A paradigm shift from industrial agriculture to diversified agroecological systems
From Uniformity to Diversity

A paradigm shift from industrial agriculture to diversified agroecological systems

The report asks three key questions:

• What are the outcomes of industrial agriculture / diversified agroecological systems?
• What is keeping industrial agriculture in place?
• How can the balance be shifted?
What is wrong with our food systems?

Triple burden of malnutrition
- Hunger, micronutrient deficiencies, obesity & NCDs

Environmentally unsustainable
- Biodiversity losses, water pollution, soil degradation, GHG emissions, unsustainable use of natural resources, low resilience ...

Social inequities
- Poverty, disempowerment ...

Neglect of cultural values
- Directly associated with current food systems based on industrial agriculture
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What benefits diversified agroecological systems can bring

- **Economic**
  - Productivity and income
  - Resilience and stability
- **Environmental**
  - Ecosystem services
  - Biodiversity
- **Health**: better nutrition and healthy environment
- **Social**: Employment
- **Cultural**: respect for cultural preferences
Outcomes of diversified agroecological systems: productivity

THE PRODUCTIVITY OF DIVERSIFIED GRASSLAND SYSTEMS

- Conventional: 100
- Organic in Developing: 180
- Organic in industrialized: 92

1. Data from Preto et al, 2015
2. Data from Cardinale et al, 2008
Outcomes of diversified agroecological systems: productivity & resilience

PRODUCTIVITY AND RESILIENCE IN ORGANIC FARMING SYSTEMS

<table>
<thead>
<tr>
<th>30 YEAR AVERAGE YIELDS OF MAIZE &amp; SOYBEAN</th>
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<tbody>
<tr>
<td>CONVENTIONAL</td>
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<td>ORGANIC = EQUIVALENT</td>
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<tr>
<th>MAIZE YIELDS IN DROUGHT YEARS</th>
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<td>CONVENTIONAL</td>
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<td>GM + 6.7% -13.3%</td>
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<td>ORGANIC + 31%</td>
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Data from Rodale Institute, 2015

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Environmental outcomes

- Keep/put carbon in the soil: turns agriculture into a solution rather than a problem
- Restore degraded land
- Improve ecosystem services
  - Water and nutrient cycling
  - Pollination
- Pest and disease management
Outcomes of diversified agroecological systems: boosting biodiversity

BooSTING BIODIVERSITY IN ALTERNATIVE SYSTEMS

NET WILD BIODIVERSITY EFFECTS ON GRASSLANDS:
- MONOCULTURE
- MULTISPECIES ASSEMBLAGES + 15%

META-ANALYSIS OF BIODIVERSITY IMPACTS OF ORGANIC AGRICULTURE:
- CONVENTIONAL
- ORGANIC +30% SPECIES RICHNESS
- ORGANIC +50% ABUNDANCE OF ORGANISMS

1. Data from Prieto et al., 2015
2. Data from Bengtsson et al., 2005
Outcomes of diversified agroecological systems: Ecosystem services

VIRTUOUS CIRCLES OF ECOSYSTEM HEALTH IN DIVERSIFIED AGROECOLOGICAL SYSTEMS

- Minimum use of chemical inputs
- Minimum soil disturbance
- Use of organic matter
- Combination of livestock and crops
- Inter- and intra-species diversity

- Improved soil health & fertility
- Creation of habitats for wild biodiversity
- Increased soil carbon sequestration

- Restoration of nutrient cycles
- High water retention
- Encouragement of natural pollination
- Low GHG emissions
- Resilience of agroecosystems to stresses
- Restoration of degraded land

Strong/stable outputs + secure land & resource base removes need for industrial solutions...

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Nutrition and health

- No negative health outcomes of industrial agriculture: pesticides/antibiotics
- Diverse, healthy diets
- Increased levels of beneficial nutrients, such as omega 3 fatty acids, and antioxidants such as polyphenols...
Social and Cultural

- **Social:**
  - More employment
  - Employment throughout the year
  - Closer links with consumers

- **Cultural:**
  - Cultivation of diversity of traditional crops
  - Integration of traditional knowledge
A major question

Why do we not see a major transition towards diversified agroecological systems, given the expanding evidence that they can deliver on all dimensions of sustainable food systems?

→ The political economy of food systems
What prevents change: 8 Lock-ins

- Export Orientation
- Expectation of Cheap Food
- Path Dependency
- Concentration of Power
- Measures of Success
- Compartmentalized Thinking
- Short-Term Thinking
- Feed the World Narratives

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Market concentration in multiple sectors

- 3 companies control 50% of commercial seed market
- 7 companies control nearly 100% of fertilizer sales
- 5 companies share 68% of agrochemical market
- 4 firms account for 97% of private R&D in poultry
- 4 firms control up to 90% of the global grain trade
All have a common interest: maintaining industrial agriculture

.... But things are changing!
8 Emerging opportunities for a transition to diversified agroecological systems

- Global recognition
- Changing policies
- Emerging multi-stakeholder initiatives
- Integrated landscape thinking
- Integrated food systems science
- Peer-to-peer action research
- Healthy eating and sustainable sourcing
- Short supply chains
Changing the paradigm

1. Develop new indicators for sustainable food systems.

2. Shift public support towards diversified agroecological production systems.


4. Use public procurement to support local agroecological produce.

5. Strengthen movements that unify diverse constituencies around agroecology.

6. Mainstream agroecology and holistic food systems approach into education & research agendas.

7. Develop food planning processes and joined-up ‘food policies’ at all levels.
Measuring what matters

GDP GROWTH

NET CALORIE PRODUCTION
YIELD / HECTARE
PRODUCTIVITY / WORKER
INCOME

NUTRIENT CONTENT / HECTARE
LOCAL CALORIE & NUTRIENT AVAILABILITY
TOTAL OUTPUTS / HECTARE
TOTAL BIOMASS PRODUCED
RESOURCE EFFICIENCY
ECOSYSTEM SERVICES DELIVERED
LIVELIHOOD RESILIENCE & SOCIAL EQUITY

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Recommendations

1. Develop **new indicators** for sustainable food systems
2. Shift **public support** towards diversified agroecological production systems
3. Support **short circuits & alternative retail infrastructures**
4. Use **public procurement** to support local agroecological produce
5. **Strengthen movements** that unify **diverse constituencies** around agroecology
6. **Mainstream** agroecology and holistic food systems approaches into education and research agendas
7. Develop **food planning processes** and ‘**food policies**’ at all levels
Different pathways, common goal

- Subsistence Agriculture
  - Connect to Markets
  - Diversify
  - Mechanize
  - Build knowledge

- Industrial Agriculture
  - Relocalize
  - Diversify
  - Reduce chemical inputs
  - Build knowledge

Diversified Agroecological Farming
1990
So, this climate change thing could be a problem...

1995
Climate change: definitely a problem.

2001
Yup, we should really be getting on with sorting this out pretty soon...

2007
Look, sorry to sound like a broken record here...

2013
We really have checked and we're not making this up.

2019
Is this thing on?

Tap tap tap

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Key messages

• Industrial agriculture provides calories to global markets, but with many negative outcomes

• Problems are linked specifically to industrial agriculture

• Industrial agriculture is locked in place by a series of vicious cycles

• Tweaking practices can improve some of the specific outcomes, but will not provide long-term solutions to the multiple problems
Key messages (cont’d)

• What is required is a fundamentally different model of agriculture: diversified agroecological systems

• These systems can compete with industrial agriculture in terms of total outputs, performing particularly strongly under environmental stress

• Change is already happening

• A series of modest steps can collectively shift the centre of gravity in food systems
Thank you!

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