

## SDG<sup>nexus</sup> Network Doctoral Research Assistants in Facultad de Ciencias Agrarias at Universidad Nacional de Colombia

The Universidad Nacional de Colombia, within the SDG<sup>nexus</sup> Network project, awards, for four years starting March 1<sup>st</sup>, 2025,

**Three Ph.D. Research Assistants in Facultad de Ciencias Agrarias  
in the field of *Land Use* and/or *Water* for Studying Sustainable Development Goal Interactions**

### About the SDG<sup>nexus</sup> Network

The SDG<sup>nexus</sup> Network, consisting of partners from Colombia, Ecuador, Germany, Kazakhstan, Kyrgyzstan, and Uzbekistan, provides a common research framework related to the Sustainable Development Goals (SDGs) of the United Nations and aims to analyze synergies and trade-offs among individual SDGs (SDG-Nexus-analysis).

Following a successful first phase from 2020-2024, the SDG<sup>nexus</sup> Network will intensify its activities in a second phase 2025-2029. The research concentrates on examining the relationships between individual SDGs, with particular emphasis on *Land Use* and *Water*. A particular focus lays on promoting and connecting the next generation of scientists. Further information about the network can be found at [www.sdgnexus.net](http://www.sdgnexus.net)

### PhD research assistant description

Based at Universidad Nacional de Colombia (UNAL) – Sede Bogotá –, you will conduct research focused on addressing key research questions about *Land Use Change* and/or *Integrated River Basin Management* in the Colombian Orinoquía.

### What we offer

- An economic incentive (EUR 1,000 per month) for four years, starting from 01.03.2025.
- A working place in the Facultad de Ciencias Agrarias at Universidad Nacional de Colombia. Bogotá
- A research network with partners from Germany, Latin America and Central Asia that grant you a collaboration with ongoing research projects
- Comprehensive guidance and supervision of your doctoral research
- Short-term research stays at network partner institutions can be supported with travel funds

### What we expect / Applications Requirements

- Applicants must have a citizenship of an [ODA recipient country](#)
- Applicants should hold a Bachelor of Science (B.Sc.) degree as well as a M.Sc. degree in a topic related to SDGs whose research outcomes are relevant to *Land Use* and/or *Water Science*.
- Applicants should be familiar with the SDG framework and with the methods, indicators, metrics for monitoring progress and solving trade-offs between them.
- Applicants should have advanced communication skills in spoken and written English and Spanish as well as good scientific writing skills. A minimum B2 level of the Common European Framework of Reference for Languages (CEFR) for the second language is required.
- Applicants should have: (1) critical thinking and problem-solving skills; (2) communication and collaboration skills; and (3) creativity and innovation skills
- Applicants should have experience in processing geospatial data and performing spatial analyses using GIS software
- Technical skills in spatial statistics, spatio-temporal modeling, big data analysis, and geospatial programming/scripting are desirable
- Applicants should draft a doctoral research proposal aimed at addressing one or several research questions in *Land Use* and/or *Water Science* in the Colombian Orinoquía as described in Annex 1
- Applicants to this call should meet the admission requirements for doctoral programs established at [Universidad Nacional](#) as well as for *doctorado en ciencias agrarias* in [Facultad de Ciencias Agrarias](#) sede Bogotá.

- Applicants to this call should apply for admission as doctoral students in the *Doctorado en Ciencias Agrarias* program at Universidad Nacional de Colombia, Bogotá, either in the *Rural Development* or in the *Soils & Water* research lines, for enrolling in the first semester of 2025. The due date for registering for that program is 28<sup>th</sup> January 2025. Follow instructions at [this link](#) for registering.

## Application process

Please send your application via e-mail to the *UNAL's SDGNN Selection Committee* ([frleivab@unal.edu.co](mailto:frleivab@unal.edu.co)) stating the **reference code SDGNN/PhDCall** until 31<sup>st</sup> January 2025. Applications must be submitted in English language as a **single PDF file**. Only complete applications, with documents in the order listed below, will be accepted:

- Cover letter stating your motivation to apply for the *UNAL's SDGNN Doctoral Research Assistantship*
- Two-page curriculum vitae
- Preliminary Ph.D. research proposal (about 2000 words long, including title, background, state of knowledge, key research questions, rationale, methodology, expected results, and references). It should describe how the research will contribute to *Land Use Change* and/or *Integrated River Basin Management*
- Undergraduate and graduate academic certificates
- Proof of proficiency in second language (English and/or Spanish according to your mother tongue)
- Two recent letters of recommendation from professors, course instructors, or other persons qualified to assess your academic achievements
- Certificate of registration for admission in the first semester of 2025, in the *Doctorado en Ciencias Agrarias* program at Universidad Nacional de Colombia sede Bogotá, either in *Gestión y Desarrollo Rural* or in *Aguas y Suelos*.
- List of scientific publications with links to the corresponding journals (optional)

### Please do not apply if you do not meet all the requirements stated here

Note that applicants should not have been (previously) awarded any scholarship, fellowship, or assistantship to conduct her/his doctoral study in any PhD program at Universidad Nacional de Colombia.

The SDG<sup>nexus</sup> Network is seeking at increasing percentage of women in academia; therefore, qualified female applicants are especially encouraged to apply. For further information on the SDG<sup>nexus</sup> Network see <http://www.sdgnexus.net>

Please be aware that the Selection Committee will only contact successful applicants.

**As part of the selection process those who meet all the requirements stated here will be called for a virtual or face-to-face interview in English**

**Note that the selected applicants should sign a *Research Assistantship Agreement*. They will be required to work on their doctoral research activities (as well as on SDGNN related research activities) from the beginning of the assistantship a minimum of 20 hours per week in exchange for the aforementioned economic incentive (which does not include UNAL's tuition fees).**

## Annex 1A

### Land Use

#### Background

Land Use, in the context of the Phase II of SDGnexus Network, summarizes various topics that impact the availability and use of resources for food and feed production on a spatial level. The new nexus topic includes all resources and features that drive land use, including for example economics, gender, governance, minerals and fossil fuels, biodiversity, climate, availability of fertile land for agriculture, space for settlements and infrastructure, ownership or land rights. Land Use will thus include scientific and social aspects that are crucial for the sustainable utilisation of natural resources.

The Orinoquía region, Colombia's last agricultural frontier, is home to 1.3 million people. This area of eastern Colombia, also known as the Eastern Plains, has a wide variety of ecosystems and species as well as an invaluable wealth of its biodiversity: (i) 35% of the area's species are unique to the region; and (ii) its wetlands account for 34% of the national total. Twelve ethnic groups inhabiting this area reflect the diversity of belief systems and worldviews.

All this natural and cultural capital supports the region's economic development which is currently ranked as the leading agricultural production area in Colombia. The departments of Orinoquía (Meta, Casanare, Arauca, Vichada) generate 7% of the country's GDP and are the leading producers of rice, maize, cocoa, oil palm, horticultural crops and livestock.

This production is all made possible thanks to the ecosystem's water, pollination and climate regulation services. However, the natural ecosystems of the Orinoquía region are disappearing at an alarming rate - 200,000 hectares annually and among the causes of this are extractive systems (mining and oil) and inadequate agricultural production. Thus, unsustainable activities lead to losses for the economy, the environment and society.

If Orinoquía's natural systems degrade faster than nature replaces and restores their biocapacity, value chains and food security risks will increase, at a high cost to people and the planet. Orinoquía region has been chosen as the UNAL's study area for the Phase II of SDGNN as a case study where taking care of environmental health becomes a key element to support human quality of life, productivity and wealth.

#### Research questions about Land Cover Land Use Change (LCLUC) in the Colombian Orinoquía

- Where are land-cover and land-use changing? What is the extent and over what time scale and how do the changes vary from year to year? (*Measurement, Variability*)
- What changes are occurring in land-cover and land-use, and what are their causes? (*Forcing*)
- What are the impacts of civil war and violence on LCLUC and/or land tenure? (*Impacts, Responses*)
- What are the consequences of oil and mining activities as well as agriculture expansion for people & ecosystems health and how do they respond to such impacts? (*Consequences, Responses, Adaptation*)
- How will land-cover change on time scales from years to decades? (*Modeling, Prediction*)
- What are the projected changes in land-cover due to climate change and human activities and what are their potential impacts? (*Modeling, Prediction*)

## Annex 1B

### Water Science

#### Background

Colombia has six natural regions, including the Orinoquía, a transition zone between the Amazon and the Andean region. At 347,607 km<sup>2</sup>, it covers a third of the country and contains 30% of Colombia's freshwater. It is key to the Orinoco basin and is made up of wetlands, forests and grasslands. Its population exceeds 3 million people and its water demand represents only 13%. Economic activities include perennial and arable crops, cattle ranching, agribusiness, oil, fishing, mining, and illicit crops, but in spite of national and local policies and regulations, may affect biodiversity, ecosystem services, and water resources.

In order to analyze the quality and quantity of available water at river basin level and taking into account climate change, it is key to study the interdependence between physical, economic, socio-cultural and political factors. This would make it possible to identify the complex problems related to water management in a specific river basin in the Orinoquía region. In turn, it would allow the creation of a prospective model that would serve as a scientific basis for the development of policies, programs and projects for integrated water resources management (IWRM) or integrated river basin management (IRBM). Although hydrological models exist, they usually do not include socio-cultural and political factors, which are crucial for a comprehensive approach.

The research should identify critical interrelationships between natural resources and socioeconomic systems, as well as context-specific research gaps and governance priorities for moving towards integrated water resources management in the Orinoquía.

#### Research questions about integrated and sustainable water management in an important river basin in Orinoquía

- What physical, biotic, economic, cultural and political factors influence the availability, quality, use and efficient management of water resources in the selected river basin and how do they relate to each other? (Matrix Analysis)
- What are the future effects of changes in physical, biotic, economic, socio-cultural and political factors on the quantity and quality of available water in the selected river basin? (Negative or positive impact model).
- How do population growth, economic activities, climate change, policies and illegal activities influence the availability of water resources in the selected river basin?
- What are the priority policies, programs and projects for integrated water resources management (IWRM) or integrated river basin management (IRBM) in Orinoquía?
- How to meet medium and long term water demands of households, primary and secondary economic sectors (i.e. agriculture, mining, energy, industry) in the selected river basin? (Matrix analysis of sectoral water requirements).