A02

*Rurban*SoilFunctions - Synergies and trade-offs in soil functions of *rurban* spaces

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Study region and international partners

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Introduction

Soil functions and socio-economic farm functions are interdependent and are affected by farm endowments, lifestyles and perceptions in *rurban* settings (Fig. 1). Tree-based systems are discussed to reduce trade-offs between soil functions and enhance farm resilience.

Objectives

- Explore how heterogeneity in *rurban* endowments and lifestyles (i.e. natural, social, human capital, attitudes) affect perceptions and provision of soil functions (**GH I**)
- Understand the interplay between tree-based systems, provision of soil functions, and farm resilience in dynamic *rurban* social-ecological systems (**GH II**)
- Develop and evaluate science and model-based co-learning processes towards sustainable transformation scenarios (**GH III**)

	Rural	*Rurban*	Urban
Dominant land use	Agriculture	Multiple	Built structures
Process	Intensification in agriculture	Investments in sustainable and resilient agriculture	Increasing soil sealing Displacement agriculture
Effect on landscape	Homogenization • Monocultures • Increasing field sizes & management intensity	Diversification of crops Increasing Heterogeneity	Fragmentation of green spaces
Soil function	Biomass productivity	Multiple	Building ground & recreation

Fig. 1. Effects of *rurban* transformation processes on landscapes and soil functions and the role of land-use diversification

Outcomes

- Data and theory building on the link between land use and soil functions (e.g. C-sequestration, Fig. 2)
- Conditions under which tree-based systems contribute to a sustainable *rurban* landscape assemblage

Networking with other projects

Field data collection, identification of soil function drivers, and social-ecological modelling will be done in collaboration with **A01**, **A03**, and **A04**. Collected and modelled soil and farm data will be shared with **A04**, **C01**, and **C02**.

Methods and work plan

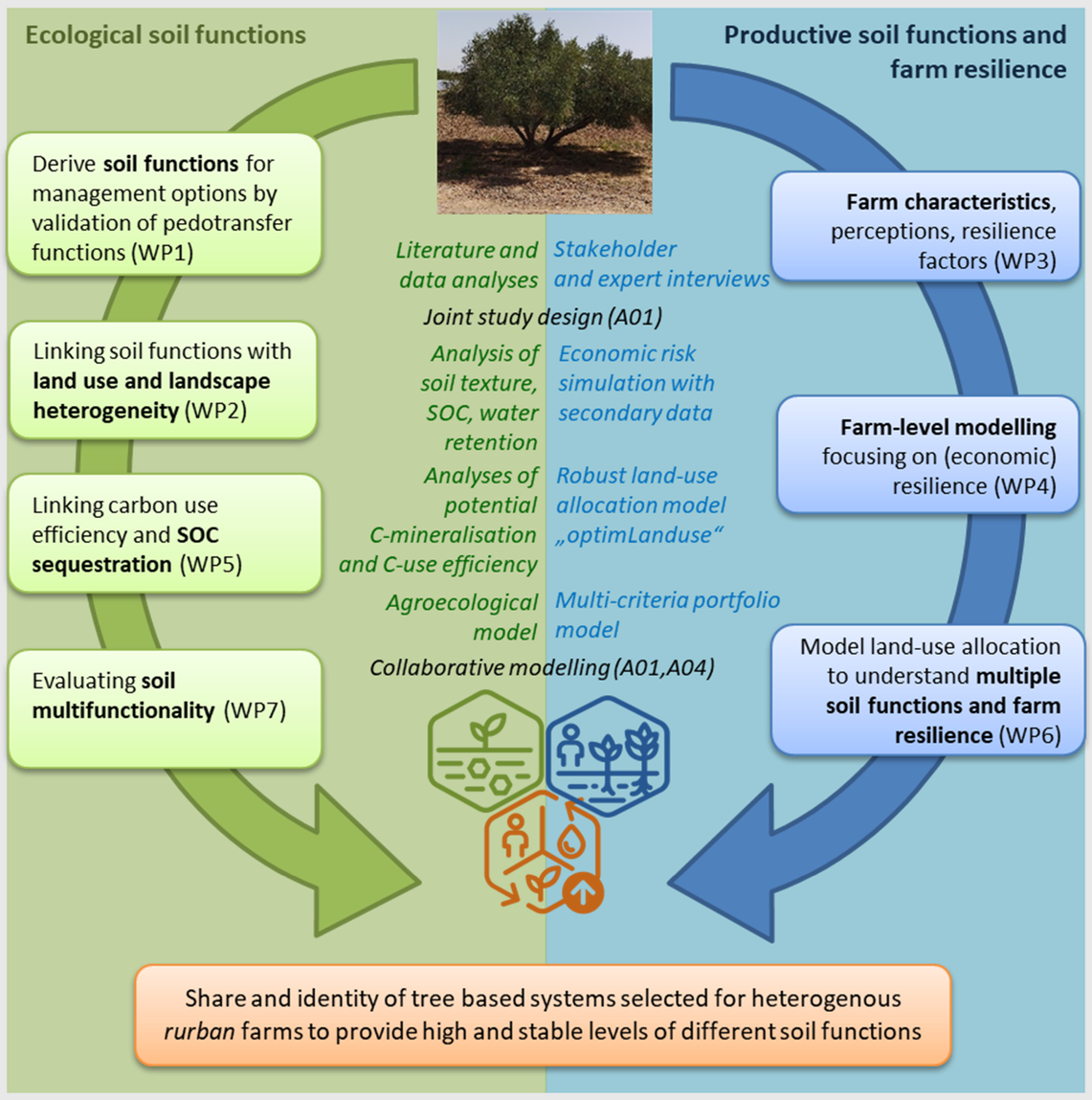

Fig. 2. General approach and methods (in italics)

WP1 Effect of ruban transformation on SOC and soil functions

WP2 Linking SOC related soil functions and social environmental factors

WP3 Socio-economic characteristics of farming systems and management alternatives

WP4 Farm-level modelling of land-use allocation

WP5 Evaluation of potential soil C-sequestration

WP6 Multi-criteria farm and landscape-level modelling

WP7 Impact of transformation in *rurban* crop production on soil multifunctionality

Contributions to Sustainable *Rurbanity*

We contribute to *Endowments & Place* by scrutinising the interrelation between biophysical (soil) resources and physical and human (farm) capital in *rurban* land-use systems. We use participatory approaches to better understand *Lifelihoods & Lifestyles* and their feedback with farmers' preferences (*Institutions & Practices*).

Sustainability dimensions

Sustainability is addressed by conceptualising and quantifying multiple ecological and socio-economic soil functions, trade-offs, and interplay with farm resilience.