2023_08_CEP_Slade: Nature based solutions for climate mitigation and adaptation: limits, opportunities and strategies

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Many of the proposed technologies for mitigating and adapting to climate change require extensive land use change. How land is used, and the associated impacts, vary considerably among options and also for the same option depending on the geographic location, scale, system design and deployment strategy. Land occupation can be large uniform areas, e.g., hydropower reservoirs and tree plantations, or can be distributed and integrated with other land uses, e.g., wind turbines and agroforestry in agricultural landscapes.

Land-based measures can provide co-benefits, but there are also risks and trade-offs from inappropriate land management. Mitigation measures addressing GHGs, for example, may also affect other climate forcers such as albedo and evapotranspiration.

Mitigation and adaptation options that provide additional benefits to biodiversity and human well-being are often described as ‘Nature-based Solutions’ (NBS), however this term is often used ambiguously to refer to subsets of options favoured by particular stakeholders, advocates, or government. This can lead to an over-reliance on nature-based solutions in governments’ commitments to responding to climate change, or the unwarranted rejection of alternatives.

This interdisciplinary PhD project will explore both the potential contribution that NBS can make to climate mitigation and adaptation and the environmental, ecological and social, limits to their deployment. Starting from the evaluation of available data sets, the project will assess the global contribution that NBS can make and develop a framework to quantify the positive and negative impacts at different levels of deployment. Subsequently, there will be an opportunity to explore the role of NBS in the context of policy making, and countries pledges under the Paris agreement. Alternately there is the opportunity to focus on specific case studies.