Impact of ecosystem carbon sequestration service on progress towards the Sustainable Development Goals

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Abstract

Ecosystem carbon sequestration service (ECSS), the benefit that humans derive from ecosystem carbon sequestration, is key to regulating climate and supporting Sustainable Development Goals (SDGs) achievement. However, the ECSS-SDGs relationship is largely unknown, limiting our understanding of how ecosystem services contribute to the sustainable development agenda. Here we assessed the sustainable development progress of the Loess Plateau from 2000 to 2019 based on the SDG indicators. Then we analysed the impact of ECSS on regional SDG progress and its threshold. The results showed that the Loess Plateau made higher progress on resource and environmental SDGs, such as SDG 13 (Climate action), SDG 12 (Responsible consumption and production), SDG 6 (Clean water and sanitation), and SDG 7 (Affordable and clean energy). SDG 6, 7, 13 and 15 (Life on land) showed linear responses to ECSS, while the response of SDG 1 (No poverty), 4 (Quality education), 8 (Decent work and economic growth) and 12 (Responsible consumption and production) to ECSS showed a threshold when the standardised carbon sequestration value was 0.11. ECSS positively affected the SDG progress when the standardised carbon sequestration value was less than 0.11, which corresponds to most part of the Loess Plateau. It indicates that ECSS support the SDG realization in most areas of the Loess Plateau, where the socio-economic sustainability is closely related to carbon sequestration service. The areas that ECSS had no significant impact on SDGs (when the standardised carbon sequestration value was larger than 0.11) correspond to large-scale forestland. This work links carbon sequestration service to sustainable development and can help to leverage nature's contributions to social-ecological sustainability.

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