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Methodology to co-design temperate fruit tree-based agroforestry systems: three case studies in Southern France

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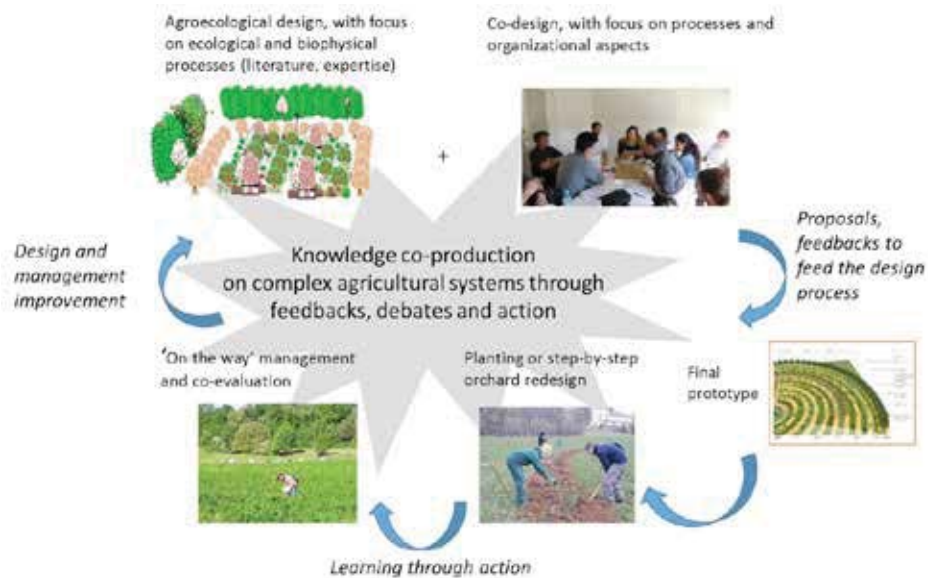
Diversification of fruit tree species, cultivars, crops and companion plants is a way to reinforce ecosystem services towards productive and 'pest suppressive' fruit-tree based agroforestry systems (FT-AFS). We analyzed the approach and the outputs of three design processes that shared the same objectives of ecological intensification and diversification in FT-AFS.
The approach targeted 'pest suppressive' processes but also resource use optimization within time and space between productive and associated plants. Basic and applied knowledge on ecological and biophysical processes, feedbacks and experiences of various stakeholders in the fruitchain permitted to make tradeoff between agronomic, ecological and organizational aspects. For genericity purpose, the functions of each plant species or assemblage (e.g. barrier, trap, production) were identified taking into account growth dynamics over time.
The set-up of those FT-AFS prototypes implies changes in technics due to the spatial design (e.g. machinery adaptation, ergonomics) and changes in management of the agroecosystem, made 'on the way' considering the objectives and design principles as dynamic guidelines. The trajectory and performances of those systems are now assessed through multicriteria evaluation including organizational aspects and products' valorization. All steps include an interdisciplinary and participative approach fostering exchanges, knowledge sharing and building, and providing innovative avenues in FT-AFS.



Overall co-design process

Keywords: temperate agroforestry, fruit, co-design process, ecosystem service, pest suppression.

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