TPorganics
Technology Platform

Technology Platform for organic food and farming

Strategic Research Agenda

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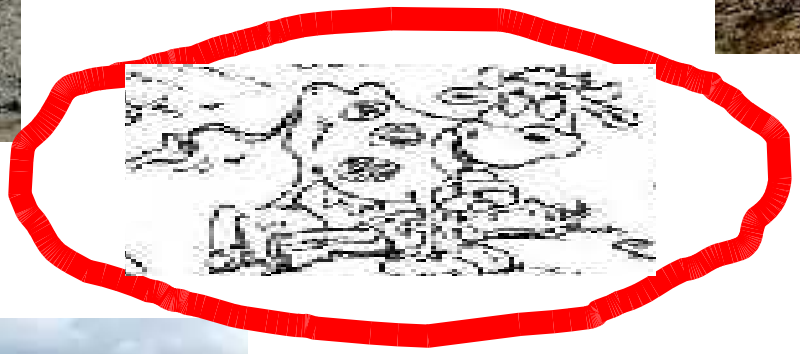
Trade-offs in agriculture and food production

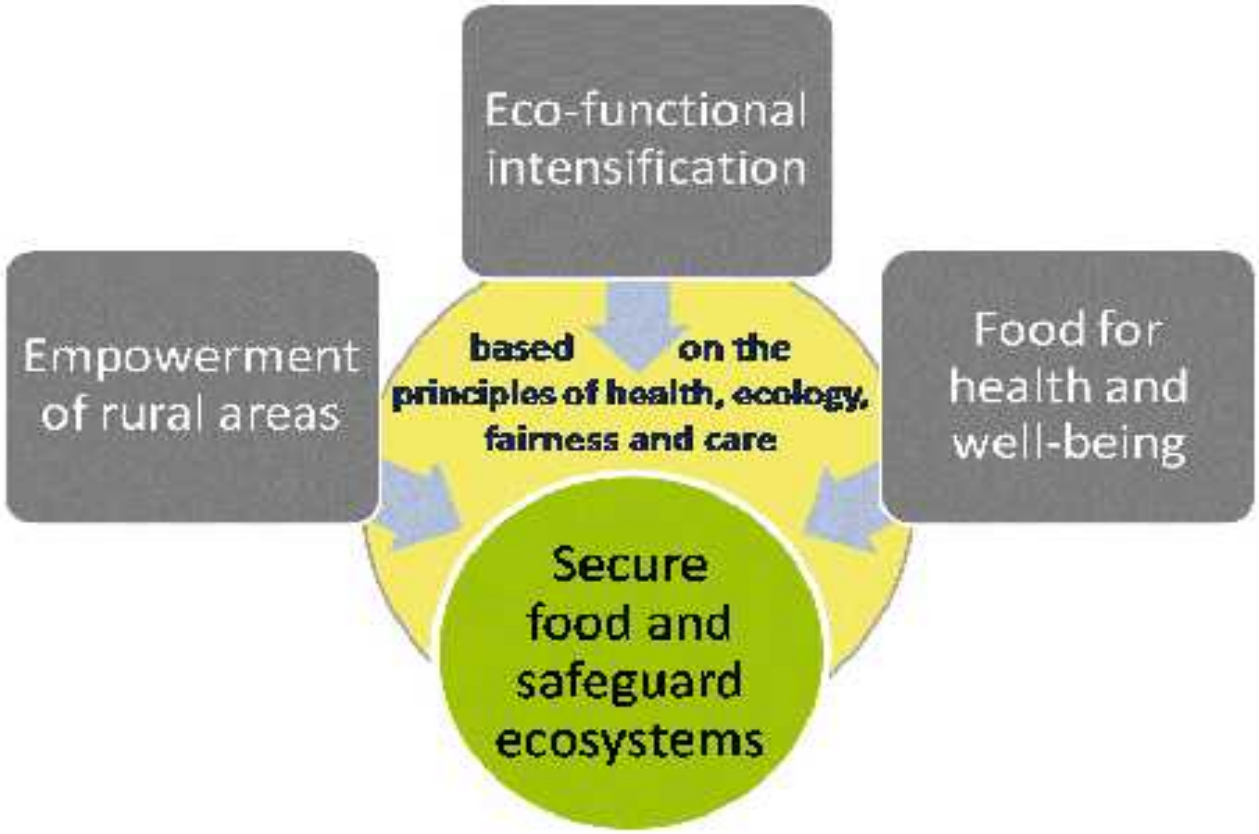


- *Pimentel et al. (1995)*: During the last 40 years, one-third of the world‘s arable land lost by erosion, current loss rate more than 10 million hectares per year.
- *Bellamy et al. (2005):* On 92 % of UK cropland annual losses of 0.5 to more than 2 g of carbon per kg soil occurred in the last 25 years.

The IFOAM-EU Group

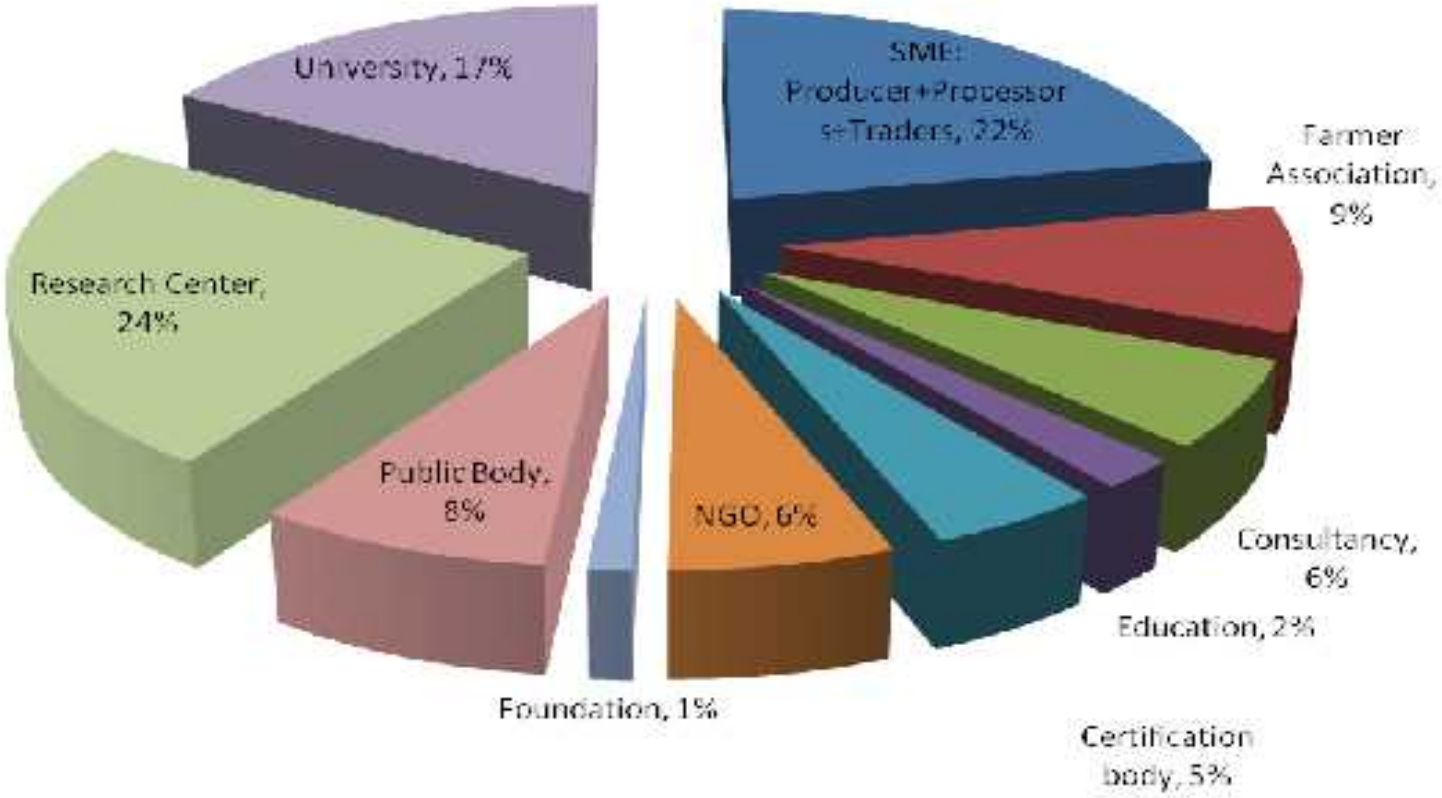
- All members of the International Federation of Organic Agriculture Movements (IFOAM) in EU and Associated Countries.
- Farmers organizations, scientific organisations and advisory services, farm input suppliers, food processors and traders/retailers, certifiers, NGO etc.
- Office in Brussels, co-ordinates TP Organics.

The research vision



Strategic Research Agenda

Organisations involved in the consultations: 199



Thematic area 1: Empowerment of rural areas

Viable concepts for the empowerment of rural economies in a regional and global context: the socio-economic challenges of organic farming

- **Develop the concept of multi-functionality to strengthen sustainable rural development.**
- **Build and maintain competitive, trustworthy and fair supply chains of high quality organic food.**
- **Improve knowledge and communication systems for multifunctional organic and low-input food production.**
- **Improve organic farming's contribution to food security and international development.**
- **Develop an integrative policy framework for organic farming and sustainable rural development.**

High priority topics

- Innovative ways to implement key principles in organic standards and regulations.
- Social sustainability impact of organic and low-input farms and supply chains.
- Data Network for better European organic market information.

Thematic area 2:
Eco-functional intensification

Securing food and ecosystems by eco-functional intensification

- **Improved ecological support functions for resilient crop production.**
- **Modern mixed farming systems.**
- **Appropriate and robust livestock production.**
- **Green improvement of genetic resources.**
- **Development and adaptation of novel technology.**

Eco-functional intensification?

- Higher degree of organization of farms, knowledge-based farming and food systems.
- More complex and less industrialised farming systems (e.g. agro-forestry).
- Improved land and resource use efficiency.
- Improved management of soil fertility, water, biodiversity, genetic diversity, energy and nutrients.
- Improved use of resilience, self-regulation and self-healing in farming systems and animal herds.
- Adaptation of crop and animal breeding programs to organic and low-input systems.
- Novel and improved therapies against pests and diseases in crop and livestock.
- Improved use of novel technologies like MAS, nanotechnology, robots, sensors and IT.

Functional diversity?

Companion plants increase life span, fecundity and mobility of parasitoids

Iberis amara

Centaurea cyanus

Diadegma semiclausum

Health promoting agents from plants against endo-parasites of livestock (especially sheep and pig)

Cichorium intybus

Onobrychis viciifolia

Heckendorn et al., 2006; Marley et al., 2003; Hansen et al., 2006

Maize: Mechanical resistance against the European Corn Borer (*Ostrinia nubilalis*)

FiBL

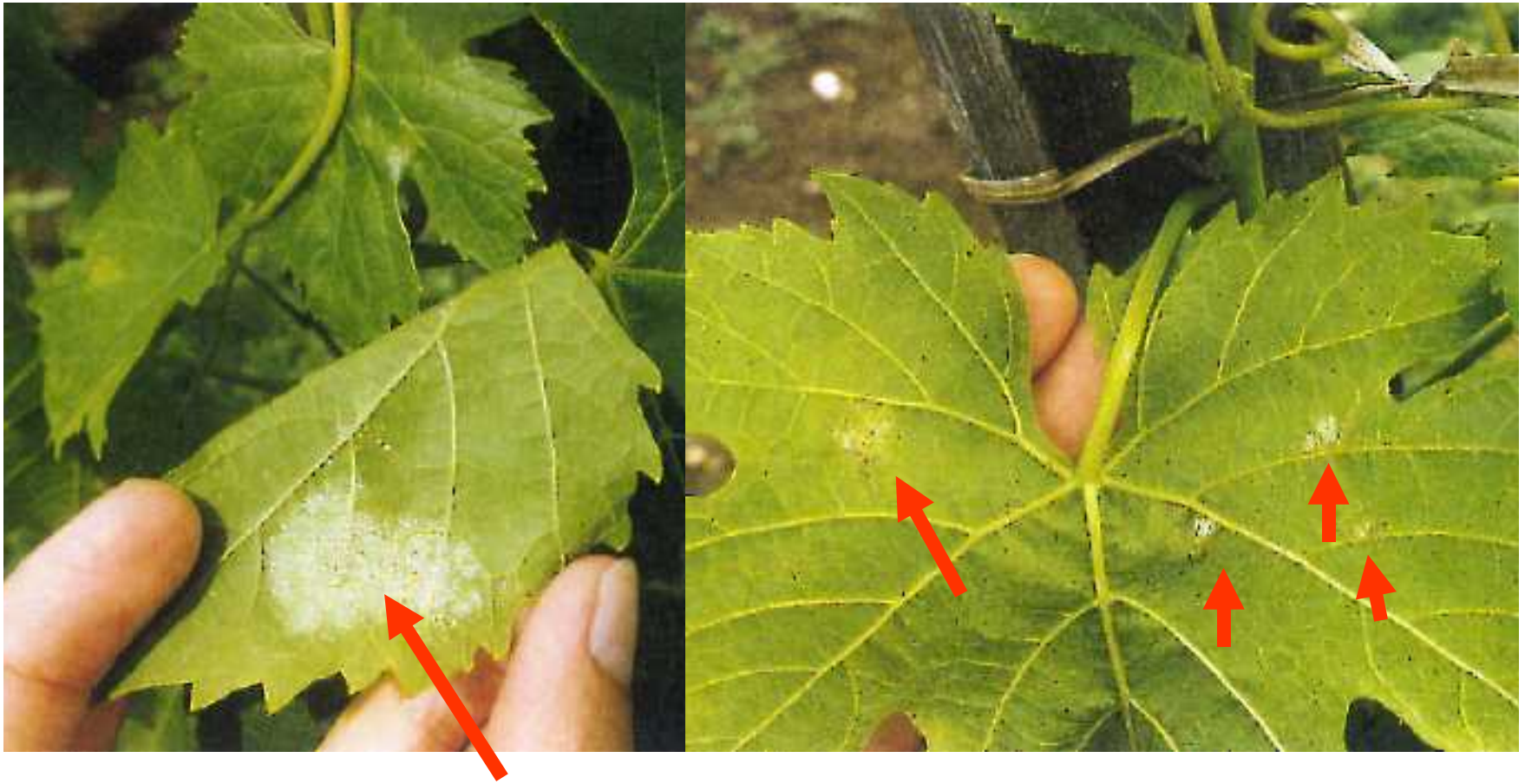
Walter Schmidt, 2009

KWS

Induced resistance (e.g. **grapevine, downy mildew, *Plasmopara viticola***)

Control

PEN (natural elicitor)



High priority topics_

- Innovative forms of mixed farming for optimized use of energy and nutrients.
- Improved use of ecological support functions for resilient low external input and organic crop production.

Thematic area 3:
Food for health and well-being

- Development of quality testing methodology to assess food quality from an organic point of view, of standards and of connected references.
- Processing with care – Development of gentle processing technologies to maintain and improve ‘organic food quality’.
- Effect studies on health and well-being in humans consuming organic food in comparison to foods of different qualities.

Strategic Research Agenda :
Horizontal objectives

- Organic agriculture and climate change

- Water Management

- Problem of loss of biodiversity

<u>High priority topic:</u>

- Minimising the climate footprint through improved soil management

Ecosystem Services Sustain Agricultural Productivity and Resilience

Ecosystem services are defined as "the benefits provided by ecosystems to humans". Many key ecosystem services provided by biodiversity, such as nutrient cycling, pest regulation and pollination, sustain agricultural productivity. Promoting the healthy functioning of ecosystems ensures the resilience of agriculture as it intensifies to meet the stress of growing demands for food production. Climate change and other stresses have the potential to make major impacts on key functions, such as pollination and pest regulation services. Learning to strengthen the ecosystem linkages that promote resilience and to mitigate the forces that impede the ability of agro-ecosystems to deliver goods and services remains an important challenge.

Resource use efficiency (DOK trial, 28 years)

Parameter	Unit	Organic farming	Integrated farming (IP) with FYM	Organic in % of IP
Nutrient input	kg N_{total} ha^{-1} yr^{-1}	101	157	64 %
	kg N_{min} ha^{-1} yr^{-1}	34	112	30 %
	kg P ha^{-1} yr^{-1}	25	40	62 %
	kg K ha^{-1} yr^{-1}	162	254	64 %
Pesticides applied	kg ha^{-1} yr^{-1}	1.5	42	4 %
Fuel use	l ha^{-1} yr^{-1}	808	924	87 %
Total yield output for 28 years	%	83	100	83 %
Soil microbial biomass „output“	tons ha^{-1}	40	24	167 %

Mäder, Fliessbach, Dubois, Fried, Niggli (2002), *Science 296*

Thanks for your attention

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