SMART PROJECT
AGROFORESTRY SYSTEMS USING FRUIT TREES AND VEGETABLES IN FRANCE

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Introduction

Agroforestry systems mixing fruit trees and annual crops are very well developed and studied in tropical countries, but they have been forgotten or neglected during the last 40 years in France and Europe. Current trends and challenges in agriculture (land access, periurban agricultural forms, inputs reduction through functional biodiversity and crop diversification) lead small farmers in France to combine annual plants and fruits with the aim to increase their field performance on a multifunctional basis. The number of such agroforestry systems has increased significantly especially during the past few years.

Objectives and approach

The SMART project started in 2014 with the objectives to:
(i) Identify those farmers and establishing a map of their farms (figure 2a);
(ii) Better understand farmers' motivations and choices;
(iii) Unravel the biological interactions between fruit trees and vegetables in farmer's plots
(iv) Share and stimulate information among members of the network.

The SMART project is a co-operation of 16 partners situated in three French regions[1].

Results

An open online survey[2] has been carried out in 2013-2014, and resulted in a **typology** of agroforestry systems with fruits (figure 1). This survey is still undergoing, to gather new initiatives.
To date, about 150 different systems have been identified.

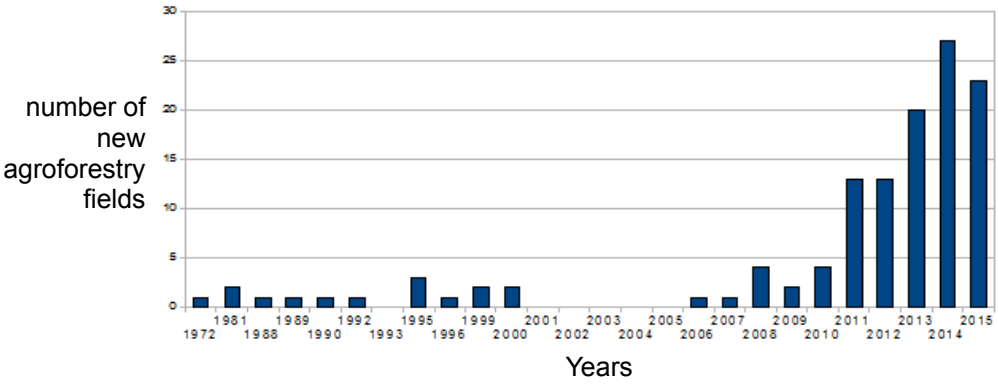

Figure 1 : number of new agroforestry fields combining fruit trees and annual crops, each year

The most relevant systems have been selected for more complete interviews conducted in 2014, in order to select 40 farms in three contrasted regions of France (South-East, South-West, North-West). These sites will be used for field assessments (figure 2b).

1 www.agroforesterie.fr/smart
2 http://doiop.com/inventaire_smart

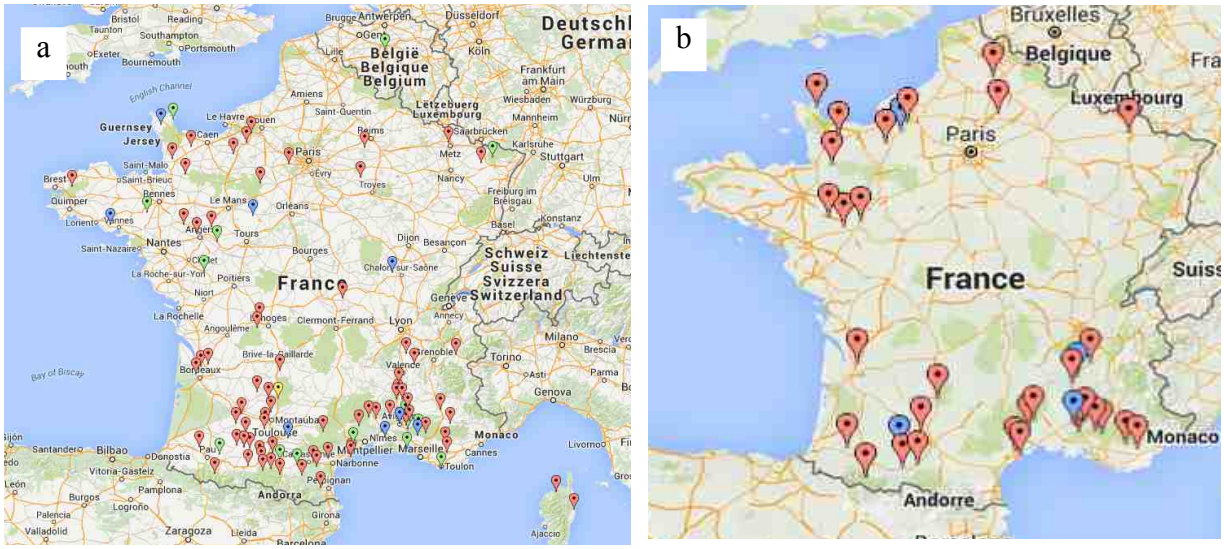

Figure 2. Geolocalization of the fruit trees/vegetable agroforestry systems identified in France (a), and those selected for field assessment (b).

Based on these interviews, the **farmers' priorities** in performance characterization have been identified. It mostly deals with (i) biodiversity, (ii) socio-economic sustainability, (iii) interactions between trees and annual crops. To adress these requests, simple **indicators** have been discussed, shared or selected together with farmers in the very beginning of 2015 (table 1). The field booklet is available for download[3].

Table 1. Examples of field assessment for different performance indicators

Criteria	***indicators***
biodiversity	Earthworms, carabids, pollinators
socio-economic sustainability	social & economical feedback from farmers
Impact of trees on annual crops	Annual crop yield according to distance to trees

Indicators are provided to farmers for self-assessment of their systems, starting in 2015 : they have to be easy to use in a diversity of contexts, and useful enough to stimulate growers participation.
Indicators used to describe biodiversity follow national protocols established by MNHN[4].

Knowledge sharing was also among the most expected deliverable of the SMART project. Farmers showed keen interest in the regional on-farm events organized in the frame of the SMART project. These events are carried out with the objective to increase and share knowledge and know-how on various topics. Many reports (in French) of these field trips are available online[5]. Short videos are also available to explain why such agroforestry systems are of relevancy for farmers.

Figure 3.
Most agroforestry systems with fruit trees are rather young like here in the southwest of France.

3 www.agroforesterie.fr/SMART/documents/livret-suivi-parcelle-SMART-Agroforesterie-maraichere-avril-2015.pdf
4 observatoire-agricole-biodiversite.fr/
5 www.ad-mediterranee.org/RessourcesAgroforesterie

Discussion

2015 was a first year of field data collection. All systems are very different and very unique, leading to a great diversity in results so far. After one year, no trend could be found on influence of trees on vegetables, either positive or negative. In some cases, the link could not be formally established.
This high diversity of farms (crops, surfaces, designs, cultural practices...) makes it very complicated to find generalities in performances of orchard systems integrating vegetables. Most of fields are also rather young (figure 3), therefore agroforestry effect may still be uncomplete.
For now, the contribution of the SMART project consisted in establishing link between farmers in France, also with students, future farmers interested in agroforestry principles.

A second round of field data will be collected in 2016. We hypothetise that the dynamics launched within farmers and other stakeholders could be pursued after the end of the SMART project, scheduled for June 2017. Simple assessment tools proposed should be further used and spread in a way farmers can follow themselves their performances in agroforestry.