

Reviewer Comments to Authors

Manuscript: **Urban gullies and their massive economic toll: insights from Kinshasa, the world's most affected city**

Recommendation: Minor Revision

General Comments

This manuscript offers a valuable and timely assessment of the economic impacts of urban gully erosion in Kinshasa, D.R. Congo. The study is novel, supported by an extensive household survey dataset, and addresses a significant knowledge gap regarding the socioeconomic impacts of urban gullies. The integration of household surveys, spatial analysis, and real-estate valuation is commendable. The manuscript is well-structured, and the findings are highly relevant to urban planning and resilience policy. Several methodological assumptions, considerations of uncertainty, and extrapolation procedures require clarification before publication. I recommend publication after addressing the following comments.

Specific Comments

Abstract

Line 25–35

- The statement that Kinshasa is "the world's most affected city" should be supported by quantitative global comparisons or revised to "one of the world's most affected cities."
- The abstract reports estimated losses of USD 979 million but does not indicate uncertainty ranges. Please provide confidence intervals or indicate that these are approximate estimates.

Introduction

Line 66–72

- The statement that most community stabilization initiatives have little or no effect is important. Please provide quantitative evidence or summarize findings from cited references demonstrating failure rates.

Line 73–80

- The authors state that few studies have quantified costs associated with urban gullies. A more comprehensive review of available economic assessments globally would strengthen the justification for the research gap.

Line 126–132

- The household sampling strategy intentionally targeted households closest to gullies. While appropriate for impact documentation, this introduces potential sampling bias. Please discuss how this affects the extrapolation of findings to the city scale.

Line 143–150

- Were respondents provided with any guidance for estimating historical damages and expenditure? Please clarify how recall bias was minimized.

Line 158–168

- The real-estate valuation component relies on interviews with only 12 brokers. Please provide additional information on:
 - Years of professional experience.
 - Number of transactions handled annually.
 - Selection criteria.
 - Spatial representativeness across Kinshasa.

Line 180–182

- The 30 m threshold for defining high-risk parcels appears somewhat arbitrary. Please provide stronger justification and discuss sensitivity to alternative thresholds such as 20 m, 40 m, or 50 m.

Line 184–192

- Inflation correction methodology is appropriate. However, please provide a sensitivity analysis showing the effect of alternative inflation assumptions.

Line 201–220

- The GIS extrapolation approach is central to the manuscript. Please provide an uncertainty assessment associated with parcel density estimation and buffer delineation.

Line 245–248

- The conclusion that property values in marginal zones experience negligible reduction appears inconsistent with the observed 39% median difference reported later in the manuscript. Please clarify this interpretation.

Results

Line 265–270

- Notably, 98.3% of respondents are concerned about gullies, whereas only 70.6% perceive themselves as at risk. Please explore this discrepancy further, potentially using socioeconomic variables.

Line 281–285

- Because 725 of 802 surveyed households are within 30 m of gullies, the reported damage percentages may not represent the broader exposed population. Please clarify this limitation.

Line 303–309

- The reported average damage cost of USD 4,320 is a key result. Please provide median values alongside means, as damage distributions appear highly skewed.

Line 334–342

- Reported stabilization investments show high variability. Consider reporting interquartile ranges and medians to better characterize the distribution.

Line 365–370

- The estimated citywide stabilization investment of USD 31.1 million is based on several assumptions. Please provide confidence intervals or scenario-based ranges.

Line 367–370

- The assumption of an average gully age of 15 years is critical for annualized estimates. Please explain how this value was derived and provide sensitivity analyses using alternative gully ages.

Line 379–380

- The statement that losses exceed 10% of household income is important. Consider presenting this result separately by income category in a table.

Real Estate Valuation

Line 388–395

- Real-estate values appear to decline by more than 50% near gullies according to broker estimates. Please discuss whether this reduction reflects actual transactions or perceived market values.

Line 406–414

- The estimate of USD 979 million in property value losses is one of the manuscript's most influential findings. Please provide uncertainty bounds and explain how sensitive this estimate is to broker-derived assumptions.
- Please clarify whether direct damage costs and real-estate value reductions may partially overlap and risk double counting economic losses.

Discussion

Line 446–452

- The discussion would benefit from a comparison of urban gully losses with other hazards affecting Kinshasa, such as flooding or landslides, to place the results in context.

Line 454–469

- The risk perception findings are particularly interesting. Consider conducting additional statistical analyses (e.g., logistic regression) to identify factors influencing risk perception.

Line 490–499

- The discussion correctly highlights limitations of uncoordinated stabilization efforts. It would be useful to estimate the potential economic benefits of coordinated watershed-scale interventions.

Line 501–514

- The Mataba gully example is compelling. Consider integrating additional case studies to support broader conclusions regarding preventive investments.

Figures and Tables

- Figure 3 would benefit from larger labels and clearer visualization of percentages.
- Figure 10 should include percentage reductions directly on the figure.
- Figure 11 should include uncertainty ranges associated with the estimated real-estate losses. Estimated value of Area with Urban Gullies – pink (Are only)

Minor Comments

- Several discussion sections contain repetitive statements regarding vulnerability and risk perception. Moderate shortening would improve readability.
- Please ensure consistent use of "urban gullies (UGs)" throughout the manuscript.
- Check consistency of USD formatting throughout the manuscript.
- Some figures have small fonts that may not be readable after journal formatting and should be enlarged.
- Some figure captions could be shortened and made more concise.