

Reporting Summary

Nature Research 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 Research 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

Data analysis

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 Research [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 list of figures that have associated raw data
- A description of any restrictions on data availability

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](https://www.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	Data collection was conducted under multiple studies, as summarized in the Methods, Supplementary Information, and linked to in Supplementary Table 7.
Research sample	Data collection was conducted under multiple studies, as summarized in the Methods, Supplementary Information, and linked to in Supplementary Table 5.
Sampling strategy	Data collection was conducted under multiple studies, as summarized in the Methods, Supplementary Information, and linked to in Supplementary Table 7.
Data collection	Data collection was conducted under multiple studies, as summarized in the Methods, Supplementary Information, and linked to in Supplementary Table 7.
Timing and spatial scale	Across the landscape detailed in the manuscript, and within the papers listed in Supplementary Table 7. All data were collected during 2014-2015.
Data exclusions	No data were excluded
Reproducibility	Standard methods were used for field surveys.
Randomization	Field data collection sites were stratified random, ensuring spatial independence via taxon specific spacing.
Blinding	Not applicable
Did the study involve field work?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Field work, collection and transport

Field conditions	Tropical forests and oil palm plantations in Sabah, Malaysia.
Location	SAFE project in Sabah Malaysia and surrounding plantations. Centred on 4.678198, 117.564159. For further details see https://www.safeproject.net/
Access & import/export	Various field research permits each detailed under the DOIs shown in Supplementary Table 7
Disturbance	No disturbance other than human presence

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
<input checked="" type="checkbox"/>	<input type="checkbox"/> Antibodies
<input checked="" type="checkbox"/>	<input type="checkbox"/> Eukaryotic cell lines
<input checked="" type="checkbox"/>	<input type="checkbox"/> Palaeontology and archaeology
<input type="checkbox"/>	<input checked="" type="checkbox"/> Animals and other organisms
<input type="checkbox"/>	<input checked="" type="checkbox"/> Human research participants
<input checked="" type="checkbox"/>	<input type="checkbox"/> Clinical data
<input checked="" type="checkbox"/>	<input type="checkbox"/> Dual use research of concern

Methods

n/a	Involved in the study
<input checked="" type="checkbox"/>	<input type="checkbox"/> ChIP-seq
<input checked="" type="checkbox"/>	<input type="checkbox"/> Flow cytometry
<input checked="" type="checkbox"/>	<input type="checkbox"/> MRI-based neuroimaging

Animals and other organisms

Policy information about [studies involving animals](#); [ARRIVE guidelines](#) recommended for reporting animal research

Laboratory animals	N/A
Wild animals	We collected abundance data of 247 species. Bird and non-volant mammal data was non-intrusive and observational. Bats were trapped and released at the study site in Sabah. Dung beetles were collected using lethal pit-fall traps.
Field-collected samples	N/A
Ethics oversight	Ethical approval was granted by the University of Kent School of Anthropology and Conservation ethics committee: reference number 001-ST-17.

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Human research participants

Policy information about [studies involving human research participants](#)

Population characteristics	We conducted semi-structured interviews with nine representatives from seven palm oil producers. We did not collect data on age (apart from ensuring they were over 18) or gender (although our sample included both men and women).
Recruitment	All oil palm companies attending an oil palm conference were invited to conduct a semi-structured interview
Ethics oversight	Ethical approval was granted by the University of Kent School of Anthropology and Conservation ethics committee: reference number 001-ST-17.

Note that full information on the approval of the study protocol must also be provided in the manuscript.