PROJECT TITLE: Assessing the potential of forests for sustainable climate mitigation contributing to the Paris Climate Agreement, using multi-data sources in a policy context.

DTP Research Theme(s): Changing Planet

Lead Institution: University of Bristol

Lead Supervisor: Dr Joanna I House, University of Bristol, Geographical Sciences

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Project keywords: forests, climate change, greenhouse gas, land use, models, satellite data, policy

Project Background

Land-based activities (e.g. deforestation) contribute around 10% of global carbon dioxide emissions. Under the Paris Climate Agreement, countries pledged to reduce emissions in their Nationally Determined Contributions (NDCs), with 25% of mitigation coming from land-based activities (e.g. avoided deforestation, reforestation). There are large differences between what countries report as their land emissions under the United Nations Framework Convention on Climate Change (UNFCCC), and independent estimates using global models and satellite data. In order to have confidence in the effectiveness of mitigation there is an urgent need to improve accuracy and transparency in Monitoring, Reporting and Verification (MRV) of greenhouse gas fluxes as well as ecosystem co-benefits and trade-offs. This is requisite for the Global Stocktake of collective progress towards meeting Paris Agreement goals, for project-based carbon credits, and for countries to assess the potential to raise ambition in future NDC pledges.

Project Aims and Methods

This PhD will compare official National Reporting of greenhouse gas fluxes and/or mitigation potential, with independent methods such as global models and satellite data. It will identify key reasons for the differences including data, methods, and attribution to “anthropogenic activity” versus “natural” processes. Through the process of reconciliation, results will target methodological development for model and satellite analyses, as well as formal methods guidance for National Reporting.

This project will benefit from access to the Global Carbon Project’s international multi-model synthesis activity. The supervision team has extensive policy connections nationally (e.g. UK Department of Business Energy and Industrial Strategy) and internationally (e.g. IPCC) to support co-production of information of relevance to policy processes. There is flexibility for the student in terms of methodological approaches, scale (project to global) and regional focus. Tropical South America and South East Asia are potential case study regions which account for over 60% of land sector emissions. This studentship offers a potential internship with field experience at INPE in Brazil working with data providers and remote sensing experts. Co-benefits of forest mitigation (biodiversity, flood and landslide resilience) can be explored through field work at Cardiff University’s field site in Borneo.
Candidate requirements
This would suit a candidate with excellent numeric skills (able to analyse different types of data), preferably a science background, with a strong interest in climate policy. Skills in GIS and remote sensing preferred, but training can be provided, with optional opportunities for training in running and developing models. We welcome and encourage student applications from under-represented groups. We value a diverse research environment.

Project partners
The skillsets of teams in Bristol, Cardiff and Exeter are highly complementary and will provide expertise and guidance in a range of disciplines including climate policy, remote-sensing and modelling. Project collaborators in Brazil and Malaysia will provide the opportunity to visit the field and their labs, enabling the student to experience the forests that they study and broaden their international research network.

Training
Specific training will include different methodological approaches to estimating land-based greenhouse gas fluxes; GIS and remote sensing; analyzing model output and optionally running/developing models; climate policy, the policy process and climate communication. The student will have opportunities for field work and specialized training in ground and airborne field data collection in Brazil and/or Borneo.

Background reading and references
1. IPCC (2022) Mitigation of Climate Change. 6th Assessment Report, Working Group III

Useful links
http://www.bristol.ac.uk/geography/courses/postgraduate/

Bristol NERC GW4+ DTP Prospectus:
http://www.bristol.ac.uk/study/postgraduate/2023/doctoral/phd-great-western-four-dtp/

How to apply to the University of Bristol:
http://www.bristol.ac.uk/study/postgraduate/apply/

Please note: If you wish to apply for more than one project please contact the Bristol NERC GW4+ DTP Administrator to find out the process for doing this.

The application deadline is Monday 9 January 2023 at 2359 GMT. Interviews will take place during the period 22 February – 8 March 2023.

NERC GW4+ DTP Website:
For more information about the NERC GW4+ Doctoral Training Partnership please visit https://www.nercgw4plus.ac.uk.

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