Carbon Footprint Assessment

D.2 – Conclusions and recommendations

LIFE RESILIENCE

LIFE17 CCA/ES/000030

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Deliverable Name: Carbon Footprint Assessment

Action D.2: Conclusions and recommendations

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1. Summary

This deliverable presents the carbon footprint assessment corresponding to the LIFE Resilience project.

This assessment aims at accounting the emissions of the actions held within the project. For this end, the GHG Protocol will be used, particularly the GHG Protocol for project Accounting.

The document presents the steps underneath this methodology, the different indicators that has been considered in order to estimate the emissions, the calculation of these emissions and finally, conclusions about the greenhouse gasses emissions of the project.

2. Introduction

There are multiple methods to estimate the carbon footprint, in this case the guidelines of the GHG Protocol will be used. The GHG Protocol is the international most widely used greenhouse gas accounting standard and it is governed by the principles of ISO 14067.

Particularly, the GHG Protocol for Project Accounting (Project Protocol) will be followed by this assessment. This protocol provides a detailed method to quantify and report GHG reductions for climate change mitigation projects, including decreases in GHG emissions, increases in removals and storage.

This protocol applies to any entity that seeks to quantify GHG reductions resulting from projects.

In this case, the protocol will be applied to the LIFE Resilience project, where different activities that aimed at having a positive impact on the environment were implemented. This assessment covers the whole duration of the project (2018-2022) and covers the activities that took place in the different demonstration sites:

- Finca El Valenciano. Carmona, Sevilla, Spain.
- H. Charqueirao. Alandroal, Évora, Portugal.
- La Traversagna, Pisa, Italy.

In addition, it covers the activities that took place in the replica farms:

- Herdadinha Farm, Beja, Portugal.
- Vica Belha, Beja, Portugal.
- Herdade do Monte Branco, Aljustrel, Portugal.
- Contanda, Concelho de Campo Maior, Portugal.
- Novillero, Albuera, Portugal.
- Pozanco, Mérica, Spain.

- Torrejoncillo, Extremadura, Spain.
- Casa Palacios, Plasencia, Spain.
- La Salgada, Riolobos, Spain.
- San Francisco Javier, La Campana, Spain.
- Portia Winery, Burgos, Spain.
- Galifrut, Alicante, Spain.
- Marina di Grosseto, Marina di Grosseto, Italy.

In the following chapters, the methodology of the protocol and the steps followed will be presented to define the activities within the project, its relevant effects, determine a baseline from which the study starts, determine the monitoring plan followed and, finally, quantify the total emissions and the reduction due to the impact of the activities.

3. Chapters + Results

The report includes the following chapters:

- Chapter I: Methodology

- Chapter II: Baseline scenario and emissions

- Chapter III: Monitoring and quantifying GHG reduction

Chapter I. Methodology

Chapter developed in collaboration with the External Agronomist: Ideagro

The GHG Protocol (https://ghgprotocol.org/) provides an extensive guideline to correctly quantify and report the greenhouse gases. Despite the fact that the requirements are extensive, there exists significant flexibility in completing them because the accounting decisions depend on the end user policy choices.

GHG reductions are determined separately for each activity within the project. In that sense, the total GHG reductions are quantified as the sum of the GHG reductions from each project activity.

The steps that need to be taken in order for quantifying the reduction in each activity are summarized in the following image.

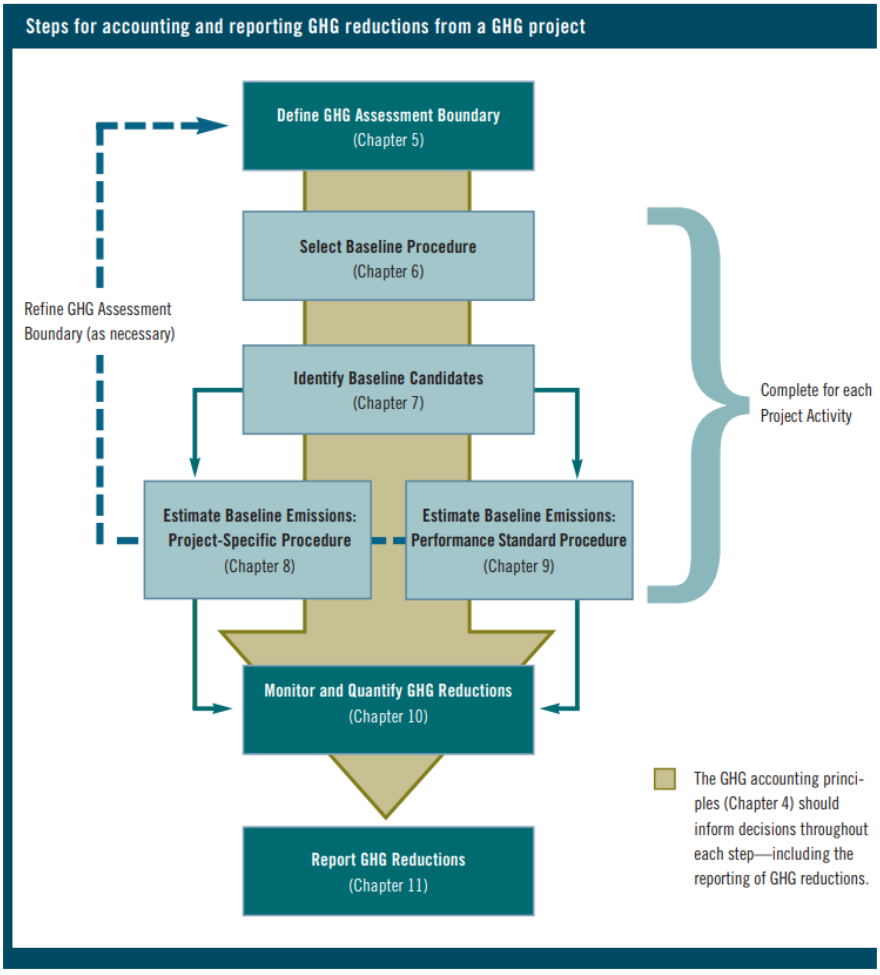

Image 1. Roadmap for accounting GHG Reductions (Source: GHG Protocol)

In that sense, these steps were taken as a guideline for this specific project:

- Definition of the assessment boundary
- Baseline scenario and emissions
- Monitoring and quantifying GHG reductions

Chapter II. Definition of the assessment boundary

- *Chapter developed in collaboration with the External Agronomist: Ideagro*

The GHG assessment boundary encompasses GHG effects, including all the primary effects and significant secondary effects, if any. A primary effect is the intended change caused by a project activity in GHG emissions, removals, or storage associated with a GHG source or sink.

In order to identify these primary and secondary effect, an assessment of the project activities that will be included has been done. For this project, the scope of the evaluation includes the activities that were established as goals in order to improve environmental and climate performance in the different areas. These activities are presented next:

1. Regulated Deficit Irrigation protocol
2. Sustainable management of cultivated land
3. Implementation of cover crops

For the previous project activities, the primary effects were identified and are presented next:

- Reduction in emissions due to decreased diesel consumption as a result of fewer tractor passes following the installation of cover crops.
- Reduction in combustion emissions from irrigation pumps, due to deficit irrigation.
- Reduction in emissions caused by the substitution of Phytosanitary use.
- Increased CO2 storage due to the increase in cultivated area.

For all the project activities nonsignificant secondary effects were identified.

Chapter III. Baseline scenario and emissions

Chapter developed in collaboration with the External Agronomist: Ideagro

The baseline scenario serves as a benchmark for the project's activities. It's a hypothetical scenario of what would have happened if there had been no thought of climate change mitigation. The baseline scenario is employed to calculate baseline emissions.

In this case, the baseline scenario that was chosen for each project activity involves the continuation of current activities, that means, considering the activities that were held in the farms before the implementation of this project. For these activities, the baseline emissions were chosen according to the data available that represent best the scenario in which these GHG reduction activities are not performed.

The baseline scenario, for all of the demonstration sites, is presented in the following table.

EMISSIONS				Spain	Portugal	Italy	
Diesel consumption from tractor passes due to weed control and soil preparation activities.	Diesel consumption	20,00	l/ha	Area			
	Passes	7,00		T3, T4	T3, T4	T3, T4	
	ISCC	3,14	kg CO2 /l diesel.				
	CO2 emissions	439,60	kg CO2 eq /ha	12858,30	9666,80	11710,94	kg Co2 eq/ year
Energy consumption from water pumping.	Energy Consumption	100000,00	kWh/ ha	T2, T4	T2, T4	T2, T4	
	Conversion factor	0,36	kg CO2 /kWh				
	CO2 emissions	35700,00	kg CO2 eq / h	784329,00	584766,00	475167,00	kg Co2 eq/ year
Herbicide consumption	ISCC Glyphosate	9,79	kg Co2 eq/ kg a.i.	T3, T4	T3, T4	T3, T4	
	Herbicide (UPL-Cosmic XL-glyphosate 36%)	3,52	kg Co2 eq/ kg a.i.				
	Dosis	3,00	kg/ha				
	Passes	4,00					
	Co2 emissions	42,29	kg CO2 eq/ha	1237,06	930,02	1126,68	kg Co2 eq/ year
Carbon store due to cover crop installation				-	-	-	
	Cover crops CO2 fixing	8000,00	kg Co2 eq/ha	0	0	0	kg Co2 eq/ year

Table 1. *Carbon emissions baselines for the demonstration sites.*

	Area (ha)		
	SPAIN	PORTUGAL	ITALY
T0	102,24	8,68	13,46
T1	14,74	18,39	12,81
T2	17,09	10,17	0
T3	24,37	15,78	13,33
T4	4,88	6,21	13,31
Total	163,32	59,23	52,91

Table 2. *Areas of the demonstration sites in which the different activities took place.*

In addition, the carbon emission baseline for the replication farms is presented next:

EMISSIONS				Herdadinha	Vica Belha	Herdade do Monte Branco	Contanda	Novillero	Pozanco	Torrejoncillo	Casa Palacios	
Diesel consumption from tractor passes due to weed control and soil preparation activities.	Diesel consumption	20,00	l/ha	Area								
	Passes	7,00		T3	T3	T3	T3	T3	T3	T3	T3	
	ISCC	3,14	kg CO2 /l diesel.									
	CO2 emissions	439,60	kg CO2 eq /ha	19039,08	6321,45	9570,09	38007,82	10163,55	6418,16	0,00	0,00	kg Co2 eq/ year
Energy consumption from water pumping.	Energy Consumption	100000,00	kWh/ ha	T2	T2	T2	T2	T2	T2	T2	T2	
	Conversion factor	0,36	kg CO2 /kWh									
	CO2 emissions	35700,00	kg CO2 eq / ha	1716813,00	0,00	283815,00	1775004,00	428400,00	590121,00	874293,00	0,00	kg Co2 eq/ year
				T3	T3	T3	T3	T3	T3	T3	T3	
Carbon store due to cover crop installation	Cover crops CO2 fixing	8000,00	kg Co2 eq/ha	346480,00	115040,00	174160,00	691680,00	184960,00	116800,00	0,00	0,00	kg Co2 eq/ year
Herbicide consumption	ISCC Glypho	9,79	kg Co2 eq/ kg a.i.	T3	T3	T3	T3	T3	T3	T3	T3	
	Herbicide (UPL-Cosmic XL-glyphosate 36%)	3,52	kg Co2 eq/ kg a.i.									
	Dosis	3,00	kg/ha									
	Passes	4,00										
	Co2 emissions	42,29	kg CO2 eq/ha	1831,70	608,17	920,71	3656,64	977,81	617,47	0,00	0,00	kg Co2 eq/ year

EMISSIONS				La Salgada	San Francisco Javier	Portia Winery	Galifrut				Marina di Grosseto	
Diesel consumption from tractor passes due to weed control and soil preparation activities.	Diesel consumption	20,00	l/ha									
	Passes	7,00		T3	T3	T3	T3	T3	T3	T3	T3	
	ISCC	3,14	kg CO2 /l diesel.									
	CO2 emissions	439,60	kg CO2 eq /ha	4655,36	15513,48	15342,04	3011,26	1384,74	2615,62	492,35	1494,64	kg Co2 eq/ year
Energy consumption from water pumping.	Energy Consumption	100000,00	kWh/ ha	T2	T2	T2	T2	T2	T2	T2	T2	
	Conversion factor	0,36	kg CO2 /kWh									
	CO2 emissions	35700,00	kg CO2 eq / ha	0,00	927486,00	896070,00	95676,00	8211,00	141372,00	120666,00	107814,00	kg Co2 eq/ year
Carbon store due to cover crop installation				T3	T3	T3	T3	T3	T3	T3	T3	
	Cover crops CO2 fixing	8000,00	kg Co2 eq/ha	84720,00	282320,00	279200,00	54800,00	25200,00	47600,00	8960,00	27200,00	kg Co2 eq/ year
Herbicide consumption	ISCC Glypho	9,79	kg Co2 eq/ kg a.i.	T3	T3	T3	T3	T3	T3	T3	T3	
	Herbicide (UPL-Cosmic XL-glyphosate 36%)	3,52	kg Co2 eq/ kg a.i.									
	Dosis	3,00	kg/ha									
	Passes	4,00										
	Co2 emissions	42,29	kg CO2 eq/ha	447,88	1492,51	1476,02	289,71	133,22	251,64	47,37	143,80	kg Co2 eq/ year

Table 3. *Carbon emissions baselines for the replication farms.*[1]

	Area (ha)															
	Herdadinha	Vica Belha	Herdade do Monte Branco	Contanda	Noviller o	Pozanc o	Torrejo ncillo	Casa Palacios	La Salgada	San Francisco Javier	Portia Winery	Galifrut				Marina di Grosseto
T1	54,3	16,2	49,1	28,8	41,7	27,1	13,2	18,5	59,5	29,3	13,2	4,6	6,4	4,6	1,4	1,7
T2	48,1	0,0	8,0	49,7	12,0	16,5	24,5			26,0	24,5	2,7	0,2	4,0	3,4	3,0
T3	43,3	14,4	21,8	86,5	23,1	14,6			10,6	35,3		6,9	3,2	6,0	1,1	3,4

Table 4. *Areas of the replication farms in which the different activities took place.*

[1] The values from the demonstration sites were used as a reference to estimate the carbon emissions of the replication farms because the measures in the replication sites are outside the scope of the project.

Chapter IV. Monitoring and quantifying GHG reductions

Chapter developed in collaboration with the External Agronomist: Ideagro

In this section, the data that was monitored, the procedure to obtain it and the formulas used in order to quantify reductions are described.

The following information was gathered and monitored in the demonstration sites in order to quantify reductions in the corresponding areas:

- Number of tractor passes per year for tillage and herbicide applications.
- Yearly energy consumption of the water pumps used for irrigation.
- Number of treatments for pest control per year.
- Total area of cover crop planting.

The project's annual emission reduction is calculated as follows.

Annual quantification of GHG reductions:

$$R= BE- PE$$

Where:

R= Annual GHG reductions for the entire GHG project

BE= Total annual baseline emissions for all GHG project primary effects

PE= Total annual GHG project emissions

The baseline emissions were calculated in the previous chapter. The GHG project emissions and the GHG reductions are estimated next.

EMISSIONS				Spain	Portugal	Italy	
Diesel consumption from tractor passes due to weed control and soil preparation activities.	Diesel consumption	20,00	l/ha		Area		
	Passes	2,00		T3, T4	T3, T4	T3, T4	
	ISCC	3,14	kg CO2 /l diesel.				
	CO2 emissions	125,60	kg CO2 eq /ha	3673,80	2761,94	3345,98	kg Co2 eq/ year
Energy consumption from water pumping.	Energy Consumption	80000,00	kWh/ ha	T2, T4	T2, T4	T2, T4	
	Conversion factor	0,36	kg CO2 /kWh				
	CO2 emissions	28560,00	kg CO2 eq / ha	627463,20	467812,80	380133,60	kg Co2 eq/ year
Herbicide consumption	ISCC Glyphosate	9,79	kg Co2 eq/ kg a.i.	T3, T4	T3, T4	T3, T4	
	Herbicide (UPL-Cosmic XL-glyphosate 36%)	3,52	kg Co2 eq/ kg a.i.				
	Dosis	3,00	kg/ha				
	Passes	0,00					
	Co2 emissions	0,00	kg CO2 eq/ha	0,00	0,00	0,00	kg Co2 eq/ year
Carbon store due to cover crop installation				T3,T4	T3,T4	T3,T4	
	Cover crops CO2 fixing	-8000,00	kg Co2 eq/ha	-234000,00	-175920,00	-213120,00	kg Co2 eq/ year

Table 5: Project's emissions at the demonstration sites.

Spain	BE1	12858,30	BE2	784329,00	BE3	1237,06	BE4	0,00	Total per year	Total
	PE1	3673,80	PE2	627463,20	PE3	0,00	PE4	-234000,00		
	RE1	9184,50	RE2	156865,80	RE3	1237,06	RE4	234000,00	401287,4	1404505,8
Portugal	BE1	9666,80	BE2	584766,00	BE3	930,02	BE4	0,00		
	PE1	2761,94	PE2	467812,80	PE3	0,00	PE4	-175920,00	Total per year	Total
	RE1	6904,86	RE2	116953,20	RE3	930,02	RE4	175920,00	300708,1	1052478,3
Italy	BE1	11710,94	BE2	475167,00	BE3	1126,68	BE4	0,00		
	PE1	3345,98	PE2	380133,60	PE3	0,00	PE4	-213120,00	Total per year	Total
	RE1	8364,96	RE2	95033,40	RE3	1126,68	RE4	213120,00	317645,0	1111757,6
									RE (tonCo2 eq)	3568,7

Table 6: Project's reduction at the demonstration sites.

In that sense, the total carbon reduction associated with the activities of the project that took place at the demonstration sites is:

3.568,7 tons of CO2 eq.

For the actions that took place in the replication sites, the GHG project emissions and the GHG reductions are estimated next. [2]

[2] The values from the demonstration sites were used as a reference to estimate the carbon emissions of the replication farms because the measures in the replication sites are outside the scope of the project.

EMISSIONS				Herdadinha	Vica Belha	Herdade do Monte Branco	Contanda	Novillero	Pozanco	Torrejoncillo	Casa Palacios	
Diesel consumption from tractor passes due to weed control and soil preparation activities.	Diesel consumption	20,00	l/ha	Area								
	Passes	2,00		T3	T3	T3	T3	T3	T3	T3	T3	
	ISCC	3,14	kg CO2 /l diesel.									
	CO2 emissions	125,60	kg CO2 eq /ha	5439,74	1806,13	2734,31	10859,38	2903,87	1833,76	0,00	0,00	kg Co2 eq/ year
Energy consumption from water pumping.	Energy Consumption	80000,00	kWh/ ha	T2	T2	T2	T2	T2	T2	T2	T2	
	Conversion factor	0,36	kg CO2 /kWh									
	CO2 emissions	28560,00	kg CO2 eq / ha	1373450,40	0,00	227052,00	1420003,20	342720,00	472096,80	699434,40	0,00	kg Co2 eq/ year
Carbon store due to cover crop installation				T3	T3	T3	T3	T3	T3	T3	T3	
	Cover crops CO2 fixing	-8000,00	kg Co2 eq/ha	-346480,00	-115040,00	-174160,00	-691680,00	-184960,00	-116800,00	0,00	0,00	kg Co2 eq/ year
Herbicide consumption	ISCC Glyphosate	9,79	kg Co2 eq/ kg a.i.	T3	T3	T3	T3	T3	T3	T3	T3	
	Herbicide (UPL-Cosmic XL-glyphosate 36%)	3,52	kg Co2 eq/ kg a.i.									
	Dosis	3,00	kg/ha									
	Passes	0,00										
	Co2 emissions	0,00	kg CO2 eq/ha	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	kg Co2 eq/ year

EMISSIONS				La Salgada	San Francisco Javier	Portia Winery	Galifrut				Marina di Grosseto	
Diesel consumption from tractor passes due to weed control and soil preparation activities.	Diesel consumption	20,00	l/ha									
	Passes	2,00		T3	T3	T3	T3	T3	T3	T3	T3	
	ISCC	3,14	kg CO2 /l diesel.									
	CO2 emissions	125,60	kg CO2 eq /ha	1330,10	4432,42	4383,44	860,36	395,64	747,32	140,67	427,04	kg Co2 eq/ year
Energy consumption from water pumping.	Energy Consumption	80000,00	kWh/ ha	T2	T2	T2	T2	T2	T2	T2	T2	
	Conversion factor	0,36	kg CO2 /kWh									
	CO2 emissions	28560,00	kg CO2 eq / ha	0,00	741988,80	716856,00	76540,80	6568,80	113097,60	96532,80	86251,20	kg Co2 eq/ year
				T3	T3	T3	T3	T3	T3	T3	T3	
Carbon store due to cover crop installation	Cover crops CO2 fixing	-8000,00	kg Co2 eq/ha	-84720,00	-282320,00	-279200,00	-54800,00	-25200,00	-47600,00	-8960,00	-27200,00	kg Co2 eq/ year
Herbicide consumption	ISCC Glyphosate	9,79	kg Co2 eq/ kg a.i.	T3	T3	T3	T3	T3	T3	T3	T3	
	Herbicide (UPL-Cosmic XL-glyphosate 36%)	3,52	kg Co2 eq/ kg a.i.									
	Dosis	3,00	kg/ha									
	Passes	0,00										
	Co2 emissions	0,00	kg CO2 eq/ha	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	kg Co2 eq/ year

Table 7: Project's emissions at the replication sites.

Herdadinha	BE1	19039,08	BE2	1716813,00	BE3	346480,00	BE4	1831,70	
	PE1	5439,74	PE2	1373450,40	PE3	-346480,00	PE4	0,00	Total
	RE1	13599,34	RE2	343362,60	RE3	692960,00	RE4	1831,70	1051753,6
Vica Belha	BE1	6321,45	BE2	0,00	BE3	115040,00	BE4	608,17	
	PE1	1806,13	PE2	0,00	PE3	-115040,00	PE4	0,00	Total
	RE1	4515,32	RE2	0,00	RE3	230080,00	RE4	608,17	235203,5
Herdade do Monte Branco	BE1	9570,09	BE2	283815,00	BE3	174160,00	BE4	920,71	
	PE1	2734,31	PE2	227052,00	PE3	-174160,00	PE4	0,00	Total
	RE1	6835,78	RE2	56763,00	RE3	348320,00	RE4	920,71	412839,5
Contanda	BE1	38007,82	BE2	1775004,00	BE3	691680,00	BE4	3656,64	
	PE1	10859,38	PE2	1420003,20	PE3	-691680,00	PE4	0,00	Total
	RE1	27148,44	RE2	355000,80	RE3	1383360,00	RE4	3656,64	1769165,9
Novillero	BE1	10163,55	BE2	428400,00	BE3	184960,00	BE4	977,81	
	PE1	2903,87	PE2	342720,00	PE3	-184960,00	PE4	0,00	Total
	RE1	7259,68	RE2	85680,00	RE3	369920,00	RE4	977,81	463837,5
Pozanco	BE1	6418,16	BE2	590121,00	BE3	116800,00	BE4	617,47	
	PE1	1833,76	PE2	472096,80	PE3	-116800,00	PE4	0,00	Total
	RE1	4584,40	RE2	118024,20	RE3	233600,00	RE4	617,47	356826,1
Torrejoncillo	BE1	0,00	BE2	874293,00	BE3	0,00	BE4	0,00	
	PE1	0,00	PE2	699434,40	PE3	0,00	PE4	0,00	Total
	RE1	0,00	RE2	174858,60	RE3	0,00	RE4	0,00	174858,6
Casa Palacios	BE1	0,00	BE2	0,00	BE3	0,00	BE4	0,00	
	PE1	0,00	PE2	0,00	PE3	0,00	PE4	0,00	Total
	RE1	0,00	RE2	0,00	RE3	0,00	RE4	0,00	0,0
La Salgada	BE1	4655,36	BE2	0,00	BE3	84720,00	BE4	447,88	
	PE1	1330,10	PE2	0,00	PE3	-84720,00	PE4	0,00	Total
	RE1	3325,26	RE2	0,00	RE3	169440,00	RE4	447,88	173213,1
San Francisco Javier	BE1	15513,48	BE2	927486,00	BE3	282320,00	BE4	1492,51	
	PE1	4432,42	PE2	741988,80	PE3	-282320,00	PE4	0,00	Total
	RE1	11081,06	RE2	185497,20	RE3	564640,00	RE4	1492,51	762710,8
Portia Winery	BE1	15342,04	BE2	896070,00	BE3	279200,00	BE4	1476,02	
	PE1	4383,44	PE2	716856,00	PE3	-279200,00	PE4	0,00	Total
	RE1	10958,60	RE2	179214,00	RE3	558400,00	RE4	1476,02	750048,6
Gallfrut	BE1	3011,26	BE2	95676,00	BE3	54800,00	BE4	289,71	
	PE1	860,36	PE2	76540,80	PE3	-54800,00	PE4	0,00	Total
	RE1	2150,90	RE2	19135,20	RE3	109600,00	RE4	289,71	131175,8
	BE1	1384,74	BE2	8211,00	BE3	25200,00	BE4	133,22	
	PE1	395,64	PE2	6568,80	PE3	-25200,00	PE4	0,00	Total
	RE1	989,10	RE2	1642,20	RE3	50400,00	RE4	133,22	53164,5
	BE1	2615,62	BE2	141372,00	BE3	47600,00	BE4	251,64	
	PE1	747,32	PE2	113097,60	PE3	-47600,00	PE4	0,00	Total
	RE1	1868,30	RE2	28274,40	RE3	95200,00	RE4	251,64	125594,3
	BE1	492,35	BE2	120666,00	BE3	8960,00	BE4	47,37	
	PE1	140,67	PE2	96532,80	PE3	-8960,00	PE4	0,00	Total
	RE1	351,68	RE2	24133,20	RE3	17920,00	RE4	47,37	42452,2
Marina di Grosseto	BE1	1494,64	BE2	107814,00	BE3	27200,00	BE4	143,80	
	PE1	427,04	PE2	86251,20	PE3	-27200,00	PE4	0,00	Total
	RE1	1067,60	RE2	21562,80	RE3	54400,00	RE4	143,80	77174,2
RE (tonCo2 eq)									6580,02

Table 8: Project's reduction at the replication sites.

In that sense, the total carbon reduction associated with the activities of the project that took place at the replication sites is:

6.580,02 tons of CO2 eq.

4. Conclusions

Considering all the areas in which the measures were applied, at the demonstration sites and the replication sites, a total of 10.148,72 CO2 eq was removed from the atmosphere up to this moment.

This document clearly demonstrates the project's significance in terms of reducing carbon emissions. In that sense, it is reasonable to consider the project's potential to have a positive impact on the environment if its scope of action is expanded. For example, just considering the countries where the activities took place, Spain, Italy, and Portugal, they have a total of 19.526.432 ha of arable land[3]. If we assume that 1% of this land will replicate this project's activities, we can estimate the average reduction in CO2 emissions as follows:

Reductions per activity:

RE1: 9184,50 (ES) + 6904,86 (PT) + 8364,96 (IT)= 24.454,32 ton Co2 /year

Area 1 (T3 + T4 Spain, Portugal and Italy): 77,88 ha

➔ **RE1: 314 ton Co2/ha year**

RE2: 368.852,4 ton Co2/year

Area 2 (T2 +T4): 51.66 ha

➔ **RE2: 7.140 ton CO2/ ha year**

RE3: 3.293,76 ton CO2/year

Area 3 (T3+T4): 77,88 ha

➔ **RE3: 42,29 ton CO2/ha year**

RE4: 623.040 ton CO2/year

Area 4(T3+T4): 77,88 ha

➔ **RE4: 8.000 ton CO2/ha year**

Reduction per ha: RE1 + RE2 + RE3 + RE4= **15.496,29 ton CO2/ha year**

1% of arable land:

195.264,32 ha

[3] The United Nations Food and Agriculture Organization (FAO) defines arable land as any area that is being used for growing seasonal crops or that has the capacity to do so.

In that sense, the potential CO2 emissions reduction per year if these activities were applied in 1% of the arable land of the three countries would be:

3.025.872.529,37 ton CO2/year

Finally, the environmental benefit provided by this project is significant. This study emphasizes the importance of carrying out projects and actions that consider the environmental component; in this way, it is possible to reduce the planet's emissions, bringing us closer to the goal of achieving a more sustainable agriculture.

LIFE RESILIENCE