



Digital agriculture: from technologies to food systems changes

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INRAE

#DigitAg

A digital revolution in agriculture?

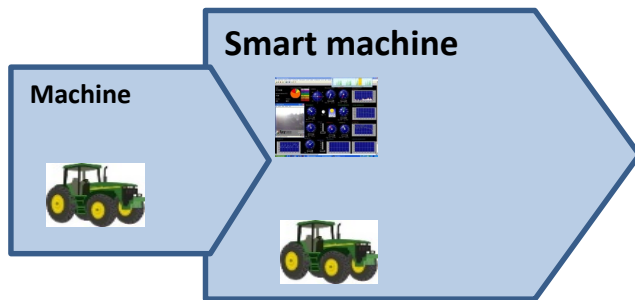
- **For agriculture, digitalization is an exogenous innovation (similar to machinery (19th century) and chemistry (20th century))**
- **Digital agriculture is transformative**
 - Technical and technological transformation
 - Organisational transformation
 - Social and societal transformation
- **Data are transformative**
 - Because of massive production and automation, data become increasingly available at very low cost
 - Data reconnect actors through ICT
- **Digital meets key farmers' expectations**
 - Economic performance
 - Environmental performance
 - Social issues
- **And impact the whole agri-food system**
 - Block chain technologies
 - Agri-food systems 4.0

Creating and sharing added value

On the various dimensions of sustainability: production, economics, environment, social issues

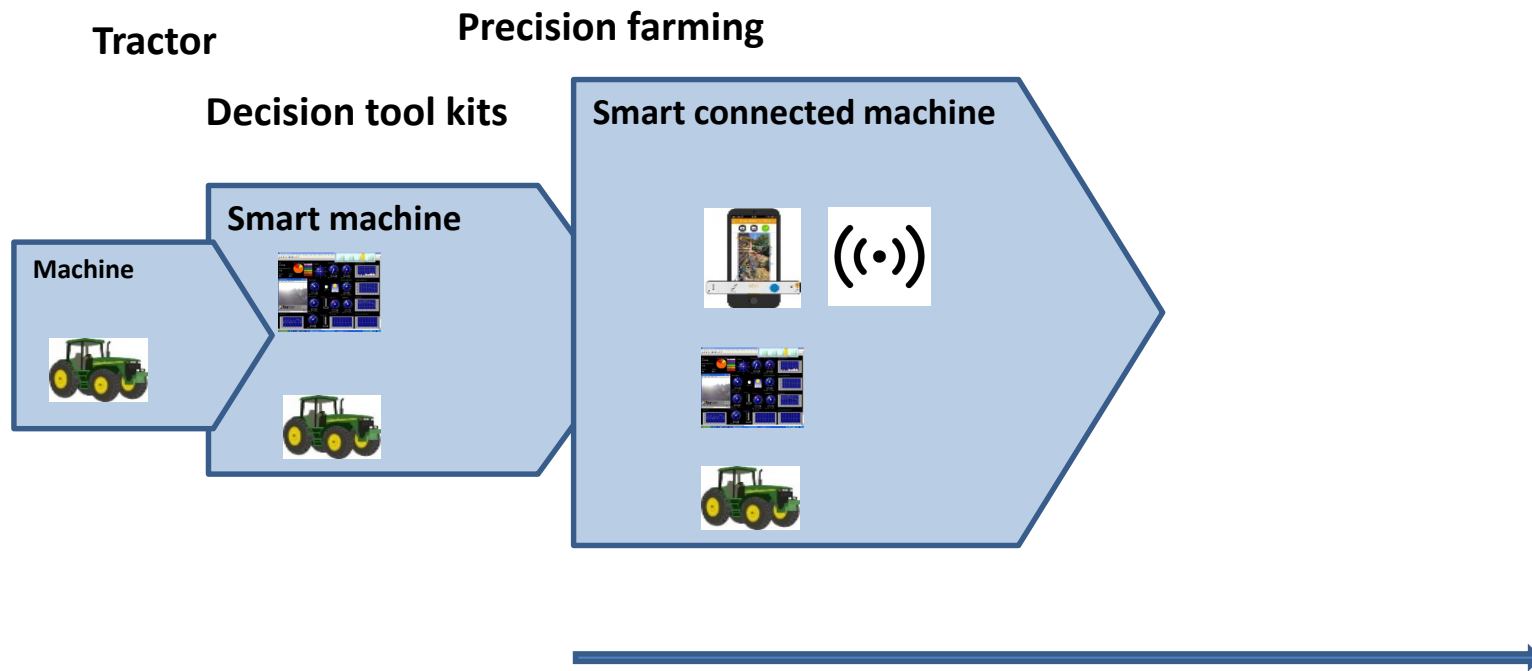
Tractor

Decision tool kits



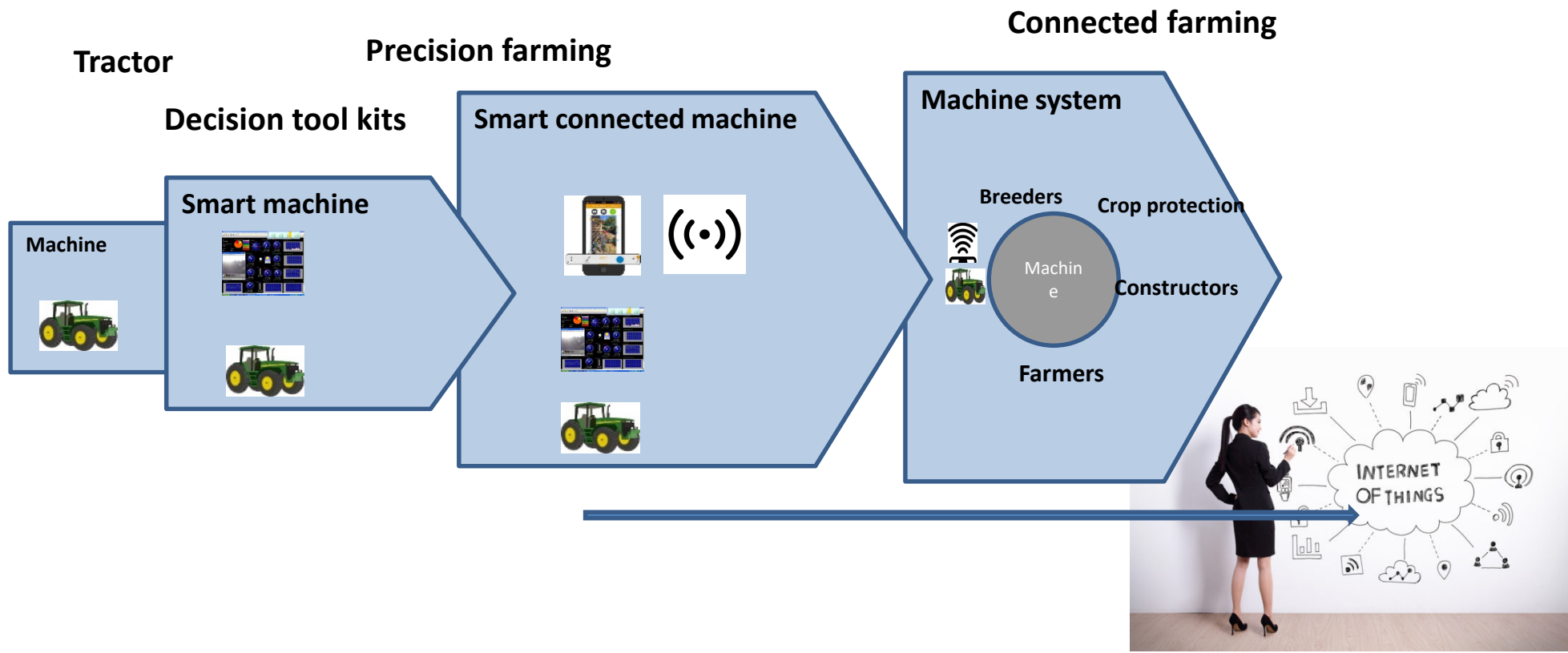
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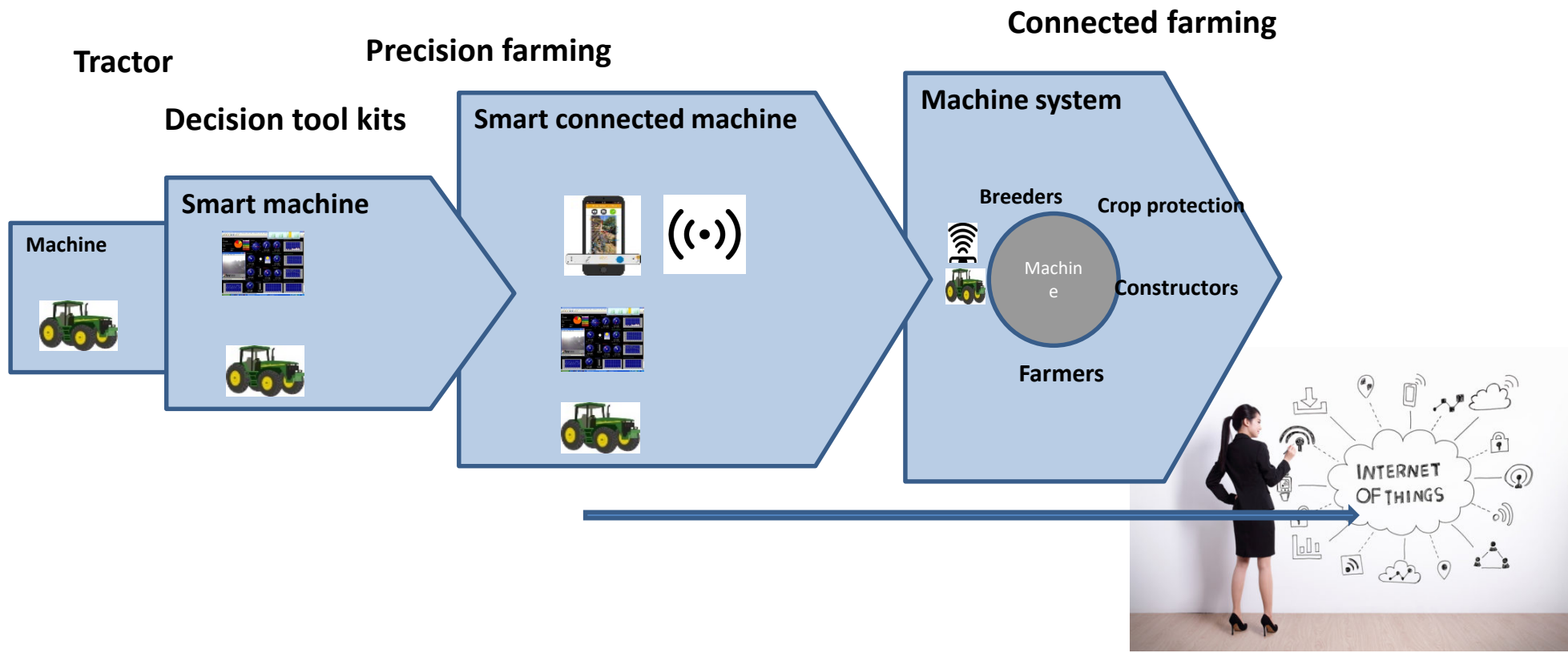
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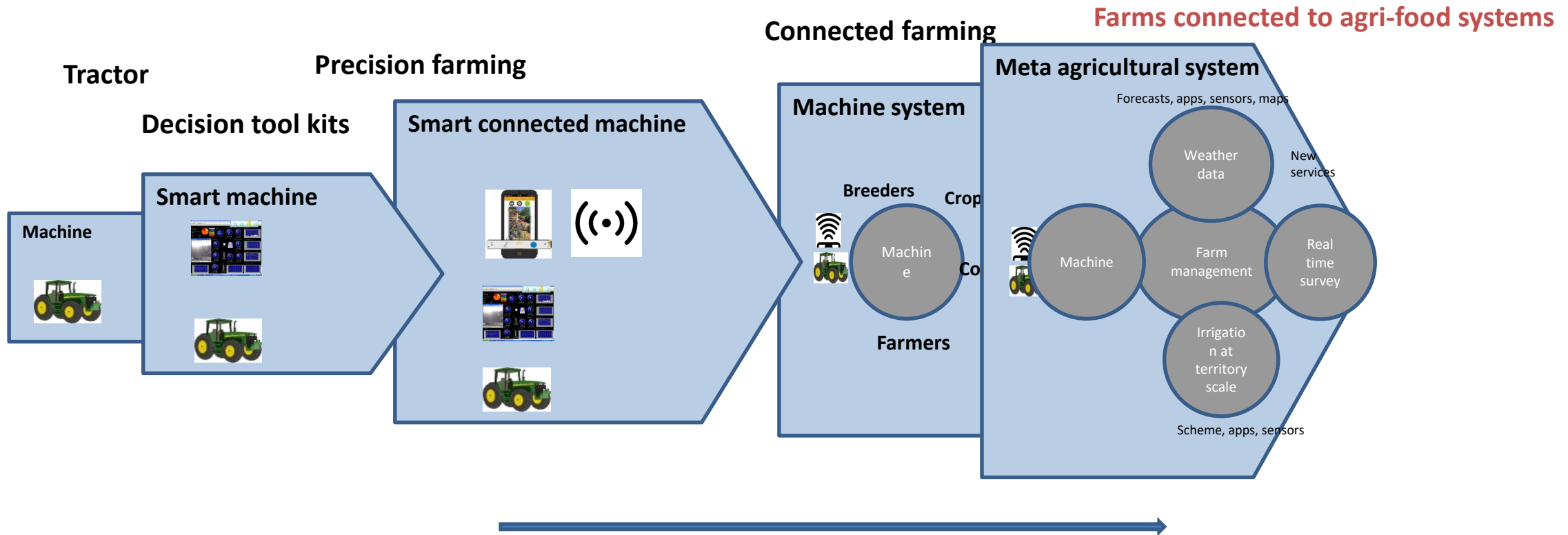
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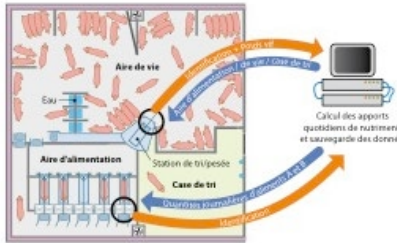
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Precision farming: capturing local heterogeneities

- Heterogeneities exist within and among entities managed by farmers: fields, animal herds
- Ensuring the most precise and the most adapted action at each point of these entities
- *Locally adapted crop management*
- *Individual diet for animals*



Capturing local heterogeneities is also true for high-throughput phenotyping

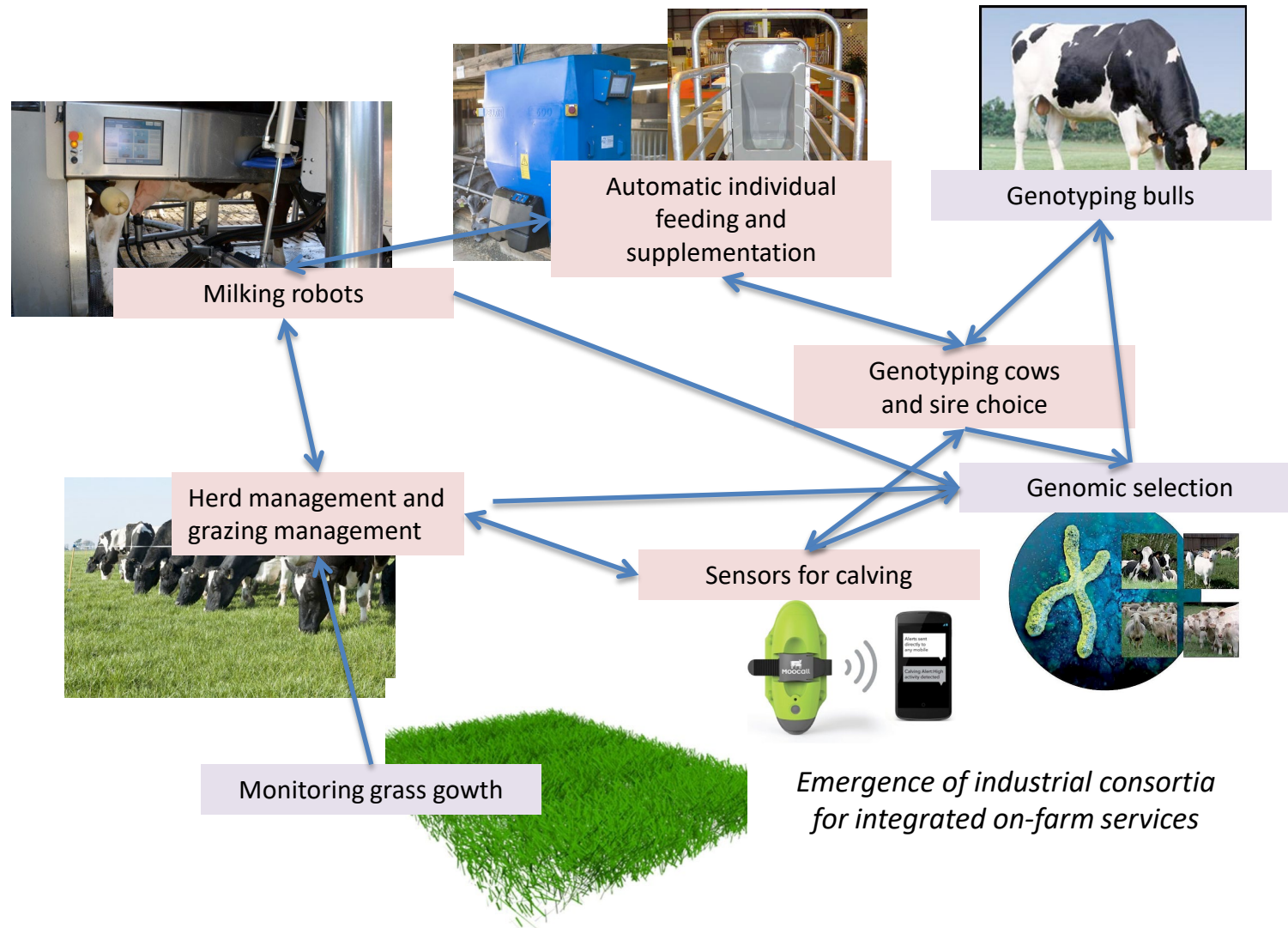
*Emphasis project, Inra platform in
Clermont -Ferrand*



*They use the same sensors, and the same algorithms as those used for high throughput
phenotyping: Joint technological Unit Capte (Avignon): Inra and Arvalis*



Connected livestock systems



ICT – from the farm gate to the consumer

Eco-conception / circularity:

Online control of molecules / biomarkers on raw products or by-products for improvement of processing conditions, for developing cascading use.

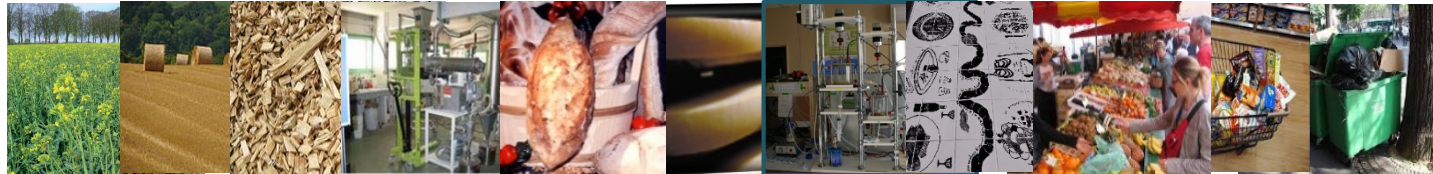
Safety:

Smart packaging – Biosensors

Quality :

Virtual reality to improve sensory quality – user experience

Social impact of ICT on consumers (Food and Health domains)



How to make it possible to meet...



Farmers' demand for decent incomes & decent working conditions



Increasing **consumers'** demand for organic or low-input food products, variety, nutritional quality at reasonable prices

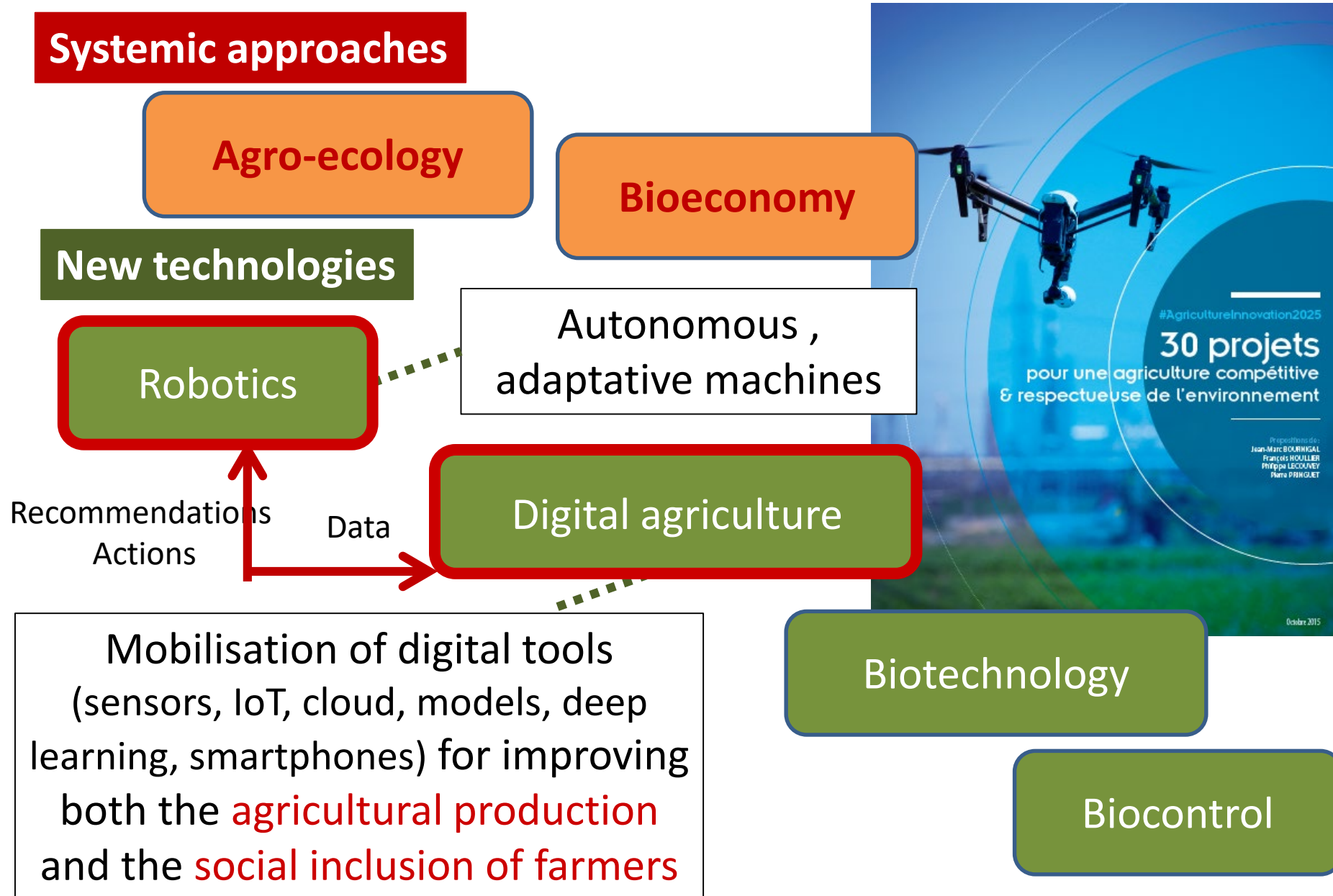


Any combination?

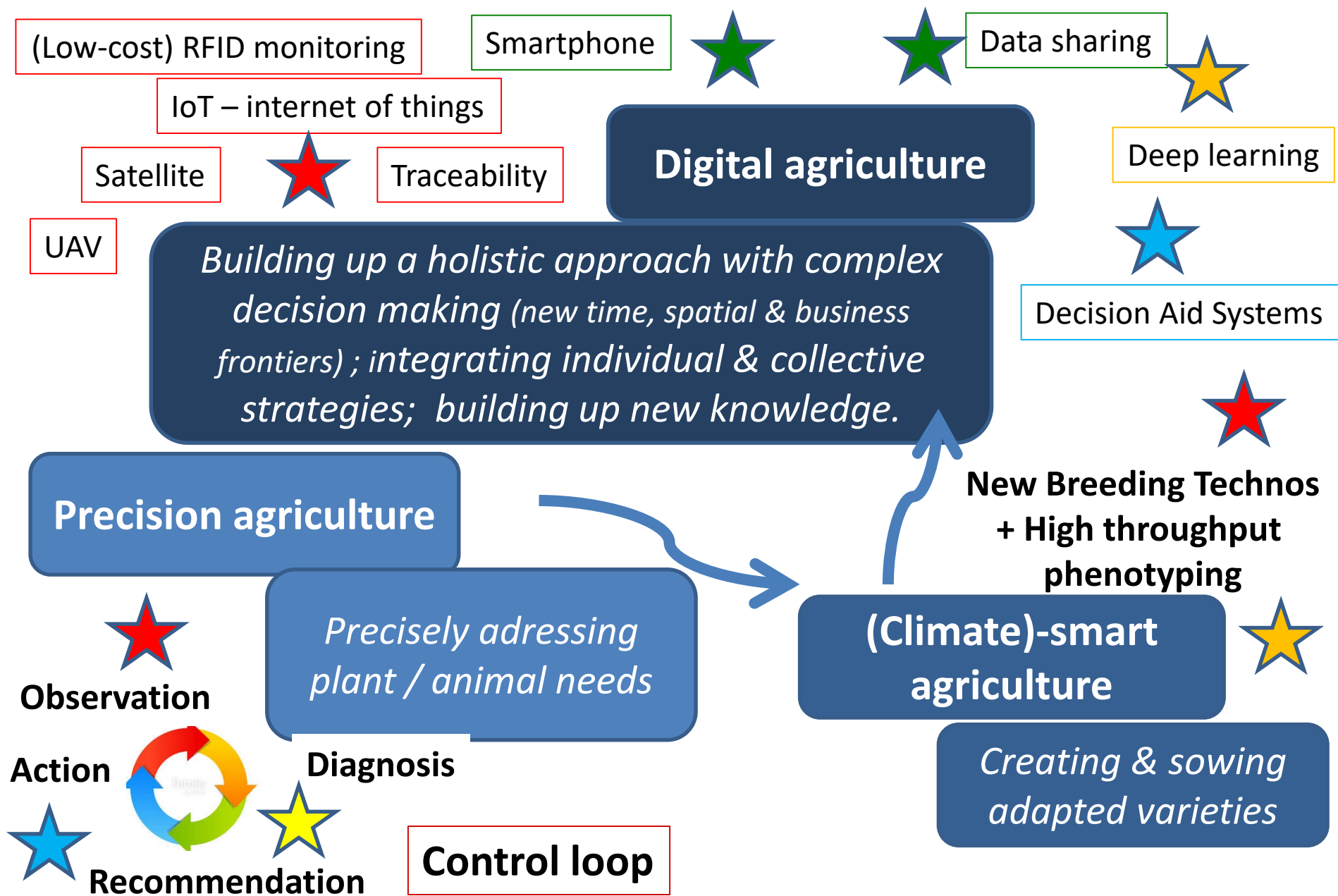
The **society** demand for the preservation of the environment



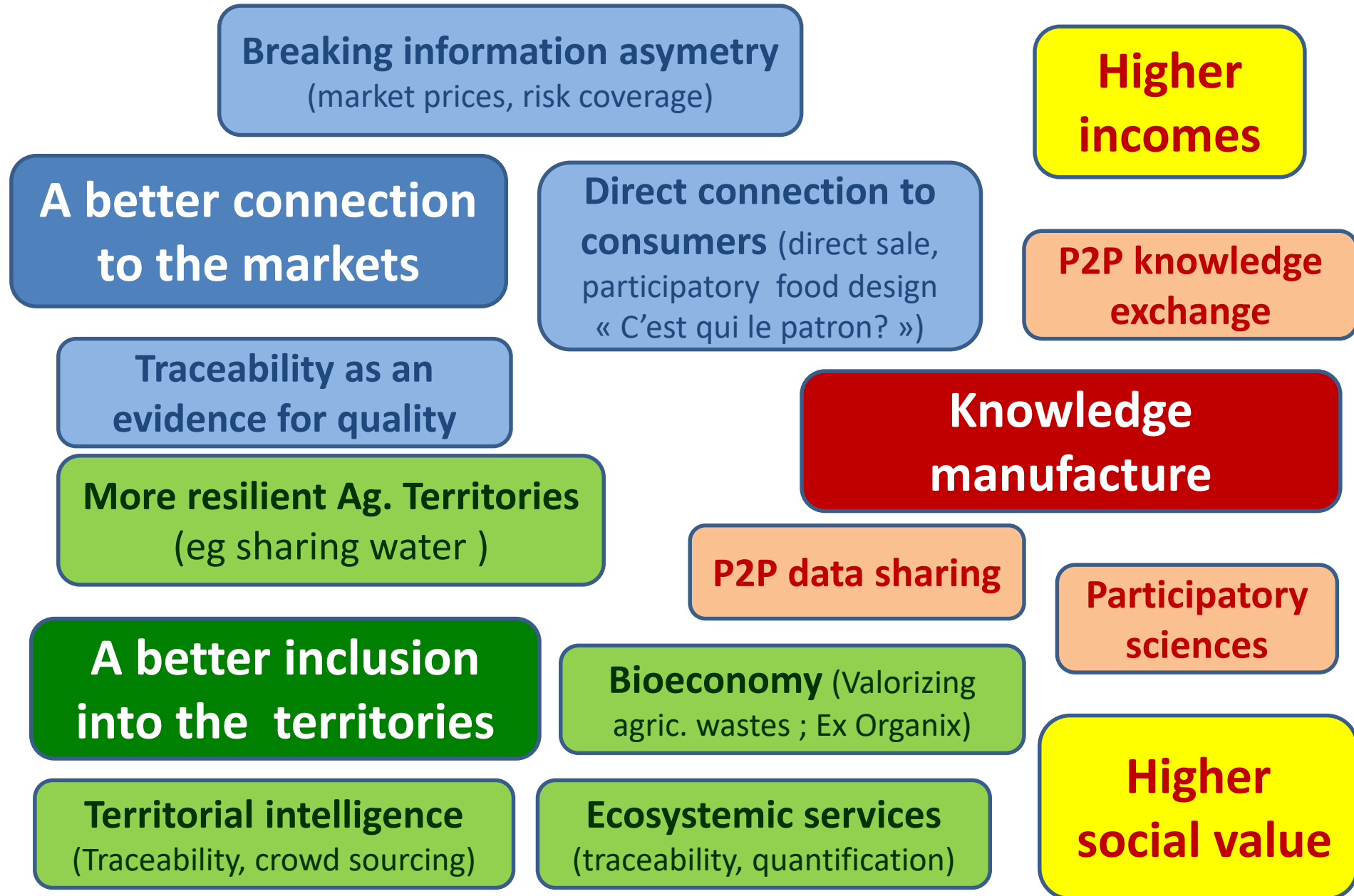
Levers that help agriculture to evolve



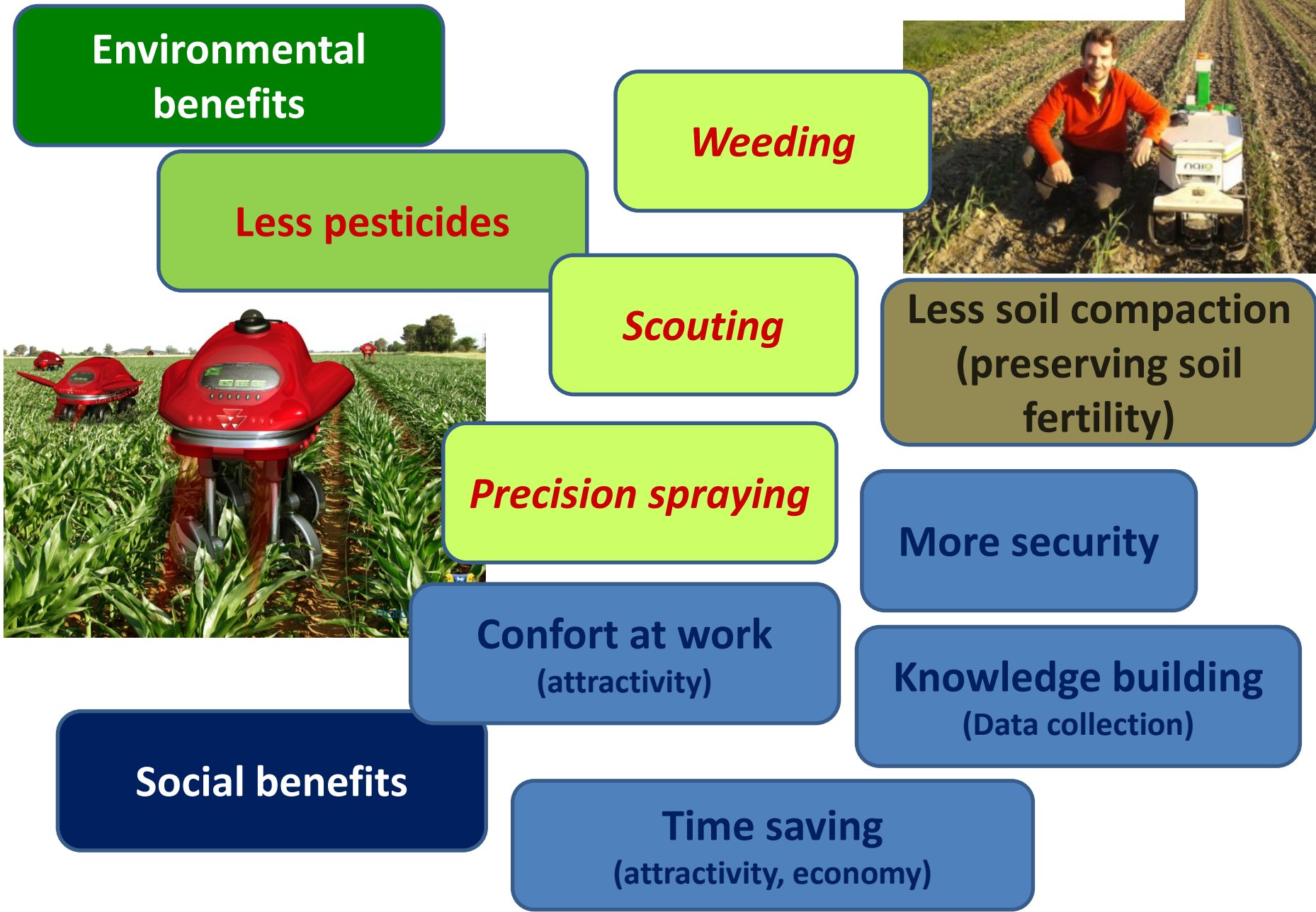
DA for improving agricultural production



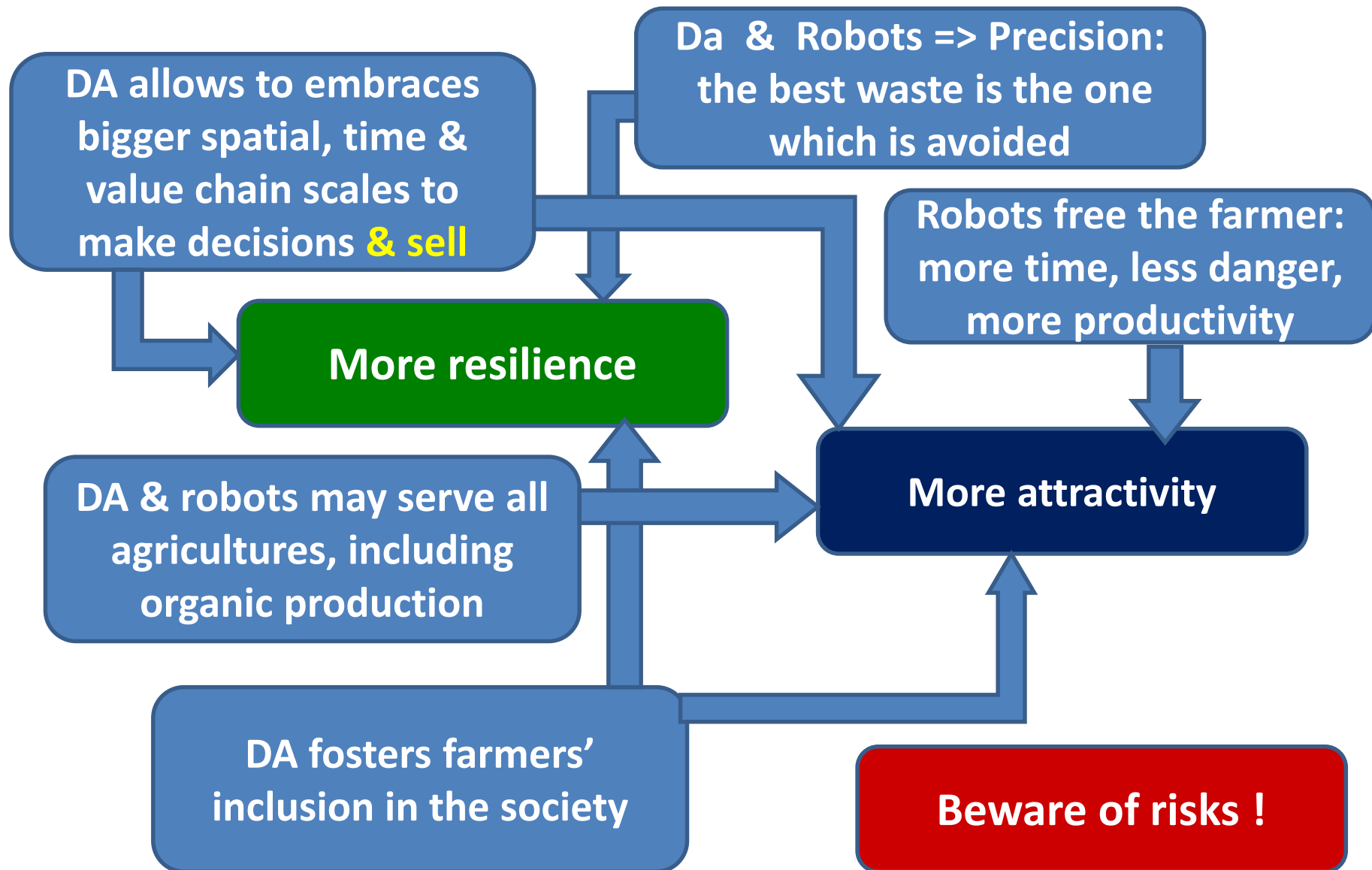
DA for improving farmers' social inclusion



Robotics : not only an economic gain



Why encouraging DA & robotics?



Risks

The digital divide

Debt Overload
(robots)

Two-tier system
(adoption issues)

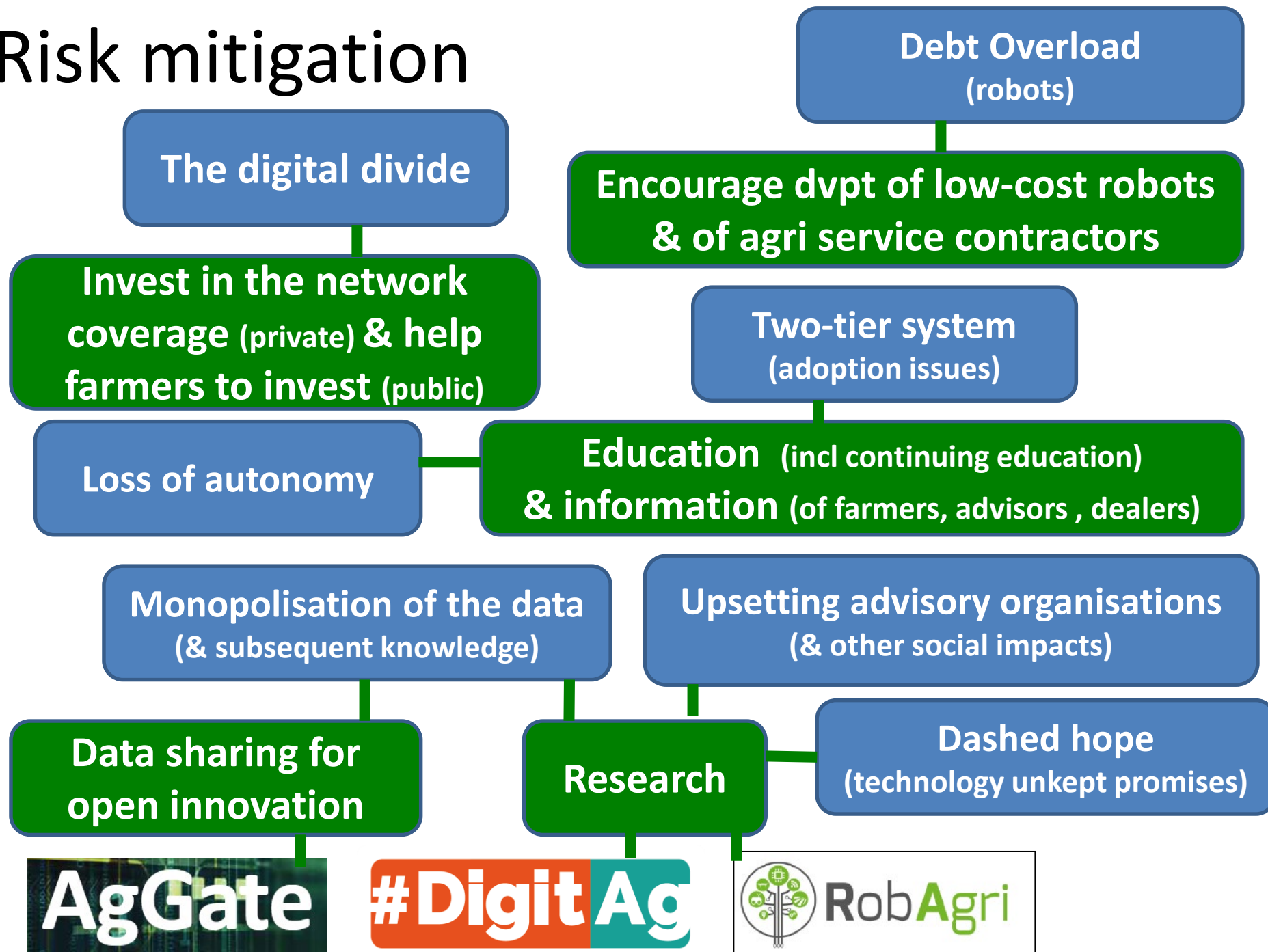
Loss of autonomy

Monopolisation of the data
(& subsequent knowledge)

Upsetting advisory organisations
(& other social impacts)

Dashed hope
(technology unkept promises)

Risk mitigation





INRAE



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Thank you for your attention!

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