



Housing Requirements, Hazard Exposure, and Resilience Costs: A Global Outlook to 2100

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This review verifies the reproducibility of the exhibits included in the paper “*Housing Requirements, Hazard Exposure, and Resilience Costs: A Global Outlook to 2100*”.

Contents in this review:

1. Main findings
2. List of exhibits and reproducibility status
3. Reproduction Environment

Main findings

- **Every exhibit in the main section of the paper and the appendix were reproduced accurately**
- The code was successfully executed on a new computer after:
 1. Restoring the environment using “requirements.txt.”
 2. Updating the file paths to match the local environment.
 3. Running the Jupyter notebooks in the order specified in the README.
- Input files (located in data_raw/GEM/wb_adm1_2024oct_revised_complete_v20260114/) were created manually in QGIS by the author’s collaborator. The process is briefly described in the README. The QGIS workflow has not been reproduced by the reviewers.
- The output was not verified for stability because the package takes more than 24 hours to run.
- The code takes approximately 48 hours to run.
- We conducted our reproducibility analysis based on the paper shared by the authors by email on August 13, 2026.
- **Verification Process and Data Handling:**
 - The reproducibility package relies on 2 types of data: open and accessible.
 - Open data is included in the public reproducibility package.
 - Reviewers verified that the accessible data matches what was provided by the authors; results of this verification are documented in the file *comparison_report.csv*.

- *data_hash_report.csv* lists the SHA256 hashes of all files in the Data folder to support data integrity checks. Users who acquire the accessible data can use this file to verify that the data has not been altered.
- **Reproducibility Summary:**
 - **Data:** All data sources are publicly available but not all are included in the reproducibility package.
 - **Code:** All code files (from cleaning to analysis) are included in the reproducibility package.
 - **Outputs:** All outputs are generated by code included in the reproducibility package.
 - **Dependencies environment:** The reviewers created a new environment using the latest versions of dependencies available at the moment of the review.

List of exhibits and reproducibility status

Results in the Main Section of the Paper

- **Figure 1** Does not apply. This figure does not contain analytical output.
- **Figure 2** Reproduced.
- **Figure 3** Reproduced.
- **Figure 4** Reproduced.
- **Figure 5** Reproduced.
- **Figure 6** Reproduced.
- **Figure 7** Reproduced.
- **Figure 8** Reproduced.
- **Figure 9** Reproduced.
- **Figure 10** Reproduced.
- **Figure 11** Reproduced.
- **Figure 12** Reproduced.
- **Table 1** Reproduced.
- **Table 2** Reproduced.
- **Table 3** Reproduced.
- **Table 4** Reproduced.
- **Table 5** Reproduced.

Results in the Annex

- Table A2.1 Reproduced.
- Table A2.2 Reproduced.
- Figure A3.1 Reproduced.
- Figure A3.2 Reproduced.
- Figure A3.3 Reproduced.
- Table A4.1 Reproduced.
- Table A4.2 Reproduced.
- Figure A4.1 Reproduced.
- Figure A4.2 Reproduced.
- Figure A5.1 Reproduced.
- Figure A5.2 Reproduced.

Reproduction Environment

Paper exhibits were reproduced on a computer with the following specifications:

- OS: Windows 11 Enterprise
- Processor: INTEL(R) XEON(R) PLATINUM 8562Y+ 2.80 GHz (2 processors)
- Memory available: 32.0 GB
- Software version: Python 3.13.14, QGIS 3.44.5