TITLE OF PROPOSED INTERN RESEARCH PROJECT:

Modelling water displacement for measuring nutrient leakage in coffee/pepper farms

PERIOD & DURATION:

4 to 6 months

THE ORGANISATION:

ICRAF

LOCALIZATION:

The intern will be based in Hanoi.
Fieldwork will be conducted in the Central Highlands, in the provinces of Dak Nong and Gia Lai.

PROJECT CONTEXT:

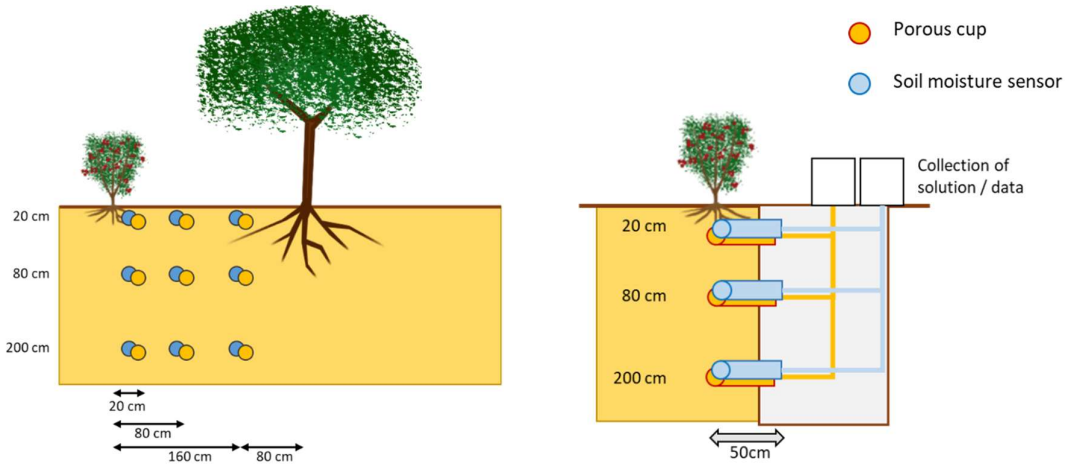
The V-SCOPE project (Vietnam towards Sustainable Coffee and Pepper) is a research project coordinated by ICRAF (World Agroforestry Center) and funded by the ACIAR (Australian Centre for International Agricultural Research). It aims at increasing the sustainability, productivity and economic value of coffee and black pepper farming systems and value chains in the Central Highland region. One key aspect of the research project focuses on improving farming practices through improved fertilizer inputs and recommendations on agroforestry practices.

Considering the levels of mineral fertilizer inputs assessed through previous surveys (~400 kg.N/ha/yr), it is believed that nitrogen leakage in deep soil horizons is a major cause of nitrogen loss (after the export of fruits from harvest). Quantifying nitrogen leakage is therefore key to improving nutrient input efficiency. On the other hand, the ongoing transition of monoculture coffee and pepper systems towards agroforestry with fruit trees could reduce nutrient leakage.

As part of the research project, 4 on-farm trials were setup in May 2022 to measure nitrogen leakage:

- 1 trial in a monoculture coffee farm
- 1 trial in a coffee-agroforestry farm
- 1 trial in a monoculture pepper farm
- 1 trial in a pepper-agroforestry farm

Each trial is equipped with porous cups to sample soil solutions every 10 days, and soil moisture sensors to take measurements every 15 minutes.



Front view of a trench Side view of a trench

Illustration of the experimental design in a coffee-agroforestry plot

PROJECT OBJECTIVE:

Setting up a model for water displacement in the soil in the 4 on-farm trials.

The model will be used by researchers to estimate nutrient leakage based on the laboratory analysis of NH_4^+ and NO_3^- concentrations in soil solution samples in order to:

- assess the nitrogen leakage in coffee and pepper systems;
- assess the role of agroforestry design to mitigate nitrogen leakage;
- assess the role of coffee husk biochar inputs (5t/ha) to mitigate nitrogen leakage.

The student will work on data collected from May 2022 in the 4 trials. In addition, the student will participate in field trips to visit the trials and (optionally) collect additional measurements necessary to initiate/improve the model.

INSTITUTIONAL ARRANGEMENTS:

The student will do the internship under ICRAF/CIRAD supervision and the supervision of his/her university professor.
A stipend equivalent to 200USD/month will be provided by ICRAF.
Field costs will be covered by ICRAF.

REQUIREMENTS / QUALIFICATIONS:

Master student familiar with soil hydrology and modeling.
Autonomous, able to conduct fieldwork in the Central Highlands.
Good level in either English or French.
Previous experience in similar work will be considered as an asset.
Previous experience in scientific writing will be considered as an asset.

APPLICATION:

Send your application to clement.rigal@cirad.fr, with copy to icraf-vietnam@cifor-icraf.org.
Use the following email object: “Application – M2 internship – Water modeling – YOUR_NAME”.
Attach a cover letter and a resume. Deadline : 28 February 2023