2024 DOCTORAL INPhINIT FELLOWSHIPS PROGRAMME – INCOMING

Towards effective Carbon Markets for Climate Action and Forest Protection

Area of Knowledge: LIFE SCIENCES

Group of disciplines: Agriculture, Veterinary Science, Animal Production, **Forestry**

Research project

Carbon markets (CMs), as pivotal instruments in climate change (CC) mitigation, demand the input of experts capable of solving the intricate nexus between forests, carbon dynamics, and CC scenarios. Working towards effective CMs for climate action and forest protection is directly aligned with the Sustainable Development Goals: 13) Climate action, being a key tool for reducing GHG emissions and CC mitigation; 15) Life on Land, protecting ecosystems that play a vital role in carbon storage; 7) Affordable and Clean Energy, promoting the development and deployment of efficiency technologies; 9) Industry, Innovation and Infrastructure, incentivizing investment in new and innovative CC mitigation technologies; 10) Reduce Inequalities, providing financial support to developing countries to reduce their emissions and build resilience to CC.

In addition, CMs can indirectly contribute to the achievement of the UN´s SDGs 1 (No Poverty), 3 (Good Health and Well-being), and 11 (Sustainable Cities and Communities).

The group leader (BO) has been working on the quantification of carbon stocks and fluxes of forested ecosystems (FIRE-C-BUDs, ModelEco, LIFE REFOREST, FirEProd), pasture ecosystems (SOILCOMBAT and TRUESOIL), and wetlands (RESTORE4Cs), integrating field with lab and remotely sensed data, as well as developing and applying modeling techniques using multiple programming tools. The group co-leader (SC) has been working in forestry research at corporative and academic levels, including in forest management, the impacts of prescribed fire and wildfires on soil quality and forest productivity (FirEProd, SusPiRe, EPYRIS, FoRES), economic analysis of the scientific outputs (BESIDE), integration of results on decision support system tools policy-oriented, and the interaction between science and society (FirEProd, FoRES, BESIDE, Facing Fire). BO and SC have extensive experience in project management, European networks, coordinating and tutoring academic teams and students.

Job position description

Carbon markets (CMs) are often seen as advantageous compared to other policy instruments, but they have also faced criticism for their lack of ambition, perceived gaps, and effectiveness. To address these weaknesses, several measures can be adopted to make CMs more effective in their role in mitigating carbon emissions and protecting forests, including:

- Establish a robust price signal for GHG emissions, encompassing land-use and biosphere, while considering long-term societal and ecological costs.

- Expand CM instruments to cover all GHG.
- Create and enforce guidelines to mitigate GHG leakage.
- Enhance the quantification of GHG emissions from land-use and the biosphere.
- Prioritize emission reductions and integrating them into relevant policies.
- Link MRV methodologies for carbon assessment in forests with CMs to maintain the integrity of carbon benefits, evaluating trade-offs, and quantifying potential improvements.
- Ensure that CMs account comprehensively for the costs and benefits of forest protection and restoration.
- Guarantee quality and transparency.
- Enhance the economic viability of reforestation projects by considering co-benefits such as landscape remediation, biodiversity conservation, and social outcomes.
- Integrate biodiversity preservation and SDGs as integral components of forest carbon projects.
- Develop robust market infrastructure, including standards and registries, to ensure that CMs encompass the full spectrum of costs and benefits.

The main research objectives will be:

- exploring conceptual aspects of current policies and conducting empirical studies to understand how CMs work and perform;
- identify and propose solutions for the obstacles faced by CMs and provide support for their development;
- study the formulation of CMs, including legislation, regulations, and trade procedures, in order to optimize carbon trading operations;
- critically examine the impact of CMs and explore alternative policy mechanisms.

Supervisor team

Dr. Bruna R.F. Oliveira (BO) (bruna.oliveira@ua.pt)

Research projects: ModelEco, RESTORE4Cs

CESAM´s Research group: SES https://www.cesam-la.pt/sobre/grupos-de-investigacao/ses/

Dr. Sofia C. Corticeiro (SC)

Research projects: FirEProd, BESIDE

CESAM´s Research group: ABEP https://www.cesam-la.pt/sobre/grupos-de-investigacao/abep/

Additional information

Website of CESAM: www.cesam-la.pt

Website of the University of Aveiro, Portugal: https://www.ua.pt/en/

Website of the ModelEco project: https://www.cesam-la.pt/projetos/modeleco-modelacao-de-fluxos-de-ecossistemas-com-tempo-apos-incendio-com-base-em-detecao-remota-de-indices-de-vegetacao-e-parametros-meteorologicos/

Website of the FirEProd project: https://www.cesam-la.pt/projetos/fireprod-fogo-controlado-risco-de-incendio-e-produtividade-do-eucaliptal-da-investigacao-a-pratica/

Website of the BESIDE project: https://www.cesam-la.pt/projetos/beside-institutional-behavioural-critical-and-adaptive-economics-towards-sustainable-development-management-of-natural-capital-and-circular-economy/