

# SOLMACC: Strategies for organic and low-input farming to mitigate and adapt to climate change



## *Organic farmers countering climate change*

- **Duration:** Start: 01/09/2013 - End: 30/09/2018
- **Budget:** €2.140.121 (50% paid by DG ENVI/LIFE)
- **Partners:**
  - Ekologiska Lantbrukarna, SE
  - IFOAM EU Group (Day-to-day Coordinator), BE
  - AIAB, IT
  - Bioland Beratung GmbH, DE
  - FiBL, DE



# CONTEXT OF THE PROJECT



**Farming** contributes to climate change:

- Greenhouse gas emissions from agriculture in the EU account for about 10% of total GHG emissions
- (Ireland 30,7% - Lithuania 23,4% - Denmark 18,6% - France 18,2%)
- About 25% at global level when Land Use Change is included
- EU target 40% reduction by 2030 (ESD/LULUCF)
- At the same time agriculture is extremely vulnerable to the consequences of climate change

→ Agriculture faces serious challenges both in terms of climate change mitigation and adaptation



# MAIN ACTIVITIES OF SOLMACC



- Setting up a **demonstration farm network** with 12 organic farms in DE, IT and SE
- Training the farmers to **integrate 4 climate-friendly practices into their farming system**:
  - optimised on-farm nutrient recycling
  - optimised crop rotations with legume-grass leys
  - optimised tillage system
  - Agroforestry
- Demonstrating the practices to local farmers and stakeholders
- **Monitoring the impact** of the new practices on climate change mitigation and adaptation, economic viability and technical feasibility



# Soil and climate benefits from organic farming



- Humus accumulation
- Higher nitrogen fixation of legumes
- Reduction of soil erosion
- Increased carbon stocks in soil
- Reduction of greenhouse gases
- Saving of fossil fuels

# SOLMACC practices:

## 1. Improved on-farm nutrient management



**Specific practices implemented on the SOLMACC farms include:**

- **Composting of on-farm residues**
- **Anaerobic treatment (biogas) of on-farm residues**



Composting at Gut Krauscha farm



# SOLMACC practices:

## 2. Optimised crop rotations with legumes

**Specific practices implemented on the SOLMACC farms include:**

- **Introduction of grain legumes**
- **Increasing proportion of forage legumes**



Optimised crop rotation with grass clover at Gut Krauscha farm

# SOLMACC practices:

## 3. Optimised tillage system



**Specific practices implemented on the SOLMACC farms include:**

- **Reduced or minimum tillage**

# SOLMACC practices:

## 4. Agroforestry



**Specific practices implemented on the SOLMACC farms include:**

- **Hedgerows and tree strips along agricultural fields**
- **Silvopastoral system**



Farms Hånsta Östergärde and Gut Krauscha





# First results after one year of implementation



- Results suggest that all farms are able to reduce their GHG emissions by 15%
- No negative experiences on the performance of these practices in terms of climate change adaptation were reported by the farmers.
- No negative impact on farm economics due to the adoption of new agricultural practices has been reported so far. Furthermore, the obtained crop yields are in the range of the long-term average.

# Example of GHG savings of one German farm



Climate friendly practice	GHG savings <sup>1)</sup> [kg CO <sub>2</sub> - eq./ha*year <sup>-</sup>
Improved on-farm nutrient management	-2.400
Optimised crop rotations with legumes	-1.550
Optimised tillage systems	-570
Agroforestry (tree biomass: 3.723 kg <sup>2)</sup> ; soil: 1668 kg/ha*year)	-4.178

1) Savings refer to one hectare of the area the practice is applied on.

2) CO<sub>2</sub> storage in the trees refer to an annual wood extraction of 20% of the area.



# Benefits of higher soil organic matter for adaptation



- Increased aggregate stability (Gerhardt, 1997; Siegrist et al., 1998; Brown et al., 2000; Maeder *et al.*, 2002; Pulleman et al., 2003; Williams & Peticrew, 2009).
- Increased water holding capacity, higher water content in soil (Brown et al., 2000; Lotter et al., 2003; Pimentel et al., 2005)
- Improved infiltration rate of water (Lotter et al., 2003; Pimentel et al., 2005; Zeiger & Fohrer, 2009).

## Bio dynamic



## Conventional/ IPM

Mäder et al. 2002, Science



# Soil aggregate stability, infiltration rate



Fotos: Fliessbach Nov. 2002



Biodynamic with composted manure

IP with mineral fertilizers





# Eco-functional intensification as an approach to reduce vulnerability and improve resilience



# Workshop on CAP and Climate Change

- 9 November 2016
- Committee of the Regions, hosted by the Nordrhein Westfalia Region
- Presentation SOLMACC interim results
- Discussion on CAP and RDPs
- Target audience: European Commission, farmers organisations, representatives of the regions, think-tanks, research institutes, NGOs
- 50 participants



# Roundtable and brochure on economic aspects of climate-friendly practices

- A roundtable will be organized by Bioland in February 2017 in Germany to assess how to make climate-friendly practices an economic asset for farmers.
- The steering group plus 5 additional experts from the production chain will discuss how the uptake of climate friendly sustainable farm practices could be made more attractive for farmers and the food chain by improving the financial return.
- Publication of a brochure in July 2017





# Benefits of organic farming

Organic Agriculture provides....

- Lower GHG emissions
- Higher carbon sequestration
- Greater adaptation potential

Organic farming is more than just climate-friendly agriculture. It provides further benefits to society in a changing and resource-constrained world.



**Table 7.2:** Production rules and organic objectives and principles

Production rules Article numbers refer to Council Regulation (EC) 834/2007 [A] and Commission Regulation (EC) 889/2008 [B]	Respect natures systems/ cycles	Contribute to bio- diversity	Make responsible use of natural resources			
			Energy	Water	Soil	Air & climate
Prohibitions [A: 4 (a) iii and (c)]						
No mineral nitrogen fertilisers [A: 12.1 (e)]	✓	✓	✓	✓	✓	✓
No herbicides, only authorised products can be used [A: 12 (h), B: Annex II]	✓	✓	✓	✓	✓	✓
No landless livestock production [B: 16]	✓		✓			✓
No hydroponic production [B: 4]	✓			✓	✓	
No use of GMOs [A: 9]	✓					
Strict control of external inputs [A: 4 (b)], minimisation of the use of non-renewable resources [A: 5 (b)] and recycling of wastes and by-products [A: 5 (c)]						
Only permitted fertilisers : low-soluble mineral fertiliser [A: 4 (b) iii] and soil conditioners when need proven [B: 3, Annex I]	✓	✓			✓	
Only authorised plant protection products when established threat [A: 12.1 (h), B: Annex II]	✓	✓			✓	✓
Feed primarily from holding or same region (with exceptions) [A: 14.1 (d)]	✓		✓			
Stocking density and use of livestock manure restricted to maximum of 170 kg N/ha and year [B: 3 & 15.1]	✓	✓	✓	✓	✓	✓
Obligations to use good husbandry practises and prevention [A: 4 (a) iv and 5]						
Multiannual crop rotation including legumes and other green manures [A: 12.1 (b)]	✓	✓	✓	✓	✓	
Tillage and cultivation practices that maintains organic matter, and protects soil [A: 12.1 (a)]	✓	✓	✓	✓	✓	
Maintain crop health through prevention (natural enemies, the choice of species and varieties, crop rotation) cultivation techniques and thermal processes [A: 12.1 (g)]	✓	✓	✓		✓	
Number of livestock limited to minimise overgrazing, poaching, soil erosion or pollution [A: 14.1 (b) iv]	✓	✓		✓	✓	✓
Preference for inputs from organic origin (Art 4b with exceptions (Art 4d))						
Manage entire holding organically (with exceptions) [A: 11]	✓	✓	✓	✓	✓	✓
Only organic seed (with exceptions) [A: 12.1]	✓					
Only organic feed (with 5 % exceptional rule for monogastrics) [A: 14 (d) ii]	✓					

Source: Own analysis based on the Regulations (EC) 834/2007 and (EC) 889/2008 and scientific literature.

Source:

Sander, J. (ed.)

2013

*Evaluation of the  
EU legislation on  
organic farming.*

Braunschweig:  
Thünen Institute  
of Farm  
Economics

# Key messages on the ESD and LULUCF

- Despite claims of a “lower mitigation potential”, it is possible to reduce emissions from agriculture through given agriculture practices, such as improved on farm nutrient recycling, improved crop rotation or agroforestry.
- The need to ensure “food security” should not be used as an excuse to continue business as usual and to further industrialise European agriculture.
- Developing organic farming is part of the solution to climate change.
- Agriculture practices applied in organic farming and tested in SOLMACC are also relevant for conventional agriculture.
- The agriculture sector should not be exempted from meaningful targets to reduce emissions in the Effort Sharing Decision and should do its share of the effort, like other economic sectors.
- The integration of LULUCF emissions should not undermine the environmental integrity of the EU climate and energy package for 2030 and there should be no possibility to artificially offset agriculture emissions with afforestation.



# Key messages on the CAP and RDPs

- The current implementation of Rural Development Plans (RDPs) should better encourage the adoption of beneficial agriculture practices
- It is important to promote solutions that contribute to mitigation, but also to adaptation, and to improvements of biodiversity, water quality, soil health, animal welfare, and farmers profitability. It is crucial to avoid trade-offs and to take into account all environmental “co-benefits” from different farming systems.
- The discussions on the next reform of the CAP should take into account the need to evaluate all the co-benefits of given agricultural practices and farming systems (and not only address GHG mitigation – no “silo” approach)







### About SOLMACC

SOLMACC is a LIFE-co-funded project that runs from 2013 to 2018.

Its ambition is to demonstrate that by applying optimised farming practices organic farming can be climate-friendly.

12 demonstration farms are therefore adjusting their farming techniques under the close supervision and monitoring of agricultural scientists.

[Read more about the SOLMACC objectives](#)

### Recent news



#### SOLMACC newsletter #1

The first newsletter, sent out to recipients all over Europe, is now [Read More...](#)

Posted on 08/26/2014

Project website: [www.solmacc.eu](http://www.solmacc.eu)  
in four languages



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