

# Biomass and bioenergy in organic farming systems

<http://www.darcof.dk/research/darcofiii/bioconcens.html>

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## Organic farming principals according to IFOAM

2002

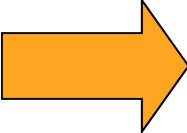
” .. to use as far as possible, **renewable resources** in production and processing systems and avoid pollution and waste.”

2005

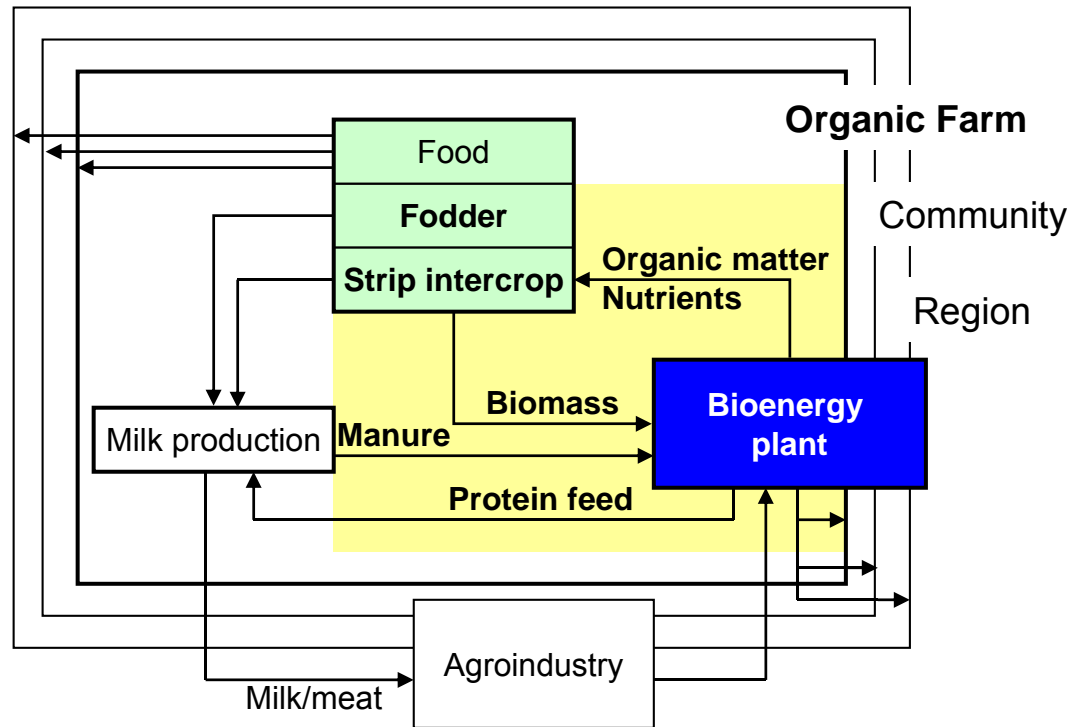
”Inputs should be reduced by reuse, recycling and efficient management of materials and energy in order to maintain and improve environmental quality and conserve resources.”



## BIOCONCENS approach

- The production of bioenergy from local biological resources and the maintenance of soil fertility seem to have been opposing aims in organic agriculture (OA). It is however, important to reduce the reliance on fossil fuels and decrease greenhouse gas emissions in OA, especially in the context of enhanced integrity of OA.
- Project organisation
  1. WP: Co-production of biogas, bioethanol and animal feed from organic raw materials
  -  2. WP: Strip intercrop system for biomass production
  3. WP: Effects of bioenergy production on soil quality and survival of parasites and weed seeds.
  4. WP: Emissions of greenhouse gases from strip intercropping and green/animal manures.
  5. WP: Scenarios for bio-energy production in organic agriculture and socio-economic analysis

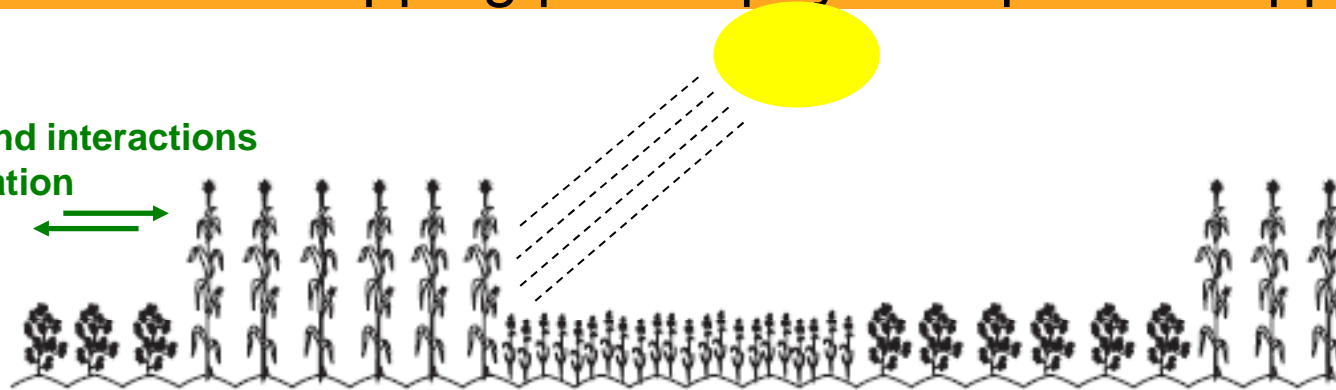
# BioConcens concept framework (FØJOIII 2007-2011)



BIOCONCENS cropping philosophy – strip intercropping

Aboveground interactions

- solar radiation



Belowground interactions

- soil water and nutrients

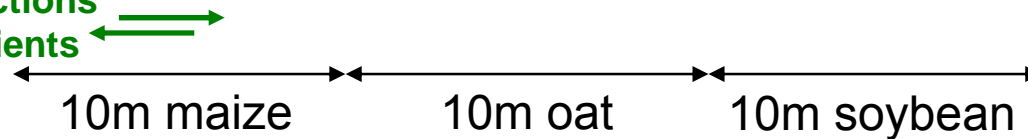


Fig. 3.1. The oat/corn border.



Fig. 3.2. The soybean/corn border.

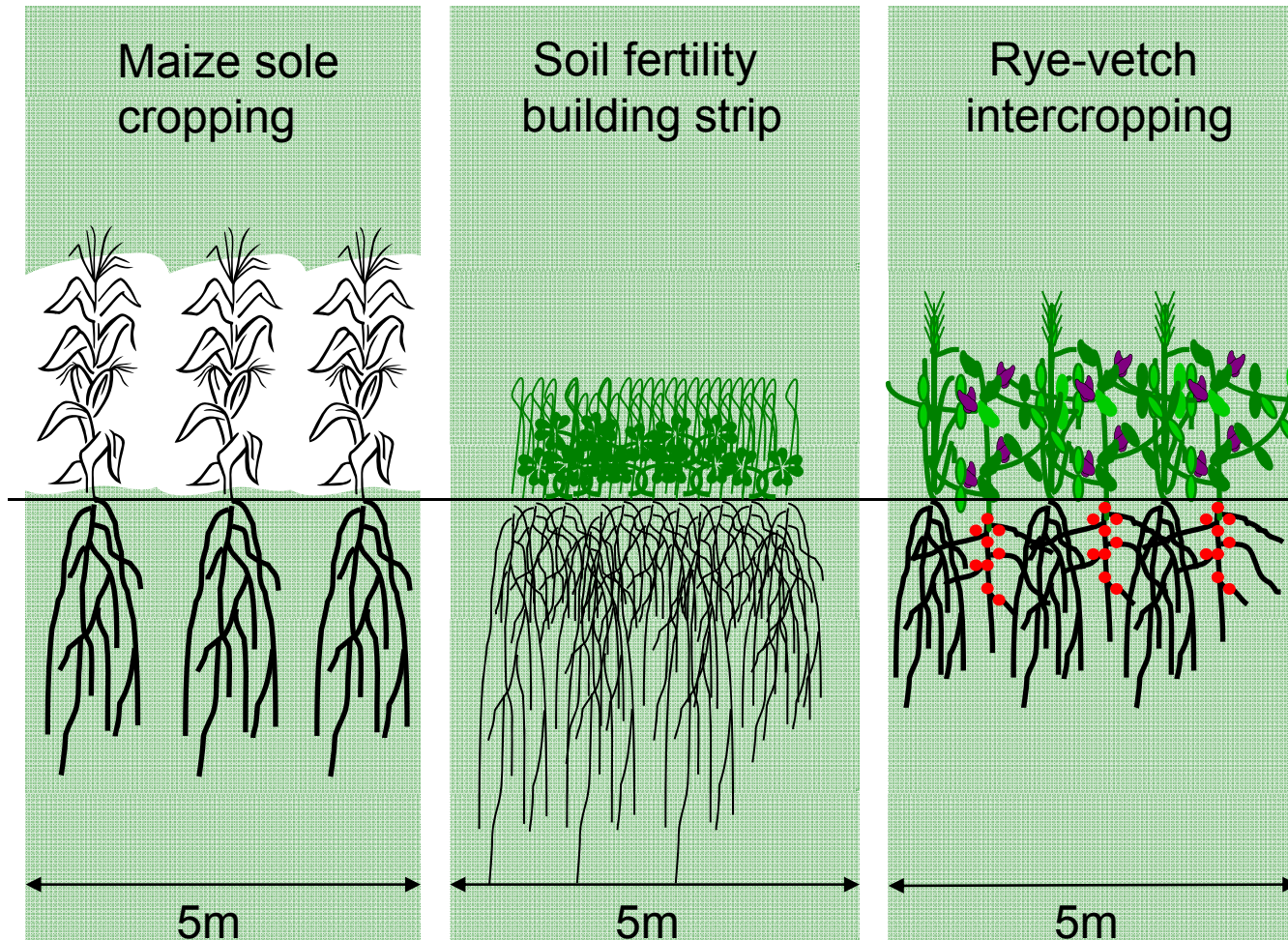


Fig. 3.3. The oat/soybean border.

Fig. 3. Border rows within a three-crop strip intercropping system.

Source: <http://www.extension.iastate.edu/Publications/PM1763.pdf>

# BIOCONCENS cropping philosophy





## Strip intercropping and the landscape

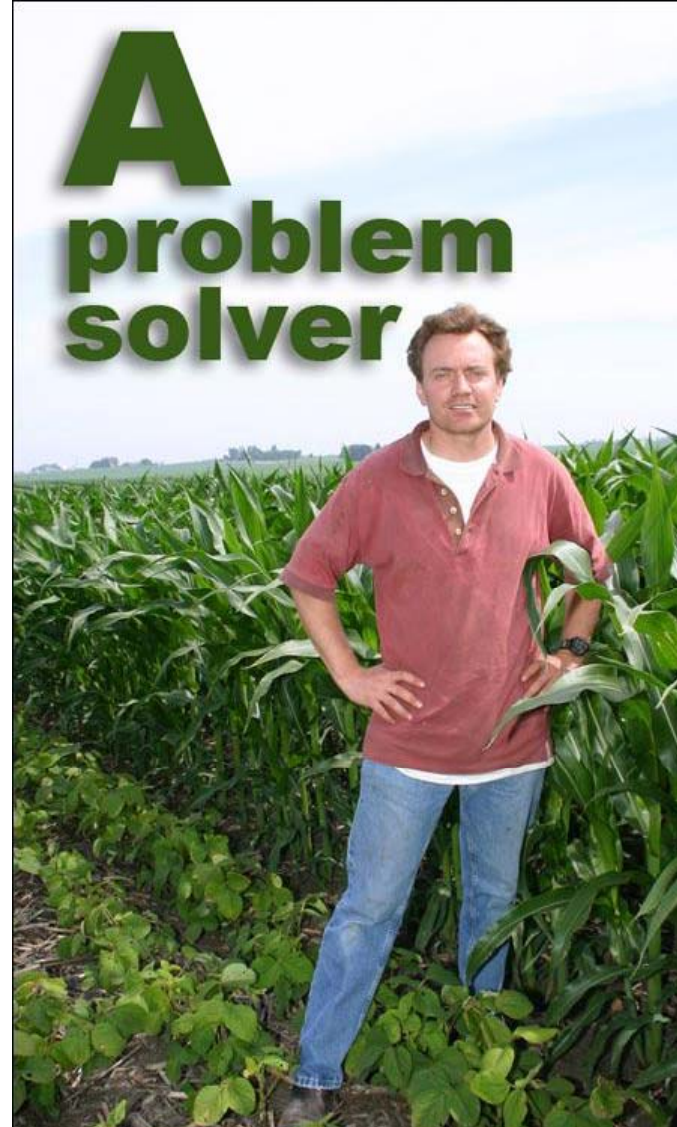


Source: [oregonstate.edu/dept/ncs/photos/strip.jpg](http://oregonstate.edu/dept/ncs/photos/strip.jpg)

Cropping concept with many possible uses



Interface between broccoli and onion. *From Broad et al., 2004*



Clay Mitchell stands in a field of corn and soybeans he is strip intercropping using precision agriculture technology.

*From Iowa Farmer Today. 13 July 2006*



## Some questions for you to discuss

- Biomass from agriculture is regarded as one of the main alternatives for breaking Europe's dependence on fossil fuels
- The question is what path to follow??

### **2007**

- High production levels based upon external inputs
- The world's food and feed demand sets limits to eco-friendliness
- Higher agricultural productivity saves wildland

### **2027(?!)**

- Mimic nature: No “waste” products - outputs from one process become inputs for another
- Adaptive management: resilient agro-ecosystems with the capacity for self-regulation when reducing external inputs to recover from biotic and abiotic stress