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## How do participatory and systemic approaches complete, to design more sustainable orchards ?

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# How do participatory and systemic approaches complete, to design more sustainable orchards ?

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Bellon S., Fauriel J., Alaphilippe A., Corroyer N., Dapena E, Fillatre J.-Y., Guibert Y., Hemptinne J.-L., Jamar L., Laizeau R., Lateur M., Lauri P.-E., Leterme E., Libourel G., Liehn B., Petit J.-L., Ramonguilhem M., Simon S.

# CONTEXT

Orchards systems face specific constraints for adaptation: culture pérenne, production de fruits frais 'zéro défaut'

Orchards systems have poor self-regulation: current systems target productivity and require frequent plant protection and fertilization measures and rather suppress than foster the self-regulation of the system to control pests and diseases

The context is changing encouraging producers to reconsider their orchard's design and management:

- Low profit margins in the conventional food-chain

- Environmental and health awareness among consumers, producers and regulators, e.g. EU reduction of chemical active compounds

- Successful new practices and marketing organizations demonstrate potential alternatives

# OBJECTIVES OF THE GROUP « VERGERS + DURABLES »



**Re-  
conception**

- Tree architecture
- Orchards multi-strata structure
- Temporal & spatial stability



Complex design opportunities to foster ecosystem processes



**Eco-  
conception**

- Integrative approach to address interdependent, multi-level and multi-actors issues



**Co-  
conception**

But :

- Scarce references on the combined use of alternative methods and their **integration** within the agroecosystem
- Technical and **scientific paradigm shift** : approach, properties and methods



- (i) Redefine properties of sustainable orchards and evaluation criteria
- (ii) Explore new techniques and promising orchards

## A group of experts:

24 permanent French-speaking participants :

- 8 Scientists from various disciplines
- 6 Farmers in OF
- 9 Advisors and technicians
- 1 Professor

## An orchards network:

- 8 Experimental
- 6 Commercial

## Thematic meetings :

- Invited key speakers
- Visits of innovative orchards
- Workshops



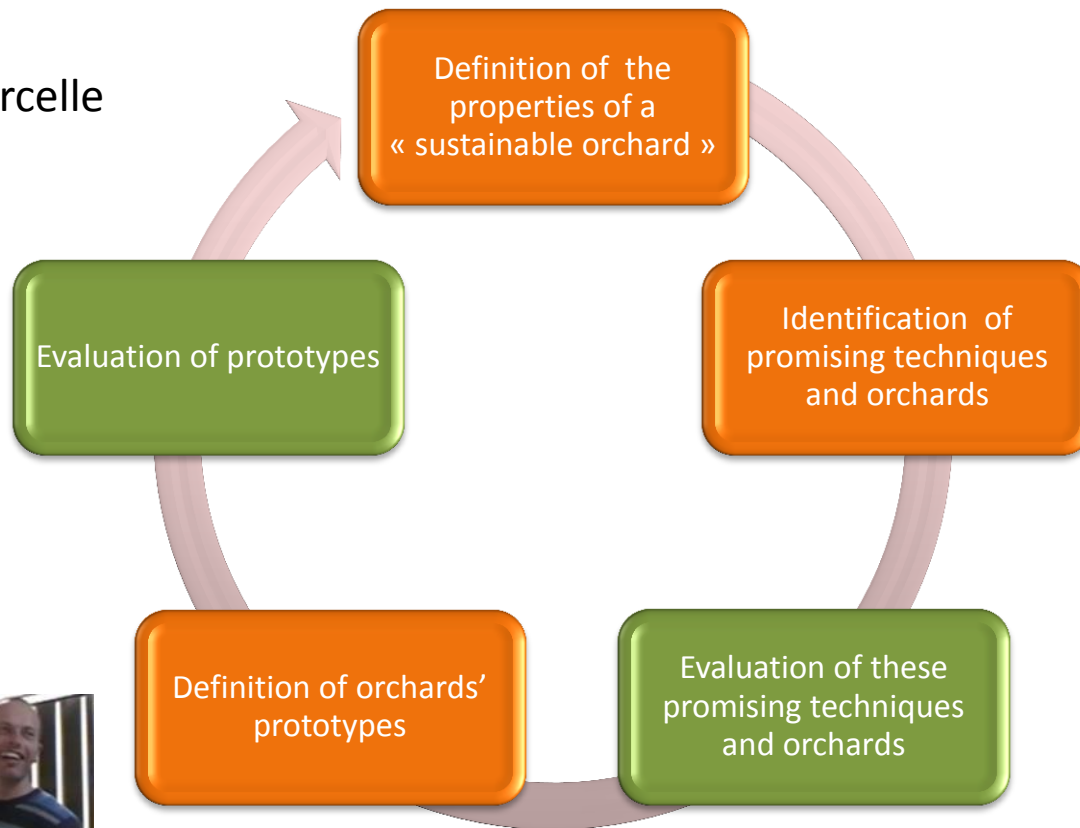
# AN ITERATIVE APPROACH



A dire d'experts

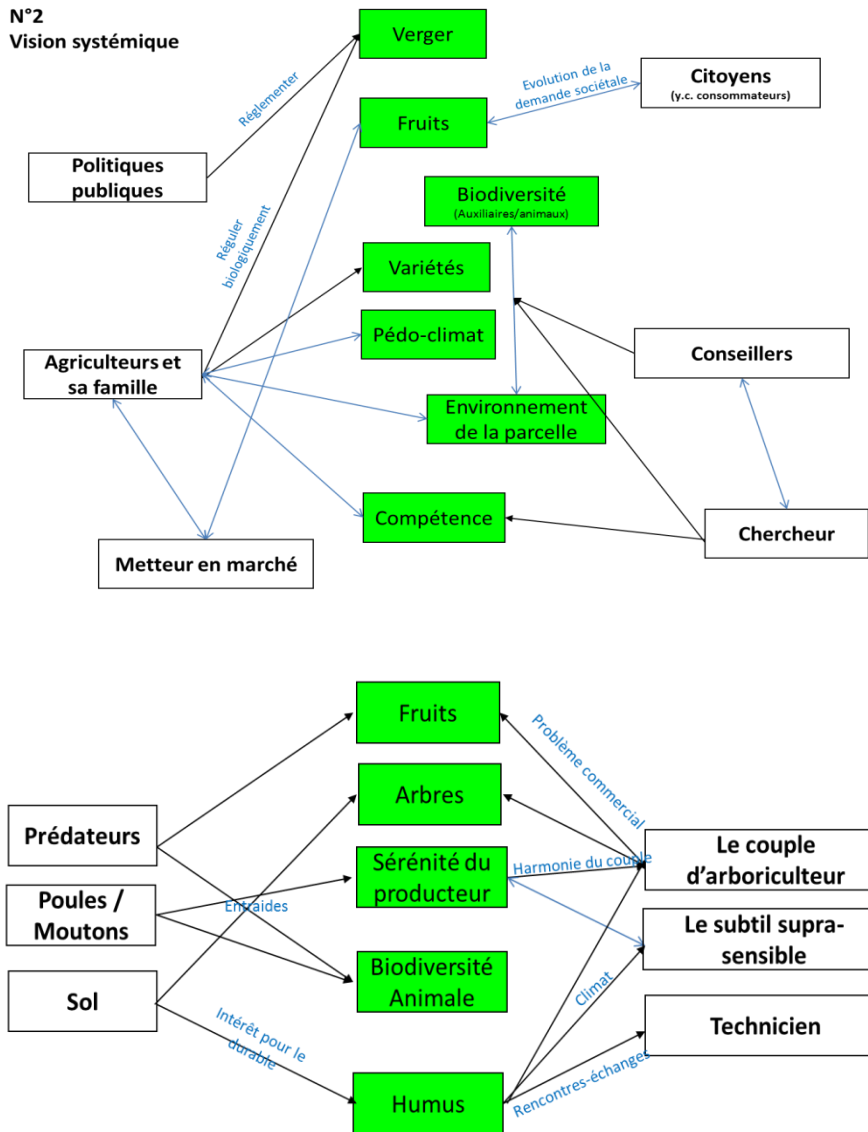


En parcelle



# COMMON DEFINITION OF THE PROPERTIES OF « SUSTAINABLE ORCHARDS » ?

N°2  
Vision systémique



# PARTICIPATIVE SELECTION OF LEVERS AND PROTOTYPES



## Technological Orchard

1

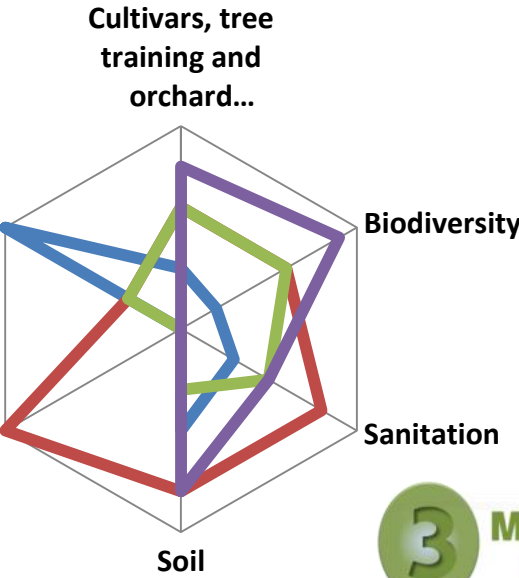
*Reproducible & Productive*



## Ecological Orchard

2

*Resilient & Self-functioning*



4

## Mixed Tree-Animal Orchard

*Multi-functional & Self-sufficient*



3

## Mixed Crop Orchard

*Productive & Flexible*





# EVALUATION OF PROTOTYPES IN EXPERIMENTAL ORCHARDS

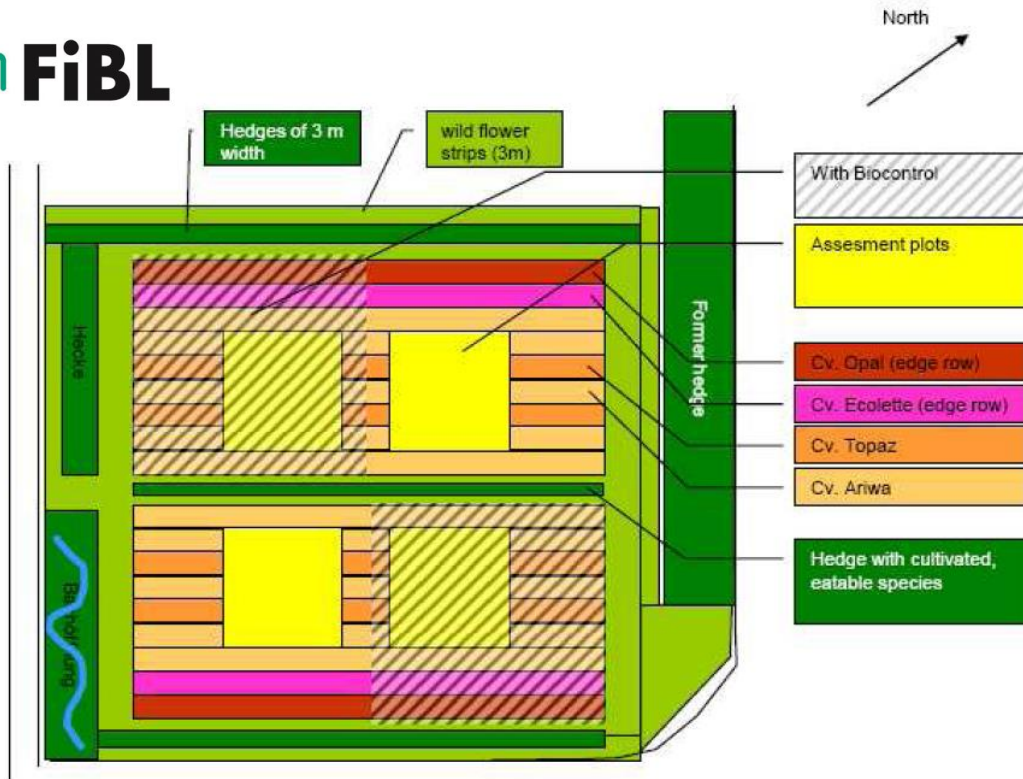


Figure 1: Plan of the self-regulating orchard established at Frick in 2006. Total acreage is 1 ha. Details see text.



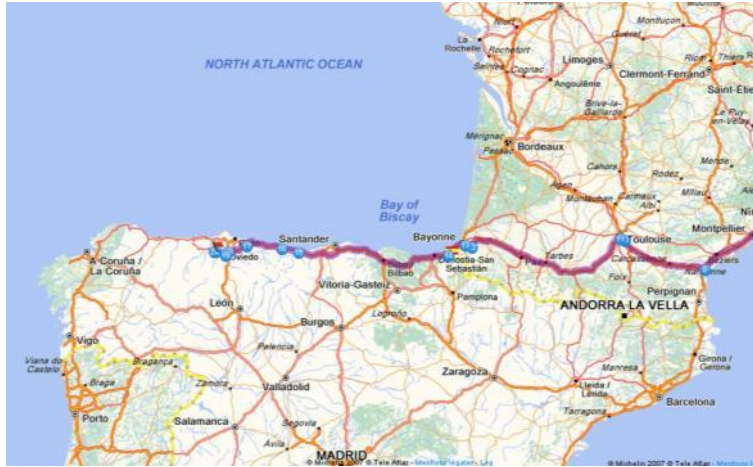
La Castelette

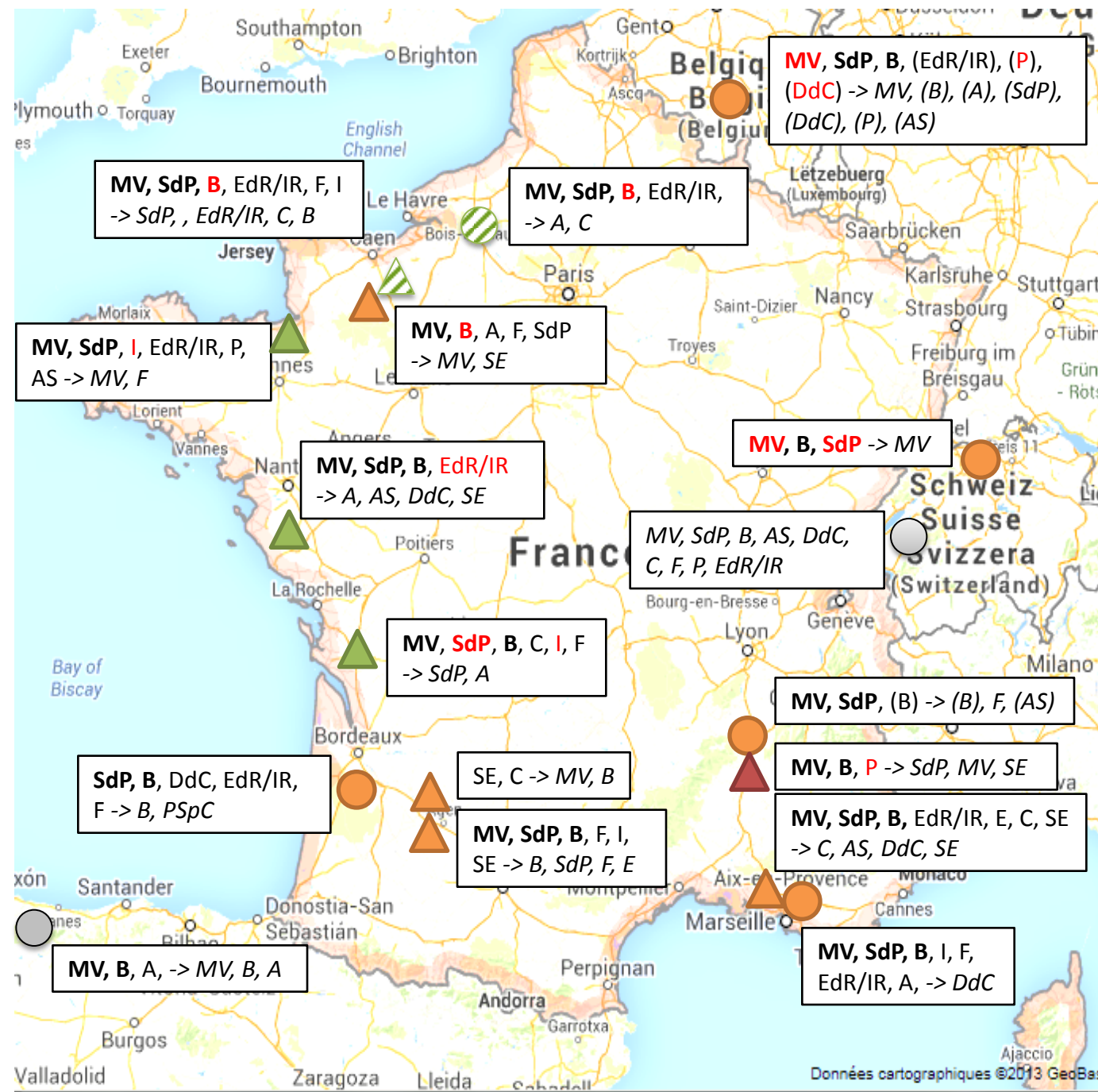


## La Durette



# AND IN COMMERCIAL ORCHARDS ...





- VD adapté à sa vision
- VD pas mal mais peut mieux faire
- VD éloigné de sa vision
- VD non planté
- parcelle cidricole
- Parcelle expérimentale
- Parcelle producteur

**Leviers mobilisés**

MV : matériel végétal  
 SdP : stratégie de protection  
 B : biodiversité  
 EdR/IR : entretien du rang/inter-rang  
 F : fertilisation  
 C : conduite  
 P : palissage  
 AS : agencement spatial  
 I : irrigation  
 DdC : diversification de cultures  
 A : introduction animal  
 SE : socio-économique  
 E : énergie  
 PSpC : préparation de sol par culture

**En gras : fréquence supérieure**  
**En rouge : effet négatif**  
*En italique : futurs leviers*  
*( ) : réponse différente selon enquête*

**MV, SdP, B, (EdR/IR), (P), (DdC) -> MV, (B), (A), (SdP), (DdC), (P), (AS)**

**MV, SdP, B, EdR/IR, F, I -> SdP, EdR/IR, C, B**

**MV, SdP, B, EdR/IR, -> A, C**

**MV, SdP, I, EdR/IR, P, AS -> MV, F**

**MV, B, A, F, SdP -> MV, SE**

**MV, SdP, B, EdR/IR -> A, AS, DdC, SE**

**MV, B, SdP -> MV**

*MV, SdP, B, AS, DdC, C, F, P, EdR/IR*

**MV, SdP, B, C, I, F -> SdP, A**

**MV, SdP, (B) -> (B), F, (AS)**

**SdP, B, DdC, EdR/IR, F -> B, PSpC**

*SE, C -> MV, B*

**MV, B, P -> SdP, MV, SE**

**MV, SdP, B, F, I, SE -> B, SdP, F, E**

**MV, SdP, B, EdR/IR, E, C, SE -> C, AS, DdC, SE**

**MV, B, A, -> MV, B, A**

**MV, SdP, B, I, F, EdR/IR, A, -> DdC**

# HOW COMPLEMENTARY ARE SYSTEM APPROACHES ON COMMERCIAL AND EXPERIMENTAL FARMS ?

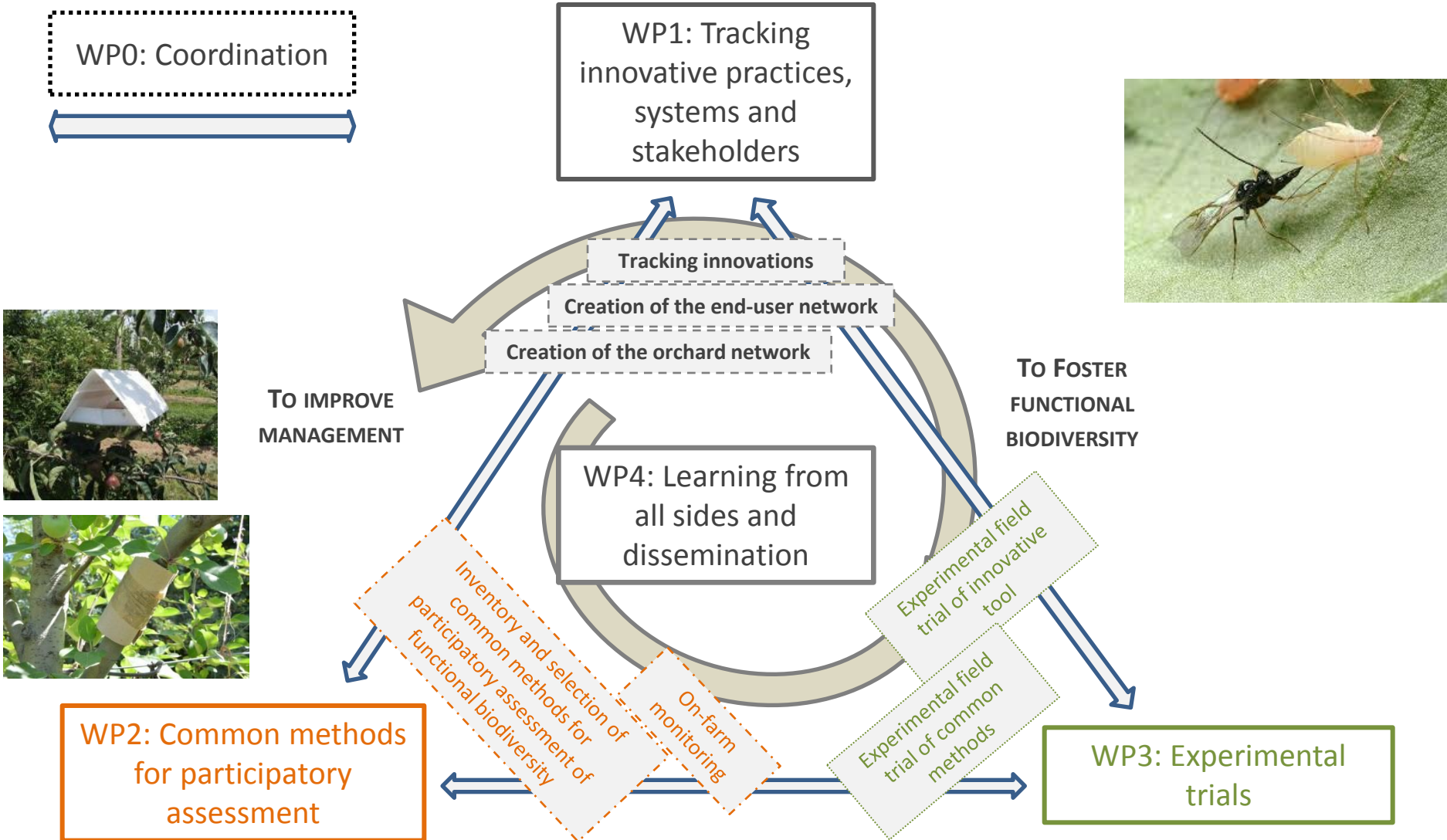
- **Experimental orchards** →
  - More prospective prototypes ?
  - Scientific assessment
- **Commercial orchards** →
  - Increased number of levers implemented
  - Farm scale incl. socio-economical dimensions
  - Field constraints and practitioners assessment



# ECO-ORCHARD PROJECT :



## TRACKING AND ASSESSING EFFICIENT AND OPERATIONAL TOOLS TO MANAGE AND FOSTER CONSERVATION BIOCONTROL IN ORCHARDS



# Thank you !

