SOLMACC

Farmers tackling climate change:

Systemic solutions for greater mitigation and adaptation of EU's agriculture sector

Climate Change Mitigation, Organic Agriculture and Human Health: Status Quo and New Data

23 May 2018, Brussels

SOLMACC

→ Demonstration project co-funded by the EU LIFE programme

- **FULL NAME:** Strategies for Organic and Low-input farming to Mitigate and Adapt to Climate Change
- **LOCATION**: Germany, Italy, Sweden and Belgium
- **DURATION**: Sep 2013 – Aug 2018
- **CONSORTIUM**: IFOAM EU (BE), Ekologiska Lantbrukarna (SE), AIAB (IT), Bioland Beratung GmbH (DE), FiBL (DE)

Demonstration Network

- 12 SOLMACC **organic demonstration farms** in Italy, Germany and Sweden changed their farming practices
- Representing **diverse climatic regions** of Europe
- Representing **typical farm types** for each country (**SE** livestock/cereal, **DE** livestock/arable, **IT** veg/fruit/olives/vineyards/ family)

Italy
Finca Mannucci Droandi

Sweden
Hånsta Östergärde

Context

- → Agriculture needs to adapt to climate change but also help with mitigation
  - Agriculture is vulnerable to changes in average temperature, rainfall, pests and diseases, and extreme and unpredictable weather patterns
  - Greater risk of floods and droughts and changes in growing seasons are a threat to farmers
  - At least 10% of all EU GHG emissions are from agriculture (2012)
- → Applying the right farming techniques can make a considerable difference
  - Greater resilience towards climate change effects
  - Reduction in GHG emissions
  - Ensuring food security
  - Strengthening ecosystem services
  - Ensuring economic viability

Project objectives

- Promote wider adoption of climate-friendly practices that can help mitigate and adapt to climate change
- Reduce on-farm GHG emissions
- Increase farmers' resilience to climate change effects
- Demonstrate co-benefits (e.g. positive impacts on soil quality, biodiversity)
- Share knowledge with key stakeholders (students, farmers, researchers, policy makers)

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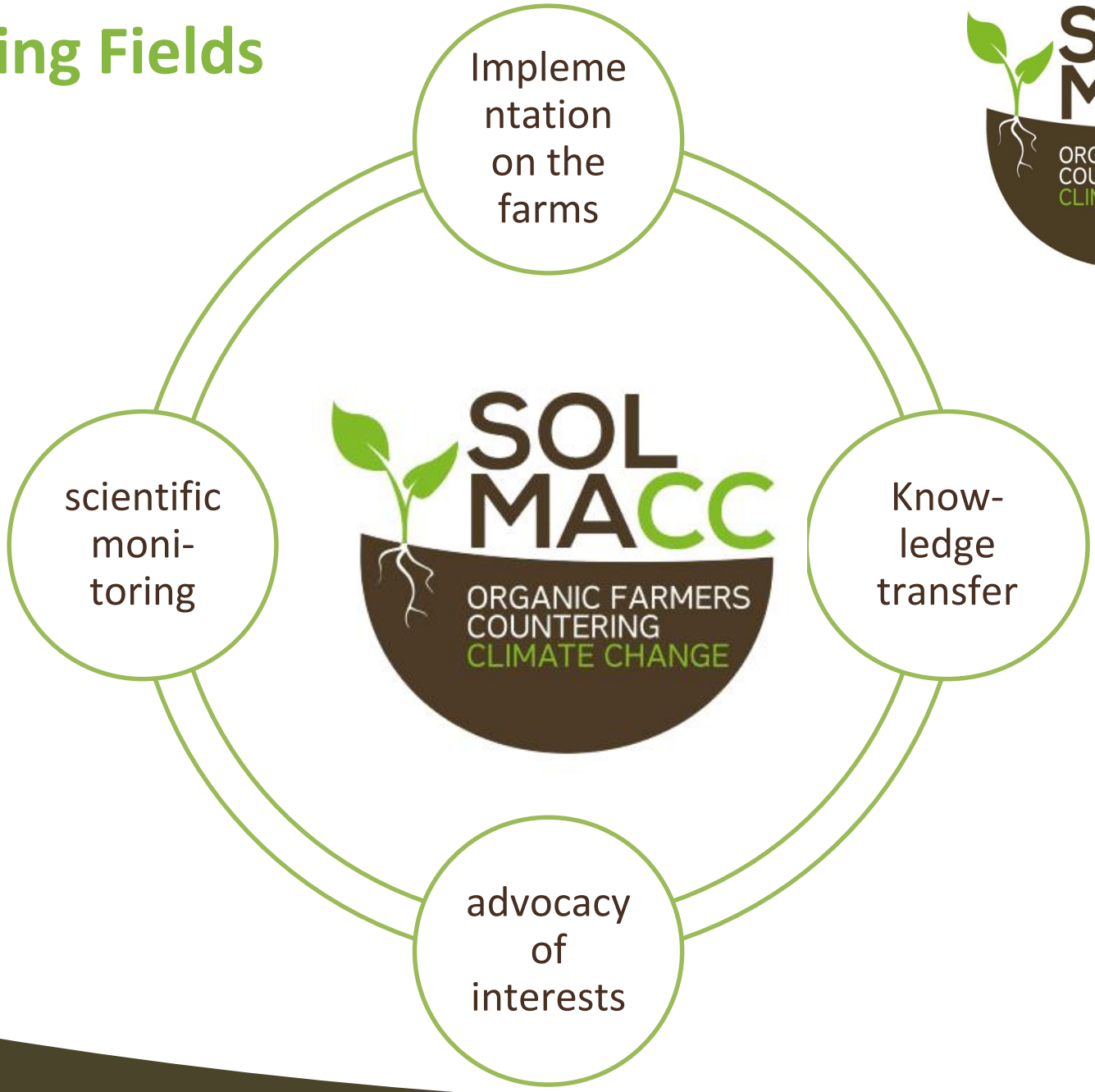
*"Thanks to the SOLMACC practices, **I will play a role** in the fight against climate change!"*

Claudio Caramadre (IT)

Key project activities

- Implementation of climate-friendly practices on the 12 demonstration farms
- Monitoring of practices and calculating the impact on GHG emissions and wider environmental and socio-economic aspects
- Exchanging knowledge through field visits, stakeholder events, publications etc.

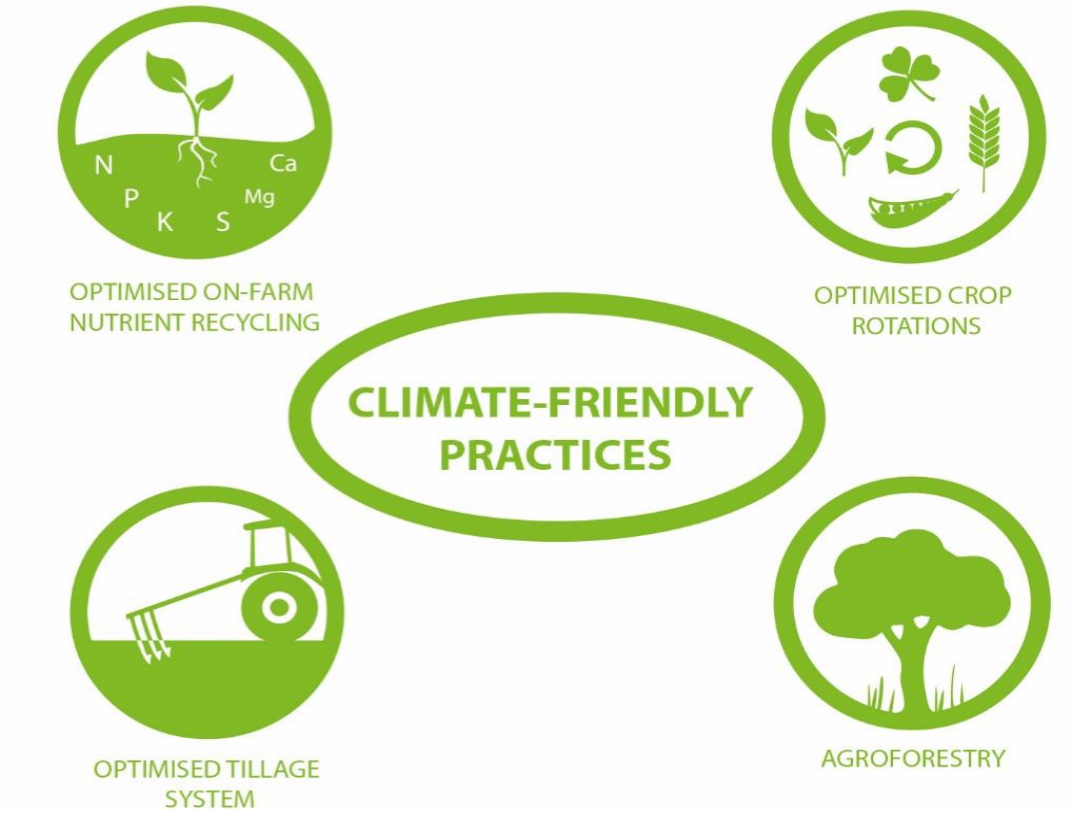
Working Fields



Benefits of organic farming

- no synthetic fertilizers are applied
- emissions from livestock feed consumption are reduced
- higher carbon sequestration (Gattinger et al., 2012)
- lower N2O emissions per hectare (Skinner et al., 2014)
- around 17% of agricultural GHG emissions could be reduced (Muller et al. 2016)

Farming practices implemented



© Gut Krauscha: Turning of the compost piles ©Daniele Fontanive – Cabbage field at Caramadre,Alföldi, FiBL,© Kjell Sjelin in Hånsta Östergärde

Example of practices implemented on Italian farms

	Azienda agricola Fontanabona	Azienda agricola Caramadre	Azienda agricola Mannucci Droandi	Azienda agricola Tamburello
Improved on-farm nutrient management	Improved composting of on-farm residues	Forage-manure cooperation and composting of on-farm residues	Improved composting of on-farm residues	Composting of on-farm residues
Optimised crop rotations with legumes	Increasing proportion of forage legumes	Increasing proportion of forage legumes	Increasing proportion of forage legumes	Increasing proportion of forage legumes
Optimised tillage systems	Reduced tillage	Minimum tillage	Minimum tillage	Minimum tillage
Agroforestry	Hedgerows and tree strips along agricultural fields	Hedgerows and tree strips along agricultural fields	Diversifying the usage of existing tree crops	Diversifying the usage of existing tree crops

Scientific monitoring to measure the impact of farming practices

- FiBL collaborates with Bioland, AIAB and Ekolantbruk
- Scientific monitoring is done on all farms for:
  - GHG mitigation potential
  - Adaptation potential
  - Environmental benefits
  - Technical feasibility
  - Economic performance

Example of a SOLMACC practice: Agroforestry

- Benefits: Carbon sequestration, biomass in soil, replacement of fossil fuels
- Implemented on all farms but using different systems:
  - Boundary hedges
  - Buffer stripes
  - Alley cropping
  - Silvopasture (lifestock integration)

Bilder: Hånsta Östergärde, Kreppold, Haus Holte

Example of a SOLMACC farm in Italy: Azienda Agricola Caramadre

- Located in the Agro Romano region
- 20.5 ha of vegetables & fruits (broccoli, cabbage, strawberries…), no livestock
- Example of nutrient management practice imlemented: Forage legumes are exchanged for livestock manure

  → Cooperation between livestock farmers and stockless farmers

Credits: Daniele Fontanive

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The impact of implementing climate-friendly practices – SOLMACC project results

Lessons learned from SOLMACC farms in Germany

Ralf Mack, SOLMACC advisor Germany, Bioland Beratung GmbH

Life

Consultant´s experiences from SOLMACC

CC → issue:

- water
  - droughts from spring – midsummer
  - rain before harvest
- temperature
  - Viruses / vectors - insects
- soil fertility → framing conditions for biology
  - mechanical tools – biological tools
  - CC / soil fertility: Chemistry – Biology – Physics
  - C & N together: C/N-ratio

Consultant´s experiences from SOLMACC

- Farmers´ expectation: reduced yields
  - higher yields short- & longterm under organic management
- Principle of CC: C from soil to atmosphere
- Reversal of CC: C from atmosphere to soil & keep it there
- Motivation for farmers
  - better water infiltration & retention
  - higher yields & better quality
- Practical tools and knowledge management

Transfer mulch

Definition:
Chopped clover-grass transferred to vegetable fields as N-fertilizer instead of purchased external N-source
- well suited for farms without livestock , especially vegetable growers
- extensive research available

Ecology:

- N_2O – emissions reduced by 50% by transfer from giving to receiving field
- N_2O-Emissions from any N-fertilizer peak after rainfall
- reduced erosion & weed supression

Economy:

- 2,5 €/kg N compared to 5,50 €/kg purchased organic N
- Machinery available / for rent / contractor → no extra machinery necessary


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The impact of implementing climate-friendly practices – SOLMACC project results

Italian SOLMACC farms context

Daniele Fontanive, SOLMACC national coordinator Italy, AIAB

Paolo Fontanabona

Castel d'Azzano (VR) – Italy

3 hectares greenhouse and 4 hectares of orchard (Kiwi)

- Very specialized farm on spring and autumn winter vegetables, sold to a cooperative.
- The project focused on the part of horticultural crops in greenhouse
- begin: leguminous plants were not inserted in the rotation.
- *problem: time and how to insert leguminous plants in the rotation or make a green manure with leguminous plants and some problems with the composting management (cover and no turn of the piles)*

Implemented practises

- Crop rotation with green manure (leguminouse plants for e.g. Crotalaria) or sudan grass.
- improvement of composting techniques and greater attention to the turning of the pile, for the management of temperatures and humidity.
- reduction of the soil tillage, no deep ploughing, weeds are contained by mulching with plastic film (nylon white or black).

Result

- Composting farmyard manure and mushroom bed residues helps to reduce CH_4 and N_2O emissions, compared to the emissions of a manure pile. Additionally, compost application helps to reduce fertilizer application in the following years.
- Reduces the number of viable seeds in the fertilizer.
- A stabilized organic matter and therefore a slower release of nutrients.
- Legume crops contribute to N fixation and therefore reduce the amount of fertilizers needed in the following years.
- Crop biodiversity on the arable fields.
- Stabilization/enhancement of soil fertility by N-fixation of legumes.
- Reducing the depth of tillage helps to reduce fossil fuel consumption.
- Potential increase of organic top soil and reduce soil erosion

CLAUDIO CARAMADRE

Farm is located in the Agro-Romano. It includes two different areas: one located in Maccarese (7.5 hectares wide including 2 hectare of cold greenhouses) with mainly fruit production and another area in Torre in Pietra (13 hectares wide) and it consists of all organically cultivated fields.

- The project focused on the part of horticultural crops. A field dedicated to the tests of the project.
- begin: leguminous plants were not inserted in the rotation; the farmer did not use organic fertilizers;

- Which Problems: the typical problems of a farm that produces different types of vegetables and must always offer its customers certain products throughout the year. The challenge was to change the type of crop rotation and make it efficient from different points of view, agronomic, environmental and in terms of profit.

Implemented practises

- The farmer introduced legumes into the crop rotation.
- They included green manure, broad bean or field beans. In the greenhouse crotalaria was introduced as a green manure legume.
- Before the project, the farmer ploughed all of his crop cultures. Now, he reduced the depth of tillage for all crops, by only working superficial.
- The agricultural areas are surrounded by tree strips of pines and eucalyptus. Their main function is to protect the agricultural areas against the wind and increase biodiversity in the farm area.

Results

- A stabilized organic matter and therefore a slower release of nutrients
- Legume crops contribute to N fixation and therefore reduce the amount of fertilizers needed in the following years.
- Crop biodiversity on the arable fields
- Stabilization/enhancement of soil fertility by N-fixation of legumes
- Reducing the depth of tillage helps to reduce fossil fuel consumption.
- Trees and hedges help to sequester atmospheric carbon into plant biomass and soils. Therefore, they function as a carbon sink.

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MANNUCCI DROANDI

The farm consists of two areas: Campolucci and Ceppeto. The former is located on the eastern slopes of the Chianti hills at an altitude of 250 m above sea level. The second part of the estate, Ceppeto, consists of vineyards and olive groves surrounded by dense oak and chestnut woodland. It is situated on the west side of the Chianti hills at 350 m above sea level.

farm conducted in organic for more than 20 years

Implemented practises

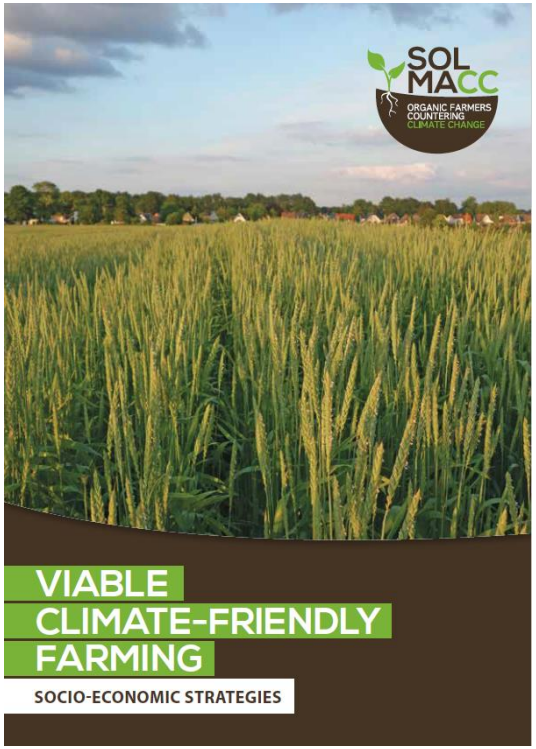
- The fertility of the soil is maintained with the permanent grassing that has been maintained in the vineyards for more than twenty years, in addition to the shredding of the pruning sarments.
- The sowing of grasses and legumes has been done in the past few years, then gradually a permanent grassy turf has been created where no work is carried out, only mowing and openings of the ground with a ripper in alternating rows over the years.
- The farm consists of 8 ha olive groves, 25 ha vineyards .The boundary trees were diversified and new trees were planted (e.g. Robinia and Oak).
- With permanent grassing, tillage has been considerably reduced

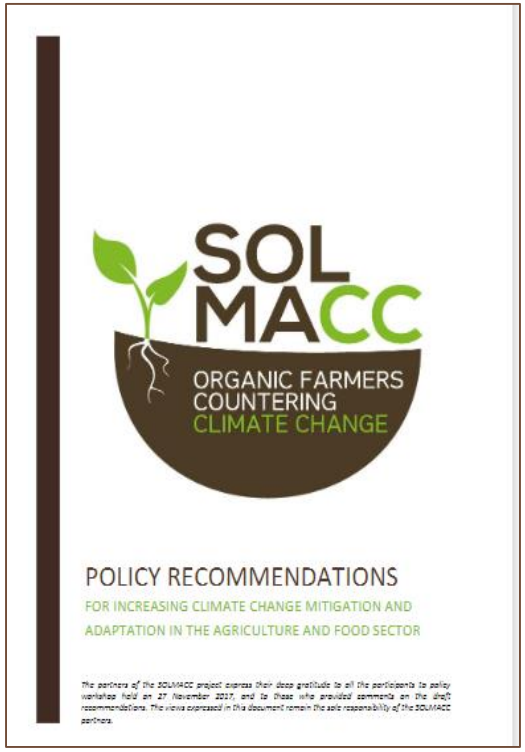
Results

- Trees help to sequester atmospheric carbon into plant biomass and soils. Therefore, they function as a carbon sink.
- biodiversity protection and bee food and protection.
- a stabilized organic matter and therefore a slower release of nutrients.
- avoiding tillage helps to reduce fossil fuel consumption.
- Potential increase of organic top soil and helps to reduce soil erosion.
- Living habitat for diverse animals (biodiversity protection), diversified income source.
- reduction of phytosanitary treatments against harmful insects (as a result of a high level of biodiversity).
- reduction of water consumption

- grassing of the vineyard, reduction of tillage, biodiversity in terms of useful insects also due to the woods surrounding the farm, minor plant health measures with products allowed in organic farming.
- It is innovative, always!!

New publications: Socio-economic brochure, policy recommendations and advocacy leaflet





Coming up: Practitioner‘s manual and Layman‘s report!

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ABOUT US | CLIMATE-FRIENDLY PRACTICES | DEMONSTRATION FARMS | TOOLBOX | OUTREACH | GETTING INVOLVED

Organic farming can be climate-friendly

by applying optimised farming practices

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 or watch the video summary:

Climate-friendly farms across Europe

Visit the newly updated SOLMACC website!
www.solmacc.eu

4 new videos

- View new videos on www.solmacc.eu/toolbox/videos and IFOAM EU website/FB (to be published on 16 May)

Thank you for your attention!

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