



INTERCROP
VALUES

Agroecology : twenty years and one day

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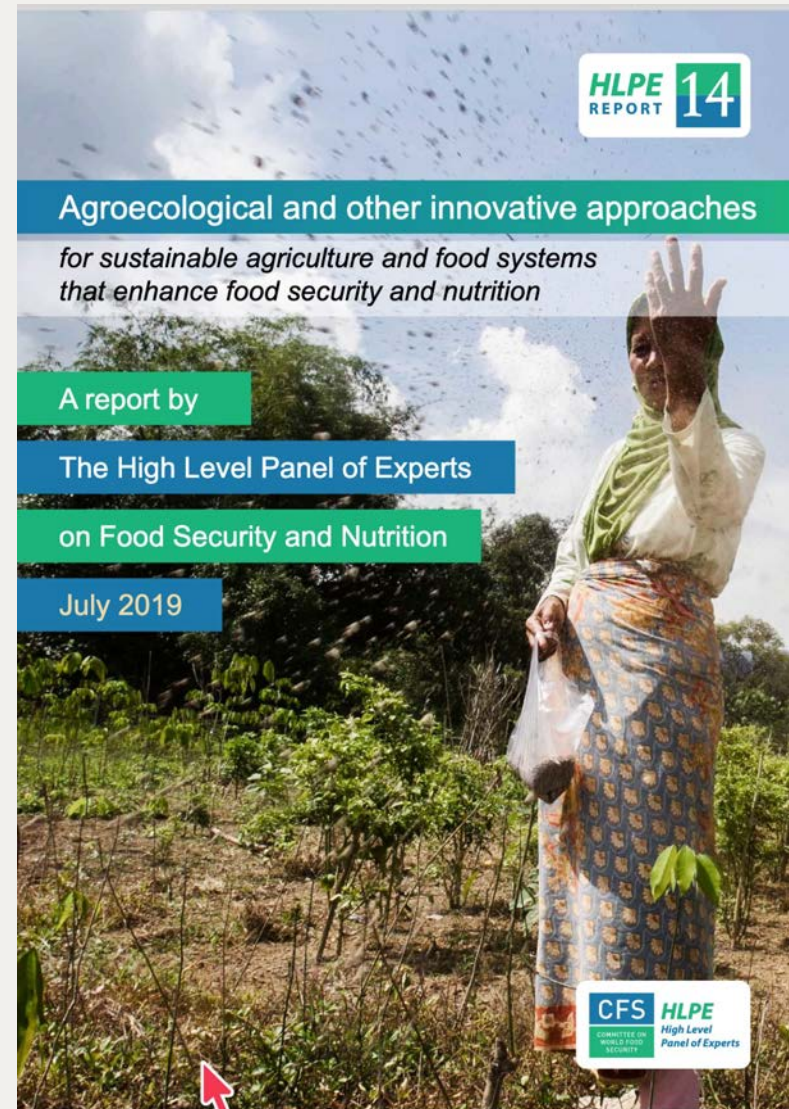
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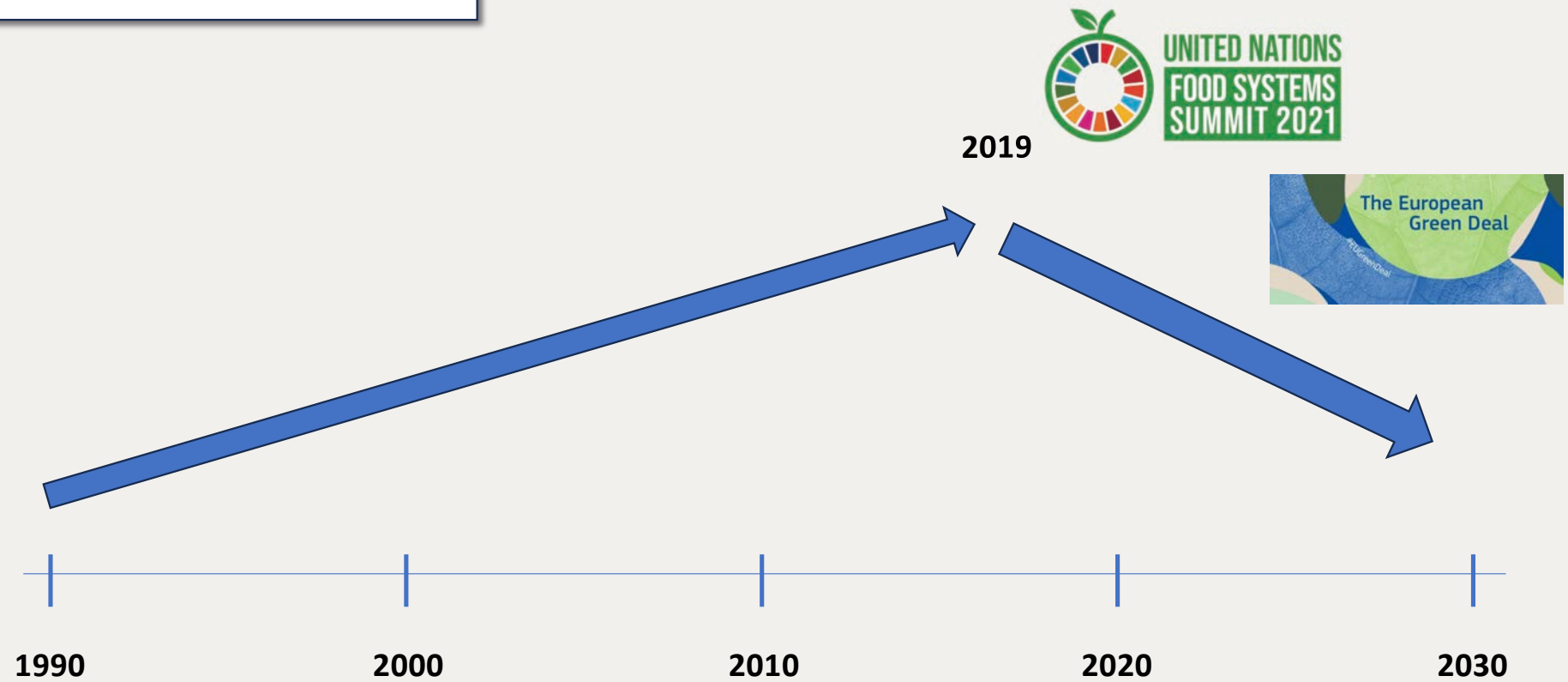
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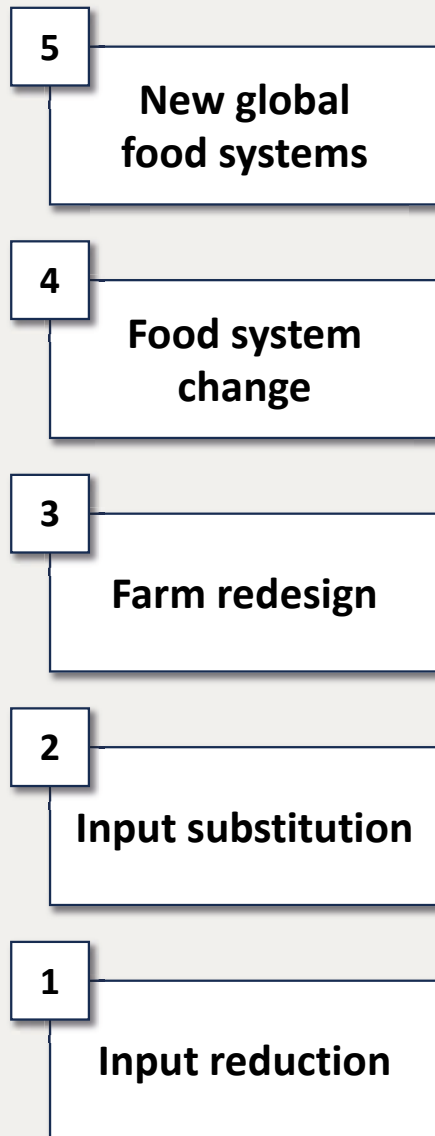
Agroecology : 20 year ago

- A new paradigm
- A scientific community
- Some social movements
- (New) set of practices
- A difficult upscaling

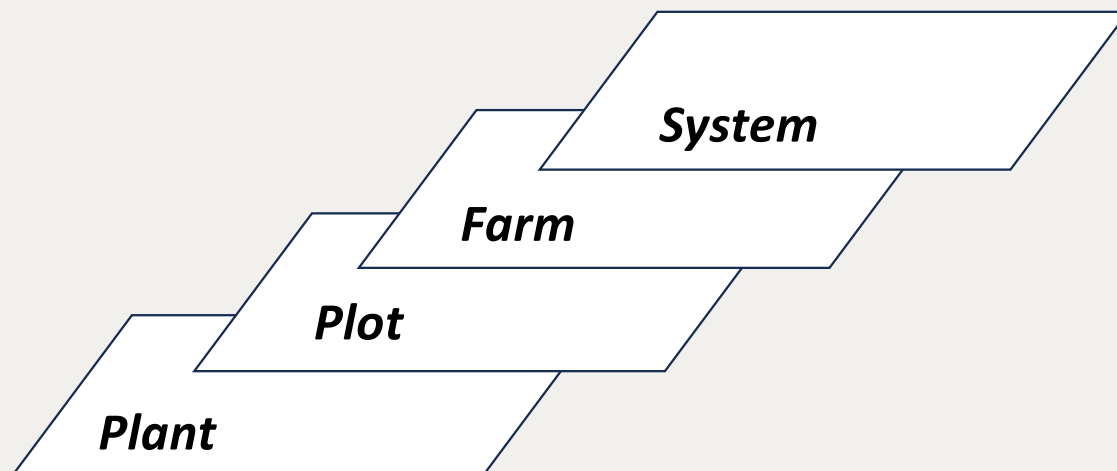
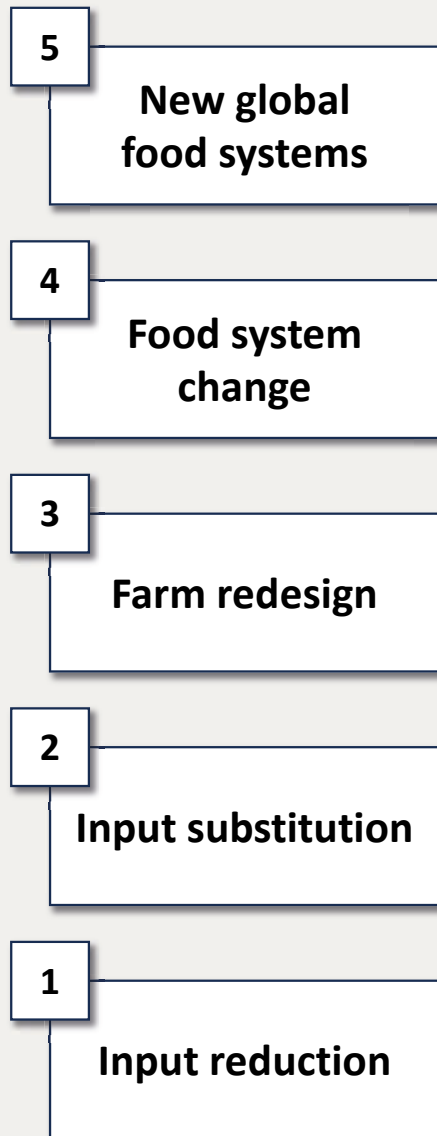


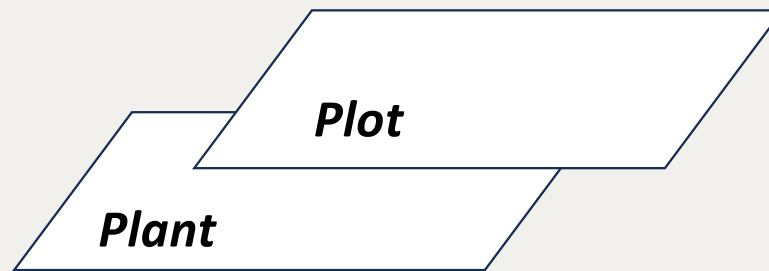
A quick history of agroecology





**Gliessman's
ladder**





1

Input reduction





BLIND SPOT
Take care!

2

Input substitution



1

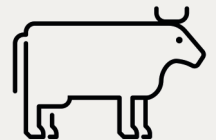
Input reduction



PES

Payment for
ecosystemic services

Feed





***WE'RE*
SIMPLY
THE
BEST**

**If we are so good, why
are we such a minority
group, why so limited
impact of intercropping ?**

Overpromising

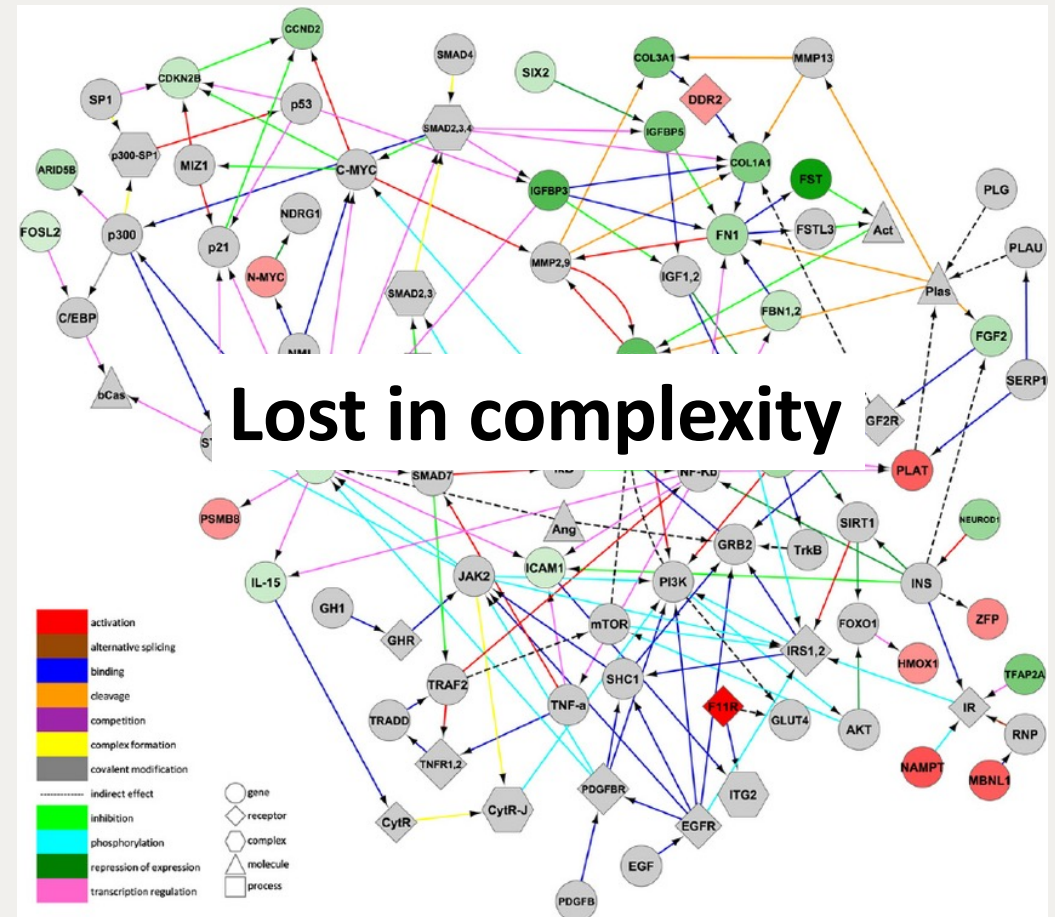
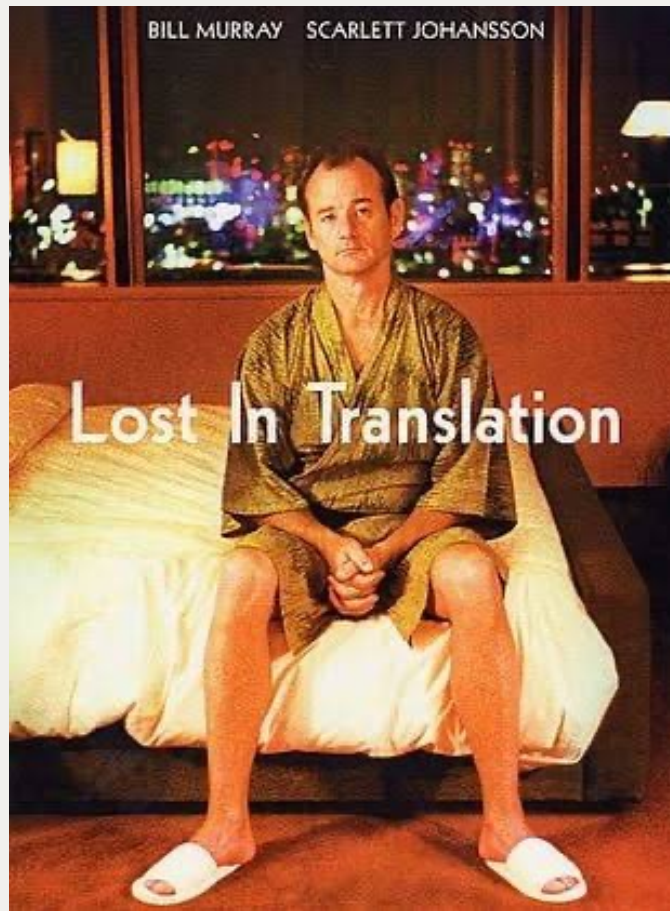
Overlooking lock-ins

**Fascination
for complexity**

**Neglecting
governance
and institutions**

The right scale ?

**The Red Queen
model**



Overpromising

“A lot of noise as you may expect”

“It is very difficult to demonstrate success”.

Intercropping is not reaching the expectations

Carbon farming is our competitor

Our issues are out of fashion

Change the indicators

Contextualize

Listen to expectations



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How agricultural research systems shape a technological regime that develops genetic engineering but locks out agroecological innovations

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ABSTRACT

Agricultural science and technology (S&T) is under great scrutiny. Reorientation toward approaches, including agroecology, has recently been backed by a global international agriculture S&T for development (IAASTD). Understanding the past and current trends S&T is crucial if such recommendations are to be implemented. This paper shows how technological paradigms and trajectories can help analyse the agricultural S&T landscape. Genetic engineering and agroecology can be usefully analysed as two different technological regimes even though they have not been equally successful in influencing agricultural research. A Systems of Innovation (SI) approach to identify the determinants of innovation (the factors research choices) within agricultural research systems. The influence of each determinant is described (e.g. funding priorities, scientists' cognitive and cultural routines etc.). As a result, these determinants construct a technological regime and a lock-in situation that hinders the development of agroecological engineering. Issues linked to breaking out of this lock-in are finally discussed.

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ANALYSIS

Why are ecological, low-input, multi-resistant wheat cultivars slow to develop commercially? A Belgian agricultural 'lock-in' case study

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ABSTRACT

The use of multi-resistant cultivars allows a significant reduction in fungicide use in low-input cropping systems. However, many major wheat cultivars used in Europe remain sensitive to frequent diseases and require fungicide protection. This paper aims at understanding the factors explaining the low level of adoption of multi-resistant wheat cultivars in Wallonia (Belgium). Cultivar adoption has been an important topic of research, but few analyses have been done in Europe in the past decades. We used a systems approach combining a survey among stakeholders in the food chain and a systematic

Fascination for complexity

« More data is always better »

« It is complicate, so we need models”

Complexity is fascinating

Our power is in multifactorial approach

We want to understand

Factorial approaches will boosted by AI

Causality ?

Questions first

Regulate the scientific competition

System driven research

Science is a causality quest

AGROECOSYSTEM ANALYSIS

GORDON R CONWAY

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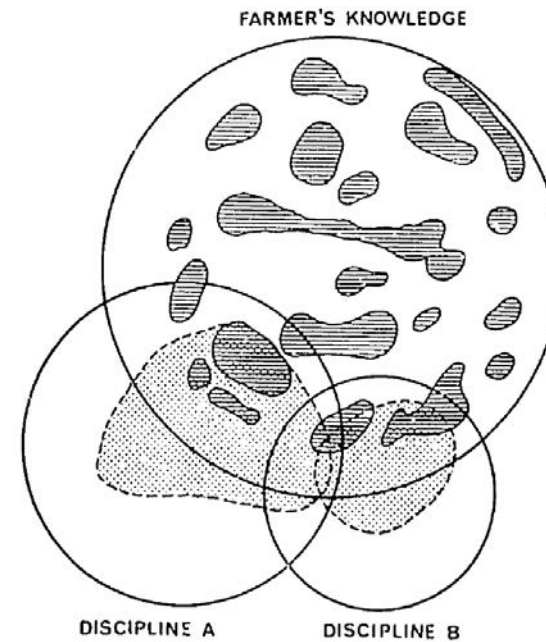


FIGURE 1 Overlapping knowledge between farmers and research specialists (eg soil scientists and agricultural economists). Hatched and striped areas indicate extent of knowledge



The right scale ?

How do you choose scale ?

What is the relevant scale for farmers ?

What is the right scale for impact ?

Impact driven

Which knowledge ?

Transdisciplinarity



anr

INRAE

GROWING
PROTECTING
DIFFERENTLY

European Chemical Pesticide-Free Agriculture in 2050 Foresight report

November 2023

Scenarios of European Chemical Pesticide-Free Agriculture in 2050

SCENARIO 1

global market



SCENARIO 2

healthy microbiomes



SCENARIO 3

embedded landscapes



Foresight: European Chemical Pesticide-Free Agriculture in 2050 - March 2023 - INRAE - Priority Research Program "Growing and Protecting crops Differently"

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Overlooking lock-ins

Lock-ins are impeding adoption

Adoption is a requirement for impact

Value chain is key

Take lock-ins seriously

**From list to system
of lock-ins**

We need strategies

POLICY BRIEF N°1

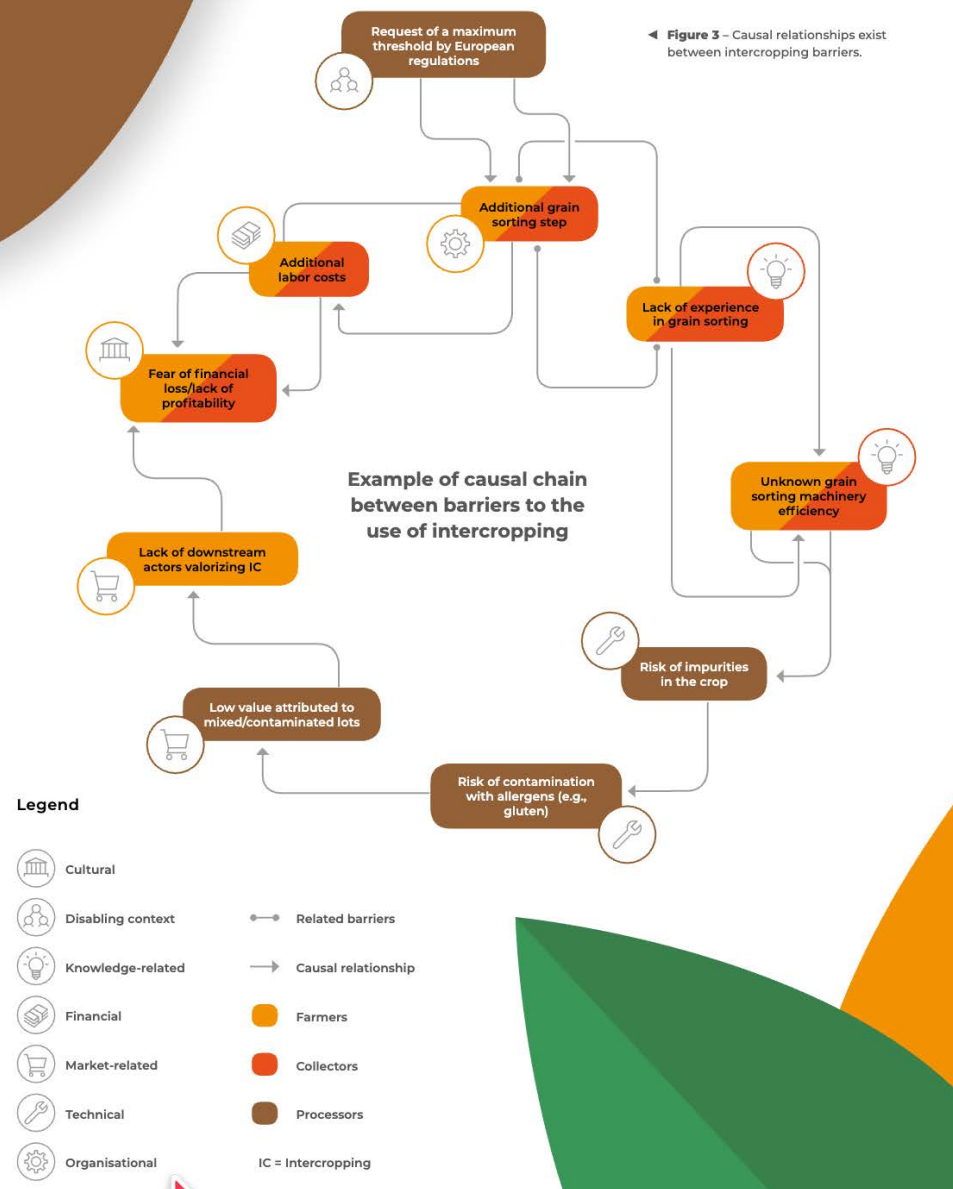
How to design “intercrops friendly” policies? Lessons from the analysis of the barriers to intercropping in Europe

- Despite its potential to increase the sustainability of our agricultural system, intercropping has virtually disappeared from the agricultural landscapes of European member states,
- The spread of intercropping is hindered by barriers of different types (e.g., cultural, financial, organisational, technical) affecting all levels of the food value chain,
- Barriers emerge from a complex web of interactions and may reinforce one another. When it comes to identifying solutions, the whole causal chains linking barriers together should be considered.
- Intercropping won't develop without a coordinated commitment from all stakeholders of the food value chain, including policy makers.
- Policymakers can foster the use of intercropping by promoting the development of coordinated value chains adapted to intercropping, enhancing the involvement of stakeholders in policy making, ensuring coherency between policy objectives and instruments, increasing and facilitating the access to financial support for all actors involved in intercropping value chains, and fostering advisor training and knowledge transfer. These actions should be implemented altogether to address the systemic aspect of the intercropping lock-ins.



Over the past decades, the green revolution, and the technologies it brought, e.g., fertilizers, pesticides, and efficient machinery, led to an increase food, and feed productivity in Europe, but also to a major drawback: the specialization of rotations, farms, and territories^[2]. This specialization resulted in multiple well-documented negative effects: loss of biodiversity, decrease in the resilience of agricultural systems, shortage and contamination of water resources, disruption of nutrient cycles, general decrease in macro- and micro-nutrient content of staple crops and precariousness of farmers^[3]. These multiple negative impacts make a strong case for the need of creating fairer, healthier, and more environmentally friendly food systems^[4], an objective pursued by Europe's "Farm to Fork" strategy (Figure 1).

Intercropping is an agroecological practice corresponding to multiple crops grown simultaneously on the same field. In the last years, there has been a growing awareness that intercropping delivers numerous environmental, economic, and nutritional benefits to our society^[5]. This practice thoroughly contributes to the targets of the "Farm to Fork" strategy (Figure 1). Additionally, intercropping may enhance the production of plant-based proteins as legumes are often associated with cereals in intercropping systems^[6], and may contribute to Europe's protein autonomy as encouraged by the



Institutional changes required differ between pathways



Seamless Integration

Tightened impurity thresholds

Financial support for investment in machinery

CAP subsidies

Local Anchoring

Financial support for machinery sharing cooperatives

Financial support for innovation by small-scale artisans

CAP subsidies

Green public procurement favoring IC products

Local & regional support to local value chains (e.g., regional food plans)

Mainstream Engagement

Relaxed impurity thresholds allowing the use of current terrior

Adaptation of impurity classes

Financial reward for ecosystem services

CAP subsidies

Green public procurement favoring IC products

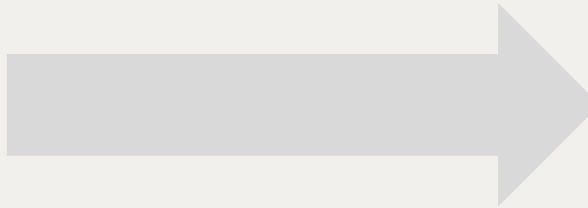
Supporting the development of IC-focused value chains

Inverting the sequence

«Are the farmers interested by my knowledge ? «

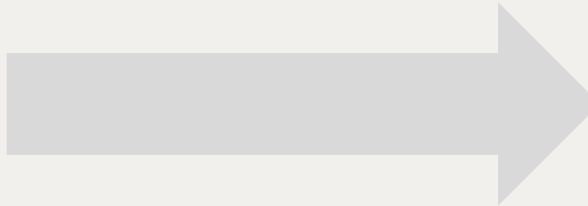
«Perhaps your hypotheses will change »

Innovation



System

SystemS



Innovation

**Neglecting
governance
and institutions**

**Farmers are driven by Common
agricultural policy rules**

**Governance could complement
evidences**

We lost the narrative battle

**NSP National Strategic
Plans are coming**

**Make alliances with and
out of our discipline**

Scientists are citizens



PHD DEFENCE DIANA BORNIOOTTO



The PhD focusses on the role of governance in shaping agri-environmental policies. It adopts a multi-level approach linking EU, national and regional levels and explore how they pursue environmental objectives within the EU's largest public budget: the Common Agricultural Policy

 Transition pathways

 Production systems

Common Agricultural Policy

governance

agri-environment

Europe



Speakers

Diana Borniotto

**What will be the share of
intercropping in 2035 in
Europe ?**

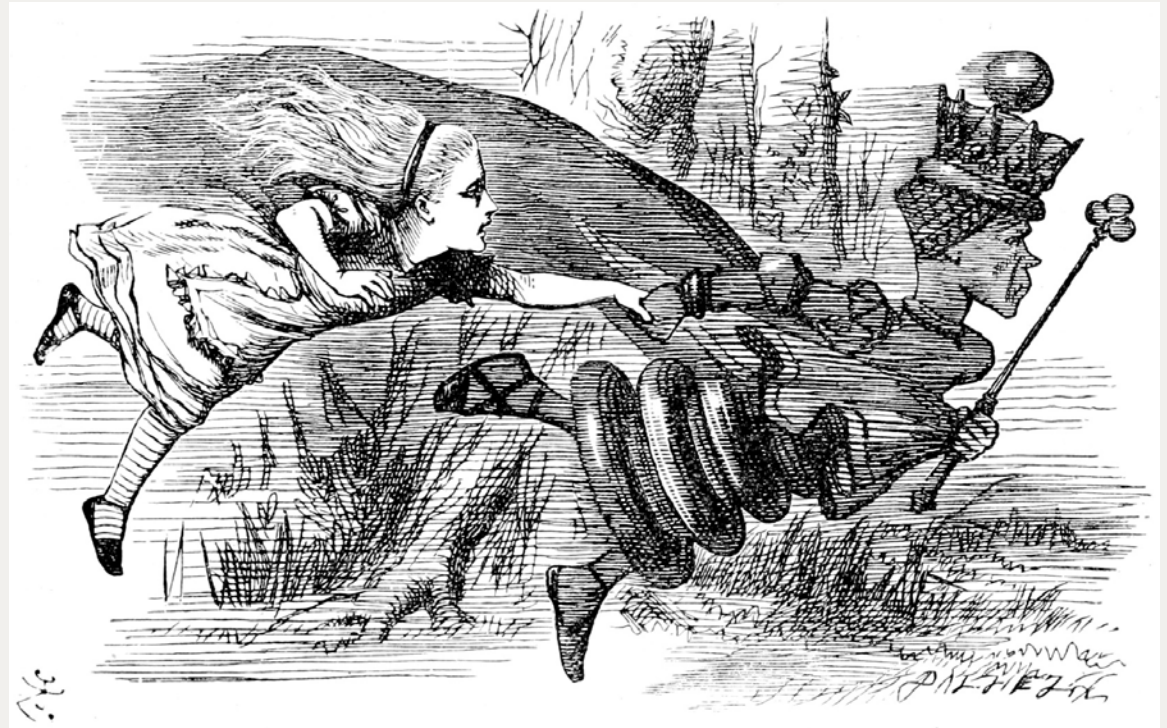
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☐ **3 %**

☐ **5 %**



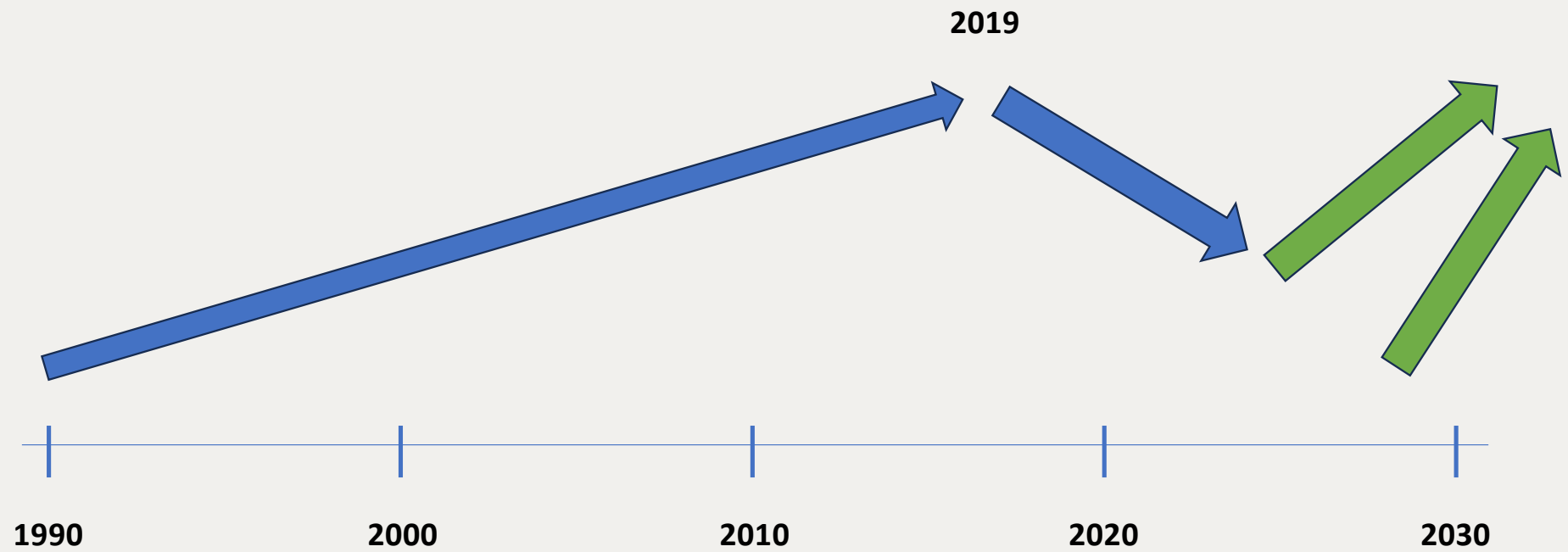
The Red Queen model

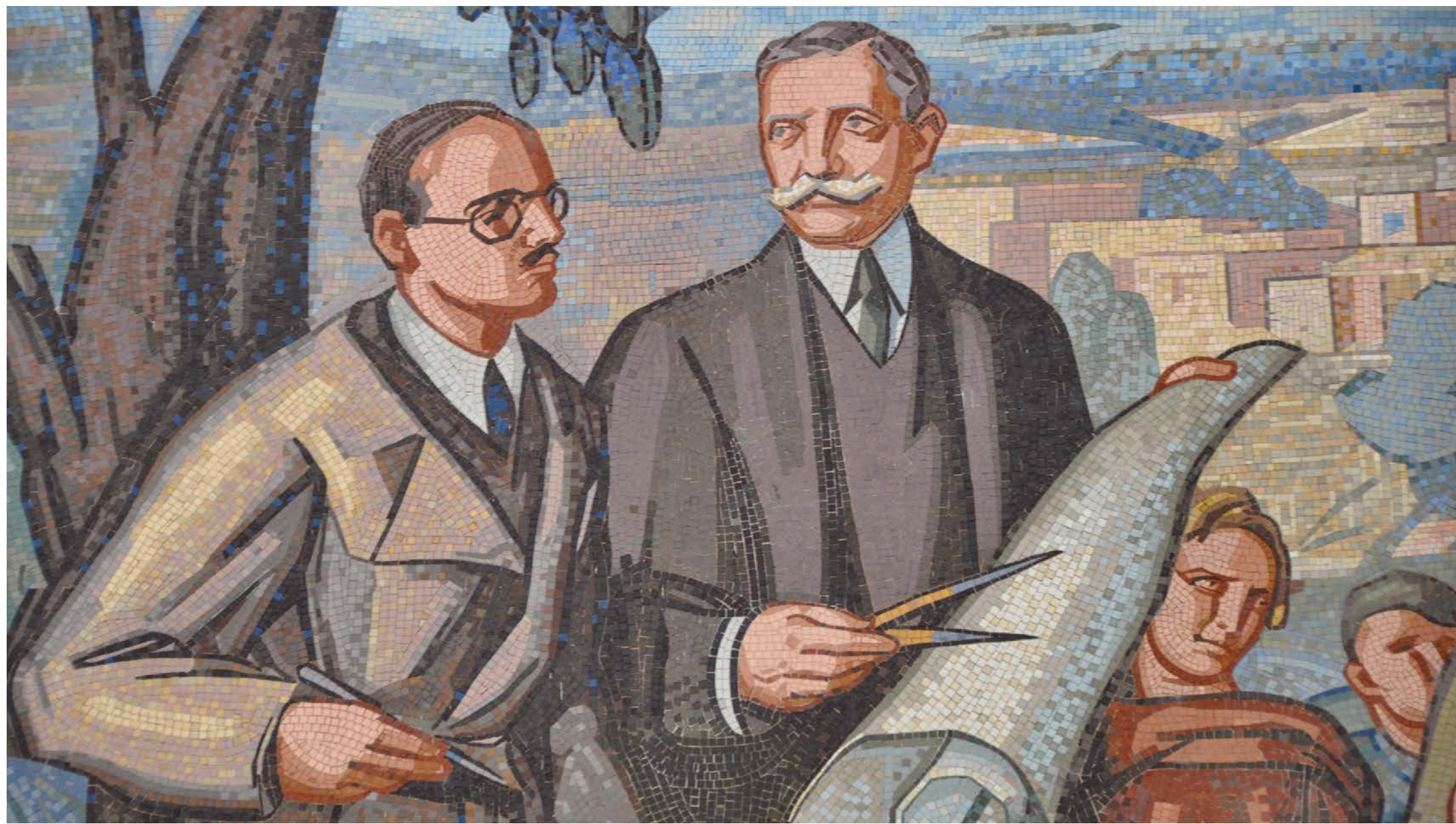


« Now, here, you see, it takes all the running you can do, to keep in the same place. » - Lewis Carroll

The **Red Queen model** (or **Red Queen hypothesis**) proposes that species must constantly adapt, evolve, and proliferate not to gain a permanent advantage, but simply to survive while competing against ever-evolving opposing species

A quick history of agroecology





Our common duty

«How these knowledges can come together ? »



- We are working with a common good
- Transition is a scientific discipline
- As we have a minimal background in statistics and biology, we also need to build a basic knowledge in social and human sciences
- How to find the right trade-off between knowledge and impact ?
- A strategy is the key to change our pathway



transition of
food systems

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the European Union



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