Agroecology and agro-food systems diversification

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Over the last several decades, agriculture in industrialised countries experienced a significant **intensification** and progressive **specialization**

- diffusion of mechanization
- use of genetically improved genotypes
- large-scale use of off-farm inputs (i.e. fossil fuel energy and synthetic fertilizers and pesticides)
- supply chains models based on large volumes and efficient long-distance logistics

The **reduction of diversity** at the in-field, in-farm and territory scale due to the low number of crops, the shortening of crop rotations and the reduced number of cultivated genotypes is becoming evident in many agro-environments in developed countries.

(Ratnadass et al., 2012)
Intensive and specialised systems have been acknowledged to have:

1. environmental impact (negative externalities);
2. limited ability to cope with the main challenges our society is facing (i.e. climate change adaptation and mitigation; losses of natural resources as biodiversity and soil);
3. limited ability to guarantee the fair distribution of value along the supply chain;
4. not perceived by consumers as able to produce quality food, to promote/protect landscapes and cultural heritage of rural areas

(IPes Food Report, 2016)

These constrains are fostering the debate within the civil society and are pushing public authorities to consider the challenges involved in promoting more social and environmental performing *agriculture models based on diversification and agro-ecologically sound approaches.*

(Altieri, 1995)
La ricerca italiana per l'agricoltura biologica e biodinamica: una visione di insieme

Roma, 20-21 gennaio 2016
In order to promote diversification, food systems need to be re-designed from farm to fork (upstream and downstream)

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<tr>
<th>Obstacles</th>
<th>Levers</th>
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<td>(i) shortage of technical references concerning minor crops</td>
<td>(i) coordination among the different actors in the supply chains/networks</td>
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<td>(ii) genetic progress is rapid only for the &quot;major crops&quot;</td>
<td>(ii) promotion of new market outlets (i.e. public procurement)</td>
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<td>(iii) lack of minor crop protection solutions</td>
<td>(iii) identification and support of innovation niches for diversification of farming systems and supply chains</td>
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<td>(iv) competition with &quot;major crops&quot; on the raw material market</td>
<td>(iv) Involvement of R&amp;D and advisory systems in diversification</td>
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<td>(v) lack of coordination among the different actors in the supply chains/networks</td>
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Meynard et al., 2013
Institutional innovation

Critical transition zone (vulnerability)

Input substitution

Current systems

Eco-efficiency

Consumer drive

Regulations

Systems re-design

Co-evolution of social movements

Territorial development

Agro-ecological landscapes & food systems

Technological innovation

Current Opinion in Environmental Sustainability

Tittonel, 2014
Agroecological strategies and techniques to foster diversification at farm scale

- Diversified rotation (crop choice, crop spatial distribution, and crop temporal succession)
- Agroecological Service Crops (i.e. fertility building crops, cover crops, etc.)
- Intercropping and/or strip cropping
- Ecological infrastructures and corridors
- Genotypic diversification (minor crops; local and/or non-DUS genotypes)
- No till and/or minimun tillage seeding and planting
- Off farm inputs reduction (fertilisers, plant protection products, fossil energy)
CREA MOVE LTE (established in 2001 – summer view)
CREA MOVE LTE (established in 2001 – winter view)
No till tomato transplanted on vetch mulch
No till zucchini transplanted on barley mulch
No till lettuce transplanted on rafanus mulch
Artichoke – field pea intercropping
Living mulches for weed control and nitrate leaching mitigation
Horizon 2020

Food Security, Sustainable Agriculture and Forestry, Maritime and Inland Water Research and the Bioeconomy

DiverIMPACTS
Diversification through Rotation, Intercropping, Multiple Cropping, Promoted by Actors and Value Chains towards Sustainability

Call: Rural Renaissance - Fostering innovation and business opportunities
Topics: RUR-06-2016: Crop diversification systems for the delivery of food, feed, industrial products and ecosystems services - from farm benefits to value-chain organisation
Coordinator: Dr. Antoine Messéan

The overall goal of DiverIMPACTS is to realise the full potential of crop diversification through rotation, intercropping and multiple cropping, promoted by actors and value chains towards sustainability, by demonstrating clear technical, economic and environmental benefits for farmers, value chains and society and by providing rural actors with those key enablers and innovations that remove existing barriers and ensure actual uptake of combined benefits at farm, value chain and territory levels.
32 partners
5 years
10 M€
Thank you!

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