UNISECO

UNDERSTANDING & IMPROVING THE SUSTAINABILITY OF AGRO-ECOLOGICAL FARMING SYSTEMS IN THE EU

Governance and Sustainability Implications of Agro-ecological Transitions

Lessons and policy recommendations from case studies across Europe

SBD Conference, 20th May 2021

Gerald Schwarz
Thuenen Institute of Farm Economics

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Outline

- Analysing agro-ecological transitions in Europe:
  - Background and objectives
  - Main elements of UNISECO
  - Sustainability implications
  - Governance changes
  - Key lessons and recommendations

Background and Objectives

- Increasing attention in policy discussions and research funding on the role and contributions of **agro-ecological transitions** to address sustainability challenges and future strategies
  - Healthy food while maintaining productivity, increase soil fertility and biodiversity, and reduce the footprint of food production
- **European R&I partnership on agroecology living labs and research infrastructures**

- Scaling up agro-ecological approaches through the Partnership
- Contribution to reducing the use of pesticides, fertilisers and antimicrobials
- Future CAP and support for agroecology: Eco-schemes

Source: DG Agri 2021

Background and Objectives

Agro-ecological transitions to address key dilemma:

- How to produce sufficient amount of **public goods from agriculture** while having viable production of **private goods** securing economic and social sustainability on farm level, which is not too dependent on public funds?

Overarching objectives

- To strengthen the sustainability of European farming systems, through **co-constructing improved strategies and incentives for agro-ecological approaches.**

- To improve the knowledge base of agro-ecological farming in the EU **to inform future policies** at European, national and regional levels

Perspectives and scope of agroecology

- **Agroecology**
  - **Science:** focus on the ecology of agricultural systems considered as agroecosystems – evolved to the integration of research, education, action and change for sustainable food systems
  - **Practice:** application of ecological principles and processes to the design and management of agricultural systems
  - **Social Movement:** transformation of socio-economic as well as technical processes in agricultural and food systems
  - **Combined to a holistic approach:** transdisciplinary and participatory cutting across a wide range of scientific disciplines including ecological, agricultural, food, nutritional and social sciences
  - Transformation to sustainable **farming and food** systems
  - Focus on **local** / territorial level

Perspectives and scope of agroecology

- **Development of agroecological principles**
  - FAO's 10 elements of agroecology (FAO, 2018)
  - HLPE (2019) and Wezel et al. (2020): 13 principles, including:
    - Recycling, input reduction, soil health, animal health, biodiversity, synergies, economic diversification, **co-construction of knowledge**, social values and diets, fairness, connectivity, land and resource governance and participation
  - Substantial overlap with principles of organic farming (health, ecology, fairness, care)
  - Agroecological transitions: Recognising commonalities and building on experiences in organic farming

Agroecological transitions

Transformational

Incremental

Food system

Agroecosystem

Level 5 Build a new global food system based on participation, localness, fairness and justice

Level 4 Reconnect consumers and producers through the development of alternative food networks

Level 3 Redesign agroecosystems

Level 2 Substitute conventional inputs and practices with agroecological alternatives

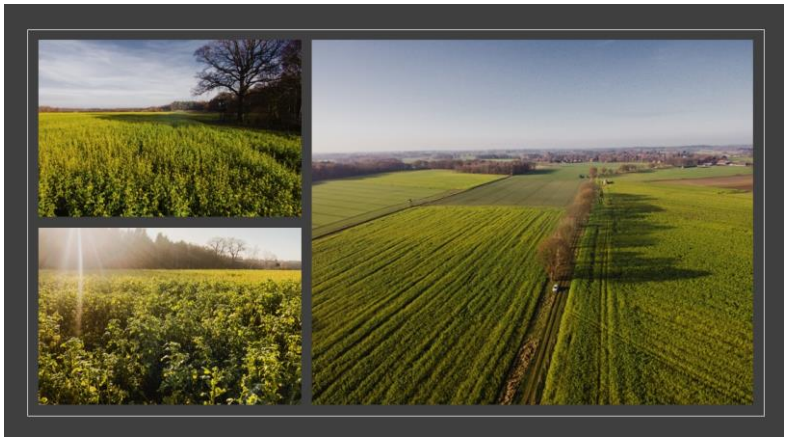
Level 1 Increase efficiency of input use and reduce use of costly, scarce or environmentally damaging inputs

Source: Wezel et al. (2020) based on Gliessman (2007)

Local context and diversity

Importance of the European diversity and local context for agro-ecological transitions, for example:

Small-scale farming in Transsylvania



Arable farming systems in Lower Saxony

More crops for human consumption, Sweden

Agro-ecological farming systems in Northern Spain

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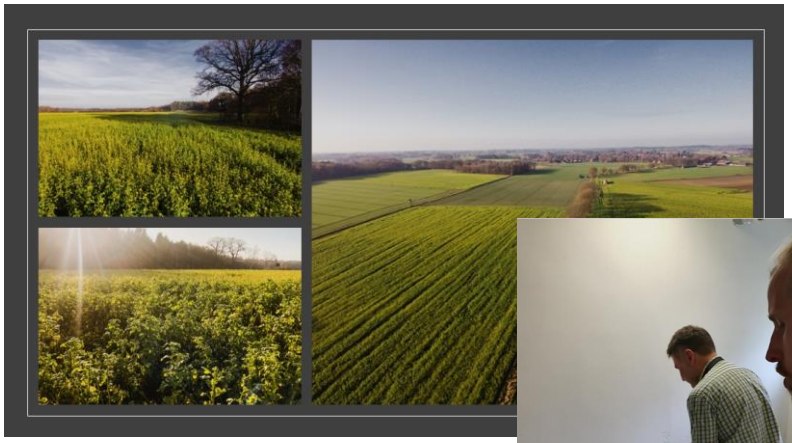

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Small scale dairy farmers and cheesemakers in Lithuania

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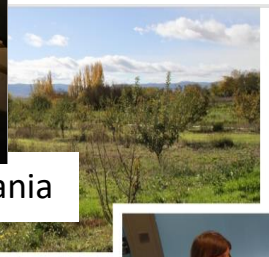

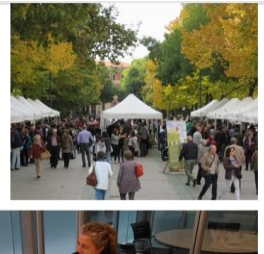

Agro-ecological farming systems in Northern Spain

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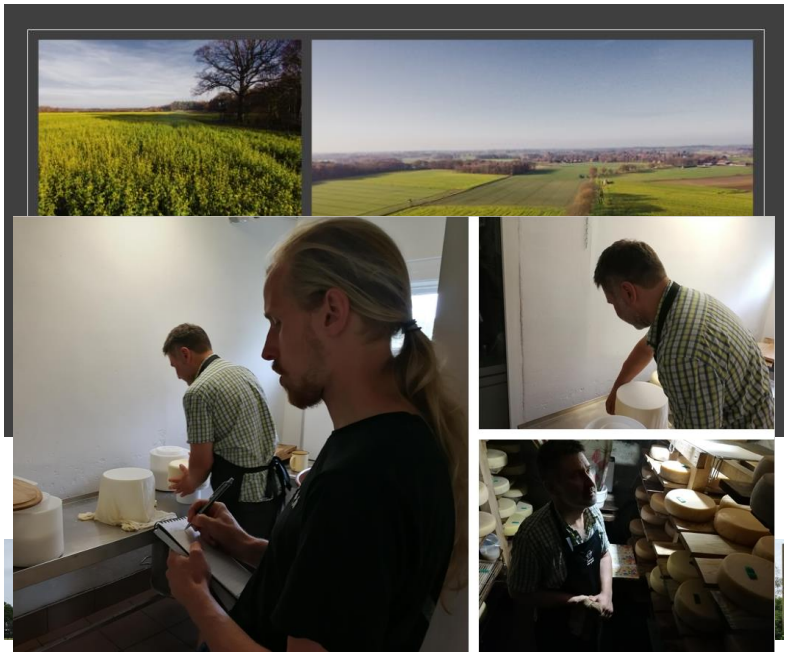
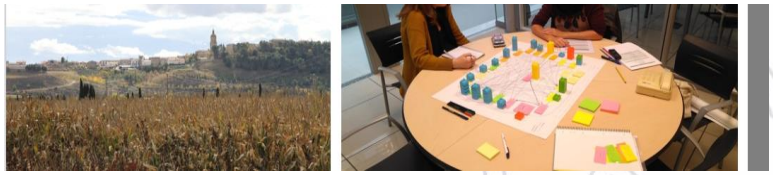


Small scale dairy farmers and cheesemakers in Lithuania

Promoting agro-ecological transitions, Biodistrict Chianti

More crops for human consumption, Sweden

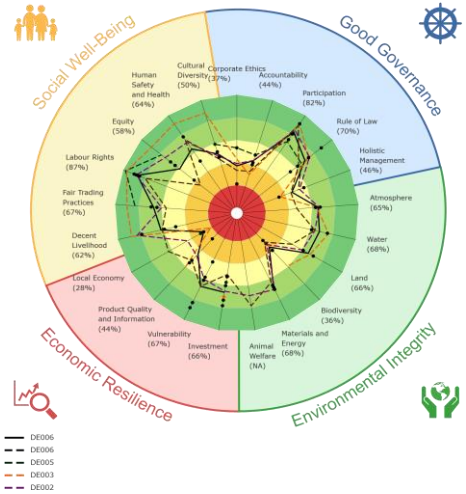


Agro-ecological farming systems in Northern Spain

Background and Objectives

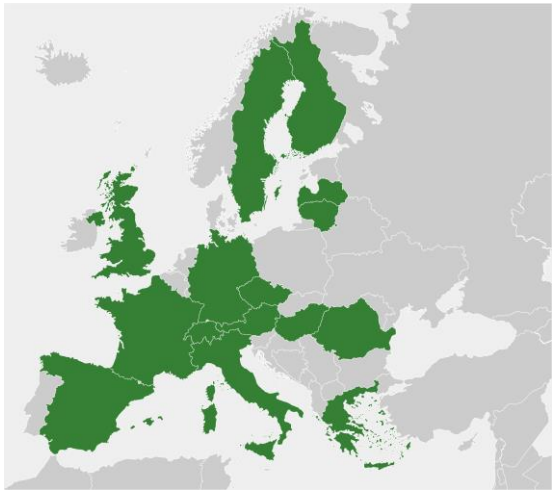
To address the key dilemma in these specific local contexts, there is a need for:

- Systems-based approach to understand barriers & drivers
- Multi-actor engagement with farmers, advisors, value chain actors, consumers, and policy makers
- Range of tools / methods for co-learning and assessment



Overview of UNISECO elements

- Setting-up, managing & monitoring **multi-actor platforms** to foster engagement and cooperation of key actors of agro-ecological farming systems (AEFS)
- Adapted **Social-ecological Systems (SES) framework** and **typology** for assessing transition pathways to agro-ecological farming systems
- Empirical data collection in **participatory case studies** and **co-construction** of knowledge, transition strategies and **market and policy incentives**
  - Understanding of barriers and drivers of transitions
  - Assessing sustainability performance and trade-offs
  - Lessons learnt for practice and policy



- **Biophysical and socio-economic modelling** and scenario development for assessing sustainability of AEFS **at territorial level**
- Development of a **UNISECO agro-ecological knowledge hub**

Sustainability implications

How to produce environmentally sustainable and be profitable at the same time?

→ UNISECO approached this key dilemma with a focus on *agro-ecological farming* in the 15 case studies

- from **two different sides of the core dilemma:**
  - Case studies with weak economic farm performance
  - Case studies with environmental issues (soil degradation, water pollution etc.)
- from the perspective of **various farm production types:** livestock, arable, mixed, perennial systems across Europe

Diversity of agro-ecological practices

Type of practice (based on Wezel et al., 2014)	Practices	Examples of case studies
Fertiliser management	Organic fertilisers, compost application, green manure	AT, CH, CZ, DE, ES, FI, FR, HU, IT, LV, SE, RO, UK
Weed, pest and disease control	Mechanical weeding, organic pesticides, mating disruption methods, pesticides application control	AT, CH, CZ, ES, FI, FR, GR, HU, IT, LV, RO, SE, UK
Livestock feed and grazing practices	Grass-fed livestock, grazing on temporary and permanent meadows	CH, LT, RO, SE
Tillage management	Soil conservation / reduced tillage	AT, CH, DE, HU, SE
Soil covering and management	Cover / catch-Crops, compost application, bio-char application, grass cover in vineyards, mulching	AT, CH, CZ, DE, FR, IT

Diversity of agro-ecological practices

Type of practice (based on Wezel et al., 2014)	Practices	Examples of case studies
Water management (including crop irrigation)	Drip irrigation	GR
Crop choices	Mixed and local / rare varieties	IT, SE
Crop spatial diversity	Agro-forestry (fruit production)	AT
Crop temporal diversity	Rotation including legumes	AT, CH
Livestock density	Reduced stocking rates	CH
Livestock diversity	Livestock integrated with other farm activity	ES, LV, RO, SE
Biodiversity	Buffer and flowering strips	CH, CZ, DE, HU, SE
Management landscape elements	Diverse and numerous semi-natural habitats	CH, ES, IT, SE, UK

Sustainability implications

- How do farms applying agro-ecological practices compare to their conventional counterparts with regard sustainability performance?
- Combination of three farm sustainability assessment tools:
  - SMART → Multi-criteria sustainability assessment
  - Cool Farm Tool → Greenhouse gas footprint calculation & multi-criteria biodiversity assessment
  - COMPAS → Economic analysis
- Detailed protocol for data collection and evaluation with several visits per farm

Sustainability implications

(n= 131 assessed farms)

- Agro-ecological farms tend to perform higher with regard to sustainability in:
  - Biodiversity (pesticides, fertilisers)
  - Water quality
- Less clear was the difference between agro-ecological and conventional farms:
  - Soil quality (impacted by many practices, soil condition, land use)
  - Productivity and farm income
- Agro-ecological practices can decrease GHG emissions on a farm.
  - Less N-fertilizer was reflected in lower GHG footprints per hectare
  - Lower pesticide use reduces GHG emissions
- But also increases in GHG emissions observed
  - E.g. through increased fuel use for mechanical weeding

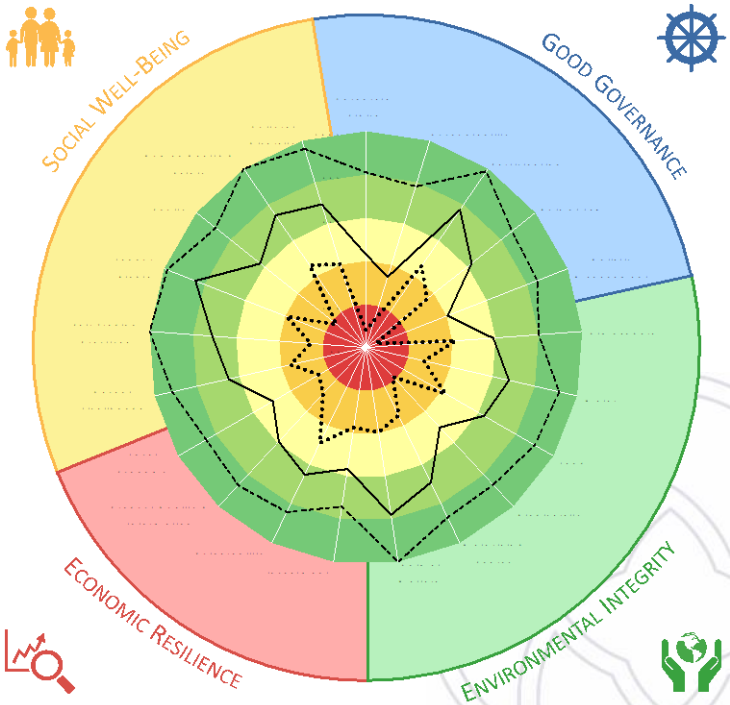
→Question of optimal combination of practices

Some room for improvement

- Biodiversity:
  - Larger semi-natural habits are often missing (median score 2%; on a scale 0% to 100%)
  - Targeted support for species is still not standard among farms (23% of agro-ecological farms; 33% of conventional farms)

- Soil quality:
  - Compost application rare

  (around 15% of farms)



Trade-offs and synergies

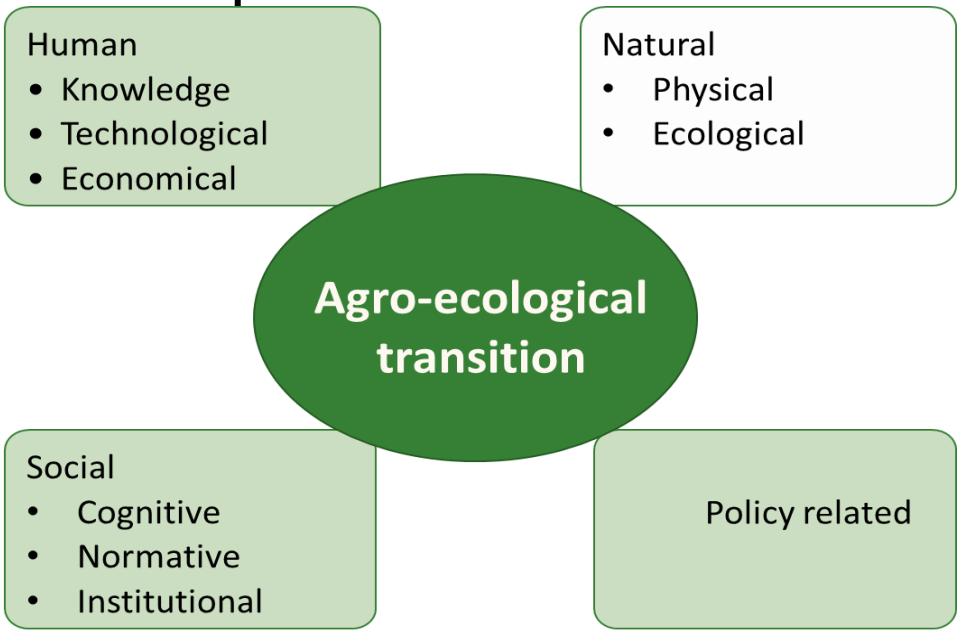
- Modelled introduction of new AE farming practices in SMART, Cool Farm Tool and COMPAS
- **Synergies**: inter-row green cover (IT, GR), inter-row cover in combination with 2D-canopy (GR), pest-monitoring (IT), diversification (SE)
- But quite some **economic trade-offs**:
  - Soil: Composting (IT; labour costs), reduced till, flower buffer strips and intercropping (DE; lower net farm income), reduced till (UK; contracted work)
  - Pesticides: No synthetic pesticides (FR; lower yield)
  - System level: Conversion to organic (RO; decrease in yield), extensification (CH; less farm income)

Co-constructing governance change

- What are key barriers and drivers hindering or facilitating agro-ecological transitions that need to be addressed?
- What **governance changes** are needed considering a multi-actor perspective?
  - Which actions to address the barriers can be done by whom, with whom and for whom?
  - How can these actors cooperate to facilitate the implementation of agro-ecological practices?
  - Which changes in market institutions and external policy related rules address the barriers and drivers?

Methodological approach

- Social-Network Analysis and Multi-Criteria Assessments
- Semi-structured interviews and 4 sets of workshops in each case study to co-construct strategies in local contexts
- Types of actors: Farmers, AKIS, value chain, authority and administration, rural community, NGOs
- Classification and scope of barriers and drivers:



Adapted based Jones and Boyd (2011) and Gruere and Wreford (2017)

Results

- Identified more than 100 key barriers across seven main types of barriers
- Focus on socio-economic and policy factors, which local actors can address
- Three main themes of barriers and drivers and proposed actions emerged:

1) Knowledge and social capital

2) Added value and market access

3) Policy design

Knowledge and social capital

Barriers

- Lack of specific knowledge on agro-ecological practices and market opportunities
- Attitudes towards agro-ecological farming and strong tradition in conventional practices
- Limited willingness to cooperate
- Farmers fatigue (especially small farmers)

Drivers

- Sharing of experience and information between farmers in some cases.

Knowledge and social capital

Governance changes proposed in strategies

Internal to social-ecological system studied – initiated by SES actors
Creation of formal and informal networks for knowledge transfer and sharing
Farmers agree on hiring advisors, attracting research/education actors (e.g. for open days and strategic discussions)
Cooperation of actors to create digital hub for knowledge exchange.
Piloting new technologies on demonstration farms.
Cooperation of advanced farmers with educational institutions

External to social-ecological system studied
Local authorities coordinating education and raising awareness of landowners.
Policy support for creation of networks and capacity building in cooperation
Support for better targeted advisory service (e.g. to facilitating cooperation, lacking knowledge transfer, using demonstration farms, platforms).
Support to farmers for better access to advisory services to address knowledge gaps.
Pilot testing instruments to foster farmer and non-farmer actors cooperation.

Knowledge and social capital

Challenge	Policy recommendations
Raising **awareness** on agroecological practices	➢ Facilitating access to advisory services for small farms
Empowering **entrepreneurship**	➢ Information, skills and training aimed at food-system re-design ➢ Covering market/legal issues
Strengthening **partnerships** and collective projects	➢ Targeted interventions for intermediate institutions (e.g., Bio-districts) ➢ Empowerment of RDP Cooperation measures (e.g., pilot food chain projects)

Added value and market access

Barriers

- Cost-price squeeze, market saturation and sales uncertainty
- Investments needs – difficult to afford technology.
- Access to land
- Low awareness of consumers
- Markets not mature
- Lack of storing and processing facilities

Drivers

- Similar initiatives to learn from, slow demand growth

Added value and market access

Governance changes proposed in strategies

Internal to social-ecological system studied – initiated by SES actors
Collective processing, marketing, storage, machinery use and similar activities.
Initiate cooperation with all key value chain actors outside SES (e.g. processors)
Develop regional fairs as platforms and markets for niche products.
Create procurement platform for organic matter exchange and composting centre.
Creation of rural land associations to match supply and demand for land.

External to social-ecological system studied
Support for collective initiatives (e.g. marketing, processing)
Creation of cooperation platforms for different value chain actors including short value chains and supermarkets with secure and stable growing contracts
Green public procurement implementation – for agro-ecologically produced goods.
Support promotional campaigns and advertisements, regional labels/certification.
Support farm investment related to transition to agro-ecological farming.

Added value and market access

Challenge	Policy recommendations
Increasing **sustainability** in consumer markets	➢ Introduction of new voluntary certification schemes
Creating **awareness** among consumers and citizens	➢ Promotion of educational campaigns in schools and awareness campaigns through local media
Improving **public procurement** initiatives	➢ New and more ambitious standards in the catering contracts for public schools (e.g., local food, reducing food waste)

Policy design

Barriers

- Bureaucracy of policy support and unclear definitions and requirements of support
- Low differentiation of Pillar II support
- Milk cooperatives not allowed to sell to traders
- Low promotion of agro-ecological practices in protected areas

Drivers

- Increasing knowledge and experience with innovative contract design (e.g. cooperative, result-based, rental agreements).

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Policy design

Challenge	Policy recommendations
Simplification on the requirement for policy support	➢ Reducing bureaucracy ➢ Providing free access to advisory services to small farms
Improving **targeting** of policy support	➢ Better designing the support for AE practices (e.g. targeting to core practices / farm typologies)
Prioritization among different initiatives	➢ Prioritizing support for advisory services
Policy **coordination**	➢ Integrating support for investments, practices adoption and cooperation measures
Experimenting **innovative** instruments	➢ Result-based payments ➢ Eco-schemes targeted to AE practices

Key lessons

- Improving farmer **knowledge** on the benefits of agro-ecological practices and economic opportunities is a key aspect for successful agro-ecological transitions
- Important role of education - focus on **young generation and school programmes**
- Horizontal and vertical **collaboration in the value chain** are of crucial importance to address key barriers
- Tailored policy support to increase the capacity of local actors to create **agro-ecological networks and territories**
- Transformational change requires several interlinked strategic pathways addressing the **whole food system (farm to fork) – including changes in consumer preferences and diets**

Global Challenges

Tackling climate change

- Quantitative evidence from scenarios of agro-ecological on-farm practices compared to status quo shows reductions of **over 50% in GHG emissions are achievable**, albeit traded-off with increased costs and reduced farm income (e.g. c.5%)

Reducing loss of biodiversity

- Qualitative and quantitative evidence of agro-ecological farm practices, and case study farm demonstrations shows **biodiversity gains**

Convention on Biological Diversity

Recommendations

- **Design mechanisms for inspiring and incentivising changes in farm level practices at relevant levels of governance**
- **Enhance knowledge and skills through increased access to tailored advice, awareness raising and finance**

See: Landert *et al.*, 2021. Key barriers of AEFS in Europe and co-constructed strategies to overcome them. Deliverable D3.4, UNISECO.

Social Rights

UNISECO findings give insight to the potential for agro-ecological farming systems and farm practices to contribute to European Pillar of Social Rights

EPSR

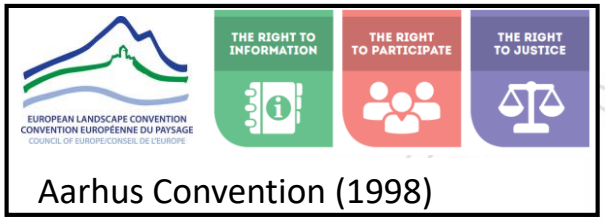
Social dialogue, health and safety

- On-farm - farmers applying new practices and standards
- Off-farm, local system – responsibilities of all actors in farming & food systems becoming climate neutral, reverse biodiversity loss

EPSR

Respect rights of all actors in just transitions to farming systems

- Ensuring no actors are left behind in just transitions to new practices and structure of farming and food systems



Landert *et al.*, 2019. Report on Environmental, Economic and Social Performance of Current AEFS, and Comparison to Conventional Baseline. Deliverable 3.1, UNISECO, 235pp

Education, Learning and Training

UNISECO findings reveal the importance of advice, research, innovation and training in the social networks of farming systems, delivering to SDG 4 on education and life-long learning

EPSR

Education, training and life-long learning

- On-farm – Peer-to-peer learning
- Actor-led knowledge and innovation – Up-skilling and active sharing of place-based knowledge
- In-school – Principles of food production, agricultural practices, social responsibility

SDG 4

Recommendations

- **Include principles and practices of agro-ecology in school curricula, continuing professional development, and citizen focused learning**
- **Increase the capacity of local actors to create agro-ecological networks, and cooperation with schools through public learning and procurement programmes**

Vanni *et al.*, 2019. Governance Networks Supporting Agro-Ecological Farming Systems. D5.2, UNISECO, 66pp
Galioto *et al.*, in press. Innovative market and policy instruments to promote the agro-ecological transition strategies, D5.4

Contact

Thank you for your attention.

Contact and information:

Gerald Schwarz: gerald.schwarz@thuenen.de

Website: https://uniseco-project.eu/

Zenodo: https://zenodo.org/communities/uniseco-h2020/?page=1&size=20

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