



@IFOAMorganic

Organic Climate Smart Agriculture

**An Ecosystem-Based & People-Centred Approach to
Climate Change Adaptation, Mitigation & Resilience.**

An Example of the information presented at UN meetings

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**HIGH SEQUESTRATION
LOW EMISSION
FOOD SECURE FARMING**

IFOAM is the international umbrella organization for organic agriculture



Mission

Leading, uniting and assisting the organic movement in its full diversity.

Goal

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

People

The global organic umbrella organization has over 800 member organizations in around 120 countries worldwide.

1.8 million certified organic farmers and substantially more uncertified organic farmers



International Federation of Organic Agriculture Movements

The Definition of Organic Agriculture

‘Organic agriculture is a production system that sustains the health of soils, ecosystems and people.

It relies on ***ecological processes, biodiversity and cycles adapted to local conditions***, rather than the use of inputs with adverse effects.

Organic agriculture ***combines tradition, innovation and science*** to benefit the shared environment and promote fair relationships and a good quality of life for all involved.’

The Four Principles of Organic Agriculture

Organic agriculture is based on:

- The principle of health
- The principle of ecology
- The principle of fairness
- The principle of care

IFOAM Advocacy

IFOAM regards all forms of agriculture that are based on the 4 principles and the definition as 'organic'.

These can include:

- Agro-ecology, Eco Agriculture, Ecological Agriculture, Natural Farming, Biological Agriculture, Permaculture, Biodynamic Agriculture, Agroforestry and other ecological based systems

IFOAM Advocacy

- The majority of the world's ecosystems are used by their local populations for food, fibre and other resources.
- The sustainable use of these ecosystem services and products is essential to ensure an adequate quality of existence for ecosystems and their communities.
- The majority of these communities are composed of small holder producers

Small Holder Farmers are the Most Vulnerable

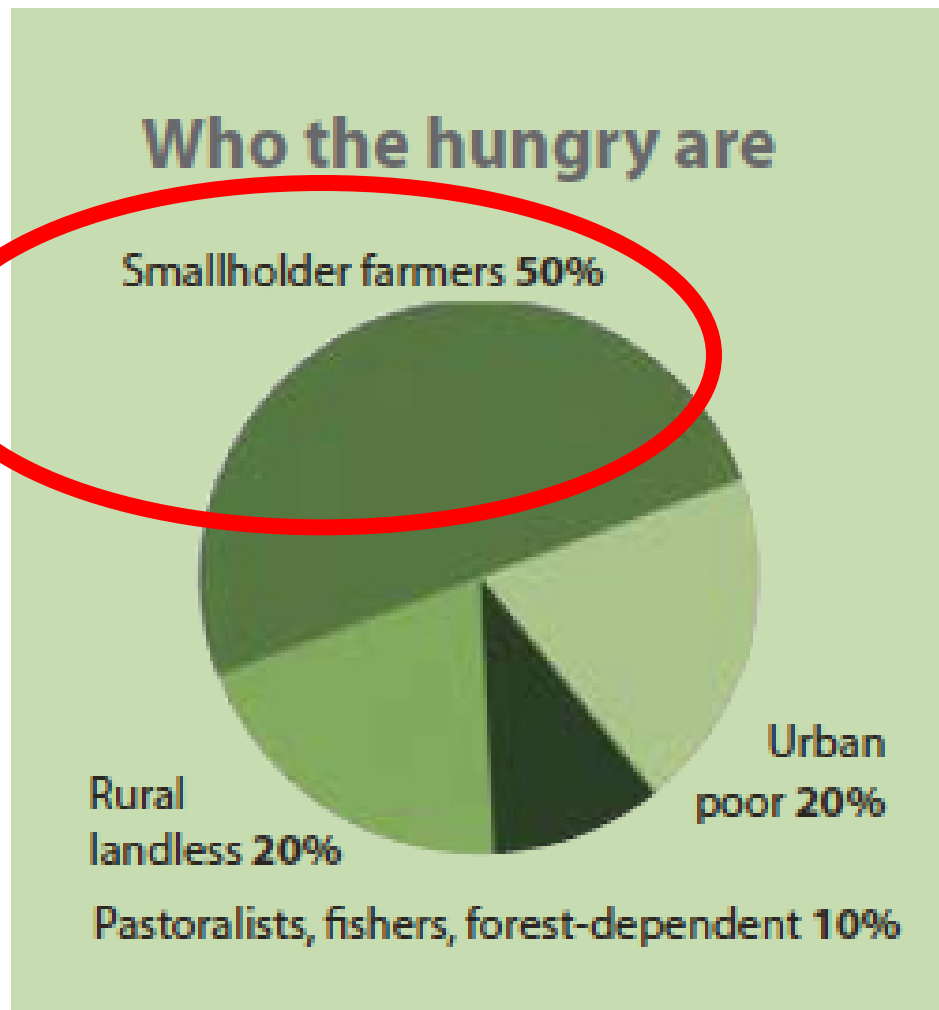
80% of the worlds hungry live in rural areas

50% of the worlds hungry are small farmers

They are the most vulnerable to the increasing weather extremes

– droughts, floods, destructive rains and winds

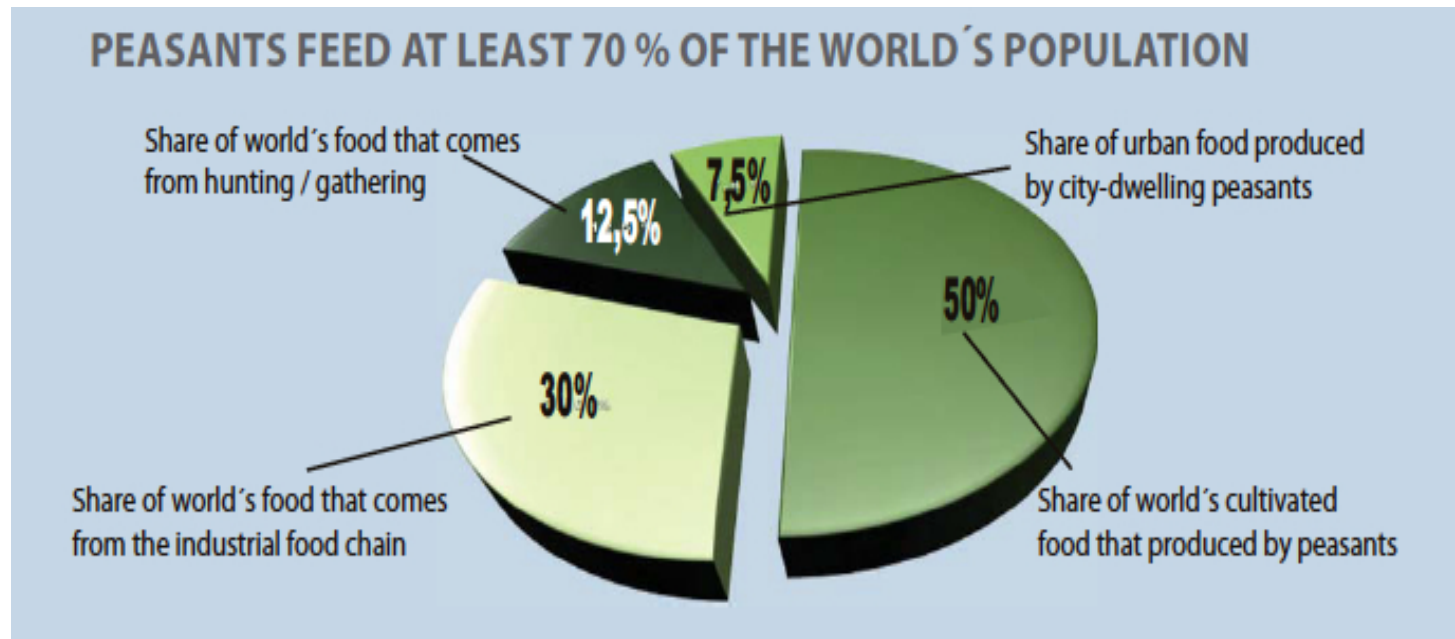
Source: ETC



Small Scale Farmers Produce 70% of the Worlds Food

80% of the food in developing countries comes from small holder farmers (FAO 2011)

- The only practical way to achieve food security is to grow the food locally where it is needed by small holder farmers
- It is important to increase the resilience of small holders at local level to ensure adequate food security for the world



Small Farmer Organic Agriculture and Food Security

- The majority of small holder farmers are traditional farmers – organic by default
- Teaching these farmers to add good organic practices to their traditional methods – organic by design:
 1. Better soil nutrition – recycling organic matter (carbon) and mineral balance
 2. Improved pest and disease control
 3. Water use efficiency – especially increasing SOM
 4. Better weed control methods
 5. Eco-function intensification: stacking systems
- Leads to significant increases in yields

Organic High Yield

- A report by the United National Conference on Trade and Development (UNCTAD) and the United Nations Environment Programme (UNEP) stated on Organic Agriculture:
- 114 projects in Africa covering 2 million hectares and 1.9 million farmers
- *'...the average crop yield was ... 116 per cent increase for all African projects and 128 per cent increase for the projects in East Africa.'*
- *Organic Agriculture and Food Security in Africa 2008*

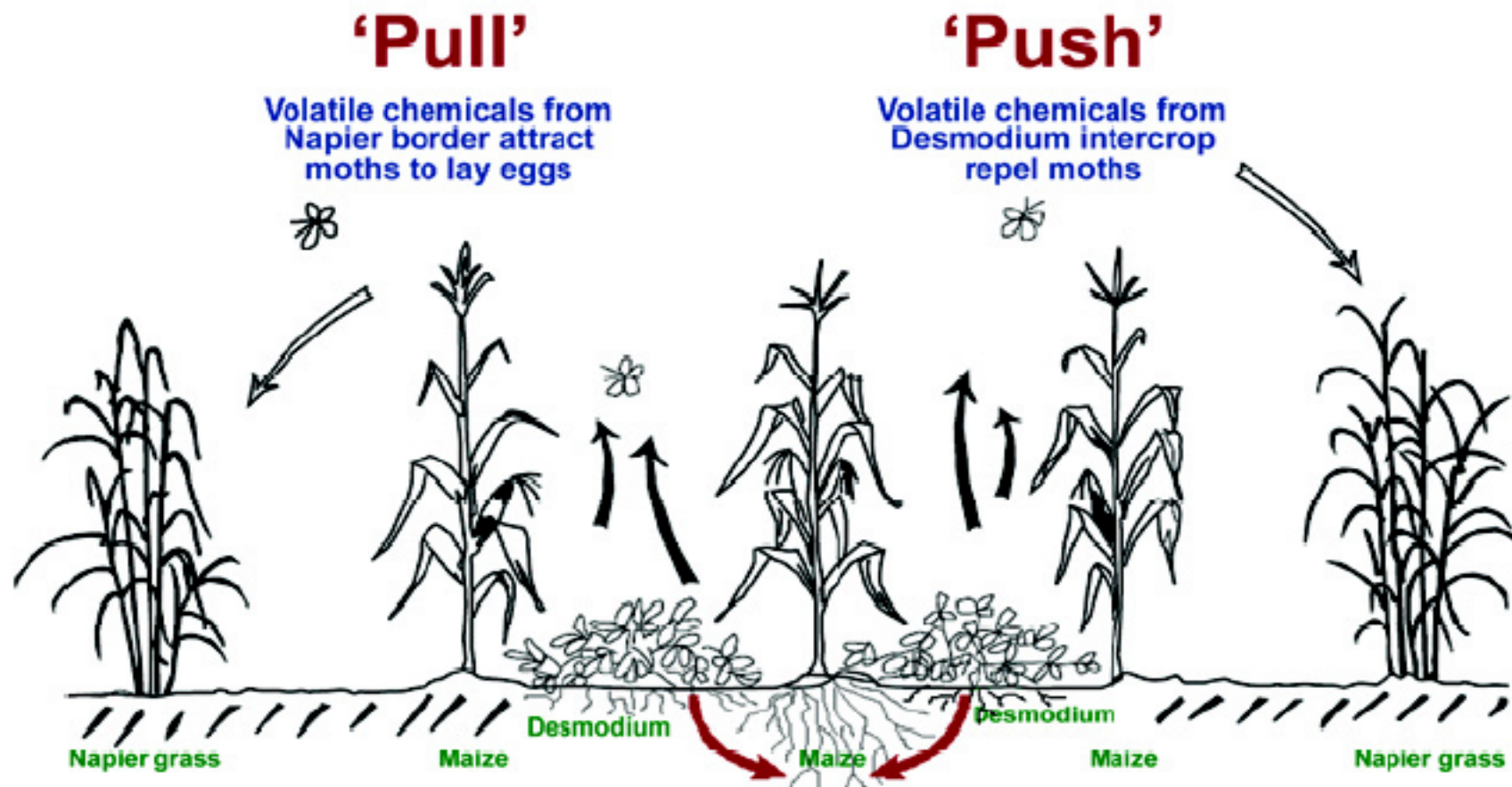
Organic High Yield

- The report notes that despite the introduction of conventional agriculture in Africa food production per person is 10% lower now, than in the 1960s.
- *‘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.’*

Source: Supachai Panitchpakdi, Secretary general of UNCTAD and Achim Steiner, Executive Director of UNEP 2008

The African Union has included Ecological Organic Agriculture as a core part of its Agriculture and food security programs

“Push – Pull” for Stemborer and Striga Control



Chemicals (isoflavones) secreted by desmodium roots inhibit attachment of striga to maize roots and cause suicidal germination of striga seed in soil

The System's Approach

Using natural systems to regulate pest outbreaks

push-pull
greater farm productivity with higher corns yields (2 to 10X)



Eco Function Intensification



The Napier grass is progressively cut and fed to a cow. The excess fresh milk is sold everyday as a cash income

Eco Function Intensification



The desmodium, suppresses weeds, adds nitrogen, conserves the soil, repels pests and provides high protein stock feed

Organic Matter - Benefits

- The term 'Organic' in Organic Agriculture comes from the recycling of organic matter as one of the primary management systems
- Increasing organic matter in farming systems brings multiple benefits

Organic Higher Yields in Climate Extremes

- **Organic systems have higher yields** than conventional farming systems in weather extremes such as heavy rains and droughts. (Drinkwater, Wagoner and Sarrantonio 1998; Welsh, 1999; Lotter 2004)
- 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*)
- The Rodale FST showed that the organic systems produced 30 per cent more corn than the conventional system in drought years. (*Pimentel D 2005, La Salle and Hepperly 2008*)

Organic Matter Increases Infiltration



Organic

Picture: FiBL DOK Trials



Conventional

Soil Organic Carbon Mitigates and Adapts



- Higher corn and soybean yields in drought years
- Increased soil C and N

- Higher water infiltration
- Higher water holding cap
- Higher microbial activity
- Increased stability

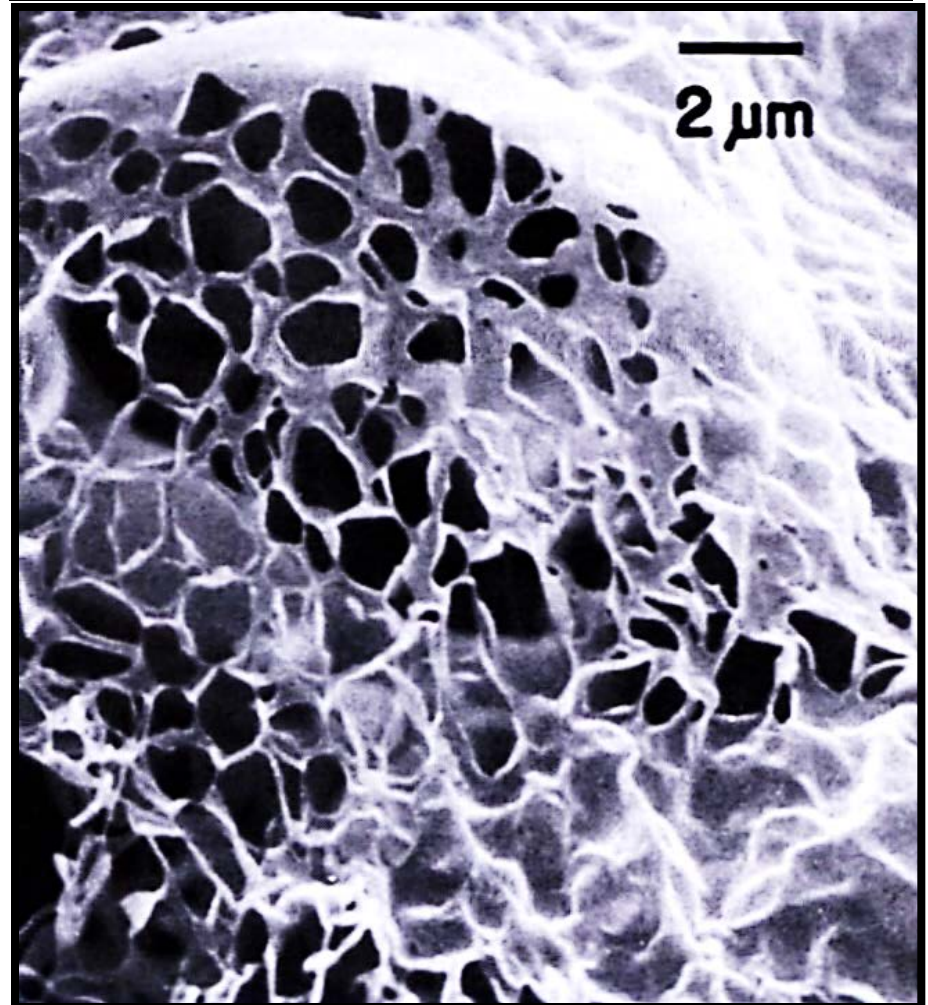


Soil Organic Matter

Living Carbon

- Holds up to 30X its weight in 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



Soil Organic Matter/Soil Carbon

Research Shows that Organic Systems use Water More Efficiently

- Volume of Water Retained /ha (to 30 cm) in relation to soil organic matter (OM).
- 0.5% OM = 80,000 litres (common conventional level)
- 1 % OM = 160,000 litres (common conventional level)
- 2 % OM = 320,000 litres
- 3 % OM = 480,000 litres
- 4 % OM = 640,000 litres
- 5 % OM = 800,000 litres

Organic Corn - 1995 Drought

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

Organic

Conventional

Picture: Rodale Institute

The average corn yields during the drought years were from 28% to 34% higher in the two organic systems.

The yields were 6,938 and 7,235 kg per ha in the organic animal and the organic legume systems, respectively, compared with 5,333 kg per ha in the conventional system (Pimentel, 2005)

Soil Organic Matter/Soil Carbon

Mitigation Potential of Organic Practices

In a peer reviewed meta-analysis study, published in the Journal PNAS, Gattinger et al.2012 reported:

- **used 41 comparison trials**
- **removed the outliers in the data sets in order not to over-estimate the data**
- **to obtain a conservative estimate,**
- **reported that organic systems sequestered 550 Kgs C per hectare per year.**
- **This equates to 2018.5 Kgs CO₂ per hectare per year.**

Soil Organic Matter/Soil Carbon

Mitigation Potential of Organic Practices

Based on these figures:

- **widespread adoption of current organic practices globally has the potential to sequester 10 Gt of CO₂,**
- **just under 20 per cent of the world's current GHG emissions.**

Soil Organic Matter/Soil Carbon

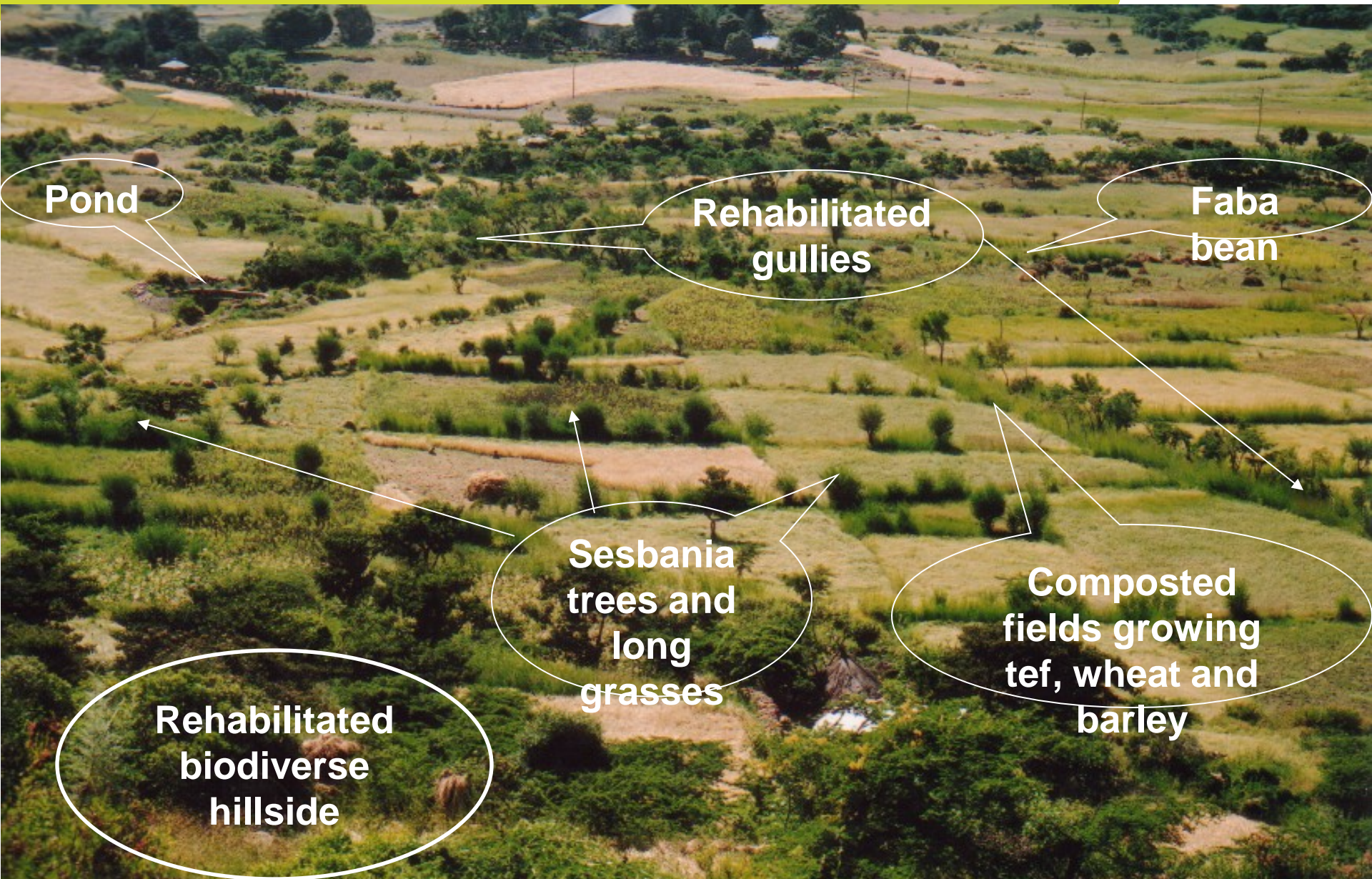
Total Agricultural Land Source: (FAO, 2010)

• Grassland	3,356,940,000	ha
• Arable crops	1,380,515,000	ha
• Permanent crops	146,242,000	ha
• Total	4,883,697,000	ha

Organic @ 2 tons per hectare: 9.76 Gt of CO₂
(Gattinger et al., 2012)

Annual GHG emissions: 49 Gt of CO₂e (IPCC
Fourth Assessment Report (AR4), 2007)

All the components being used in October 2003



Pond

**Rehabilitated
gullies**

**Faba
bean**

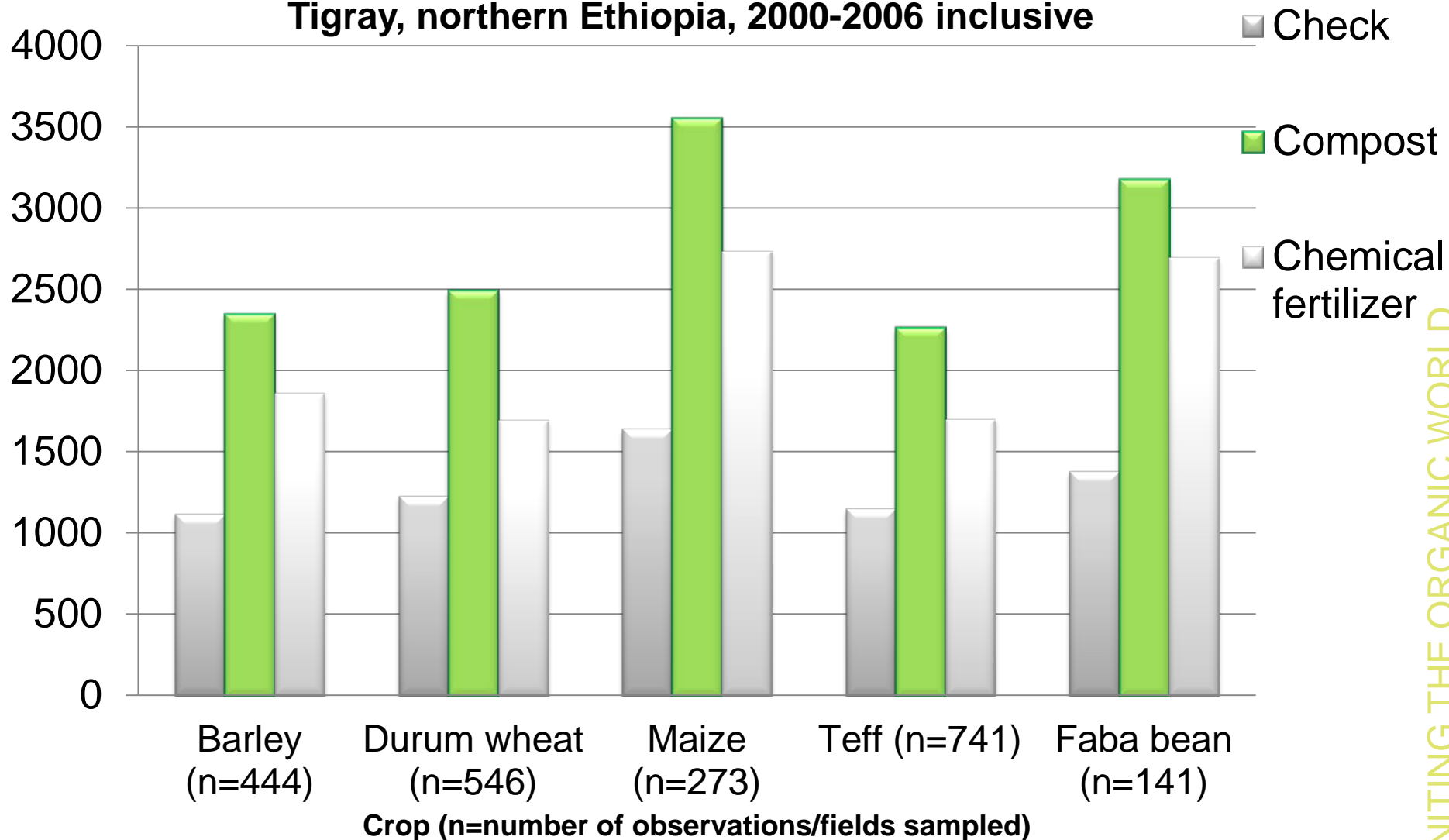
**Sesbania
trees and
long
grasses**

**Composted
fields growing
tef, wheat and
barley**

**Rehabilitated
biodiverse
hillside**

Impact of using compost - Grain yields from over 900 samples from farmers fields over 7 years

Average mean grain yields in kg/ha for 4 cereals and 1 pulse crop from Tigray, northern Ethiopia, 2000-2006 inclusive



Composted Fields have higher Resilience



Wheat grown on
compost treated
field

Wheat grown with
chemical fertilizers
and requiring
spraying with
fungicide

Wheat infested with stripe rust and sprayed – gave yield of 1.6 t/ha



Wheat grown on composted soil resist the rust – gave yield over 6.5 t/ha



The Multiple Benefits of Organic Agriculture

Conclusion

Organic Agriculture offers multiple benefits:

- Compost can be free and sourced on farm – better economically than purchasing expensive fertilizers
- Functional Biodiversity can provide nutrients, pest and disease control, windbreaks, erosion control, stock feed etc
- Increasing SOM improves water holding, adaptation resilience, soil fertility, stability, N, and mitigation
- Appropriate for all farmers especially small holders
- Food Security, Mitigation and Adaptation

Thank You

