


Conversion to Permanent Grasslands and Implementation of No-tillage Techniques in Cropland Management as a Contribution to meet the Portuguese Kyoto Target

Tiago Domingos, Ricardo Teixeira,
Paulo Canaveira, Teresa Avelar,
Gottlieb Basch, Carlos C. Belo, Fátima
Calouro, David Crespo

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- Project EXTENSITY
 - Baseline scenario
 - Conversion to permanent grassland
 - No-tillage techniques
 - Expansion potential

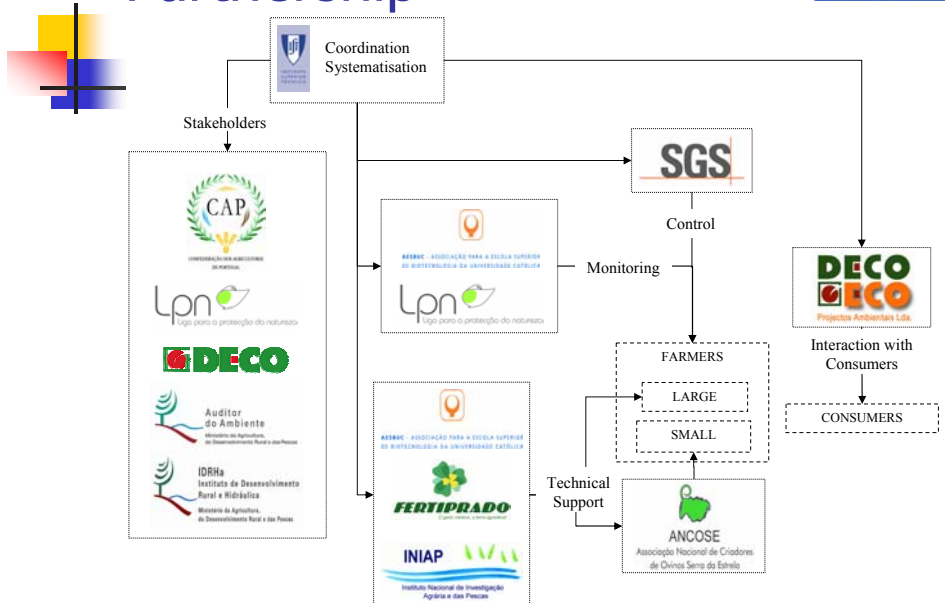
Project EXTENSITY

Environmental and Sustainability Management in Extensive Agriculture

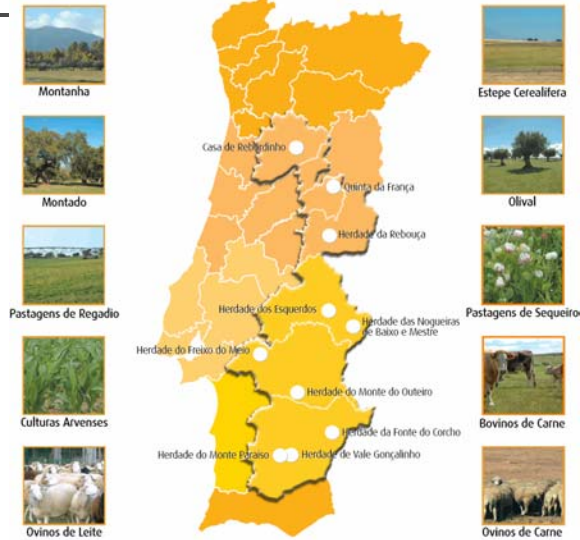
- Funded by the Life Program of the EU
- Create a sustainability management system for extensive agriculture
 - simple and with low costs
 - comprising environmental, social and economic aspects
 - integrating successive levels of demand
 - based on an iterative approach, including, as possible intermediate steps: integrated agriculture; organic farming; origin certification; ISO 14001; EMAS
- Obtain farm level sustainability indicators
- Apply innovative aggregation methods
- Promote the viability of the system
 - guarantee economic viability for farmers
 - promote the system to consumers



Partnership



EXTENSIVITY Intervention Areas



Environmental Monitoring



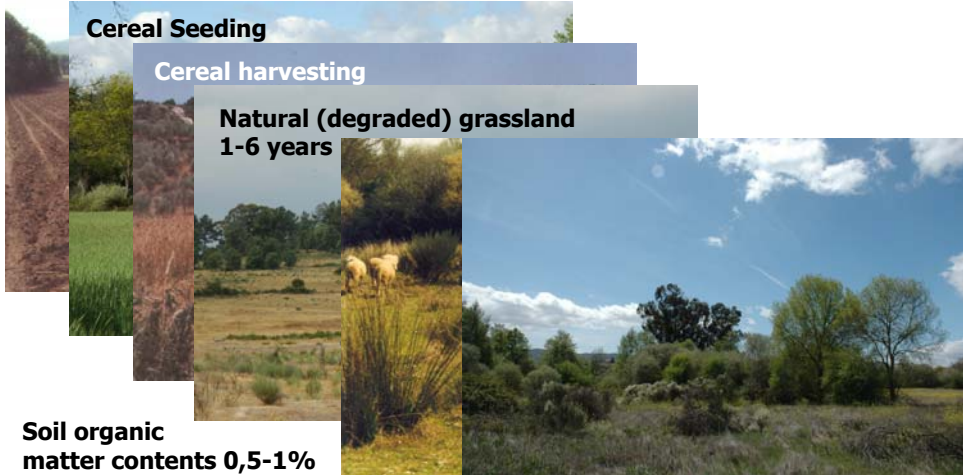
1. Sampling method - Pitfall Traps (more appropriate for epigeal arthropods)



2. Sample point composed by a line of 8 pitfall traps separated from each other by a 5 meter distance
3. Annual sampling in two phases:
 - Spring - April to July
 - Autumn - September to October
4. Sampling Periodicity – 2 weeks

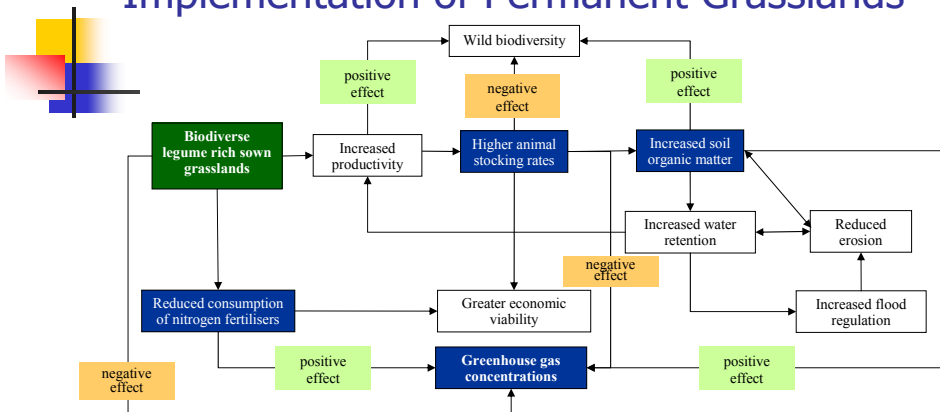
Baseline Scenario

Plowing and/or harrowing



Soil organic matter contents 0,5-1%

Implementation of Permanent Grasslands



Results from the Project "Pastagens Biodiversas Ricas em Leguminosas"

- Established in 2001, in 6 farms comparing:
 - Natural grassland (with/without fertilization)
 - Sown grassland (with fertilization)
- Results:
 - Average increase in organic matter in soils by 0,3%/year over 4 years in sown grassland



Average increase in average animal stocking from 0,3 Cattle units ha⁻¹ ano⁻¹ (natural grassland) to 1,2 CU ha⁻¹ year⁻¹ (sown grassland)

Crespo, D., A. M. C. Barradas, P. V. Santos, J. P. G. Carneiro (2004). Sustainable improvement of Mediterranean pastures. Poster presented at the EGF2004 General Meeting, "Land use systems in grassland dominated regions", Luzern, Switzerland, 21-24 June 2004.

Effect	Value / ha.year	Emission (-) / Sequestration (+) ton CO ₂ eq. year ⁻¹ ha ⁻¹
Soil organic matter accumulation	0.2% OM/ha.year First 10cm Soil density 1.2-1,7 g/cm ³	+5.1 to +6.6
Liming	2 ton every 2 years 12% CO ₃ emitted as CO ₂	-0.44
Reduction of fertilizer needs and machinery input	Not estimated	
Reduction of fire risk	Not estimated	
Direct Legume N ₂ O emissions	0,001 kgN ₂ O_N/kg dry matter	-0.3
Increase in Animal Direct Emissions	Enteric fermentation CH ₄ 48kg/cattle unit N ₂ O 1.62 kg/cattle unit	-0.13 -0.06
+ 0,5 cattle unit	Faeces N ₂ O 0.43 kg/cattle unit	-0.07
	Manure (avoided) CH ₄ 1.88kg/cattle unit N ₂ O 1.62 kg/cattle unit	+0.02 +0.19
TOTAL		+4.31 to +5.81

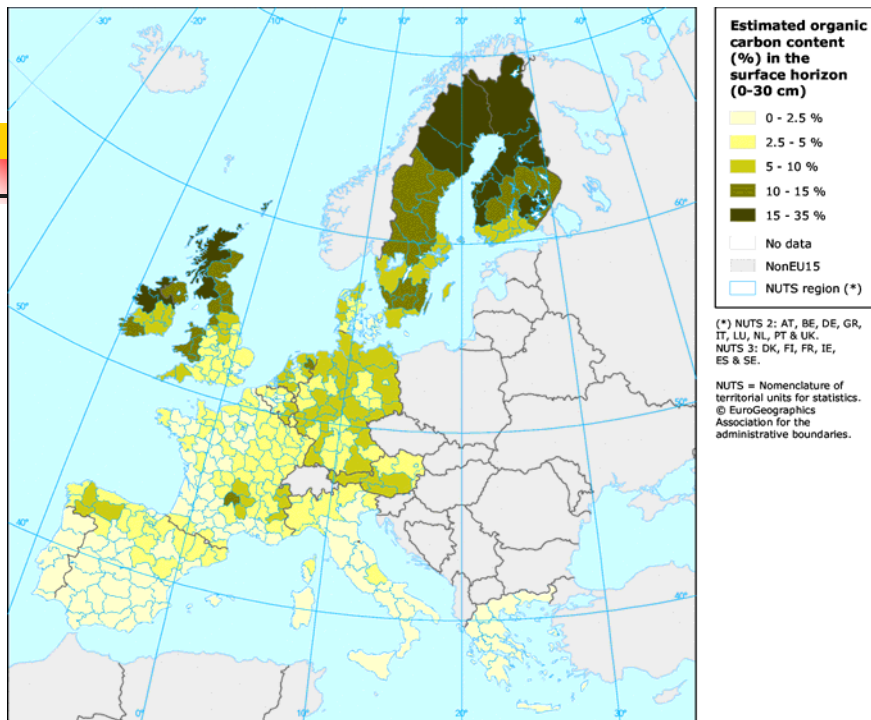
Introduction of No-Tillage / Direct Seeding Techniques



Effect	Value / ha.year	Emission (-) / Sequestration (+) ton CO ₂ eq. year ⁻¹ ha ⁻¹
Soil organic matter accumulation	0.1% OM/ha.year First 30cm Soil density 1,2-1,69 g/cm ³	+7.4 to +10.2
Other effects: - Reduced emissions from machinery use - Reduced organic matter mineralization from plowing - ...	Not estimated	
TOTAL		+7.4 to +10.2

Expansion Potential in Portugal

- Permanent Grasslands
 - 300,000 ha
 - Sink Potential 1.5MtonCO_{2eq.}/year
- Direct Seeding
 - 100,000 ha
 - Sink Potential 0.9MtonCO_{2eq.} /year
- Current estimated gap to Kyoto Target 5 to 10 MtonCO_{2eq.}/year
 - Agriculture and Grassland can contribute with 25% to 50% of the estimated gap





Thank YOU!