nature portfolio

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Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our Editorial Policies and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed	
☒	☐	The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement
☒	☐	A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☒	☐	The statistical test(s) used AND whether they are one- or two-sided *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☒	☐	A description of all covariates tested
☐	☒	A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☒	☐	A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☒	☐	For null hypothesis testing, the test statistic (e.g. *F*, *t*, *r*) with confidence intervals, effect sizes, degrees of freedom and *P* value noted *Give P values as exact values whenever suitable.*
☒	☐	For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☒	☐	For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☒	☐	Estimates of effect sizes (e.g. Cohen's *d*, Pearson's *r*), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection	No software was required for data collection. All data was collected from publicly accessible databases.
Data analysis	Data was analyzed using R version 4.1.1 and original code for our analysis is available at this repository: https://doi.org/10.5281/zenodo.6469117

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our policy

Data was collected from The Nature conservancy, Kummu et al 2018, Global Forest Watch and the SSP database. Data for this paper is available at this repository: https://doi.org/10.5281/zenodo.6469117

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☐ Life sciences ☐ Behavioural & social sciences ☒ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Ecological, evolutionary & environmental sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	We perform a dynamic optimization for prioritizing forest conservation for plant biodiversity across 458 forest ecoregions around the world. This is a quantitative data analysis based on data which was collected from other sources.
Research sample	We used data on 458 forest ecoregions based on The Nature Conservancy's (TNC) global terrestrial ecoregions . For each forest ecoregion, we used the area of forest remaining in 2018 as the initial forested area and forest area in 2000 as the maximum extent for reforestation . We defined threat for each ecoregion as the annual rate of deforestation (as a fraction of remaining unprotected forest), which was calculated using the annual rate of forest cover loss between 2000 and 2018. For each ecoregion we also used the area of protected forest (UNEP-IUCN Protected Areas of the World database)6, a proxy for the cost of protecting land (globally gridded 2015 GDP from Kummu et al.) , and the number of plant species (TNC) . We used plant species data because plants are an important component of overall biodiversity, plant data is available globally, and plants are a key indicator of ecosystem productivity and resilience . We chose the TNC plant biodiversity data set because it has global coverage, does not focus on a particular subset of plants, and reports species richness per ecoregion.
Sampling strategy	We used all 458 global forested ecoregions, there was no sampling.
Data collection	Data was retrieved Online from The Nature Conservancy, Kummu et al 2018, Global Forest Watch and the SSP database. No original data collection was done for this project.
Timing and spatial scale	Data from our sources referenced above was collected between 2019-2021. It is global data. There was no original data collected for this study.
Data exclusions	No Data was excluded beyond limiting our focus on forested ecoregions.
Reproducibility	All data and code for reproducibility is available at the referenced repository
Randomization	Not applicable, we used all of the data from the forested ecoregions.
Blinding	Not applicable to this study, there were no participants.

Did the study involve field work? ☐ Yes ☒ No

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☒	☐ Human research participants
☒	☐ Clinical data
☒	☐ Dual use research of concern

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging