Analysing sociotechnical barriers and fostering innovation to diversify crop rotations. Examples in vegetable cropping systems in South-Eastern France

Mireille Navarrete, Marion Casagrande, Arnaud Dufils, Amélie Lefèvre, Claire Lesur-Dumoulin

ANALYZING SOCIOTECHNICAL BARRIERS AND FOSTERING INNOVATION TO DIVERSIFY CROP ROTATIONS. EXAMPLE IN VEGETABLE CROPPING SYSTEMS IN SOUTH-EASTERN FRANCE

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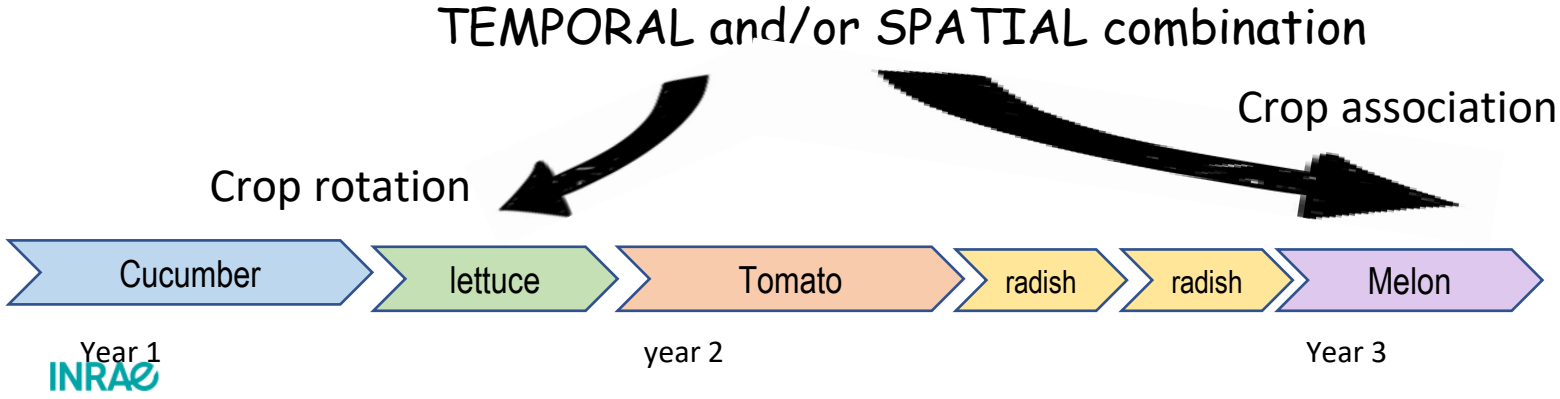
WEBINAR, 19/06/2024

Socio-economic context and state of the art

- Agroecology (AE) : A transformative way to preserve human and environment health
- Crop diversification : a large potential to lower pest and disease damages + other ecosystemic services (Kremen *et al* 2012, Vialatte *et al* 2023)
- Various levers to manage pests and diseases with crop diversification
  - ↗ number of species (introduce resistant or tolerant species/cv and ↘ crop return time of most frequent species)
  - ↘ number of pesticide-intensive crops/species
  - Introduce commercial or service species with pest control effects (e.g. allelopathic effects, biofumigation)



Sociotechnical lock-in (concepts and theory)

- Crop diversification requires a deep redesign of cropping and farming systems (Altieri, 1999; Morel et al., 2020)
- Difficulties in changing practices in the farms :

INDIVIDUALS

farmers' motivations

+

SYSTEM

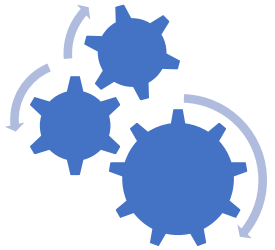
sociotechnical lock-in

Sociotechnical lock-in (Vanloqueren and Baret 2009, Meynard *et al* 2018, Della Rossa *et al* 2020, Boulestreau *et al* 2021)

Complex relationships between upstream chain, farmers, advisory actors, downstream chain

Each may create a barrier to crop diversification

The different barriers to crop diversification reinforce one another in a systemic way

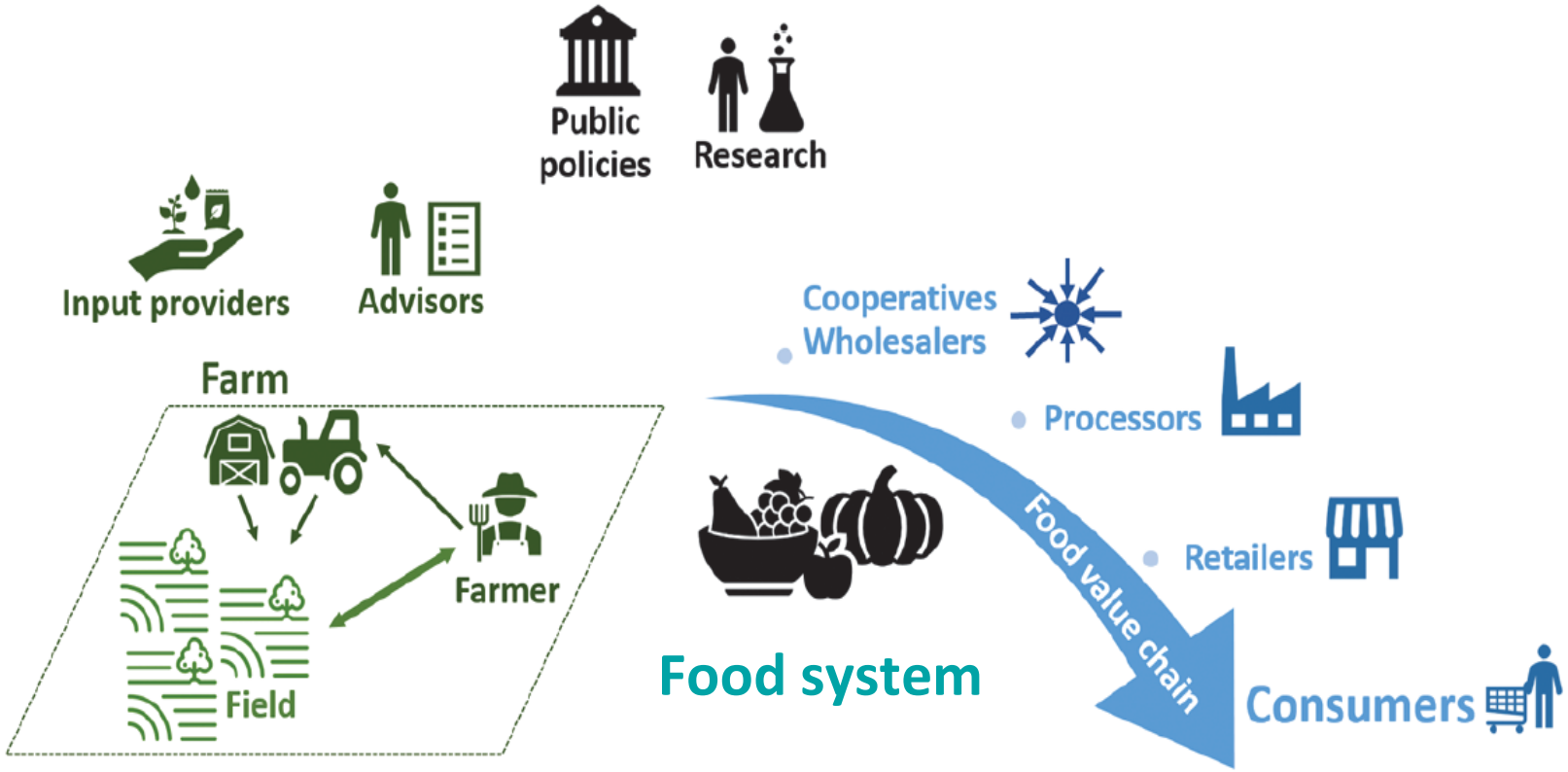


My presentation : focus on crop diversification at farm level (crop rotation, crop association)

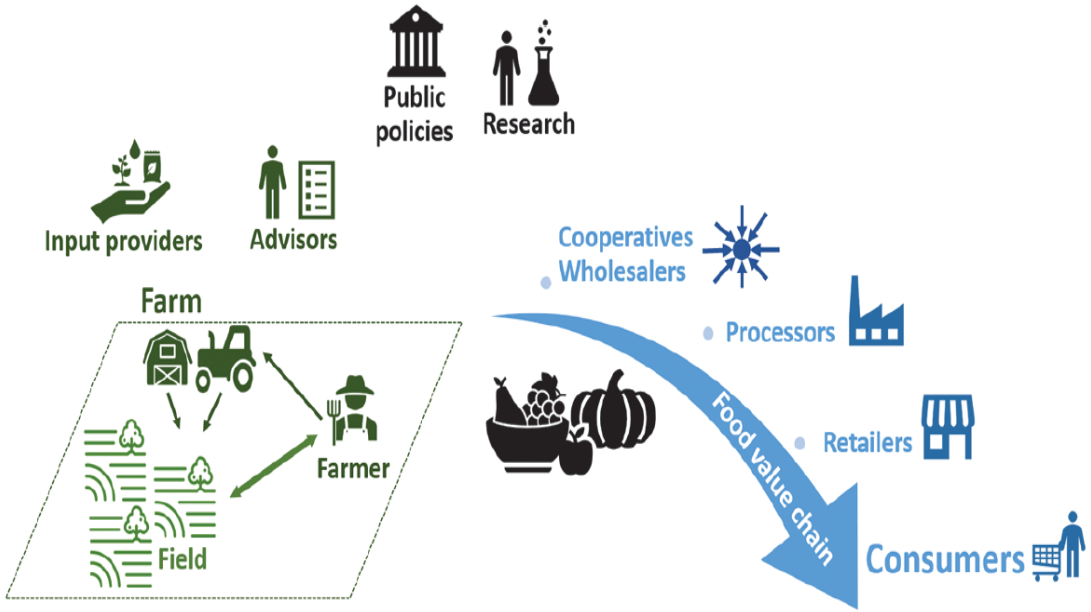
1. Which farmers' barriers and how the other actors reinforce or alleviate them ?
2. Which innovation at agrifood systems level to unlock the socio-technical system and promote crop diversification

Methods : An empirical survey with semi-directive questionnaires

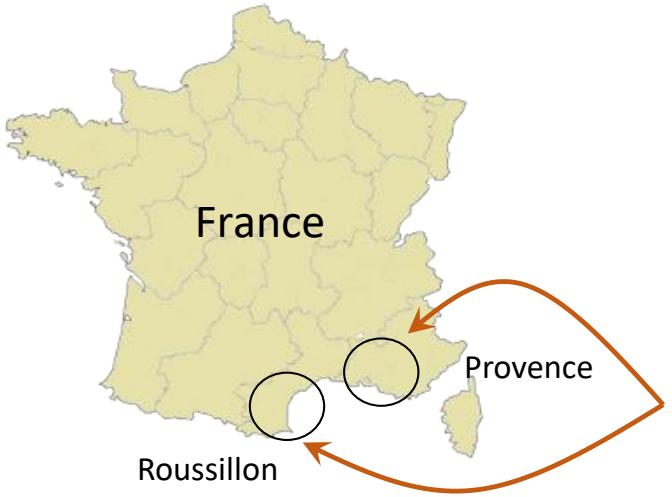
Different categories of actors likely to hinder the adoption of diversified crop rotations in market-gardening systems



Methods : An empirical survey with semi-directive questionnaires



- Mapping the actors concerned by the diversification of crop rotation
- Empirical surveys to understand the determinants of actors' practices in relation to crop diversification (N=49)
- Characterizing the obstacles and levers to the innovation process

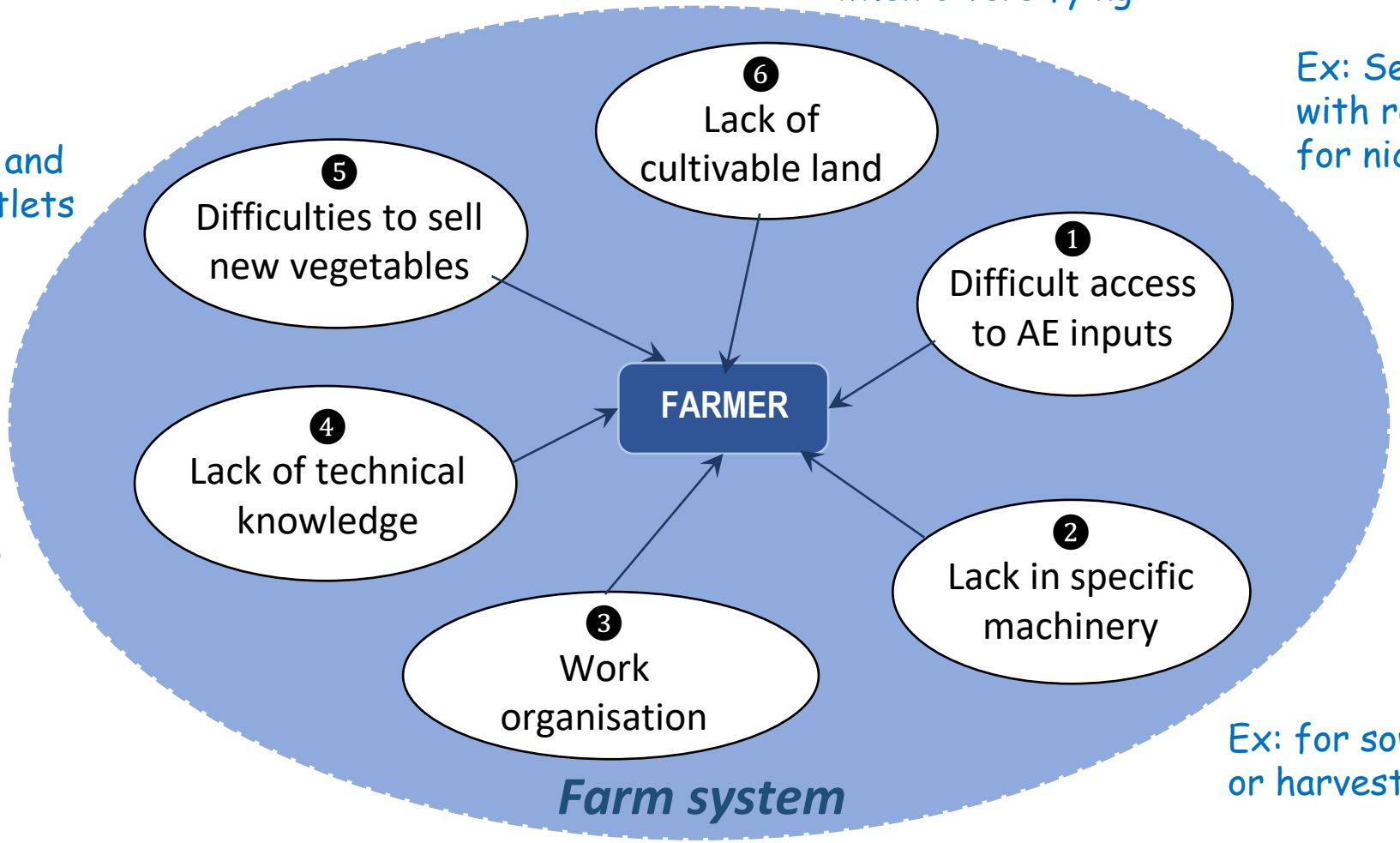


2 major market-gardening production basins in France

INRAE

Results : brakes for crop diversification to reduce pesticide use

6 categories of brakes related to farmers



Ex: to remain competitive when diversifying

Ex: Seeds and plantlets with resistant genes for niche species

Ex: narrow and uncertain outlets

Ex: knowledge and know-how on new species

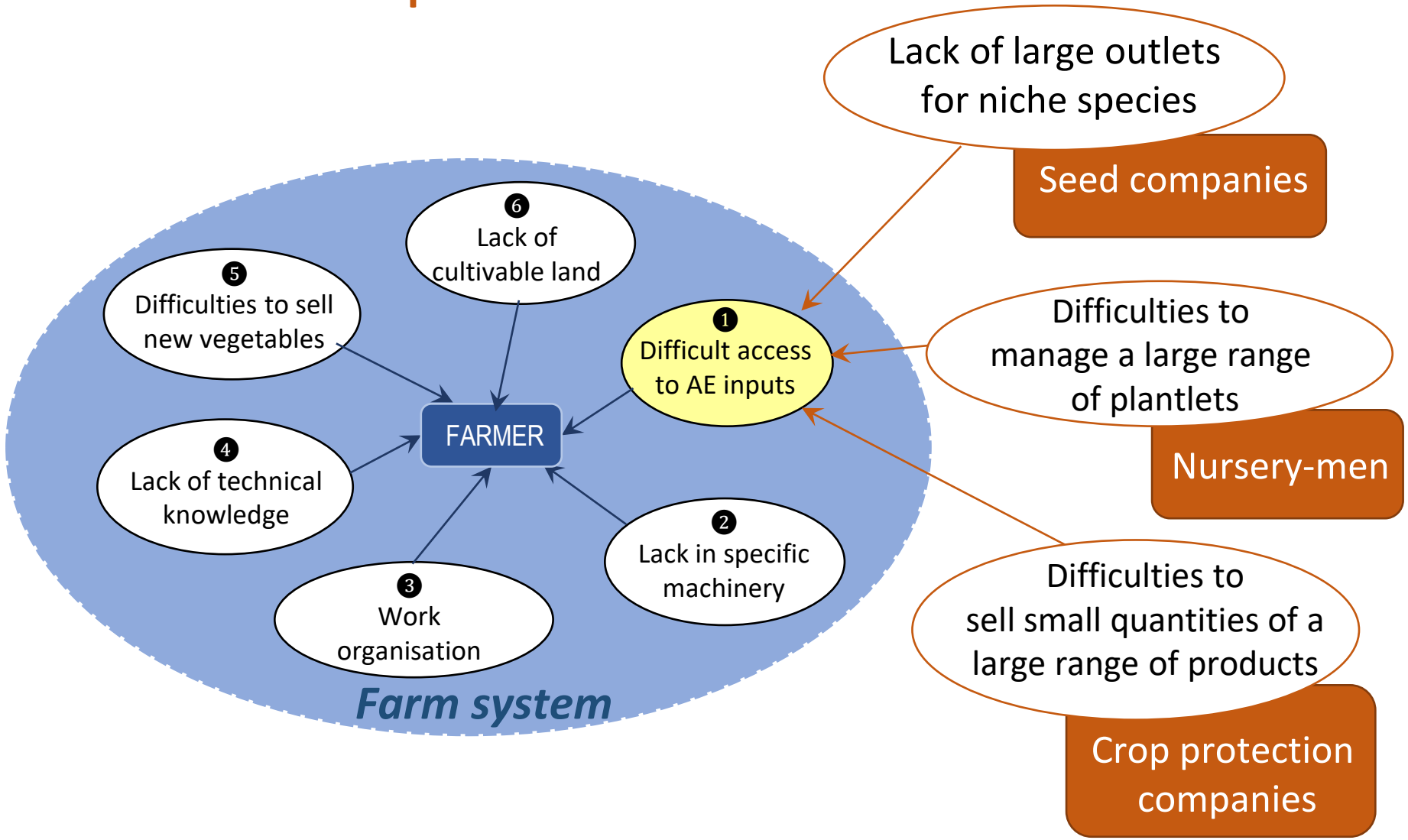
Ex: for sowing or harvesting niche species

Ex: Organisation of tasks on an increased number of species

INRAE

Results : brakes for crop diversification to reduce pesticide use

Brakes related to upstream actors



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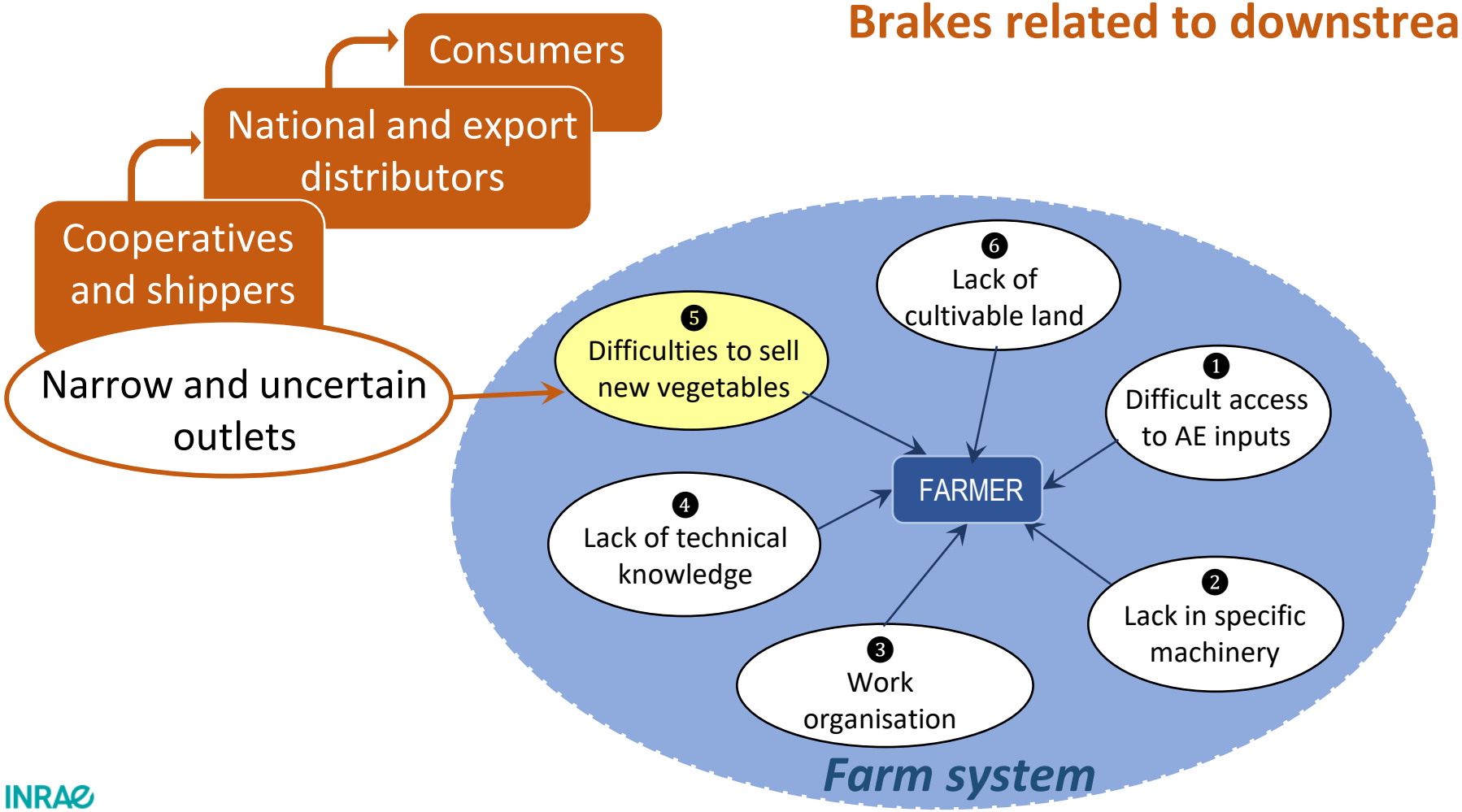
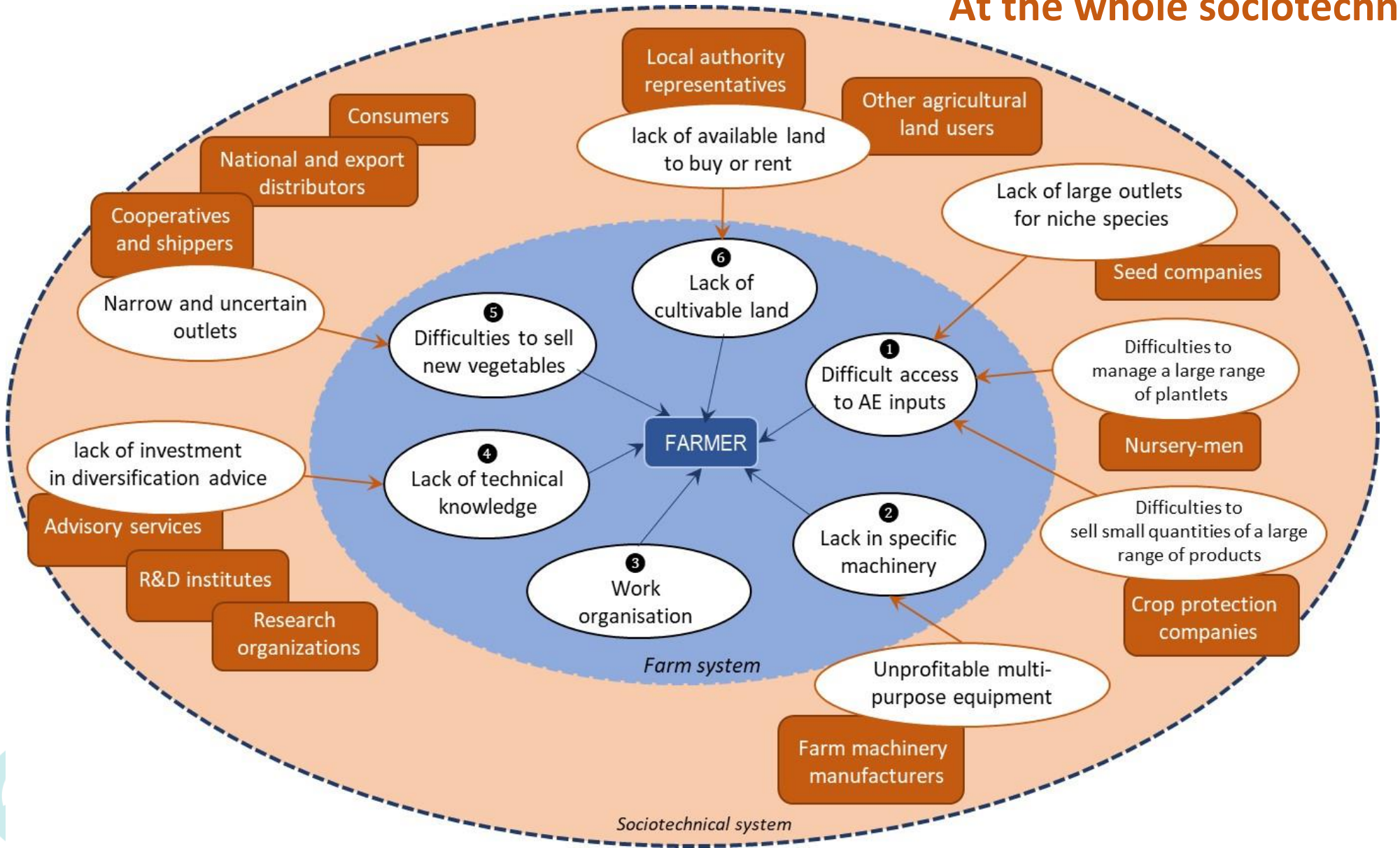
Results : brakes for crop diversification to reduce pesticide use

Brakes related to downstream actors



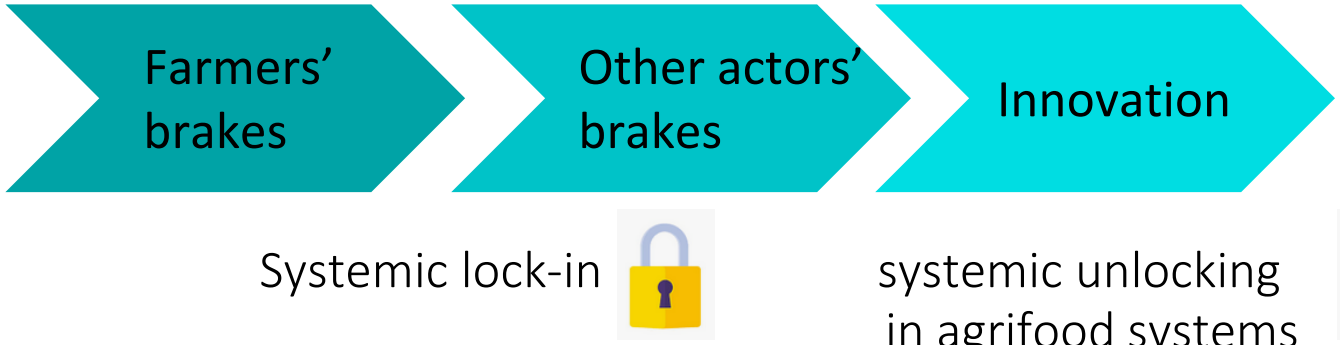
Results : brakes for crop diversification to reduce pesticide use

At the whole sociotechnical level system



Coupled innovations lock-in (concepts and theory)

From sociotechnical lock-in ... to coupled innovation



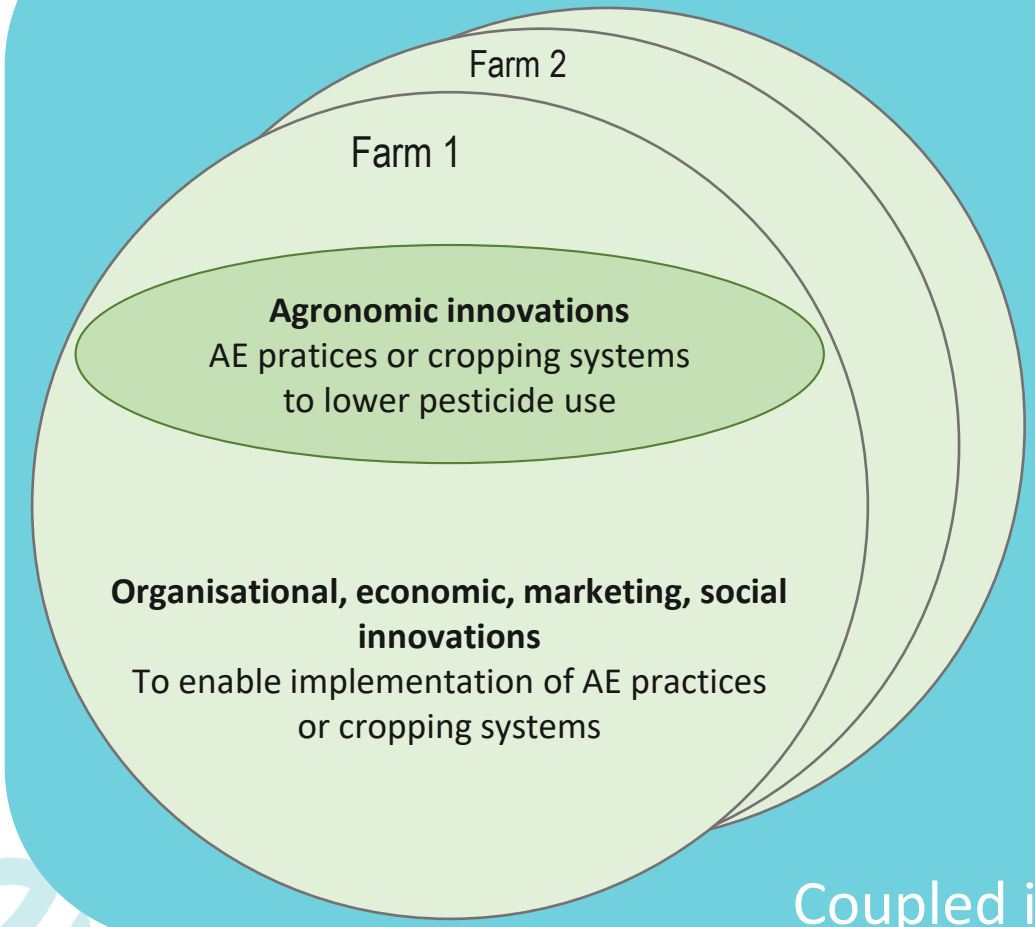
Coupled innovation :

Coordination of innovation processes of different natures (technical, organizational, regulatory, institutional, social), driven by different actors and generally apprehended independently of each other

(Meynard et al. 2017; Boulestreau et al. 2023)

Coupled innovation to support crop diversification : theoretical framework

Innovations on farm



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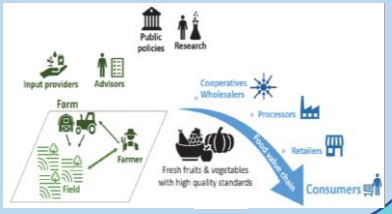
Coordination between food-system actors to favour innovations at farm level

Coordinations

- Between farmers
- Between farmers and upstream/downstream actors
- Within upstream or downstream channels
- With extension services
- With local and national public authorities
- With other production channels

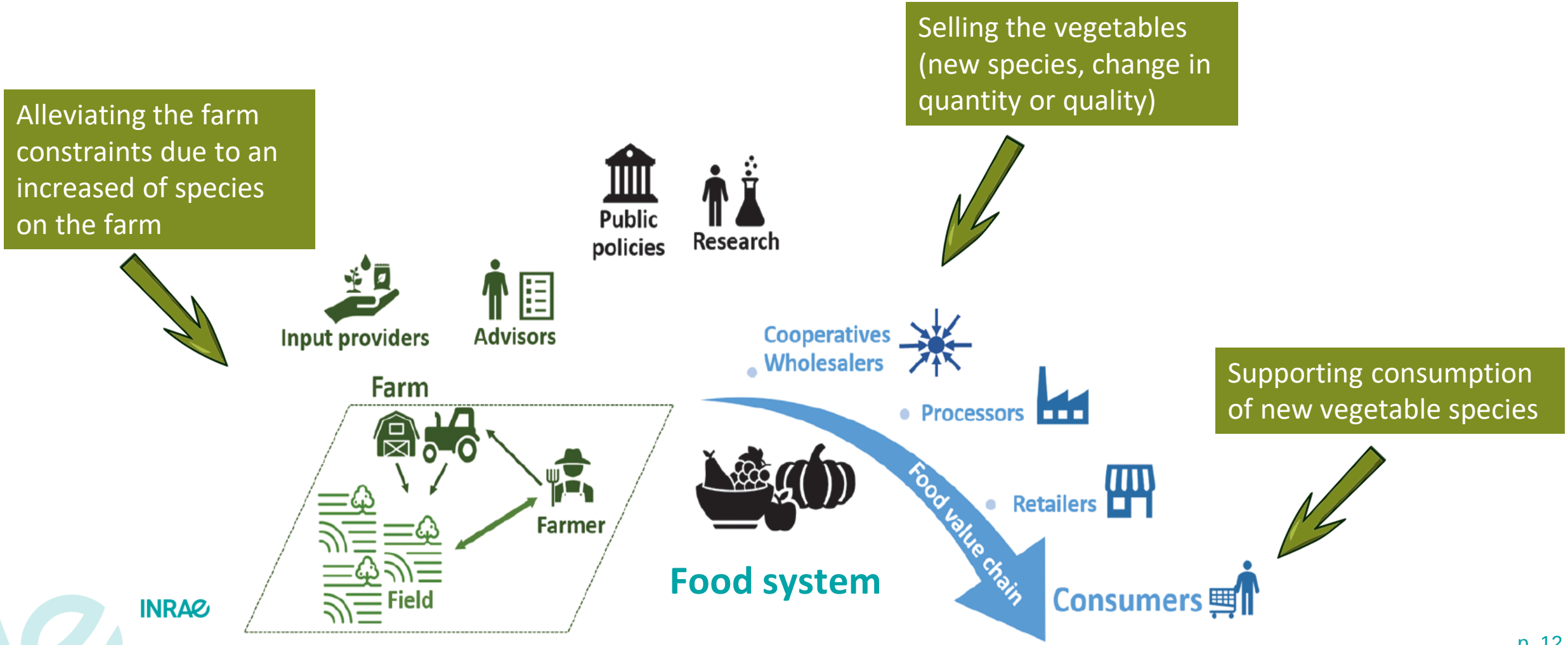


Coupled innovation

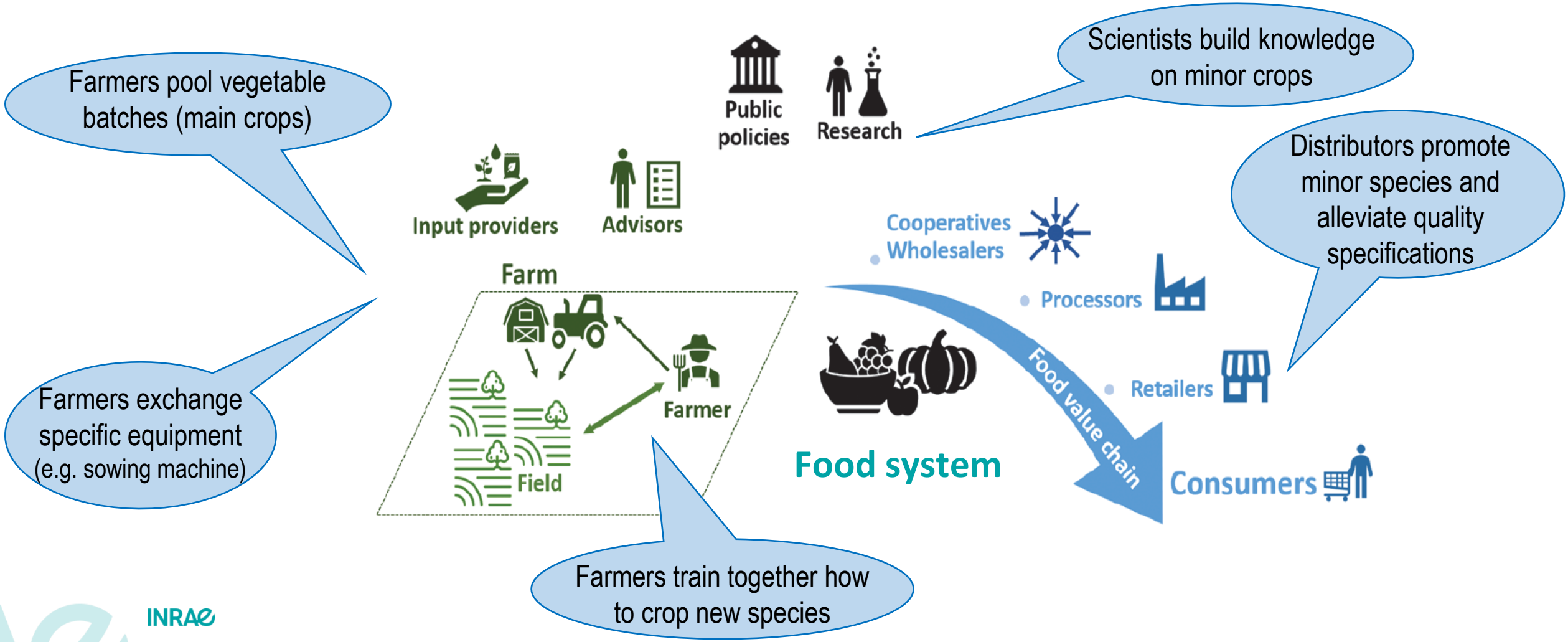
AE : agroecological

Navarrete et al. submitted

Coupled innovation to support crop diversification : a example of prototype from the case study



Coupled innovation to support crop diversification : example of a prototype coming from the case study



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Thanks for your attention !

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