Agroecology and the future of organic farming in Europe: Organic-PLUS

V International Conference on organic farming in Belarus
Organic and Sustainable Agriculture: Meeting the Global Challenges
22 February 2018 – Minsk, Belarus

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Quick History
garden organic!

Our vision: ‘a healthy sustainable world that has embraced organic growing’ -

Nuestra visión: ‘Un mundo saludable que ha adoptado el cultivo ecológico’

HDRA 1954

Founded over 60 years ago as Henry Doubleday Research Association (HDRA), a charity for research, education, empowering people to grow -

Fundado hace 60 años como Henry Doubleday Research Association (HDRA) una asociación sin ánimo de lucro para la investigación, educación y empoderamiento de las comunidades hacia el cultivo

Garden Organic Ryton,
Coventry, Warwickshire CV8 3LG, UK

www.gardenorganic.org.uk

Registered charity no 298104 Garden Organic is the working name of the Henry Doubleday Research Association.
University Centre for Agroecology, Water & Resilience = CAWR
CAWR’s five research lenses to understand and develop resilient food and water systems

- Community Self-Organization for Resilience
- Resilient food and water systems in practice
- Fundamental resilience processes & dynamics
- Policies & Institutions for resilient systems
- <............. Peoples’ Knowledge and Transdisciplinarity ............>
Policy influence

The UN High Level Panel of Experts on Food Security and Nutrition (HLPE)

- The HLPE is the science-policy interface of UN Committee on World Food Security (CFS)

- HLPE Reports serve as THE starting point of discussions and negotiations in CFS

- Policy recommendations and strategic advice to world governments and international community
Largest Research Centre in the world doing transdisciplinary research on the links between agroecology and food systems
Framing the discussion
How much will the world's population rise by?

UN and Deutsche Bank's population projections compared

![Graph showing population projections](source)

Source: UN and Deutsche Bank

Sanjeev Sanyal, global strategist Deutsche Bank

UN versus Sanjeev Sanyal (DB)
Mainstreaming Agroecology
Mainstreaming Agroecology: Implications for Global Food and Farming Systems

Discussion Paper

Foreword by HRH the Prince of Wales
Definitions and scope of Agroecology

- Agroecology is “the application of ecological science to the study, design, and management of sustainable agriculture” (Altieri, 1995)

- Agroecology: the ecology of food systems (Francis et al, 2003)

- Agroecology as a science, a movement and a practice (Wezel et al, 2009)
Agroecology and Different Scales

Scale/dimension

Urban Agroecology
Political Agroecology

Farm, agroecosystem

Plot, field

Time

1930s 1940s 1950s 1960s 1970s 1980s 1990s 2000s

Crop protection/pest management, crop production/management
Agronomy, zoology, ecology, crop physiology

Agroecosystem analysis/management, land use zoning
Agronomy, ecology, geography

Agroecosystem management, sustainability/biodiversity, rural development
Sociology, geography, socio-economy

Source: Wezel and Soldat (2009) A quantitative and qualitative historical analysis of the scientific discipline of agroecology
Agroecological principles

• Adapting to the local environment - its constraints and opportunities
• Creating favorable soil conditions for plant growth and recycling nutrients
• Diversifying species, crop varieties and livestock breeds in the agroecosystem
Agroecological principles

- Enhancing biological interactions and productivity throughout the system
Agroecological principles

• Minimising soil and water losses

• Minimising the use of non-renewable external resources and inputs
Agroecology at crossroads

Dominant agri-food model

- Agroecology as part of Sustainable Intensification and Climate Smart Agriculture (e.g. GMOs)
- Emphasis on natural science
- Conforms to productivist model

Food sovereignty and other possible worlds

- Agroecology as a science, practice and social movement
- Emphasis on peasant agroecology as part of food sovereignty
- Transformation of dominant agri-food regime
International Forum for Agroecology
Nyéléni Center, Sélingué, Mali
24-27 February 2015
Agroecology as Food Sovereignty includes:

- the right of peoples to define their own food and agriculture policies
- rights of access and control over land, water, seeds, livestock breeds, territories
- ecologically sustainable production and harvesting, artisanal fisheries based on bio-cultural diversity
- right to protect and regulate domestic agricultural production and trade
Global industrial food system

- **Concentration**: just 6 companies control 70% of global commercial market for seed; 4 companies control 72% of pesticide market

- **Control & regulation**: by specifying the rules that govern food systems, monopolistic networks control people & resources

- **Squeeze & dependency**: cost–price squeeze for farmers and consumer dependency of supermarkets

=> *High social costs*
A shift from linear to circular economy
French inter-ministerial study: *Départs précoces en agriculture. Analyse d’une situation peu connue* (ASP, 2016)

- 10 000 farmers *per* year leave farming before reaching retirement age – i.e. one third of total number of farmers who quit farming every year
- Young people unable to enter farming or find it hard to do so
- Retired farmers receive a very small pension
A decline in the number of farmers and farms in the EU

• number of farmers is decreasing every year by about 2%, - with more than 8% decrease in the Czech Republic, Hungary, Poland, Slovenia, Slovakia and the UK

• only 6% of farmers are under the age of 35 across the EU, and 34% of all farmers are over 65 years old (CEJA, 2011)

• as farmers and farms have declined in numbers, land and capital is concentrated into larger and larger farm holdings e.g. in Germany the average farm size has increased from 10 to 40 hectares in the last 40 years
Transforming agricultural research

Democratising science and technology research, with more funds for public research
Agroecology contributes
Our research - examples:

UK Farming systems research
Defra project OF0386: ‘To produce methodology for assessing the environmental, economic and social characteristics of (organic and non-organic) farming systems’ - ‘Producción de metodologías de evaluación de las características medioambientales, económicas y sociales de sistemas de producción (ecológicos y no ecológicos)’

www2.warwick.ac.uk/fac/sci/lifesci/wcc/research/impact/farmingsystems

Project Duration 2009 to 2013 (Duración del Proyecto 2009-2013)

Project partners (socios participantes)

1. University of Warwick, Coventry
2. CCRI (The Countryside and Community Research Institute), University of Gloucestershire
3. Cranfield University, Cranfield
4. Garden Organic, Coventry
5. The Organic Research Centre Elm Farm, Berkshire
6. SRUC (Scotland's Rural University College)
Our research - examples:

Fertility building in organic systems
Fertility building crops

- Evaluation of species for growing as leys and short term winter or summer green manures
- Mineralisation patterns after incorporation and integration into rotations
- Computer modelling to aid farmer decision making
Use of compost and digestate

- Use of green waste compost in agriculture
- Methods for assessing the stability of compost
- Food waste anaerobic digestate – its use to promote energy crop production on brownfield sites
Members’ Experiments
(Citizen Science)
Members’ experiment topics

Per year 200 members and locations across the UK:
• Novel crops: Shark’s fin melon, Mango ginger, Tree spinach, Quinoa, Chickpeas
• Blight resistant tomato varieties
• Comparing old and new varieties of peas, tomato and lettuce
• Evaluating Russian comfrey
• The potential of winter salads
• Edible flowers
• The ecological footprint of gardens and allotments
Food growing for Health and Wellbeing
Growing Health
Food growing for health and wellbeing
Growing Health Project

- 2-year trust funded project
- Document evidence and measure outcome (Social Return on Investment)
- Identify barriers and solutions
- Get community food growing routinely used for health outcomes
- ‘Crack the NHS’ (National Health Service)
Short Food Supply Chains
Short Food Supply Chains and Local Food Systems in the EU. A State of Play of their Socio-Economic Characteristics.

Authors: Maya Kneafsey, Laura Verve, Ulrich Schmutz, Balint Balazs, Liz Trenheid, Trish Ryder-Wood, Elisabeth Bos, Gemma Sutton, Matthew Blackett

Editors: Fabien Santini, Sergio Gomez y Paloma

2013

5 August 1888
an illegal act by a women together with her two children,
with fundamental, ongoing, consequences for local food systems worldwide
Our hero Bertha Benz: First shopping trip and petrol station

1888 a revolution → 2018 mainstream → 2088 ?
Urbanisation
Urban horticulture
Cuba, Latin America

Organoponicos – raised beds,
75% organic matter
25% soil
Urban horticulture
Seoul, South Korea, Asia
Growing in soil – ‘not an option’ (London, Europe)
Patchwork Farm
(in soil & out of soil)
London, Europe
New spaces

The Urban Gardner's favourite tool
Why urban horticulture needs to be organic

Globally, urban horticulture plays a key role within urban/peri-urban agriculture. Globally, the population with vegetarian/vegan and meat exclusive (pig, beef) diets is growing faster.

=> Large demand for certification but clear differentiation to non-organic systems needed e.g. hydroponics or using synthetic fertilisers and pesticides within cities

Delivers fully to organic objectives and principles of Health (soil, plant, people), Ecology (ecosystems and recycling), Fairness (sharing and efficient use of resources, consumer interaction) and Care (social health and wellbeing outputs)
Organic standards for EU urban horticulture

Clear and robust rules for urban organic substrates
(as for organic mushrooms)

- biological active ecosystem, nutrient delivered through microbial activity

- conventional inputs currently allowed in organic are excluded:
  No conventional straw (pesticides, GM-feed)
  No conventional manure from any system (veterinary residues, herbicides)
  No peat (fossil fuel, carbon, damage to natural environment)

- green waste, food waste, home compost & digestate from biogas allowed
The way forward in the EU and Europe

Urban agriculture is not a niche and it’s important to include it into certified organic standards for EU greenhouse production.

Land, across the world, where ‘growing in soil is not an option’ should not be lost to organic production.

In cases where growing in substrate is necessary, it can be inspected and certified as strictly as any other production system (as done for organic mushrooms)

EU organic standards to include novel organic certification systems already successfully used outside Europe (group certification, participatory guarantee schemes, self-declaration of small-holders)
BioGreenhouse
Horizon 2020, EU COST, FA1105, 4 year 2012-2016, €0.7million

5 WGs

27 COST countries (300+ experts)
EU, Switzerland, Serbia, Turkey, Israel, Jordan, Egypt, Canada...

Lead: Rob Meijer, Wageningen University, Netherlands

WG lead: Sustainability and standards, Garden Organic -> CAWR
Building collaboration

2008 Modena: 16th IFOAM Congress

2009 Cologne

2010 Bleiswijk 1st Symposium
Working groups

WG1: Robust planting material

WG2: Soil fertility, suppressiveness and water management

WG3: Plant Health

WG4: Energy saving and climate neutral production

WG5: Sustainability and standards

The diagram illustrates the overlap and integration of different working groups focused on various aspects of sustainability and plant health.
BioGreenhouse - Definitions: Polytunnel, high, unheated

Figure 1.2 Polytunnels, either permanently covered (left) or with removable covers (right).

Figure 1.3 Temporary field coverings, either supported on hoops (left) or loose (right).
Variety trials - participatory plant breeding

*Figure 3.1* Left, a lettuce variety trial; Right, evaluation of radish characteristics.
Green manure in greenhouses

Figure 3.4 Green manures: Red clover (left) and Sudan grass and brown mustard being mown in a polytunnel in Switzerland (right, picture by Agroscope Conthey, Switzerland).
Biodiversity inside and outside the greenhouses

*Figure 3.6* Left, a border of host plants for beneficial insects; Right, sampling insects using a vacuum collector.
Main crops: Tomato

Figure 4.1 Tomato crop trials in Estonia.
Main crops: Salads

Figure 4.14 A lettuce variety trial in Austria.
Perennial crops: soft-fruit strawberry and raspberry

Figure 4.22 Strawberry production, on the right showing the use of raised mulched beds in England.

Figure 4.23 Raspberry fruit (left) and commercial production in polytunnels in Scotland (right).
Perennial crops: top-fruit trees papaya and mango

Figure 4.24 Papaya fruit (left) and commercial production in polytunnels in Spain (right).

Figure 4.26 Mango experiments, in a greenhouse
Impact

Sustainability assessment
Tools described

Life Cycle Assessment (LCA) and **Social-LCA**

**Social Impact Assessment (SIA)**

**Social Return on Investment (SROI)**

**SMART - Sustainability monitoring and assessment routines**

**Public Goods tool**

**Ecological and Carbon footprint calculators**
Thank you from Estonia
Organic-PLUS
International Advisory Board

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Organic-PLUS

Numbers:
4 years, 4.1m Euro, 11 Universities, 14 other research & NGOs, 9 EU, 3 associated countries, > 50 supporting SMEs, NGOs
“The overall aim of the ‘Organic-PLUS project’ is to provide high-quality, trans-disciplinary, scientifically informed decision support to help all actors in the organic sector, including national and regional policy makers, to reach the next level of Europe’s organic success story.”

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Organic-PLUS

WP2 ‘IMPACT’
Public view of contentious inputs, Dissemination, Citizen juries, Organic standards & policies

WP3 ‘PLANT’
‘Zero-Cu’ Mediterranean crops & potatoes
MINERAL Oils

WP4 ‘LIVESTOCK’
SYNTHETIC VITAMINS
HORMONS
‘Agroforestry’ BEDDING

WP5 ‘SOIL’
‘VEGAN’ fertilisers
PEAT
PLASTIC

WP6 ‘MODEL’
Socio-economics models, LCA, phase-outs scenarios

WP1 ‘LEAD’
International and Industry Advisory Boards

WP4 ‘LIVESTOCK’
SYNTHETIC VITAMINS
HORMONS
‘Agroforestry’ BEDDING

WP5 ‘SOIL’
‘VEGAN’ fertilisers
PEAT
PLASTIC

WP6 ‘MODEL’
Socio-economics models, LCA, phase-outs scenarios
Research done to advance the TRL (Technology Readiness Level)

<table>
<thead>
<tr>
<th>Innovations to replace or minimise contentious inputs in organic</th>
<th>Technology readiness level (TRL)</th>
<th>Research done</th>
<th>Impact org.</th>
<th>Impact conv.</th>
<th>WP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TRL 1 2 3 4 5 6 7 8 9</td>
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<tr>
<td>System solutions for minimising Cu in potatoes and other field crops</td>
<td>7</td>
<td>on-farm trials</td>
<td>o</td>
<td>c</td>
<td>2, 3, 6</td>
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<tr>
<td>Cu alternatives for greenhouse crops (tomato, aubergine)</td>
<td>6</td>
<td>replicated and greenhouse trials</td>
<td>o</td>
<td>c</td>
<td>2, 3, 6</td>
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<td>Cu alternatives for Mediterranean tree crops (olives and citrus)</td>
<td>6</td>
<td>on-farm trials</td>
<td>o</td>
<td>c</td>
<td>2, 3, 6</td>
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<tr>
<td>Phase-out of mineral oils in plant protection and seeding production</td>
<td>7-8</td>
<td>on-farm trials</td>
<td>o</td>
<td>c</td>
<td>2, 3, 6</td>
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<tr>
<td>Phase-out of non-organic manure and straw into organic systems</td>
<td>9</td>
<td>only socio-economic and LCA modelling</td>
<td>o</td>
<td></td>
<td>2, 6</td>
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<tr>
<td>Anti-infective and immuno-stimulatory properties of plant molecules in organic dairy, beef, pig and poultry health and feed</td>
<td>5-6</td>
<td>replicated in-vitro and in-vivo trials, on-farm trials</td>
<td>o</td>
<td>c</td>
<td>2, 4, 6</td>
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<td>Agroforestry supply chain products for animal bedding (conventional straw replacement) and peat and plastic replacement</td>
<td>5-6</td>
<td>processing lab trials, on-farm trials</td>
<td>o</td>
<td>c</td>
<td>4, 5, 6</td>
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<tr>
<td>Animal-free fertiliser (vegan), peat growing media and plastic mulch replacement</td>
<td>6</td>
<td>replicated, nursery and on-farm trials</td>
<td>o</td>
<td>c</td>
<td>2, 5, 6</td>
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<tr>
<td>Average TRL</td>
<td>6.7</td>
<td>Tailor-made research to the innovation’s TRL: followed by socio-economic and LCA modelling</td>
<td>Impact delivered to organic and conventional systems</td>
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</table>
Cu alternatives for organic greenhouse & field crops: potatoes, tomatoes...
Cu alternatives for organic tree crops
Agroforestry products as straw alternatives
Antibiotics alternatives
Vegan: Animal manure alternatives
Green manures as vegan fertiliser
Liquid vegan organic fertilisers
Peat alternatives
Vegan, peat-free organic
Plastic mulch alternatives
Lets work together
Join Agroforestry research
thank you, please contact us

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