



Agricultural Intensification and Dynamics of Soil Carbon Sequestration in Tropical and Temperate Farming Systems

A research project to explore the potential for sequestering carbon in agricultural soils in the context of global changes

2019-2023

Soil carbon for food security and climate change mitigation

Soil organic matter is a crucial component of **soil functions** providing ecosystem services

Sequestering carbon in soils contributes to climate change mitigation

Constraints are multiple: the finite capacity of soil carbon sinks, residence time of C sequestered, water and nutrients limitation or building organic matter, social and economic contexts

Lack of relevant field measurements and data

Multidisciplinary and multilevel objectives

Quantifying and understanding soil carbon sequestration dynamics at **soil-plant, field, farm and landscape scales**

Deliberating amongst stakeholders about soil carbon sequestration pathways, by **iteratively designing and assessing alternative options**

Sharing knowledge, tools and experiences on soil management options

Multiscale and systemic mechanisms

Synergies and tradeoffs between yield, labor, benefit and risk determine farmers decisions and farm activities, affect carbon and nutrients cycles, and consequently **the soil carbon sequestration potential as also the sustainability** of the agricultural systems.

A **systemic and multi-actors approach** is necessary to define and assess agricultural practices relevant to conciliate several objectives in a changing context.

Documented scenarii, models, tools

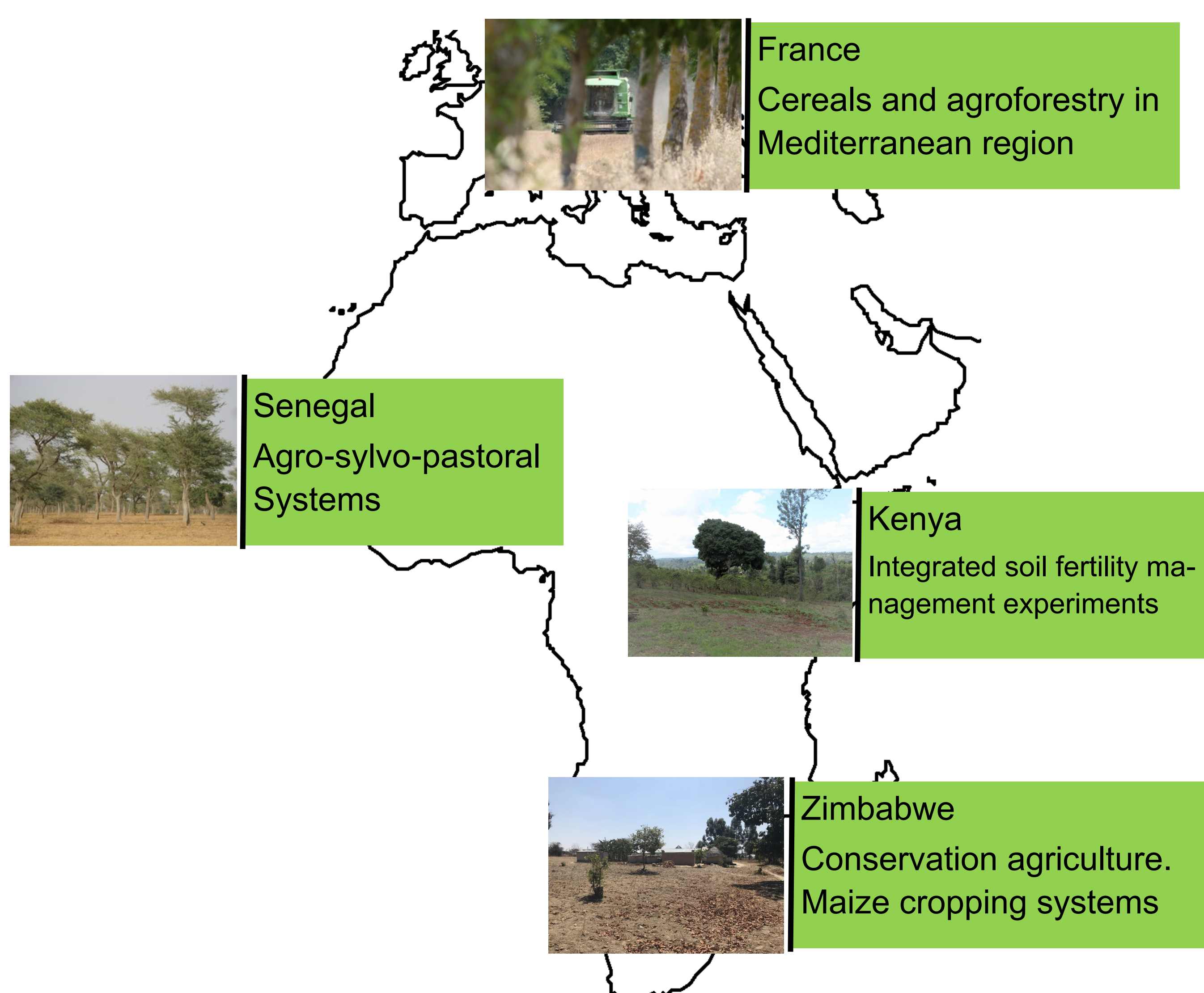
Documented strategic pathways to foster soil carbon sequestration

Tested multi-actor approaches dedicated to soil use management and soil carbon sequestration

Toolkits helping local and institutional actors to consider SCS issues in their development strategies

Databases and multi-scale models on long-term dynamics of soil carbon

The Study Sites in Africa and in France



The Partners

- IRD: ECO&SOLS Functional Ecology and Biogeochemistry of Soils and Agrosystems, France
- CIRAD: ECO&SOLS, AIDA Agroecology and Sustainable Intensification of Annual Crops, SELMET Mediterranean and Tropical Livestock Systems, GREEN Management of renewable resources and environment, France
- INRA: ECO&SOLS, SYSTEM Tropical and Mediterranean Cropping System Functioning and Management, CEE-M Center for Environmental Economics—Montpellier. France
- ISRA Agricultural Research Senegalese Institute, Senegal
- AGROOF Société Coopérative et Participative spécialisée en Agroforesterie, France
- UZ Crop science and Social Sciences Departments of University of Zimbabwe, Zimbabwe
- And the participation of Embu University and the International Institute of Tropical Agriculture IITA in Kenya

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