



Integrating soil health in land planning documents: feedback from France



No net land take by 2050
+ neutral degradation
= “ZAN” in France

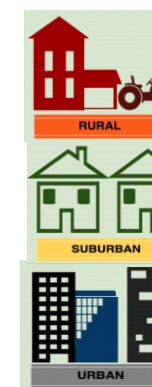
Climate and Resilience law (2021)

⇒ Soil preservation & restoration

⇒ Revision of planning documents



Dealing with partial knowledge on soils



Rural soils:
maps, data available

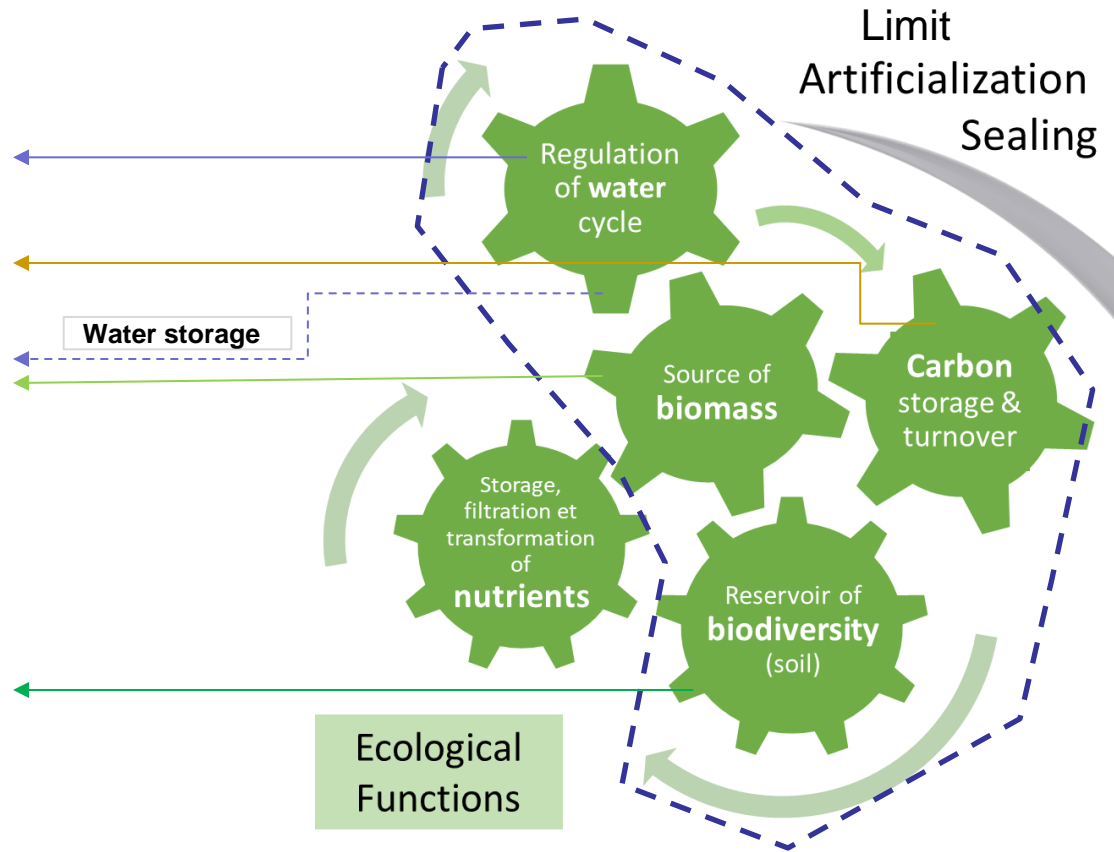
Urban soils:
no maps, few data

The MUSE method

Mapping estimated soil ecological functions using national datasets

4 indices

- Water infiltration
- Carbon storage
- Agronomic value
- Biodiversity storage



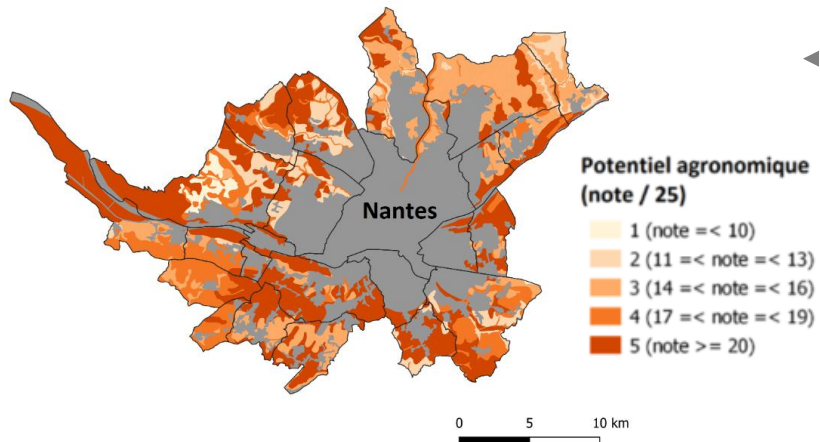
Target issues

- Preserve agricultural, natural and forest soils as well as wetlands
- Limit soil degradation and maintain ecological continuities
- Optimise the use of urban soils and restore ecosystemic services

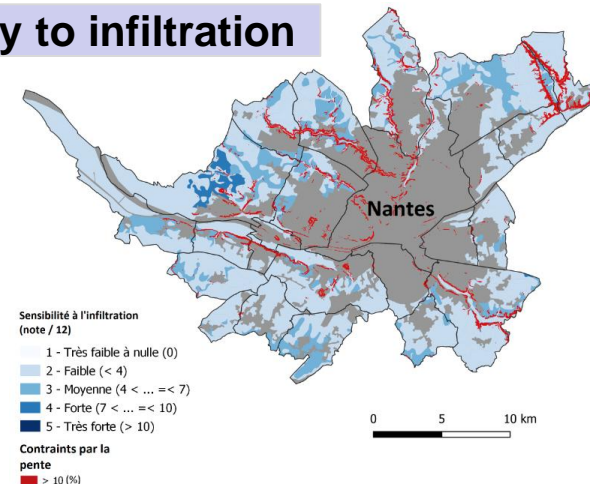
From soil and land data to assessed soil ecological functions



Agronomic value



Sensitivity to infiltration

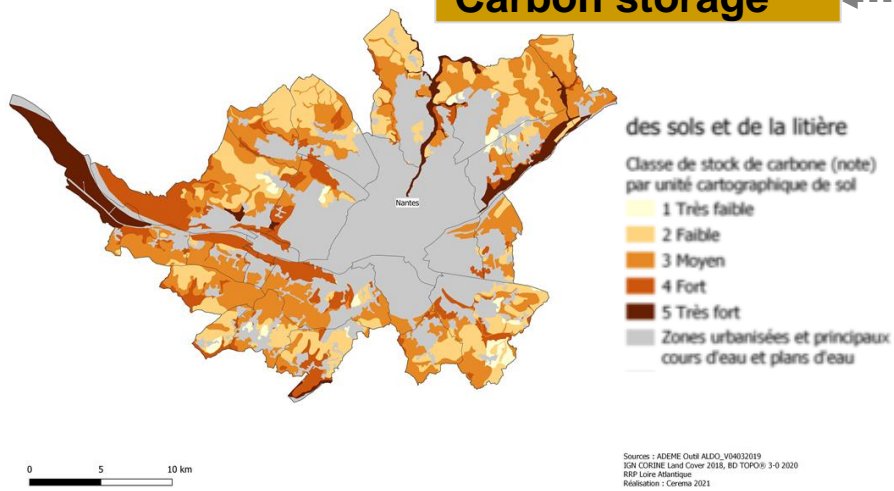


Direct approach

Soil maps
Point data

No data on urban soil

Carbon storage

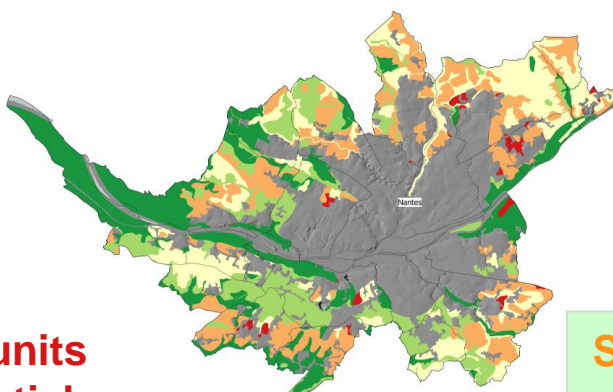
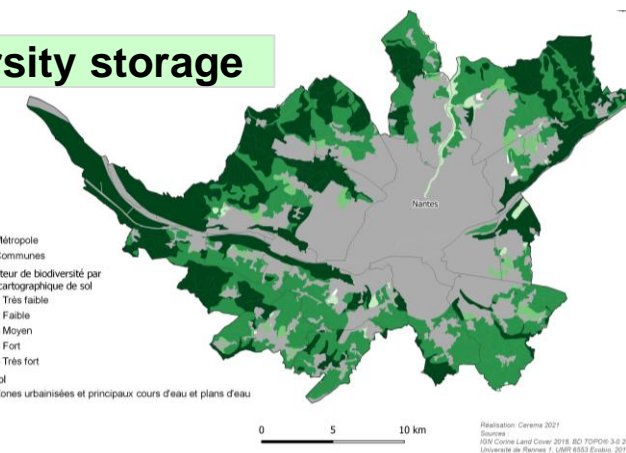


Indirect approach

Land use model

National/regional statistics

Biodiversity storage

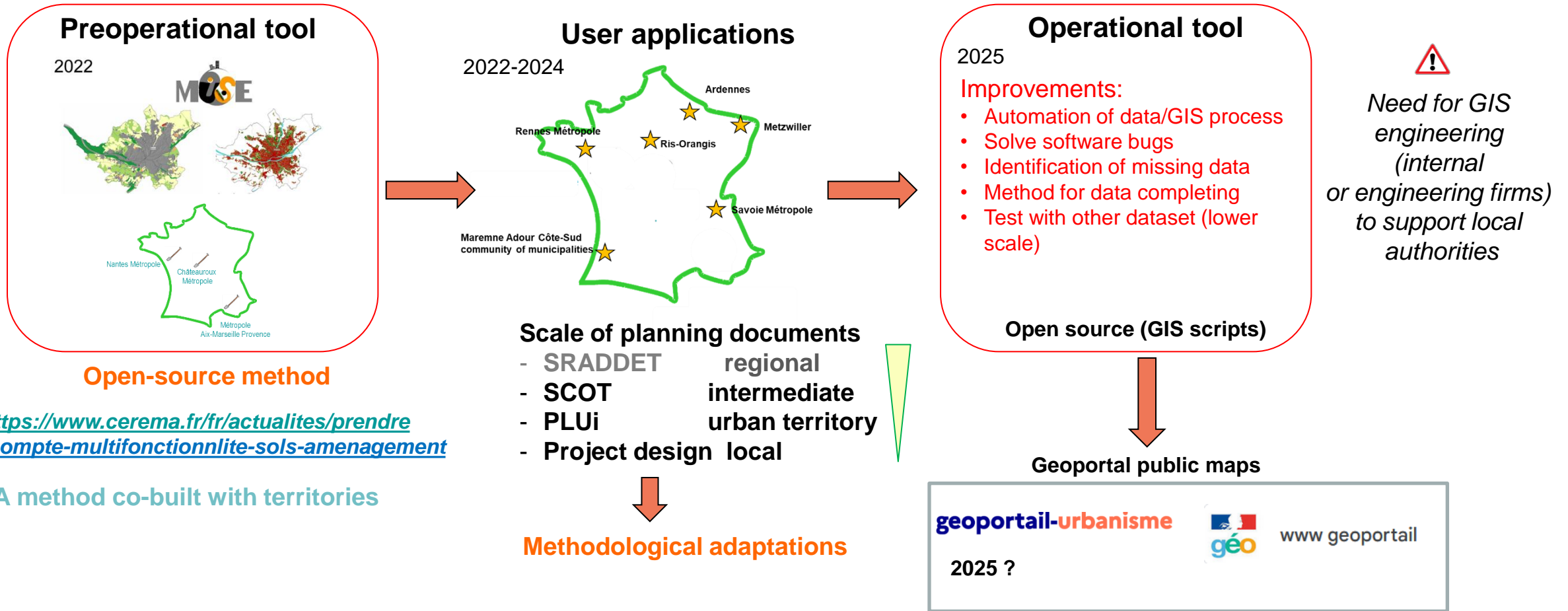


Soil map units as referential

Crossing assessed soils functions

Soil multifunctionality quality index

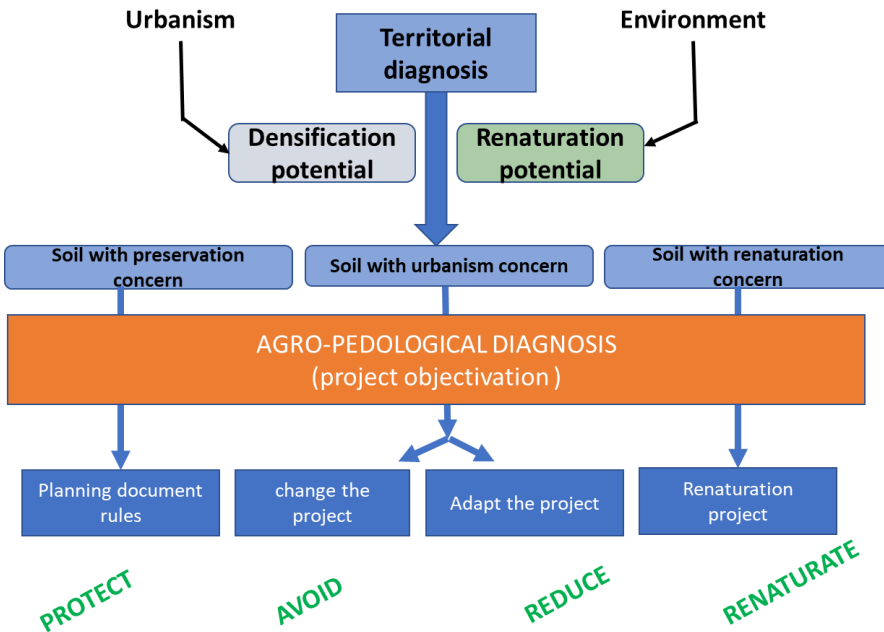
From research to operational considerations



Example 1 : Ris Orangis (communal scale)

Objective : how to design an urban planning document that integrates the functional quality of soil ?

Adaptation : New soil data produced to improve local knowledge (ie at the operational urbanism scale)



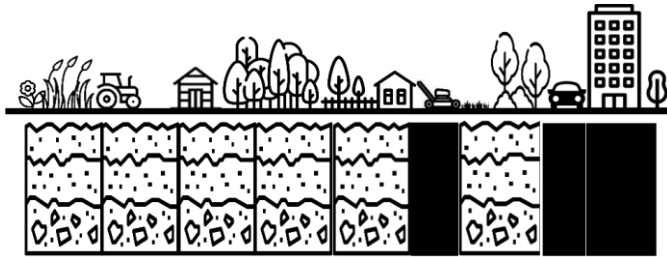
Soil anthropisation



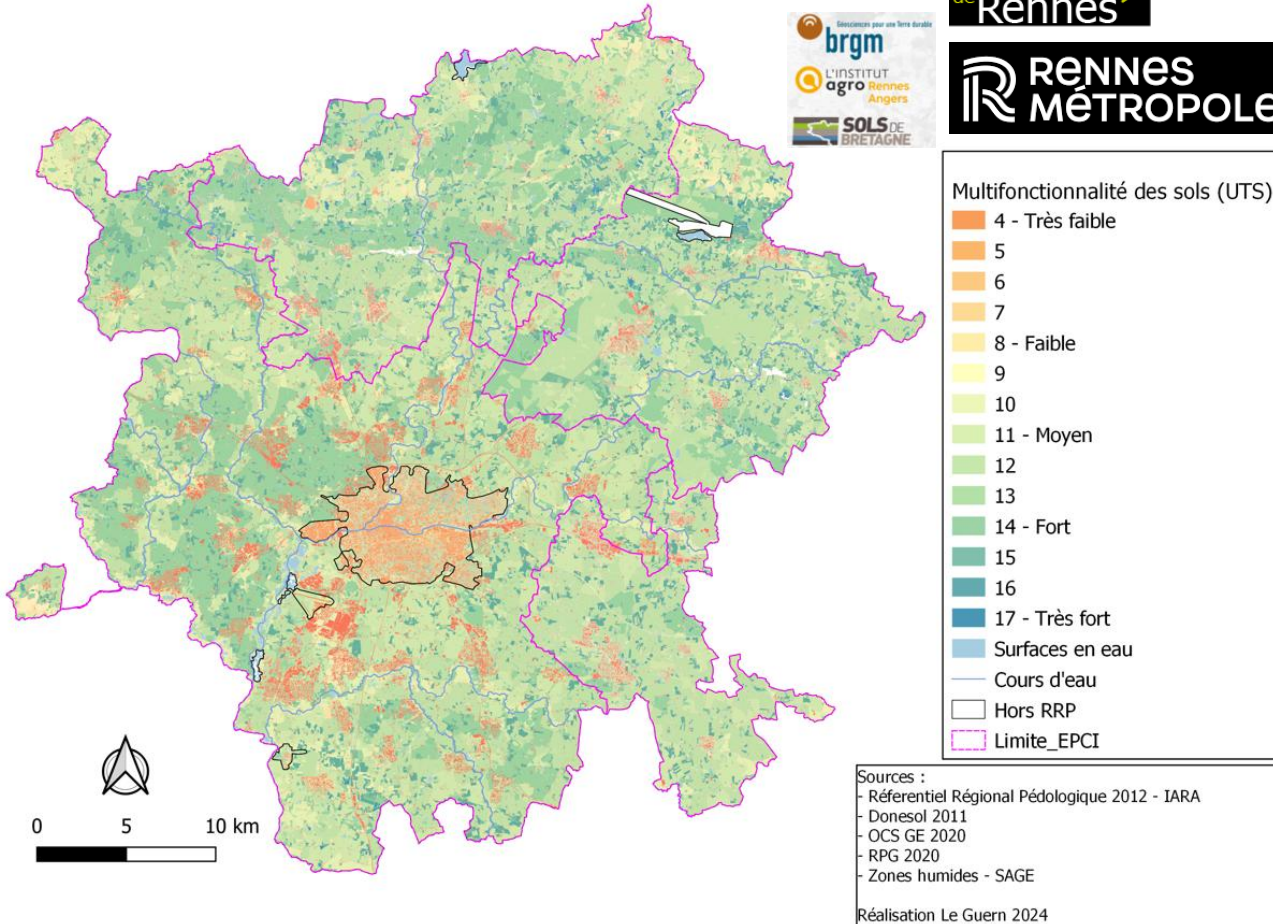
Soil multifunctionality



Example 2 : Rennes Métropolis and Pays de Rennes



Soil multifunctionality quality index (SMQI)



Objective
 Integrating soil quality in planning scenarios for a qualitative approach of no net land take

Adaptation of MUSE method

- **Urban zone**
 - Soil infiltration capacity integrating vadose zone
 - Biological and carbon storage
 - Agronomic value (extrapolation)
- **Integration of sealed surfaces**
 - Degradation of infiltration capacity and agronomic value
- **Downscaling soil map**

+ Mapping Soil pollution pressure

Conclusions and perspectives

> The MUSE method

- From research to operational
- Increasing use at different scales
- Map easy to understand
- Soil ecological quality rather than soil health
- Replicable in other EU countries ?

> Dynamic aspects

- Needs on
- Soil monitoring
- Urban soil maps
- Minimum set of indicators
eg
SUPRA (Séré et al, 2024),
Indiquasol (Cousin et al., 2024)
Soil monitoring law

**Thanks for your attention !
Any question ?**

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