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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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 »

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

Complex design opportunities to foster ecosystem processes

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

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

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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

Definition of the properties of a « sustainable orchard »

Identification of promising techniques and orchards

Evaluation of prototypes

Definition of orchards’ prototypes

Evaluation of these promising techniques and orchards

Work sessions

Orchards visits

Experience and science sharing

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

Productivity in short and long term:
- Through natural resource preservation

Capable of absorbing disturbances (Robust and resilient):
- By nurturing agroecosystemic services over external use (phyto, fertilisation, W, E)

Capable of adapting to changes: climate, input prices, consumption, etc. (Adaptable and evolutionary - "duragility")
- By promoting diversification (cultivars, incomes, commercial channels, etc.) and innovation

Differentiation at the high end (High value and high quality):
- Fruits with high nutritional, gustative, conservation (outside the fridge) or from orchards of high environmental value must be marketable and at a "socially just price".
PARTICIPATIVE SELECTION OF LEVERS AND PROTOTYPES

Technological Orchard
Reproducible & Productive

Direct control
Animal introduction

Cultivars, tree training and orchard...

Biodiversity
Sanitation

Ecological Orchard
Resilient & Self-functioning

Mixed Tree-Animal Orchard
Multi-functional & Self-sufficient

Mixed Crop Orchard
Productive & Flexible

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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.
AND IN COMMERCIAL ORCHARDS ...
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 enquêté

MV, SdP, B, EdR/IR, -> A, C
MV, SdP, B, EdR/IR, P, AS -> MV, F
MV, SdP, I, EdR/IR, -> MV, SE
MV, SdP, B, EdR/IR, -> A, AS, DdC, SE
MV, SdP, B, C, I, F -> SdP, A
MV, SdP, B, SD, C, I, F, SE -> B, SdP, A
MV, SdP, (B) -> (B), F, (AS)
MV, SdP, (B) -> MV, (B), (SdP), (DdC), (P), (AS)
MV, B, P -> SdP, MV, SE
MV, SdP, B, I, F, EdR/IR, A, -> DdC

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

MV, SdP, B, EdR/IR, -> A, C
MV, SdP, B, EdR/IR, P, AS -> MV, F
MV, SdP, I, EdR/IR, -> MV, SE
MV, SdP, B, EdR/IR, -> A, AS, DdC, SE
MV, SdP, B, SD, C, I, F -> SdP, A
MV, SdP, B, SD, C, I, F, SE -> B, SdP, A
MV, SdP, (B) -> (B), F, (AS)
MV, SdP, (B) -> MV, (B), (SdP), (DdC), (P), (AS)
MV, B, P -> SdP, MV, SE
MV, SdP, B, I, F, EdR/IR, A, -> DdC

En gras : fréquence supérieure
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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 practionners assessment
ECO-ORCHARD PROJECT:
TRACKING AND ASSESSING EFFICIENT AND OPERATIONAL TOOLS TO MANAGE AND FOSTER CONSERVATION BIOCONTROL IN ORCHARDS

WP0: Coordination

WP1: Tracking innovative practices, systems and stakeholders

WP2: Common methods for participatory assessment

WP3: Experimental trials

WP4: Learning from all sides and dissemination

To improve management

To foster functional biodiversity

Tracking innovations

Creation of the end-user network

Creation of the orchard network

Inventory and selection of common methods for functional biodiversity

On-farm monitoring

Experimental field trial of innovative tool

Experimental field trial of common methods
Thank you!