corresponding herd category in 2020 year. Please select one type from the list.	<a href="#"><i>Please select in the list</i></a>
		<b>Building capacity</b>	X	Refers to the number of place there is for the corresponding herd category in 2020 year.	Nb of heads
		<b>Type of ventilation system</b>	X	Please select one type of ventilation system that is installed in the corresponding type of livestock building.	<a href="#"><i>Please select in the list</i></a>
		<b>Type of air treatment system</b>	X	Please select one type of air treatment system for the corresponding type of livestock building.	<a href="#"><i>Please select in the list</i></a>
		<b>Water-saving system (Yes/No)</b>	X	Select “yes” if there is any kind of water-saving system in the corresponding livestock building.	Yes/No
Manure	General information	<b>“Herd category” raised 100% outdoors (Yes/No)</b>	X	If the corresponding herd category is raised outdoors during all the period, input “Yes” otherwise input “No”. If “Yes” is selected, no manure management information is necessary for the corresponding herd category.	Yes/No
	Effluent	<b>Type of manure</b>	X	Select a type of manure from the list for the corresponding herd category.	<a href="#"><i>Please select in the list</i></a>
		<b>Type of litter</b>	X	Type of litter used by the corresponding herd category. If the manure is managed as a liquid, it is not necessary to fill out this variable.	<a href="#"><i>Please select in the list</i></a>
		<b>Amount of litter</b>	X	Amount of litter used by the corresponding herd category.	t/year
		<b>Evacuation frequency in the year (from the building to a storage)</b>	X	Annual frequency of evacuation for the corresponding type of manure. It is whether evacuated to an effluent storage or directly spread on crops.	
		<b>Daily evacuation</b>	X	Select “Yes” if the corresponding type of manure is daily evacuated from the livestock building to an outdoor use.	Yes/No

## Template part IV: Economic data

Table 5: Farm-level variables used in the economic assessment

Worksheet	Sub-category	Variable	X if repeated	Description	Unit
General data	General information	<b>Name of the interviewer</b>		Name of the data recorder of this file.	
		<b>Name of the institution</b>		Name of the institution to which the interviewer belongs.	
		<b>Email address</b>		Email address of the interviewer.	
		<b>Tel</b>		Telephone number of the interviewer with the country code.	
		<b>Date</b>		Date of the data collection.	dd/mm/yy
		<b>N° of the scenario</b>		In our assessment, a scenario includes all processes within the farm gate, such as the production of farm products (including feed and crop production), biodiversity preservation, and effluent management. Please consult the Milkey handbook (i.e., indicator calculation) and the template “part I” for the system boundaries and the details of the assessment.  Given that all case studies have a unique scenario, the scenario numbers will follow the case study collection order (case study 1 = scenario 1) for each partner. The data recorder has to fill out with a number between 1 and the maximum number of partner’s farms.	
		<b>Country</b>		Country of the case study farm. Country code to input:  Fr = France, De = Germany, Gr = Greece, No = Norway, Po = Poland, Ir = Ireland.	
		<b>Farm ID for naming the file</b>		Farm ID generated with the date of the interview, the N° of the scenario, and the country code. The file has to be renamed with the code "Farm ID" followed by "Part n", n being the number of the template part.	

Worksheet	Sub-category	Variable	Repeatedly (X if true)	Description	Unit
Labour <sup>1</sup>	List of workers: Age	<b>Farm holder/manager</b>		Please select the age category of the farm holder or manager.	<a href="#"><i>Please select in the list</i></a>
		<b>Spouse of the farm holder</b>		Please select the age category of the spouse of the farm holder.	<a href="#"><i>Please select the list</i></a>
		<b>Other regular</b>	X	Please select the age category of another unpaid family member who works at least one day per week (e.g., son or daughter of the farm holder). This variable can be filled out as many times as necessary to fit all unpaid family labour.	<a href="#"><i>Please select the list</i></a>
		<b>Other casual</b>	X	Please select the age category of another unpaid family members who works less than a day per week (e.g., son or daughter of the farm holder). This variable can be filled out as many times as necessary to fit all unpaid family labour.	<a href="#"><i>Please select the list</i></a>
		<b>Farm manager</b>		Please select the age category of the farm manager if he/she is a wage earner and works at least one day per week.	<a href="#"><i>Please select the list</i></a>
		<b>Regular employee</b>	X	Please select the age category of another regular employee who works at least one day per week. This variable can be filled out as many times as necessary to fit all paid labour.	<a href="#"><i>Please select the list</i></a>
		<b>Casual employee</b>	X	Please select the age category of a casual employee who works less than a day per week. This variable can be filled out as many times as necessary to fit all paid labour.	<a href="#"><i>Please select the list</i></a>
		<b>Farm holder/manager</b>		Yearly hours worked by the farm holder or manager.	Hours
		<b>Spouse of the farm holder</b>		Yearly hours worked by the spouse of the farm holder.	Hours

<sup>1</sup> More information is provided page 66 (entitled “Additional information for the labour worksheet (Part IV)”) to explain which tasks are taken into account when recording labour inputs, as well as the differences between unpaid and paid labour.



Worksheet	Sub-category	Variable	Repeatedly (X if true)	Description	Unit
	List of workers: Annual work on the holding	<b>Other regular</b>	X	Yearly hours worked by another unpaid family member who works at least one day per week (e.g., son or daughter of the farm holder).  This variable can be filled out as many times as necessary to fit all unpaid family labour.	Hours
		<b>Other casual</b>	X	Yearly hours worked by another unpaid family members who works less than a day per week (e.g., son or daughter of the farm holder).  This variable can be filled out as many times as necessary to fit all unpaid family labour.	Hours
		<b>Farm manager</b>		Yearly hours worked by the farm manager if he/she is a wage earner and works at least one day per week.	Hours
		<b>Regular employee</b>	X	Yearly hours worked by another regular employee who works at least one day per week.  This variable can be filled out as many times as necessary to fit all paid labour.	Hours
		<b>Casual employee</b>	X	Yearly hours worked by a casual employee who works less than a day per week.  This variable can be filled out as many times as necessary to fit all paid labour.	Hours
<b>Assets &amp; Liabilities</b>	Farm assets: Total investment value / Purchases	<b>Land purchases</b>		Expenditure on land purchases. Please indicate the amount of money paid up front in the year 2020.  Please note that the level of farm debt at the end of 2020 is recorded in the closing valuation of liabilities (in the current worksheet) and loan repayments in 2020 are recorded in the worksheet "Costs".	Local currency
		<b>Improvements on owned and rented land</b>		Expenditure on 'large' investments into land improvements (e.g., fencing, drainage, fixed irrigation system, water troughs at pasture), the building of farm buildings, and the planting of permanent crops or commercial forest. This variable only takes into account money paid up front in the year 2020 and reflects 'large' investments that will <u>substantially</u> increase the value of the agricultural land and farm buildings.  Please note that costs associated with the current upkeep of land improvements or farm buildings (that do not substantially increase their value) are not included	Local currency

Worksheet	Sub-category	Variable	Repeatedly (X if true)	Description	Unit
				in this variable and will be recorded in the worksheet “Costs” in the variable “Current upkeep of land improvements and buildings”. For example, the costs associated with installing a new irrigation system will be considered a ‘large’ investment category (i.e., worksheet “Assets & Liabilities”), while the costs associated with repairing a small dysfunction on the current irrigation system will be considered in the current upkeep category (i.e., worksheet “Costs”).	
		<b>Machinery and equipment</b>		Expenditure on ‘large’ investments into and purchases of machinery (e.g., tractors) and equipment (e.g., new milking machine). This variable takes into account the amount of money paid up front in the year 2020.  Please note that the level of farm debt at the end of 2020 is recorded in the closing valuation of liabilities (in the current worksheet) and loan repayments in 2020 are recorded in the worksheet “Costs”.	Local currency
	Farm assets: Investment subsidies	<b>Land purchases</b>		Investment subsidies (i.e., capital grants) related to land purchases, received during the year 2020.	Local currency
		<b>Improvements on owned and rented land</b>		Investment subsidies (i.e., capital grants) related to land improvements (other than land purchases), received during the year 2020.	Local currency
		<b>Machinery and equipment</b>		Investment subsidies (i.e., capital grants) related to machinery and equipment, received during the year 2020.	Local currency
	Farm assets: Sales	<b>Inventories</b>		Earnings from sales of the farm inventories. The inventories are carried out on stocks of products owned by the holding that can be either used as inputs or sold (e.g., concentrate feed, fertilisers, veterinary supplies, crop protection products). Please note that the stocks of livestock and crop products are not included in this variable.	Local currency
		<b>Owned agricultural land</b>		Earnings from sales of agricultural land.	Local currency
		<b>Machinery and equipment</b>		Earnings from sales of machinery and equipment.	Local currency
		<b>Debt – commercial loans</b>		Value of debt from commercial loans left to pay at the end of the accounting year (December 2020).	Local currency

Worksheet	Sub-category	Variable	Repeatedly (X if true)	Description	Unit
	Liabilities: Closing valuation	<b>Debt – family/private loans</b>		Value of debt from family/private loans left to pay at the end of the accounting year (December 2020).  Family/private loans refer to loans concluded with a physical person thanks to their family/private relationships with the farm holder.	Local currency
		<b>Payables</b>		Amount of money left to pay to suppliers of goods and services at the end of the accounting year (December 2020).	Local currency
Costs	Expenditure	<b>Wages and social security costs</b>		Expenditure on wages and social security charges for paid labour, including a monetary estimation of payments in kind (e.g., lodging, board, housing, farm produce).  Please note that expenditure on contract work is not included in this variable. It is recorded in the variable “Contract work and machinery hire”.	Local currency
		<b>Rent paid</b>		Amount of money spent on renting agricultural land.	Local currency
		<b>Loan repayments</b>		Amount of money spent on repaying loans, including both principal and interests.	Local currency
		<b>Purchased feedstuffs</b>		Expenditure on purchased feedstuffs for animals, including notably concentrated feed and forage, mineral licks, milk replacer, purchased litter and straw, agistments and expenditure on the use of common pastures, products for the preservation and storage of feedstuffs.	Local currency
		<b>Veterinary and reproduction expenses</b>		Veterinary and reproduction expenses, e.g., veterinary fees, expenditure on medicines, stud fees, and expenditure on artificial insemination.	Local currency
		<b>Other direct production costs for livestock</b>		Other costs specifically associated with livestock production, e.g., milk tests; gloves for milking; detergents for cleaning milking machines; subscription and registration in herd-book; cost of on-farm storage, market preparation, and processing of livestock products (e.g., cow milk, sheep milk, meat); cost of disposal of excess manure; expenditure on contract rearing.	Local currency
		<b>Seeds and seedlings</b>		Expenditure on seeds and seedlings.	Local currency

Worksheet	Sub-category	Variable	Repeatedly (X if true)	Description	Unit
		<b>Fertilisers and soil improvers</b>		Expenditure on fertilisers and soil improvers, e.g., mineral fertilisers, lime, compost, peat and manure.	Local currency
		<b>Crop protection products</b>		Expenditure on crop protection products, e.g., insecticides, fungicides, herbicides, poisoned baits, bird scarers, anti-hail shells, netting, frost protection.	Local currency
		<b>Other direct production costs for crops</b>		Other costs specifically associated with crop production, e.g., soil analysis; packing and binding materials; string and rope; plastic coverings for silage; costs of on-farm storage, market preparation, and processing of cash crops.  This variable does not include forestry-specific costs.	Local currency
		<b>Direct production costs for forestry and wood processing</b>		Costs specifically associated with commercial forestry and wood processing, e.g., costs of forest plants and planting; fertilisers; protective materials; and miscellaneous costs specific for forestry and wood processing.	Local currency
		<b>Direct production costs for the production of renewable energy</b>		Costs specifically associated with the production of renewable energy, e.g., investments into the biogas plant; and other costs associated with the functioning of the biogas plant, including purchase of energy crops.	Local currency
		<b>Current upkeep of land improvements and buildings</b>		Costs associated with the current upkeep of land improvements and buildings, i.e., maintenance of buildings and land improvements (e.g., repairing a fence).  Please note that this variable does not include ‘large’ investment costs, which will substantially increase the land or building value. These are recorded in the worksheet “Assets & Liabilities” in the variable “ <b>Erreur ! Source du renvoi introuvable.</b> ”. For example, the costs associated with installing a new irrigation system will be considered a ‘large’ investment category (i.e., worksheet “Assets & Liabilities”), while the costs associated with repairing a small dysfunction on the current irrigation system will be considered in the current upkeep category (i.e., worksheet “Costs”).	Local currency
		<b>Current upkeep of machinery and equipment</b>		Costs associated with the current upkeep of machinery and equipment, e.g., repairs in the milking parlour, change of tyres, machinery, and car expenses other than fuel.	Local currency

Worksheet	Sub-category	Variable	Repeatedly (X if true)	Description	Unit
				Please note that this variable does not include ‘large’ investment costs associated with new machinery or equipment. These are recorded in the worksheet “Assets & Liabilities” in the variable “ <b>Erreur ! Source du renvoi introuvable.</b> ”.	
		<b>Electricity</b>		Expenditure on electricity.	Local currency
		<b>Heating fuels</b>		Expenditure on heating fuels. When the same fuel is used as motor and heating fuels, please ensure that the value is recorded only once to avoid double counting, in either one of the variables.	Local currency
		<b>Motor fuels and lubricants</b>		Expenditure on motor fuels and lubricants. When the same fuel is used as motor and heating fuels, please ensure that the value is recorded only once to avoid double counting, in either one of the variables.	Local currency
		<b>Water</b>		Expenditure on water.	Local currency
		<b>Farm insurance</b>		Expenditure on farm insurance, e.g., insurance against death of livestock and damage to crops; third-party liability; insurance against fire and flood damage; insurance for accidents at work; and insurance for buildings and machinery.	Local currency
		<b>Farm taxes</b>		Farm taxes, excluding the farm holder’s personal taxes.	Local currency
		<b>Contract work and machinery hire</b>		Expenditure on contract work and machinery hire.	Local currency
		<b>Other farming overheads</b>		Other overhead costs, e.g., accountants’ fees; secretarial services and office expenses; telephone charges; software subscriptions; and miscellaneous contributions and subscriptions.	Local currency
<b>Crops</b>	Crop product types: Sales	<b>Arable crops</b>		Earnings from sales of arable crop products. This variable excludes fruit and vegetables.	Local currency

Worksheet	Sub-category	Variable	Repeatedly (X if true)	Description	Unit
		<b>Fruits and vegetables</b>		Earnings from sales of fruits and vegetables.	Local currency
		<b>Forage crops</b>		Earnings from sales of forage.	Local currency
		<b>Crop by-products</b>		Earnings from sales of crop by-products.	Local currency
	Crop product types: Farm use	<b>Arable crops</b>		Estimated value of arable crop products used on the farm (e.g., for animal feeding, for biogas production). The value is estimated by the farmer based on farm-gate prices. This variable excludes fruit and vegetables.	Local currency
		<b>Fruits and vegetables</b>		Estimated value of fruits and vegetables used on the farm (e.g., for animal feeding). The value is estimated by the farmer based on farm-gate prices. This variable does not include fruits and vegetables consumed by the farmer and his/her family.	Local currency
		<b>Forage crops</b>		Estimated value of forage used on the farm (e.g., for animal feeding and bedding). The value is estimated by the farmer based on farm-gate prices.	Local currency
		<b>Crop by-products</b>		Estimated value of crop by-products used on the farm (e.g., for animal feeding)	Local currency
	Crop product types: Expected value of rental if land were rented out	<b>Grazed pasture</b>		Expected value of rental if the farmer were to lease out all grazed pastures. The value is estimated in a conservative manner by the farmer based on agricultural land leasing market.	Local currency

Worksheet	Sub-category	Variable	Repeatedly (X if true)	Description	Unit
Livestock production	Animal types: Purchases	Calves of beef dam		Expenditure on purchases of calves born out of a suckler cow.	Local currency
		Calves of dairy dam		Expenditure on purchases of calves born out of a dairy cow.	Local currency
		Dairy replacement heifers 1-2 years old		Expenditure on purchases of dairy replacement heifers between 1 and 2 years of age.	Local currency
		Beef replacement heifers 1-2 years old		Expenditure on purchases of beef replacement heifers between 1 and 2 years of age.	Local currency
		Bovine animals for fattening 1-2 years old		Expenditure on purchases of bovine animals between 1 and 2 years of age, meant for fattening.	Local currency
		Bovine animals for fattening > 2 years old		Expenditure on purchases of bovine animals above 2 years of age, meant for fattening.	Local currency
		Breeding beef heifers > 2 years old		Expenditure on purchases of breeding beef heifers above 2 years of age (i.e., first-time calvers in 2020 or replacements of the suckler herd for the year 2021)	Local currency
		Breeding dairy heifers > 2 years old		Expenditure on purchases of breeding dairy heifers above 2 years of age (i.e., first-time calvers in 2020 or replacements of the dairy herd for the year 2021)	Local currency
		Dairy cows		Expenditure on purchases of dairy cows.	Local currency
		Suckler cows		Expenditure on purchases of suckler cows.	Local currency
		Breeding bulls (dairy enterprise)		Expenditure on purchases of breeding bulls used by the dairy enterprise.  If the same bulls are used by both dairy and beef enterprises, please account for them only for the dairy enterprise.	Local currency
		Breeding bulls (beef enterprise)		Expenditure on purchases of breeding bulls used by the beef enterprise.  If the same bulls are used by both dairy and beef enterprises, please account for them only for the dairy enterprise.	Local currency

Worksheet	Sub-category	Variable	Repeatedly (X if true)	Description	Unit
	Animal types: Sales	<b>Calves of beef dam</b>		Earnings from sales of calves born out of a suckler cow.	Local currency
		<b>Calves of dairy dam</b>		Earnings from sales of calves born out of a dairy cow.	Local currency
		<b>Dairy replacement heifers 1-2 years old</b>		Earnings from sales of dairy replacement heifers that are between 1 and 2 years old, irrespective of whether they are sold to another farm or the slaughterhouse.	Local currency
		<b>Beef replacement heifers 1-2 years old</b>		Earnings from sales of beef replacement heifers that are between 1 and 2 years old, irrespective of whether they are sold to another farm or the slaughterhouse.	Local currency
		<b>Bovine animals for fattening 1-2 years old</b>		Earnings from sales of bovine animals that are between 1 and 2 years old, meant for fattening, irrespective of whether they are sold to another farm or the slaughterhouse.	Local currency
		<b>Bovine animals for fattening &gt; 2 years old</b>		Earnings from sales of bovine animals above 2 years of age, meant for fattening, irrespective of whether they are sold to another farm or the slaughterhouse.	Local currency
		<b>Breeding beef heifers &gt; 2 years old</b>		Earnings from sales of breeding beef heifers, irrespective of whether they are sold to another farm or the slaughterhouse.	Local currency
		<b>Breeding dairy heifers &gt; 2 years old</b>		Earnings from sales of breeding dairy heifers irrespective of whether they are sold to another farm or the slaughterhouse.	Local currency
		<b>Dairy cows</b>		Earnings from sales of dairy cows, irrespective of whether they are sold to another farm or the slaughterhouse as cull cows.	Local currency
		<b>Suckler cows</b>		Earnings from sales of suckler cows, irrespective of whether they are sold to another farm or the slaughterhouse as cull cows.	Local currency
		<b>Breeding bulls (dairy enterprise)</b>		Earnings from sales of breeding bulls used by the dairy enterprise, irrespective of whether they are sold to another farm or culled.  If the same bulls are used by both dairy and beef enterprises, please account for them only for the dairy enterprise.	Local currency
		<b>Breeding bulls (beef enterprise)</b>		Earnings from sales of breeding bulls used by the beef enterprise, irrespective of whether they are sold to another farm or culled.	Local currency



Worksheet	Sub-category	Variable	Repeatedly (X if true)	Description	Unit
				If the same bulls are used by both dairy and beef enterprises, please account for them only for the dairy enterprise.	
Animal products & services	Types of animal products and services: Sales / receipts	<b>Milk and milk products – dairy cows</b>		Earnings from sales of milk and milk products from dairy cows.	Local currency
		<b>Manure</b>		Earnings from sales of farm-produced manure.	Local currency
		<b>Contract rearing</b>		Earnings from contract rearing.	Local currency
	Types of animal products and services: Farm use	<b>Milk and milk products – dairy cows</b>		Estimated value of milk and milk products from dairy cows used on the farm (e.g., for animal feeding, agri-tourism). The value is estimated by the farmer based on farm-gate prices. This variable does not include milk and milk products consumed by the farmer and his/her family.	Local currency
		<b>Manure</b>		Estimated value of farm-produced manure used on the farm for fertilisation. The value is estimated by the farmer based on farm-gate prices.	Local currency
Other gainful activities	Gainful activities: Sales / receipts	<b>Forestry and wood processing</b>		Earnings from sales of harvested and/or processed wood (e.g., timber, Christmas trees).	Local currency
		<b>Production of renewable energy</b>		Earnings from sales of renewable energy (e.g., production from biogas plant).	Local currency
		<b>Receipt from renting out agricultural land</b>		Earnings from renting out agricultural land to another farm.	Local currency
		<b>Receipt from hiring out machinery (without labour)</b>		Earnings from hiring out machinery to another farm. This variable does not account for labour, as this information is recorded as earnings from contractual work.	Local currency
		<b>Contractual work</b>		Earnings from contractual work for another farm.	Local currency

Worksheet	Sub-category	Variable	Repeatedly (X if true)	Description	Unit
		<b>Other gainful activities directly related to the farm</b>		Earnings from other gainful activities directly related to the farm (e.g., agri-tourism).	Local currency
	Gainful activities: Farm use	<b>Forestry and wood processing</b>		Estimated value of harvested and/or processed wood used on the farm.  The value is estimated by the farmer based on farm-gate prices.  This variable does not include harvested and/or processed wood used by the farmer and his/her family.	Local currency
		<b>Production of renewable energy</b>		Estimated value of farm-produced renewable energy used on the farm (e.g., from biogas plant).  The value is estimated by the farmer based on farm-gate prices.  This variable does not include farm-produced renewable energy used in the farmhouse by the farmer and his/her family.	Local currency
Subsidies		Breakdown of subsidies: Total received	<b>Coupled direct payments for crops and livestock</b>		Amount of coupled direct payments for crops and livestock received by the farm during the accounting year.
	<b>Total support for rural development</b>			Total support for rural development received by the farm during the accounting year (e.g., payments for participation in agri-environmental scheme).	Local currency
	<b>Subsidies on other inputs</b>			Amount of direct subsidies for any other farm inputs (e.g., fertilisers, wages, feed, fuels, electricity). This variable includes only subsidies given directly to the farm holding, with an actual payment of funds (as opposed to indirect subsidies such as tax relief).  Please do not include investment subsidies (i.e., capital grants) as they are recorded in the worksheet “Assets & Liabilities” in the sub-category “Farm assets: Investment subsidies”.	Local currency
	<b>Decoupled direct payments</b>			Amount of decoupled payments received by the farm during the accounting year (e.g., Basic Payment Scheme).	Local currency

## Inputs description for pre-entered variable list (template parts I, II and III)

Template	Worksheet	Variable	Page	Option list
Template part I: General Farm Information and Crop production	General data	Type of production	<a href="#">4</a>	<i>Conventional</i> <i>Organic</i> <i>Red label</i>
	Manure	Type of management	<a href="#">4</a>	<i>Field storage</i> <i>Forced air drying</i> <i>Manure pit with cover</i> <i>Manure pit without cover</i> <i>Slurry pit with cover and crust</i> <i>Slurry pit with cover and without crust</i> <i>Slurry pit with hard and soft cover</i> <i>Slurry pit with natural crust, straw, plastic ball, other</i> <i>Slurry pit with soft cover</i> <i>Slurry pit without cover and crust</i> <i>Slurry pit without cover and filled by the bottom</i> <i>Slurry pit without cover and with crust</i> <i>Other (add details in comments)</i>
		Type of manure n by selected management	<a href="#">4</a>	<i>Bovine manure, from deep litter house</i> <i>Bovine manure</i> <i>Bovine slurry</i> <i>Bovine slurry, diluted</i> <i>Bovine slurry, mixture</i> <i>Effluents, low concentration, mixture</i> <i>Goat manure</i> <i>Goat manure, from deep litter house</i> <i>Semi-solid bovine manure, from lying box house</i> <i>Sheep manure</i> <i>Sheep manure, from deep litter house</i>
	Infrastructure	Type of storage infrastructure	<a href="#">5</a>	<i>Slurry pit</i> <i>Feeding silo</i> <i>Silage silo</i> <i>Slurry treatment station</i> <i>Solid manure pit</i> <i>Storage shed, bare ground, mostly steel</i> <i>Storage shed, bare ground, mostly wood</i> <i>Storage shed, concrete floor, mostly steel</i>

Template	Worksheet	Variable	Page	Option list
				<i>Storage shed, concrete floor, mostly wood Other (add details in comments)</i>
	Water and energy consumption	Water source	<u>5</u>	<i>From distribution network From on-farm groundwater From rain</i>
		Type of energy used	<u>5</u>	<i>Diesel Electricity Gasoline Fuel oil Grease Natural gas Propane or/and butane gas</i>
		Source (for electricity and gas)	<u>5</u>	<i>From grid From renewable energy Other (add details in comments)</i>
	Arable crop	Average soil type	<u>6</u>	<i>Sand Sand loam Loam Clay loam Clay</i>
		Tillage method	<u>7</u>	<i>Bed preparation Harrowing, 3 m harrow Harrowing, with rotary harrow (4-m) Harrowing, with rotary harrow and roller Harrowing, with vibrating tine cultivator (standard equipment) 5 m Harrowing, with vibrating tine cultivator 3-m (0,33 h /ha) Harrowing, with vibrating tine cultivator 3-m (1 h /ha) Mounds preparation Ploughing, with 4-soc plough Ploughing, with 5 or 6 soc plough Ploughing, with 5-soc plough Preparation of soil for irrigation channel, with rotary hoe (special crops) Rolling, higher speed, with roller 9 m Rolling, lower speed, with roller 9 m Rolling, with roller 3 m Soil decompactation, with 16-tines chisel Soil decompactation, with 2.5 m chisel Soil decompactation, with 4.5 m chisel</i>

Template	Worksheet	Variable	Page	Option list
				<i>Soil decompaction, with subsoil plow 2 m (consumption 15 L/h)</i> <i>Soil decompaction, with subsoiler, 5-shank</i> <i>Soil maintenance, with cover crop 3 m</i> <i>Soil maintenance, with cover crop 4 m</i> <i>Soil preparation (dry soil), with disc harrow</i> <i>Soil preparation (moist soil), with disc harrow</i> <i>Soil preparation deep, bulldozer</i> <i>Soil preparation deep, subsoiler shanks</i> <i>Stubble ploughing, with stubble share 4 m</i> <i>Stubble ploughing, with stubble share 5.5 m</i> <i>Tillage, preparation of irrigation</i>
		Sowing method	<a href="#">7 / 8</a>	<i>Combined sowing, Horsch</i> <i>Combined sowing, mecanicha seed drill</i> <i>Combined sowing, mono-seed drill</i> <i>Direct sowing, disc seed drill</i> <i>Sowing, classic seed drill</i> <i>Sowing, mono-seed, pneumatic</i>
		Fertilizer type	<a href="#">8</a>	<i>Compound mineral fertilizer</i> <i>Organic fertilizer</i> <i>Straight nitrogen fertilizer</i> <i>Straight phosphate fertilizer</i> <i>Straight potassium fertilizer</i> <i>Other mineral fertilizer</i>
		Fertilizing method	<a href="#">8</a>	<i>Fertilizing, charging compost, with frontal bucket and 5 t spreader</i> <i>Fertilizing, charging solid manure, with frontal bucket and 5 t spreader</i> <i>Fertilizing, lime (charging and spreading), with frontal bucket and 5 t spreader</i> <i>Fertilizing, liquid nitrogen, with sprayer, 2500 L</i> <i>Fertilizing, slurry, with tanker with dribble bar</i> <i>Fertilizing, solid manure (charging and spreading), with 5 t spreader</i> <i>Fertilizing, solid manure (charging and spreading), with 8-10 t spreader</i> <i>Fertilizing, solid manure or compost (charging), with frontal bucket and 5 t spreader</i> <i>Fertilizing, solid manure or compost (spreading), with frontal bucket and 5 t spreader</i> <i>Fertilizing, spreading solid manure, with frontal bucket and 5 t spreader</i> <i>Fertilizing, with spreader, 1500 L</i> <i>Fertilizing, with spreader, 2500 L</i> <i>Fertilizing, with spreader, 500 L</i> <i>Liming before planting</i> <i>Manure spreading, before planting</i>

Template	Worksheet	Variable	Page	Option list
		Product type	<a href="#">8</a>	<i>Biocontrol</i> <i>Biostimulant</i> <i>Fungicide</i> <i>Growth regulator</i> <i>Herbicide</i> <i>Insecticide</i>
		Irrigation equipment	<a href="#">9</a>	<i>Dripping</i> <i>Pivot</i> <i>Reel</i> <i>Solid set</i>
		Harvest method	<a href="#">9</a>	<i>Baling, with round baler (harvest of 4 t DM)</i> <i>Crushing straw, with shredder or chipper</i> <i>Harvest with platform self-propelled (special crops)</i> <i>Harvesting Forage, with balling machine</i> <i>Harvesting silage grass, with hay chopper and blower</i> <i>Haying, with tedder</i> <i>Manual harvest</i> <i>Mowing, with mower-conditioner</i> <i>Mowing, with rotary mower 3 m</i> <i>Mowing, with rotary mower 7 m</i> <i>Straw distribution, before spreading</i> <i>Swath, with 9 m swather</i>
		Type of crop residues	<a href="#">9</a>	<i>Above ground</i> <i>Underground</i>
		Crop residue management	<a href="#">10</a>	<i>Mulch</i> <i>Soil incorporation</i>
	Meadow or alfalfa	Average soil type	<a href="#">10</a>	<i>Sand</i> <i>Sand loam</i> <i>Loam</i> <i>Clay loam</i> <i>Clay</i>
		Meadow type	<a href="#">10</a>	<i>Permanent</i> <i>Temporary</i>
		Primary purpose of meadow	<a href="#">11</a>	<i>Grazed grass</i> <i>Hay</i> <i>Silage</i> <i>Wrapping</i> <i>Other (add details in comments)</i>

Template	Worksheet	Variable	Page	Option list
		Tillage method	<a href="#">11</a>	<i>Bed preparation</i> <i>Harrowing, 3 m harrow</i> <i>Harrowing, with rotary harrow (4-m)</i> <i>Harrowing, with rotary harrow and roller</i> <i>Harrowing, with vibrating tine cultivator (standard equipment) 5 m</i> <i>Harrowing, with vibrating tine cultivator 3-m (0,33 h /ha)</i> <i>Harrowing, with vibrating tine cultivator 3-m (1 h /ha)</i> <i>Mounds preparation</i> <i>Ploughing, with 4-soc plough</i> <i>Ploughing, with 5 or 6 soc plough</i> <i>Ploughing, with 5-soc plough</i> <i>Preparation of soil for irrigation channel, with rotary hoe (special crops)</i> <i>Rolling, higher speed, with roller 9 m</i> <i>Rolling, lower speed, with roller 9 m</i> <i>Rolling, with roller 3 m</i> <i>Soil decompaction, with 16-tines chisel</i> <i>Soil decompaction, with 2.5 m chisel</i> <i>Soil decompaction, with 4.5 m chisel</i> <i>Soil decompaction, with subsoil plow 2 m (consumption 15 L/h)</i> <i>Soil decompaction, with subsoiler, 5-shank</i> <i>Soil maintenance, with cover crop 3 m</i> <i>Soil maintenance, with cover crop 4 m</i> <i>Soil preparation (dry soil), with disc harrow</i> <i>Soil preparation (moist soil), with disc harrow</i> <i>Soil preparation deep, bulldozer</i> <i>Soil preparation deep, subsoiler shanks</i> <i>Stubble ploughing, with stubble share 4 m</i> <i>Stubble ploughing, with stubble share 5.5 m</i> <i>Tillage, preparation of irrigation</i>
		Sowing method	<a href="#">11</a>	<i>Combined sowing, Horsch</i> <i>Combined sowing, mecanicha seed drill</i> <i>Combined sowing, mono-seed drill</i> <i>Direct sowing, disc seed drill</i> <i>Sowing, classic seed drill</i> <i>Sowing, mono-seed, pneumatic</i>
		Fertilizer type	<a href="#">12</a>	<i>Compound mineral fertilizer</i> <i>Organic fertilizer</i> <i>Straight nitrogen fertilizer</i> <i>Straight phosphate fertilizer</i>

Template	Worksheet	Variable	Page	Option list
				<i>Straight potassium fertilizer</i> <i>Other mineral fertilizer</i>
		Fertilizing method	<a href="#">12</a>	<i>Fertilizing, charging compost, with frontal bucket and 5 t spreader</i> <i>Fertilizing, charging solid manure, with frontal bucket and 5 t spreader</i> <i>Fertilizing, lime (charging and spreading), with frontal bucket and 5 t spreader</i> <i>Fertilizing, liquid nitrogen, with sprayer, 2500 L</i> <i>Fertilizing, slurry, with tanker with dribble bar</i> <i>Fertilizing, solid manure (charging and spreading), with 5 t spreader</i> <i>Fertilizing, solid manure (charging and spreading), with 8-10 t spreader</i> <i>Fertilizing, solid manure or compost (charging), with frontal bucket and 5 t spreader</i> <i>Fertilizing, solid manure or compost (spreading), with frontal bucket and 5 t spreader</i> <i>Fertilizing, spreading solid manure, with frontal bucket and 5 t spreader</i> <i>Fertilizing, with spreader, 1500 L</i> <i>Fertilizing, with spreader, 2500 L</i> <i>Fertilizing, with spreader, 500 L</i> <i>Liming before planting</i> <i>Manure spreading, before planting</i>
		Product type	<a href="#">12</a>	<i>Biocontrol</i> <i>Biostimulant</i> <i>Fungicide</i> <i>Growth regulator</i> <i>Herbicide</i> <i>Insecticide</i>
		Irrigation equipment	<a href="#">13</a>	<i>Dripping</i> <i>Pivot</i> <i>Reel</i> <i>Solid set</i>
		Harvest method	<a href="#">13</a>	<i>Baling, with round baler (harvest of 4 t DM)</i> <i>Crushing straw, with shredder or chipper</i> <i>Harvest with platform self-propelled (special crops)</i> <i>Harvesting Forage, with balling machine</i> <i>Harvesting silage grass, with hay chopper and blower</i> <i>Haying, with tedder</i> <i>Manual harvest</i> <i>Mowing, with mower-conditioner</i> <i>Mowing, with rotary mower 3 m</i> <i>Mowing, with rotary mower 7 m</i> <i>Straw distribution, before spreading</i>



Template	Worksheet	Variable	Page	Option list
				<i>Swath, with 9 m swather</i>
		Type of crop residues	<a href="#">13</a>	<i>Above ground Underground</i>
		Crop residue management	<a href="#">13</a>	<i>Mulch Soil incorporation</i>
		Other grazing animal type	<a href="#">13</a>	<i>Sheeps and goats Horses Piglet &lt; 20 kg Breeding sows &gt; 50 kg Other pigs Broilers Laying hens Ostriches Other poultry Rabbit</i>
	Biogas plant	Origin of input	<a href="#">14</a>	<i>Off-farm On-farm</i>
		Type of storage	<a href="#">14</a>	<i>Field storage Forced air drying Manure pit with cover Manure pit without cover Slurry pit with cover and crust Slurry pit with cover and without crust Slurry pit with hard and soft cover Slurry pit with natural crust, straw, plastic ball, other Slurry pit with soft cover Slurry pit without cover and crust Slurry pit without cover and filled by the bottom Slurry pit without cover and with crust Other (add details in comments)</i>
		Phase separator type	<a href="#">14</a>	<i>Centrifuge Compacting screw</i>
		Type of post-storage	<a href="#">15</a>	<i>Field storage Forced air drying Manure pit with cover Manure pit without cover Slurry pit with cover and crust Slurry pit with cover and without crust</i>

Template	Worksheet	Variable	Page	Option list	
				<i>Slurry pit with hard and soft cover</i> <i>Slurry pit with natural crust, straw, plastic ball, other</i> <i>Slurry pit with soft cover</i> <i>Slurry pit without cover and crust</i> <i>Slurry pit without cover and filled by the bottom</i> <i>Slurry pit without cover and with crust</i> <i>Other (add details in comments)</i>	
	Biodiversity	Organic fertilizer use	<a href="#">19</a>	<i>Regular (every year or every two years)</i> <i>Very occasional (every three years or more)</i>	
Template part II: Dairy Farm enterprise / Template part III: Beef enterprise	Diet	Diet-relevant herd category	<a href="#">24 / 34</a>	<u>Dairy enterprise:</u> <i>Born calves &lt; 8 days</i> <i>Calves &gt; 8 days</i> <i>Heifers &lt; 1 year old</i> <i>Heifers 1-2 years old</i> <i>Heifers &gt; 2 years old</i> <i>Dairy cows</i> <i>Cull cows</i>	<u>Beef enterprise:</u> <i>Calf for fattening (from breeding system)</i> <i>Heifer &lt; 1 year old (from breeding system)</i> <i>Heifer 1-2 years old (from breeding system)</i> <i>Heifer &gt; 2 years old (from breeding system)</i> <i>Suckler cow (from breeding system)</i> <i>Cull cow (from breeding system)</i> <i>Breeding bull (from breeding system)</i> <i>Calf 8 days to 1 year old (long fattening system)</i> <i>Male or heifer 1-2 years old (long fattening system)</i> <i>Male or heifer &gt; 2 years old (long fattening system)</i> <i>Bull 8 days to 1 year old (short fattening system)</i> <i>Bull &gt; 1 year old (short fattening system)</i>
		Forage type	<a href="#">24 / 35</a>	<i>Grass, wrapping, permanent meadow, with clover, lowland</i> <i>Alfalfa, fresh for dehydration, conventional</i> <i>Alfalfa, fresh, national average, conventional</i> <i>Alfalfa, hay, conventional (to precise the DM %)</i> <i>Alfalfa, hay, organic (to precise the DM %)</i> <i>Grass, baled hay, permanent meadow with clover, lowland</i> <i>Grass, baled hay, permanent meadow without clover, half-mountain</i> <i>Grass, baled hay, permanent meadow without clover, lowland</i> <i>Grass, baled hay, temporary meadow with clover, lowland</i> <i>Grass, baled hay, temporary meadow without clover, lowland</i> <i>Grass, grazed, permanent meadow, with clover, lowland</i> <i>Grass, grazed, permanent meadow, without clover, lowland</i> <i>Grass, grazed, permanent meadow, without clover, half-mountain</i> <i>Grass, grazed, temporary meadow, with clover, lowland</i> <i>Grass, grazed, temporary meadow, without clover, lowland</i>	

Template	Worksheet	Variable	Page	Option list	
				<i>Grass, silage, permanent meadow, without clover, half mountain</i> <i>Grass, silage, temporary meadow, with clover, lowland</i> <i>Grass, wrapping, permanent meadow, without clover, half mountain</i> <i>Grass, wrapping, permanent meadow, without clover, lowland</i> <i>Grass, wrapping, temporary meadow, with clover, lowland</i> <i>Grass, wrapping, temporary meadow, without clover, lowland</i> <i>Maize, silage, conventional</i> <i>Maize, silage, organic</i> <i>sorghum, silage, conventional</i>	
		Raw material	<a href="#">25</a> / <a href="#">35</a>	<i>Rapeseed, raw oil, conventional</i> <i>Selenium</i> <i>Skim milk powder</i> <i>Sodium bicarbonate</i> <i>Sodium chloride</i> <i>Soft whey powder</i> <i>Sorghum, grain, conventional</i> <i>Soybean meal 46, organic</i> <i>Soybean meal 46, transformed in South-America</i> <i>Soybean meal 48, organic</i> <i>Soybean meal 48, transformed in Europe</i> <i>Soybean meal 48, transformed in South-America</i> <i>Soybean meal 50, organic</i> <i>Soybean meal 50, transformed in Europe</i> <i>Soybean meal 50, transformed in South-America</i> <i>Soybean oil, transformed in Europe</i> <i>Soybean oil, transformed in South-America</i> <i>Soybean, grain</i> <i>Soybean, grain, dried</i> <i>Soybean, grain, extruded</i> <i>Soybean, grain, organic</i> <i>Soybean, grain, toasted</i> <i>Soybean, lecithin, transformed in Europe</i> <i>Soybean, lecithin, transformed in South-America</i> <i>Soybean, protein (flour)</i> <i>Soybean, protein concentrate</i>	

Template	Worksheet	Variable	Page	Option list	
				<i>Faba bean, grain, organic</i> <i>Fat, from broiler</i> <i>Feather meal</i> <i>Fish oil from cutting, at plant</i> <i>Fish oil from Norway</i> <i>Fish oil from Peru</i> <i>Fish, flour from cutting</i> <i>Fish, flour from Norway</i> <i>Fish, flour from Peru</i> <i>Fish, protein concentrate, from whole fish</i> <i>Flaxseed expeller (meal)</i> <i>Flaxseed oil</i> <i>Flaxseed, dried</i> <i>Iodine</i> <i>Lard, from pigs</i> <i>Limestone</i> <i>L-lysine HCl</i> <i>L-threonine</i> <i>Lupin flour</i> <i>Lupin, husked</i> <i>Magnesium oxide</i> <i>Maize flour</i> <i>Maize starch</i> <i>Maize, degerminated</i> <i>Maize, dried sprouts</i> <i>Maize, germ meal expeller, from wet milling</i> <i>Maize, germ meal extracted, from wet milling</i> <i>Maize, grain, dried, conventional</i> <i>Maize, oil</i> <i>Maize, raw germ oil, pressed</i> <i>Maize, raw germ oil, solvent extraction</i> <i>Milk, for calves</i> <i>Milk, for lambs</i> <i>Oat, grain, conventional</i> <i>Other : citrus</i> <i>Other feed component</i>	<i>Spring oat, grain, organic</i> <i>Spring pea, grain, conventional</i> <i>Spring pea, grain, organic</i> <i>Sugar beet roots, Crystalline sugar, conventional</i> <i>Sugar beet roots, dried pulp, conventional</i> <i>Sugar beet roots, molasses</i> <i>Sugar beet roots, pressed pulp, conventional</i> <i>Sugar beet roots, vinasse of molasses</i> <i>Sugarcane, molasses</i> <i>Sunflower crude oil, not husked, conventional</i> <i>Sunflower crude oil, not husked, organic</i> <i>Sunflower crude oil, strong husking, conventional</i> <i>Sunflower crude oil, weak husking, conventional</i> <i>Sunflower meal, high protein content, strong husking, conventional</i> <i>Sunflower meal, not husked, conventional</i> <i>Sunflower meal, not husked, organic</i> <i>Sunflower meal, strong husking, conventional</i> <i>Sunflower meal, weak husking, conventional</i> <i>Sunflower, grain, dried, conventional</i> <i>Sunflower, grain, strongly husked</i> <i>Sunflower, grain, weakly husked</i> <i>Sunflower, husk, strongly husked</i> <i>Sunflower, husk, weakly husked</i> <i>Tallow, from beef</i> <i>Triticale, grain, conventional</i> <i>Triticale, grain, organic</i> <i>Tryptophan</i> <i>Valine</i> <i>Vitamin pre-mix</i> <i>Wheat semi-white middlings, conventional</i> <i>Wheat, bran, conventional</i> <i>Wheat, bran, organic, milling</i> <i>Wheat, Dried distillers grains with solubles</i>

Template	Worksheet	Variable	Page	Option list
				<i>Palm kernel meal</i> <i>Pea, husked, protein</i> <i>Peanut meal, manual extraction</i> <i>Potassium carbonate</i> <i>Potatoes, protein</i> <i>Potatoes, starch</i> <i>Rapeseed expeller (meal), organic</i> <i>Rapeseed meal, conventional</i> <i>Rapeseed, dried grain, conventional</i> <i>Wheat, gluten feed Amyplus, conventional</i> <i>Wheat, gluten feed Milurex, conventional</i> <i>Wheat, gluten feed, conventional</i> <i>Wheat, grain, conventional</i> <i>Wheat, grain, organic</i> <i>Wheat, low flour, conventional</i> <i>Wheat, starch, conventional</i> <i>Wheat, Wet distillers grains with solubles</i> <i>Whey, other than powder</i> <i>Whey, powder</i> <i>Zinc oxide</i>
	Housing information	Type of housing	<a href="#">26 / 36</a>	<i>Building with cubicles, liquid manure, steel majority (calves)</i> <i>Building with cubicles, liquid manure, steel majority (dairy cow highland)</i> <i>Building with cubicles, liquid manure, steel majority (dairy cow lowland)</i> <i>Building with cubicles, liquid manure, wood majority (calves)</i> <i>Building with cubicles, liquid manure, wood majority (dairy cow highland)</i> <i>Building with cubicles, solid manure, steel majority (calves)</i> <i>Building with cubicles, solid manure, steel majority (dairy cow highland)</i> <i>Building with cubicles, solid manure, steel majority (dairy cow lowland)</i> <i>Building with cubicles, solid manure, wood majority (calves)</i> <i>Building with cubicles, solid manure, wood majority (dairy cow highland)</i> <i>Building with cubicles, solid manure, wood majority (dairy cow highland)</i> <i>Building with cubicles, liquid manure, wood majority (dairy cow lowland)</i> <i>Integral straw area, steel majority (calves)</i> <i>Integral straw area, steel majority (dairy cow highland)</i> <i>Integral straw area, steel majority (dairy cow lowland)</i> <i>Integral straw area, steel majority (suckler cow)</i> <i>Integral straw area, wood majority (calves)</i> <i>Integral straw area, wood majority (dairy cow highland)</i> <i>Integral straw area, wood majority (dairy cow lowland)</i> <i>Integral straw area, wood majority (suckler cow)</i> <i>Milking parlour + milkhouse</i>
		Type of ventilation system	<a href="#">26 / 36</a>	<i>Forced ventilation</i> <i>Natural ventilation</i>
		Type of air treatment	<a href="#">26 / 36</a>	<i>Acid scrubber</i> <i>Bioscrubber</i> <i>Compressed air scrubber</i> <i>No treatment</i> <i>Other treatment (add details in comments)</i>

Template	Worksheet	Variable	Page	Option list					
	Effluent	Type of manure	<a href="#">27 / 36</a>	<i>Bovine manure, from deep litter house</i> <i>Bovine manure</i> <i>Bovine slurry</i> <i>Bovine slurry, diluted</i> <i>Bovine slurry, mixture</i> <i>Effluents, low concentration, mixture</i> <i>Semi-solid bovine manure, from lying box house</i>					
		Type of litter	<a href="#">28 / 36</a>	<i>Mixture straw/wood shavings</i> <i>Other (add details in comments)</i> <i>Sawdust</i> <i>Straw</i> <i>Wood shavings</i>					
Template part II: Dairy Farm enterprise	Milking parlour	Type of milking parlour	<a href="#">28</a>	<i>Robot</i> <i>Rotary parlour</i> <i>_90_degree_stall</i> <i>Polygone_shaped_parlour</i> <i>Tandem_stall</i> <i>Trine_stall</i> <i>Herringbone_milking_system</i>					
		Characteristic of the system	<a href="#">28</a>	<u>Robot:</u>  <i>Standard white-water volume</i> <i>High white-water volume</i> <i>Sparing use of white-water</i>	<u>Rotary parlour:</u>  <i>16 units</i> <i>20 units</i> <i>24 units</i> <i>28 units</i> <i>32 units</i> <i>36 units</i> <i>40 units</i> <i>44 units</i> <i>50 units</i>	<u>Herringbone milking system:</u>  <i>One row</i> <i>Simple equipment</i> <i>Dual equipment</i>	<u>Trine stall:</u>  <i>Station scheme: 5-5-5</i> <i>Station scheme: 6-6-4</i> <i>Station scheme: 8-8-6</i> <i>Station scheme: 10-10-6</i>	<u>90° stall / Tandem stall:</u>  <i>One row</i> <i>Dual equipment</i>	<u>Polygone shaped parlour:</u>  <i>4*5</i> <i>stations</i> <i>4*6</i> <i>stations</i>
		Water consumption for cleaning (estimation)	<a href="#">28</a>	<i>High (7L/m<sup>2</sup>)</i> <i>Moderate (4L/m<sup>2</sup>)</i> <i>Low (2,5L/m<sup>2</sup>)</i>					

## Additional information for the labour worksheet (Part IV)

The “Labour” worksheet records labour inputs on the farm during the accounting year (in hours). It collects data for all people who have worked on the farm, except work done to substitute own labour force (i.e., agricultural contract work, whose costs is recorded in the “input” worksheet).

The work taken into account includes the following tasks:

- Farm agricultural work;
- Financial organisation and management (e.g., farm sales and purchases, bookkeeping);
- Work in the field (e.g., ploughing, sowing, harvesting, orchard maintenance);
- Livestock husbandry (e.g., feed preparation, feeding of animals, milking, care of livestock);
- Maintenance of infrastructures and landscape features (e.g., buildings, machinery, equipment, hedges, ditches);
- Transport for the holding and carried out by the labour force of the holding;
- Work for the other gainful activities directly related to the holding (e.g., biogas production); and
- Contractual work for others, using production means of the holding.

Workers are divided into two main categories: unpaid labour and paid labour. Unpaid labour refers to the labour input from family members who do not receive a wage from the holding, while paid labour refers to wage earners.

To account for differences in worker productivity, their ages are recorded in years by selecting an option in the following list:

- *12 – 14*
- *14 – 16*
- *17*
- *18 – 65*
- *66 – 70*
- *Over 70*

## References

- Baillet, V., Balaine, L., Díaz de Otálora, X., Flø, B.E., Rodriguez, D.G.P., Krol, D., Wilfart, A., 2022a. Sustainability assessment of dairy production systems: Templates for farm data collection. Recherche Data Gouv, Version 1.0. <https://doi.org/10.57745/XVFWVC>
- Baillet, V., Balaine, L., Díaz de Otálora, X., Rodriguez, D.G.P., Frątczak-Müller, J., Flø, B.E., Wilfart, A., 2022b. DEXi-Dairy indicator handbook: Sustainability tree and selected indicators for assessing European specialised dairy farms. Recherche Data Gouv, Version 1.0. <https://doi.org/10.57745/XEPNUH>