From diagnosis to action

A bibliometric assessment of land degradation neutrality research and the gap in soil and land management solutions

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Introduction

- Land degradation threatens soil productivity, food security, water resources, and biodiversity worldwide.
- Land Degradation Neutrality (LDN), under SDG 15.3, aims to avoid, reduce, and reverse degradation.
- This study examines whether rapidly growing LDN research is translating diagnosis and policy into practical soil and land management solutions

Methods

- Bibliographic records were retrieved from Scopus for the period 2013-2026.
- Final dataset consisted of 607 unique publications.
- Bibliometric and science mapping analyses were conducted in Python 3.

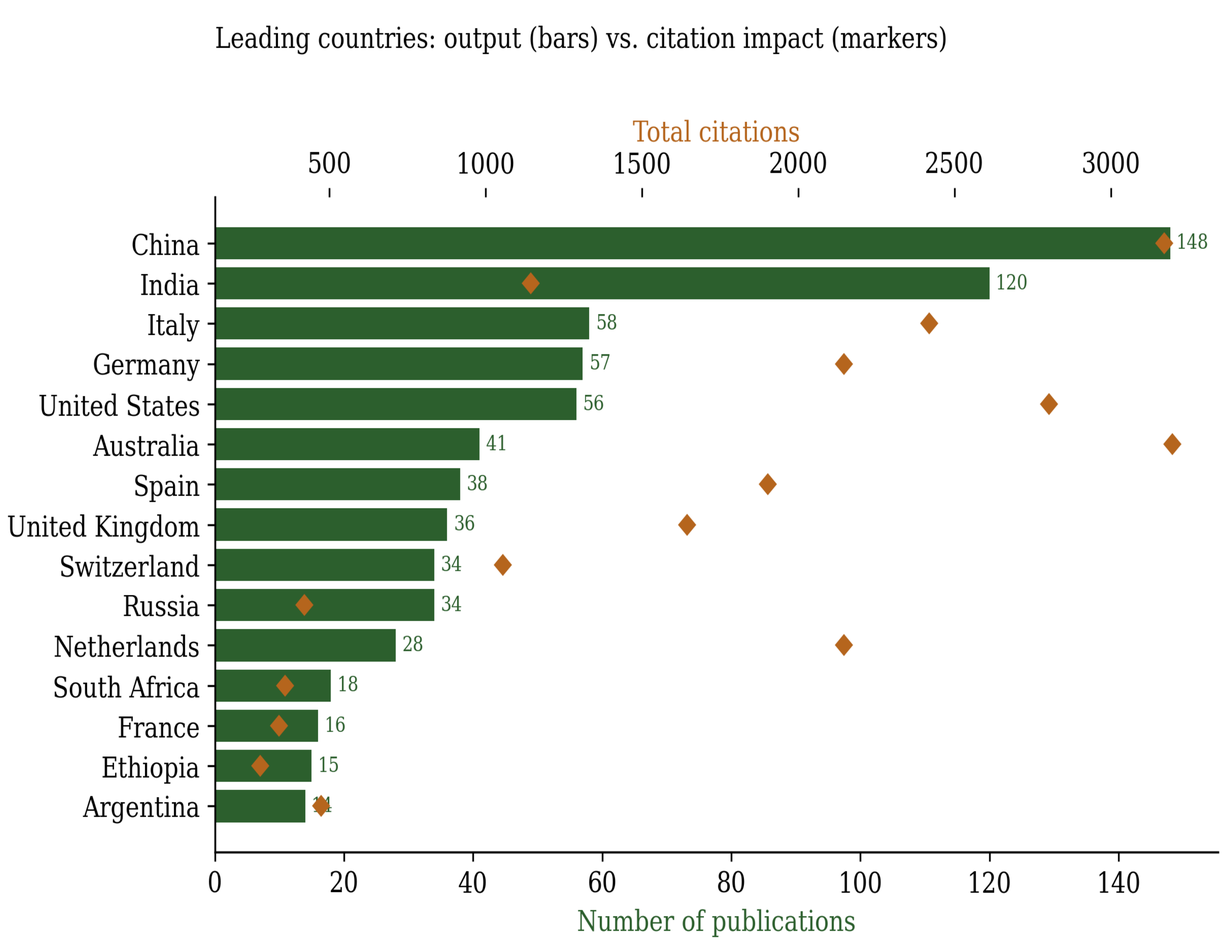
Results

Growth of Land Degradation Neutrality research

- The corpus included 607 documents from 257 sources and 2,193 authors, showing that LDN has developed into a substantial research field.

- Land Degradation and Development was the most productive journal with 50 publications, followed by Environmental Science and Policy (29) and Land (25).

- LDN research grew rapidly after 2015, averaging 32% annual growth and reaching nearly 100 publications by 2025.

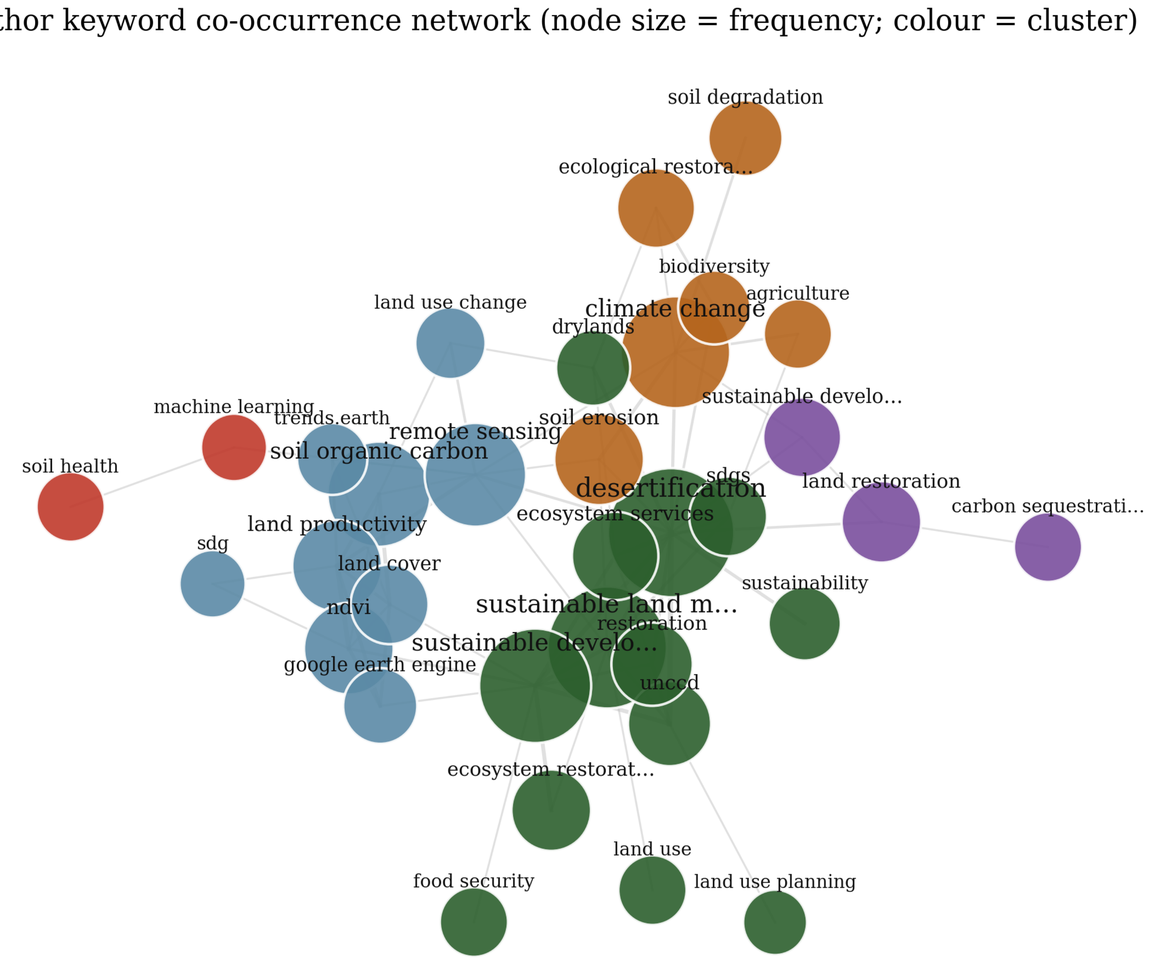


Leading countries by publication output (bars) and total citation impact (markers)

- Research output is concentrated in a small group of journals and institutions, led by *Land Degradation and Development* and the Chinese Academy of Sciences.

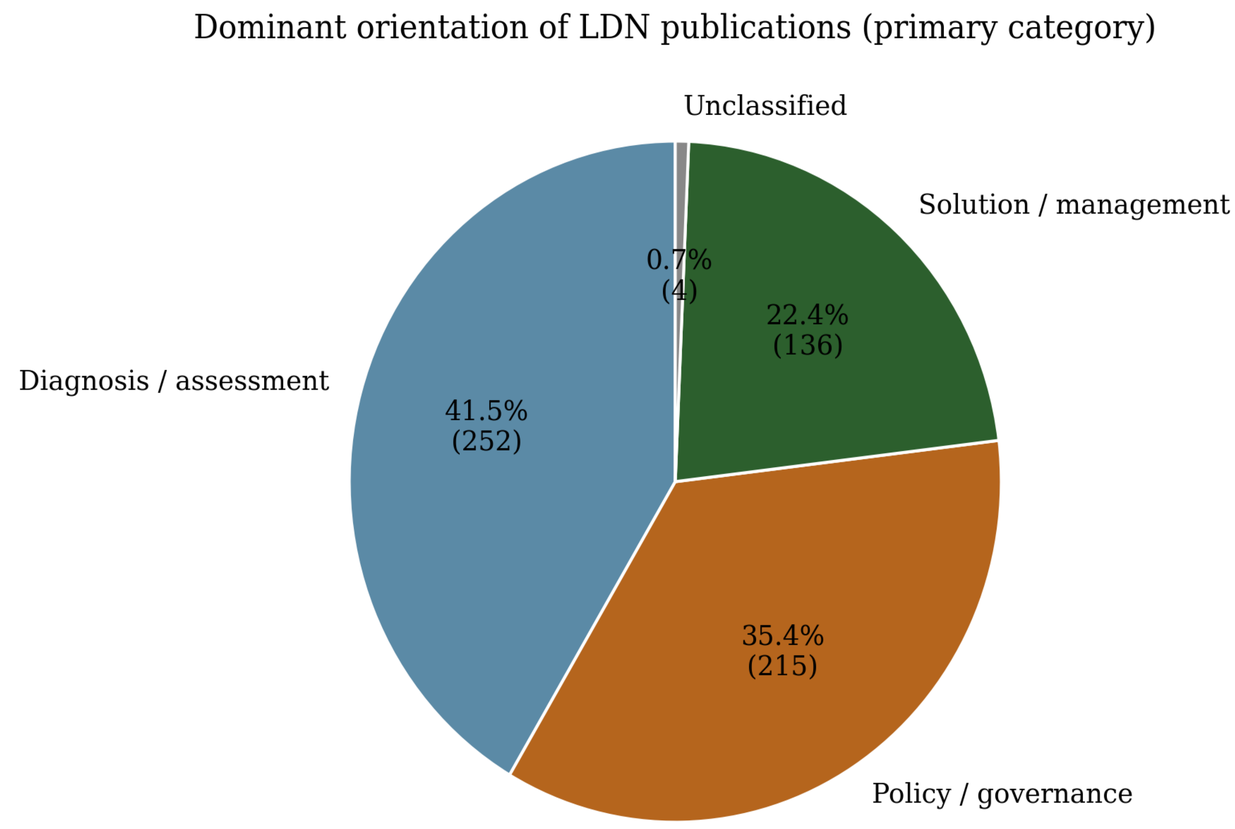
- Most importantly, only 22.4% of publications were solution-oriented, compared with 41.5% diagnosis-oriented and 35.4% policy-oriented, indicating a substantial gap between assessment and actionable land management research.

- Five main thematic clusters emerged: governance & sustainable land management, measurement & Earth observation, degradation processes & drivers, restoration & carbon, and soil health & machine learning.



Co-occurrence network of author keywords.

- Future research should strengthen locally grounded evidence in sub-Saharan Africa and other under-represented regions and better connect monitoring with management interventions



Distribution of the corpus across dominant research orientations

Conclusions

- LDN research has grown rapidly and developed a strong foundation in assessment methods and conceptual frameworks.

- However, on-ground soil and land management studies still account for less than one-quarter of the literature, and research remains geographically uneven.

- Moving from diagnosis to action requires more field-tested management evidence in regions with the greatest degradation burden.