**Reference:** P-Eco&Sols-2020-06-CDI-3762

**Permanent position**

**Researcher in biogeochemistry of nutrients in tropical forest plantations**

Starting 01/10/2020

**CIRAD**

The French agricultural research and international cooperation organization working for the sustainable development of tropical and Mediterranean regions.

[https://www.cirad.fr/en](https://www.cirad.fr/en)

**Description of the position / mission**

The Joint Research Unit on Functional Ecology and Biogeochemistry of Soils and Agro-ecosystems (UMR Eco&Sols) is developing a functional ecology approach centered on the study of the role of soil and plant organisms in biogeochemical cycles within Mediterranean and tropical agrosystems. The finalized outputs of this research contribute to the agroecological transition, with the design and evaluation of innovative cropping systems producing ecosystem services while contributing to the sustainability of agroecosystems.

In this context, you will study the functioning of multi-species tree plantations in tropical environments. This type of plantation could have a higher resilience and increase the ecosystem services produced as compared to mono-specific stands, by reconciling high forest production (meeting growing global demand) with the restoration of forest ecosystems.

The main issues is to analyze the major biogeochemical processes influenced by the functional diversity of trees in tropical forest plantations. More specifically, the following research questions will be studied:

- What are the consequences of this diversity on the production of biomass and on the physicochemical properties of the soil?
- What are the effects of this diversity on the dynamics of soil organic matter, as well as the recycling and loss of nutrients at the ecosystem level?
- What are the consequences of this diversity on the production of ecosystem services?

The answers to these research questions require in situ studies of the processes involved in order to remove knowledge barriers that currently limit ecological intensification in forestry.

Practically, you will work, in particular in Central Africa, within a group of scientists specialized in the study of the functioning of tree plantations in tropical areas.

In particular, you will have to quantify, through an experimental approach and based on modeling:

- Biomass production in mono and multi-specific stands
- The main incoming and outgoing fluxes to assess the degree of closing of the geochemical cycles.
- Nutrient flows linked to the seasonal cycle with uptake by trees, litter falls, leaf exchanges and litter mineralization. Particular attention will be paid to the absorption of nutrients by root in the deep horizons of the soil.
- The flows linked to the biochemical cycle in order to assess the internal remobilization capacities of nutrients in the trees tissues.

This work will provide information to determine the choice of species, plantation designs and management methods for multi-specific stands.

**Requirements**

Doctorate (PhD) in relevant field.

Biogeochemistry / soil science skills are required, as well as a good background in agronomy / forestry / plant ecology. Competence in isotopic methods, as well as experience in modeling, would be appreciated.

You should:

- have a good ability to carry out field research. Experience in a tropical environment would be an advantage.

- be able to coordinate the work of teams for setting up and monitoring experiments and for processing and analyzing samples in the laboratory.

- be able to process, analyze and synthesize complex quantitative data.

- know how to interact closely with scientists from other disciplines (microbiology, ecology, ecophysiology, etc.) invested in the same research objects.

- show real capacities for writing scientific articles.

- have a good command of French and English languages.

- have a strong ability to work in a team and integrate multidisciplinary research issues.

- present a strong motivation to work in southern countries (in particular in Africa).

**Terms of offer**

Permanent position

Frequent trips to France and abroad

Work in tropical / humid / subtropical zones

Salary - France, not including expatriation allowances, 27-37 K€ per year.

Location: The permanent position is in CIRAD headquarters, Montpellier, France. The researcher will be initially posted to Central Africa. The country of assignment may vary before taking office.