

# **(ORGANIC) AGRICULTURE AND CLIMATE CHANGE – FROM PROBLEM TO SOLUTION?**

**An overview from the Netherlands**



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**SANA, Bologna, September 12, 2016**

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# Louis Bolk (1866-1930)

Professor of Human Anatomy at the University of Amsterdam



Prof. L. BOLK.

# The Louis Bolk Institute

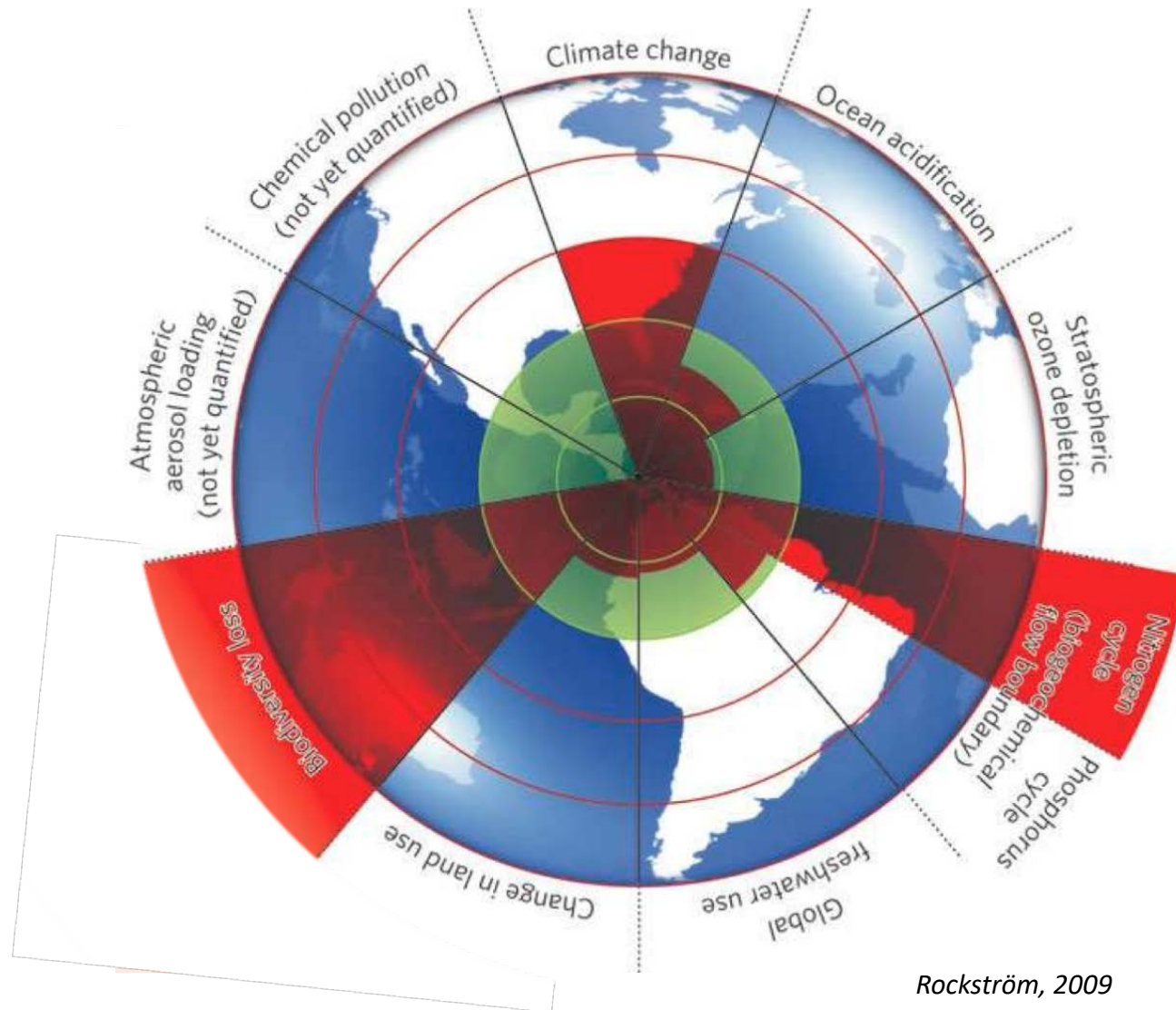
*soilsplantsanimalsenvironmentnutritionhealth*

- Systems approach
- Nature as base
- Participatory research
- Practical solutions
- Independent research and advice





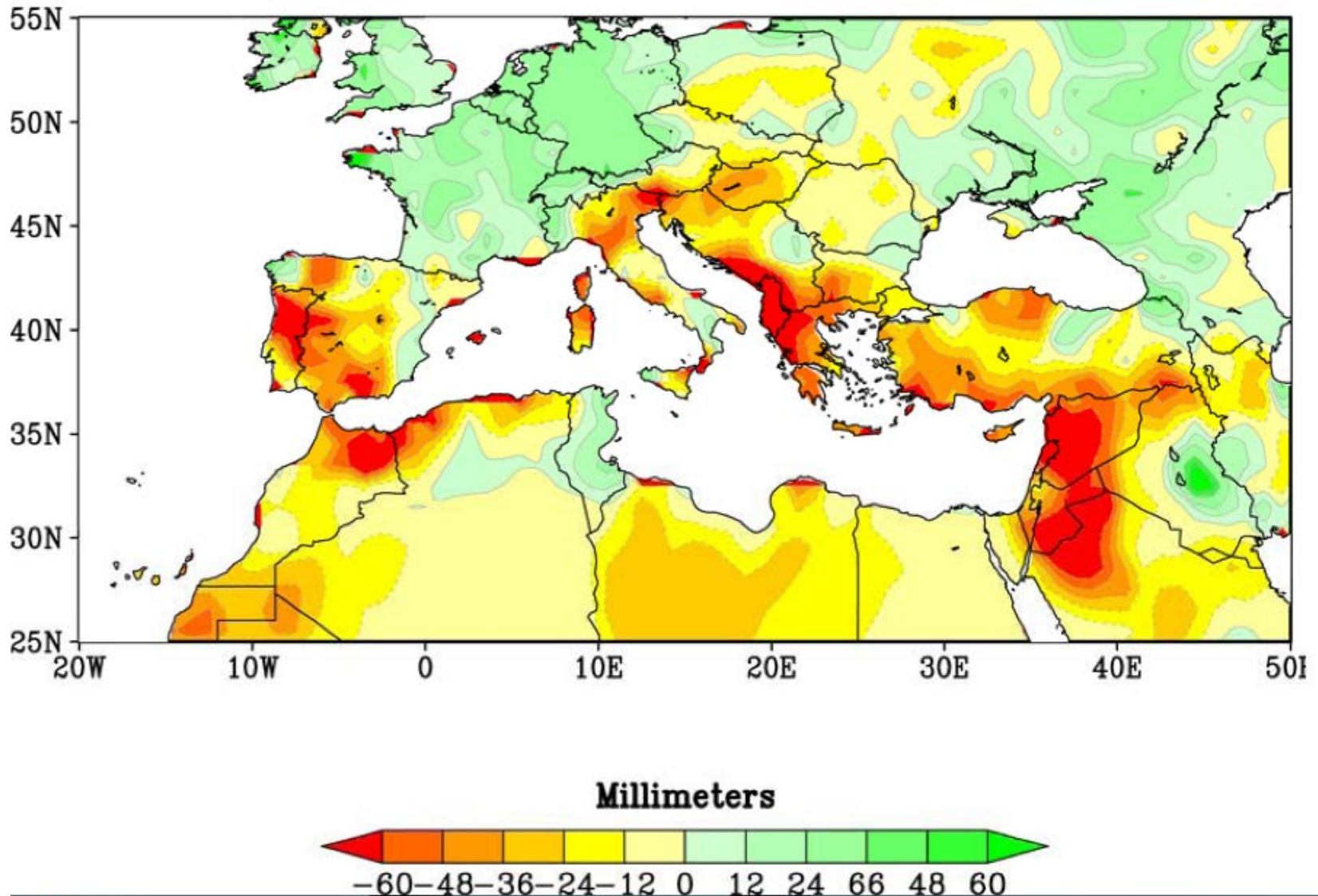
# Carrying capacity of the earth is being exceeded



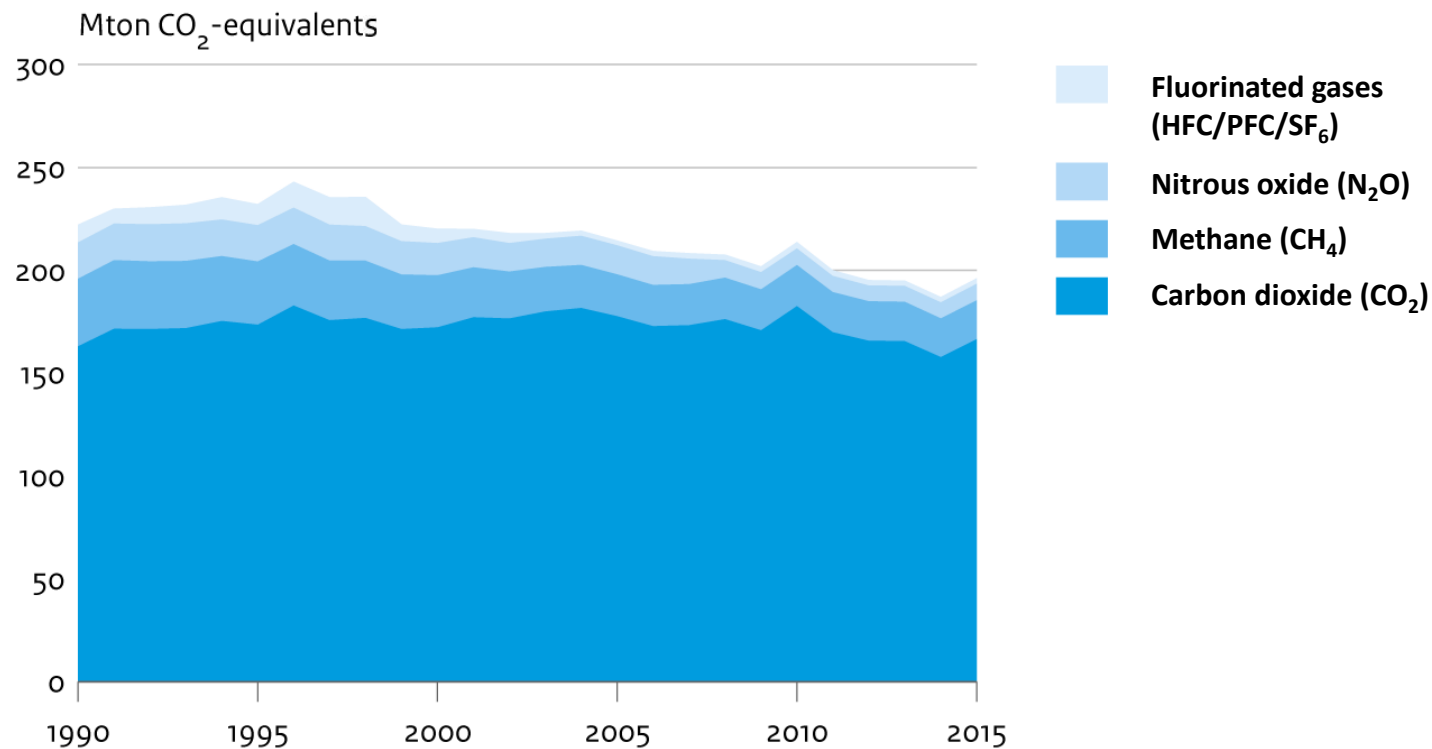
Rockström, 2009



# Dryer winters in mediterranean area (1971-2010 / 1902 – 2010)



# Emission green house gasses (NL)



Source: Emission registration

CBS/sep16  
[www.clo.nl/nl016529](http://www.clo.nl/nl016529)

# 4 promille initiative (Paris, COP 2015)

The world's **soils** contain **1 500** billion tons of carbon in the form of organic material

absorption of CO<sub>2</sub> by plants



storage of organic carbon in soils

**1500** bn tons carbon

The quantity of carbon contained in the **atmosphere** increases by **4.3** billion tons every year

**+4.3**

bn tons carbon / year

CO<sub>2</sub> emissions



Forests ⊖⊖

Oceans ⊖⊖

Human activities ⊕⊕⊕⊕

Deforestation ⊕

⊖ absorption ⊕ emission

If we increase by **4‰** (0.4%) a year the quantity of carbon contained in soils, **we can halt the annual increase in CO<sub>2</sub> in the atmosphere**, which is a major contributor to the greenhouse effect and climate change

increased absorption of CO<sub>2</sub> by plants :



farmlands, meadows, forests...



**+4‰** carbon storage in the world's soils

= more fertile soils  
= soils better able to cope with the effects of climate change



# Organic principles:



The Principle  
of **Health.**



The Principle  
of **Ecology.**



The Principle  
of **Fairness.**



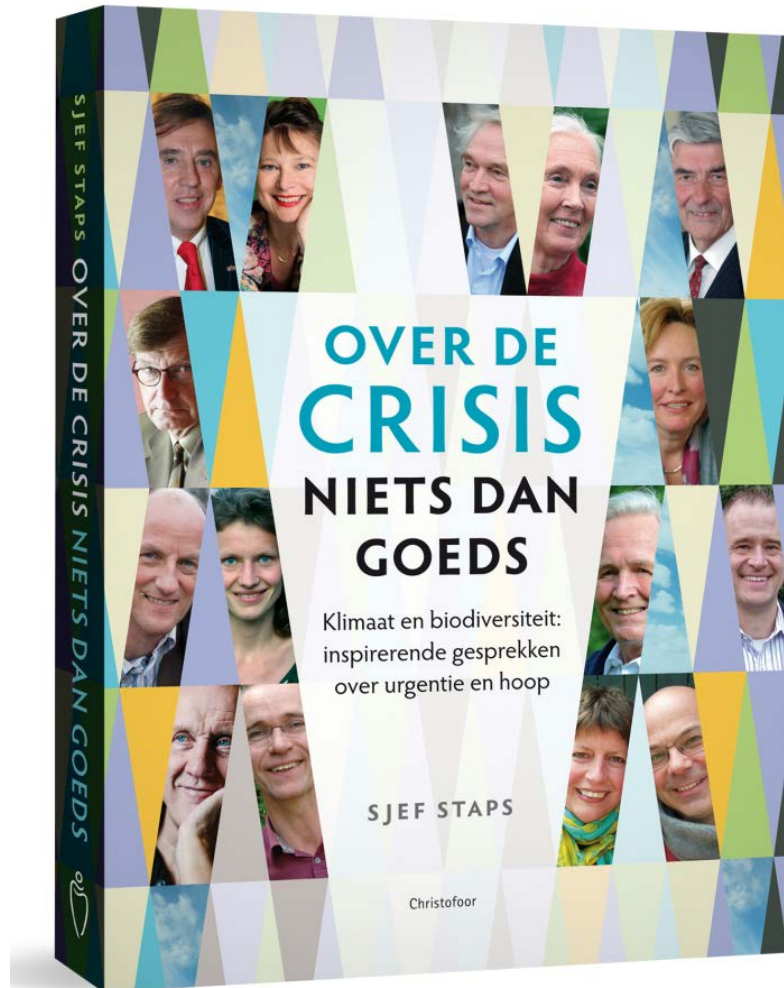
The Principle  
of **Care.**

If we take these principles serious, 'organic' must take strong action in relation with climate change

This is:

1. Task (to reduce Climate Change)
2. Opportunity (we do better than conventional; USP)

# Project: 'Nothing but good about the crisis'





# Current course is dramatic



- Biodiversity: substantial decrease
  - Climate: goal of max 2° increase will not be reached (IPCC)
- Urgent need for measures



# Consequences of climate change:

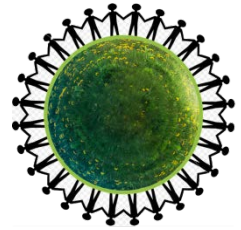


- Are global
- Cannot be estimated
- Are partly irreversible
- Will affect all future generations



# Project: Practical network

## Organic: Climate Neutral



BLGG AGROXPERTUS



**Rabobank**



Ministerie van Economische Zaken,  
Landbouw en Innovatie



**BALTUSSEN**  
KONSERVENFABRIEK B.V.



Climate Neutral Group®

Triodos  Foundation



**LOUIS BOLK**  
I N S T I T U U T



LOUIS BOLK  
I N S T I T U U T

# Towards climate neutral organic agriculture?



Organic dairy farms are more climate friendly than regular:

- More organic carbon in soil
- Less use of imported forage

For making Netherlands agriculture climate neutral, emission compensation is inevitable

# Climat neutral project conclusions



- 25-30% green house gas-emissions possible:
  - Energy savings: land treatment, heating, cooling and lighting
  - Forage concentrate
  - Manure storage and treatment
  - Rotation improvement
  - Reduced tillage
  - Agroforestry
- **If all arable land on earth would be transformed to organic agriculture, this would yearly compensate 40% of the global CO<sub>2</sub>-emissions**

# Project: 'Credits for Carbon Care'



## Goals:

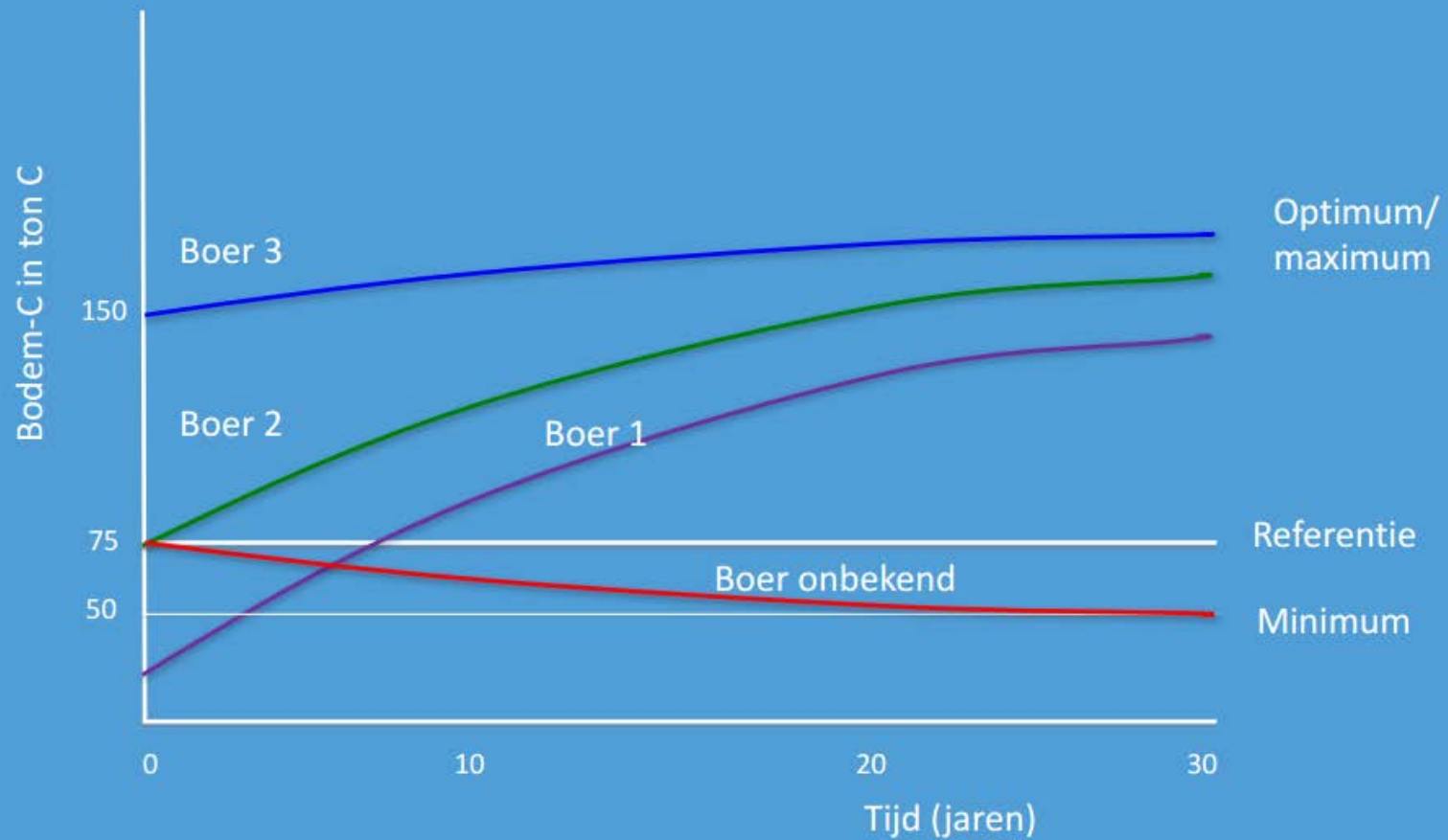
- Identify measures for C-sequestration in agriculture
- Prepare a system for quantifying and payment of sequestration
- Build up support with stakeholders:
  - food industry,
  - agriculture,
  - financial sector,
  - authorities,
  - NGO's



## Base for payment:

- Stock and flux
- Upto reference value:  
requirement: C-increase → payment 1
- Above reference value:  
requirement:  
C-increase or maintaining balance → payment 2

# Carbon-levels: stock and flux





# Payment



- Payment for stock dependent on:  
Actual C-stock  
Reference C-stock  
Time (preventing C-emissions)
- Payment for flux dependent on:  
Realisation of a positive C-balance

# CCC-Project results:



- Online Tool (based on Roth-C-model)
- Reports:
  - Economic effects of increasing organic matter content in soil
  - The challenge of measuring, monitoring and added value of soil-Carbon
  - Guideline good C-management

# Austria: 'Zurück zum Ursprung'



Organic products cause less CO<sub>2</sub>-emissions (/ha and / kg product) :

- Milk products: **10 - 21 %** less CO<sub>2</sub>-eq/kg
- Bread products: **25 - 42 %** “
- Vegetables: **9 - 35 %** “
- Chicken meat and eggs: **40 - 56%** “



# Ökoregion Kaindorf (Austria):



Exchange between farmers and industry:

- Farmers fix carbon in the soil
- Industry pays € 45/ ton CO<sub>2</sub>-eq for getting carbon-neutral

**Ökoregion Kaindorf**  
Dietersdorf-Ebersdorf-Hartl-Hofkirchen-Kaindorf-Tiefenbach

Kontakt | Impressum | Anfahrt | Sitemap

Home | Aktuelles | Die Ökoregion | Arbeitsgruppen | CO<sub>2</sub> Bilanz | Klimawandel | Service | Auszeichnungen | Archiv

CO<sub>2</sub> Bilanz Ökoregion  
Energiekonzept

## CO<sub>2</sub> Bilanz der Ökoregion Kaindorf

Mit der CO<sub>2</sub>-Bilanz der Ökoregion werden auf Basis des CO<sub>2</sub>-Ausstoßes 2006 die jährlichen Änderungen unseres CO<sub>2</sub>-Haushalts dargestellt. Das dafür notwendige Rechenmodell wurde speziell für die Ökoregion entwickelt.

Dargestellt werden die Bereiche Privathaushalt, Landwirtschaft, Gewerbe und öffentliche Gebäude. Die Datenerfassung erfolgt mittels Fragebögen. Bisher wurden die Daten der Jahre 2006 bis 2008 erhoben. Die Erhebung für das Jahr 2010 wurde 2011 durchgeführt.

Für die Öffentlichkeit zugänglich sind die Hochrechnungen aus den einzelnen Bereichen. Auf Basis der Ergebnisse legen wir die Arbeitsschwerpunkte für die Zukunft fest. Jene Personen, die Fragebögen abgegeben haben, können ihre persönliche CO<sub>2</sub>-Bilanz ebenfalls einsehen.

Die Ökoregion hat das Ziel, CO<sub>2</sub>-neutral und damit zu einer wirtschaftlichen Vorzeige-Region zu werden. Die Veröffentlichung der CO<sub>2</sub>-Bilanz zeigt transparent den Weg dorthin.

Die nächste Erhebung erfolgt 2014 für das Jahr 2013.

| Kategorie           | 2006           | 2007           | 2008           |
|---------------------|----------------|----------------|----------------|
| Privathaushalt      | 1.100,0        | 1.100,0        | 1.100,0        |
| Landwirtschaft      | 1.100,0        | 1.100,0        | 1.100,0        |
| Gewerbe             | 1.100,0        | 1.100,0        | 1.100,0        |
| Öffentliche Gebäude | 1.100,0        | 1.100,0        | 1.100,0        |
| <b>Gesamt</b>       | <b>4.400,0</b> | <b>4.400,0</b> | <b>4.400,0</b> |

### Ergebnisse der CO<sub>2</sub>-Bilanz

Vielen Dank an alle Personen, Betriebe und Einrichtungen, die bisher ihre Fragebögen abgegeben und damit dazu beigetragen haben, dass wir eine bereits fundierte Hochrechnung unserer CO<sub>2</sub>-eq-Bilanz veröffentlichen können.

[» mehr](#)

DVD's Humus/Komposttage 2016  
Humus-Stammtisch  
Fundgrube

Watch film on YouTube!

# Project: Clover and climate



- Artificial fertilizer:
  - High fossile energy costs
  - Emission of CO<sub>2</sub> and N<sub>2</sub>O
- Grass/clover mixtures:
  - Energy saving
  - Decreasing green house gas-emissions
- Higher yields (+ € 400/ha)
- Climate mitigation: minimal 6% of CO<sub>2</sub>-eq.

# How can soils store more carbon?



- Soil covering
- Intercropping
- Hedges and agroforestry
- Optimize pasture management
- Restore land in poor condition

# Project: MAC Trial (Manure as Opportunity)

- Unique field experiment since 1999
- 12 different fertilizing management plots
- Scientific base; 4 repeats
- Suitable for long term effects (e.g. organic matter)



# Many more interesting developments:

- New products from salinated environments
- Insects as protein source for animal forage
- Agroforestry
- Permaculture; nature-inclusive agriculture



# General conclusions (1/2)

- Climate Change is a huge and urgent problem
- Organic Principles
  - task for a solution
  - opportunity to distinguish from conventional agriculture

# General conclusions (2/2)

## Directions for solutions:

- Savings (climate and €'s)
- Raising awareness, incl. climate friendly diets
- Carbon-fixation in soil;
  - Soil covering, red clover, choice of rotation, green manures, compost, farmyard manure, etc.
- good for
  - Farmer
  - Climate and society
- Promising: payment for Carbon-fixation

*We humans are engaged in a monumental work of reinventing ourselves and our societies.*

*You and I have the privilege to live at the most exciting moment of creative opportunity in the whole of the human experience.*

*We have the power to turn this world around for the sake of our children and ourselves, for generations to come.*

***WE** are the ones we have been waiting for.*

David Korten  
American economist

# Don't look away from Climate Change, but use the opportunities of the soil!



Thank you for your attention.

For more information:

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[www.louisbolk.nl](http://www.louisbolk.nl)

**Project #:**



# EU CLIMATE CAFE

- Part of EU/FACCE project - Organic
- Climate Change will affect agriculture
- Good soil management increasingly important
- In-depth interviews and modelling (FarmDesign)

# Climate friendly ways to improve soil quality:

- Green manures
- Controlled traffic farming (fixed lanes)
- Organic manure / compost
- Reduced or no soil tillage
- Agroforestry

# Project #: Perspectives from Salinisation



Dieet en  
gezondheid

Type en kwaliteit  
producten

Duurzame zilte  
Rotaties

Passende  
gewassen

Bodem  
kwaliteit  
en -leven





# Project #: Agforward (Agroforestry)



1. Agroforestry systems



2. Valuable cultural trees



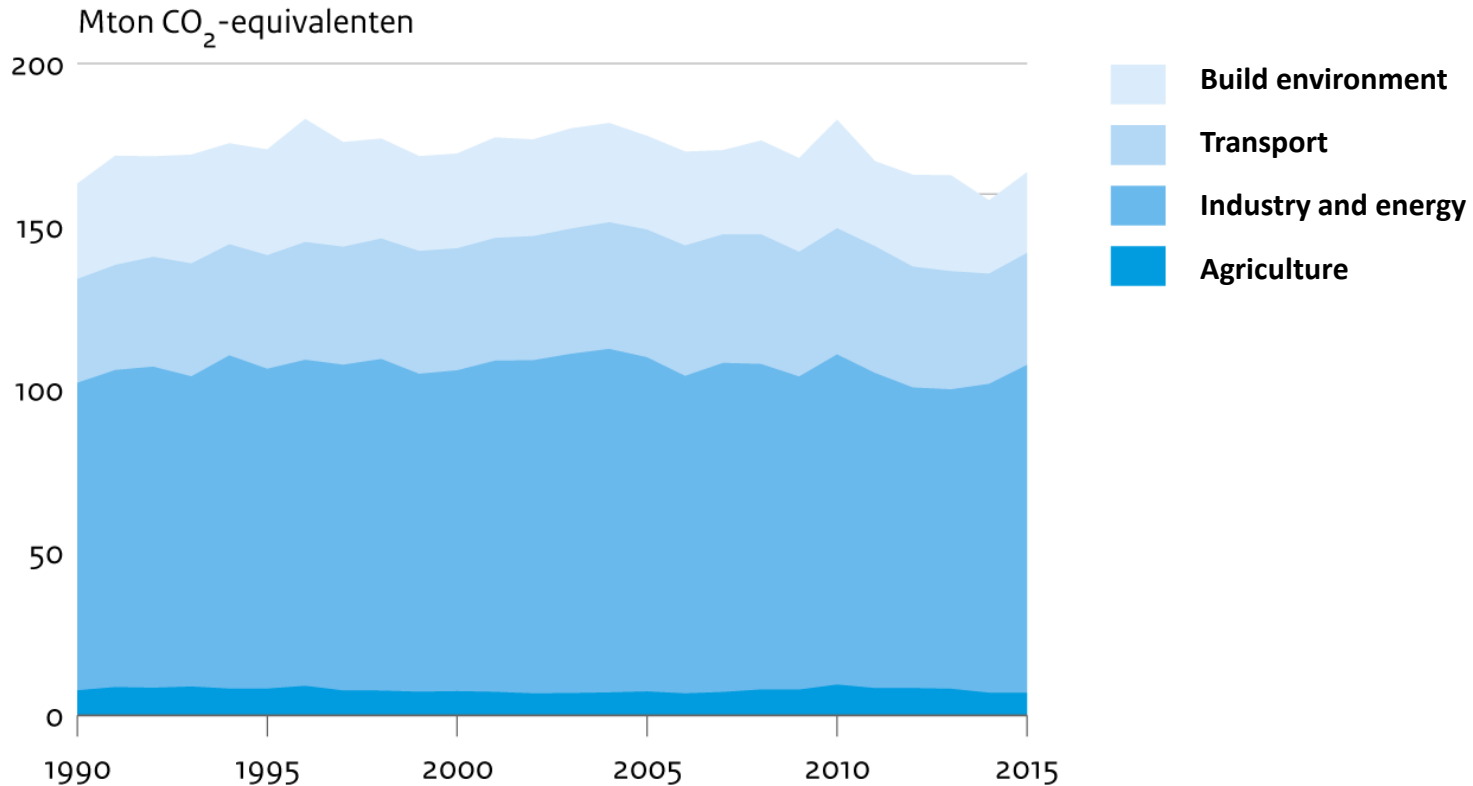
3. Fruit trees



4. Agroforestry for arable land



# CO<sub>2</sub>-emissions per sector (NL)

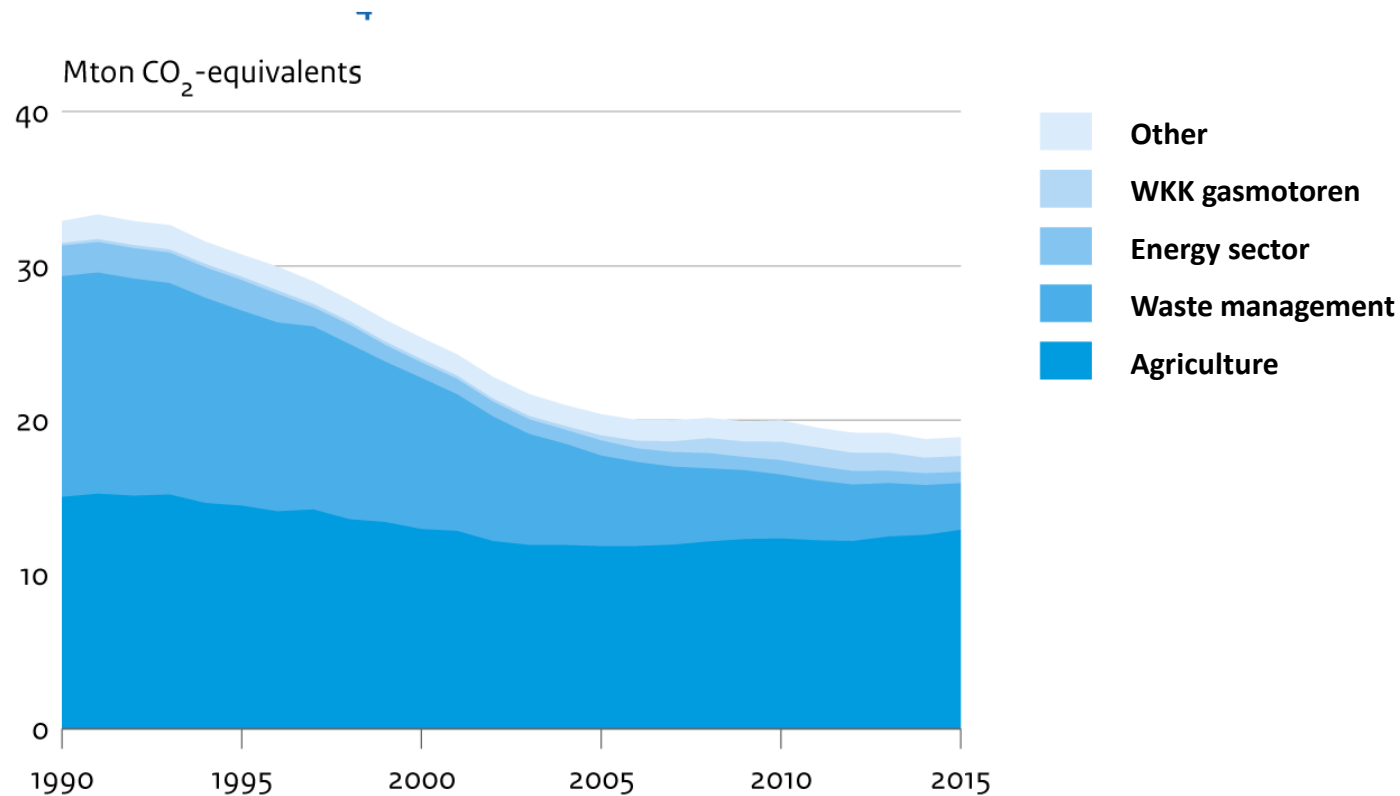


Source: Emission registration

CBS/sep16  
[www.clo.nl/nl016529](http://www.clo.nl/nl016529)



# Emission methane (CH<sub>4</sub>) per sector (NL)



Source: Emission registration

CBS/sep16  
[www.clo.nl/nl016529](http://www.clo.nl/nl016529)

# Emission nitrous gas (N<sub>2</sub>O) per sector (NL)

