

Towards new models of highly sustainable orchards: an integrative and participatory approach

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Abstract

Since 2008, a European group of growers, extension agents and scientists has addressed the question of growing 'more sustainable' fruits within a participatory approach. More recently, an original framework to describe innovative trajectories was tested. A survey was performed to characterise promising orchards according to the combination of techniques, satisfaction and evolution perspectives. The results emphasize a variety of trajectories, but common technical practices and evolution perspectives were identified.

Keywords: participatory research, orchards, sustainability, design, innovation

Introduction

Since 2008, a group of growers, extension agents and scientists has addressed the question of growing 'more sustainable' fruits within a participatory approach (Penvern *et al.*, 2012a). Promising orchard prototypes have already been identified (Penvern *et al.*, 2012b). Each orchard is unique since orchard management and redesign are the result of different combinations of techniques implemented within a systemic and dynamic approach in response to specific constraints and objectives. New approaches are thus necessary to characterise promising orchards and innovations. This contribution proposes an original framework that we developed to describe changes in practices along socio-technical trajectories and to take the concerned actors' visions and constraints into account.

Material and Methods

Interviews were carried out in 2013 among members of the group (n=20). The survey was structured into three sections: (i) their vision of a "sustainable orchard", their motivations and the problems they faced; (ii) the technical practices (levers) the members used, assumed to implement or renounced implementing; (iii) their degree of satisfaction and evolution perspectives. The interviews were recorded and transcribed in their entirety before codification and analysis.

Results

First, this method allowed us to identify the diversity of levers implemented in the network. Fourteen groups of levers were characterised, among which the most frequent were: plant material, protection strategies and biodiversity conservation. The number of implemented levers varied from two to nine. Commercial orchards displayed a higher degree of integration, including socio-economic levers, whereas experimental orchards were generally dedicated to plant protection and growth. Second, the degree of satisfaction and projected future levers also provided information about the relevance of each lever in terms of increased sustainability.

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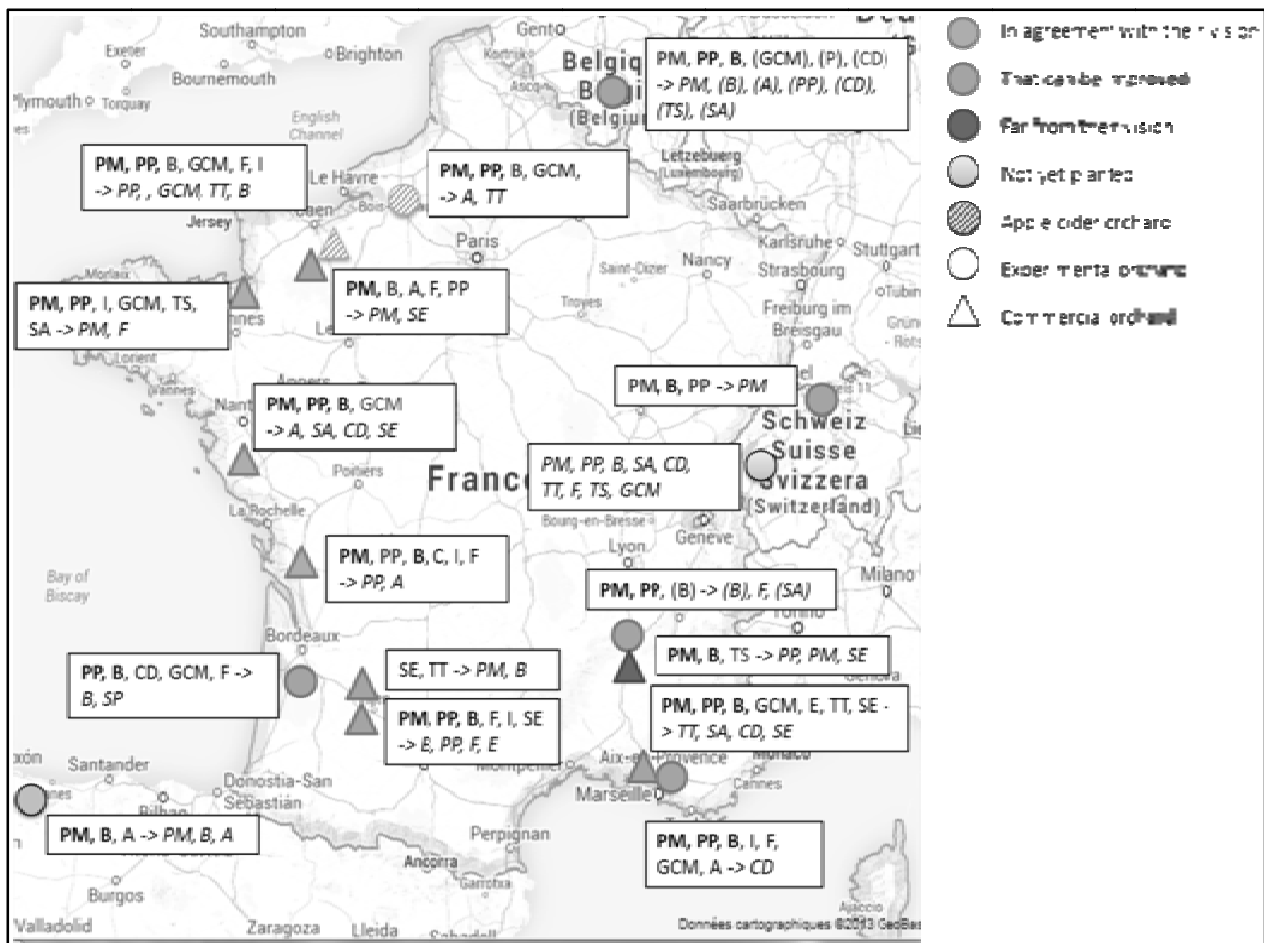


Figure 1: Description of the levers implemented (prevailing ones in bold) or planned (in italics), and degree of satisfaction according to their vision of a sustainable orchard. PM: plant material; PP: plant protection strategy; B: biodiversity; GCM: ground cover management; F: fertilisation; TT: tree training; TS: tree support; SA: spatial arrangement; I: irrigation; CD: crop diversification; A: animal introduction; SE: socio-economic lever; E: energy; SP: soil preparation.

Surprisingly, productivity was not the prevailing criterion used for evaluation, casting doubts on the criteria traditionally used for sustainability assessments. Even if opinions were divided on the subject of biodiversity conservation, tree support, crop diversification and irrigation were considered to be unsatisfactory. On the contrary, the most promising lever, considered to be either satisfactory or deserving of further testing, concerned new hardy, tasty and regular-bearing cultivars, regardless of the activity. However, even if researchers gave priority to plant protection strategies, farmers instead emphasized socio-economic levers and reduced fertilisation strategies to better fit their vision of a sustainable orchard. Finally, some levers were rarely or not implemented at all due to their complexity (e.g., animal introduction into the orchard), doubts about reversibility (e.g., crop diversification), pedo-climatic conditions or unproven efficacy.

Conclusion and perspectives

This survey was exploratory but the analytical framework for characterising orchard trajectories is promising. Although we focused our presentation on lever analysis here, the survey provides further information about the actors' visions, problems and constraints, as well as levers that have been abandoned or renounced. Such an analysis of the

determinants of change and innovation is crucial for a more sustainable orchard redesign perspective.

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References

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