Systematic extraction of urban poor-centred multi-hazard impacts from DesInventar Sendai: a case study of Kathmandu Valley, Nepal

[Abstract EGU23-8379] Harriet E. Thompson[1,4], Bruce D. Malamud[1,5], Faith E. Taylor[1], Joel C. Gill[2], Robert Šakić Trogrlić[3], and Melanie J. Duncan[4]

A. SUMMARY

QR link to digital abstract

- Systematic extraction of **multi-hazard impact information** from **DesInventar Sendai**.
- Focus on **urban poor-centred** impacts on **slums** and **squatter settlements** in **Kathmandu Valley**.
- Results show that reporting in DesInventar Sendai is focused on **quantitative direct** impacts, rather than **indirect**, **intangible** and/or **qualitative** descriptions of impacts.
- Recorded hazard events are often **limited** to **single hazards**, or **simple multi-hazard** events.
- **Lack** of **disaggregated impacts** contributes towards **bias** in DesInventar Sendai records.

B. MOTIVATION

- Identify **multi-hazard impacts** on **slums** and **squatter settlements** in **Kathmandu Valley**.
- Consider how well hazard events recorded in **DesInventar Sendai represent** impacts on **urban poor** communities (Brown *et al.* 2019).
  - Are impacts **disaggregated** by **social group**?
  - Are **indirect** and **intangible** impacts recorded?
- This research ultimately aims to develop a **classification** of **multi-hazard impacts** in the **context** of the **urban poor** in **Kathmandu Valley**.

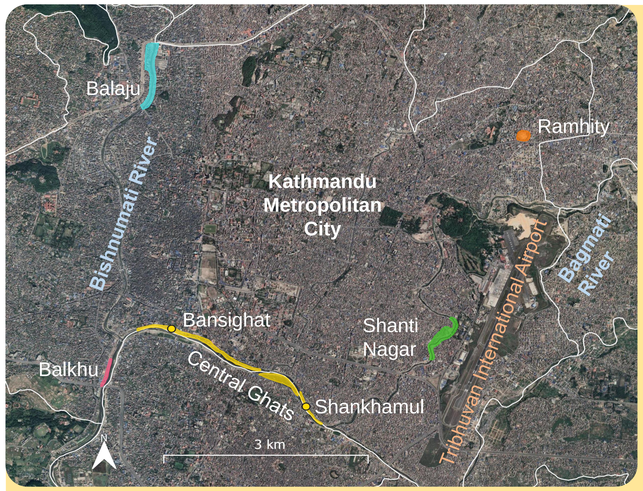

Figure 1. Map showing the location of slums and squatter settlements in Kathmandu Valley, main rivers, Tribhuvan International Airport and administrative boundaries.

C. METHODOLOGY

- **Search DesInventar Sendai** for **earthquake, fire, flood** and **landslide** events that have impacted **Kathmandu Valley**.
- **Export** extended results into an **Excel** database.
- Within the database, **manually search** for the **names** of the **slums** and **squatter settlements** (***Figure 1***) listed in Khanal and Khanal (2022).
- Analyse the data for:
  - **Causes**
  - Multi-hazard **interrelationships**
  - Urban poor-centred **impacts**

D. RESULTS

- Of the **72 hazard events** returned in the DesInventar Sendai search (***Figure 2***) there were:
  - **60 fire** events (***Figure 3***)
  - **2 landslide** events
  - **1 flood** event
  - **9 other** hazard events (e.g., accident, heavy rainfall and structure collapse)
- These events were either **single hazard events** or were the **main hazard described** as part of a **multi-hazard event**.
- There were **no recorded earthquake** hazard events that specifically referred to the **slums** or **squatter settlements** listed.

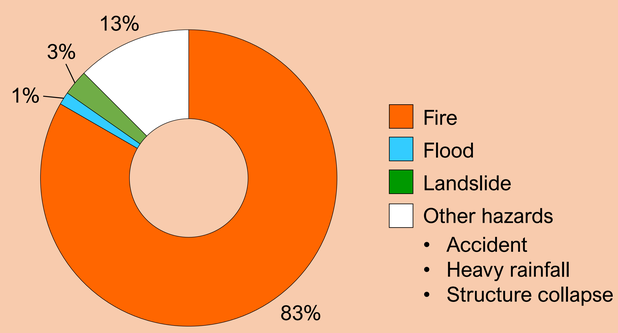

Figure 2. Doughnut chart showing the percentage contribution of each hazard event type out of all 72 hazard events (single hazards and multi-hazards) returned by the DesInventar Sendai search.

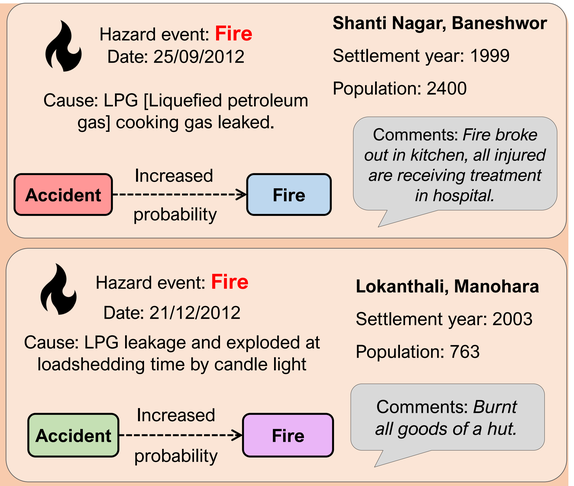

Figure 3. Two examples of multi-hazard events and their qualitative impacts affecting squatter settlements in Kathmandu Valley.

E. DISCUSSION

- **Multi-hazard events** were restricted to **triggering relationships** (i.e., a primary hazard triggers a secondary hazard).
- **Causes** and **qualitative impacts** were recorded as **brief descriptions** only.
- Impact data was mainly restricted to **direct quantitative impacts** (e.g., injured, houses destroyed).
- Data ***could*** be **disaggregated** by **gender**, **age**, "**disabled**" and "**poor**" social groups.
- In reality, data was **not input** into these disaggregated columns.

F. IMPLICATIONS

- DesInventar Sendai could be **used more effectively** to document **disaggregated impacts**.
- Many impacts are **qualitative** but are **lost** in a more **quantitative system**.
- Consideration of **bias** in DesInventar Sendai (i.e., data **collection**, **documentation**).

G. FURTHER STUDY

- Compare DesInventar Sendai results with **text mining** of **hazard events** in **Nepali newspapers**.
- Examine **bias** in the **reporting** of **impacts** through snowball sampling **interviews** with **local stakeholders**.
- Consider how to **develop** and **apply** an **urban poor-centred impact classification**.

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REFERENCES
[1]Brown, S., Budimir, M., Upadhyay Crawford, S., Clements, R., and Sneddon, A. (2019) Gender and Age Inequality of Disaster Risk: Policy Brief, *UNICEF and UN Women.*
[2]Khanal, K. and Khanal, S.P. (2022). The Study of Slum Definitions, its Demographic Characteristic and Distribution Patterns in Kathmandu Valley, Nepal. *Nepal Journal of Mathematical Sciences*, 3(1), 59-74.