

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 (<i>n</i>) 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. <i>F</i> , <i>t</i> , <i>r</i>) with confidence intervals, effect sizes, degrees of freedom and <i>P</i> 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 <i>d</i> , Pearson's <i>r</i>), 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	The weather data utilized in this study, which include temperature, rainfall, relative humidity and sunshine duration, were sourced from China's National Meteorological Information Center. As the premier institution tasked with the collection and dissemination of national weather statistics, it offered a comprehensive dataset for our analysis. We compiled station-day records that spanned from 2012 to 2023, incorporating data from a total of 824 stations strategically spread across China. Our pricing and market information data are derived from the National Agricultural Products Price Database (https://pfsc.agri.cn/#/indexPage), which provides daily updates on vegetable wholesale prices. In the construction of our comprehensive dataset, we have synergized anticipated climate patterns, economic output (GDP), and demographic data. Our longitudinal weather forecasts and climatic projections are sourced from NASA's Earth Exchange Global Daily Downscaled Projections (NEX-GDDP). Originating from the General Circulation Models (GCMs) of the Coupled Model Intercomparison Project Phase 6, the NEX-GDDP provides daily, high-resolution (0.25-degree spatial resolution) climate scenarios under SSP2-4.5 and SSP5-8.5 for the period 1950 to 2100 from 21 different GCMs (Thrasher et al. 2022). These projections are congruent with our baseline model in terms of their analytical granularity, focusing on daily variations at the market level. We integrate market-centric vegetable wholesale price data with corresponding points on the NEX-GDDP's grid, ensuring locality-specific accuracy. Our primary findings are derived from the average of the projected temperatures and climate conditions as indicated by the consensus of the 21 GCMs.
Data analysis	The StataMP17 and ArcMap V10.8, QGIS 4.0.0 are employed for 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 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 weather and climate data that support the findings of this study are available, while the price data is confidential. We cannot disclose the data to the public under the nondisclosure agreement. However, the data for replication are uploaded to Zenodo after trimming sensitive data (<https://zenodo.org/records/15236927>).

Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

Reporting on sex and gender

Reporting on race, ethnicity, or other socially relevant groupings

Population characteristics

Recruitment

Ethics oversight

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](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

Behavioural & social sciences study design

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

Study description

Research sample

Sampling strategy

Data collection

Timing

Data exclusions

Non-participation

Randomization was not applicable because this study uses observational panel data.

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
☒	☐ Clinical data
☒	☐ Dual use research of concern
☒	☐ Plants

Methods

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

Plants

Seed stocks

No seed stocks, plants, or novel plant genotypes were used in this study.

Novel plant genotypes

No seed stocks, plants, or novel plant genotypes were used in this study.

Authentication

No seed stocks, plants, or novel plant genotypes were used in this study.