



Knowledge and Innovation System for the Bioeconomy: The challenges for the future CAP



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RURAL DEVELOPMENT IN THE FUTURE CAP 2021-2027

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Looking inside the “black box” of agricultural innovation

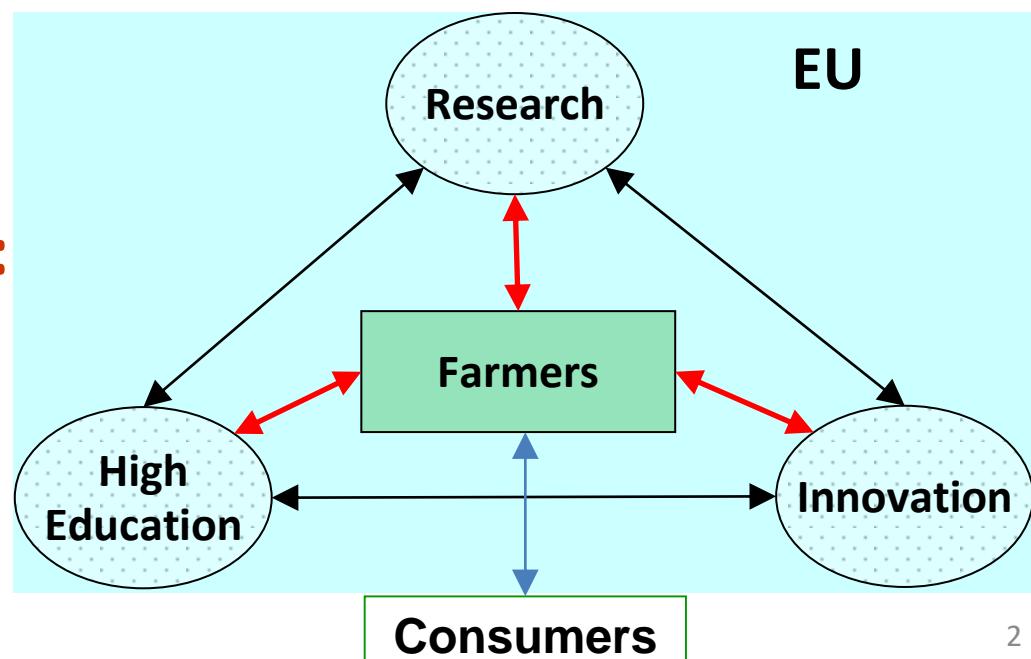
BIOECONOMY

Object: The Agricultural Knowledge and Innovation System (AKIS)



“The System”

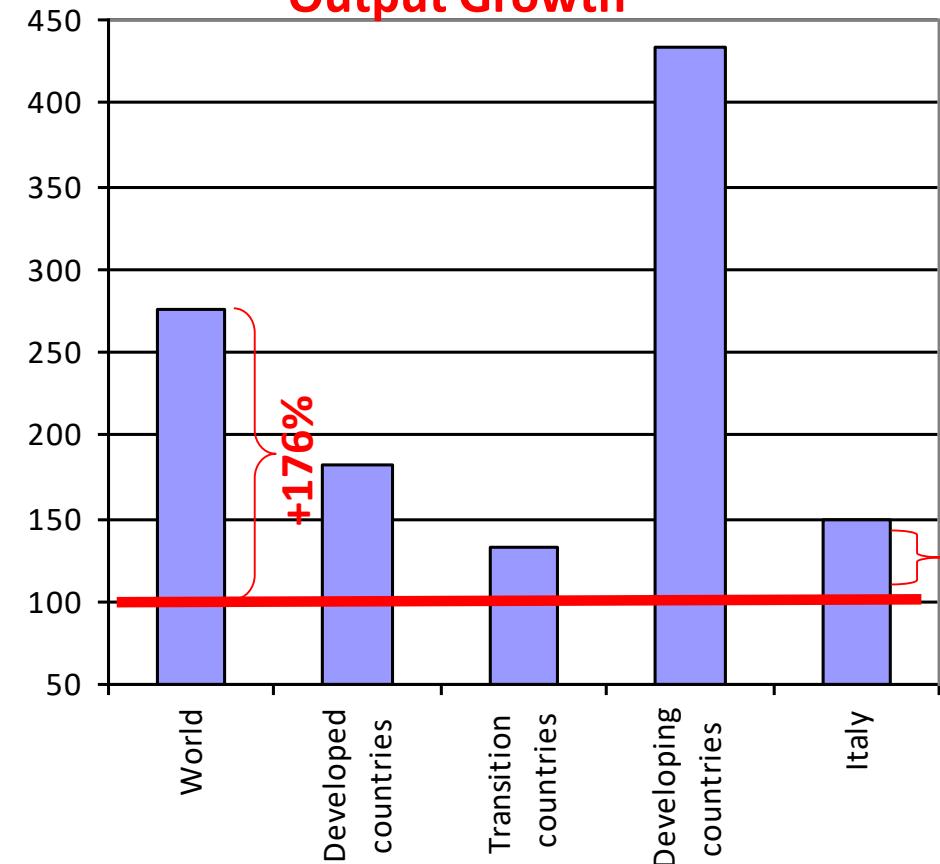
THE KNOWLEDGE TRIANGLE:



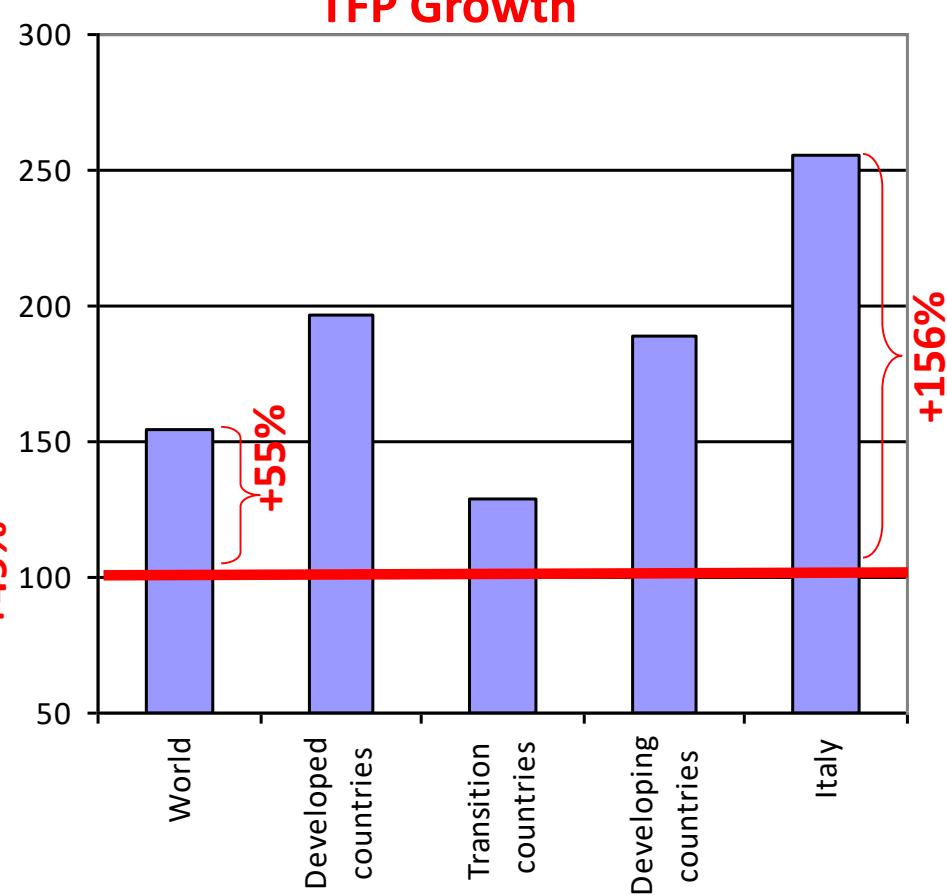
A successful story: “a magic box”

Huge agricultural output and productivity growth. 1960-2010:

Output Growth

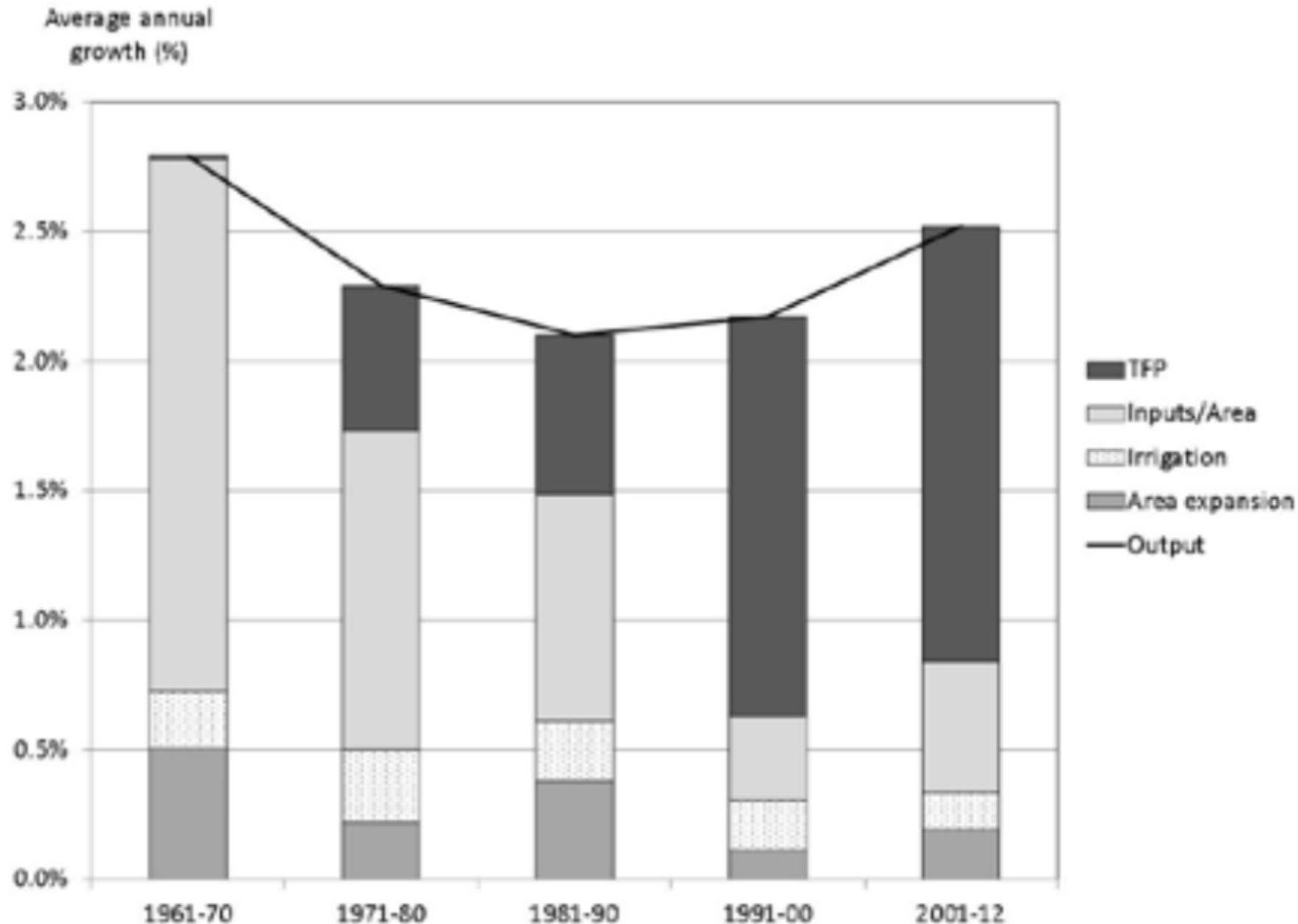


TFP Growth

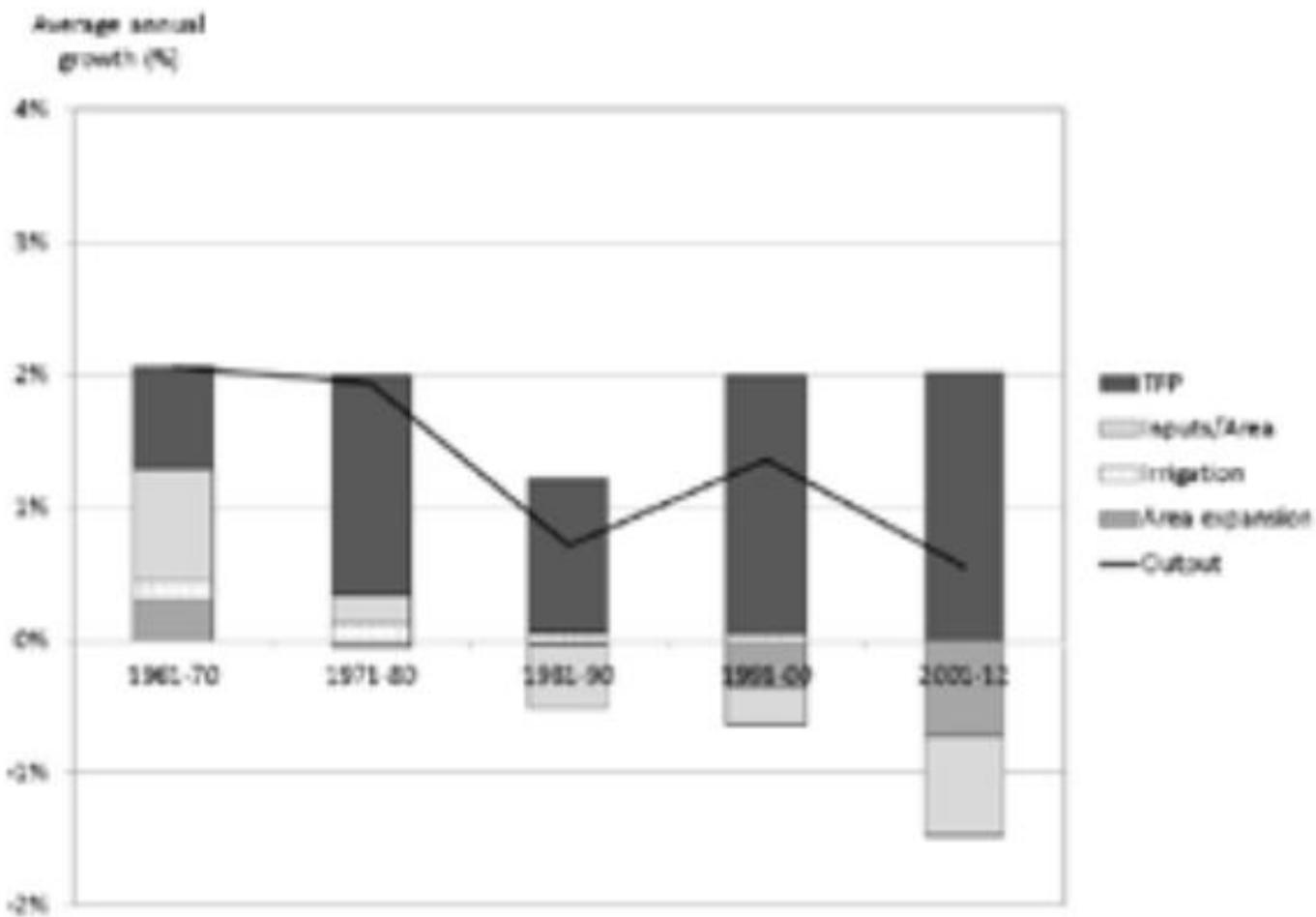


■ Mendel vs. Malthus: Mendel won

Any productivity slowdown? (1)



Any productivity slowdown? (2)

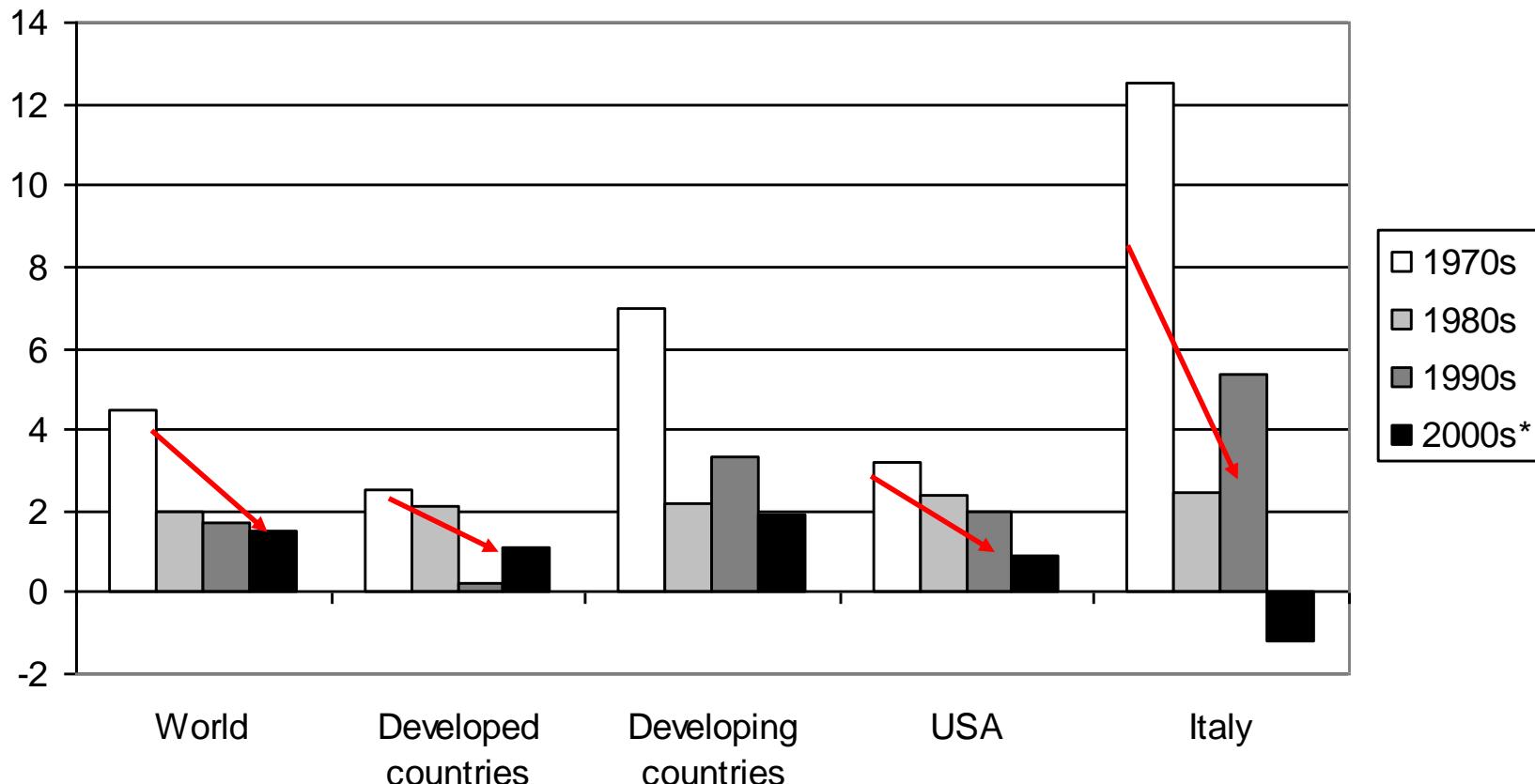


Panel A: Industrialized Countries.

- If any, slowdown only in the developed world in output growth

...and in ag. R&D investments

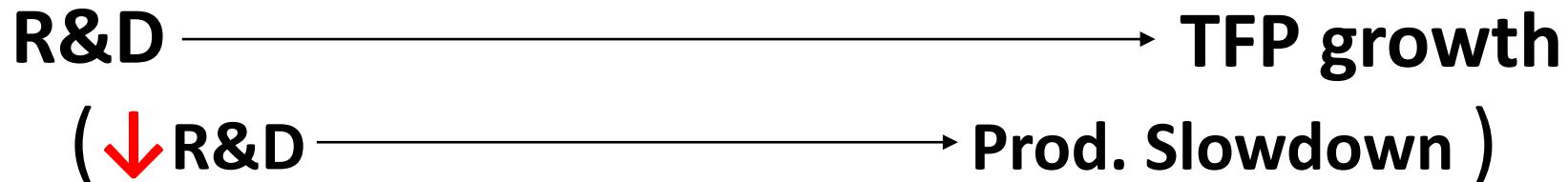
Annual avg. real-term ag. R&D expenditure growth (%)



- **High social returns to ag. R&D invest.**
 - if 20%: about 40€ from 1€ after 20 years
- **Gradual shift from high-income (still 54% of public R&D) to developing countries**
- **Are we underinvesting?**

A certain idea of “the system”

THERE IS A DIRECT CAUSE-EFFECT LINKAGE: productivity growth rate increases (or slowdown) depending on the ag. R&D effort (+extension+education)



The “linear model of innovation” driven by the research domain:

- More investments in national and global international ag. R&D
- Reinforce property regimes+extension+education

Alternative interpretation (system “failure”):

- R&D (science) is not so crucial in agricultural innovation
 - Contribution of R&D is overestimated
 - Productivity growth was exaggerated
- The problems is that too much emphasis (resources) on R&D, too little on **other critical processes** (the “cloud of knowledge”) for innovations

Some examples of “failure”

FAILURES: GM crops (now Genome Editing), nanofood

- Research institutions made their job
 - Property right regimes were clearly established
 - Knowledge incorporated in ready-to-use technological solutions
 - Poor interaction among stakeholders, poor coordination
- **Most of the deliberated/institutional effort has been lost in the system**

Cases of SUCCESS: organic ag., agroenergy...

- No ready-to-use technological solutions
 - Few R&D investments (if any)
 - On-demand involvement of research, extension, education often on local base
 - Creation of collective, diffused (though often local) knowledge
- **Successful outcome without a pre-determined coordination or institutional guidance**

CONSIDER THE EU FP INVESTMENTS:

- Biotech: 19% of FP6-Food; Organic<=5%
- FP7 (approx.): Biotech/Organic=6/1

Failure and agenda shifting

AGRICULTURAL INNOVATION FOR WHAT?

FROM: *Agenda for scarcity*: food security

TO: *Agenda for post scarcity*: food safety&quality, sustainability, multifunctionality

- ✓ More needs and a wider idea of agricultural innovation

Two major novelties:

- The advent of a “new” consumer
 - ❑ The Hyper-modern consumer (**the hyper-consumer**)
- The advent of a “new” sector: the Bioeconomy
 - ❑ Agricultural (sectoral) boundaries expand and fade converging with more knowledge-intensive sectors

Policy implications (1)

Can be these agendas reconciled or are they diverging?

In principle, yes

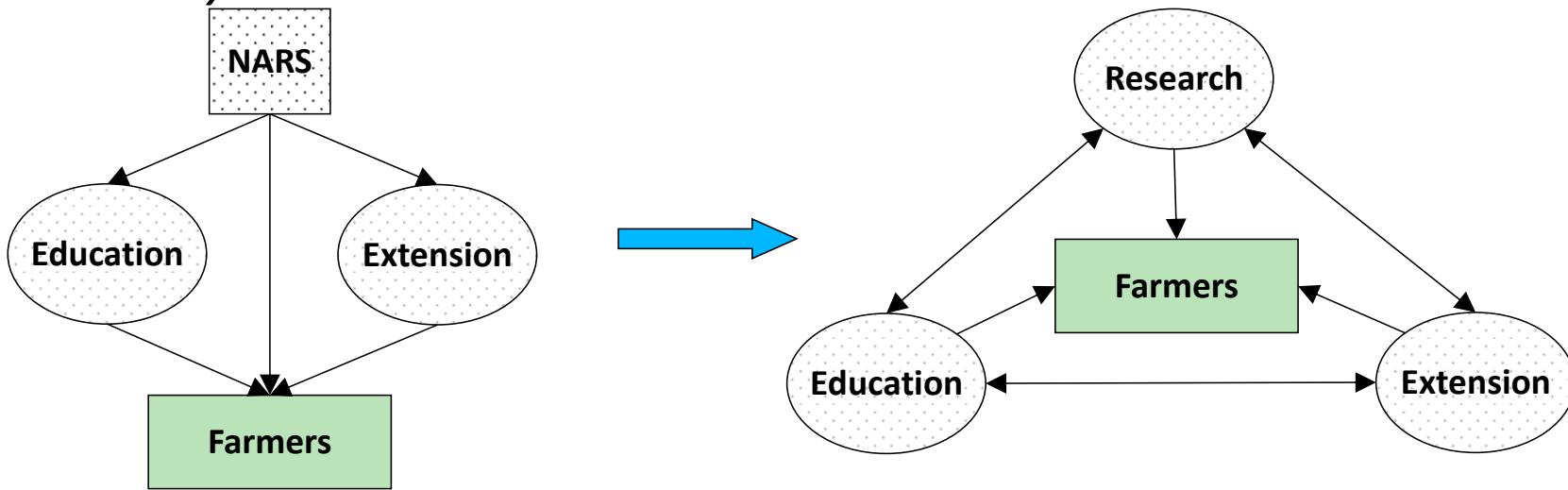
- The EU strategy: productivity+sustainability, sustainable intensification

In practice, they are already diverging (and so their “systems”)

- Developing/emerging countries: (new) scarcity agenda
- Developed countries: post-scarcity agenda

This new agenda requires a new idea of the “system”:

- *multi-directional open space innovations*
- *no ready-to-use solutions; users' continuous adaptation/upgrading*
- *complex combination of different components (tech., social, envir.)*
- *many stakeholders involved: innovation is a network outcome*



Policy implications (2)

An EU perspective: building a EU-wide AKIS

Main issues:

- Strong cross-country(region) heterogeneity: no one-fits-all model
- Top-down coordination: EU policies vs. national/local policies
- Cross-policy coordination. 2 EU policies involved:
 - EU Research policy: ideally, the supply-side of the system
 - the CAP (II Pillar): ideally, the demand-side of the system

The past:

EU research policy (FP7)

- already within a Knowledge Based Bio-Economy (**KBBE**)
- FP7-KBBE (2007-13): about 2 billion €, 4% of FP7 budget

CAP Pillar II

- Still strictly sectoral (limited extension to “bioeconomy”)
- Several measures related to AKIS: 2007-2013 in Italy about 5% of the expenditure

Policy implications (3)

The present: Europe2020 and a new integrating framework:
 Innovation Union, the Agricultural EIP (EIP Agri)
EU research policy (Horizon2020)

- ↑resources to KBBE: 4,5 billion €; 5% of Horizon2020
 - *From the CAP budget*

CAP Pillar II

- Still strictly sectoral (limited extension to “bioeconomy”)
- Knowledge/innovation 1 of the 6 key horizontal priorities
- New-reinforced 2 major measures related to the AKIS
- **The Operational Groups (OG) for innovation**

The future: networks or confusion?

- Is the EU idea of agricultural innovation becoming ideological?
- Is the EU policy imposing a particular idea of innovation?
- Shouldn't farmers, consumers and RESEARCHERS be free to decide?
- Is the “linear model” really over?