

Operation CO<sub>2</sub>



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**Muntanya d' Alinyà**  
**Carbon Sequestration and Certification**

**Final Conference project LIFE Operation CO<sub>2</sub>**  
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## Project Action B.7

- ❑ Certification of carbon credits and improved Forest management systems (Area A)
- ❑ Carbon credits additional to products and services from Agroforestry management (integrated approach)
- ❑ Combined standards VCS+CCB
- ❑ Developing a Project Description (PDD)
- ❑ Following steps: Project Pipeline listing, contact VVB, project validation, resolve CAR, start measurement, Monitoring Report, Verification by VVB, registration, issuance of credits.

## Sectoral Scope and Project Activities

- ❑ Agriculture, Forestry, Land Use (AFOLU)
- ❑ Afforestation, Reforestation and Revegetation (ARR)  
(Not valid: Improved Forest Management – LtHP)
- ❑ Reforestation of pasture land and erosion sites (AF) –  
carbon sequestration with trees, shrubs and SOC.
- ❑ Community and biodiversity benefits:
  - ⇒ Viable income model, employment, stakeholder involvement.
  - ⇒ Bees/insects, birds, soil fauna

# Additionality

- ❑ Tools (Baseline Scenario, **Additionality**, Displacement, carbon stocks trees and shrubs, change in SOC).
- ❑ Additionality is key requirement: project actions should represent a clear management change from the without-project situation.
- ❑ Downscaling to a certifiable area of 6,23 hectares ARR

# GHG sources, sinks and emissions

Methodology used:

AR-ACM0003. A/R Large-scale Consolidated Methodology for Afforestation and reforestation of lands except wetlands. Version 02.0.

Source	Included gas	Justification/Explanation	
<b>Baseline</b>	Above and below ground tree biomass	CO <sub>2</sub>	Major carbon pool for ARR activities.
	Above and below ground shrub biomass	CO <sub>2</sub>	Major carbon pool for ARR activities
<b>Project</b>	Above and below ground tree biomass	CO <sub>2</sub>	Major carbon pool in ARR activities.
	Above and below ground shrub biomass	CO <sub>2</sub>	Major carbon pool in ARR activities.
	Soil Organic Content	CO <sub>2</sub>	Major carbon pool in ARR activities.
<b>Leakage</b>	<b>CO<sub>2</sub></b>	<b>There is no leakage in this project (considered zero).</b>	

## Baseline Scenario and emissions

### Tool for demonstrating Baseline scenario and Additionality.

- ❑ Continuation of pre-project use; grazing activities keeping vegetation stagnant.
- ❑ The project proposes something new from pre-project situation.

Baseline net removals from sinks:

$$\Delta C_{BSL,t} = \Delta C_{Tree, BSL,t} + \Delta C_{Shrub,BSL,t} + \Delta C_{DW,BSL,t} + \Delta C_{LI,BSL,t}$$

Carbon stock of pre-project trees considered 0

*Net carbon removals in the baseline situation are 0 t CO<sub>2</sub>-e*

# Project Scenario

Project Strata and pre-project vegetation cover (%)				
Strata	Functionalities	Hectares	Pre-project trees	Pre-project shrubs
Apple	Apple production	2,19	7,77 %	21,72 %
Timber	Timber production	2,6	7,20 %	35,06 %
Restoration	Soil Restoration	1,45	3,54 %	23,24 %

## Actual net removals by sinks

$$\Delta C_{\text{ACTUAL},t} = \Delta C_{\text{P},t} - \text{GHG}_{\text{E},t}$$

## Actual net removals by sinks

$$\Delta C_{\text{P},t} = \Delta C_{\text{TREE\_PROJ},t} + \Delta C_{\text{SHRUB\_PROJ},t} + \Delta C_{\text{SOC\_AL},T}$$

For three strata: Trees, Shrubs and SOC (next slides)

Use of 'Ex-ante CO<sub>2</sub> Absorption Calculator for Spanish Forest Tree Species',

Strata	Species	Planting	Number	Permanence	Area	CO2 Absorption (t CO2-e)		
Apple	Name	Year	N	Years	Hectares	Per Tree	Per hectare	Total
	<i>Malus sylvestris</i>	2014	840	40	2,19	0,300	114,88	<b>251,59</b>
Timber	Species	Planting	Number	Permanence	Area	CO2 Absorption (t CO2-e)		
	Name	Year	N	Years	Hectares	Per Tree	Per hectare	Total
	<i>Juglans regia</i>	2014	55	80	2,6	0,496	10,50	27,31
	<i>Pinus nigra (Resto)</i>	2014	77	80	2,6	0,211	6,25	16,26
	<i>Pinus sylvestris pirineos</i>	2014	77	80	2,6	0,333	9,85	25,60
	<i>Quercus ilex</i>	2014	87	80	2,6	0,192	6,44	16,74
	<i>Quercus pubescens</i>	2014	41	80	2,6	0,528	8,32	21,63
	<i>Quercus faginea</i>	2014	35	80	2,6	0,260	3,50	9,11
	<i>Prunus spp.</i>	2014	53	80	2,6	0,599	12,21	31,75
	<i>Sorbus spp.</i>	2014	34	80	2,6	0,661	8,64	22,46
<b>Total for Timber</b>								<b>170,85</b>
Restoration	Species	Planting	Number	Permanence	Area	CO2 Absorption (t CO2-e)		
	Name	Year	N	Years	Hectares	Per Tree	Per hectare	Total
	<i>Pinus nigra</i>	2014	60	80	1,45	0,211	8,74	12,67
	<i>Pinus sylvestris pirineos</i>	2014	60	80	1,45	0,333	13,76	19,95
	<i>Quercus ilex</i>	2014	53	80	1,45	0,192	7,03	10,20
	<i>Quercus pubescens</i>	2014	53	80	1,45	0,528	19,29	27,96
<b>Total for Restoration</b>								<b>70,78</b>
<b>Net CO2 Absorption for all trees combined at the end of the project</b>								<b>493,23</b>





## Total net change in SOC (2 strata)

	<b>SOC<sub>INITIAL, i</sub></b>	<b>SOC<sub>LOSS, i</sub></b>	<b>SOC<sub>REF, i</sub></b>	<b>ΣA<sub>, i</sub></b>	<b>dSOC<sub>t, i</sub></b>	<b>Conversion</b>	<b>ΔSOC<sub>AL, t</sub></b>
	<b>t C ha<sup>-1</sup></b>	<b>t C ha<sup>-1</sup></b>	<b>t C ha<sup>-1</sup></b>	<b>Hectares</b>	<b>t C ha<sup>-1</sup>yr<sup>-1</sup></b>	<b>C to CO<sub>2</sub></b>	<b>t CO<sub>2</sub>-e</b>
Timber	88,000	8,800	88	2,600	0,440	3,667	<b>4,19</b>
	<b>SOC<sub>INITIAL, i</sub></b>	<b>SOC<sub>LOSS, i</sub></b>	<b>SOC<sub>REF, i</sub></b>	<b>ΣA<sub>, i</sub></b>	<b>dSOC<sub>t, i</sub></b>	<b>Conversion</b>	<b>ΔSOC<sub>AL, t</sub></b>
	<b>t C ha<sup>-1</sup></b>	<b>t C ha<sup>-1</sup></b>	<b>t C ha<sup>-1</sup></b>	<b>Hectares</b>	<b>t C ha<sup>-1</sup>yr<sup>-1</sup></b>	<b>C to CO<sub>2</sub></b>	<b>t CO<sub>2</sub>-e</b>
Restoration	88,000	8,800	88	1,450	0,440	3,667	<b>2,34</b>
<b>Total net change in soil organic content</b>							<b>6,53</b>

## Net Anthropogenic GHG removals by sinks

$$\Delta C_{AR-CDM,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_{t,(0)}$$

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t}$$

$$\Delta C_{P,t} = \Delta C_{TREE\_PROJ,t} + \Delta C_{SHRUB\_PROJ,t} + \Delta C_{SOC\_AL,t}$$

Strata >	Net removal Apple		Net removal Timber		Net removal Restoration	
Carbon sink	t CO <sub>2</sub> -e	Permanence	t CO <sub>2</sub> -e	Permanence	t CO <sub>2</sub> -e	Permanence
$\Delta C_{TREE\_PROJ,t}$	251,59	40	170,85	80	70,78	80
$\Delta C_{SHRUB,t}$	593,93	80	0,00	80	346,71	80
<b>Total (t CO<sub>2</sub>e)</b>	<b>845,52</b>		<b>170,85</b>		<b>417,49</b>	<b>1433,86</b>

### Removals distribution over project lifetime

Permanence	$\Delta C_{TREE\_PROJ,t}$	$\Delta C_{SRHUB\_PROJ,t}$	$\Delta C_{SOC\_PROJ,t}$	Clearing	$\Delta C_{P,t}$
Period (yr)	t CO <sub>2</sub> -e yr <sup>-1</sup>	t CO <sub>2</sub> -e yr <sup>-1</sup>	t CO <sub>2</sub> -e yr <sup>-1</sup>	t CO <sub>2</sub> -e yr <sup>-1</sup>	t CO <sub>2</sub> -e yr <sup>-1</sup>
2014	9,31	11,76	6,53	-2,35	25,26
2015-2033	9,31	11,76	6,53	0,00	27,60
2034-2053	9,31	11,76	0,00	0,00	21,07
2054-2093	3,02	11,76	0,00	0,00	14,78

## Estimated net GHG removals in t CO<sub>2</sub>e

<b>Total estimated ERs</b>	<b>1562,20</b>
<b>Total number of crediting years</b>	<b>80</b>
<b>Average annual ERs</b>	<b>19,53</b>

## Community and Biodiversity

- ❑ Interviews with key stakeholders and Community impact in accordance with 5-Capitals model (Richards and Panfil, 2011). Positive impact for 19/22 parameters.
- ❑ Inventories of soil fauna, bird life and diurnal butterflies. (increased structural complexity of vegetation)

# Project Validation

## Audit visit May 24<sup>th</sup>-26<sup>th</sup> 2016

- ❑ IFM cancelled (No methodology for Mediterranean forest)
- ❑ CARs solved, except for double counting with National Inventory
- ❑ Conclusion: Mediterranean forests are not certifiable for entering the Voluntary Carbon market, due to obstacles at national level.
- ❑ There are no viable methodologies for certifying (unmanaged) Mediterranean forest.

# Thank you!

