Can agroecology help us achieve the SDGs?
Building the evidence and learning from diversity

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A QUICK OVERVIEW OF WHAT’S WRONG WITH OUR CURRENT FOOD SYSTEM
Food distribution: Energy supply (kcal/cap/day)

Source: FAO (2017) & Various historical sources
Note: Historical data for the USSR is highly uncertain – it likely gives an overestimate of caloric supply
Food distribution: Protein supply (g/cap/day)

Source: UN Food and Agriculture Organization (FAO)
Note: Data measures the availability delivered to households but does not necessarily indicate the quantity of protein actually consumed (food may be wasted at the consumer level).
Hunger is on the rise

Moderate and severe food insecurity affects 30% of the global population

Prevalence of undernourishment (percentage, left axis) - Number of undernourished (millions, right axis)

http://www.fao.org/3/cb4474en/online/cb4474en.html#chapter-2_1
And other forms of malnutrition are growing

GLOBAL DISTRIBUTION OF RISKS ASSOCIATED WITH MAIN AGRICULTURAL PRODUCTION SYSTEMS - A SCHEMATIC OVERVIEW

Source: THE STATE OF THE WORLD’S LAND AND WATER RESOURCES FOR FOOD AND AGRICULTURE
Important losses in agricultural biodiversity

Of the 250,000 plant species known to humankind:
- More than 30,000 plant species are edible
- About 7,000 have been used for food
- Some 120 are cultivated today
- 9 provide more than 75% of human food
- Only 3 provide more than 50% of human food

Food supply (kcal/capita/day)
FAOSTAT 2019

- Rice: 18%
- Wheat: 18%
- Sugar: 7%
- Maize: 6%
- Milk: 5%
- Maize: 6%
- Pigmeat: 4%
- Soyabean Oil: 3%
- Vegetables: 3%
- Poultry Meat: 2%
- Palm Oil: 2%
- Potatoes: 2%
- Cassava: 2%
- Eggs: 1%
- Bovine Meat: 1%
- Other foods (>70): 26%
- Food supply (kcal/capita/day)

- Rice: 18%
- Wheat: 18%
- Sugar: 7%
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Women work but have less access to resources

Share of agricultural landowners who are female
Share of female agricultural landowners among all landowners. Landowner are those that own land solely or jointly with someone inside or outside the household.

Women as share of agricultural workforce (%), 2016

Source: FAO Gender and Land Flights Database
Note: Note that due to poor data availability, the year of measurement varies between countries (while most countries are represented in 2010-11, some extend to 1993).
HOW CAN WE MAKE OUR FOOD SYSTEMS MORE SUSTAINABLE?

AGROECOLOGY, A TRANSFORMATIVE AND INNOVATIVE APPROACH
Agroecology, not only a science

Science (since the 30s)
- Ecology of the food system (Francis et al., 2003)
- Application of ecological concepts and principles to the design and management of sustainable food systems (Gliessman, 2007)
- Integration of research, education, action and change that brings sustainability to all parts of the food system (Gliessman, 2018)

Social movement (since the 80s)
- A solution to current challenges (CC, malnutrition...)
- By opposition to “industrial” model, build locally relevant food systems that strengthen the economic viability of rural areas based on short marketing chains, fair & safe food production.
- Smallholder food production and family farming, rural communities, food sovereignty, local knowledge, social justice, local identity and culture, indigenous rights for seeds/breeds (Altieri and Toledo, 2011; Rosset et al., 2011; Nyéléni, 2015).
- As a political movement: becoming increasingly prominent (Gonzalez de Molina, 2013; Toledo and Barrera-Bassols, 2017).

Practices (since the 60s)
Aiming at improving agroecosystems by harnessing natural processes, creating beneficial biological interactions and synergies among their components (Gliessman, ed, 1990) and using, in the best way, ecological processes and ecosystem services for the development and implementation of practices (Wezel et al., 2014).

Transition or transformation?

Institutional innovation

- Consumer drive
- Regulations
- Eco-efficiency
- Current systems
- Optimisation

Critical transition zone (vulnerability)

- Input substitution
- Systems re-design
- Co-evolution of social organisations
- Territorial development

Agro-ecological landscapes & food systems

Technical innovation

Sources: Tittonell, 2017
From the 2nd International Symposium on agroecology (2018)
• Political and social dimensions of food production: smallholders and marginalised population, redistribution of added value, working conditions, women, local markets...

• Difficulty in providing labels/certifications: convergence or not with organic agriculture, lessons to be learnt for agroecological labels

• Can agroecology feed the world? Increase in production and productivity (food supply) vs system design/inequalities (utilisation and access). Moreover, agroecology doesn’t mean less productivity!

• Knowledge systems: the role of farmers, indigenous and local food producers, and systems approaches

• Knowledge gaps, because of funding (e.g. to diversification) and education. Focus is on yield gap (or lack thereof) and upscaling

• Consolidating the evidence: currently scattered and addressing one or two criteria (e.g. climate resilience and income)

Sources: HLPE (2019) and authors
What is roughly the agroecological focus in Europe?

- **Environment**: biodiversity, soil health, pollution, GHG emissions etc. Cf recent call for Horizon Europe on agroecology, climate change and biodiversity

- **Economic performances**: less documented, and less easy as long as there is no standard set of definitions/certifications (e.g. organic ag.)

- **Social performances**: while the body of work exists (e.g. labour in ag), it doesn’t really happen in the same circles as AE. Need for trans-disciplinarity and discussion about the meaning of “science”

- Opportunities with the living labs to integrate the various dimensions and at the same time work on harmonizing the approaches, methodologies and tools.
The 10 elements of agroecology proposed by FAO: the result of a global consultation with all stakeholders and a validation by member nations.

IN PRACTICE
BUILDING THE EVIDENCE AND LEARNING FROM DIVERSITY
A tool for sustainability assessment in agriculture that is using the 10 elements of agroecology for a diagnostic and producing evidence on multiple criteria

- Developed through a large consultative process led by FAO, based on existing evaluation frameworks, including SDGs
- Response to a mandate received by countries (COAG), using the 10 elements approved by countries and validated methodologies on sustainability criteria
- Stepwise approach with
  - analysis of enabling environment
  - diagnostic of the status (10 elements)
  - 10 quantitative criteria of performance
  - participative interpretation of results.
- Collects data at farm level, provides information and results at community and territorial level.

Belize and Dominica: Assessment of 100 farms (CARDI)

Guyana, Grenada, Ethiopia and Kyrgyzstan: FMM Enhancing Nutrition through Social Protection Programs

Mexico: Assessment of 100 farms in 2 regions (UNAM and GIRA)

Nicaragua: Assessment of 50 farms with farmers organizations

Venezuela: sampling size pending (SSP)

Argentina: Assessment 25 farms (INTA) and 60 farms (InSitu)

Mali and Burkina Faso: Baseline of GEF projects (>200 farms in each country)

Lesotho: Baseline of GEF project (IFAD)

France: Assessment of 30 farms (ISARA)

Poland: (SSP)

Macedonia: (SSP)

China: 50 farms (Community Supported Agriculture Alliance)

Lao PDR and Viet Nam: 200 farms (Ministries of Agriculture)

Cambodia: 230 farms (Louvain Cooperation and 9 local NGOs)

Uganda: (SSP)

Kenya: M&E in 30 farms (reNature)

Tanzania: 200 farms planned

Mozambique: Baseline assessment (SSP)

Zimbabwe: Monitor and Evaluation (SSP)

New Caledonia: 15 farms in EU PROTEGE project

COUNTRIES: by the end of 2021

REGIONS: by the end of 2021

Farms/households: by the end of 2021

UN official languages: 6

Other languages: 11

~4,000
Characterizing the level of agroecological transition of 200 farms in Lesotho
Results for all 10 criteria of performance in France (20 farms): social and environmental performances could be improved.

<table>
<thead>
<tr>
<th>Farm</th>
<th>Man land tenure score</th>
<th>Women land tenure</th>
<th>Productivity/ha</th>
<th>Productivity/par</th>
<th>Added value</th>
<th>Income</th>
<th>Exposure to pesticide</th>
<th>Dietary diversity</th>
<th>Women empowerment</th>
<th>Youth score</th>
<th>Soil health</th>
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</table>

More advanced agroecological farms in Lesotho (200) have better economic performances.
More advanced agroecological farms in Burkina Faso have better women’s empowerment and gender parity.

**Characterisation of Agroecological Transition (CAET)**

<table>
<thead>
<tr>
<th>Step</th>
<th>Non-agroecological farms</th>
<th>Incipient transition</th>
<th>In transition to agroecology</th>
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**Women Empowerment in Ag Index (WEAI)**

<table>
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<th>Non-agroecological farms</th>
<th>Incipient transition</th>
<th>In transition to agroecology</th>
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<td>Women Empowerment</td>
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<tr>
<td>Gender Parity Index</td>
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<tr>
<td>Decision making on production</td>
<td>29%</td>
<td>39%</td>
<td>37%</td>
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<tr>
<td>Perception of decision making</td>
<td>26%</td>
<td>31%</td>
<td>31%</td>
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<tr>
<td>Decision making on revenue</td>
<td>18%</td>
<td>22%</td>
<td>19%</td>
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<tr>
<td>Leadership</td>
<td>24%</td>
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<tr>
<td>Time burden</td>
<td>48%</td>
<td>58%</td>
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</table>

**STEP 1**

(aggregated CAET score on the 10 elements)
More advanced agroecological farms in Mali have higher youth empowerment in agriculture.

**Youth empowerment index per category of CAET**

- **Non-agro ecological** (red bar)
- **40-50** in transition to agroecology (yellow bar)
- **50-60** advanced agroecological (green bar)
- **60-70** in transition to agroecology (green bar)
- **70-80** advanced agroecological (green bar)

**Youth empowerment index per type of farms**

- **Diversified family farms (agroecological)**
- **Conventional farms**
- **Monoculture**
- **Diversified (agroecological)**

**STEP 1**

(aggregated CAET score on the 10 elements)
More advanced agroecological farms in Argentina have higher health and environmental performance (use of pesticides)

Pesticide score in Argentina (exposure, mitigation measure and use of alternative practices)
More advanced agroecological farms in Tanzania have higher environmental performances (soil health and agrobiodiversity).

**STEP 1** (aggregated CAET score on the 10 elements)

**Soil Health Index**

- **Districts**: Kagera, Kigoma
- **Area**:
  - 5
  - 10
  - 15
  - 20

**Agrobiodiversity score (%)**

- **Farm types**:
  - Beneficiary
  - Control
Conclusions

- Agroecology is a science, a set of practices and a social movement that can help transform our food systems to achieve the SDGs

- In practice, agroecology contributes to **minimize the trade offs** between the various dimensions of sustainability (cf social and evidence from TAPE in various countries)

- CFS policy recommendation 2: *Establish, improve and apply comprehensive performance measurement and monitoring frameworks [...]* including metrics and indicators such as TAPE

- The role of science is key, not so much for defining agroecology anymore but for measuring it, in an effort of harmonization. In addition: foster knowledge co-creation, knowledge sharing and colearning (CFS policy recom. 4)

- The role of governments remains decisive in providing policy instruments to farmers, but also to academia, especially monitoring systems and sharing information

- Some of the big opportunities: 1) harmonization, 2) the discussion about certification/standards, 3) a systems approach, and 4) the loaded discussion about what is "science"- not only agronomy, but also environmental science, social science, data science, economics, etc
THANK YOU!