



International Federation of Organic Agriculture Movements

IFOAM and Climate Change

Andre Leu, Vice President
IFOAM

IFOAM is the international umbrella organization of
organic agriculture movements worldwide



International Federation of Organic Agriculture Movements

Mission

IFOAM's mission is leading,
uniting and assisting the
organic movement in its full
diversity.

Vision

Our goal is the worldwide
adoption of ecologically,
socially and economically
sound systems that are based
on the principles of Organic
Agriculture.



IFOAM Climate Change Campaign



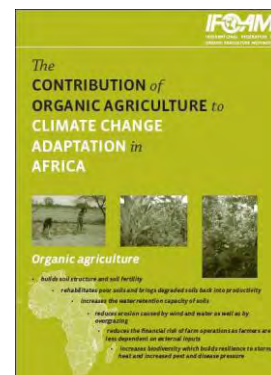
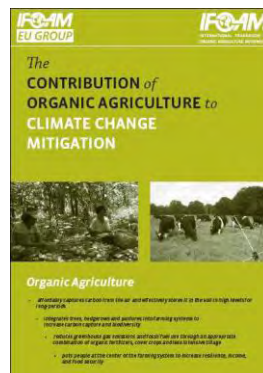
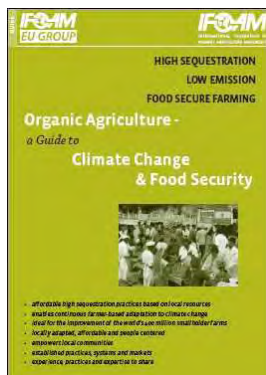
not just CARBON

High Sequestration and Low Emission

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Soil Organic Matter Living Carbon



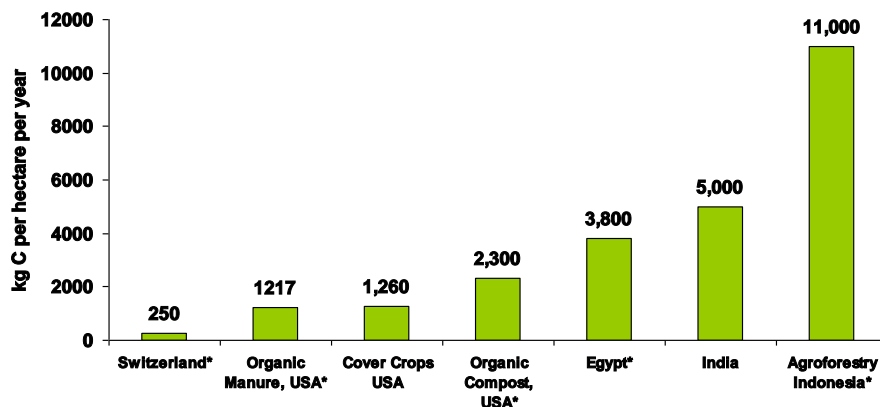
- Recycling Organic Matter is a key tenet of Organic agriculture
- Soil Organic Matter is rich in carbon
- This carbon has been taken out of the air by plants when they use photosynthesis to join carbon dioxide and water to make sugars, starches, oils and amino acids
- Can Organic agriculture increase soil carbon and sequester Carbon Dioxide?

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Global Soil Carbon Sequestration



IFOAM Case Study



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Soil Carbon Sequestration

2 Independent Global Meta Reviews

- FiBL study- Average Globally - Organic farming practices remove about 2,000 kilos of carbon dioxide from the air each year and sequester it in a hectare of farmland
- UK Soil Association study- Organic farming practices remove about 2,200 kilos of carbon dioxide

Potential for sequestering carbon

Grassland	3'488'000'000	ha
Arable Crops	1'405'000'000	ha
Permanent Crops	130'000'000	ha
Total	5'023'000'000	ha
Organic @ 2 tonnes per hectare	10	Gt C
Annual GHG emissions	49	Gt CO ₂ equ.

Soil Carbon Sequestration

Rodale Institute Long Term Trails

- *Organic farming practices, can remove about 7,400 kgs of carbon dioxide from the air each year for over 30 years and sequester it in a hectare of farmland*

Rodale (2008)

Organic Mitigates and Adapts

Adaptation to climate change due to higher soil carbon levels

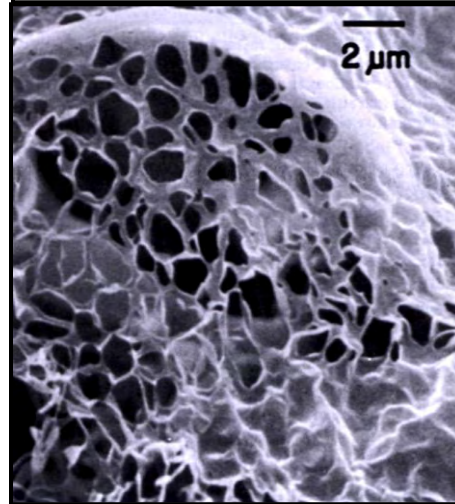
- Increased aggregate stability (Gerhardt, 1997; Siegrist et al., 1998; Brown et al., 2000; Maeder *et al.*, 2002; Pulleman et al., 2003; Williams & Peticrew, 2009).
- Increased water holding capacity, higher water content in soil (Brown et al., 2000; Lotter et al., 2003; Pimentel et al., 2005)
- Improved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

Soil Organic Matter Living Carbon

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- Holds water
- Cements soil particles and reduces soil erosion
- Increases nutrient storage & availability
- Humus can last 2000 years in the soil

Electron micrograph of
soil humus



The RODALE INSTITUTE

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Sustainability

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Research Shows that Organic Systems use Water More Efficiently

- *'The exceptional water capture capability of the organic treatments stood out during the torrential downpours during hurricane Floyd in September of 1999.*
- *The organic systems captured about twice as much water as the conventional treatment during that two day event' (Lotter 2003)*

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Research Shows that Organic Systems use Water More Efficiently

‘Soil water held in the crop root zone was measured and shown to be consistently higher ... in the organic plots than the conventional plots, due to the higher organic matter ...’ (Lotter 2003)

Organic Systems Have Less Soil Erosion

- The results of a study that compared erosion in organic and conventional farming over 38 years.
- *‘This study indicates that, in the long term, the organic farming system was more effective than the conventional farming system in reducing soil erosion and, therefore, in maintaining soil productivity’ (Reganold et al. 1987).*

Organic Systems Improve Soil

- "Results of this research suggest that organic farming systems can provide greater long-term soil improvement than conventional no-tillage systems, despite the use of tillage in organic systems."
- Journal of Soil and Water Conservation entitled "Strategies for Soil Conservation in No-tillage and Organic Farming Systems" (Nov/Dec 2007, Vol. 62, Number 6).

Sustainability and Adaption

Scientific Review by Cornell University into a 22 year-long Field Study

- The improved soil allowed the organic land to generate yields equal to or greater than the conventional crops after 5 years
- The conventional crops collapsed during drought years.
- The organic crops fluctuated only slightly during drought years, due to greater water holding capacity in the enriched soil.
- The organic crops used 30% less fossil energy inputs than the conventional crops.

» Pimental et al 2005 Published in the Journal Bioscience

Organic Corn - 1995 Drought



Better infiltration, retention, and delivery to plants helps avoid drought damage

Organic

Conventional



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Sustainability and Food Security



United Nations Study – Organic Agriculture Increased Yields

- Report by UNCTAD and UNEP –average increase in crop yield
- *116 per cent increase for all African projects*
- *128 per cent increase for the projects in East Africa.'*

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Sustainability and Food Security

United Nations Study – Organic Agriculture Increased Yields

‘The evidence presented in this study supports the argument that organic agriculture can be more conducive to food security in Africa than most conventional production systems, and that it is more likely to be sustainable in the long term.’

Supachai Panitchpakdi, Secretary general of UNCTAD and Achim Steiner, Executive Director of UNEP

Sustainability and Food Security

Scientific Review by Cornell University into the System of Rice Intensification (SRI)

- Organic SRI yields greater than the conventional crops
- Organic SRI had significantly lower input costs (fertiliser, pesticide, weeding etc) than the conventional crops.

Recent Scientific Field Trials in the USA

- **US Agricultural Research Service (ARS) Pecan Trial**
- The ARS organically managed pecans out-yielded the conventionally managed, chemically fertilized Gebert orchard in each of the past five years. Yields on ARS' organic test site surpassed the Gebert commercial orchard by 18 pounds of pecan nuts per tree in 2005 and by 12 pounds per tree in 2007. (*Bradford J.M. 2008*)
- **The Wisconsin Integrated Cropping Systems Trials**
- found that organic yields were higher in drought years and the same as conventional in normal weather years. (*Posner et al. 2008*)

Recent Scientific Field Trials in the USA

- **IOWA State University Trials**
- The results from the Long Term Agroecological Research (LTAR), a 12 year collaborative effort between producers and researchers.
- organic corn harvests averaged 130 bushels per acre while conventional corn yield was 112 bushels per acre.
- organic soybean yield was 45 bu/ac compared to the conventional yield of 40 bu/ac in the fourth year.
- Cost-wise, on average, the organic crops' revenue was twice that of conventional crops due to the savings from non-utilization of chemical fertilizers and pesticides.

Recent Scientific Field Trials in the USA

- **Rodale Organic Low/No Till**
- The Rodale Institute has been trialling a range of organic low tillage and no tillage systems.
- 'The 2006 trials resulted inorganic yields of 160 bushels and acre (bu/ac) compared to the Country average of 130 bu/ac. (Rodale 2006)

Minimum Till without Herbicides



Minimum Till without Herbicides

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Reduced tillage (better than no till)

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Berner, A. et al. (2008): Crop yield and soil quality response to reduced tillage under organic management. Soil & Tillage Research: 89-96.



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Pasture Cropping



Oats Sown into Pasture

Pasture Cropping



Oats Sown into Pasture

Biodiversity

- ‘*Organic agriculture has demonstrated its ability to not only produce commodities but also to "produce" biodiversity at all levels.*’ Food and Agriculture Organization of the United Nations (FAO 2003)
- Lapwings, a bird species that has declined by 80 percent in the U.K. were flourishing on organic farms. *Randerson (2004)*

- **Full sun systems.** Phase of establishment with plantains as temporary shade.
- **Agroforestry system** with *Inga edulis* and *Erythrina poeppigiana* as main shade leguminous trees, common in Latin America. Associated fruit trees (*Euterpe predatoria*, *Nephelium lappaceum*, *Theobroma grandiflorum*, *Garcinia macrophylla*, *Persea americana*) and timber trees (*Hymenaea couraril*, *Centrolobium ochroxylum*, *Swietenia macrophylla*, *Myroxylon balsamum*).
- **Successional agroforestry system** with the same shade trees of the agroforestry treatment and in addition natural regeneration and crops (manioc, rice, maize, hibiscus, cajanus cajan, achiote, pineapple). Taking into account natural plant species succession, the high turn over of carbon typical for the conditions of humid tropics, self regulation processes with high biodiversity, to use all storeys and provide as much as possible ecosystem services beside the cocoa production.



**Sustainability
Eco-intensification**



... using high diversity nature for promoting beneficial insects and combating pests.



... spraying extracts of plants and other natural compounds against pests and diseases.

... using robust varieties.

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**Sustainability
Eco-intensification**



**Maximises
solar capture**

**Fixes nitrogen
and soil carbon**

**Flowers attract
beneficial
insects**



Legume vines in fruit trees

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Insectary

**Refuges
Created by
Strip
Mowing**



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Message to COP 16: Advantages of Organic Agriculture

- Mitigates and Adapts
- Sequester significant levels of CO₂
- Increase and conserve Biodiversity
- Increase resilience and drought proofing
- Increase water use efficiency –reduce need for irrigation
- Reduce soil erosion
- Reduce eutrophication of water systems
- End chemical contamination of the environment
- Good yields of quality food

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Thank You

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