

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
<i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i> |
| ☐ | ☒ | 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
<i>Give P values as exact values whenever suitable.</i> |
| ☒ | ☐ | 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 | All data used in this analysis come from publicly available sources. The custom codes for the data collection, and the compiled datasheets, supporting the findings of this study are available in Zenodo with the identifier https://doi.org/10.5281/zenodo.7547323 |
| Data analysis | Custom codes to replicate all tables, figures and results of this study are available in Zenodo with the identifier https://doi.org/10.5281/zenodo.7547323 |

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](#)

The custom codes for the data collection, and the compiled datasheets, supporting the findings of this study are available in Zenodo with the identifier <https://doi.org/10.5281/zenodo.7547323>. All data used in this analysis come from publicly available sources:

Flood fatalities from EM-DAT (www.emdat.be, accessed 2022-12-07).
 Geocoded disasters from GDIS (<https://doi.org/10.7927/zz3b-8y61>).
 Administrative region boundaries from GADM v. 3.6 (www.gadm.org).
 Gini index of disposable income from the Standardized World Income Inequality Database v. 9.1 (<https://doi.org/10.7910/DVN/LM4OWF>).
 Expenditure-side real GDP at chained PPPs and country population totals from the Penn World Table v. 10.0 (<https://doi.org/10.15141/S5Q94M>).
 Income class and share of population aged 65 or more from the World Bank Development Indicators (<https://data.worldbank.org/>).
 GHS-POP P2016 (accessed via Google Earth Engine snippet "JRC/GHSL/P2016/POP_GPW_GLOBE_V1").
 GHS-SMOD P2016 (accessed via Google Earth Engine snippet "JRC/GHSL/P2016/SMOD_POP_GLOBE_V1").
 GHS-UCD R2019A (<http://data.europa.eu/89h/53473144-b88c-44bc-b4a3-4583ed1f547e>)

Human research participants

Policy information about [studies involving human research participants and Sex and Gender in Research](#).

Reporting on sex and gender

Use the terms sex (biological attribute) and gender (shaped by social and cultural circumstances) carefully in order to avoid confusing both terms. Indicate if findings apply to only one sex or gender; describe whether sex and gender were considered in study design whether sex and/or gender was determined based on self-reporting or assigned and methods used. Provide in the source data disaggregated sex and gender data where this information has been collected, and consent has been obtained for sharing of individual-level data; provide overall numbers in this Reporting Summary. Please state if this information has not been collected. Report sex- and gender-based analyses where performed, justify reasons for lack of sex- and gender-based analysis.

Population characteristics

Describe the covariate-relevant population characteristics of the human research participants (e.g. age, genotypic information, past and current diagnosis and treatment categories). If you filled out the behavioural & social sciences study design questions and have nothing to add here, write "See above."

Recruitment

Describe how participants were recruited. Outline any potential self-selection bias or other biases that may be present and how these are likely to impact results.

Ethics oversight

Identify the organization(s) that approved the study protocol.

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

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 conduct quantitative statistical analyses on country level to evaluate if countries with high income inequality also tend to suffer more flood fatalities, compared to countries with low income inequality. We tested the association between income inequality and flood mortality at country level by combining data on disaster losses, human exposure and socioeconomic indicators from a number of international databases.

Research sample

The flood disaster reports and socioeconomic data are derived from existing datasets, as described in the paper. We only included records that had been geocoded on, at least, county or district level (or finer) by the database GDIS. This enabled us to estimate the number of potentially exposed individuals for each record.

Sampling strategy

We included all samples that were available in the global and publicly available databases.

Data collection

S.L. collected the data in 2022 from already published data sources, and compiled the variables of interest into one datasheet using R and Google Earth Engine.

Timing and spatial scale

Major floods occurring in middle- and high-income countries (MHICs) between 1990 and 2018 were included. As stated in the introduction, we limit the study to MHICs primarily due to comparability reasons and because we aim to shed light on the role of inequality in advanced economies.

Data exclusions

Only flood records geocoded to at least district level was included in the study, we thus excluded records geocoded to state level. The state level subdivisions are typically five times larger than the district subdivisions, which would have resulted in larger exposure estimates and hence potentially biasing the analysis. We also excluded one record as it did not contain any inhabitants according to the global population map, which we deemed unrealistic.

Reproducibility

Custom codes to replicate all tables, figures and results of this study are available in Zenodo with the identifier <https://doi.org/10.5281/zenodo.7547323>

Randomization

Randomization is not applicable for this study.

Blinding

Blinding is not applicable for this study.

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	Involvement in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☒	☐ Clinical data
☒	☐ Dual use research of concern

Methods

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