

JOB OFFER

Post-doctoral position in Environmental Sciences

The French National Research Institute for Agriculture, Food, and the Environment (INRAE) is a public research establishment under the dual authority of the Ministry of Agriculture and the Ministry of Research. It is a community of 12,000 people with more than 200 research units and 42 experimental units located throughout France.

The institute is among the world leaders in agricultural and food sciences, in plant and animal sciences, and is 11th in the world in ecology and environment. INRAE's main goal is to be a key player in the transitions necessary to address major global challenges. In the face of the increase in population, climate change, scarcity of resources and decline in biodiversity, the institute develops solutions for multi-performance agriculture, high quality food and sustainable management of resources and ecosystems.

YOUR MISSION AND ACTIVITIES

 **You will be hosted by:** the joint research unit CESAER (INRAE, l'Institut Agro and University of Bourgogne Franche-Comté), the Center for Economics and Sociology applied to Rural Areas, in Dijon. You will contribute to two European projects from the EJP SOIL call, in close partnership with both environmental and social sciences. These projects intend to enhance soil policy effectiveness through the analysis of soil ecosystem services bundles across European agricultural landscapes (<https://ejpsoil.eu/soil-research/serena>). You will be supervised by Jean-Sauveur Ay and Valentin Bellassen.

 **More specifically,** you will be in charge of modeling the relationships between soil management and the ecosystem services provided. Your work will be divided into two tasks.

- **Task 1: Modeling the effects of land use and land management on soil organic carbon content**

Land-use and management changes are a large source of soil organic carbon (SOC) changes, and hence of greenhouse gas emissions or storage. Nevertheless, the existing studies on the quantification of these soil carbon changes suffers from two important pitfalls: selection bias and large-scale averaging. In several national greenhouse gas inventories, soil carbon changes are assessed by comparing current stocks in different land-uses, at best controlling for a few observed pedo-climatic variables. In the scientific literature, the reference meta-analysis by Poeplau and Don (2013) possibly also suffers from selection bias as the comparability of "comparable sites" is often subjectively assessed. The second pitfall is that many GHG inventories are using IPCC global default values for the differences in SOC between different land uses.

You will use land returns derived from FADN data as an exclusion variable to identification, and apply an statistical selection bias model to LUCAS land use and soil data. From this selection model, at least three applications are expected:

- 1) a validation of the reference values for SOC changes between land-uses, and possibly a few key land management changes such as the planting of hedges;
- 2) the establishment of reference values at national (NUTS1) and possibly regional (NUTS2) levels that EU member states can easily use in their national GHG inventories;
- 3) the simulation of the impact of economic incentives (eg. grassland subsidies) on land-use changes, and the associated changes in SOC and GHG emissions (including cattle).

- Task 2: Modeling the effects of land use and land management on other soil ecosystem services

The effective provision of soil-based ecosystem services (ES) requires integrating actual agricultural policies and other farmers' incentives about land use. Policies and private decisions can enhance the value of one ES at the expense or benefit of others (Bateman et al., 2013; Leclère et al., 2020). Consequently, trade-offs as well as synergies between ES may occur, which complexifies the design of sustainable land-use policies balancing these different outcomes. The policy and economic analysis is a decisive tool to understand also the impact of the incentives faced by farmers and the consequences of their choices on the environment (Ay et al., 2014). This allows the design of more efficient public policies, by fully exploiting the new soil quality indicators developed in the SERENA project.

In this task, you will generalize the findings from task 1 to other soil ecosystem services than carbon. The cooperation within a consortium of several European countries and several disciplines will allow you to extend the analysis of ES produced by soils. It could thus be a question of water regulation, agricultural production, or the preservation of biodiversity, which make soils decisive resources.

THE PROFILE WE ARE LOOKING FOR

-  **Recommended education:** a PhD in soil or environmental sciences is required.
-  **Desired knowledge:** interest in the provision of ecosystem services from soil functions and the design of public policies with a focus on economics.
-  **Experience preferred:** experience in modeling environmental data and/or soil characteristics are a plus.

YOUR QUALITY OF LIFE AT INRAE

By joining INRAE, you will be able to benefit, depending on the type of contract:

-  up to 30 days off + 15 RTT per year (for full time)
-  Parenting support: CESU childcare, leisure benefits;
-  skills development schemes: training, career guidance advice;
-  social support: advice and listening, social aid and loans;
-  holiday and leisure services: holiday vouchers, accommodation at preferential rates;
-  sporting and cultural activities and a collective catering.

Terms of reception

-  Research Unit : 1041 UMR CESAER
-  Postal code + city : 21000 Dijon
-  Type of contract : Post-doctoral
-  Length of contract : 3 years
-  Beginning : January, 1st 2023
-  Remuneration : from 2370€/month tax excluded, depending on experience

How to apply?

Send a cover letter, CV and contact information for two present or past supervisors to: Jean-Sauveur Ay and Valentin Bellassen

 From e-mail : jean-sauveur.ay@inrae.fr and valentin.bellassen@inrae.fr

 **Deadline to apply:** December 20, 2022.