

Greenhouse gas removal through carbon sequestration in vegetation and soils

Pete Smith

Institute of Biological and Environmental Sciences, University of Aberdeen, 23 St Machar Drive, Aberdeen, AB24 3UU, Scotland, UK

A majority of IPCC scenarios show that often very significant amounts (20 Gt CO₂e/yr) of Greenhouse Gas Removal technologies (GGRs) are required to reach a 2°C target by 2100. Given that most models fail to reach a 2°C target without GGRs, it seems impossible that the aspirational target of 1.5°C of the Paris Agreement could be met without GGRs. The global potential, feasibility, barriers and impacts of GGRs need to be assessed. The global implications of widespread implementation of GGRs on land competition, greenhouse gas emissions, physical climate feedbacks (e.g. albedo), water requirements, nutrient use, energy and cost, have recently been assessed. It appears that sequestration in soils and vegetation have significant potential for GGR, and may do so with much less competition for land, water and nutrients than, for example, Bioenergy with Carbon Capture and Storage (BECCS). In addition, soil and vegetation-based GGRs could help deliver other Sustainable Development Goals (SDGs), particularly 1, 2, 13 and 15 (poverty, hunger, climate and life on land). Yet constraints due to high uncertainties about the level of GGR achievable, the need for site-specific options and incentives, social and ecological impacts, and the risk of impermanence have limited the implementation of soil and vegetation-based GGR to date. In this paper I will provide an introduction to the issues that will be covered by talks in a conference session examining some of the challenges and opportunities presented by land-based GGR options.

Keywords: Soil Climate change, carbon sequestration