

Impacts of invasive alien plants on land degradation and sustainable ecosystem restoration

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Abstract

Land resources are finite, comprised with biophysical complexities (biodiversity, soil, and water resources), vital in sustenance of life. However, multiple anthropogenic disturbances transmogrified the global landscapes with spread of invasive alien plants (IAPs), and perturbed the land-biophysical components, thereby triggering the ecosystem degradation. Nevertheless, the interrelationship of IAPs with land degradation and sustainable restoration is not well established. Furthermore, the restoration challenges of IAPs driven land degradation is also exacerbated under the event of climate change. In this review, the adverse impacts of IAPs on biophysical components of land resources are discussed to explicitly assess the drivers of ecosystem degradation. Restoration efforts of degraded lands should be therefore targeted to revitalize the associated biophysical complexities. Further, the explicit study on the effects of IAPs on plant-soil and plant-soil microbe interactions need to be at the heart of sustainable land or ecosystem restoration strategies. Several studies refused the blanket condemnation of IAPs in ecosystem restoration, ascribed to co-benefits (bioenergy, phytoremediation, biopolymers, and ethnomedicines), inextricably linked with the coverage of financial incentives. Nevertheless, the use of IAPs in ecological restoration needs pragmatic evaluation in terms of long-term ecosystem effects. To this end, the incorporation of ‘hybrid technology’, integrating scientific information with traditional ecological knowledge (TEK), can be the founding principle of sustainable ecosystem restoration and rural livelihood. Importantly, holistic approach in restoration of degraded lands in concert with ‘circular economy’ can remarkably influence in achieving the target of UN Sustainable Development Goals (UN-SDGs) and UN Decade on Ecosystem Restoration (UN-DER) (2021-30).

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