Agroforestry Orchards Systems

How far does biodiversity contribute to system sustainability?

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Introduction

Agricultural systems nowadays have to reduce their reliance on pesticides while remaining efficient.

Crop diversification and increasing of biodiversity in the agricultural system associated with the implementation of **agroecological practices** could promote biological pest control and increase the **sustainability** of the systems.

Hypothesis

Could the intercropping practices and biodiversity at plot and farm level promote a better biological pest control and increase the sustainability of the system?

Objectives

. Produce references on the performances of the multispecies and multi-scale systems

. Provide design support tools

Co-design

The designing of **sustainable agroforestry orchards systems** required a **collaborative learning**. This design has been led on two sites: TAB and Durette by a collaborative groups of scientists, farmers and technicians. Setting up production **objectives** and **constraints**, designing **3D patterns** and writing **metarules** of the system have constituted major steps and products of the design. The systems have been afterwards evaluated with an ex-ante evaluation tool.

Durette

. Set up in 2014

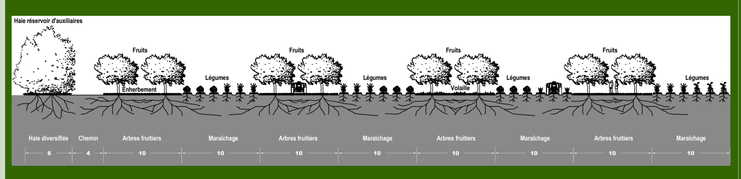
. 5 ha in Avignon

. Farm-scale approach with two independent farmers

. Short food supply chain

. Diversity of vegetables (30 and more) associated with various fruit trees

. Composite and specific hedges (kiwi and grapes)



. Double-row of fruit trees

⇒ Maximum ground coverage between the trees

⇒ Presence of poultry (pests control)

Plate-forme TAB

. Set up in 2013

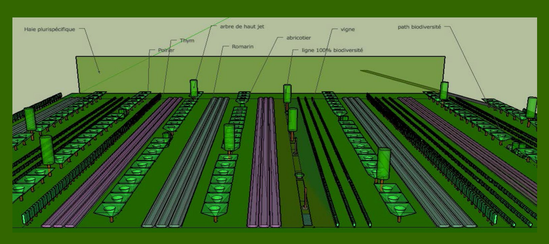
. 6 ha in Etoile-sur-Rhône

. Experimental site scale with several experts

. Products sold on distribution markets

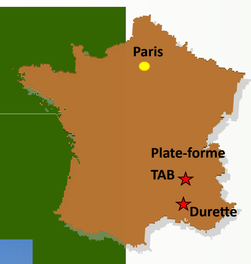
. Peach associated with arable crops (soya/corn seed/fababean/colza/wheat)

. Composite hedges and hot spot of biodiversity



. Different prototypes are considered for the future

. Implementation of two other plots planned for 2016



Metarules : Different leverages to manage cultural systems

Long-term

Organisation of the agroecosystem

Crop mixing and diversification. Pest-tolerant cultivars. Crop rotation and soil cover, improved soil fertility. Increased non-productive biodiversity areas

Mid-term

Prophylaxis and preventive practices

Cultural practices: reduce irrigation frequency and tillage, increase seeding rate to compete with weeds

Managing pests and pathogens propagation

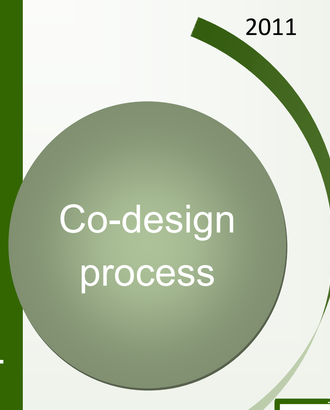
Reduction of fertilization

Introduction of animals

Short-term

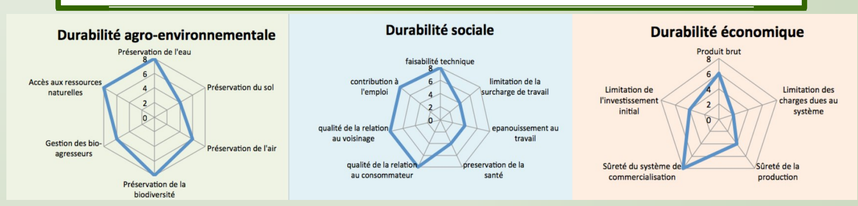
Direct pest control

Mechanical weed control and plant protection treatments



Evaluation ex-ante

A first evaluation has been made to adjust their characteristics. A new ex-ante tool has been set up with the collaborative group to take into account the interactions between crops and trees in organic farming.



Evaluation ex-post

A multiple-criteria evaluation is conducted.

Dissemination

Articles, open field days for farmers, network building, scientific conferences...

Technical partners:

With the financial support of :