

Call for applications (M/F) for a "PilotMAB" PhD grant

Project's Title : The Biosphere Reserves of Luki and Yangambi : Pilot sites for Research and Development in the DRC (PilotMAB)

CONTEXT OF THE CALL

The PilotMAB project results of a framework agreement between the Directorate-General Development Cooperation and Humanitarian Aid (DGD), and the Royal Museum for Central Africa in Tervuren (RMCA), Belgium. In the context of this agreement, the RMCA offers 2 doctoral grants in the Democratic Republic of the Congo. The overall objective of the project is the development of research activities and the promotion of training and educational activities. It takes place in the landscape of the UNESCO Man And Biosphere (MAB) reserves of the DRC characterized by a humid tropical forest biome: Luki (Kongo central) and Yangambi (Tshopo). The function of these reserves as models for reconciling nature conservation actions, economic activity and social well-being is being studied and strengthened. The Congo Basin is the second largest tropical rainforest in the world, and MABs have an international reputation as living laboratories for the study of climate change. PilotMAB therefore focuses on the carbon budgets of different types of forests through the analysis of their vital rates: regeneration, growth, and mortality. Forest resilience is also addressed through the study of anatomical traits, phenology, and cambial activity of trees. The work and activities are carried out with the support of various partners including the Center for International Forestry Research (CIFOR), Resources and Synergies Development (R&SD DRC), the Ecole Régionale Postuniversitaire d'Aménagement et de Gestion Intégré des Forêts et Territoires Tropicaux (ERAIFT), and the World Wide Fund for Nature (WWF DRC).

WORK AND LIVING ENVIRONMENT :

The PhD candidate will be hosted at the Wood Biology Department of the Royal Museum for Central Africa (Dr. Hans Beeckman) and his or her work will be partly based at the Wood Biology Laboratory in Yangambi.

The RMCA's Wood Biology Department has one of the largest wood collections (xylarium) in the world with more than 80,000 specimens belonging to some 13,000 different species. This makes it a key world reference center with extensive documentation and unique information on tropical woods and trees. The specimens preserved in the xylarium are used for numerous research projects on carbon sequestration, botanical taxonomy and the ecology and management of forest ecosystems.

The wood biology department, which manages the xylarium, has a specialized team carrying out numerous projects such as (i) the evaluation of wood production in Africa based on growth analysis, (ii) the codification of standardized anatomical characteristics and the analysis of the relationship between habitat type and wood anatomical characteristics, and (iii) the establishment of growth curves with a view

to developing plans for the sustainable management of woodlands. The researchers, in collaboration with promoters of partner universities, will supervise the doctoral student.

The Yangambi research center, located in the heart of the Congo Basin in the Tshopo Province (DRC), is now equipped with a wood biology laboratory supervised by the RMCA. This laboratory was built in collaboration and with the support of the FORESTS project (CIFOR).

INFORMATION ON DOCTORAL RESEARCH ACTIVITY

The aim of each thesis project is to contribute to the study of the Congo Basin forest massif in support of resource management and conservation. Data will be collected within existing plots and study sites in the two MAB reserves of Luki and Yangambi, or after the installation of new plots by the PhD student. These data will then be valorized by the PhD student through scientific publications.

RESEARCH SUBJECTS :

The two proposed research themes are the following:

- Theme 1 : Study of the periodicity of cambial activity of a selection of representative or dominant species from the Congo Basin.

Global changes are altering the floristic structure and composition of tropical forests. A more pronounced dry season, for example, may slow down the growth of some species or, on the contrary, stimulate the growth of others. The project analyses the rhythm of secondary radial growth and the response of trees to environmental fluctuations. The methodology involves the use of phenological cameras, high-resolution dendrometers, and microscopic analysis of samples from the cambial zone.

Keywords: periodicity, growth, phenology, high-resolution dendrometers, cambial activity, wood anatomy, phenological cameras, ...

Partnerships: RMCA, ULiège (Gemboux Agro-Bio Tech, Belgium), scientific academic institution in DRC to be specified.

- Theme 2 : Study of the potential of the Congo Basin as a Carbon sink. Analysis of incoming and outgoing flows.

Permanent forest plots in Luki and Yangambi allow the collection of information on vital rates such as tree mortality, regeneration and growth. On the basis of these, the stocks of carbon captured by the forest can be quantified. The project studies vital rates by linking them to functional traits (foliar, woody and architectural), in order to allow the refinement of models describing forest growth dynamics.

Keywords: vital rates, carbon, biomass, climate change, ...

Partnerships: RMCA, UGent (Belgium), scientific academic institution in DRC to be specified.

FRAMEWORK OF THE DOCTORAL RESEARCH:

- The theses will be completed in a minimum of 3 years with a "sandwich" type of grant: the researcher spends part of the year in Belgium, at the RMCA and/or at the host university, and the rest of the year in the country in the partner institution to which he/she is affiliated;
- The thesis begins on January 1, 2021 and ends at the earliest on December 31, 2023 ;
The number of months in Belgium is distributed as follows: 2021 :5 / 2022 :5 / 2023 :5. Total : 15 ;
The grant covers the costs of travel and stay in Belgium, registration at the Belgian University, participation in conferences, field costs, computer equipment costs, and other miscellaneous costs up to a certain ceiling ;
- If applicable, the doctoral candidate is laid off by the institution to which he/she is affiliated and devotes himself/herself full-time to his/her thesis. Freed from professional obligations for the duration of his/her thesis, he/she will however continue to participate in the scientific activities of his/her institution (seminars, conferences, ...) ;
- The candidate will be subject to the regulations of the host university in Belgium, which implies the monitoring of the evolution of his/her work by a steering committee (composed of his/her promoters and external members). The supervising committee meets several times a year and gives a binding opinion, which can go as far as the interruption of the thesis if the progress is not satisfactory ;
- The selected candidate will work in collaboration with the other doctoral students selected within the framework of PilotMAB and also with the various partners from the north and south of the PilotMAB project and other projects carried out by the RMCA and its collaborators ;
- The candidate will be supervised by a researcher from the RMCA (Dr. Hans Beeckman) in collaboration with an academic promoter from a Belgian university and, if possible, a promoter from the Congolese partner institution ;
- During his/her first research stay in Belgium, the candidate will be required to follow a series of courses in the Belgian university in which he/she will be registered. The results obtained for these courses (exams, practical work) will be taken into account in the evaluation of the thesis through the structure of the Belgian doctoral school to which he/she will be affiliated ;
- After 8 months of thesis (August 2021), the candidate will be evaluated by the supervisory committee and it will be decided whether the candidate is suitable to continue his/her doctoral research. A negative evaluation will imply with immediate effect the interruption of the thesis and the return of the candidate to his/her country.

SELECTION PROCESS AND BEGINNING OF THE THESIS :

- A pre-selection will be carried out in partnership with the partner institution concerned on the basis of the applications and the candidates selected for an interview will be informed by December 10, 2020 at the latest ;
- The nature and location of the interviews will also be communicated by December 10, 2020 and will be adapted according to the global sanitary conditions. The interviews will take place during

the month of December 2020. Candidates will receive a response following the interviews as soon as possible, after deliberation with the various southern and northern promoters ;

- The theses will begin on January 1, 2021.

REQUIRED PROFILE – APPLICATION FORM

Diploma	Graduate degree recognised by the Congolese state in one of the following fields: agronomy, plant biology, or an equivalent master's degree offering access to doctoral research; with a major course in forest management or ecology. Applications will also be accepted from students in the final year of their master's degree. Have obtained this diploma and completed their final work with, as a minimum, a degree of distinction (mention good or equivalent).
Nationality	DR Congo, Benin, Burkina Faso, Burundi, Cameroon, Ethiopia, Madagascar, Niger, Rwanda, Senegal, Kenya, Mozambique, South Africa, Tanzania, Uganda.

FROM AN ADMINISTRATIVE POINT OF VIEW :

- The candidate must, during his/her PhD, be affiliated to a scientific, academic or research institution that is a partner of PilotMAB ;
- Applications must therefore be supported by the head of this institution - Director General or Rector - ;
- Unless an exception is duly argued, the candidate will be under 40 years of age; candidates over 50 years of age on January 1, 2021 will not be selected ;
- For candidates with similar skills, the preference will be given the youngest ;
- For candidates with similar skills, the preference will be given to those who are staff members of the partner institution where the thesis will take place. Candidates from other institutions are also invited to apply in accordance with the conditions described above ;
- For candidates with similar skills, the preference will be given to female candidates. The RMCA encourages the participation of women in its doctoral scholarship programs.

EACH CANDIDATE MUST MEET THE FOLLOWING CRITERIA :

- The candidate must have a Master's degree or equivalent or significant experience in a scientific field relevant to the proposed research topic ;
- Be fluent in spoken and written French ; passive knowledge of English is a minimum prerequisite; a very good knowledge of English is an important asset ;
- Be highly motivated to undertake academic research in an international context ;
- Be hardworking and able to manage a project independently, taking initiative and meeting deadlines ;
- Be able to demonstrate creativity (especially in the face of potential problems that may arise in the course of research) ;

- Be part of a collaborative dynamic and be willing to share the fruits of his/her work for the benefit of the project and the scientific community in general ;
- Be sincere, honest and willing to adhere to the researcher's ethics (ensure respect for confidentiality, intellectual property, etc.) ;
- Willing to contribute to diverse aspects related to the ongoing operation of the project ;
- Demonstrate organizational skills, with attention to detail, to interact with other project partners and stakeholders ;
- Demonstrate a good aptitude to carry out field work in the forest ;
- Demonstrate good analytical and writing skills ;
- Be able to stay for a long time (several months) in Belgium.

COMPOSITION OF THE FILE AND PROCEDURE FOR SUBMITTING APPLICATIONS

Candidates are requested to submit an application file containing the following by December 1, 2020 :

- A cover letter (max 1 page) in which the candidate clearly states the title of the PhD for which he/she is applying (only one application per candidate will be accepted) ;
- A detailed and updated curriculum vitae (max 2 pages) and a list of publications (if relevant) + a recent passport photo + a certified copy of diplomas and university transcripts ;
- The name and e-mail address of two referees (members of the academic staff of a scientific institution) as well as a letter of recommendation from each of them ;
- A proposed methodology for the research project :
 - Provisional title of the research project, in French and English ;
 - Abstract, in French and English (maximum 2000 characters) ;
 - Choice of theme (cambial periodicity or carbon approach) ;
 - Project description (4 pages maximum): Research objective; State of the art; Research project; Work plan ;
 - Graphs and tables (2 pages maximum) are allowed in addition to the 4 pages ;
 - A reference bibliography (1 page maximum) must be included and listed in order of appearance in the text.
- A summary of the end-of-study work + (if possible) a copy (PDF) of this work carried out by the candidate ;
- A copy (PDF) of key publications (if relevant).

The application file is to be sent as a **single PDF file**, saved **in your name**, by email to **three people at the same time** :

- Dr. Hans Beeckman (hans.beeckman@africamuseum.be)
- Dr. Nils Bourland (nils.bourland@aigx.be)
- Félix Laurent (felix.laurent@africamuseum.be)