



ClieNFarms
Climate Neutral Farms

[D3.2 Action plan towards climate neutrality identified for each Lead Commercial Farm]

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List of Abbreviations and Acronyms	
LCF	Lead Commercial Farm(s)
IS	Innovative Systemic Solutions Spaces
GHG	Greenhouse gas
C	Carbon

1 Executive summary

This Deliverable presents the Action plans for the Lead Commercial Farms (LCFs) in the ClieNFarms project. The central operational focus of the ClieNFarms project is the case-study structure that allows a strong empowerment of farmers and the supply chain accompanied by a smooth dissemination and replication of the tested innovations. Called I3S (Innovative Systemic Solutions Space), the demonstration structure is based on demonstration farms (DFs), LCFs, outreach farms and replicate farms all working together with the supply chain in a living-lab like structure approach. There are 20 I3S in ClieNFarms. The LCFs involved in ClieNFarms project all aim to reduce GHG emissions from and/or increase carbon (C) storage on their farms. Each farmer has chosen two or more solutions (see Task 1.4 for catalogue of solutions) to implement on their farms. Those solutions and the measure of implementation are described in this deliverable. Selection of solutions to be included in the action plans was facilitated by the creation of the 'catalogue of Solutions' in Task 1.4, hosting of Creative Arenas (Task 2.1 and 3.2) in each I3S, exchanges with experts including, but not limited to, advisors, nutritionist, veterinarian, the I3S demonstration farm and other farmers, as well as their I3S Co-Ordinator.

Table 1 below summarises the main categories of solutions chosen by the LCFs in each I3S. This document will make it possible to understand the specifics of each solution chosen for individual farms, as well as the initial and objective values of the progress monitoring indicator.

[D3.2. Lead Commercial Farms Action Plans]

Table 1: Summary of the main categories of solutions chosen by the LCFs of each I3S involved in ClieNFarms.

Main solution categories I3S	Animal management	Feed optimisation	Surface management	Energy production	Effluents/ fertiliser management	Rotation management	Hedgerows	Reduce tillage	Cover crops
France - Dairy	X	X	X						
Ireland - Dairy	X	X	X		X				
The Netherlands - Dairy		X		X					
Switzerland - Dairy			X						
Germany - Dairy			X	X	X				
Spain - Dairy	X	X	X						
France - Beef	X		X	X					
Ireland - Beef		X	X		X				
Romania - Sheep	X								
France - Crops (south)						X			X
France - Crops (north)						X	X		X
Belgium -Crops									
Ukraine - Crops					X		X	X	X
UK - Crops					X				X
Italy - Specialist crops (tomatoes)					X			X	X
Portugal – Specialist crops (olive oil)					X				X
New Zealand - Dairy									
Poland - Dairy									
French - Energy and Wine									
UK - Pigs									

In year 3 and 4 of the ClieNFarms project, one of the objectives will be to evaluate the impact of these solutions, including quantifying the reduction in GHG emissions and/or increase in C sequestration and the economic impact of applying these solutions (Task 3.3) and sharing this knowledge with other farmers (Task 3.4).

2 Introduction

2.1. Purpose of the document

The purpose of this document is to present the action plan for each of the LCFs involved in the ClieNFarms project (see the map below). Each I3S has between 5 and 10 LCFs. An action plan is a selection of solutions chosen by the LCF to reduce their GHG emissions and/or increase their C sequestration as they transition towards climate neutrality. These solutions were chosen, on the basis of knowledge of the farm's baseline (Task 1.3), from the Catalogue of Solutions developed in Task 1.4 and in partnership with various stakeholders who provide advice to the farmer. This is a Living Lab approach which included the ClieNFarms Creative Arena workshops (Task 2.1 and 3.2), as well as discussions with people around the farm (other farmers, advisers, vets, processors, input suppliers, researchers, bankers, etc.). The Action Plan, which is specific and adapted to each LCF in each I3S, will serve as a basis for analysing the impact of implementing solutions (Task 3.3), as well as for disseminating solutions to outreach farms at demonstration events (Task 3.4 and WP6). Finally, the aim at the end of the project will be to review, with the farmer, the implementation and continuation of their action plan, since the quest to reduce GHG emissions and/or increase C sequestration and transition to climate neutrality will not come to an end at the end of the ClieNFarms project; on the contrary, this project is intended to be a springboard for moving towards climate neutrality on farms across Europe.

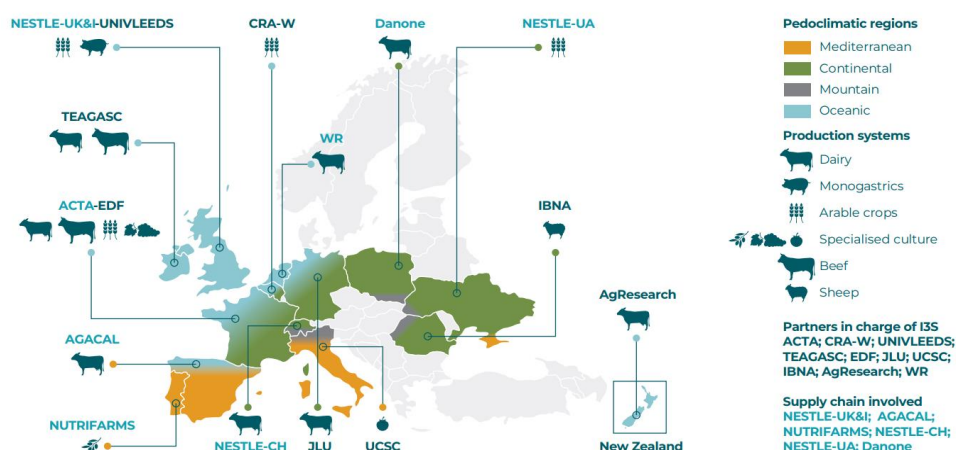


Figure 1: Map presenting the 19 I3S of ClieNFarms (location, production and partners)

2.2. Structure of the document

Sections 3 to 21 each correspond to a ClieNFarms project I3S, and within each section, each subsection comprises a LCF Action Plan. Each Action Plan has an introduction section providing general information about the farm (number of hectares, number of animals, etc.), followed by the solutions that are being/will be implemented. For each solution, it's implementation will be briefly explained, the indicators that will be monitored will be outlined, and the timeframe for implementation and planned level of implementation. Since the base line for the ClieNFarms project is 2017/2018, solutions implemented since the baseline calculations are also included. This allows more data and information on these solutions to be included in the assessment of the solutions and for demonstration to outreach farmers. The people/groups who are helping or will help the farmer to implement the action is also indicated.

The information is presented in the form of tables, according to a model drawn up by Task 3.2 leader in consultation with I3S co-ordinators, WP1 and WP3 leaders, and WP3 Task leaders.

There are no action plans for the French – Wine and Energy I3S. This I3S has a demonstration farm since 2023. Implementation of LCFs for this system will require significant financial investment (€1 million/ha; typical size needed for a commercial farm is 10 ha), therefore no such farms will be available during the life time of the ClieNfarms project.

In annex is the catalogue of solutions from Task 1.4.

3 French Dairy I3S

I3S manager: Pauline Lambert (ACTA)

3.1. LCF1

3.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Derval	Pays de la Loire	Dairy and crops	Conventional	104.6	Sandy-clay loam	700	2

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
85	Holstein	60% maize silage 40% grass (grazed, silage, bales, hay) Rapeseed meal (2.7 kg/cow/day) Wheat (1.1 kg/cow/day)	697,240 L/year (8,174 L/cow/year)

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Wheat (18 ha)	7.8 t DM/ha/year	ploughing
Maize silage (33 ha)	15 t DM/ha/year	ploughing

3.1.2. Farm Action Plan

[D3.2. Lead Commercial Farms Action Plans]

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Optimize the type and quantity of concentrates fed	Replace soybean with rapeseed	Amount of soya	2.3 kg of soya/cow/day	0 kg of soya (rapeseed for equivalent crude protein)	2016	Nutrition advisor
Cultivate intersown or inter-relayed crops	Intercropping with meslin	Meslin surface	0 ha	12 ha	2018	Crop advisor
Use a methanisation unit	Export slurry and manure to methanisation and import digestate	Effluent storage time	6 months	30 days	2019	Environment advisor
Adapt fertiliser application	Reduce mineral fertilization	Ton of ammonit rate	10-12 (+dairy effluents)	5-6 (+digestate)	2019	Environment advisor
Optimize effluent spreading methods	Change material used for spreading to limit air loss	Material used for spreading	Pallet nozzle	Pendants with injection	2019	Environment advisor
Save energy use for milking	water heater isolation, air circuit replacement on milking robot	Electricity consumption	20 000 MJ/ha	18 000 MJ/ha	2010	Environment advisor

3.2. LCF2

3.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC de KERCHERNEC	Finistère (France)	Dairy cows	Organic	82	Silty soil	1300	3 full time

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
78 dairy cows	Holstein and crossbreed	100% grass (grazed+silage) 0 kg/cow/year of concentrates	4,500 L/cow

3.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Establish or maintain agroforestry	Intra-plot planting of trees that can be used to generate energy	Tones of recovered wood	0	80 t	2023	Farmers
use of sawdust as bedding	Use of sawdust from tree maintenance for the bedding	Tones of straw purchased		0 t	2023	Farmers
Establish or maintain hedgerows and individual trees	Plant few more hedges	km of hedges		+ 1 km of hedges	2025	Farmers

Use renewable electricity	Install photovoltaic panels				Under consideration (2025)	
Use electric vehicles and machines	Reduce or even eliminate the use of gasoil (electric quad and tractor)	L of gasoil		Goal = 0	Under consideration (2030)	Farmers

3.3. LCF3

3.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
EARL de Nocunole	Brittany (Morbihan)	Dairy and crops	Conventional	139	Sand clay soil	860	4 full time

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
64	Holstein	30% maize silage 70% grass (grazed, hay, silage) Wheat (0.9 kg/cow/day) Soybean meal (40%) (1.4 kg/cow/day)	478,732 L/year (7,752 L/cow/year)

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize silage	12 t DM/ha/year	
Corn grain	7.3 t DM/ha/year	
Wheat	7.5 t DM/ha/year	
Rapeseed	3 t DM/ha/year	

3.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce number of unproductive animals	Reduce the number of heifers kept on the farm for replacement	% heifers LSU/dairy cows LSU	49%	30%	2024	Farm advisor
Improve young stock management	Reduce the age at first calving (change in ration, better monitoring of growth)	Age at first calving	29 months	27 months	2024	Farm advisor
Reduce slurry emissions during storage	Cover the slurry pit	Cover presence	No slurry pit cover	Cover on the slurry pit	2025	Farm advisor

3.4. LCF4

3.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
EARL A LAEZH BREIZH	Finistère (France)	Dairy cows and crops	Organic	109	Silty soil	1000	2.3 full time

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
87 dairy cows	Holstein	20% maize silage	6,150 L/cow

		80% grass (grazed+silage) 0 kg/cow/year concentrates 20 kg/cow/year mineral	
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Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize silage	13 t DM/ha	Ploughing
Barley	5 t DM/ha	Ploughing
But dry grains	4 t DM/ha	Ploughing
Rapeseed grain	3 t DM/ha	Ploughing

3.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce application of organic fertilizers	No more pig slurry applied (from neighbourhood)	kg organic N/ha L of gasoil			2023	Farmers
Establish or maintain hedgerows and individual trees	Plant hedges	km of hedges		+ 3 km of hedges	2023	Farmers
Reduce soil tillage	Less ploughing and direct seeding	L of gasoil			2024	Advisors; farmers
Use less fuel	Invest in a mower with greater width (from 3 m to 6 m) with other farmers	L of gasoil			2024	Advisors; farmers (group using shared machinery)
Use less electricity	Install a pre-cooler on the tank	kWh/year			2024	Farmers

Improve animal health	Use essential oils (training)	Number of mastitis			Under consideration	Veterinarian
Use renewable electricity	Install photovoltaic panels	kWh/year			Under consideration	

3.5. LCF5

3.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC des ARUMS	Finistère (France)	Dairy cows	Conventional	110 ha	Silty soil		2 full time

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
110 dairy cows	Holstein	23% grass (grazed + silage) 77% maize silage 1,041 kg/cow/year concentrates	7,344 L/cow

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize silage	15 t DM/ha	Ploughing
Barley	7 t/ha	Ploughing

3.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition)
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						advisor, veterinarian...)
Optimize the type and quantity of concentrates	Change concentrates (rapeseed instead of soya)	% of concentrate from soya	70%	40%	2023-2024	Nutrition advisor, farmers
Improve youngstock management	Reduce the age at first calving by changing the ration (dry ration and more concentrates) and better health conditions and heat monitoring	Age at first calving	26 months	24 months	2023	Farm advisor, farmer
Optimize amount of concentrate	reduce concentrate per heifer	kg concentrate	1300 kg	1000 kg	2024	Nutrition advisor, farmers
Use renewable electricity	Install solar panels	Electricity production (kWh/year)	0	Not defined yet	Under consideration	

3.6. LCF6

3.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
EARL de Boureau	Brittany (Morbihan)	Dairy and crops	Conventional	47.8	Silty clay soil	650	1 full time

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
66	Holstein	70% maize silage	631,281 L/year (9,427 L/cow/year)

[D3.2. Lead Commercial Farms Action Plans]

		30% grass (grazed + silage) 4 kg/cow/day soybean meal (40%)	
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Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize silage	15.3 t DM/ha	
Wheat	7.2 t DM/ha	

3.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce number of unproductive animals	Reduce the number of heifers kept on the farm for replacement	Replacement rate (%)	36%	35%	2024	Farm advisor
Adapt fertilizer application	Reduce mineral fertilization on cereals	kg N/ha	180	125	2024	Farm advisor
Save energy use of vehicles and machinery	Reduce fuel consumption by better practices (not defined yet)	Fuel consumption (L/year)	325L/ha	300L/ha	2024	Farm advisor
Optimize the type of concentrate	Replace soya by rapeseed	% of soya in concentrates given	80	0	2023	Farm advisor

3.7. LCF7

3.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
EARL Glehello	Brittany (Morbihan)	Dairy and crops	Conventional	200	Silty soil	800	4 full time

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
130	Holstein	54% maize silage 46 grass (grazed + silage + bales) 2.1 kg/cow/day soybean meal (48) 0.9 kg/cow/day rapeseed meal 0.6 kg/cow/day barley	1,074,138 L/year (8,329 L/cow/year)

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize silage	14.2 t DM/ha	
Barley	7.0 t DM/ha	

3.7.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Optimize the amount of concentrates	Reduce the amount of concentrates given to heifers	t of concentrates per LSU	1 t/LSU	Not defined yet	2024	Nutrition advisor
Adapt organic fertilizers application	Better spreading management of organic fertilizers	Spreading machinery Landfill period	Pallet nozzle Within 24 hours	Pendulum Within 12 hours	2024	Farm advisor
Produce and use renewable energy	Install a photovoltaic tracker	Number of tracker Energy produce (kWh)	0 0	1 ?	2023	Farm advisor
Save energy use in livestock barns	Install a heat recovery unit	Energy save (kWh)	0	?		

3.8. LCF8

3.8.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC de KERYVON	Côtes d'Armor (France)	Dairy cows	Conventional	85	Silty soil	1300	3 full time

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
120 dairy cows	Holstein	27% grass (grazed+silage) 73% maize silage 2920 kg/cow/year concentrates	10,000 L/cow

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize silage	15 t DM/ha	Ploughing
Wheat	8 t DM/ha	Ploughing

3.8.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian ...)
Optimize the type of concentrates	Change concentrates (rapeseed instead of soya)	% of concentrate from soya	70%	50%	2023	Nutrition advisor; farmers
Optimize quantity of concentrates	reduce concentrate per heifer	kg of concentrate/heifer/year		Less than 20 t of soya	2024	Nutrition advisor; farmers
Reduce number of unproductive animals	Reduce the replacement rate by rearing less heifers and increasing the cows longevity	Replacement rate	50%	30%	2023	Farm advisor; farmers

Diversify crop rotation	more hectares of grass	Hectares of grass		+ 5 hectares of grass	2023	Crop advisor; farmers
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3.9. LCF9

3.9.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC Plaisir des champs	Brittany (Ille-et-Vilaine)	Dairy and crops	Conventional	72		860	2 full time

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
92	Holstein	50% maize silage 50% grass (grazed + silage + bales + hay) 2 kg/cow/day soybean meal (48%) 0.8 kg/cow/day wheat	751,534 L/year (8,123 L/cow/year)

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize silage	12.4 t DM/ha	
Wheat	7.6 t DM/ha	

3.9.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Optimize the type of concentrates	Use rapeseed meal instead of soybean meal	Amount of soybean meal in concentrates given	70%	0%	2024	Nutrition advisor
Increase carbon storage	Plant hedges	hedges meters	6063 m	+400 m	2025	Farm advisor
Adapt fertiliser application	Reduce mineral fertilization of grasslands	kg N/ha of grassland	40Nitrogen units on permanent grasslands 45 N units on temporary grasslands	Reduce from 10 units	2024	Farm advisor

4 Irish Dairy I3S

I3S managers: Natasha Browne & Susan Moloney

4.1. LCF1

4.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF1	Tipperary	Dairy	Conventional	105 ha: 96 ha pasture 3 ha forestry, 6 ha rough grazing	Mostly light, dry mineral soil	1099	2.99

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
155 dairy cows 38 Heifers 40 dairy calves 43 meat calves 27 cattle 2 suckler 1 stock bull	Main breed: HF Other crosses	Concentrate: 152 tons Grass and grass silage	962,194 kg milk/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 12358 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

4.1.2. Farm Action Plan

Solution	Explanation (how the farmer will apply it concretely)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Goal of the indicator value	Year of implementation	People helping to choose and implement his solution (nutrition advisor, veterinarian...)
Nitrification and urease inhibitors	I am committed to maximising the use of protected urea on my farm so as to reduce GHG emissions. I will call my Merchant to order Protected Urea for next year.	Proportion of Total Chemical N as Protected Urea	<50% of N	>70% of N	2018	Teagasc advisor
Optimize soil pH	I am committed to implement my liming plan on my farm so as to reduce GHG emissions. I will apply lime to all mineral soils below pH 6.2. Attend training on Nutrient Management. I Will take soil samples every year and implement the plan based on new soil samples	Proportion of soils with pH at or above 6.2	75-90% above 6.2	>90% above 6.2	2021	Teagasc advisor
P Index on High Output Pasture	I am committed to correcting low P and K levels on my farm so as to reduce GHG emissions. Return slurry to the silage ground where most of offtakes occur. I will identify plots with low P and K and Target with slurry. I will take soil samples every year and implement the plan based on new soil samples	Proportions of soils with P index 3 or 4	>90% Index 3 or 4	>90% Index 3 or 4	2021	Teagasc advisor
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm. I will use the dribble bar for all my Slurry Application	Method used to spread slurry	Splash plate	100% LESS (dribble bar)	2019	Teagasc advisor
Grass-legume	I am committed to having over 30% of my paddocks	Proportion of Clover in Sward	10-20% of sward	>20% of sward	2021	Teagasc advisor

mixtures (clover)	incorporated with clover so as to minimise GHG emissions from my farm. I will develop an N application plan which is tailored to promote clover. I will employ best practice to prevent bloat					
Improve Animal Health	I am committed to prepare and implement an Animal Health Plan in conjunction with my VET, so as to minimise GHG emissions from my farm. I will implement effective Vaccination Programme for my herd.	Herd health plan completed with vet and implemented	Basic Bord Bia plan	Implement a comprehensive Vet led health plan	2021	Teagasc advisor and Vet
Reduce Chemical Nitrogen Usage	I will optimise soil fertility and lower N use. I will reduce N use in early spring - I will only spread when soil conditions are stable above 6 degrees. I will include clover in seed mix and focus on achieving high clover composition	N usage (kg/ha)	179 kg N/ha	Reduce by 0-20 kg N/ha	2021	Teagasc advisor
Hedgerows	I am committed to planting new hedgerow to increase carbon sequestration and add to biodiversity	New hedgerows planted	No new hedgerows planted	New Hedgerow planted	2020	Teagasc advisor
Reduce crude protein content of diet	I am committed to reducing the protein in concentrates to less than 14% when cows are grazing full time and below 13% if feeding occurs during the summer. I am going to improve the understanding of protein requirement of milking cows and the impact of excess protein	Protein %	Lowered to below 14% at grazing	Lowered to below 14% at grazing and below 13% in mid-summer	2021	Teagasc advisor
Genetic selection (improve EBI)	I am committed to increasing my herd EBI on my farm so as to increase output/cow and reduce GHG emissions. I am going to prepare a breeding plan and select AI	Herd EBI	150-175	200+	2021	Teagasc advisor

	bulls to improve targeted traits.					
Save energy use for milking	I will get advice on the economic benefit and possibility of incorporating a heat exchange system if appropriate	Heat Exchange in my unit	Heat Exchange not installed	Heat Exchange Installed	2019	Teagasc advisor
Genetic selection (use DBI)	I will select AI beef bulls with a high DBI	Beef bull selected on DBI	DBI not used to select bulls	I base my beef bull selection heavily on DBI	2020	Teagasc advisor
Heifers Calved at 22-26 Months	I will focus on achieving target weight gains for heifer calves (.6 kg/day). I will turn out yearlings as early as possible to maximise weight gain prior to breeding. I will ensure a good supply of quality grass to yearlings to achieve a growth rate of 1kg per day to meet the target weight at breeding of 60% of mature weight	Proportion of my Heifers Calved at 22-26 Months (%)	>80%	>90%	2019	Teagasc advisor

4.2. LCF2

4.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF2	Cork	Dairy	Conventional	192 ha: 190 ha pasture 2 ha other	Mostly light, dry mineral soil – free draining	1151	3.21

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
323 dairy cows 5 Heifers 76 dairy calves 20 meat calves 5 stock bull	Main breed: HF Other crosses	Concentrate: 470 tonnes Grass and grass silage	1,908,777 kg milk/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 13401 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

4.2.2. Farm Action Plan

Solution	Explanation (how the farmer will apply it concretely)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Goal of the indicator value	Year of implementation	People helping to choose and implement his solution (nutrition advisor, veterinarian ...)
Nitrification and urease inhibitors	I am committed to maximising the use of protected urea on my farm so as to reduce GHG emissions. I will call my Merchant to order Protected Urea for next year	Proportion of Chemical N as Protected Urea	>50% of N	>50% of N	2018	Teagasc advisor
Optimize soil pH	I am committed to implement my liming plan on my farm so as to reduce GHG emissions. I will apply lime to all mineral soils below pH 6.2. I will apply lime according to a Liming Plan based on soil sample analysis	Proportion of soils with pH at or above 6.2	50-75% above 6.2	>90% above 6.2	2021	Teagasc advisor
P Index on High Output Pasture	I am committed to correcting low P and K levels on my farm so as to reduce GHG emissions. Return Slurry to the silage ground where most of offtakes occur. I will attend training on Nutrient Management	Proportions of soils with P index 3 or 4	>90% Index 3 or 4	>90% Index 3 or 4	2021	Teagasc advisor
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my	Method used to spread slurry	100% LESS (dribble bar)	100% LESS (dribble bar)	2021	Teagasc advisor

[D3.2. Lead Commercial Farms Action Plans]

	farm. I will Use the dribble bar for all my Slurry application					
Grass-legume mixtures (clover)	I am committed to having over 30% of my paddocks incorporated with clover so as to minimise GHG emissions from my farm. I will incorporate clover seed into my new grass seeds. I will develop an N application plan which is tailored to promote Clover	Proportion of clover in Sward	10-20% sward	>20% of sward	2021	Teagasc advisor
Improve Grazing Management	I am committed to learning about and using PastureBase to improve my grassland management and animal performance so as to minimise GHG emissions from my farm. I will measure grass on PastureBase. I will avoid damage to grazing land	Number covers recorded on PastureBase Ireland	34 covers recorded	> 40 covers recorded	2018	Teagasc advisor
Improve Animal Health	I am committed to prepare and implement an Animal Health Plan in conjunction with my VET, so as to minimise GHG emissions from my farm. I will implement effective Vaccination Programme for my herd. I will use the EBI sub-index for health in sire selection	Herd health plan completed with vet and implemented	Basic Bord Bia plan	Implement a comprehensive Vet led health plan	2021	Teagasc advisor & vet
Reduce Chemical Nitrogen Usage	I will optimise soil fertility and lower N use. I will make best use of N in organic manured through timing and LESS. I will manage my pasture to increase clover composition	N usage (kg/ha)	232 kg N/ha	Reduce by 0-10 kg/ha	2021	Teagasc advisor
Hedgerows	I am committed to planting new hedgerow to increase carbon sequestration and add to biodiversity	New hedgerows planted	No new hedgerows planted	New Hedgerow planted	2020	Teagasc advisor
Reduce crude protein content of diet	I am committed to reducing the protein in concentrates to less than 14% when cows are grazing full time and below 13% if feeding occurs during the summer	Protein %	Lowered to below 14% at grazing	Lowered to below 14% at grazing and below 13% in	2022	Teagasc advisor

				mid-summer		
Genetic selection (improve EBI)	I am committed to increasing my herd EBI by €10/year on my farm so as to increase output/cow and reduce GHG emissions. I am going to prepare a breeding plan and select AI bulls to improve targeted traits. I am going to use AI bulls from the top 75 bulls on the ICBF active bull list	Herd EBI	150-175	200+	2021	Teagasc advisor
Produce renewable energy	I committed to producing renewable energy through solar panels	Solar Panels installed	Yes	Yes	2021	Teagasc advisor
Genetic selection (use DBI)	I will select AI beef bulls with a high DBI	Beef bull selected on DBI	DBI not used to select bulls	I base my beef bull selection heavily on DBI	2020	Teagasc advisor
Heifers Calved at 22-26 Months	I will focus on achieving target weight gains for heifer calves (.6 kg/day). I will feed high quality silage supplemented with meal to weanlings to achieve 0.5Kg / day. I will ensure a good supply of quality grass to yearlings	Proportion of my Heifers Calved at 22-26 Months (%)	>90%	>90%	2021	Teagasc advisor

4.3. LCF3

4.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF 3	Cork	Dairy	Conventional	70 ha	Mineral – dry well drained	1150.8	2.55

Number (of cows, ewes, sows,)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
Dairy cows: 124 Dairy calves:32	Main breed: Holstein Friesian	Concentrates: 160 tonnes Grass and grass silage	Total milk production (kg): 638,488

Meat calves: 33 Heifers:40	Other crosses		
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Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 11835 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

4.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Optimize soil pH	I will take soil samples every year and implement the plan based on new soil samples. I will implement my liming plan on my farm. I will apply lime to all mineral soils below pH 6.2.	Proportion of soils with pH at or above 6.2	75-90% above 6.2	>90% above 6.2	2021	Teagasc advisor
Slurry spread timing- %	I will maximize spring slurry application in spring with application when closing for first cut silage. I will ensure to only spread in calm/moist conditions. I plan to spread most of milking block with slurry in spring instead of chemical nitrogen	% slurry spread before 15 May	50-75 %	>75%	2021	Teagasc advisor
Improve Grazing Management	I am committed to learning about and using PastureBase to improve my grassland management. I will	Number covers recorded on	<20 covers recorded	> 30 covers recorded	2020	Teagasc advisor



[D3.2. Lead Commercial Farms Action Plans]

	measure grass and record grass covers on PastureBase.	PastureBase Ireland				
Improve Animal Health	I am committed to prepare and implement an Animal Health Plan in conjunction with my vet.	Herd health plan completed with vet and implemented	Basic Bord Bia plan	Implement a comprehensive Vet led health plan	2021	Vet
Reduce crude protein content of diet	I am committed to reducing the protein in concentrates to less than 14% when cows are grazing full time and below 13% if feeding occurs during the summer	Protein %	Lowered to below 14% at grazing	Lowered to below 14% at grazing and below 13% in mid-summer	2022	Teagasc advisor
Genetic selection (improve EBI)	I am committed to increasing my herd EBI by €10/year on my farm so as to increase output/cow and reduce GHG emissions. I am going to prepare a breeding plan and select AI bulls to improve targeted traits. I am going to use AI bulls from the top 75 bulls on the ICBF active bull list	Herd EBI	150-175	180+	2021	Teagasc advisor
Save energy use for milking	I will get advice on the viability of PV and apply for a grant and install if appropriate. I will get advice on the economic benefit and possibility of incorporating a heat exchange system if appropriate	PV and heat exchange	No PV or heat exchange	PV & heat exchange installed	2022	Teagasc advisor
Heifers Calved at 22-26 Months	I will focus on achieving target weight gains for heifer calves (.6 kg/day). I will turn out yearlings as early as possible to maximise weight gain prior to breeding. I will ensure a good supply of quality grass to yearlings	Proportion of my Heifers Calved at 22-26 Months (%)	>80%	>90%	2019	Teagasc advisor



	to achieve a growth rate of 1 kg per day to meet the target weight at breeding of 60% of mature weight					
Genetic selection (use DBI)	I will select AI beef bulls with a high DBI	Beef bull selected on DBI	DBI not used to select bulls	I base my beef bull selection heavily on DBI	2020	Teagasc advisor

4.4. LCF4

4.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF 4	Limerick	Dairy	Conventional	53.39	Mineral – wet (poorly drained)	10991.1	2.11

Number (of cows, ewes, sows,)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
Dairy cows: 69 Dairy calves: 21 Meat calves: 24 Heifers: 16 Cattle 1-2 yrs: 8	Mainly Holstein Friesian Other cross breeds	Concentrates: 56.92 tonnes Grass and grass silage	Total milk production 411,163 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total DM: 10257 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

4.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Optimize soil pH	I Will take soil samples every year and implement the plan based on new soil samples. I am committed to implement my liming plan on my farm. I will apply lime to all mineral soils below pH 6.2. Attend training on Nutrient Management.	Proportion of soils with pH at or above 6.2	0-25 % above 6.2	75-90% above 6.2	2020	Teagasc advisor
P Index on High Output Pasture	I am committed to correcting low P and K levels on my farm so as to reduce GHG emissions.	Proportions of soils with P index 3 or 4	50-75% index 3 or 4	75-90% Index 3 or 4	2021	Teagasc advisor
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm. I will use the dribble bar for all my Slurry Application	Method used to spread slurry	Splash plate	100% LESS (dribble bar)	2019	Teagasc advisor
Improve grassland management	I am committed to optimizing the length of the grazing season so as to minimize GHG emissions from my farm. I will apply N or Slurry when soil	Grassland management	Using Spring and Autumn grass planner to improve grazing season length	Using Spring and Autumn grass planner to improve grazing season length. Introduce spur roadways	2021	Teagasc advisor

[D3.2. Lead Commercial Farms Action Plans]

	temperature, ground conditions and forecast are good for grass growth I will use on/off grazing to get stock to grass when conditions are more difficult.			during spring/autumn		
Improve Animal Health	I am committed to prepare and implement an Animal Health Plan in conjunction with my VET, so as to minimise GHG emissions from my farm. I will implement effective Vaccination Programme for my herd.	Herd health plan completed with vet and implemented	Basic Bord Bia plan	Implement a comprehensive Vet led health plan	2022	Vet
Hedgerows	I am committed to planting new hedgerow to increase carbon sequestration and add to biodiversity	New hedgerows planted	No new hedgerows planted	New Hedgerow planted	2020	Teagasc advisor
Use of sexed semen	I am committed to using sexed semen on a proportion of cows for replacement and increase the proportion of cows bred to beef breeds. I will ask my breeding advisor to discuss the potential for sexed semen in my herd	Sexed semen	>10% of cows and heifers	>20% of cows and heifers	2021	Teagasc advisor
Genetic selection (improve EBI)	I am committed to increasing my herd EBI on my farm so as to increase output/cow and reduce GHG emissions. I am	Herd EBI	140-160	200+	2020	Teagasc advisor

	going to prepare a breeding plan and select AI bulls to improve targeted traits.					
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4.5. LCF5

4.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF 5	Cork	Dairy	Conventional	77	Acid brown earths	1099	1.63

Number (of cows, ewes, sows,)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
Dairy cows: 86 Dairy calves: 32 Meat calves: 29 Heifers: 29 Cattle 1-2 years: 7	Main breed: HF Other crosses	Concentrate: 101 tonnes Grass and grass silage	Total milk production (kg): 563,240

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total DM: 11907 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

4.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Use of protected urea	I am committed to maximizing the use of protected urea on my farm so as to reduce GHG emissions	Fertiliser-protected urea	>50% of N	>50% of N	2021	Teagasc advisor

[D3.2. Lead Commercial Farms Action Plans]

Optimize soil pH	I am committed to implement my liming plan on my farm so as to reduce GHG emissions. I will apply lime to all mineral soils below pH 6.2. I will apply lime according to a Liming Plan based on soil sample analysis	Proportion of soils with pH at or above 6.2	75-90% above 6.2	>90% above 6.2	2021	Teagasc advisor
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm. I will Use the dribble bar for all my Slurry application	Method used to spread slurry	100% LESS (dribble bar)	100% LESS (dribble bar)	2021	Teagasc advisor
Hedgerows	I am committed to planting new hedgerow to increase carbon sequestration and add to biodiversity	New hedgerows planted	No new hedgerows planted	New Hedgerow planted	2020	Teagasc advisor
Genetic selection (improve EBI)	I am committed to increasing my herd EBI by €10/year on my farm so as to increase output/cow and reduce GHG emissions. I am going to prepare a breeding plan and select AI bulls to improve targeted traits. I am going to use AI bulls from the top 75 bulls on the ICBF active bull list	Herd EBI	150-165	200+	2020	Teagasc advisor
Use of sexed semen	I am committed to using sexed semen on a proportion of cows for replacements and increase the proportion of cows bred to beef breeds	% of sexed semen used	No sexed semen used	<7.5% of cows & heifers	2021	Teagasc advisor
Heifers Calved at 22-26 Months	I will focus on achieving target weight gains for heifer calves (.6 kg/day). I will turn out yearlings as early as possible to maximise weight gain prior to breeding. I will ensure a good supply of quality grass to yearlings to achieve a growth rate of 1kg per day to meet the target weight at breeding of 60% of mature weight	Proportion of my Heifers Calved at 22-26 Months (%)	>80%	>90%	2019	Teagasc advisor

Improve forage quality	I will focus on making high quality DMD first and second cut silage	DMD%	65-70%	70-75%	2020	Teagasc advisor
Use renewable electricity	I will continue to use solar Panels to generate renewable energy on my farm	Solar Panels installed	Yes	Yes	2022	Teagasc advisor
Improve Animal Health	I will work with my vet to develop a herd health plan to maximise animal health, productivity and sustainability on my farm through the effective management of disease within the herd	Herd health plan	Basic herd health plan	Implement a comprehensive Vet led health plan	2021	Vet

4.6. LCF6

4.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF6	Cork	Dairy	Conventional	123.8	Brown podzolic	1119	1.88

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
Dairy cows: 117 Dairy calves: 43 Meat calves: 40 Heifers: 41 Cattle 1-2 years: 8 Stock Bulls: 1	Main breed: HF Other crosses	Concentrates: 189.6 tonnes Grass and grass silage	Total milk production 736,024 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total Grazing DM: 14460 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

4.6.2. Farm Action Plan

[D3.2. Lead Commercial Farms Action Plans]

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Nitrification and urease inhibitors	I am committed to maximizing the use of protected urea on my farm so as to reduce GHG emissions	Fertiliser use-protected urea	20-30% of N	>50 % of N	2021	Teagasc advisor
Optimize soil pH	I am committed to implement my liming plan on my farm so as to reduce GHG emissions. I will apply lime to all mineral soils below pH 6.2. I will apply lime according to a Liming Plan based on soil sample analysis	Proportion of soils with pH at or above 6.2	50-75% above 6.2	75-90 % above 6.2	2021	Teagasc advisor
Improve grassland management	I am committed to optimizing the length of the grazing season so as to minimize GHG emissions from my farm.	Grassland management	Using Spring and Autumn grass planner to improve grazing season length	Using Spring and Autumn grass planner to improve grazing season length.	2020	Teagasc advisor
Hedgerows	I am committed to planting new hedgerow to increase carbon sequestration and add to biodiversity	New hedgerows planted	No new hedgerows planted	New Hedgerow planted	2020	Teagasc advisor
Heifers Calved at 22-26 Months	I will focus on achieving target weight gains for heifer calves (.6 kg/day). I will turn out yearlings as early as possible to maximise weight gain prior to breeding. I will ensure a good supply of quality grass to yearlings to achieve a growth rate of 1kg per day to meet the target weight at	Proportion of my Heifers Calved at 22-26 Months (%)	>80%	>90%	2019	Teagasc advisor



	breeding of 60% of mature weight					
Improve genetic selection for improved performance	I will use the Dairy Beef Index to produce quality beef cattle from my dairy herd that have both desirable calving attributes for the dairy herd and valuable carcass merit attributes for the finisher.	Dairy Beef Index (DBI)	None	I base my beef bull selection heavily on DBI	2022	Teagasc advisor
Improve reproductive management practices	I am going to prepare a breeding plan with Munster Bovine breeding advisor and select AI Bulls to improve targeted traits	Breeding Plan	None	12 week breeding plan	2018	Breeding advisor & Teagasc advisor
Improve grazing practises	I will use on/off grazing to get stock to grass when conditions are more difficult. I will set up spur roadways if weather conditions are difficult.	Grazing practices	Yes	Yes	2022	Teagasc advisor

4.7. LCF7

4.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF 7	Tipperary	Dairy	Conventional	61 ha	Dry mineral soil	1099	1.86

Number (of cows, ewes, sows,)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
115 dairy cows 30 heifers 31 dairy calves 12 meat calves 1 stock bull	Main breed: HF Other crosses	Concentrates: 156 tonnes Grass and grass silage	Total milk production 758,531 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 12,256 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

4.7.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Grass-legume mixtures (clover)	I am committed to having over 30% of my paddocks incorporated with clover so as to minimize GHG emissions from my farm. I will develop an N application plan which is tailored to promote clover. I will employ best practice to prevent bloat	Proportion of clover in sward	10-20% of sward	>20% of sward	2020	Teagasc advisor
Improve grassland management	I will measure grass on PastureBase	Grass measuring on PastureBase	<20 grass walks recorded on PastureBase	>30 grass walks recorded on PastureBase	2019	Teagasc advisor
Optimize soil pH	I am committed to implement my liming plan on my farm so as to reduce GHG emissions. I will apply lime to all mineral soils below pH 6.2. Attend training on Nutrient Management. I Will take soil samples every year and	Proportion of soils with pH at or above 6.2	75 -90% above 6.2	>90% above 6.2	2021	Teagasc advisor

[D3.2. Lead Commercial Farms Action Plans]

	implement the plan based on new soil samples					
Use of sexed semen	I am committed to using sexed semen on the replacement heifers.	% of sexed semen used	< 10% of heifers	10-20 % of heifers	2020	Teagasc advisor
Improve reproductive management practises	I will prepare a breeding plan with my breeding advisor to achieve a compact calving season. I will tail paint cows 3 weeks pre-breeding. I will use scratch cards as heat detection method and will observe the cows am and pm during breeding season	Breeding plan	Basic breeding plan	12 week breeding plan	2021	Breeding advisor
Genetic selection (use DBI)	I will use the Dairy Beef Index to produce quality beef cattle from my dairy herd that have both desirable calving attributes for the dairy herd and valuable carcass merit attributes for the finisher.	Dairy Beef Index (DBI)	None	I base my beef bull selection heavily on DBI	2022	Teagasc advisor
Heifers Calved at 22-26 Months	I will focus on achieving target weight gains for heifer calves (.6 kg/day). I will turn out yearlings as early as possible to maximise weight gain prior to breeding. I will ensure a good supply of quality grass to yearlings to achieve a growth rate of 1kg per day to meet the target weight at breeding of 60% of mature weight	Proportion of my Heifers Calved at 22-26 Months (%)	>80%	>90%	2019	Teagasc advisor
Hedgerows	I am committed to planting new hedgerow to increase carbon sequestration and add to biodiversity	New hedgerows planted	No new hedgerows planted	New Hedgerow planted	2020	Teagasc advisor
Low-emission	I am committed to applying all of my cattle slurry using LESS so as to	Method used to	100% LESS	100% LESS	2021	Teagasc advisor

slurry spreading	minimise GHG and Ammonia emissions from my farm. I will Use the trailing shoe for all my Slurry application	spread slurry				
Improve Animal Health	I will work with my vet to develop a herd health plan to maximise animal health, productivity and sustainability on my farm through the effective management of disease within the herd	Herd health plan	Basic herd health plan	Implement a comprehensive Vet led health plan	2021	Vet

4.8. LCF8

4.8.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF 8	Cork	Dairy	Conventional	91 ha	Brown podzolic	1109	2.67

Number (of cows, ewes, sows,)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
Dairy cows: 148 Dairy calves: 23 Meat calves: 30 Heifers: 30 Stock Bull: 2 Cattle 1-2 years: 10	Main breed: HF Other crosses	Concentrates: 186 tonnes Grass and grass silage	Total milk production 925,203 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 12085 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

4.8.2. Farm Action Plan

[D3.2. Lead Commercial Farms Action Plans]

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Nitrification and urease inhibitors	I am committed to maximising the use of protected urea on my farm so as to reduce GHG emissions. I will call my Merchant to order Protected Urea for next year.	Proportion of Total Chemical N as Protected Urea	40-50%	>50% of N	2020	Teagasc advisor
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm. I will use the trailing shoe for all my Slurry Application	Method used to spread slurry	Splash plate	100% LESS (trailing shoe)	2020	Teagasc advisor
Optimize soil pH	I am committed to implement my liming plan on my farm so as to reduce GHG emissions. I will apply lime to all mineral soils below pH 6.2. I will apply lime according to a Liming Plan based on soil sample analysis.	Proportion of soils with pH at or above 6.2	78% farm >6.2	>90% above 6.2	2021	Teagasc advisor
Grass-legume mixtures (clover)	I plan to increase the amount of clover in the grassland swards to reduce chemical N spread on the farm. I included 1.5kg of clover into reseeded paddocks	Proportion of Clover in Sward	<10% of swards	>20% of sward	2022	Teagasc advisor

[D3.2. Lead Commercial Farms Action Plans]

	this year. Also incorporated red clover into the silage fields.					
Improve grassland management	I will measure grass on PastureBase	Grass measuring on pastureBase	<20 grass walks recorded on PastureBase	>30 grass walks recorded on PastureBase	2018	Teagasc advisor
Improve grazing practises	I will use the Spring and Autumn grazing planners on PastureBase to increase the days at grass in spring/autumn time. I will use on/off grazing to get stock to grass when conditions are more difficult	Spring & Autumn grazing planner on PastureBase	Yes	Yes	2022	Teagasc advisor
Genetic selection (improve EBI)	I am committed to increasing my herd EBI on my farm so as to increase output/cow and reduce GHG emissions. I am going to prepare a breeding plan and select AI bulls to improve targeted traits.	Herd EBI	Herd EBI €169	175+	2022	Teagasc advisor
Improve Animal Health	I will work with my vet to develop a herd health plan to maximise animal health, productivity and sustainability on my farm through the effective management of disease within the herd	Herd health plan	Basic herd health plan	Implement a comprehensive Vet led health plan	2021	Vet
Use of sexed semen	I am committed to using sexed semen on a proportion of cows for replacements and increase the	% of sexed semen used	No sexed semen used	<10 % of cows & heifers	2022	Teagasc advisor

	proportion of cows bred to beef breeds					
Establish hedgerow	I will plant new hedgerows to increase carbon sequestration and add to biodiversity. I will plant hazel, rowan, holly and whitethorn in the hedgerow.	New hedgerow planted	No new hedgerows planted	New Hedgerow planted	2021	Teagasc advisor

4.9. LCF9

4.9.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF 9	Cork	Dairy	Conventional	59 ha	Brown podzolics	1151	2.34

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
Dairy Cows: 122 Dairy calves: 28 Meat calves: 7 Heifers: 25 Stock Bull: 1	Main breed: HF Other crosses	Concentrate: 159 tonnes Grass and grass silage	Total milk production 838,464 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total Grazing: 11,357 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

4.9.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Nitrification and urease inhibitors	I am committed to maximizing the use of protected urea on my farm so as to reduce GHG emissions	Fertiliser use-protected urea	40-50% of N	>50 % of N	2021	Teagasc advisor
Improve grassland management	I will measure grass on PastureBase	Grass measuring on PastureBase	<20 grass walks recorded on PastureBase	>30 grass walks recorded on PastureBase	2019	Teagasc advisor
Incorporate legumes in grassland	I am committed to having over 30% of my paddocks incorporated with clover so as to minimize GHG emissions from my farm. I will develop an N application plan which is tailored to promote clover. I will employ best practice to prevent bloat	Proportion of clover in sward	10-20% of sward	>20% of sward	2020	Teagasc advisor
Genetic selection (improve EBI)	I will use the Dairy Beef Index to produce quality beef cattle from my dairy	Dairy Beef Index (DBI)	None	I base my beef bull selection	2022	Teagasc advisor

[D3.2. Lead Commercial Farms Action Plans]

	herd that have both desirable calving attributes for the dairy herd and valuable carcass merit attributes for the finisher.			heavily on DBI		
Heifers Calved at 22-26 Months	I will focus on achieving target weight gains for heifer calves (.6 kg/day). I will turn out yearlings as early as possible to maximise weight gain prior to breeding. I will ensure a good supply of quality grass to yearlings to achieve a growth rate of 1kg per day to meet the target weight at breeding of 60% of mature weight	Proportion of my Heifers Calved at 22-26 Months (%)	>80%	>90%	2019	Teagasc advisor
Hedgerows	I am committed to planting new hedgerow to increase carbon sequestration and add to biodiversity	New hedgerows planted	No new hedgerows planted	New Hedgerow planted	2020	Teagasc advisor
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm. I will Use the dribble bar for all my Slurry application	Method used to spread slurry	100% LESS	100% LESS	2021	Teagasc advisor
Improve Animal Health	I will work with my vet to develop a herd health plan to maximise animal health, productivity and sustainability on my farm through the effective management of	Herd health plan	Basic herd health plan	Implement a comprehensive Vet led health plan	2021	Vet

	disease within the herd					
Use renewable electricity	I will continue to use solar Panels to generate renewable energy on my farm	Solar Panels installed	Yes	Yes	2022	Teagasc advisor
Improve forage quality	I will focus on making high quality DMD first and second cut silage	DMD%	65-70%	70-75%	2020	Teagasc advisor
Use of sexed semen	I am committed to using sexed semen on a proportion of cows for replacements and increase the proportion of cows bred to beef breeds	% of sexed semen used	No sexed semen used	<7.5% of cows & heifers	2021	Teagasc advisor

4.10. LCF10

4.10.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF 10	Cork	Dairy	Conventional	46.54 ha	Mineral - Dry- well drained	1105	1.5

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
Dairy cows: 110 Heifers: 5 Dairy calves: 12 Meat calves: 4	Holstein Friesian × Jersey crossbreds	Concentrates: 153 tonnes Grass and grass silage	Total milk production 715,625 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 12,723 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

4.10.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation - (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Nitrification and urease inhibitors	I am committed to maximising the use of protected urea on my farm so as to reduce GHG emissions. I will call my Merchant to order Protected Urea for next year.	Proportion of Total Chemical N as Protected Urea	50-60 % of N	>70% of N	2018	Teagasc advisor
Nitrification and urease inhibitors	I am committed to maximising the use of protected urea on my farm so as to reduce GHG emissions. I will call my Merchant to order Protected Urea for next year.	Proportion of Total Chemical N as Protected Urea	<50% of N	>70% of N	2018	Teagasc advisor
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm. I will Use the dribble bar for all my Slurry application	Method used to spread slurry	Splash Plate	100% LESS (dribble bar)	2018	Teagasc advisor
Improve grassland management	I will continue to grass measure and record results on PastureBase	Numbers of covers recorded on PastureBase	<30 covers recorded	>40 covers recorded	2020	Teagasc advisor
Grass-legume mixtures (clover)	I am committed to having over 30% of my paddocks incorporated with	Proportion of Clover in Sward	<20 % swards	>30% of swards	2021	Teagasc advisor

[D3.2. Lead Commercial Farms Action Plans]

	clover so as to minimise GHG emissions from my farm. I will incorporate clover seed into my new grass seeds. I will develop an N application plan which is tailored to promote Clover					
Genetic selection (improve EBI)	I am committed to increasing my herd EBI by €10/year on my farm so as to increase output/cow and reduce GHG emissions. I will prepare a breeding plan and select AI bulls to improve targeted traits. I am going to use AI bulls from the top 75 bulls on the ICBF active bull list	Herd EBI	Herd EBI €196	Herd EBI €200+	2022	Teagasc advisor
Reduce crude protein content of diet	I am committed to reducing the protein in concentrates to less than 14% when cows are grazing full time and below 13% if feeding occurs during summer	Protein %	Lowered to below 14% at grazing	Lowered to below 14% at grazing and below 13% in mid-summer	2022	Teagasc advisor
Heifers Calved at 22-26 Months	I will focus on achieving target weight gains for heifer calves (.6 kg/day). I will feed high quality silage supplemented with meal to weanlings to achieve 0.5Kg / day. I will ensure a good supply of quality grass to yearlings	Proportion of my Heifers Calved at 22-26 Months (%)	>90%	>90%	2021	Teagasc advisor
Improve Animal Health	I will work with my vet to develop a herd health plan to maximise animal	Herd health plan	Basic herd health plan	Implement a comprehen	2021	Vet

[D3.2. Lead Commercial Farms Action Plans]

	health, productivity and sustainability on my farm through the effective management of disease within the herd			sive Vet led health plan		
Use renewable electricity	I will continue to use solar Panels to generate renewable energy on my farm	Solar Panels installed	Yes	Yes	2022	Teagasc advisor
Save energy use – milking	I am committed to improving the energy efficiency of my milking operation by ensuring that I am plate cooling to below 200 C and have a Variable Speed Vacuum Pump. I will check the temperature of milk entering the bulk tank and seek advice in to improve performance of my plate cooler as required	Energy use	Both (a) Plate Cooler to < 200C and (b) Variable speed vacuum pump	Both (a) Plate Cooler to < 200C and (b) Variable speed vacuum pump	2021	Teagasc advisor

5 Dutch Dairy I3S

I3S manager: Jouke Oenema

5.1. LCF1

5.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Baltus	NH	Dairy	conventional	43.3	clay	650 – 850	1,2

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
119.6	HF	0% fresh grass 55.7% silage grass 14.5% silage maize 5.4% wet by products 24.3% concentrates	10760 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	22117 kg DM/ha	minimum cultivation
Silage maize	19436 kg DM/ha	minimum cultivation

5.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Use low-emission feed ingredients (low EF)	Select concentrate feed with low EF like flax seed and corn starch.	y/n	n	y	2020	Advisor and farmer
Use low-emission feed ingredients	Use local feed stuffs like wheat products and brewers grain	y/n	n	y	2020	Advisor and farmer

(low Carbon Food Print)						
Improve forage quality	High frequency of grass renewal and used 'state of the art' species focused on production	DM yield (t/ha)	22	20	2015	Advisor and farmer
Optimize starch content of the diet	Use starch rich concentrates	Starch content feed ration	?	?	2020	Advisor and farmer
Reduce crude protein content of the diet	Focus on a balanced feed ration (CP, starch, energy, digestibility)	CP feed ration (g/kg ds)	153	150	2015	Advisor and farmer
Reduce feed losses	Secure and precise management during harvest, conservation and feeding	-			2015	Farmer
Optimize feed ration according to animal requirements	A stable and uniform base feed ration (grass and maize silage). Fine tuning with concentrates using tools.	Feed efficiency			2015	Advisor and farmer
Apply organic fertilizers	Apply organic removals from ditch to arable land	-			2020	Farmer
Generate solar thermal energy and electricity	Solar Panels for own use	y/n	n	y	2020	Farmer
Increase longevity	Improve genetic selection and performance, improve young stock management	Life time milk production (kg)	48.000	> 45.000	2015	Farmer

5.2. LCF2

5.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Buijs	NB	Dairy	conventional	56.65	clay/sandy	650 - 850	1,8

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
131.2	HF	8% fresh grass 38% silage grass 20.5% silage maize 8% other feed 19.8% wet by products 5.7% concentrates	9582 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	13833 kg DM/ha	Ploughing
Silage maize	18499	Ploughing

5.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Use low-emission feed ingredients	Low import of concentrates. Produce own concentrates (other crops) or use local feeds, by-products and small grain products	y/n	n	y	2015	Farmer, advisor, research
Improve forage quality	Moving grass in an early stage (4 wks).	Grass quality (energy, CP, digestibility)			2022	Advisor and farmer
Optimize starch content of the diet	Use starch rich concentrates and produce maize silage and/or CCM with high starch content (late harvest)	Starch content maize silage			2020	Advisor and farmer

Reduce crude protein content of the diet	Focus on a balanced feed ration (CP, starch, energy, digestibility)	CP feed ration (g/kg DM)	150	150	2015	Advisor and farmer
Reduce feed losses	Use additives in silage (acetic acid bacteria, yeast) to prevent conservation losses and increase tasty	-			2015	Advisor and farmer
Optimize feed ration according to animal requirements	A balanced feed ration with a low portion of concentrates	Feed efficiency			2015	Advisor and farmer
Reduce pH of slurry via acidification	Use additives in manure storage (bacteria)	y/n	n	y	2018	Advisor and farmer
Improve grassland management	More grazing area, more grazing hours	grazing hours			2023	Farmer
Improve grazing practices	More grazing with 'fresh grass' by more mowing after a grazing cut				2023	Farmer
Cultivate legume crops	Field beans	y/n	n	y	2015	Advisor and farmer

5.3. LCF3

5.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
De Vries	Zuid-Holland; Netherlands	Dairy	Conventional	63.49	Peat	650 - 850	

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
140	HF	16% fresh grass 37,6% silage grass 16,6% silage maize 0,9% other feed	8800 L/cow/ear

		5% wet by products 23,6% concentrates	
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Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	10789 kg DM/ha	None
Silage maize	19614 kg DM/ha	Ploughing

5.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Feed methanogenic inhibitors	Farmer feeds Bovear in feed concentrate as part of a different project that pays for the extra costs.	Y/N	N	Y	2023	Independent feed advisor
Use low-emission feed ingredients	Buy feed concentrate with ingredients with lower carbon foot print for production and transport	Y/N	N	Y	2023	Independent feed advisor
Reduce crude protein content of the diet	Lower RE in home grown grass and balanced diet.	RE/ kg DM in ration	170	150		Independent feed advisor
Establish or maintain hedgerows and individual trees	Grow more trees around the farm yard.	y/n	N	Y	2024	
Use biofuels, biogas and biomass	Swap to Blue Diesel	y/n	N	Y	2025	

5.4. LCF4

5.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Dekker	Flevoland, Netherlands	Dairy	conventional	39.5	clay	650 - 850	

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
192	HF	6.9% fresh grass 32.1% silage grass 24.3% silage maize 1.4% other feed 7.6% wet by products 27.4% concentrates	9064 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	16990 kg DM/ha	Ploughing

5.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Increase lipid content of diet	Higher lipid content	% fat/kg DM ration	2	5	2021	
Use low-emission feed ingredients	Buy feed concentrates with ingredients with lower EF for methane.	Y/N	N	Y	2022	
Improve grazing practices	More efficient grazing with more utilization of fresh grass within the same amount of grazing hours.	% fresh grass in ration	7%	9%	2023	

Establish or maintain hedgerows and individual trees	Trees and hedgerows around the farm yard	y/n	N	Y	2025	
Improve genetic selection for improved performance	Focus breeding on feed efficiency	Y/N	N	Y	2024	Breeding advisor

5.5. LCF5

5.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Hagoort	Zuid-Holland; Netherlands	Dairy	Conventional	50.1	Peat	650 - 850	

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
121,4	HF	14.8% fresh grass 40.8% silage grass 14.1% silage maize 0.5% other feed 3.6% wet by products 26% concentrates	7924 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	11244 kg DM/ha	None (peat soil)

5.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce crude protein content of the diet		g RE/kg DM	170	150		
Improve grassland management		DM/ year	11 t/year	12 t/ year	2023	
Improve grazing practices	This winter a switch to AMS system. So next summer probably less hours. But want to keep the same amount of fresh grass in the ration.	% DM fresh grass in total ration	17% fresh grass in ration	>= 17% fresh grass in ration	2024	Feed advisor
Generate wind energy	Wind turbine combined with solar Panels to compensate own electricity use	Y/N	N	Y	2021	
Improve genetic selection for improved performance	All calves are sold and all heifers are bought. At buying more focus on efficient production.					

5.6. LCF6

5.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Houbraken	Noord Brabant; Netherlands	Dairy	Conventional	51.07	sandy	650 - 850	2

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
115 dairy cows	HF	11% fresh grass 36.9% grass silage 21.9% maize silage 3.6% other feed 3.3% wet by products 23.1% concentrates	10327 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
grassland	13894 kg DM/ha	Ploughed, seeded. Mandatory winter cover crop.
Maize	19938 kg DM/ha	Rotation with grassland and rented potato land. Ploughed. Mandatory winter cover crop.

5.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Generate solar thermal energy and electricity	Solar Panels on the roof of farm-buildings. Total production is 250.000 kWh. 198.000 kWh is delivered. 52.000 kWh is directly used.	Y/N	N	Y	2018	
Feed plant secondary metabolites that reduce methane synthesis	3 hectares is sown with productive herbal grassland mix (containing grass; Plantago; chicory; caraway; red and white clover)	Y/N	N	Y	2023	Nutrient advisor

5.7. LCF7

5.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Koopman	FR	Dairy	conventional	120.96	clay/peat/sandy	650 - 850	2,2

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
190.5	HF	20.6% fresh grass 32.8% silage grass 17.7% silage maize 6% other feed 2.3% wet by products 20.4% concentrates	8794 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	10020 kg DM/ha	Minimum cultivation
Silage maize	12626 kg DM/ha	Ploughing

5.7.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve forage quality	Moving grass in an early stage (4 wks).	Grass quality (energy, CP, digestibility)			2022	Advisor and farmer
Optimize starch content of the diet	Produce maize silage and/or CCM with high starch content (early breeds, late harvest)	Starch content maize silage			2020	Advisor and farmer
Reduce crude protein	Focus on a balanced feed ration (CP, starch, energy, digestibility),	CP feed ration (g/kg ds)	154	150	2020	Advisor and farmer

content of the diet	reduce CP in concentrates					
Reduce feed losses	Improve harvest process by shorten the period between moving and harvest	-			2022	Advisor and farmer
Improve grazing practices	Improve rotational grazing by faster rotate (more fresh grass)	DM intake per hour grazing			2023	Farmer
Increase or maintain share of permanent pasture	Already a high share of PG. Conditions of milk processor (higher milk price).	share of PG			2018	Farmer, Milk processor
Reduce soil tillage	Not allowed in grassland. Conditions of milk processor (higher milk price).				2020	Farmer, Milk processor
Apply low-emission fertilizers	Use of urea fertilizers	% urea fertilizer			2021	Farmer
Increase water table in peat soils	In cooperation with water bodies: increase water level in spring and summer	-				
Increase longevity (life sPlan)	Improve genetic selection, performance, and young stock management	Life time milk production (kg)	42.000	> 40.000	2018	Farmer, Advisor(s)

5.8. LCF8

5.8.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Van Erp	NB	Dairy	Conventional	66.11	clay	650-850	1,5

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
155	HF	18.1% fresh grass 20.3% silage grass 33.2% silage maize 4.2% other feed 5.9% wet by products	9713 L/cow/year

		18.2% concentrates	
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Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	13523 kg DM/ha	Ploughing
Silage maize	17202 kg DM/ha	Ploughing

5.8.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Prioritized measures (prio 1)						
Increase fat content	Farmer currently increases the fat content of forage for cows whom just given birth	% of total feed uptake	KLW?		2020	
Increase animal health	Aims for a larger production per animal lifetime	Lifetime production per cow			2020	
Increase forage quality	Has started mowing following the calendar mowing method i.e. mow every month.	Feed efficiency cattle ?	KLW		2020	
Lower protein content in ration	Currently actively steering on protein contents, has found that this years content was too low so wants to increase towards 150.	g/kg dry matter	140	150	2020	
Application of solid manure or compost	Supplies extra compost to add extra phosphates, due to the low availability of phosphates on the farmers soil	% of manure applied aboveground (KLW)	KLW		2020	
Prioritized measures (prio 2)						

More permanent grassland	The farmer is going to grow less silage maize which reduces the need for grassland destruction and increases the amount of permanent grassland.	% of total farm area	<40 %	40-50 %	2023	
Reduce amount of nonproductive animals	A larger lifetime production and lower annual replacement, lowers the need for youngstock	Replacement value per year or lifetime production per cow			2020	
Plantbased ingredients to lower methane emission	Tannines and saponines can be found in clovers. The farmer is seriously considering starting to grow (extra) clovers.	Uptake of tannins and saponines?	KLW?		2023	
Reduce artificial fertilizer usage	Lower usage of artificial fertilizer due to proper application of animal manures	Kg artificial fertilizer per ha	KLW		2020	
Prioritized measures (prio 3)						
Use concentrates with less methane emission	Falls into a project which the farmer participates in. So it's currently implemented. (although economical feasibility is a concern)	?	KLW		2020	
Production renewable energy	Farmer has installed solar Panels	% of energy which is renewable	0	100	2020	
Cooling manure	If the farmer builds a new barn a manure cooling installation is seriously considered	Average manure temperature?			2030	

5.9. LCF9

5.9.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Oegema	OV	Dairy	conventional	57.98	sandy	650 - 850	1,8

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
123.7	Jersey	9% fresh grass 35.9% silage grass 22.8% silage maize 3% other feed 0.2% wet by products 28.8% concentrates	6863 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	10563 kg DM/ha	Minimum cultivation
Silage maize	17588 kg DM/ha	Minimum cultivation

5.9.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Use low-emission feed ingredients (low Carbon Food Print)	Use feed stuffs with low Carbon food print	y/n	n	y	2022	Advisor and farmer
Improve forage quality	Moving ' young grass' resulting in high levels of energy and CP	Grass quality (energy, CP, digestibility)			2021	Farmer

[D3.2. Lead Commercial Farms Action Plans]

Optimize starch content of the diet	Use starch rich concentrates and produce maize silage with high starch content (early breeds, late harvest)	Starch content maize silage		170-180	2021	Advisor and farmer
Reduce crude protein content of the diet	Focus on a balanced feed ration (CP, starch, energy, digestibility)	CP feed ration (g/kg ds)	156	150	2021	Advisor and farmer
Reduce feed losses	Multi layer silage heaps (grass from different cuts; 'lasagne silage'). Advantage during feeding.	-			2021	Advisor and farmer
Optimize feed ration according to animal requirements	A stable and uniform base feed ration (grass and maize silage; multi layer silage heaps). Fine stuning with concentrates using tools. Key parameter is feed efficiency	Feed efficiency		> 1.5 (during lactation)	2020	Advisor and farmer
Improve grassland management	Maintaining grass swards with minimum use of pesticides and mechanical herb protection.	sward age?		> 10 yr	2015	Farmer
Incorporate legumes in grassland	75% of grassland area with clover (5-15%). After maize, new grassland sown with a grass/clover mixture	% legumes in grassland			2015	Farmer and advisor
Improve grazing practices	Change in grazing system (siesta grazing, in combination with milk robot), resulting in more grazing hours	grazing hours			2023	Farmer and advisor
Increase or maintain share of permanent pasture	Already a high share of PG. Under pressure due to legislation rules (obliged rotation of maize)	share of PG			2015	Farmer
Increase crop residues left on the soil	A combination of under sown with Italian rey (early july) and (if needed) rey after maize	Standing DM yield catch crop before incorporation			2020	Farmer

	harvest. Incorporation in spring.					
Adapt fertiliser application	Reduce mineral N fertiliser use on grassland due to introduction of legumes.	Mineral N per ha on grassland			2022	Farmer
Generate solar thermal energy and electricity	Solar Panels for own use (75%). Remainder use green energie import	y/n	n	y	2020	Farmer

5.10. LCF10

5.10.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Oosterhof	Drenthe	Dairy	Organic	93.87	Sandy	650-850	2

Number (of cows, ewes, sows, ...)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
104	HF/mixed	43.2% fresh grass 41.1% silage grass 15.7% concentrates	6312 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	6659 kg DM/ha	Mulching if necessary, aiming for minimum tillage
Silage maize	Not present	

5.10.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Priority 1						

Optimizing ration to needs of the cows	F: Intends to optimize the ration consisting of homegrown crops, that is, predominantly fresh grass and silage grass. The aim of this strategy is to reduce the required inputs of feed to the farm to the minimum	Feed efficiency			2020	
Improving quality of the grass sod	F: the aim is to require and maintain a species rich grassland with a high share of herbs and clover. This supports the feed quality. The aim is to achieve a stable 'healthy' status of soil quality, rooting system and plants.	Productivity of grass (kg dm/ha) Botanical composition of grass (% species)			2020	
Enhancing permanent grassland	F: grassland is renewed by mulching. Furthermore the mechanical impact is minimized as much is possible	- % pg	100	100	2020	
Improving grazing management	F: this is a premise to achieve a good ration from homegrown crops (roughage)	Kg imported feed per kg milk produced			2020	
Giving space to hedgerows that can be 'grazed' by cattle	F: wants to plant a hedgerow that cows can eat from	Yes/no M of hedgerow		?	2024	

5.11. LCF11

5.11.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Post	Drenthe; Netherlands	Dairy	Conventional	58.93	Sandy	650 – 850	

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
135	HF	4.5% fresh grass 31% silage grass 23.3% silage maize 4.1% other feed 1.1% wet by products 35.7% concentrates	9874 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	11097 kg DM/ha	Ploughing
Silage	14547 kg DM/ha	Ploughing

5.11.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Feed plant secondary metabolites that reduce methane synthesis	Experimenting with productive species rich grasslands. Clover and most herbs are lost in time but plantain stays.	y/n	N	Y	2022	
Optimize starch content of the diet	Choose maize breeds with high starch content. If grass growth is good and there is enough forage in stock, mow maize higher or maize is harvested as MKS or CCM.	G starch/ kg DM in maize silage	< 380 g / kg DM	> 380 g starch/ kg DM	2023	
Establish or maintain hedgerows and individual trees	0.25 ha of hedgerows is planted (200 m long) and 4 solitaire trees	y/n	N	Y	2023/2024	Dairy factory

Improve grazing practices	Rotational block grazing from 4 to 8 blocks.	# blocks	4	8	2022	Feed advisor
Lime soils when required	Keep soil pH around 5,5	Soil pH	<5.5	>5.5	2023	Fertilizer advisor
Apply low-emission fertilizers	Use fertilizer based on ammonia instead of CAN	y/n	N	y	2020	

5.12. LCF112

5.12.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Stevens	Overijssel	Dairy	conventional	46.2	sandy	65-850	1,3

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
102,2	HF	21.5% fresh grass 35.7% silage grass 17.3% silage maize 3% other feed 2.8% wet by products 19.3% concentrates	8026 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	13352 kg DM/ha	Ploughing
Silage maize	17094 kg DM/ha	Ploughing

5.12.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Priority 1						
Optimize general farm management	F: good housing, animal management and feed management support high feed efficiency of the herd, thus a high turnover of feed in products. This reduces the emission per liter milk	Feed offered per litre milk produced			2020	
High lifetime production by breed, management and young stock management	F: thus reducing the amount of unproductive animals				2020	
Higher maize share in ration	F: to reduce EF of ration (EF silage maize is usually lower than that of grass)				2021	WUR project
More uptake of fresh grass (grazing)	F: to reduce EF of ration (EF fresh grass is probably lower than that of silage grass)				2022	WUR project
Concentrates with low EF	To reduce methane emission	EF concentrates				WUR project/feed supplier
Low tillage in maize	F: C seq in soil and reduction of energy use	Spading machine instead of ploughing			2021	
Manure digestion	F: With quick transfer of manure to reduce methane emission from storage. Intention to do this with neighbours	Yes/no			?	

Species rich grassland	F: to enhance C seq	Botanical composition			2021	
A higher level of water in ditches and canals	F: to increase productivity of homegrown crops and reduce off farm emissions associated with feed inputs to the farm	Import of feeds per liter of milk sold			2021	Water board Rijn IJssel
Solar energy	F: for green energy				2020	RFC milk comPlanY

5.13. LCF13

5.13.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Van de Heijning	ZL	Dairy	conventional	60.03	clay	650 - 850	1,5

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
121.5	HF	8.8% fresh grass 27.7% silage grass 37.2% silage maize 2.4% other feed 23.7% concentrates	8608 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	10925 kg DM/ha	Ploughing
Silage maize	14202 kg DM/ha	Ploughing

5.13.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve forage quality	Moving ' young grass' resulting in high levels of energy and CP	Grass quality (energy, CP, digestibility)			2022	Farmer
Reduce feed losses	Improve harvest process by shorten the period between moving and harvest (same day). Mowing grass with conditioners. Precise and secure management during feeding to prevent (extra)losses (reducing infiltration of air in silage heaps).	-			2021	Farmer
Improve grassland management	Maintaining grass swards with minimum use of pesticides and mechanical herb protection.	sward age?		> 10 yr	2015	Farmer
Incorporate legumes in grassland	If possible, new grassland sown with a grass/clover mixture.	% legumes in grassland			2020	Farmer and advisor
Improve grazing practices	Change and adjust grazing system (continues grazing) in combination with mowing between grazing cuts (for 'fresh grass' in the next grazing cut).	DM intake per hour grazing			2023	Farmer and advisor

5.14. LCF14

5.14.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Neutel	Groningen	Dairy	Conventional	97	clay	650-850	1,5

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
192	HF	9.9% fresh grass 35% silage grass 17.5% silage maize 3.6% other feed 0.9% wet by products 32.6% concentrates	9874 L/cow/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grassland	13852 kg DM/ha	Ploughing

5.14.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Prioritized measures (prio 1)						
Improve quality of homegrown crops (roughage)	F: Explore possibilities. Is always profitable.	Feed efficiency cattle			2020**	
Growing legumes for N fixation	F: In grass/clover mixtures, possibly also Luzern. Combined with corresponding reduction of protein purchase to the farm. This is important and	- % land with legumes - % clover in grass/clov			2020	

	in the same time a challenge	er mixtures				
No till/reduced tillage	F: is already low	Tilling methods			2020	
Save energy	Reduced use of fossil fuel. F: This is a now regret action	Annual use of fossil fuels (l/yr)	KLW*		2020	Lely vector
Reduce nonproductive animals	Eg. a high lifetime production and low annual replacement of cows (enhance efficiency). F: longer lactation periods	Mean lifetime production of the cattle (kg per cow)			2020	
Prioritized measures (prio 2)						
More grazing	With a focus on enhancing the daily uptake of grass from the pasture during grazing	Uptake p day p cow (kg dm per day)	KLW		2022	
Low RE ration	With a focus on reducing the use of soja	RE % ration % soja used	KLW	1500	2022	
Adding more organic C by using composts	Keeping solid manure on the farm, rather than exporting it. Preferably by applying farm specific standards for supply of organic manure on the farmland (BES)	C input to land (kg/ha)		Steady state	2023	
Maintain or increase permanent grassland	F: the share of permanent grassland is not high and it can hardly be enhanced. But crop rotation (ley/maize) is on the basis of no till	% permanent grassland of total AA	KLW	Steady state	2020	
Use renewable energy	F: robot for collecting feeds and bringing it to animals works on electricity (Lely vector). All electricity is already renewable (wind and solar).	Use of electricity/ fuels (all in kWh?)		Blijft	2023	
Improve animal health	To minimize feeds that are needed to support life processes of the	Body condition score			2020	

	animals (enhance efficiency)	Energy uptake p cow. Sensor technics/ data collection				
Prioritized measures (prio 3)						
Reducing N fertilization	F: Aiming at low N surplus by saving N in dry periods, possibly precision fertilization	Kg fertilizer N per ha	KLW		2023	
Produce renewable energy	F: solar panels and 3 wind mills are installed	kWh per year produced	310.000 kwh.		2017/2021	
Improve animal genetics	To get a breed with lower methane emission F: pays attention in his breeding strategy	Lifetime production of the cattle			When available	
Measures that are not applicable/not preferred						
Fertilizers with low emission	F: I tried this, but performance was not adequate				Not relevant	
Adding nitrate to feed	F: Too many risks for animal health				Not relevant	
Adding fats to ration	F: not preferred because palm oil also puts a pressure on CO2				Not relevant	
Agroforestry	F: impact not significant, only minor actions close to buildings.				Not relevant	
Planting hedgerows etc	F: does not fit in the landscape				Not relevant	
Incorporating crop residues (not take it from the fields)	F: all plant residues are already incorporated (potato leaves, stubbles of maize, etc...)				Not relevant	

* : KringloopWijzer (ANCA)

** : when a measure was already applied before 2020 we set the year of implementation at 2020

6 Swiss Dairy I3S

I3S manager: Jan Grenz

6.1. LCF1

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Hof 1	Bern	Dairy cows, pigs, crops, biogas	Conventional ÖLN	83.66	Loamy soil	1136.6	4 full-time family workers, 2 apprentice and 2 collaborators

Number (of cows, ewes, sows, ...)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
138 milk cows	Mainly Holstein, some Red Holstein and Jersey	46% maize silage 24% grass silage 15% sugar beet pulp silage 10% hay 3% dried grass 1% brewer's grain Concentrates: 2,058.50 kg DM/cow/year	Milk: 11,508 kg ECM/cow/year Output meat: 36,081 kg /year
115 adult productive pigs 750 places for fattening pigs (growing to 950 places in 2023)	Schweizer Edelschwein	Maize corn-cob mix and Concentrates	On average 2,800 fattening pigs and 400 piglets exported/year
40 laying hens	-	-	290 eggs/hen/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
maize silage	18.5 t DM/ha	ploughing
maize corn	12 t DM/ha	ploughing
winter wheat	6 -9 t DM /ha	Chisel plough (minimum cultivation)
barley	9 t DM /ha	Chisel plough (minimum cultivation)
canola	3.5 t DM /ha	Chisel plough (minimum cultivation)
extensive grassland	3 t DM /ha	permanent grassland
High-intensity grassland	16 t DM /ha	Chisel plough (minimum cultivation)
permanent pasture	9.5 t DM /ha	permanent grassland
sugar beets	90 t DM /ha	Chisel plough (minimum cultivation)
lucerne	16 t DM /ha	Chisel plough (minimum cultivation)

6.1.1. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Use anaerobic digestion & use biofuels, biogas and biomass & use renewable electricity	A biogas plant was installed in 2018/19, animal feces from the farm and horse feces from a neighboring farm go through the biogas plant. 10'000 m ³ of biogas digestate leave the farm after anaerobic digestion. Electricity from biogas plant (and photovoltaic, wood chip combustion) is fed into the grid.	GHG emissions per kg of milk	2017: 0.91 kg CO ₂ e/kg ECM 2019: 0.610 kg CO ₂ e/kg ECM	2022: 0.601 kg CO ₂ e/kg ECM	2019	Canton, municipality
Apply low-emission fertilizers	Application of ENTEC-26, a product recognized by the Federal Office for the Environment as reducing nitrous oxide (and therefore protecting the climate), is used for nitrogen fertilization.	Amount of ENTEC-26 used	2018: 0 t	2021: 19.24 t of ENTEC-26 in total to produce winter wheat, barley and maize	Starting in 2019	-
Feces-urine separation (pigs)	As future measure feces-urine separation is planned for the pigs. Goal is the reduction of ammonia emissions. Urine will be treated with bacteria (EAWAG)	Number of pig places where feces-urine separation is installed	2022: 0 places	2023: 950 places	2023	EAWAG for urine treatment
Optimize the type and amount of concentrates & Use low-emission feed ingredients	Along with KlimaStaR-Milch project the amount and type of concentrates is optimized to lower GHG emissions and reach a lower feed-food competition.	Feed-food competition & GHG-emissions per kg of energy	Feed-food competition: 0.922 kg crude protein/kg crude protein	For both indicators : The lower the better	2023	KlimaStaR-Milch project team and advisors

& Reduce crude protein content of the diet		corrected milk (ECM)	GHG per kg of energy corrected milk: 0.604 kg/ CO ₂ e/kg ECM			
Additional wood heating plant for heating flats and community buildings	Currently heating network involves 100 flats, one community centre and school building	Number of flats heated with wood heating	70 flats	400 flats	2024-2026	-

6.2. LCF2

6.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Hof 2	Zurich	Suckler cows, crops	Conventional ÖLN	28	Loamy soil	1081.2	About 1.5 full time & seasonal workers

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
3.4 mother cows, 4.8 heifers & 1.3 calves	angus	pasture and grass silage in winter	3 animals per year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
winter wheat	8 t DM /ha	Regenerative practices; direct sowing after sunflowers
barley	10.5 t DM /ha	Regenerative practices
maize silage	18 t DM /ha	"
canola	4.5 DM t/ha	"
sugar beets	100 t DM /ha	"
extensive grassland	2.5 t DM /ha	permanent grassland
mid-intensity grassland	8.5 t DM /ha	Regenerative practices
high-intensity grassland	13.3 t DM /ha	"
low-intensity grassland	6 t DM /ha	"

hemp	18 t DM /ha	“
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6.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate intersown or inter-relayed crops	The farmer cultivates a variety of intercrops to cover the soil as much as possible all year round. In addition, nitrogen can be fixed by legumes.	Ha with intercrops per season	5%	100%	2023	-
Reduce soil tillage	Tillage is only carried out where necessary and as gently as possible. Ploughing is not the first choice.	Ha not ploughed (total arable land with artificial meadow)	30%	100%	2023	-
Establish or maintain agroforestry	From January 2023, agroforestry will be practiced on a small area.	Amount of hectares under agroforestry	0	0.5 ha	2023	Swiss centre for Agricultural Advisory and Extension Services Agridea

6.3. LCF3

6.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Hof 3	Bern	Dairy, pigs, cereal production, agriculture with penal system.	conventional	632.6	Sandy loam, peat soils	1065.8	20 full-time collaborators and 40 prisoners

Number (of cows, ewes, sows, ...)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
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90 dairy cows	Eight different breeds	Grass silage: summer 27%, winter 47% Hay: summer 12%, winter 19% Maize silage: summer 25%, winter 30% Sugar beet silage: summer and winter 4% Pasture in summer 32%	Milk: 8,183 kg ECM/cow/year Output meat: 21,416 kg /year
25 pigs, 350 fattening pigs and 50 piglets	Schweizer Edelschwein	Fattening pigs: 43% barley 20% wheat 8% maize some wheat starch, wheat bran, sugar beet pulp...	700 fattening pigs * 120 kg = 84,000 kg slaughter weight (year 2023)

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
maize silage	8.2 t DM /ha	No-Till (direct drilling)
Maize corn	10 t DM /ha	No-Till (direct drilling)
wheat	6.5 t DM /ha	No-Till (direct drilling)
triticale	6 t DM /ha	No-Till (direct drilling)
potatoes	45 t DM /ha	Plough, Power harrow
Sugar beets	90 t DM /ha	No-Till (direct drilling)
peas	4 t DM /ha	No-Till (direct drilling)
barley	6 t DM /ha	No-Till (direct drilling)
colza	3.5 t DM /ha	No-Till (direct drilling)
sunflowers	3 t DM /ha	No-Till (direct drilling)
Potatoes for seed	25 t DM /ha	Plough, Power harrow
salads	40 t DM /ha	Plough, Power harrow
rhubarb	17 t DM /ha	None
apple production	29 t DM /ha	None
pastures and grassland of different intensity	2.5-9 t DM /ha	No-Till (direct drilling) or permanent grassland

6.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce soil tillage	Measures to limit humus degradation are being pursued (peat soils)	Number of hectares with tillage cultivation methods	30 - 40 ha	< 20 ha	2024	-
Cultivate cover crops	The farm uses green manures and clover in the crop rotation to cover the soil.	Number of hectares where cover crops (green manures, clover in rotation) are cultivated.	79 ha (2021)	> 100 ha	Starting in 2021	-
Optimize the type and amount of concentrates & Use low-emission feed ingredients & Reduce crude protein content of the diet	Along with KlimaStaR-Milch project the amount and type of concentrates is optimized to lower GHG emissions and reach a lower feed-food competition.	Feed-food competition & GHG-emissions per kg of energy corrected milk (ECM)	Feed-food competition: 0.768 kg crude protein/kg crude protein GHG per kg of energy corrected milk: 0.911 kg/CO ₂ e/kg ECM	For both indicators: The lower the better	2022-2027	KlimaStaR-Milch project team and advisors
Use biofuels, biogas and biomass	Concrete plans already exist for a biogas plant, but implementation has so far been difficult due to various decision-makers and their interests which have an influence on the farm.	GHG emissions per kg of milk	GHG per kg of energy corrected milk: 0.911 kg/CO ₂ e/kg ECM	The lower the better	Not clear	-

strategy for the following measures: Cultan fertilisation with recycled N, photovoltaics, and expansion of no-till areas.	As agriculture in the canton of Bern is currently being reviewed by the cantonal government, it is not yet possible to set an implementation date.					
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6.4. LCF4

6.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Hof 5	Zurich	Arable production without animals	organic	39.3	Sandy loam	1081.2	3 family workers for less than 1 day per week besides

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
wheat	6 t DM /ha	minimum cultivation (chisel plough)
barley and protein peas	4.5 t DM /ha	minimum cultivation (chisel plough)
sunflowers	3 t DM /ha	minimum cultivation (chisel plough)
maize, corn	10 t DM /ha	minimum cultivation (chisel plough)
extensive pasture	3 t DM /ha	minimum cultivation (chisel plough)
intermediate forage, grazing, spring cutting before meadow ploughing	2.5 t DM /ha	minimum cultivation (chisel plough)
high-intensity grassland	13.5 t DM /ha	minimum cultivation (chisel plough)

6.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Apply organic fertilizers / Adapt fertiliser application	A reduction in the use of mineral fertilizers was also pursued as part of the AgroCO2ncept project.	Percentage of nitrogen which comes from mineral fertilizers	NA	0 %	2011	-
Increase crop residues left on the soil	Harvest residues as well as straw and a cut of the artificial meadow remain on the fields as biomass (mulch).	number of hectares where residues are left on the soil.	approx. 8 ha	39.9 ha	2012	AgroCO2ncept project
Cultivate cover crops	Clover and green manure are cultivated between the main crop cultivation periods.	Number of hectares where cover crops are cultivated.	16.53 ha	approx. 25 ha	2012	AgroCO2ncept project
Reduce soil tillage	Direct sowing was practiced until 2010, since then the farm has worked with minimum tillage to a maximum depth of 8 cm.	Number of hectares with minimum tillage (chisel plough)	0 ha (2010: direct seeding not yet an organic farm)	39.9 ha (2021)	2010	AgroCO2ncept project
Cultivate intersown or inter-relayed crops	Increased use of underseed starting in 2023	-	-	-		-

Others; biochar production; reduce machine fleet	The farm operates with a low energy intensity per hectare. Much of the work is carried out by third parties (sowing, combine harvesting, fertilizer spreading and removal of forage). In addition to the farm, the Meier and Breiter families founded Auenpflegedienst Aktiengesellschaft (APD AG) in 2002. The company recycles green waste and composts green waste, maintains nature conservation areas and forests in the region and has been producing biochar using a pyrolysis process since 2019.	Amount of biochar produced by Auenpflegedienst Aktiengesellschaft (APD AG)	0 kg	422,400 kg (in 2023)	2019 - 2023	-
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6.5. LCF5

6.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Hof 6	Zurich	Dairy cows, cereal production, agrotourism	conventional	66.04	Sandy loam	1081.2	2 full-time equivalents, several part-time family workers and seasonal workers.

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
70 dairy cows, plus heifers and calves	Holstein, Red Holstein, Brown Swiss	Mainly maize silage, grass silage and concentrates	8,500 kg milk/year/cow (2021)

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
maize silage	19.7 t DM /ha	strip-till drilling
wheat	6 t DM /ha	mostly harrowing and no ploughing
barley	8 t DM /ha	harrowing
Sugar beets	90 t DM /ha	ploughing
potatoes	45 t DM /ha	ploughing
Early potatoes	30 t DM /ha	ploughing
extensive grassland	3.2 t DM /ha	permanent grassland
high-intensity grassland	11.9 t DM /ha	harrowing
mid-intensity grassland	7.5 t DM /ha	permanent grassland
low-intensity grassland	3.5-4.6 t DM /ha	permanent grassland
permanent pasture	7.5-7.8 t DM /ha	permanent grassland

6.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Feed methanogenic inhibitors	Agolin is fed to the dairy cows as methanogenic inhibitor.	Amount of Agolin used per day and cow	0 g/day/cow	1 g/day/cow	2022	Milk collector Mooh
Optimize the type and amount of concentrates	This farm has already participated in AgroCO2ncept project from 2018 until 2021. According to the farmer, the amount of concentrated feed used per kg of ECM milk was reduced also due to the participation in the project.	Amount of concentrated feed used per day/cow.	127 g/day/cow (2015)	100 g/day/cow (2021)	2018-2021	Support from cantonal advisory service Strickhof (Josias Meili)
Generate solar thermal energy and electricity	Solar energy is used to produce electricity and to heat up water.	Percentage of electricity used for agriculture generated by	0%	37% (30'000 kWh)	2021	Christof Koller, ZHAW

		the own solar panels.				
Cultivate cover crops	Clover and green manure are cultivated between the main crop cultivation periods.	Number of hectares where cover crops are cultivated.	NA	10.9 ha (2021)	2016 - 2022	-

6.6. LCF6

6.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Hof 7	Zurich	Dairy, cereal production	conventional	38.7 ha	Sandy loam	1081.2	2 full-time equivalents

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
20 dairy cows, plus heifers and calves	Brown Swiss	Mainly maize silage, grass silage with smaller amounts of sugar beet silage and concentrates. Pasture: 120 days/year for approx. 4h/day	Milk production: 7,800 kg milk/ year/cow

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
wheat	7.2 t DM /ha	ploughing
barley	8.5 t DM /ha	no-till
colza	3.4 t DM /ha	disc harrowing
sugar beets	89.5 t DM /ha	ploughing
maize silage	17 t DM /ha	harrowing
soya	3.2 t DM /ha	harrowing
extensive and intensive pastures	2 – 9 t DM /ha	permanent pasture
ley	10.4 t DM /ha	ploughing

6.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops	Green manure and mixtures with phacelia are cultivated between the main crop cultivation periods.	Number of hectares where cover crops are cultivated.	5.85 ha (year 2021)	12 ha	2022	-
Cultivate intersown or inter-relayed crops	As part of various projects (such as Agrofutura's Relay Intercropping advisory project), direct sowing and mixed cultivation were pursued. The farmer cultivates soya and wheat in a mixed cropping system.	Number of hectares with mixed cropping systems	0 ha	0.15 ha (year 2021)	2021	-
Reduce soil tillage	Tillage is only carried out where necessary and as gently as possible. Ploughing is not the first choice. In 2023, the farm purchased a strip-till machine for direct seeding.	Number of hectares not ploughed (total arable land with artificial meadow)	2 ha	16 ha	2001-2023	-

6.7. LCF7

6.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Hof 4	Graubünden	Full-time grazing system sheep and suckler cows with	Organic (Demeter)	30	Loamy sand	921.8	2-3 full-time equivalents, 2 apprentice

		slaughtering on farm, vegetable and cereal production, direct marketing					and seasonal workers
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Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
10 fattening cattle	Tiroler Grauvieh	50% hay, 50% silage and grazing	weight gain per day: 700 g
15 suckler cows with calves and bulls	Mixed breed	8 t of hay and 11t of silage in addition to grazing	weight gain per day calves: 1200 g
6 sheep	Mixed breed	grazing only	weight gain per day: 200 g

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
rye	4.5 t DM /ha	No-till, mulch seeding, Geohobel
wheat	5 t DM /ha	Minimum cultivation with Geohobel
emmer	2 t DM /ha	Minimum cultivation with Geohobel
potatoes	35 t DM /ha	plough and rotary harrow
lentils	8 t DM /ha	plough and rotary harrow
buckwheat	2 t DM /ha	Minimum cultivation with Geohobel
Garlic and other vegetable	10.25 t DM /ha	plough and rotary harrow
extensive grassland	1.7-2.3 t DM /ha	permanent grassland
High-intensity grassland	6.4 t DM /ha	Minimum cultivation with Geohobel
low-intensity grassland	2.5 t DM /ha	Minimum cultivation with Geohobel
mid-intensity grassland	3.5 t DM /ha	Minimum cultivation with Geohobel
permanent pasture	1.7 t DM /ha	permanent grassland

6.7.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce soil tillage	Tillage is only carried out where necessary and	Ha not ploughed (total arable land with artificial meadow)	0 ha	30 ha	Starting in 2016 until 2023	Partner farm

[D3.2. Lead Commercial Farms Action Plans]

	as gently as possible. Ploughing is not the first choice.					
Establish or maintain hedgerows and individual trees	The landscape structure elements have developed in a desirable direction.	Proportion of area with ecological quality	NA	45%	Until 2021	
Cultivate cover crops	Cultivate Rye and rye/peas as cover crops	Hectares of land where cover crops are cultivated	0 ha	3.5 ha	2023	
Apply organic fertilizers	Composting of farmyard manure	Percentage of total farmyard manure composted	0%	100%	2018	Neighbouring farm has compost turner
Generate solar thermal energy and electricity	The construction of a photovoltaic system is planned.	Amount of electricity produced through solar panels	0%	100%	2025	Federal Funding
Diversify crop rotation	Cultivate vegetables and develop a regional delivery service with vegetable subscriptions	Number of hectares used for vegetable production	0 ha	1.24 ha (2021), 3 ha (2025)	2021	Partner farm: Clavaetscher Malans

7 German Dairy I3S

I3S manager: Deise Knob and Andreas Gattinger

7.1. LCF1

7.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labour units
Hof Barmbach	Hessen (Germany)	Dairy cows and crops	Organic	76		650	

Number (of cows)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
65 dairy cows	Holstein	27% maize silage 45% grass (fresh + grazed + silage) 4% straw + hay 24% concentrate	8500 L/cow

Crop type	ha	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat	11.3	5.5 t DM /ha	Ploughing
Rye	1.8	5.5 t DM /ha	Ploughing
Spelt	1.5	5.5 t DM /ha	Ploughing
Sugar beet	5.5	6.5 t DM /ha	Ploughing
Triticale	4.6	5.5 t DM /ha	Ploughing
Peas	3.4	5.5 t DM /ha	Ploughing
Faba bean	6.7	3.1 t DM /ha	Ploughing
Silage maize	10.5	15 t DM/ha	Ploughing
Potatoes	1.0	30 t DM /ha	Ploughing

7.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve slurry management	The farmer will install a slurry separator to fractionate the solid and liquid components of the slurry		Regular open slurry tank		2024	Advisor
Improve slurry management	Cover the slurry tank		Open slurry tank		2024	
Cultivate cover crops	Use this practice on all the summer crops				More than 10 years ago	
Cultivate legume crops	Added to the crop rotation				More than 10 years ago	
Generate solar energy	Generate green energy	kWh generated at the farm	Buy "conventional" energy	Use of the energy generated at the farm	More than 10 years ago	
Use of green energy	In wintertime, when the generation capacity is lower, the farmer buys "green energy"				More than 5 years ago	
Incorporate legumes in grassland	At least 10% of clover added to the grassland	% of legumes in grasslands			More than 10 years ago	

7.2. LCF2

7.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labour units
Schwalbenhof	Hessen (Germany)	Dairy cows and crops	Organic	119		622	

Number (of cows)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
118 dairy cows	Holstein/Simmental /crossbreeds	Summer 78.1% grass (fresh + grazed) 21.9% concentrate Winter 16.5% maize silage 62.0% grass silage 21.5% concentrate	6000 L/cow

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Millet	5.3 t DM /ha	Ploughing
Rye	3.5 t DM /ha	Ploughing
Cereal-legume mixture (wheat, barley, peas)	3.5 t DM /ha	Ploughing
Triticale	4 t DM /ha	Ploughing
Maize Silage	12.25 t DM /ha	Ploughing
Alfalfa	9 t DM /ha	

7.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve slurry management	Installation of a biogas unit to improve the slurry management and generate energy		Regular open slurry tank		2025	Advisor
Improve slurry management	Cover the slurry tank (automatic with the installation of the biogas unit)		Open slurry tank		2024	Advisor
Cultivate cover crops and under-sowing	Use this practice on all the summer crops. For under-sowing: seed the clover while the crops are still on the field)					More than 10 years ago
Cultivate legume crops	Added to the crop rotation					More than 10 years ago
Incorporate legumes in grassland	At least 10% of clover added to the grassland					More than 10 years ago
Diversify crop rotation						

7.3. LCF3

7.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labour units
Rescheider Hof	Rheinland-Pfalz (Germany)	Dairy cows and crops	Organic	210			

Number (of cows)	Breed	Average ration (DM)	Average production (milk per year, meat per year, number of pigs sold per year, ...)
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85 dairy cows	Holstein 90% Crossbreeds 10 %	Summer 80% grass (fresh + grazed) 12% (straw and hay) 8% concentrate Winter 9% maize silage 12% (straw and hay) 68% grass silage 11% concentrate	6000 L/cow
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Crop type	Ha	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
11	10.9	4 t DM /ha	Ploughing
Rye	8.5	4 t DM /ha	Ploughing
Spelt	8.1	5.5 t DM /ha	Ploughing
Barley	12.1	3.5 t DM /ha	Ploughing
Maize Silage	6.6	11 t DM /ha	Ploughing
Cereal-legume mixture (wheat, barley, peas)	7.7	3.8 t DM /ha	Ploughing
Summer Oat	7.7	4.5 t DM /ha	Ploughing

7.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve slurry management	Cover the slurry tank		Open slurry tank		2025	Advisor
Reduce the age at the first calving	Improve the feed management of the young animals	27 months	30 months	27 months	2025	Feed advisor
Cultivate cover crops	Use this practice for all the summer crops				More than 10 years ago	
Cultivate legume crops	Added to the crop rotation				More than 10 years ago	

Generate solar energy					More than 5 years ago	
Use of green energy					More than 5 years ago	
Incorporate legumes in grassland	At least 10% of clover added to the grassland				More than 10 years ago	

7.4. LCF4

7.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labour units
	Lichtenau-Iggenhausen	Dairy cows and crops	Organic	74			

Number (of cows)	Breed	Average ration (DM)			Average production (milk per year, meat per year, number of pigs sold per year, ...)
65 dairy cows	Holstein and Crossbreeds with Simmental	Ingredients	kg_DM_per day_winter	kg_DM_per day_summer	9920 L/cow
		Maize silage	8	5	
		Hay	0.5	0	
		Straw	0.5	1	
		Grass silage	8	7	
		Fresh grass	0	4	
		Concentrate	6	5	
		Total	23	22	

Crop type	ha	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Wheat	10.5	4.5 t DM /ha	Ploughing
Faba Beans	10.6	6 t DM /ha	Ploughing
Spelt	8.9	5 t DM /ha	Ploughing
Maize Silage	14.5	11 t DM /ha	Ploughing
Grass-Clover	16.4	25 t DM /ha	Ploughing

7.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve slurry management	Cover the slurry tank		Open slurry tank		2025	Advisor
Improve slurry management	Change the application method from "broadcast application" to "trailing shoe application"		broadcast application	trailing shoe application	2024	Federal Law
Cultivate cover crops	Used this practice for all the summer crops				More than 10 years ago	
Cultivate legume crops	Added legume crops (alfalfa, clover, beans etc.) to the crop rotation	Presence of legume in the crop rotation		Farm use about 45% of legume on the crop rotation	More than 5 years ago	
Generate wind energy	The farmer created an association with other farmers to install windmills		Conventional energy	Use of renewable energy	More than 5 years ago	
Incorporate legumes in grassland	Increased the legumes in the resown temporary grasslands	% of legumes in grasslands	0%	15%	More than 10 years ago	

7.5. LCF5

7.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labour units
Biohof Jacobi	Borgentreich-Körbecke	Dairy cows and crops	Organic	175.5			



Number (of cows)	Breed	Average ration (DM)			Average production (milk per year, meat per year, number of pigs sold per year, ...)
55 dairy cows	Holstein				9800 L/cow
		Ingredient	kg DM winter	kg DM summer	
		Maize Silage	5	0	
		Hay	1.75	0	
		Straw	0	2	
		Grass silage	7	6.5	
		Fresh grass + clover	0	8	
		Concentrate	6	5.5	

Crop type	ha	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Wheat	15	5 t DM /ha	Ploughing
Faba beans	16.75	3 t DM /ha	Ploughing
Spelt	10	4 t DM /ha	Ploughing
Maize silage	4	12.5 t DM /ha	Ploughing
Rye	9.5	4 t DM /ha	Ploughing
Triticale	10	5 t DM /ha	Ploughing
Barley	10.5	4 t DM /ha	Ploughing
Oat	7.25	5 t DM /ha	Ploughing
Clover	28	25 t DM /ha	Ploughing

7.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve slurry management	Cover the slurry tank		Open slurry tank		2025	Advisor
Improve slurry management	Change the application method from "broadcast application" to "trailing shoe application"		broadcast application	trailing shoe application	2024	Federal law

Cultivate cover crops	Use this practice on all the summer crops				More than 10 years ago	
Cultivate legume crops	Added legume crops (alfalfa, clover, beans etc.) to the crop rotation	Presence of legumes in the crop rotation		Farm used about 41% of legume on the crop rotation	More than 15 years ago	
Generate solar energy	The farm generates 130 000 kWh p.a. For the dairy barn 31 000 kWh p.a. are necessary				More than 10 years ago	
Incorporate legumes in grassland	Increase legumes in the resown temporary grasslands	% of legumes in grasslands	0%	15%	More than 10 years ago	

7.6. LCF6

7.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labour units
	Medebach-Düdinghausen	Dairy cows and crops	Organic	165.5			

Number (of cows)	Breed	Average ration (DM)	Average production (milk per year, meat per year, number of pigs sold per year, ...)
166 dairy cows	Holstein	45% concentrate (not produced on the farm) 55% roughage produced on the farm	11700 L/cow

Crop type	ha	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Rotation between Maize silage and clover	15.5	12.5 t DM /ha	Ploughing
The land for maize silage production is			

leased. The farm returns the slurry to the maize area			
Grassland	150 ha of the farm are grassland	Dry and hilly region, the productivity is not high	

7.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve slurry management	Cover the slurry tank		Open slurry tank		2025	Advisor
Improve slurry management	Change the application method from "broadcast application" to "trailing shoe application"		broadcast application	trailing shoe application	2024	Federal law
Generate solar energy	They already installed the capacity to produce 270 kWh peak			Produces energy for the farm and to sell	More than 5 years ago	
Cultivate legume crops	Added legume crops (alfalfa, clover, beans etc.) to the crop rotation	Presence of legume in the crop rotation		Farm uses rotations between maize silage and clover	More than 15 years ago	
Incorporate legumes in grassland	Increase the legumes in the re-sown temporary grasslands	% of legumes in grasslands	0%	15%	More than 10 years ago	
Increase or maintain share of	The farm will maintain the permanent grassland areas					

permanent pasture						
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7.7. LCF7

7.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labour units
	Twistetal-Niederwaroldern	Dairy cows and crops	Organic	213 ha (50 ha grass land + 163 crop land)			

Number (of cows)	Breed	Average ration (DM)	Average production (milk per year, meat per year, number of pigs sold per year, ...)
53 dairy cows	Simmental and Crossbreeds	Summer: 85% fresh grass + 15% concentrate Winter: 85% grass/clover silage mix + 15% concentrate	5200 L/cow

Crop type	ha	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
			This farm uses a minimum tillage approach, their productivity is also lower than typical organic farms which plough the soil
Rye	36	2.8 t DM /ha	No Ploughing system
Spelt	53	2.8 t DM /ha	No Ploughing system
Clover	72		No Ploughing system

7.7.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve slurry management	Cover the slurry tank		Open slurry tank		2025	Advisor
Generate solar energy	Install solar panels to generate solar energy (green energy)		No renewable energy source		2024	advisor
Cultivate cover crops	Use this practice on all the summer crops				More than 15 years ago	
Cultivate legume crops	Added to the crop rotation	Percentage of legumes in the crop rotation		Almost 50% of the cultivated area is growing legumes	More than 15 years ago	
Incorporate legumes in grassland	At least 10% of clover added to the grassland	% of legumes in grasslands			More than 15 years ago	
Reduce soil tillage	The farm uses a system with no ploughing	Total areas with reduced or no tillage	Ploughing 30 cm deep	no ploughing in all areas	More than 5 years ago	

7.8. LCF8

7.8.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labour units
	Waldeck-Dehringhausen – Hesse, Germany	Dairy cows and crops	Organic	220 ha (20 ha grass land + 200 ha crop land)			

Number (of cows)	Breed	Average ration (DM)	Average production (milk per year, meat per year, number of pigs sold per year, ...)
120 dairy cows	Holstein	Grass silage (+ fresh grass in summer) 70% Concentrate 30%	7000 L/cow

Crop type	ha	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Wheat	54	4.5 t DM /ha	Ploughing
Oat	32	4.0 t DM /ha	Ploughing
Spelt	20	4.0 t DM /ha	Ploughing
Rye	18	3.5 t DM /ha	Ploughing
Triticale	13.5	5.0 t DM /ha	Ploughing
Faba beans	5.5	3.5 t DM /ha	Ploughing
Sunflowers	6.5		Ploughing
Lupines	6.8		Ploughing
Clover	36		Ploughing

7.8.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve slurry management	Cover the slurry tank		Open slurry tank		2025	Advisor
Generate solar energy	Installed solar panels to generate solar energy (green energy)		No renewable energy source		Since 2013	
Cultivate cover crops	Use this practice on all the summer crops				More than 10 years ago	
Cultivate legume crops	Added to the crop rotation	Percentage of legumes on the crop rotation		About 25 % of legume crop cultivation	More than 10 years ago	

Incorporate legumes in grassland	At least 10% of legumes/clover added to the grassland	Percentage of legumes in grasslands			More than 10 years ago	
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7.9. LCF9

7.9.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labour units
	Bad Wildungen	Dairy cows and crops	Organic (Since 2018)	130 ha (27 ha grass land + 103 ha crop land)			

Number (of cows)	Breed	Average ration (DM)		Average production (milk per year, meat per year, number of pigs sold per year, ...)
72 dairy cows	Holstein	Ingredients	%	11000 L/cow
		Maize silage	27.3	
		Grass silage	30.4	
		Wheat	14.2	
		Soy pulp	21.0	
		Faba Beans	5.3	
		Minerals	0.75	
		Total	57.7% Roughage 41.5 % Concentrate	

Crop type	ha	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Wheat	31	6.2 t DM /ha	Ploughing
Maize silage	18	40 t DM /ha	Ploughing
Spelt	17	4 t DM /ha	Ploughing
Oat	2	6 t DM /ha	Ploughing
Faba beans	17	4.5 t DM /ha	Ploughing
Clover	18		

7.9.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Biogas	Installed a biogas system for the slurry with a neighbour as a partner		Open slurry tank		More than 5 years ago	
Generate solar energy	Installed solar panels to generate green energy		No renewable energy source		More than 10 years ago	
Cultivate cover crops	Use this practice on all the summer crops				More than 10 years ago	
Cultivate legume crops	Added to the crop rotation	Percentage of legumes on the crop rotation		About 20 % of legumes in the crop cultivation	More than 10 years ago	
Incorporate legumes in grassland	At least 10% of clover added to the grassland	% of legumes in grasslands			More than 10 years ago	

7.10. LCF10

7.10.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labour units
	Gummersbach - Hesse	Dairy cows	Organic (converted 5 years ago)	98			

Number (of cows)	Breed	Average ration (DM)	Average production (milk per year, meat per year, number of pigs sold per year, ...)
64 dairy cows	Simmental and crossbreeds	Farm uses a grassland-based system. Grass silage + fresh grass in summer Average 4 kg concentrate/cow.	6200 L/cow

Crop type	ha	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
The farm does not produce any crop other than 6 ha of clover			
All the other farm areas are grassland			

7.10.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve slurry management	Cover the slurry tank		Open slurry tank		2025	Advisor
Improve slurry management	Change the application method from "broadcast application" to "trailing shoe application"		broadcast application	trailing shoe application	2024	Federal law
Cultivate legume crops	Added legume crops (alfalfa, clover, beans etc.) to the crop rotation	Presence of legumes in the crop rotation			More than 10 years ago	
Generate solar energy					More than 5 years ago	
Incorporate legumes in grassland	Increase the legumes in the resown temporary grassland	Percentage of legumes in grassland	0%	15%	More than 10 years ago	

8 New Zealander dairy I3S

missing

9 Spanish Dairy I3S

9.1. LCF1 Danone

I3S manager: José Yague

9.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Can Pol	Catalunya (Spain)	Dairy cows and crops	conventional	230	Medium soil	650	4 full time

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
370 dairy cows	85% Holstein 15% Brown	15% maize silage 25% grass (grazed+silage) 15% Sub-products 45% Concentrates	10,200L/ Cow (milking + dry cows)

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize silage	40 t of FM/ha	Ploughing
Protein silage	13 t DM /ha	Ploughing

9.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce number of unproductive animals	Reduce the replacement rate by rearing less heifers and increasing the cow's longevity	Replacement rate	34%	28%	2020	Veterinarian and Advisor specialized in heifers' management
Incorporate legumes in grassland	Increase the legumes in the resown temporary grasslands	% of legumes in grasslands	25%	75%	2020	Advisor specialized in forage production
Optimize the type and number of concentrates	Change to soya with traceability and certified	Certification of supplier	0% soja certified	80% soja certified	2021	Nutritionist
Increase % composting in the farm	More quantity of dejections composting in the farm	% composting	0% composting	50%	2019	Farmer

9.2. All AGACAL LCFs

I3S manager: César Resh

9.2.1. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Decrease number of unintentional open days (1)	Individual milk pregnancy test within days 30 and 100 after positive AI	Open days in farm	In progress	150/170	November 22	Farm advisor
Implementing a grouping strategy for	Grouping cows depending on their	Grams of concentrate		200/230 grams of	November 22	Farm advisor

feeding lactating dairy cows (2)	nutritional necessities	per liter of milk		concentrate per liter		
New crops for a lower GHG emissions (3)	20% of surface with maize is swapped to sunflower	% of sunflower sown			Spring 23	Farm advisor

10 Polish Dairy I3S

10.1. LCF1

10.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Karol Barcz	Wielkie, Poland	Dairy	conventional	20	Silt (medium)	600 mm	3

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
110	HF	60kg/cow/day	560,607 L/y

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize	550 T 10ha	ploughing
Rye	300 T /10ha	ploughing

10.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Use low-emission feed ingredients	Training by a nutrition expert and application in a dose; analysis once a quarter (if	FCE kg of milk	1.29	1.5	12.2023	Nutrition expert

	necessary on an ongoing basis)					
Optimize starch content of the diet	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.29	1.5	2023	Nutrition expert
Optimize the type and amount of concentrates	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.29	1.5	2023	Nutrition expert
Increase lipid content of diet	Feed ration application	% fat in the feed ration	1.8	3.5	2023	Nutrition expert
Generate solar thermal energy and electricity	Installation of photovoltaic panels	Quantity of kW produced	10 kW	40 kW	End of 2024	Third party
Cultivate intersown or inter-relayed crops	Use of cover crops	% of soils under maize covered by cover crop	80%	100%	2023	Agronomic advisor

10.2. LCF2

10.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Pohl	Krotoszyn, Poland	Dairy	Conventional	120	Silt (medium)	550 mm/y	3

Number (of cows, ewes, sows, ...)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
90	Holstein	65 kg FM/cow/day	1,298,264 L

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize	325000	Strip till 60%
Perennial	850000	No till
Wheat	240 T	ploughing

10.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Use low-emission feed ingredients	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.35	1.5	12.2023	Nutrition expert
Optimize starch content of the diet	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.35	1.5	2023	Nutrition expert
Optimize the type and amount of concentrates	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary, on an ongoing basis)	FCE kg of milk	1.35	1.5	2023	Nutrition expert
Increase lipid content of diet	Feed ration application	% fat in the feed ration	1.8	3.5	2023	Nutrition expert
Generate solar thermal energy and electricity	Installation of photovoltaic panels	Quantity of kW produced	30 kW	50 kW	2024	Third party

Use renewable electricity	Energy storage	Amount of stored energy	0 kW	60 kW	2023-2024	Third party
Improve animal health	Construction of the drive for hoof trimming	Less milk loss during hoof trimming	2 l/cow	1 l/cow	2024-2025	Third party
Improve animal health	Single pens for farrowing	Number of calf deaths	Loss of 4 calves	0 calves	2024-2025	Third party
Reduce soil tillage	Transition to no-till farming	% of hectares in no-till cultivation	60%	100%	2024	Agronomic advisor

10.3. LCF3

10.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Wichlinski	Piotrków Kujawski, Poland	Dairy	conventional	120 ha	Sandy (coarse) dry	400 mm/y	6

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
103	HF	27 kg DM	908,706 L

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize silage	1800000	No till
Alfalfa	620000	minimum cultivation
Rye	56000	minimum cultivation
Barley	98000	minimum cultivation

10.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Adapt fertiliser application	Extension to all farmlands	T of nitrogen consumed per year	75 t nitrogen/whole farm	40 t nitrogen/whole farm	2023	Fertilizer advisor
Reduce soil tillage	Transition to no-till farming	% of hectares in no-till cultivation	50%	90%	2023	Agronomic advisor
Use low-emission feed ingredients	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.3	1.55	2023	Nutrition expert
Optimize starch content of the diet	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.3	1.55	2023	Nutrition expert
Optimize the type and amount of concentrates	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on	FCE kg of milk	1.3	1.55	2023	Nutrition expert

	an ongoing basis)					
Improve reproductive management practices	Constant cooperation with the veterinarian, enhanced monitoring, installation of a heat detection system	Number of semen portions needed for conception	2.5	1.8	2024	Veterinarian
Increase lipid content of diet	Feed ration application	% fat in the feed ration	1.8	3.5	2023	Nutrition expert

10.4. LCF4

10.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Jerzy Wojtczak	Piotrków Kujawski, Poland	Dairy	Conventional	80	Silt (medium)	450 mm/y	3

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
64	Holstein	50 kg FM/cow/day	382,208 L/y

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize	2193 t/51 ha	ploughing
alfalfa	360 t/8 ha	No till
Rye	50 t/10 ha	ploughing
Barley	70 t/10 ha	ploughing

10.4.2. Farm Action Plan

[D3.2. Lead Commercial Farms Action Plans]

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Use low-emission feed ingredients	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.29	1.5	2023	Nutrition expert
Optimize starch content of the diet	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.29		2023	Nutrition expert
Optimize the type and amount of concentrates	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.29	1.5	2023	Nutrition expert
Increase lipid content of diet	Feed ration application	% fat in the feed ration	1.8	3.5	2023	Nutrition expert
Reduce soil tillage	Transition to no-till farming	% of hectares in no-till cultivation	20%	45%	2024	Agronomic advisor
Generate solar thermal energy and electricity	Installation of photovoltaic panels	Quantity of kW produced	0	20 kW	End of 2024	Third party
Cultivate intersown or inter-relayed crops	Use of cover crops	% of soils under maize covered by cover crop	80%	100%	2023	Agronomic advisor

10.5. LCF5

10.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Krychowiak	Gęsin, Poland	Dairy	Conventional	145	Sandy (coarse, dry) & silt (medium)	450 mm/y	3,5

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
165	Holstein	55 kg FM/cow/day	1,600,660 L

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize	3160 kg/y	Strip till
Alfalfa	594 kg/y	No till
Grass	560 kg/y	50% no till, 50% ploughing

10.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Use low-emission feed ingredients	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.28	1.55	12.2023	Nutrition expert
Optimize starch content of the diet	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.28	1.55	2023	Nutrition expert

[D3.2. Lead Commercial Farms Action Plans]

Optimize the type and amount of concentrates	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.28	1.55	2023	Nutrition expert
Increase lipid content of diet	Feed ration application	% fat in the feed ration	1.8	3.5	2023	Nutrition expert
Reduce soil tillage	Transition to no-till farming	% of hectares in no-till cultivation	90%	100%	2020	Agronomic advisor
Cultivate intersown or inter-relayed crops	Use of cover crops	% of soils under maize covered by cover crop	80%	100%	2015 implementation, 2020 increasing	Agronomic advisor
Improve animal health	Milking Robot Installation	Number of clinical cases of Mastitis, lack of constancy, elimination of inflammatory spikes, increased predictability	200- 400 SCC	180-250 SCC	2024	Delaval Service, Veterinarian
Generate energy from biomass	Installation of biogas plant	Amount of energy generated from biomass	0	0.3M Watt	2025	Third-party
Improve animal health	Construction of a freestall barn	Culling, SCC, Yield	Culling 25% SCC 200- 400 Yield 10,000 L	Culling 20% SCC 180- 250 Yield 12,000 L	End of 2025	Third-party
Grow species or varieties with higher N-use efficiency	Alfalfa	Higher proportion of protein in the feed	20 g protein/ 100 g alfalfa DM	23 g protein/ 100 g alfalfa DM	2023	Corteva - Pioneer

Improve forage quality	Higher amount of DM per ha	Quantity of DM/ha	31 g/100 g DM	34 g/100 g DM	2023	Corteva - Pioneer
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10.6. LCF6

10.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Dominika Sas-Wislocka	Piotrków Kujawski, Poland	Dairy	Conventional	90	Sandy (coarse)	400 mm/y	3

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
110	Holstein	58 kg FM/cow/day	935,967 L

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Maize silage	1800000	50% no till
Alfalfa silage	620000	100% no till
Rye grain	56000	50% no till
Barley	98000	50% no till

10.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Use low-emission feed ingredients	Training by a nutrition expert and application in a dose; analysis once a	FCE kg of milk	1.25	1.5	12.2023	Nutrition expert

[D3.2. Lead Commercial Farms Action Plans]

	quarter (if necessary on an ongoing basis)					
Optimize starch content of the diet	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.25	1.5	2023	Nutrition expert
Optimize the type and amount of concentrates	Training by a nutrition expert and application in a dose; analysis once a quarter (if necessary on an ongoing basis)	FCE kg of milk	1.25	1.5	2023	Nutrition expert
Increase lipid content of diet	Feed ration application	% fat in the feed ration	1.8	3.5	2023	Nutrition expert
Reduce soil tillage	Transition to no-till farming	% of hectares in no-till cultivation	60%	100%	2022	Agronomic advisor
Improve animal health	Extension of the barn	Milk yield	9,000 L	11,000 L	2026	Third party
Generate solar thermal energy and electricity	Installation of photovoltaic panels	Quantity of kW produced	0	50 kW	06.2024	Third party
Improve forage quality	Higher amount of DM per ha	Quantity of DM/ha	30 g/100 g DM	34 g/100 g DM	2023	Corteva - Pioneer
Grow species or varieties with higher N-use efficiency	Alfalfa	Higher proportion of protein in the feed	20 g protein/100 g alfalfa DM	23 g protein/100 g alfalfa DM	2023	Corteva - Pioneer

11 French Beef I3S

11.1. LCF1

11.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC de cabannes	Cantal	Beef	Conventional	202,4	Volcanic	1134.7	3

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
142	Charolaise	Hay / wrapping grass / grazing	63,252 kg/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Permanent pastures	202.4 ha	/

11.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Increase or maintain share of permanent pasture	Direct sowing of grassland species and a cereals-legumes mix in degraded permanent pastures	Direct sowing surface (ha)	0	3	2024	Farm advisor
Cultivate legume crops	Cultivate Alfalfa to increase protein autonomy	Alfalfa surface (ha)	0	5	2025	Farm advisor
Improve reproductive management practices	Reduce the interval between two calvings	interval between two calvings (days)	389	376	2023	Farm advisor

[D3.2. Lead Commercial Farms Action Plans]

Generate solar thermal energy and electricity	Install a photovoltaic power plant	installed capacity (kWc)	250	500	2027	Photovoltaic power plant contractor
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11.2. LCF2

11.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC FRUQUIERE	CANTAL	Beef	Conventional	186.9	Volcanic	1129.4	2,5

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
120	Salers	Hay / wrapping grass / grazing	52,544 kg/year

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Permanent pastures	186.9 ha	/

11.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Increase or maintain share of permanent pasture	Direct sowing of grassland species in degraded permanent pastures	Yield (tons of dry matter/ha)	3.1	3.3	2024	Farm advisor Farm contractor
Improve reproductive management practices	Lower age at first calving	Average age at first calving (month)	35	32	2024-2025	Farm advisor

	Select the earliest heifers (target = calving at 28 months)					
Improve grassland management	Improve protein autonomy through forages	Wrapping grass (tons of dry matter/year)	8	26	2024	Farm advisor

11.3. LCF3

11.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
BRIGE Alain	Cros de Montvert – Cantal – France	Beef	Conventional	50 ha	Granitic soil	1300	1

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
45 cows	Salers	Hay / wrapping grass / grazing	10,510 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Permanent pasture	32 ha	No cultivation
Temporary pasture	15 ha	Classical cultivation with ploughing
Cereals immature	2 ha	Classical cultivation with ploughing

11.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
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Apply organic fertilizers	Better valorization of organic fertilizers and reduce the quantity of mineral fertilizers. Cover and estimate valor of the manure.	Cover the manure, Yes or No	No	Yes	2024	Farm advisor
Improve reproductive management practices	Reduction of the interval between 2 calving (409 → 380 days) Reduce the mortality of calves (12% → 7%) Increase the production of meat.	Kg lwwg/LU	223 kg	300 kg	2025	Farm advisor
Cultivate legume crops	Increase the proportion of alfalfa in association with dactyl. Reduce the protein purchases	Ha of alfalfa	0 ha	2/3 ha	2024	Fam advisor
Generate solar thermal energy and electricity	Diversify income and increase fodder storage	Peak kilowatt hour (kWhc)	0 kWhc	200 kWhc	2025	Farm advisor

11.4. LCF4

11.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC D'AYVALS	Jussac – Cantal – France	Beef	Conventionnal	196 ha	Volcanic soil	1400 mm	2

Number (of cows, ewes, sows, ...)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
174	Salers	Grazing, hay, wrapping grass, corn silage, pasture silage	75,374 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
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Grass	177 ha	170ha of permanent pasture without cultivation and the rest are temporary pasture with ploughing
Corn silage	7 ha	Classical cultivation (ploughing)
Cereals	5 ha	Classical cultivation (ploughing)

11.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce number of unproductive animals	Increase autonomy of the farm, optimize the beef production and reduce enteric emissions by the suppression of improductiv animals. Better finishing animals	Months	35	28	2025	Farm advisor
Improve reproductive management practices	Reduce the interval between two calving for optimizing the beef production and economic results	Days	397	370	2025	Farm advisor
Optimize the type and amount of concentrates	Increase the quantity of feed to match the growth of the heifers (advanced age at calving)	Kg of concentrates/LU	654	704	2025	Farm advisor
Generate solar thermal energy and electricity	Diversify income	Peak kilowatt hour	380	600	2025	Farm advisor

11.5. LCF5

11.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC GARDES	Antignac – Cantal – France	Beef	Conventional	126	Granitic	1200	2

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
95 cows	Salers	Hay / grazing	34,423 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Permanent pasture	126	No cultivation

11.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Apply organic fertilizers	Better valorization of liquid effluent resources by analysis and advice. Lower the fertilizer bill	Kg of mineral fertilizer /ha	26	21	2024	Farm advisor
Reduce number of unproductive animals	Reduce the number of cows for reduce the volume of work and being more resilient to the climate change	Number of cows/ years	95	85	2025	Farm advisor

Improve young stock management	Increase autonomy of the farm, optimize the beef production and reduce enteric emissions by the suppression of improductiv animals	Months	35	32	2024	Farm advisor
Improve fattened animals number	Increase the beef production and diversify the income	Number of fat heifer	0	6	2025	Farm advisor
		Number of young male cattle	0	10		

11.6. LCF6

11.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC REMISE	St Urcize – Cantal – France	Beef	Conventionnal	126	Volcanic	1300	3

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
80 cows original livestock	Aubrac	Hay / grazing	111,987 kg
150 cows for fattening	Aubrac	Hay + concentrates	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Permanent pasture	126 ha	No cultivation

11.6.2. Farm Action Plan

Solution (from the list below or local solution with	Explanation (how the farmer will implement the solution)	Indicator and unit used to	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or	People helping to choose and implement this
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brief explanation)		monitor this solution set up			after the baseline year for which data were collected)	solution (farm advisor, nutrition advisor, veterinarian...)
Increase or maintain share of permanent pasture	Increase farm autonomy and optimize the agricultural aid	Hectare of permanent pasture	126	178	2025	Farm advisor
Reduce number of unproductive animals	Anticipate the reduce of meet consumption et optimize the agricultural aid by reduce the cows for fattening et increase the cows of original livestock	Number of calving Number of cows purchased	81 133	95 103	2025	Farm advisor
Optimize the type and amount of concentrates	Reduce feed cost and optimize the ration	Kg /LU	2785	2551	2025	Farm advisor
Generate solar thermal energy and electricity	Diversify income	Peak kilowatt hour	100	430	2025	Farm advisor

11.7. LCF7

11.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC ROUGIER	Le Monteil, Cantal, France	Beef	Conventional	152	Volcanic	1300	2

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
100 cows	Salers	Hay / wrapping grass / grazing	47,654 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	147 ha	Principally permanent pasture. No cultivation
Cereals	5 ha	Ploughing for all the surface,

11.7.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Apply organic fertilizers	Reduce mineral fertilizers by- better use of liquid manure et cover the solid manure	Kg of mineral fertilizer by ha	1	0	2024	Farm advisor
Improve reproductive management practices	Increase autonomy of the farm, optimize the beef production and reduce enteric emissions	Months	35	32	2024	Farm advisor
Improve reproductive management practices	Reduce the interval between two calving for optimizing the beef production and economic results	Days	375	365	2024	Farm advisor
Improve grassland management	Simplify the system by stopping the wrapping and reduce costs	Tonne of dry matter of wrapping	80	0	2025	Farm advisor
Generate solar thermal energy and electricity	Diversify income and increase fodder storage	Peak kilowatt hour	0	500	2025	Farm advisor

11.8. LCF8

11.8.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
JOUVE Jean Yves	Trizac – Cantal – France	Beef	Conventional	70	Volcanic	1300	1

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
42 cows	Salers	Hay / wrapping grass / grazing (+ corn silage bought)	23,397 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Permanent pasture	70	No cultivation

11.8.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve young stock management	Reduce the mortality of the calves	% of mortality	12.5	5	2024	Farm advisor
Improve grassland management	Stop the external purchases of grass but maintain corn silage purchase	Tonnes of dry matter purchased (grass)	70	0	2024	Farm advisor
Optimize the type and amount of concentrates	Adapt the quantity of concentrate to meat production	Kg of concentrates /UGB	93 430	153 441	2024	Farm advisor

		Kg of meat /LU				
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11.9. LCF9

11.9.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
MAGNE Emmanuel	Arches – Cantal – France	Beef	Conventional	119 ha	Volcanic soil	1300 mm	1

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
80 cows	Limousines	Hay / wrapping grass / grazing	28,851 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Permanent pasture	101 ha	No cultivation
Temporary pasture	11 ha	Ploughing , rotation with cereals
Cereals	7 ha	Ploughing , rotation with cereals

11.9.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve reproductive management practices	Increase autonomy of the farm, optimize the beef production and reduce enteric emissions by the suppression of unproductive animals	Months	42	36	2025	Farm advisor

Improve reproductive management practices	Reduce the interval between two calving for optimizing the beef production and economic results	Day	395	375	2024	Farm advisor
Optimize the type and amount of concentrates	Increase the proportion of cereals. Being more autonomy (concentrates and straw), improve the economics results	Ha of cereal	7	9	2024	Farm advisor
Generate solar thermal energy and electricity	Diversify income and increase fodder storage	Peak kilowatt hour (kWhc)	0	300	2025	Farm advisor

11.10. LCF10

11.10.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
PITOT Jérôme	Andelat – Cantal – France	Beef	Conventional	114ha	Volcanic soil	760 mm/year	1

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
66 cows	Charolaises	Hay / wrapping grass / grazing	32,223 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Permanent pasture	90 ha	No cultivation
Temporary pasture	14 ha	Ploughing, rotation with cereals
Cereals	9 ha	Ploughing, rotation with cereals

11.10.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Adapt fertiliser application	Reduce the quantity of mineral fertilizers. Better use of organic fertilizers (cover the manure)	kg of mineral unit/ha	19	10	2024	Farm advisor
Improve reproductive management practices	Increase autonomy of the farm, optimize the beef production and reduce enteric emissions by the suppression of unproductive animals	Months	36	34	2025	Farm advisor
Reduce number of unproductive animals	Reduce the number of cows, being more resilient to the climate change. Increase the autonomy	Number of calving	66	61	2025	Farm advisor
Generate solar thermal energy and electricity	Diversify income and increase fodder storage	Peak kilowatt hour (kWhc)	0	100	2025	Farm advisor

12 Irish beef I3S

I3S manager: Natasha Browne & Susan Moloney

12.1. LCF1

12.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF11	Meath	Dairy beef	Conventional	55	Mostly light	821	1.52

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
128 beef calves 12 young beef heifers 43 young beef steers 12 older beef heifers 55 older beef steers	Main breeds: Holstein (HO) × Friesian Angus × HO Belgium Blue × HO Hereford × HO	Concentrate: 110.2 tonnes Grass and grass silage	Sold: 1-2 years Male: 65 1-2 years Female: 19 2+ years Male: 69 2+ years Female: 7 Total beef output: 76,441 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 7443 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

12.1.2. Farm Action Plan

Solution	Explanation (how the farmer will apply it concretely)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Goal of the indicator value	Year of implementation	People helping to choose and implement his solution (nutrition advisor, veterinarian...)
Nitrification and urease inhibitors	I am committed to maximising the use of protected urea on my farm so as to reduce GHG emissions. I will call my Merchant to order Protected Urea for next year.	% Total Chemical N as Protected Urea	40-50% N	>50% of N	2021	Teagasc advisor
Optimize soil pH	I am committed to implement my liming plan on my farm so as to reduce GHG emissions. I will apply lime to all mineral soils below pH 6.2. Attend training on Nutrient management. I Will take soil samples every year and implement the plan	Proportion of soils with pH at or above 6.2	50-75% above 6.2	75 -90% above 6.2	2021	Teagasc advisor

[D3.2. Lead Commercial Farms Action Plans]

	based on new soil samples					
P Index on High Output Pasture	I am committed to correcting low P and K levels on my farm so as to reduce GHG emissions. Return Slurry to the silage ground where most of offtakes occur. I will Identify Plots with Low P and K and Target with Slurry. I Will take soil samples every year and implement the plan based on new soil samples	Proportions of soils with P index 3 or 4	50-75% Index 3 or 4	>90% Index 3 or 4	2021	Teagasc advisor
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm. I will use the Dribble Bar for all my Slurry Application	Method of spreading slurry	Splash plate	100% LESS (Dribble Bar)	2020	Teagasc advisor
Timing of fertiliser application	I am committed to applying over 75% of my cattle slurry before 15th May so as to minimise GHG emissions from my farm. I will Maximise Spring Slurry application in spring with application when closing for first cut silage. I will Spread Slurry in Dull/Calm / Moist conditions	% of Slurry spread before 15 May	>75%	>75%	2021	Teagasc advisor
Grass-legume mixtures (clover)	I am committed to having over 30% of my paddocks incorporated with clover so as to minimise GHG emissions from my farm. I will develop an N application plan which is tailored to promote Clover. I will employ best practice to prevent Bloat	Proportion of Clover in Sward	Moderate - 10-20% sward	High >20% of sward	2021	Teagasc advisor

Improve grazing management	I will measure grass on PastureBase. I will avoid damage to grazing land. I will improve grazing infrastructure	Number of covers recorded on Pasture Base	30 covers	> 40 covers	2019	Teagasc advisor
Reduce Chemical Nitrogen Usage	I will optimise soil fertility and lower N use. I will reduce N use in early spring - I will only spread when soil conditions are stable above 6 degrees. I will include clover in seed mix and focus on achieving high clover composition	Usage (Kg / Ha)	167 kg N/ha	Reduce by 0-10 kg / Ha	2021	Teagasc advisor
First winter Weight Gain	I will have a plan to house my weanlings. I will ensure there is a health plan in place. I will test my silage and balance my diet for energy and protein	ADG kg/day	Achieving Target of 0.6	Achieving Target of 0.6	2021	Teagasc advisor
Grazing Weight Gain	I will turn out my yearlings as early as possible. I will use a paddock system to graze my yearlings. I will weigh my cattle to assess their performance	ADG kg/day	Achieving Target of > 0.9	Achieving Target of > 0.9	2021	Teagasc advisor
Silage Quality	I commit to having a plan to make better quality silage. I commit to testing my silage. I commit to closing silage ground before the 17th of March	Silage DMD	Sil >72 DMD	Sil >72 DMD	2021	Teagasc advisor

12.2. LCF2

12.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
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LCF12	Tipperary	Dairy beef	Conventional	35	Mostly light, dry mineral soils	1,099	0.53
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Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
79 beef calves 58 young beef steers 7 older beef steers	Main breed: Holstein Friesian Other beef crosses	976 kg/livestock unit Grass and grass silage	Sold: 1-2 years: 89 male 2+ years: 25 male Total beef output: 43,942 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 10646 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

12.2.2. Farm Action Plan

Solution	Explanation (how the farmer will apply it concretely)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Goal of the indicator value	Year of implementation	People helping to choose and implement his solution (nutrition advisor, veterinarian...)
Nitrification and urease inhibitors	I am committed to maximising the use of protected urea on my farm so as to reduce GHG emissions. I will replace CAN with Protected Urea	Proportion of Total Chemical N as Protected Urea	<50% of N	>70% of N	2021	Teagasc advisor
Optimize soil pH	I am committed to implement my liming plan on my farm so as to reduce GHG emissions. I will take soil samples for next season and every 3 to 4 years thereafter and	Proportion of soils with pH at or above 6.2	>90% above 6.2	>90% above 6.2	2021	Teagasc advisor

[D3.2. Lead Commercial Farms Action Plans]

	prepare and update liming plans each year. I will apply lime to all mineral soils below pH 6.2					
P Index on High Output Pasture	I am committed to correcting low P and K levels on my farm so as to reduce GHG emissions. I will Identify Plots with Low P and K and Target with Slurry. Return Slurry to the silage ground where most of offtakes occur	Proportions of soils with P index 3 or 4	50-75% Index 3 or 4	>90% Index 3 or 4	2021	Teagasc advisor
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm.	Method used to spread slurry	LESS (Dribble bar)	LESS (Dribble bar)	2021	Teagasc advisor
Timing of fertiliser application	I am committed to applying over 75% of my cattle slurry before 15th May so as to minimise GHG emissions from my farm. I will Maximise Spring Slurry application in spring with application when closing for first cut silage	% of Slurry spread before 15 May	>75%	>75%	2021	Teagasc advisor
Grass-legume mixtures (clover)	I will increasing the clover content in grazing pasture. I will discuss a plan of action with your my adviser I will incorporate clover seed into my new grass seeds. I will only use herbicides approved for use on clover	Proportion of Clover in Sward	<10%	>20% of sward	2021	Teagasc advisor
Improve grazing management	I will measure grass on PastureBase	Number of covers recorded on PastureBase	< 5 covers	> 20 covers	2017	Teagasc advisor
First winter	I will have a plan to house my weanlings. I will ensure they have	ADG kg/day	Achieving Target of 0.6	Achieving Target of 0.6	2021	Teagasc advisor

Weight Gain	enough lying and feeding space. I will test my silage and balance my diet for energy and protein					
Grazing Weight Gain	I will turn out my yearlings as early as possible. I will use a paddock system to graze my yearlings. I will move my yearlings at least every 3 days	ADG kg/day	Achieving Target of > 0.9	Achieving Target of > 0.9	2021	Teagasc advisor
Silage Quality	I commit to having a plan to make better quality silage. I commit to testing my silage. I commit to applying adequate slurry/fertiliser to my silage group as per my plan	DMD	Sil >72 DMD	Sil >72 DMD	2021	Teagasc advisor

12.3. LCF3

12.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF13	Cork	Dairy beef	Conventional	Pasture: 52 ha	Mostly light - Acid brown earths	1150.7	0.93 (national average; Teagasc National Farm Survey 2022)

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
149 beef calves 6 young beef heifers 15 young beef steer	Main breed: Holstein × Friesian	413 kg / LU (national average; Teagasc National Farm Survey 2022)	Sold: 1-2 yrs Male: 137 1-2 yrs Female: 32 Total beef output: 93,010 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
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Grass	6000 kg DM/ha/year (estimation)	Plough or minimum cultivation, reseeding approx. every 15 years
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12.3.2. Farm Action Plan

Solution	Explanation (how the farmer will apply it concretely)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Goal of the indicator value	Year of implementation	People helping to choose and implement his solution (nutrition advisor, veterinarian...)
Optimize soil pH	I am committed to implement my liming plan on my farm so as to reduce GHG emissions. I will take soil samples for next season and every 3 to 4 years thereafter and prepare and update liming plans each year. I will apply lime to all mineral soils below pH 6.2	Proportion of soils with pH at or above 6.2	>90% above 6.2	>90% above 6.2	2021	Teagasc advisor
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm. I will use the Dribble Bar for all my Slurry Application	Method used to spread slurry	LESS (Dribble bar)	LESS (Dribble bar)	2021	Teagasc advisor
Grass-legume mixtures (clover)	I will continue to introduce red clover into my silage paddock to improve the quality of high protein silage. I will introduce multispecies into grazing platform in 2023 to help reduce chemical nitrogen applications	Clover & Multispecies	Yes	yes	2022	Teagasc advisor
Improve young stock management	I will only purchase calves from reliable dairy farmers. I will continue to build up relationships with these farmers and knows proper health protocols in terms of colostrum administration and bedding of calves is carried out in the first 2 weeks of life.	Reliable calf sourcing	Yes	Yes	2022	Dairy farmers, Teagasc advisors
Improve animal health	I will consult with my vet and will ensure an effective dosing and vaccination	Vaccination & dosing	No Plan-Managing disease with	Managing health by programme	2021	Vet



	programme is in place to improve animal health and growth.	plan in place	treatment and limited use of vaccines	vaccination/ screening and treatment		
Improve genetic selection for Improved performance	I will continue to seek good quality bull calves and the sourcing of calves in the future will be further focused on their Commercial Beef Value (CBV)	Use CBV	No	Yes	2022	Teagasc advisor
First winter Weight Gain	I will test my silage and balance my diet for energy and protein I will weigh my weanlings to assess winter performance	ADG kg/day	Achieving Target of 0.6	Achieving Target of 0.6	2021	Teagasc advisor
Grazing Weight Gain	I will weigh my cattle to assess their performance I will turn out my yearlings as early as possible I will aim to graze grass covers that have a high leaf content	ADG kg/day	Achieving Target of >0.9	Achieving Target of >0.9	2021	Teagasc advisor
Improve forage quality	I will focus on making high quality DMD first and second cut silage	DMD%	65-70%	70-75%	2020	Teagasc advisor
Improve grassland management	I will continue to grass measure weekly and record results on Pasturebase. I am committed to optimizing the length of the grazing season so as to minimize GHG emissions from my farm.	Grassland management	Using Spring and Autumn grass planner to improve grazing season length	Using Spring and Autumn grass planner to improve grazing season length.	2022	Teagasc advisor

12.4. LCF4

12.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
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LCF14	Kilkenny	Dairy Beef	Conventional	103.7 ha: 90 ha pasture 6.9 ha forestry 1.2 ha old woodland 4 ha wild bird cover 1.6 ha other	Acid brown earth soil	845.6	1.59
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Number (of cows, ewes, sows,)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
154 beef calves 180 young beef steers 20 old beef steers	Main Breeds: Holstein × Friesian Angus × Holstein	Concentrate: 219 tonnes Grass and grass silage	Sold: 1-2 yrs Male: 86 2+ yrs Male: 126 Total beef output: 94,605 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	6000 kg DM/ha/year (estimation)	Plough or minimum cultivation, reseeding approx. every 15 years

12.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Improve animal health	I will ensure an effective dosing and vaccination program is in place to improve animal health	Dosing and vaccination program in place	Yes	Yes	2022	Teagasc advisor
Utilise CBV	I am committed to utilizing the Commercial Beef Values (CBV) when buying cattle to improve cattle performance.	Utilise the Commercial Beef Values when buying cattle	CBV not being utilised (average 1 and 2 star)	CBV being utilised (average CBV of 3 star)	2022	Teagasc advisor
Improve grazing management	I will measure grass on PastureBase	Number of covers recorded on PastureBase	< 4 covers	> 20 covers	2022	Teagasc advisor

Lime status- Proportion of soils with pH at or above 6.2	I will talk soil samples for next season and every 3 to 4 years thereafter. I will prepare and update liming plans each year and will apply lime according to liming plan based on soil sample results	Soil sampling – liming plan	50-75% above 6.2	>90% above 6.2	2022	Teagasc advisor
Use of protected urea	I will trial protected urea on part of farm. I will call my Merchant to order protected urea for next year	Using protected urea	None	20-30%	2023	Teagasc advisor
First winter Weight Gain	I will have a plan to house my weanlings. I will ensure they have enough lying and feeding space. I will test my silage and balance my diet for energy and protein	ADG kg/day	0.4-0.5 kg	Achieving Target of 0.6	2021	Teagasc advisor
Grazing Weight Gain	I will turn out my yearlings as early as possible. I will use a paddock system to graze my yearlings. I will aim to graze grass covers that have a high leaf content	ADG kg/day	Achieving Target of > 0.9	Achieving Target of > 0.9	2021	Teagasc advisor

12.5. LCF5

12.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF15	Cork	Dairy beef	Conventional	34 ha: All pasture	Mainly dry mineral soil (well drained).	1069	0.76

					Smaller block slightly heavier		
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Number (of cows, ewes, sows,)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
80 beef calves 46 young beef heifer 6 young beef steer	Main breed: AA x HO	Concentrate: 42 tonnes Grass and grass silage	Sold: 1-2 yrs.: 5 male, 55 females Total beef output: 36,311 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	6000 kg DM/ha/year (estimation)	Plough or minimum cultivation, reseeding approx. every 15 years

12.5.2. Farm Action Plan

Solution	Explanation (how the farmer will apply it concretely)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Goal of the indicator value	Year of implementation	People helping to choose and implement his solution (nutrition advisor, veterinarian...)
Multispecies swards	I am committed to increasing the number of paddocks as multispecies swards.	% grazing as multispecies swards	0%	12%	2021	Teagasc Advisor
Nitrification and urease inhibitors	I am committed to maximizing the use of protected urea on my farm so as to reduce GHG emissions. I will call my Merchant to order Protected Urea for next year	% N spread as protected urea	0%	80%	2018	Teagasc Advisor
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimize GHG and Ammonia emissions from my farm.	% slurry spread by LESS	0%	100%	2018	Teagasc Advisor

Reduce age of slaughter	I am committed to taking action to reduce age of slaughter e.g. improved grazing management	Age of slaughter (months)	21.7	<20	2018	Teagasc Advisor
Grass-legume mixtures (clover)	I will increase the number of paddocks with clover. I will discuss a plan of action with your my adviser	Proportion of Clover in Sward	0% of sward	>20% of sward	2018	Teagasc Advisor

12.6. LCF6

12.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF16	Carlow	Beef	Conventional	38.8	Brown podzolic	840.6	1.07

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
Beef calves: 120 Young beef heifers: 12 Young beef steers: 75 Old beef heifers: 1 Old beef steers: 4	Angus × Holstein Hereford × Holstein Holstein × Friesian	Concentrates: 52 tonnes Grass and grass silage	Sold: 0-6 months male: 61 0-6 months female: 39 1-2 years male: 61 1-2 years female: 19 2+ years male: 22 2+ years female: 4 Total beef output: 67615 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 10077 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

12.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Silage Quality	I commit to having a plan to make better quality silage. For example, cutting silage earlier. Leading to reduced need for concentrate.	Silage DMD	Sil < 72 DMD	Sil >72 DMD	2020	Teagasc advisor
Improve Grazing Management	I will measure grass on PastureBase I will improve grazing infrastructure	Number grass covers recorded on Pasture Base	< 10 covers	> 30 covers	2019	Teagasc advisor
Use of protected urea	I will trial protected urea on part of farm. I will call my Merchant to order Protected Urea for next year	Use of protected urea	None	>50% of N	2021	Teagasc advisor
Lime status- proportion of soils with pH at or above 6.2	I will take soil samples for next season and every 3-4 years thereafter and prepare and update liming plans each year. I will apply lime	Soil sampling & liming plan	50-75% above 6.2	>90% above 6.2	2021	Teagasc advisor

	to all mineral soils below pH 6.2					
Animal Health Plan	I will implement effective Vaccination Programme for my herd in conjunction with my vet	Animal Herd Health Plan	Implement a comprehensive Vet led health plan with best practice vaccination/screening/preventative medicine and treatments	Implement a comprehensive Vet led health plan with best practice vaccination/screening/preventative medicine and treatments	2021	Vet and Teagasc advisor
First Winter Weight Gain (ADG kg/day)	I will have a plan to house my weanlings. I will ensure there is a health plan in place. I will test my silage and balance my diet for my energy and protein.	ADG kg/day	<0.4 kg	Achieving Target of 0.6 kg	2022	Teagasc advisor
Silage Quality	I commit to having a plan to make better quality silage. I will get my silage tested each year.	Silage DMD	Silage DMD 68-72	Silage >72 DMD	2022	Teagasc advisor

12.7. LCF7

12.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF17	Roscommon	Dairy beef	Conventional	60 ha pasture	Slightly heavy	1678	1.11

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
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135 beef calves 106 young beef steer 3 older beef steer	Main breed: HF and H	Concentrate: 194 tonnes Grass and grass silage	Sold: 1-2 yrs.: 160 male 2+ yrs.: 8 male Total beef output: 68,782 kg
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Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	6000 kg DM/ha/year (estimation)	Plough or minimum cultivation, reseeding approx. every 15 years

12.7.2. Farm Action Plan

Solution	Explanation (how the farmer will apply it concretely)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Goal of the indicator value	Year of implementation	People helping to choose and implement his solution (nutrition advisor, veterinarian...)
Low-emission slurry spreading	I am committed to applying all of my cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm.	Method of spreading slurry	100% LESS (Trailing shoe)	100% LESS (Trailing shoe)	2021	Teagasc advisor
Incorporate legumes (red clover) for silage	I am committed to reseeding some fields from grass to red clover in order to try and produce high quality silage with reduced chemical nitrogen use	Ha reseeded to red clover	0 ha	4 ha	2022	Teagasc advisor
Improve Animal Health	I will implement effective dosing programme for my herd. Improve growth rates	Faecal egg samples taken of all stock, and dosing as needed	No faecal egg samples taken	Faecal egg samples taken	2021	Teagasc advisor and vet
First winter Weight Gain	I will have a plan to house my weanlings. I will ensure there is a health plan in place. I will test my silage and balance my diet for energy and protein	ADG kg/day	Achieving Target of 0.6	Achieving Target of 0.65	2020	Teagasc advisor
Silage Quality	I commit to having a plan to make better	Silage DMD	Sil < 72 DMD	Sil >72 DMD	2020	Teagasc advisor

	quality silage. For example, cutting silage earlier. Leading to reduced need for concentrate.					
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12.8. LCF8

12.8.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF18	Kildare	Beef	Conventional	72	Dry mineral soil	840.6	1.17

Number (of cows, ewes, sows,)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
Beef calves: 148 Young beef heifers: 34 Young beef steers: 104	Angus × Holstein Aubrac × Holstein Holstein × Friesian	Concentrate: 90 tonnes Grass and grass silage	Sold: 1-2 years Male: 39 1-2 years Female: 38 2+ years Male : 53 2+ years Female: 1 Total beef output: 93579 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 13719 DM kg/ha	Plough or minimum cultivation, reseeding approx. every 15 years

12.8.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
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[D3.2. Lead Commercial Farms Action Plans]

Improve Grazing Management	I will measure grass on PastureBase. I will avoid damage to grazing land I will improve grazing infrastructure	Number grass covers recorded on PastureBase	< 20 covers	> 30 covers	2022	Teagasc advisor
Animal Herd Plan	I will implement effective vaccination program for my herd	Herd Health Plan	Managing health by programmed vaccinations/screening and treatment	Implement comprehensive Vet lead health plan with best practice vaccinations / preventative medicine and treatments	2021	Vet
Level of Chemical Nitrogen Usage	I will optimize soil fertility and lower N use. I will include clover in seed mix and focus on achieving high clover composition	Chemical N kg/ha	227 kg/ha	Reduce by 10-20kg/ha	2021	Teagasc advisor
First winter weight (ADG kg/day)	I will commit to improving my silage quality and will test my silage, balance diet for energy and protein	ADG kg/day	0.4 -0.5 kg/day	Achieving target of 0.6 kg/day	2022	Teagasc advisor
Grazing weight gain (ADG kg/day)	I will turn my yearling out as early as possible. I will use a paddock system to graze my yearlings. I will weigh my cattle to assess their performance	ADG kg/day	Achieving target of >0.9	Achieving target of >0.9	2021	Teagasc advisor
Low-emission slurry spreading	I am committed to applying cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm.	Method of spreading slurry	Splash plate	Start using LESS	2022	Teagasc advisor
Proportion of clover in sward	I will increase the clover content in grazing pasture. I will only use herbicides approved for use on clover	Clover %	Low	Moderate – 10-20% swards	2020	Teagasc advisor

12.9. LCF9

12.9.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF19	Westmeath	Dairy beef	Conventional	50.7 ha	Mainly dry mineral soil	1022	0.64

Number (of cows, ewes, sows, ...)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
81 beef calves 102 young beef steer 1 older beef heifer 19 older beef steer	Main breed: HF Other beef crosses	Concentrate: 66.6 tonnes Grass and grass silage	Sold: 0-6 month: 1 male 1-2 yrs.: 15 male 2+ yrs.: 67 male, 1 female Total beef output: 51,889 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 13973 kg DM/ha	Plough or minimum cultivation, reseeding approx. every 15 years

12.9.2. Farm Action Plan

Solution	Explanation (how the farmer will apply it concretely)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Goal of the indicator value	Year of implementation	People helping to choose and implement his solution (nutrition advisor, veterinarian...)
Low-emission slurry spreading	I am committed to applying cattle slurry using LESS so as to minimise GHG and Ammonia emissions from my farm.	Method of spreading slurry	Splash plate	Start using LESS	2022	Teagasc advisor

Improve Grazing Management	I will measure grass on PastureBase. I will avoid damage to grazing land I will improve grazing infrastructure	Number grass covers recorded on PastureBase	< 10 covers	> 20 covers	2022	Teagasc advisor
Improve animal Health	I will implement an effective dosing Programme for my herd	Faecal egg samples taken of all stock, and dosing as needed	No faecal egg samples taken	Faecal egg samples taken	2021	Teagasc advisor and vet
First winter Weight Gain	I will have a plan to house my weanlings I will ensure there is a health plan in place I will test my silage and balance my diet for energy and protein	ADG kg/day	Achieving ADG of 0.58	Achieving Target of 0.6	2023	Teagasc advisor
Grazing Weight Gain	I will turn out my yearlings as early as possible. I will use a paddock system to graze my yearlings. I will weigh my cattle to assess their performance	ADG kg/day	Achieving ADG of 0.89	Achieving Target of > 0.9	2023	Teagasc advisor
Silage Quality	I commit to having a plan to make better quality silage. I commit to testing my silage	Silage DMD	Sil >72 DMD	Sil >72 DMD	2021	Teagasc advisor

12.10. LCF10

12.10.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LCF20	Cavan	Beef	Conventional	50 ha	Mixture of relatively free-draining to a heavy, drumlin soil type	1048.9	1.83

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
Beef calves: 71 Young beef steers: 92 Old beef steers: 14	Angus × Holstein Hereford × Holstein Friesian × Holstein	Concentrates: 159.6 tonnes Grass and grass silage	Sold: 2+years male: 62 Total beef output: 44743 kg

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Grass	Total: 5582 DM kg/ha	Plough or minimum cultivation, reseeding approx. every 15 years

12.10.2. Farm Action Plan

Solution	Explanation (how the farmer will apply it concretely)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Goal of the indicator value	Year of implementation	People helping to choose and implement this solution (nutrition advisor, veterinarian...)
Optimize soil pH	I am committed to implement my liming plan on my farm so as to reduce GHG emissions. I will take soil samples for next season and every 3 to 4 years thereafter and prepare and update liming plans each year. I will apply lime to all mineral soils below pH 6.2	Proportion of soils with pH at or above 6.2	57% above 6.2	>57% above 6.2	2023	Teagasc advisor
P Index on High Output Pasture	I am committed to correcting low P and K levels on my farm so as to reduce GHG emissions. I will Identify Plots with Low P and K and Target with Slurry. Return Slurry to the silage ground where most of offtakes occur	Proportions of soils with P index 3 or 4	30% Index 3 or 4	>30% Index 3 or 4	2023	Teagasc advisor

Improve animal Health	I will ensure an effective dosing and vaccination program is in place, to improve animal health and growth	Dosing an vaccination program in place	Yes	Yes	2022	Teagasc advisor
Utilise CBV	I am committed to utilising the Commercial Beef Values (CBV) when buying cattle to improve cattle performance.	Utilise the Commercial Beef Values when buying cattle	CBV not being utilised (average 1 and 2 star)	CBV being utilised (average CBV of 3 star)	2022	Teagasc advisor
Improve grazing management	I will measure grass on PastureBase	Number of covers recorded on PastureBase	< 5 covers	> 20 covers	2022	Teagasc advisor

13 Romanian sheep I3S

I3S manager: Catalin Dragomir

13.1. LCF1

13.1.1. Farm portrait

Farm name	Region/ Province	Farm activities (dairy, beef, sheep, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
I.C.D.C.O.C. Palas	Constanta	Sheep and crops	conventional	400	typical and calcareous chernozems	467	8 FTE

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
3700 Sheep	Merinos de Palas & derived	30% concentrates 40% grass (grazed / hay) 30% alfalfa hay	90 L/sheep

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Alfalfa (for hay)	14.4 t DM /ha	Ploughing
Maize	3.1 t DM /ha	Ploughing

Barley	5.3 t DM /ha	Ploughing
Oats	3.1 t DM /ha	Ploughing
Wheat	5.2 t DM /ha	Ploughing
Sunflower	1.8 t DM /ha	Ploughing
Spring meadow (for hay)	16 t DM / ha	Ploughing

13.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation	People helping to choose and implement this solution
Improve genetic selection for improved performance	Increase the intensity of selection	Breeding values	105% relative breeding value	110% relative breeding value	2024	Head of the farm and the project advisor
Improve reproductive management practices	Making smaller sheep mating group	Number of ewes per ram	35	30	2024	Head of the farm and the project advisor
Incorporate legumes in grassland	In order to reduce the need for protein concentrates	nutritive value of the biomass	100% (baseline)	+10% PDI value	2024	Head of the farm and the project advisor
Cultivate legume crops	In order to reduce the need for imported protein feeds	ha	0	10	2024	Head of the farm and the project advisor

13.2. LCF2

13.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
S.C.D.C.O.C. Caransebes	Caras-Severin	Sheep and crops	conventional		podzolic	737	

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
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	Turcana		90 l / head
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13.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation	People helping to choose and implement this solution
Improve genetic selection for improved performance	Increase the intensity of selection	Breeding values	105% relative breeding value	110% relative breeding value	2024	Head of the farm and the project advisor
Improve reproductive management practices	Making smaller sheep mating group	Number of ewes per ram	35	30	2024	Head of the farm and the project advisor
Incorporate legumes in grassland	In order to reduce the need for protein concentrates	nutritive value of the biomass	100% (baseline)	+10% PDI value	2024	Head of the farm and the project advisor
Optimize feed ration according to animal requirements	In order to avoid inefficient use of the dietary nutrients	biases from the feeding requirements (energy and/or protein)	20-40%	0-5%	2024	Head of the farm and the project advisor

13.3. LCF3

13.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
S.C. Contesti A.I.C.	Dambovită	goats & crops	conventional	22	brown-reddish	600	3 FTE

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
380 goats	Murciano Granadina	40% concentrates 60% aflafla hay	300 l / goat/ lactation

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
barley	4.5 t DM / ha	ploughing
wheat	5.5 t DM / ha	ploughing
maize	5 t DM / ha	ploughing
alfalfa	17 t DM / ha	ploughing

13.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation	People helping to choose and implement this solution
Increase lipid content of diet	Replacing starch with lipids in diets	% of lipids in diet	4-5%	8-9%	2023	Head of the farm and the project advisor
Improve genetic selection for improved performance	Increase the intensity of selection	Breeding values	105% relative breeding value	110% relative breeding value	2024	Head of the farm and the project advisor
Reduce crude protein content of the diet	Align the protein supply to the protein requirements	% dietary protein over the requirements	30%	5%	2024	Head of the farm and the project advisor
Improve forage quality	Harvesting & conserving the forages at the right moment	nutritive value of the hay	100% (baseline)	110%	2024	Head of the farm and the project advisor

13.4. LCF4

13.4.1. Farm portrait

Farm name	Region/ Province	Farm activities (dairy, beef, sheep, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
S.C.D.C.O.C. Bilciuresti	Dambovita	Sheep and crops	conventional	725	pseudogleyic podzolic soils	860	5 FTE

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
681 Sheep	Turcana	10% maize silage 80% grass (grazed / silage / hay) 10% concentrates	128 L/sheep

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Alfalfa (fresh)	69 t DM /ha	Ploughing
Maize silage	17.5 t DM /ha	Ploughing
Barley (fresh)	32.6 t DM /ha	Ploughing
Oats	3.7 t DM /ha	Ploughing
Field pea	2.3 t DM /ha	Ploughing
Sunflower	2.4 t DM /ha	Ploughing

13.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation	People helping to choose and implement this solution
Optimize the type and amount of concentrates	Increase amount of concentrates	% of concentrates	200 g	300	2023	Head of the farm and the project advisor
Reduce feed losses	Use of better feeders	Quality	Made from wood now	Made from rubber or inox	2023	Head of the farm and the project advisor
Improve genetic selection for improved performance	Increase the intensity of selection	Breeding values	105% relative breeding value	110% relative breeding value	2024	Head of the farm and the project advisor
Improve reproductive management practices	Making smaller sheep mating group	Number of ewes per ram	35	30	2024	Head of the farm and the project advisor

13.5. LCF5

13.5.1. Farm portrait

Farm name	Region/ Province	Farm activities (dairy, beef, sheep, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
S.C.D.C.O.C. Reghin	Targu Mures	Sheep and crops	conventional	250	Luvisols	675	6 FTE

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
800 sheep	Tsigaie		

13.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation	People helping to choose and implement this solution
Improve genetic selection for improved performance	Increase the intensity of selection	Breeding values	105% relative breeding value	110% relative breeding value	2024	Head of the farm and the project advisor
Improve reproductive management practices	Making smaller sheep mating group	Number of ewes per ram	35	30	2024	Head of the farm and the project advisor
Incorporate legumes in grassland	In order to reduce the need for protein concentrates	nutritive value of the biomass	100% (baseline)	+10% PDI value	2024	Head of the farm and the project advisor
Improve forage quality	Harvesting & conserving the forages at the right moment	nutritive value of the hay	100% (baseline)	110%	2024	Head of the farm and the project advisor

13.6. LCF6

13.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
S.C. OVIS CAP NEGRU S.R.L.	Teleorman	Sheep & crops	conventional	200	brown-reddish	529	3 FTE

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
700 sheep	Tsigai Blackhead	20% concentrates 80% grass (grazing / hay)	80 l / sheep/ lactation

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
sunflower	1.50 t DM /ha	ploughing
wheat	7.5 t DM /kg	ploughing
maize	5.5 t DM /ha	ploughing

13.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation	People helping to choose and implement this solution
Optimize the type and amount of concentrates	Increase the proportion of concentrates in diet	daily amount of concentrates	200 g/d	300 g/d	2023	Head of the farm and the project advisor
Improve genetic selection for improved performance	Increase the intensity of selection	Breeding values	105% relative breeding value	110% relative breeding value	2024	Head of the farm and the project advisor
Improve reproductive management practices	Making smaller sheep mating groups	Number of ewes per ram	35	30	2024	Head of the farm and the project advisor
Reduce crude protein content of the diet	Reduce the amount of bulky leguminous fodder	daily amount of leguminous bulk feed	2 kg per head	1.5 kg per head	2023	Head of the farm and the project advisor

Improve animal health	Reduce pododermatitis	% in the flock	5%	4%	2024	Improve animal health
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14 UK pigs I3S

Missing

15 French crop (south) I3S

I3S manager: Oscar Godin

15.1. LCF1

15.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
EARL Fontes	Lauragais (Occitanie)	Arable crops	Conventional	250	- Loamy limestone soil - Clay	460	2

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Durum wheat		
Sunflower		
Peas		
Sorghum		
Corn		
Winter wheat		
Faba beans		

15.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Diversify crop rotation	Avoid the short rotation sunflower / durum wheat	Rotation/parcel				Coop
Cultivate cover crops	Increase the share of covers crops between cash crops	Area with cover crops				Coop, advisers
Apply organic fertilizers	Use manure or compost to increase organic fertilisation	T of organic fertilisers spread				
Lime soils when required	Liming soil	Nb of soil analyses - T of lime spread				Coop

15.2. LCF2

15.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
SCEA D'Aldeguier	Lauragais (Occitanie)	Arable crops	Conventional	263	- Clay limestone soil - Alluvium		2

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Sunflower	2.6 t DM/ha	
Faba beans	2.5 t DM/ha	
Barley	7 t DM/ha	
Camelina		
Soybean	2.6 t DM/ha	
Durum wheat	5.8 t DM/ha	
Sorghum	6 t DM/ha	
Rapeseed		

15.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Diversify crop rotation	Grow more crops in the rotation: introduction of rapeseed and camelina in 2024	Nb of crops			2024	Coop
Cultivate cover crops	Increase the share of cover crops between cash crops	Area with cover crops				Coop
Apply organic fertilizers	Use of manure and compost as organic fertilisers	T of organic fertilisers spread				
Reduce soil tillage	Change practices on soil (cover crops, simplified practices, ...)	Area with tillage				

15.3. LCF3

15.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
EI - M. LAFFORGUE YANNICK	Nouvelle Aquitaine	Arable crops	Conventional	159	Clay	1173	1

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Hard wheat (not durum)	5.3 t DM/ha	Direct sowing
Alfalfa	3 t DM/ha	Direct sowing
Sunflower	1 t DM/ha	Disk harrow
Corn	6.8 t DM/ha	Disk harrow
Winter wheat	7.3 t DM/ha	Direct sowing

15.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops	Grow more cover crops and better take care of them	Ha of cover crops	61.8	82	2023	Agro d'Oc (cooperative)
Increase crop residues left on the soil	Leave on the soil all the residues of all crops	% brought back to spom	66%	100%	2023	Agro d'Oc (cooperative)

15.4. LCF4

15.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
EARL D'EN MOUNON	Occitanie	Grandes cultures	Conventionnel	301	Argilo-calcaire	690	2

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Durum wheat	5.3	Direct sowing
Winter wheat	4.9	Direct sowing
Sorghum	4	Chisel
Sunflower	1.2	Chisel

15.4.2. Farm Action Plan

Solution (from the list below or local)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline)	People helping to choose and implement this
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solution with brief explanation)		solution set up			year for which data were collected)	solution (farm advisor, nutrition advisor, veterinarian...)
Increase crop residues left on the soil	Always leave wheat straws	% left	75%	100%	2023	Agro d'Oc (cooperative)
Adapt fertiliser application	Reduce organic fertilisation on sunflower	Unit of _organic Nitrogen /ha	72 uN_org/ha	56 uN_org/ha	2023	Agro d'Oc (cooperative)
Cultivate cover crops	Grow more cover crops	Ha of cover crops	23 ha	120 ha	2023	Agro d'Oc (cooperative)

15.5. LCF5

15.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC MASSOU	Occitanie	Arable crops	Conventional	165.33	Limesotne clay soil	637.52	2

Culture	Rendement moyen (t/ha)	Type de travail du sol (labour, semis direct, ...)
Winter wheat	6.2 t DM/ha	Disk harrow
Faba beans	2 t DM/ha	Chisel
Barley	4.4 t DM/ha	Disk harrow
Sorghum	5 t DM/ha	Disk harrow
Sunflower	2.4 t DM/ha	Disk harrow

15.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops	Go from 14 to 30 ha of cover crops	Ha of cover crops	14 ha	30 ha	2023	Agro d'Oc

Apply organic fertilizers	Bring urban mud and stop compost supply	uN organic	6 uN_org/ha	12 uN_org/ha	2024	Agro d'Oc
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15.6. LCF6

15.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
EARL PARROUNES	Occitanie	Arable crops	Conventional	181.44	clayey loamy	701.28	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Durum wheat	4 t DM/ha	Direct sowing
Winter wheat	5.4 t DM/ha	Direct sowing
Soybean	4.45 t DM/ha	Disk Harrow
Faba beans	3.8 t DM/ha	Direct sowing
Barley	1 t DM/ha	Direct sowing

15.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Diversify rotation	Grow more crops to diversify rotation (by using energy crops)	Surface of triticale and silage corn as catch crops	0	45 ha of triticale 30 ha of corn	2023	Agro d'Oc (cooperative)
Adapt fertiliser application	Reduce nitrogen supply	Nb uN/ha	196 uN/ha	131 uN/ha	2023	Agro d'Oc (cooperative)

Apply low-emission fertilizers	Use of digestate instead of manure	Quantity of digestate spread	6 t/ha	0	2023	Agro d'Oc (cooperative)
Cultivate energy crops	Grow energy crops used to produce energy	Surface of energy crops	0	75 ha	2023	Agro d'Oc (cooperative)
Cultivate cover crops	Grow cover crops	Surface of cover crops	0	15 ha	2023	Agro d'Oc (cooperative)

15.7. LCF7

15.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
GAEC PECH ET FILS	Occitanie	Arable crops	Conventional	323.61	Loam sand soil	726	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Durum wheat	4.4 t DM/ha	Disc harrow
Winter wheat	4 t DM/ha	Disc harrow
Sunflower	1.3 t DM/ha	Chisel
Rapeseed	3 t DM/ha	Chisel
Faba beans	1 t DM/ha	Disc harrow

15.7.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Incorporate crop residues in the soil	Growing alfalfa which is grinded and brought to the soil	Surface of alfalfa	0	107 ha	2023	
Cultivate cover crops	Grow more cover crops	Surface of cover crops	58 ha	157 ha	2023	Agro d'Oc (cooperative)

16 French crop (north) I3S

I3S manager: Anne Schneider

16.1. LCF1

16.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Yves CLEMENT	Champagne Ardennes	Arable crops	Conventional	296	CRAIE	687	

– source for organic materials and uses of cereal straws

Number (of cows, ewes, sows, ..)	Breed	Average ration	Average production (milk per year, meat per year, number of pigs sold per year, ...)
3 CHICKEN HOUSE (26000 places)		Industrial ration	465000 poultries

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Sugar beet	75 t FM/ha	Minimum cultivation
Winter wheat	9.5 t DM /ha	Minimum cultivation
Winter rapeseed	4 t DM /ha	Minimum cultivation
Eyelet	0.5 t DM /ha	Minimum cultivation
Barley Spring	6.5 t DM /ha	Minimum cultivation
Barley Winter	13 t DM/ha	Minimum cultivation
Potato	40 t FM/ha	Minimum cultivation
Alfalfa	10 t DM/ha	Minimum cultivation

16.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation - (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian ...)
Cultivate legume crops	Introduce more grain legume crops (spring or winter pea) to reduce nitrogen application on crop system (while producing proteins)	Ha and % of pea in crop systems Yield (to assess crop management success)	0	5-15% of arable rotation	2022	Farm advisors (Terres Inovia)
Integrate grass leys into arable rotations	Increase lucerne in the crop rotations	Ha and %	10% of arable rotation	15-20% of arable rotation	2022	Farm advisors (Luzéal) and industrialists (France Luzerne Déshydratée)
Cultivate cover crops	Grow more diversified cover crops between (diversifying species in cover mixture and extend soil cover both in long and short intercrop periods)	Ha and % Biomass Frequency of success	100% before spring crop Biomass 1-1.5 t DM with 1 species	10% between 2 winter crop Biomass 2.5-3 t DM with several species	2022	Farm advisors (GEDA, Terres Inovia, etc.)
Cultivate intersown or inter-relayed crops	Rape seed associated legume companions	% oil seed rape; assessment of the companion biomass	0	100%; more than 250 gr/m ²	2022	Farm advisors (GEDA, Terres Inovia, etc.)
Establish or maintain hedgerows and	More hedgerows on the farm	Implanted length of hedge	1550 m in 2020	2500 m in 2022-2023	2022	Nurseryman

individual trees						
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16.2. LCF2

16.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Estelle GENTILS	Champagne Ardennes	Arable crops	Organic agriculture	130	CRAIE	687	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Sugar beet	5 t DM/ha	Minimum cultivation
Winter wheat	4.5 t DM /ha	Minimum cultivation
Winter rapeseed	2 t DM /ha	Minimum cultivation
Barley Spring	6.5 t DM /ha	Minimum cultivation
Spring Winter	5.5 t DM /ha	Minimum cultivation
Hemp	7 t DM /ha	Minimum cultivation
Buckwheat	1.5 t DM /ha	Minimum cultivation
Triticale	5 t DM /ha	Minimum cultivation

16.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops	Grow more diversified cover plants between two harvested crops: diversifying species in the cover mixture or grow legume-based cover crops; extending soil cover area both in long and short intercrop periods)	Ha and % Biomass Frequency of success	100 % of spring crop Biomass 1-1.5 t DM with 1 species	10 % between 2 winter crop Biomass 2.5-3 t DM with several species (or 100% legumes)	2022	Farm advisors (GEDA, Terres Inovia, etc.)

Diversify crop rotation	Diversify crop rotations by including lentils sunflower or hemp	Ha and %	Hemp 5-10 % Lentils and sunflower 0 %	Hemp, Lentils et sunflowers 20 %	2022	Farm advisors (GEDA, Terres Inovia, etc.)
Apply organic fertilizers	Change (?) for soil fertility and N efficiency of crops (and for getting protein rich wheat)	% organic fertilizers with C/N down Better distribution for crops and better valorization	35 % compost	10 % compost	2022	Farm advisors (GEDA, Terres Inovia, etc.)
Cultivate intersown or inter-relayed crops	Rape seed associated legume companions. Wheat associated peas	% oil seed rape; assessment of the companion biomass % wheat with peas	0	100% for rape seed; more than 250 gr/m2 10% pour the wheat	2022	Farm advisors (GEDA, Terres Inovia, etc.)

16.3. LCF3

16.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Philippe LEPELLETIER	Champagne Ardennes	Arable crops	Conventional	234	Argilo-calcaire		

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Spring oats	4 t DM /ha	Minimum cultivation
Winter wheat	5 t DM /ha	Minimum cultivation
Rapeseed	2.5 t DM /ha	Minimum cultivation
Spelled winter	2 t DM /ha	Minimum cultivation
Spring fava bean	0.8 t DM /ha	Minimum cultivation
Lentil	0.9 t DM /ha	Minimum cultivation
Linen	0.8 t DM /ha	Minimum cultivation
Corn	7 t DM /ha	Minimum cultivation
Winter barley	4 t DM /ha	Minimum cultivation

Spring barley	4 t DM /ha	Minimum cultivation
Chickpea	1 t DM /ha	Minimum cultivation
Rye	2 t DM /ha	Minimum cultivation
Soy	3 t DM /ha	Minimum cultivation

16.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Diversify crop rotation	Improve <i>Fabaceae</i> surfaces	Percentage of the global arable surfaces	11%	15%	Progressively during 3 years	Farm adviser in agronomy, exchanges between farmers
Incorporate crop residues in the soil	Improve the frequency of crops residues restitution	Percentage of the global arable surfaces	0%	20%	Progressively during 3 years	Farm adviser in agronomy, exchanges between farmers
Adapt fertiliser application	Reduce total nitrogen quantities without impacting yields	N Kg/ha	/	-10%	Progressively during 3 years	Farm adviser in agronomy, exchanges between farmers

16.4. LCF4

16.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of I
Joseph et Maxime Thorey	Champagne Ardennes	Arable crops	organic	207	Argiles Argilo-calcaire		

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Temporary meadow	7.5 t DM/ha	Ploughing or minimum cultivation

Winter wheat + faba bean	3.5 t DM /ha	Ploughing or minimum cultivation
Tritical + winter pea	2.5 t DM /ha	Ploughing or minimum cultivation
Sunflower	2 t DM /ha	Ploughing or minimum cultivation
Spring wheat	3.5 t DM /ha	Ploughing or minimum cultivation

16.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Diversify crop rotation	Improve sunflower, no fertilized and associated rapeseeds surfaces	Percentage of the global arable surfaces	11%	15%	Progressively during 3 years	Farm adviser in agronomy, exchanges between farmers
Reduce soil tillage	Tillage in organic farms are important to manage weeds presence. Reduce tillage must ameliorate thanks to other strategies must reduce carbon soil emissions	Frequency of tillage per rotation	1 to 2 per rotation	0 to 1 per rotation	Progressively during 3 years	Farm adviser in agronomy, exchanges between farmers
Establish or maintain hedgerows and individual trees	Thanks to governmental economic helps ("Plantons des haies" program) the farmer will develop its hedgerows	Total linear meter of hedgerows	2,5 km	5 km	Progressively during 3 years	Farm adviser in agronomy, agroforestry, biodiversity
Cultivate intersown or inter-relayed crops	Improve intersown biomass	t/ha	Approximatively 1 t/ha	2 t/ha	Progressively during 3 years	Farm adviser in agronomy, exchanges between farmers

16.5. LCF5

16.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
B. LAMMERT	Alsace	Arable crops	Conventional	179	Hardt 31 % Sableux à limono-sableux 32 % Limono argilo sableux 37 %	610 mm	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat	9.3 t DM /ha	Ploughing
Corn	13.7 t DM /ha	Ploughing
Soy	3.8 t DM /ha	Ploughing

16.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops	Grow more diversified cover crops between (diversifying species in cover mixture and extend soil cover both in long and short intercrop periods)	Soil cover after soya	0% of the area	80% of the area		
Increase crop	Restore wheat residue	% of wheat straw restored	0% of the area	100% of the area		

residues left on the soil						
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16.6. LCF6

16.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Michael GODIET	Champagne Ardenne	Arable crops	Conventional	122	Craie 54 % Limon 46 %		

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Sugar beet	97 t FM/ha champagne	Ploughing or minimum cultivation
Winter wheat	8.8 t DM /ha brie and champagne	Ploughing or minimum cultivation
Winter rapeseed	2.5 t DM /ha brie - 1.9 t/ha champagne	Ploughing or minimum cultivation
Spring peas	2.3 t DM /ha Brie	Ploughing or minimum cultivation
Winter peas	1.8 t DM /ha Champagne	Ploughing or minimum cultivation
BarleySpring	6.3 t DM /ha Brie – 8.3 t/ha Champagne	Ploughing or minimum cultivation
BarleyWinter	8.6 t DM /ha brie – 9.3 t/ha Champagne	Ploughing or minimum cultivation
Alfalfa	8.3 t DM/ha brie	Ploughing or minimum cultivation

16.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation - (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate legume crops	Introduce more grain legume crops (spring or winter pea) to reduce nitrogen	Ha of pea and alfalfa in crop systems	9 ha alfalfa 3.84 ha winter pea (2019-2020-2021)	10.28 ha alfalfa	2022	Farm advisors

	application on crop system			6.7 ha winter pea		
Apply low-emission fertilizers	Apply more nitrogen fertilizers in the form of granular solid (mineral fertilizers NPKS and ammonium nitrate)	% form of synthetic nitrogen applied	100% of nitrogen solution	At least 30 % of UAA	2022 (with test before on a smaller area in 2021)*	Farm advisors
Cultivate cover crops	Cover crops before spring crops	Ha	16.87 ha (2019-2020-2021)	20 ha	2022	Farm advisors
Establish and maintain field margins	Fallows expansion of which honey fallows	Ha of fallows and flower strips	3% of UAA with grass	5% of UAA with grass	2023	Farm advisors

* in 2021: 13 ha of cereals (over 12 2ha of the farm cultivated area UAA) i.e 9.4%. in 2022 : 40.6 ha (30% of UAA and 55.3% of the cereals).

16.7. LCF7

16.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Maxime PRUT	Champagne Ardenne	Arable crops	Conventional	163.02	Craie 100 %	630	35

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Sugar beet	74.34 t FM/ha	Ploughing or minimum cultivation
Winter wheat	9.62 t DM /ha	Ploughing or minimum cultivation
Winter rapeseed	3.2 t DM /ha	Ploughing or minimum cultivation
Spring peas	3.6 t DM /ha	Ploughing or minimum cultivation
BarleySpring	8.34 t DM /ha	Ploughing or minimum cultivation
Sunflower	3.68 t DM /ha	Ploughing or minimum cultivation
Oilseed flax	0.52 t DM /ha	Ploughing or minimum cultivation

16.7.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation - (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Save energy use of vehicles and machinery	Reducing fuel consumption (renewal of agricultural tractor)	Fuel consumption (liter)	29000 liters	14400 liters	2023	SCARA and the farmer
Cultivate energy crops Cultivate cover crops	Introduce intermediate energy crop Diversifying species in cover mixture (8 species)	ha Biomass DMP Frequency of success	0 ha	- Rye crop : (3.5 ha, biomass 10 t DM/ha) - average of 5.2 DMP/ha	2023	SCARA and the farmer
Apply organic fertilizers	Introduce horse manure on Sugar beet. Introduce compost green and bio-waste Liquid digestate from biogas	ha Spreading rate t/ha	Horse manure (0) ha Compost (0 ha) Liquid digestate (15 t/ha, 17.39 ha)	Horse manure (5 t/ha, 2.5 ha) Compost (3 t/ha, 7.9 ha) Liquid digestate (15 t/ha, 32.32 ha)	2023	SCARA and the farmer
Establish or maintain hedgerows and individual trees	Planting a new hedgerow	LKM (Linear Kilometer)	0.83 km	1.46 km	2023	SCARA and the farmer

16.8. LCF8

16.8.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
EARL du moulin	Champagne Ardenne	Arable crops	Conventional	184.13	Craie 100 %	630	32

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Sugar beet	72.12 t FM/ha	Minimum cultivation
Winter wheat	8.63 t DM /ha	Minimum cultivation
Winter rapeseed	4.72 t DM /ha	Minimum cultivation
Spring oilseed flax	1.6 t DM /ha	Minimum cultivation
Spring barley	7.13 t DM /ha	Minimum cultivation
Winter barley	9.57 t DM /ha	Minimum cultivation
Corn	6.2 t DM /ha	Minimum cultivation
Winter rye	5.59 t DM /ha	Minimum cultivation
Fava bean	1.5 t DM /ha	Minimum cultivation
Spring pea crop	3.56 t DM /ha	Minimum cultivation
Sorghum	5.9 t DM /ha	Minimum cultivation
Millet	4.2 t DM /ha	Minimum cultivation
Alfalfa	10 t DM /ha	Minimum cultivation
Sunflower	2.7 t DM /ha	Minimum cultivation

16.8.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation - (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Establish or maintain hedgerows and individual trees	Planting a new hedgerow	LKM (Linear Kilometer)	0 km	0.8 km	2023	SCARA and the farmer

Diversify crop rotation Grow species with lower N-use	Replace the corn crop by the spring hemp crop	Ha	0 ha	Spring hemp crop: 11.71 ha	2023	SCARA and the farmer
Integrate grass leys into arable rotations	Replace 5,5 hectares of spring pea crop by a flowering fallow	Ha	Flowering fallow: 0.21 ha Spring pea: 29.13 ha	Flowering fallow: 5.71 ha Spring pea: 23.63 ha	2023	SCARA and the farmer
Cover crops	Diversifying species in cover mixture	DMP (dry matter produced)	3 t DM/ha (60.17 ha)	3,2 t DM/ha (60,17 ha)	2023	SCARA and the farmer

17 Belgian crops I3S

I3S manager: Marie Collard

17.1. LCF1

17.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
HA	Bierwart, Wallonia	Crops	Conventional	79.42 ha	Silt	806mm/year	1

Crop type	Average production (yield t/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Wheat	10 t DM/ha	ploughing
Sugarbeets	93 t FM/ha	ploughing
Green beans	7 t DM/ha	ploughing
Chicory	45 t FM/ha	ploughing
Pumpkins	20 t DM/ha	ploughing
Potatoes	47.7 t FM/ha	Stubble cultivation (cultivator)

17.1.2. Farm Action Plan

Solution (from the list below or local)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline)	People helping to choose and implement this solution (farm)
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[D3.2. Lead Commercial Farms Action Plans]

solution with brief explanation)					year for which data were collected)	advisor, nutrition advisor, veterinarian...)
Establish or maintain hedgerows and individual trees	Plant hedgerows or trees and maintain the existing ones	Number of linear meters of hedges planted or number of individual trees planted	0 hedgerows 12 individual trees	To be defined	From 2023	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS) AWAF : Walloon association for agroforestry
Reduce soil tillage	Reduce soil tillage, starting by reducing ploughing. (Event though, ploughing will be kept as last resort in cases of extreme weather and climate conditions)	% of crops where ploughing is part of tillage operations	83%	0%	From 2023	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Cultivate cover crops	Increase and maximize the use of cover crops : implement cover crops between each cash crop succession whenever possible Improve cover crops : successful implementation (difficult to succeed so far) and aiming for a higher biomass	% of cover crop sown each year/ number of cover crops that could be sown cover crops DM/ha	70% < 2 T DM /ha	100% > 3 T DM /ha for long cover crops > 2 T DM/ha for short cover crops	From 2022 From 2024	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Cultivate legumes in cover crops	Add/increase legumes in cover crops to increase N restitution and reduce N mineral fertilizer on the following cash crops	% of legumes in cover crops N kg/ha restitution estimated with MERCI method	< 30% To be defined (different for each cover crops)	> 30% To be defined (different for each	From 2024	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation



				cover crops)		agriculture (SCAM-ACS)
Adapt fertilizer application	Linked to solution nb.2 + realizing nitrogen residue soil analysis after winter to adapt the nitrogen dose on cash crops Training on the different forms of N fertilizers to adapt the dose, use low emission ones and use it at the right time	% of N reduction compare to usual dose	100% of the dose	To be defined	From 2024 From 2024	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)

17.2. LCF2

17.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
BM	Hannut, Wallonia	Crops	Conventional, conservation agriculture	144	Silt	742 mm/year	1

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Sugarbeets	97.00 t FM/ha	Stubble cultivation
Wheat	10.40 t DM/ha	Stubble cultivation and topsoiling
Chicory	56.00 t FM/ha	Stubble cultivation
Linen	6.10 t DM/ha	Stubble cultivation
Canned peas	6.50 t DM/ha	Stubble cultivation
Sunflower	1.80 t DM/ha	Stubble cultivation
Faba beans	1.33 t DM/ha	Stubble cultivation

17.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce soil tillage	Reduce soil tillage, starting by reducing ploughing. (Event though, ploughing will be kept as last resort in cases of extreme weather and climate conditions)	% of crops where ploughing is part of tillage operations	100%	0%	From 2010	Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Cultivate cover crops	Increase and maximize the use of cover crops : implement cover crops between each cash crop succession whenever possible Improve cover crops: successful implementation (difficult to succeed so far) and aiming for a higher biomass	% of cover crop sown each year/ number of cover crops that could be sown cover crops DM/ha	50% < 2 t DM /ha	100% > 3 t DM/ha for long cover crops > 2 t DM/ha for short cover crops	From 2018 From 2024	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Cultivate legumes in cover crops	Add/increase legumes in cover crops to increase N restitution and reduce N mineral fertilizer on the following cash crops	% of legumes in cover crops N kg/ha restitution estimated with MERCI method	< 30% To be defined (different for each cover crops)	> 30% To be defined (different for each cover crops)	From 2023	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)

Adapt fertilizer application	Linked to solution nb.2 + realizing nitrogen residue soil analysis after winter to adapt the nitrogen dose on cash crops (already in place) Localized fertilization at seeding (using specified engine) to avoid volatilization and reduce the N dose Training on the different forms of N fertilizers to adapt the dose, use low emission ones and use it at the right time	% of N reduction compare to usual dose	100% of the dose	To be defined	From 2024 From 2023 From 2024	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Establish or maintain field margins	Establish field margins and flower strips for biodiversity and carbon sequestration	% of field margins area	0%	To be defined	2019	
Establish or maintain hedgerows and individual trees	Plant hedgerows or trees and maintain the existing ones	Number of linear meters of hedges planted or number of individual trees planted				CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS) AWAF : Walloon association for agroforestry

17.3. LCF3

17.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
JA	Héron, Wallonia	Crops	Conventional	78.82	Silt	798.5	1

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Sugarbeets	103 t FM/ha	Stubble cultivation
Chicory	49 t FM/ha	Stubble cultivation
Rape (colza) with linen and faba beans as service crops	5.42 t DM/ha	Stubble cultivation
Spelt (épeautre)	8.83 t DM/ha	Stubble cultivation
Wheat (froment)	9.24 t DM/ha	Stubble cultivation
Faba beans (fèverole)	4.5 t DM/ha	Stubble cultivation
Linen	5.27 t DM/ha	Stubble cultivation and and topsoiling
winter peas and wheat association	8.682 t DM/ha	Stubble cultivation
Winter barley (orge d'hiver)	9.88 t DM/ha	Stubble cultivation
Permanent grassland	10 t DM/ha/year	No till – permanent grassland

17.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce soil tillage	Reduce soil tillage, starting by reducing ploughing. (Event though, ploughing is kept as last resort in cases of extreme weather and climate conditions)	% of crops where ploughing is part of tillage operations	100%	0%	From 2018	Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Cultivate cover crops	Increase and maximize the use of cover crops : implement cover crops between each cash crop succession whenever possible	% of cover crop sown each year/ number of cover crops that could be sown	50%	100% (at 60% in 2022)	From 2018	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their

	Improve cover crops: successful implementation (difficult to succeed so far) and aiming for a higher biomass	cover crops DM/ha	< 2 t DM /ha	> 3 t DM/ha for long cover crops > 2 t DM/ha for short cover crops	From 2024	farmer club dedicated to conservation agriculture (SCAM-ACS)
Cultivate legumes in cover crops	Add/increase legumes in cover crops to increase N restitution and reduce N mineral fertilizer on the following cash crops	% of legumes in cover crops N kg/ha restitution estimated with MERCI method	< 30% To be defined (different for each cover crops)	> 30% To be defined (different for each cover crops)	From 2024	ClieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Adapt fertilizer application	Linked to solution nb.2 + realizing nitrogen residue soil analysis after winter to adapt the nitrogen dose on cash crops Localized fertilization at seeding (using specified engine) to avoid volatilization and reduce the N dose Training on the different forms of N fertilizers to adapt the dose, use low emission ones and use it at the right time	% of N reduction compare to usual dose	100% of the dose	To be defined	From 2022 From 2023 From 2024	ClieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Establish or maintain hedgerows and individual trees	Plant hedgerows or trees and maintain the existing ones	Number of linear meters of hedges planted or number of individual	8 old trees and 0 hedgerows	20 fruit trees planted 396 linear meter	2015 2019	



		trees planted		planted (in two different locations – 166 m and 280 m)		
Establish and maintain field margins	Establish field margins and flower strips for biodiversity and carbon sequestration	% of field margins area	0%	3%	2019	

17.4. LCF4

17.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LH	Bierwart, Walloonie	Crops	Conventional and organic	139.48 included 34.03 ha in organic	Silt	806 mm/year	1.5

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Linen	6.7 t DM/ha	Stubble cultivation (sometimes topsoiling)
Sugarbeets (betteraves sucrières)	102 t FM/ha	Stubble cultivation (sometimes topsoiling)
Potatoes CONV (PDT)	47.5 t FM/ha	Stubble cultivation, topsoiling
Wheat (froment)	10.4 t DM/ha	Stubble cultivation, topsoiling
Broad beans (fèves des marais)	7.9 t FM/ha	Stubble cultivation
Green beans (haricots)	9.3 t FM/ha	Stubble cultivation, topsoiling
Organic Potatoes	42 t FM/ha	Ploughing
Organic Green peas	6.3 t FM/ha	Ploughing
Organic Spelt (épeautre)	6.5 t DM/ha	Ploughing
Organic Triticale (triticale céréales)	9.6 t DM/ha	Ploughing
Organic Carrots	54 t FM/ha	Ploughing
Onions	43 t FM/ha	Ploughing

17.4.2. Farm Action Plan

[D3.2. Lead Commercial Farms Action Plans]

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce soil tillage	Reduce soil tillage, starting by reducing ploughing. So far, ploughing is kept for organic crops.	% of crops where ploughing is part of tillage operations	100%	50%	From 2013	Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Cultivate cover crops	Increase and maximize the use of cover crops : implement cover crops between each cash crop succession whenever possible Improve cover crops : successful implementation (difficult to succeed so far) and aiming for a higher biomass	% of cover crop sown each year/ number of cover crops that could be sown cover crops DM/ha	50% < 2 t DM/ha	100% > 3 t DM/ha for long cover crops > 2 t DM/ha for short cover crops	From 2018 From 2024	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Cultivate legumes in cover crops	Add/increase legumes in cover crops to increase N restitution and reduce N mineral fertilizer on the following cash crops	% of legumes in cover crops N kg/ha restitution estimated with MERCI method	< 30% To be defined (different for each cover crops)	> 30% To be defined (different for each cover crops)	From 2023	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Adapt fertilizer application	Linked to solution nb.2 + realizing nitrogen residue soil analysis after winter to adapt	% of N reduction compare to usual dose			From 2024	CLieNFarms I3S network (LCFs working together)



	the nitrogen dose on cash crops (already in place) Training on the different forms of N fertilizers to adapt the dose, use low emission ones and use it at the right time				From 2024	Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Establish or maintain hedgerows and individual trees	Plant hedgerows or trees and maintain the existing ones	Number of trees planted and linear meter of hedgerows planted	0	620 linear meter of hedgerows		

17.5. LCF5

17.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
SH	La Bruyère, Wallonia	Crops	Conventional and a bit of organic (some carrots and chicory)	255	Silt	804 mm/year	3 (in 2022, baseline year)

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Wheat	9.6 t DM/ha	Reduced tillage
Carrots	54.7 t FM/ha	Ploughing
Carrots (organic)	62.8 t FM/ha	Ploughing
Chicory (conv)	49 t FM/ha	Reduced tillage
Chicory (organic)	68.7 t FM/ha	Reduced tillage
Rape	4.8 t DM/ha	Reduced tillage
Fava beans	7.1 t DM/ha	Ploughing
Green beans	25 t FM/ha	Ploughing

Linen	5.42 t DM/ha	Reduced tillage
Maize (grain)	11.8 t DM/ha	Reduced tillage
Onions	53.25 t FM/ha	Ploughing
Canned peas	5.8 t FM/ha	Ploughing
Potatoes grenailles/small potatoes	45 t FM/ha	Reduced tillage
Potatoes industries	40.11 t FM/ha	Reduced tillage
Miscanthus	13.15 t DM/ha	No till – pluriannual crop

17.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Reduce soil tillage	Reduce soil tillage, starting by reducing ploughing. Ploughing is kept for more sensible crops like carrots, chicory,...	% of crops where ploughing is part of tillage operations	100%	0% (ideal target but questioning if achievable)	From 2010	Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Produce renewable energy	Generate electricity production with solar panels Generate energy from biomass production by installing miscanthus crop on river hedges and sensitive area	Kwh of renewable energy produced	0	To be defined	Installation date of solar panels (to come) Installation date of miscanthus production (to come)	Energy advisor
Use renewable energy	Use renewable electricity (through solar panels) Use biomass (miscanthus crop) for heat production by installing a multi-fuel biomass boiler	Kwh of renewable energy used instead of fossil energy	0	To be defined	Installation date of solar panels (to come) Installation date of the multi-fuel biomass boiler (to come)	Energy advisor

Cultivate cover crops	Increase and maximize the use of cover crops : implement cover crops between each cash crop succession whenever possible Improve cover crops : successful implementation (difficult to succeed so far) and aiming for a higher biomass	% of cover crop sown each year/ number of cover crops that could be sown cover crops DM/ha	50% < 2 t DM/ha	100% > 3 t DM/ha for long cover crops > 2 t DM/ha for short cover crops	From 2018 From 2023	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Cultivate legumes in cover crops	Add/increase legumes in cover crops to increase N restitution and reduce N mineral fertilizer on the following cash crops	% of legumes in cover crops N kg/ha restitution estimated with MERCI method	< 30% To be defined (different for each cover crops)	> 30% To be defined (different for each cover crops)	From 2024	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)
Adapt fertilizer application	Linked to solution nb.2 + realizing nitrogen residue soil analysis after winter to adapt the nitrogen dose on cash crops Localized fertilization at seeding (using specified engine) to avoid volatilization and reduce the N dose Training on the different forms of N fertilizers to adapt the dose, use low emission ones and use it at the right time	% of N reduction compare to usual dose	100% of the dose	To be defined	From 2024 From 2023 From 2024	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS)

Establish or maintain hedgerows and individual trees	Plant hedgerows or trees and maintain the existing ones	Number of linear meters of hedges planted or number of individual trees planted	Existing number to precise	To be defined	From 2023	CLieNFarms I3S network (LCFs working together) Farm advisor from SCAM cooperative and their farmer club dedicated to conservation agriculture (SCAM-ACS) AWAF : Walloon association for agroforestry
Establish and maintain field margins	Establish field margins and flower strips for biodiversity and carbon sequestration	% of field margins area	0%	6%	2019	-

18 Ukrainian Crops I3S

I3S manager: Oleskii Omelianenko

18.1. LCF1

18.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
FG "Tetiana"	Dnipropetrovsk oblast	ARABLE (CROPS)	CONVENTIONAL	223 ha			

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat	96 ha	Ploughing
Winter barley	22 ha	Ploughing
Sunflower	80 ha	Ploughing
Winter OSR	25 ha	Ploughing

18.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Incorporate crop residues in the soil	Residues incorporation and destructors implementation	Monitor and record soil moisture, germination			2024-2025	Consultant
Reduce soil tillage	Reduced tillage before planting	Area of land on minimum cultivation for wheat			2024-2025	Consultant
Cultivate cover crops	Cover crops implementation in the rotation	Area with cover crops			2024-2025	Consultant

18.2. LCF2

18.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Agron	Ternopil oblast	ARABLE (CROPS)	CONVENTIONAL	633 ha	Loam (chernozem)		

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat	454 ha	Ploughing
Sugar beet	101 ha	Ploughing
Sunflower	78 ha	Ploughing

18.2.2. Farm Action Plan

Solution (from the list below or local solution with)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or	People helping to choose and implement this
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brief explanation)		solution set up			after the baseline year for which data were collected)	solution (farm advisor, nutrition advisor, veterinarian...)
Incorporate crop residues in the soil	Residues incorporation and destructors implementation	Monitor and record soil moisture, germination			2024-2025	Consultant
Reduce soil tillage	Reduced tillage before planting Direct sowing	Area of land on minimum cultivation for wheat			2024-2025	Consultant
Cultivate cover crops	Cover crops implementation in the rotation	Area with cover crops			2024-2025	Consultant

18.3. LCF3

18.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Agroprodservis Invest	Ternopil oblast	ARABLE (CROPS)	CONVENTIONAL	605 ha	Loam (chernozem)		

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat	237 ha	Ploughing
Corn	33 ha	Ploughing
Sunflower	335 ha	Ploughing

18.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Incorporate crop residues in the soil	Residues incorporation and destructors implementation	Monitor and record soil moister, germination			2024-2025	Consultant
Reduce soil tillage	Reduced tillage before planting Direct sowing	Area of land on minimum cultivation for wheat			2024-2025	Consultant
Cultivate cover crops	Cover crops implementation in the rotation	Area with cover crops			2024-2025	Consultant
Diversify crop rotation	New additional crops in the crop rotation - Not finalized yet					
Adapt fertiliser application	Introduce new technology - Not finalized yet (Check with the farmer)					

18.4. LCF4

18.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LLC «Agrotrade Group »	Kyiv oblast	ARABLE (CROPS)	CONVENTIONAL	533 ha	Loam (chernozem)		

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat	88 ha	Ploughing
Corn	261 ha	Ploughing
Soy	113 ha	Ploughing
Sunflower	70 ha	Ploughing

18.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Incorporate crop residues in the soil	Residues incorporation and destructors implementation	Monitor and record soil moisture, germination			2024-2025	Consultant
Reduce soil tillage	Reduced tillage before planting Direct sowing	Area of land on minimum cultivation for wheat			2024-2025	Consultant
Cultivate cover crops	Cover crops implementation in the rotation	Area with cover crops			2024-2025	Consultant

18.5. LCF5

18.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LLC "Mriya"	Kyiv oblast	ARABLE (CROPS)	No-till	300 ha	Loam		8

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat	90 ha	No-till
Soybean	90 ha	No-till
Sunflower	60 ha	No-till
Corn	60 ha	No-till

18.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Increase crop residues left on the soil	Improved varieties with longer stem mprove the technology of incorporation. Other operations to keep soil humidity	Monitor and record soil moister, germination			2024-2025	Consultant
Cultivate intersown or inter-relayed crops	Checking different technologies	Area of land on minimum cultivation for wheat			2024-2025	Consultant
Cultivate cover crops	Checking different types of cover crops	Area with cover crops			2024-2025	Consultant

18.6. LCF6

18.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
LLC "Viktoria"	Ternopil oblast	ARABLE (CROPS)	CONVENTIONAL	918 ha	Loam (chernozem)	649.16	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat	78 ha	Ploughing
Winter barley	211 ha	Ploughing
Winter oil seed rape	345 ha	Ploughing
Corn/Maize	129 ha	Ploughing

Sunflower	218 ha	Ploughing
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18.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Incorporate crop residues in the soil	Residues incorporation and destructors implementation	Monitor and record soil moister, germination			2024-2025	Consultant
Reduce soil tillage	Reduced tillage before planting Direct sowing	Area of land on minimum cultivation			2024-2025	Consultant
Cultivate cover crops	Cover crops implementation in the rotation	Area with cover crops			2024-2025	Consultant
Adapt fertilizer application	Precise planting technologies	Reduction in fertilizer use			2024-2025	Consultant

18.7. LCF7

18.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Horost Plus	Khmelnitsk oblast	ARABLE (CROPS)	CONVENTIONAL	628 ha	Loam (chernozem)		

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat	183 ha	Ploughing
Winter Barley	122 ha	Ploughing
Corn	222 ha	Ploughing
Soy beans	101 ha	Ploughing

18.7.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Incorporate crop residues in the soil	Residues incorporation and destructors implementation	Monitor and record soil moisture, germination			2024-2025	Consultant
Reduce soil tillage	Reduced tillage before planting	Area of land on minimum cultivation for wheat			2024-2025	Consultant
Cultivate cover crops	Cover crops implementation in the rotation	Area with cover crops			2024-2025	Consultant
Adapt fertilizer application	Introduce new technology - Not finalized yet					

18.8. LCF8

18.8.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
FG «Koshelivske SV»	Chernihiv oblast	ARABLE (CROPS)	CONVENTIONAL	457 ha	Sandy soils		

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat	50 ha	Ploughing
Corn	64ha	Ploughing
Sunflower	225 ha	Ploughing

Not planted	118 ha	
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18.8.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Incorporate crop residues in the soil	Residues incorporation and destructors implementation	Monitor and record soil moisture, germination			2024-2025	Consultant
Reduce soil tillage	Reduced tillage before planting	Area of land on minimum cultivation for wheat			2024-2025	Consultant
Cultivate cover crops	Cover crops implementation in the rotation	Area with cover crops			2024-2025	Consultant
Diversify crop rotation	Introduce additional crops (Not finalized yet)					

19 UK crops I3S

I3S manager: Alice Midmer

19.1. LCF1

19.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
BOUGHTON FARM	NORTHAMPTONSHIRE	ARABLE (CROPS)	CONVENTIONAL	1573 ha	Medium clay loam medium	608.63	

					silt clay loam		
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Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter barley		Minimum cultivation
OSR (oilseed rape)		Minimum cultivation
Winter wheat		Minimum cultivation
Herbal ley	N/A	Variable

19.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate intersown or inter-relayed crops	Participation in a soil group with other farmers Trial some intersown/inter relayed crops.	Area with intersown /interrelayed crops	0 hectare	20 hectare	2024	Farm advisor, seed provider
Cultivate legume crops	Participation in a soil group with other farmers Increase area of legume crops grown	Area of farm planted with legumes	20 hectare		2023	Farm advisor, seed provider
Adapt fertiliser application	Participation in a soil group with other farmers Trial reduced use	Reduced N use per kg	210kg/t		2023	Farm advisor
Integrate grass leys into arable rotations	Participation in a soil group with other farmers Monitor success of grass leys in arable rotation and different establishment methods	Monitor and record establishment success	No monitoring on establishment methods		2023	

Cultivate cover crops	Participation in a soil group with other farmers Trial different cover crop mixes Participation in the Certificate of Sustainable Land Management course	Area of land with over winter cover crops	0		2023	Farm advisor, seed provider
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19.2. LCF2

19.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
BRIXWORTH FARMING COMPANY	NORTHAMPTONSHIRE	ARABLE (CROPS)	CONVENTIONAL	1500 ha	Medium (Hanslope clay and Banbury ironstone)	649.16	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter beans		
Winter wheat		
Winter barley		

19.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian ...)

[D3.2. Lead Commercial Farms Action Plans]

Cultivate intersown or inter-relayed crops	Participation in a soil group with other farmers Trial some intersown/inter relayed crops.	Area with intersown/inter relayed crops	0	20 hectares	2023	
Grow species or varieties with higher N-use efficiency						
Cultivate cover crops	Participation in a soil group with other farmers Trial different cover crop mixes Participation in the Certificate of Sustainable Land Management course	Area with cover crops				
Adapt fertiliser application	Ongoing fertiliser trials with Nestle Endophyte trials	N use efficiency	210 kg/ha	160 kg/ha		
Cultivate legume crops	Participation in a soil group with other farmers Increase area of legume crops grown Trial clover understory	Area with legumes	0	100 ha		

19.3. LCF3

19.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
COURTEENHALL	NORTHAMPTONSHIRE	ARABLE (CROPS)	CONVENTIONAL	730ha	Hanslope clay	649.16	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat	360 ha	
Legume fallow	360 ha	

19.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Integrate grass leys into arable rotations	Participation in a soil group with other farmers Monitor success of grass leys in arable rotation and different establishment methods	Monitor and record establishment success	No monitoring	Monitoring	2022	Farm advisor
Reduce soil tillage	Reduced cultivations when land coming out of grass	Area of land on minimum cultivation	0	All		
Cultivate intersown or inter-	Participation in a soil group	Area with intersown/interrelayed crops	0	100 ha		

relayed crops	with other farmers Trial some intersown/inter relayed crops.					
Adapt fertiliser application	Trialling reduced fertiliser application	Reduction in fertilizer use				

19.4. LCF4

19.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
G D JEWERS & SON	SUFFOLK	ARABLE (CROPS)	CONVENTIONAL	270 ha	Clay loam / sandy loam	622.19	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Spring barley		Minimum cultivation
Winter wheat		Minimum cultivation
Buckwheat		Minimum cultivation
Winter beans		Minimum cultivation
Winter barley		Minimum cultivation

19.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate intersown or inter-	Participation in a soil group with other farmers	Area with intersown/interrelayed crops	0	100	2023	

relayed crops	Trial some intersown/inter relayed crops. Farmers					
Apply low-emission fertilisers	Trial low emission fertiliser		0		2024?	
Adapt fertilizer application	Reduced fertiliser application trials	Reduced fertilizer use	210 kg/ha	160 kg/ha	2022	

19.5. LCF5

19.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
J T LINES & SON	CAMBRIDGESHIRE	ARABLE (CROPS)	CONVENTIONAL	306 ha	Hanslope clay	608.63	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Wheat		Direct drilling
Barley		

19.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Adapt fertiliser application	Remove all synthetic Nitrogen use Ongoing trials	Nitrogen use	160 kg/ha	0 kg/ha	2023	

Integrate grass leys into arable rotations	Participation in a soil group with other farmers Introduce grass leys into the arable rotation	Area of land in grass	0	50	2023	Farm advisor
Cultivate cover crops	Participation in a soil group with other farmers Trial different cover crop mixes Participation in the Certificate of Sustainable Land Management course	Area of land with cover crops	50	100	2023	Farm advisor, seed provider

19.6. LCF6

19.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
J. H. SIMPSON & SON	PETERBOROUGH	ARABLE (CROPS)	CONVENTIONAL	650 ha	Clay loam, some fen peat	613.55	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
OSR (Oilseed rape)		
Spring wheat		
Winter wheat		
Winter barley		

19.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition)
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						advisor, veterinarian...)
Grow species or varieties with higher N-use efficiency						
Cultivate cover crops	Participation in a soil group with other farmers Trial different cover crop mixes Participation in the Certificate of Sustainable Land Management course	Area under cover crops	50	150	2021	
Adapt fertiliser application	Trials for foliar nitrogen Participation in a soil group with other farmers Trial reduced use	Reduced N use			2022	
Cultivate intersown or inter-relayed crops	Participation in a soil group with other farmers Trial some intersown/inter-relayed crops	Area with intersown/inter-relayed crops	0	100	2023	

19.7. LCF7

19.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
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MANOR FARM	NORTHAMPTONSHIRE	ARABLE (CROPS)	CONVENTIONAL	200 ha	Light ironstone (Banbury) to Hanslope / Ragdale / Moreton clays	649.16	
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Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat		Direct drilling
Barley		
Beans		

19.7.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian ...)
Cultivate cover crops	Participation in a soil group with other farmers Trial different cover crop mixes	Area with intergrown/interrelayed crops	0 hectare	20 hectare	2024	Farm advisor, seed provider
Apply low-emission fertilisers	Open to opportunities for trials Learning from other ClieN Farmers					
Grow species or varieties with higher N-use efficiency						
Reduce soil tillage	Participation in a soil group with other farmers Trial reduced tillage	Area of land under reduced tillage	0	650	2023	Farm advisor

19.8. LCF8

19.8.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
ROOKERY FARM	NORFOLK	ARABLE (CROPS)	CONVENTIONAL	406 ha	Clay loam / Loamy sand	626.19	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat		Minimum cultivation
Spring peas		Minimum cultivation
Winter barley		Minimum cultivation

19.8.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Apply low-emission fertilisers	Ongoing fertiliser trials with Nestle Biostimulant trial	Carbon emissions from fertilizer			2022	Nestle
Grow species or varieties with higher N-use efficiency	Ongoing trials					
Cultivate intersown or inter-	Participation in a soil group	Area with intersown/interrelayed crops	0 hectare	20 hectare	2024	Farm advisor, seed provider

relayed crops	with other farmers Trial some intersown/inter relayed crops					
Use biofuels, biogas and biomass	Increased use of farmyard manure	FYM replacing Ammonium Nitrate	0	50%	2023	Farm advisor

19.9. LCF9

19.9.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
WINWICK MANOR FARM	NORTHAMPTONSHIRE	ARABLE (CROPS)	CONVENTIONAL	200 ha	Mainly medium loams / some heavier and lighter ground	649.16	

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Winter wheat		
Barley		

19.9.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)

[D3.2. Lead Commercial Farms Action Plans]

Apply low-emission fertilizers	Participation in a soil group with other farmers Trial reduced use	Reduced N use per kg	210 kg/t		2023	Farm advisor
Cultivate cover crops	Participation in a soil group with other farmers Trial different cover crop mixes Participation in the Certificate of Sustainable Land Management course	Area of land with over winter cover crops	0	200	2023	Farm advisor, seed provider
Cultivate intersown or inter-relayed crops	Participation in a soil group with other farmers Trial some intersown/inter-relayed crops	Area with intersown/inter-relayed crops	0 hectare	20 hectare	2024	Farm advisor, seed provider
Use renewable electricity	Solar panels Renewable heat incentives					

20 Portuguese olives I3S

20.1. LCF1

20.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Santo Antao	Avis	Olives	Integrated Production	145	Silt-Sandy	550	6 full time equivalent

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Olives	11,000 kg/ha	Super High Density, no tillage, permanent cover in interrow

20.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops / Cultivate intersown or inter-relayed crops	Permanent herbaceous cover crop in interrows - Spontaneous cover	% of area covered	0%	30%	2009	Farm Manager
Incorporate crop residues in the soil	Depositing shredded residues from yearly pruning on soil	% of pruning debris left on field	0%	100%	2012	Farm Manager
Interrow management - No tillage vs. localized corrective tillage (to improve soil structure)	One corrective tillage with ripper and grade to correct compactation. Now evaluate results in cover density and species diversity. Area for intervention – 4,59ha	% of area determined to improve	0%	100%	2023	Farm Manager

	50% s007 e 50% s019					
Apply low emission fertilizers	Applied	% of solid fertilizers applied	0	100	2023	Farm Manager
Apply PGPR (plant growth promotion rhizobacteria)	Applied 1kg/ha applied in June 2023. Product claims to optimize potassium availability in soil	kg olives/kg K applied	86	99	2023	Farm Manager

20.2. LCF2

20.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Tinhosa	Évora	Olives	Organic	100	Clay	430	4 full time equivalent

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Olives	8100 kg/ha	Super High Density, no tillage, permanent cover in interrow

20.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Incorporate crop residues in the soil	Depositing shredded residues from yearly pruning on soil	% of pruning debris left on field	0%	100%	2020	Farm Manager
Cultivate cover crops / Cultivate intersown or inter-	Permanent herbaceous cover crop in interrows - Spontaneous cover	% of area covered	0%	50%	2017	Farm Manager

relayed crops						
Apply organic fertilizers	Applied 500 kg/ha of Fertiormont Sólido Pellets	kg/ha applied/year	0	500	2023	Farm Manager

20.3. LCF3

20.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Marmelo	Ferreira do Alentejo	Olives	Integrated Production	168	Silt-Sand-Clay	380	5 full time equivalent

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Olives	10300 kg/ha	High Density, no tillage, permanent cover in interrow

20.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops / Cultivate intersown or inter-relayed crops	Permanent herbaceous cover crop in interrows - Spontaneous cover	% of area covered	0	30%	2007	
Incorporate crop residues in the soil	Depositing shredded residues from yearly pruning on soil. Normally, all residues are left on field but from 2024 a small part (about	% of pruning debris left on field	0	100%	2010	

[D3.2. Lead Commercial Farms Action Plans]

	2.000 kg) will be used in compost					
Interrow management	Survey areas that need improvement Measures to implement: One corrective tillage with ripper to correct compaction. Now evaluate results in cover biomass Area for intervention = 14,02 ha	% of area determined to improve	0	100%	2024	
Apply organic fertilizers	Apply compost made with local subproducts (olive pomace, leaves and branches). Trial in one sector of project with 9,74 ha (currently not enough to apply in the whole farm)	kg/ha/year applied	0	4.000	2023	
Apply PGPR (plant growth promotion rhizobacteria)	1kg/ha applied via fertigation. Product claims to increase nitrogen and phosphorus availability in soil.	kg olives/kg N applied	120	130	2023	
Generate solar thermal energy and electricity / Use renewable electricity	Install solar panels to power irrigation system – 146,6 kWp	% of electricity used covered by solar in a year	0	20%	Installed in late 2023. First irrigation campaigned fully supported by solar - 2024	

20.4. LCF4

20.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Marzalonas	Beja	Olives	Integrated Production		Silty-clay-loam	340	3 full time equivalent

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Olives	8200 kg/ha	Super High Density, no tillage, permanent cover in interrow

20.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops / Cultivate intersown or inter-relayed crops	Permanent herbaceous cover crop in interrows - Spontaneous cover	% of area covered	0	30%	2011	
Incorporate crop residues in the soil	Depositing shredded residues from yearly pruning on soil	% of pruning debris left on field	0	100%	2014	
Generate solar thermal energy and electricity / Use renewable electricity	Install solar panels to power irrigation systems	% of electricity used covered by solar	0	100%	2023	

Apply organic fertilizers	Organic matter granulate applied yearly next to olive trees	kg/ha/ano	0	500	2017	
Lime soils when required	Applied yearly according to soil analysis	% area needing intervention	0	100%	2023	

20.5. LCF5

20.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Balhamim	Beja	Olives	Integrated Production		Silty-clay-loam	340	3 full time equivalent

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Olives	15000 kg/ha	Super High Density, no tillage, permanent cover in interrow

20.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops / Cultivate intersown or inter-relayed crops	Permanent herbaceous cover crop in interrows - Spontaneous cover	% of area covered	0	30%	2017	
Incorporate crop residues in the soil	Depositing shredded residues from yearly pruning on soil	% of pruning debris left on field	0	100%	2020	

Generate solar thermal energy and electricity / Use renewable electricity	Install solar panels to power irrigation systems	% of electricity used covered by solar	0	100%	2023	
Apply organic fertilizers	Organic matter granulate applied yearly next to olive trees	kg/ha/ano	0	500	2017	
Lime soils when required	Applied yearly according to soil analysis	% area needing intervention	0	100%	2023	

20.6. LCF6

20.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Manatiz	Moura	Olives	Integrated Production	21	Clay type	320	0.8 full time

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Olive	12,373 kg/ha/year	High Intensity, no tillage, permanent cover in interrow

20.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops / Cultivate intersown or	Permanent herbaceous cover crop in interrows - Spontaneous cover	% of area covered	0	100%	2013	

inter-relayed crops						
Incorporate crop residues in the soil	Depositing shredded residues from yearly pruning on soil	% of pruning debris left on field	0	100%	2013	

20.7. LCF7

20.7.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Valhascos	Amareleja (Portugal)	Olives	Integrated Production	19	clay soils	480	0.3 full time

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Olive	100-500 kg/ha/year	Traditional, no tillage, permanent cover in interrow

20.7.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops / Cultivate intersown or inter-relayed crops	Permanent herbaceous cover crop in interrows - Spontaneous cover	% of area covered	0	100%	1950	
Incorporate crop residues in the soil	Depositing shredded residues from yearly pruning on soil. The olive trees are larger than in the modern systems. As such, pruning yields	% of pruning debris left on field	30%	50%	2023	

	thicker branches with commercial value for firewood.					
Improve grassland management	Adapt grazing (lower density, less time on field) in all farm.	% of area determined to improve	0	100%	2023	

20.8. LCF8

20.8.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Cotéis	Moura (Portugal)	Olives	Integrated Production	7,52	clay	320	0.3 full time

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Olive	16,601 kg/ha/year	High Intensity, no tillage, permanent cover in interrow

20.8.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate cover crops / Cultivate intersown or inter-relayed crops	Permanent herbaceous cover crop in interrows - Spontaneous cover	% of area covered	0	100%	2016	
Incorporate crop residues in the soil	Depositing shredded residues from yearly pruning on soil	% of pruning debris left on field	0	100%	2016	

21 Italian tomatoes I3S

I3S manager: Andrea Ferrarini

21.1. LCF1

21.1.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Azienda Agricola Motta	Piacenza	Cereals/tomato	conventional	80	Clay silty	900	3

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Industrial tomato	85 ton FM/ha/year	Conventional tillage
Soft wheat	7 ton DM/ha/year	Minimum tillage
Sweet corn	16 ton DM/ha/year	Minimum tillage
Garlic	12 ton DM/ha/year	Minimum tillage

21.1.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Diversify crop rotation	Adding summer cereals into industrial tomato crop rotation	%fields with summer cereals	0	20	2020	ownself
Residues incorporation	Wheat and maize residue incorporation	Increase in SOC stock (ton SOC/ha/y)	0	0.6		I3S manager
Cultivate cover crops	Adding winter cover crops (leguminose or cover crop mixture)	Increase in SOC stock (ton SOC/ha/y)	0	0.25	2020	I3S manager
Reduced soil tillage	Adopting minimum tillage and strip	1) Gasoline consumption 2) n.a.	1) 60 L/ha 2) n.a.	1) 15 L/ha	2022	I3S manager

	tillage to main summer crops and industrial tomato	for seedbed preparation (L/ha) 2) crop yield increase %		2) +10% crop yield		
Apply organic fertilizers	Introducing slurry injection on summer crop fertilization plan	% mineral fertilizer substitution	10	50	2022	I3S manager

21.2. LCF2

21.2.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Azienda Agricola Casa Nuova	Piacenza	Cereals/tomato	conventional	130	Silty clay and loamy silty	900	4

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Industrial tomato	90 FM ton/ha/y	Conventional tillage
Soft wheat	7.5 DM ton/ha/y	Conventional tillage
Durum wheat	6 DM ton/ha/y	Conventional tillage
Silage maize	52 FM ton/ha/y	Conventional tillage
Sugarbeet	60 FM ton/ha/y	Conventional tillage
Onion	30 FM ton/ha/y	Conventional tillage

21.2.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Residues incorporation	Wheat and maize residue incorporation	Increase in SOC stock (tonSOC/ha/y)	0	0.6	2021	I3S manager

Cultivate cover crops	Adding winter cover crops (leguminose or cover crop mixture)	Increase in SOC stock (tonSOC/ha/y)	0	0.25	2021	I3S manager
Apply organic fertilizers with N inhibitors	Introducing slurry injection on winter crop fertilization plans	1) % mineral fertilizer substitution and 2) NUE (kg DM grain /kg N supply)	1) 0 % 2) NUE wheat (35)	1) 100% 2) NUE wheat (52, +50%)	2022	I3S manager

21.3. LCF3

21.3.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Tassini snc	Piacenza	Cereals/tomato	conventional	80	Clay Silty	900	4

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Industrial tomato	100 FM ton/ha/y	Conventional tillage
Soft wheat	8 DM ton/ha/y	Conventional tillage
Durum wheat	6 DM ton/ha/y	Conventional tillage
Silage maize	70 FM ton/ha/y	Conventional tillage
Grain maize	12 FM ton/ha/y	Conventional tillage

21.3.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Residues incorporation	Wheat and maize residue incorporation	Increase in SOC stock (ton SOC/ha/y)	0	0.6	2021	I3S manager

Cultivate cover crops	Adding winter cover crops (leguminose or cover crop mixture)	Increase in SOC stock (ton SOC/ha/y)	0	0.25	2021	I3S manager
Apply organic fertilizers with N inhibitors	Introducing 100% digestate injection on summer and winter crop fertilization plans	% mineral fertilizer substitution and NUE (kg DM grain /kg N supply)	0 % NUE wheat (35)	100% NUE wheat (52, +50%)	2022	I3S manager
Reduced soil tillage	Adopting strip tillage on main summer crops and industrial tomato	1) Gasoline consumption for seedbed preparation (L/ha) 2) crop yield and NUE/PUE % increase (kg DM/N, P supply) 3) Reduction % of N mineral fertilizers used per ha	1) 50 L/ha 2) NUE silage maize (82 kg DM /kg N supply) NUE grain maize (82 kg DM /kg N supply) 3) 0	1) 15 L/ha 2) +20% summer crops yield +60% NUE maize (120 silage and 63 grain maize) 3) -30%	2023	I3S manager

21.4. LCF4

21.4.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Azienda Agricola Colombarone	Piacenza	Cereals/tomato	conventional	110	Clay Silty	900	4

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Industrial tomato	85 FM ton/ha/y	Conventional tillage
Soft wheat	7 DM ton/ha/y	Minimum tillage
Durum wheat	6 DM ton/ha/y	Minimum tillage
Silage maize	70 FM ton/ha/y	Minimum tillage
Grain maize	10 FM ton/ha/y	Minimum tillage

Garlic	13 FM ton/ha/y	Minimum tillage
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21.4.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Residues incorporation	Wheat and maize residue incorporation	Increase in SOC stock (ton SOC/ha/y)	0	0.6	2021	I3S manager
Cultivate cover crops	Adding winter cover crops (leguminose or cover crop mixture)	Increase in SOC stock (ton SOC/ha/y)	0	0.25	2021	I3S manager
Apply organic fertilizers with N inhibitors	Introducing slurry injection on winter crop fertilization plans	1) % mineral fertilizer substitution per ha 2) NUE (kg DM grain /kg N supply)	1) 0 % 2) NUE wheat (35)	1) 100% 2) NUE wheat (52, > +50%)	2022	I3S manager
Reduced soil tillage	Adopting strip tillage to main summer crops and industrial tomato	1) Gasoline consumption for seedbed preparation (L/ha) 2) crop yield (Mg/ha) and NUE/PUE % change (kg DM/N,P supply)	1) 60 L/ha 2) n.a.	1) 15 L/ha 2) +10% tomato yield +30% summer crops yield >+50% NUE > +30% PUE	2022	I3S manager

21.5. LCF5

21.5.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Grandi Paolo	Cremona	Cereals	conventional	200	Loamy sandy	900	4

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Barley	4 DM ton grain/ha/y	Minimum tillage
Soft wheat	6 DM ton grain/ha/y	Minimum tillage
Silage maize	50 FM ton/ha/y	Minimum tillage
Soybean	3 DM ton grain/ha/y	Minimum tillage

21.5.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Diversify crop rotation (double cropping)	Adding summer second crops after winter crops to avoid monoculture of maize	1) % of ag land under second crops per year 2) % of imported farm N (e.g. from soybean)	1) 0 2) 100%	1) 30% 2) 85%	2023	farm advisor
Cultivate cover crops	Adding winter cover crops (leguminose or cover crop mixture)	Annual SOC stock rate change (ton SOC/ha/y)	0.1	0.35	2022	I3S manager
Apply organic fertilizers	Introducing 100% slurry injection with minimum tillage machineries on summer and winter	1) average farm-level % of mineral fertilizer substitution	1) 15 % 2) 30 ha 3) NUE winter crops (29); NUE maize (58);	1) 60% 2) 150 ha 3) NUE winter crops	2023	I3S manager

	crop's fertilization plans	2) farm hectares using slurry fertilization 2) NUE (kg DM grain /kg N supply)	NUE soybean (30)	(35, +20%); NUE maize (72, +24%); NUE maize (40, +30%)		
Residues incorporation	Wheat and maize residue incorporation	Increase in SOC stock (ton SOC/ha/y)	0	0.6	2024	I3S manager
Reduced soil tillage	Adopting strip tillage with slurry injection on main summer crops	1) Gasoline consumption for seedbed preparation (L/ha) 2) feed/crop yield increase (Mg/ha) 3) % Reduction of N mineral fertilizers use per ha	1) 40 L/ha 2) n.a. 3) n.a.	1) 15 L/ha 2) +20% first summer crops yield, +50% second summer crops yield 3) -30%	2024	I3S manager

21.6. LCF6

21.6.1. Farm portrait

Farm name	Region/Province	Farm activities (dairy, beef, sheep, pigs, crops, ...)	System type (conventional, organic, ...)	Farm size (ha)	Soil type	Precipitation (mm/year)	Number of labor units
Vanzetti Holstein Coop Speranza	Torino	Cereals	conventional	800	Loamy sandy	780	6

Crop type	Average production (yield/ha/year)	Cultivation type (ploughing, minimum cultivation, direct drilling, ...)
Ryegrass	12 FM ton/ha/y	Minimum tillage

Silage maize	65 FM ton/ha/y	Minimum tillage
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21.6.2. Farm Action Plan

Solution (from the list below or local solution with brief explanation)	Explanation (how the farmer will implement the solution)	Indicator and unit used to monitor this solution set up	Indicator value before implementation	Target indicator value	Year of implementation- (can be before or after the baseline year for which data were collected)	People helping to choose and implement this solution (farm advisor, nutrition advisor, veterinarian...)
Cultivate legume crops	Adding winter cover crops or forage legume crops both for biogas and animal feeding	1) overall farm NUE increase	1) n.a.	1) +30%	2023	farm advisor
Reduced soil tillage and double cropping	Adopting minimum and strip tillage with biogas digestate injection on winter and summer crops respectively	1) Gasoline consumption for seedbed preparation of double crops (L/ha) 2) reduction % of farm mineral fertilizer use 3) SOC stock annual rate (ton SOC/ha/y)	1) 100 L/ha 2) n.a. 3) 0.5	1) 35 L/ha 2) -20% 3) 0.9	2023	I3S manager

22 Conclusion

This document provides outlines the changes in practices that will be implemented on the LCFs to reduce GHG emissions and/or increase C sequestration. Each LCF has chosen solutions and defined objective values for their own system. Table 2 summarizes the most popular solutions chosen by each I3S.

Table 2: Summary of the main solutions chosen by the LCFs of each I3S involved in ClieNFarms

French Dairy I3S	Irish Dairy I3S	Dutch Dairy I3S
Change type and amount of concentrate Youngstock and unproductive animals management Review rotation and fertilizer application Save energy and consider solar panel installation	Genetic selection Improve animal health Reduce age at first calving Slurry spreading (time and tool) Use protected urea Better soil pH (lime) Grazing management (measures)	Low emission feed ingredients Better forage quality Reduce Crude Protein content Renewable energy production Better grassland management Methane inhibitors (additives or specific plants)
Swiss dairy I3S	German dairy I3S	Spanish Dairy I3S
Reduce soil tillage Intersown crops and cover crops	Slurry management (storage, spreading, biogas) Cover crops Legumes (in grassland or crops) Produce renewable energy (wind or solar)	Better reproductive performances Optimize feed ration (adapted to requirements) Low emissions crops (sunflower)
French beef I3S	Irish beef I3S	Romanian sheep I3S
Improve reproductive performances Improve grassland management Produce renewable energy (solar panels)	Slurry (spreading and time) Legumes in grassland and grazing management Better forage quality Improve average daily gain	Genetic selection for better performances Better reproductive performances
French crops (south) I3S	French crops (south) I3S	Ukrainian crops I3S
Diversify rotation Cover crops Increase crops residues left on soil	Diversify rotation Cover crops Hedgerows	Incorporate more crop residues in soil Reduce soil tillage Cover crops
Belgian crops I3S	UK crops I3S	Portuguese Olive I3S
Reduce soil tillage Cover crops Hedgerows Adapt fertilizer	Intersown crops Adapt fertilizer application Cover crops	Incorporate more crop residues in soil Cover crops Use organic fertilizer
Italian tomatoes I3S		

[D3.2. Lead Commercial Farms Action Plans]

Incorporate more crop residues in soil Cover crops Reduce soil tillage Use organic fertilizer		
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23 Annex

Annex 1: Catalogue of Climate Solutions (WP1, Task 1.4)

Diversify crop rotation	Generate energy from biom+B40+B35:B56
Increase crop residues left on the soil	Use anaerobic digestion
Incorporate crop residues in the soil	Reduce pH of slurry via acidification
Cultivate cover crops	Add chemical additive to slurry
Cultivate legume crops	Frequent manure removal to closed storage with cooling or treatment
Cultivate intersown or inter-relayed crops	Clean manure storage tank
Grow species or varieties with higher N-use efficiency	Reduce temperature of stored slurry
Integrate grass leys into arable rotations	Capture and treat methane from slurry (oxidation)
Establish and maintain field margins	Shorten manure storage time
Adapt fertiliser application	Use air cleaning system
Apply organic fertilizers	Reduce straw bedding
Apply low-emission fertilizers	Feed methanogenic inhibitors
Lime soils when required	Feed nitrate
Reduce soil tillage	Increase lipid content of diet
Increase water table in peat soils	Feed plant secondary metabolites that reduce methane synthesis
Apply biochar to soil	Use low-emission feed ingredients
Improve or maintain drainage of mineral soils	Improve forage quality
Establish or maintain hedgerows and individual trees	Optimize the type and amount of concentrates
Establish or maintain agroforestry	Optimize starch content of the diet
Use renewable electricity	Reduce crude protein content of the diet
Use biofuels, biogas and biomass	Reduce feed losses
Use low carbon heat	Improve grassland management
Save energy use for milking	Incorporate legumes in grassland
Save energy use in livestock barns	Improve grazing practices
Save energy use of vehicles and machinery	Increase or maintain share of permanent pasture
Save energy use for irrigation	Improve genetic selection for improved performance
Smart energy use for product storage and processing	Improve reproductive management practices
Reduce machine fleet	Improve animal health
Electrify vehicles and machinery	Optimize feed ration according to animal requirements
Generate solar thermal energy and electricity	Improve young stock management
Generate wind energy	Reduce number of unproductive animals
Cultivate energy crops	Generate energy from biom+B40+B35:B56