Accuracy and completeness of a near real-time citizen science-based multi-disaster inventory in the Rwenzori Mountains, Uganda

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Introduction

- Owing to the increasing population and land cover changes, the frequency of disasters is increasing in Uganda
- Disasters, especially landslides and (flash) floods occur during rainy season
- These are always associated with large socio-economic and environmental impacts

Introduction

- A number of studies have been carried out in the Rwenzori mountains (e.g. Kervyn *et al.*, 2015; Jacobs *et al.*, 2016; Jacobs *et al.*, 2017, 2018; Maes *et al.*, 2018).

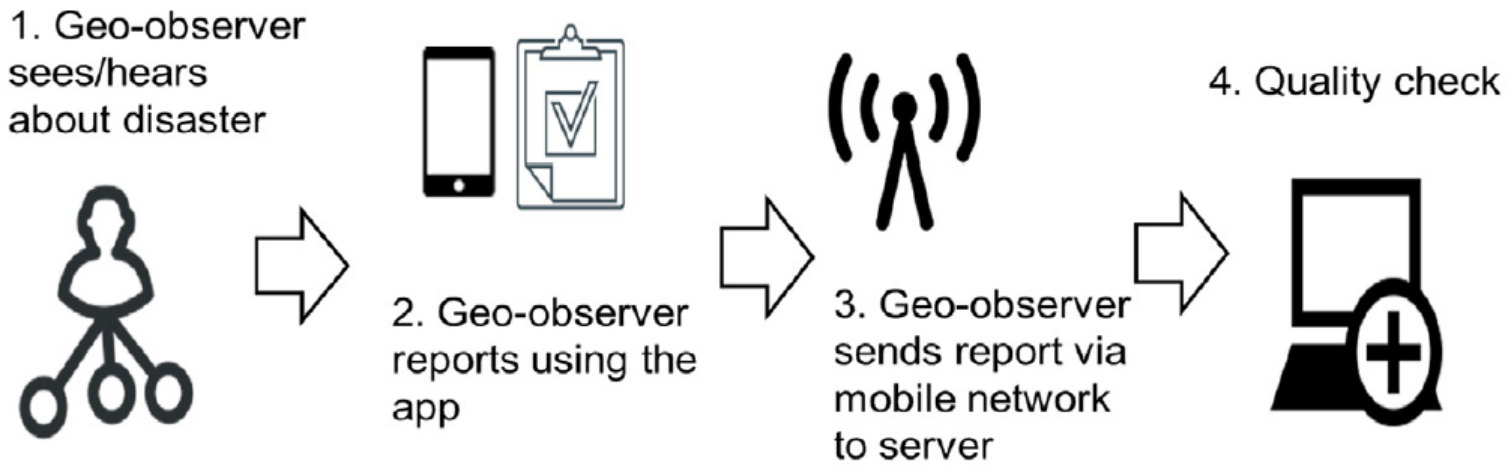
- However, temporal frequency and impacts on exposed elements not yet known

The need for systematic hazard assessment

- Systematic hazard assessment is a prerequisite for risk analysis and developing effective risk reduction strategies
- Characterizing impacts and factors controlling level of risk requires spatio-temporally explicit hazard records
- Such records are often hard to get especially in remote settings like most parts of Uganda
- Using local citizens to record and report hazards and disasters has gained international recognition

Citizen science approach and hazard assessment in Uganda

Geo-observer network reporting of hazards



- More info; https://www.citizenscienceuganda.info/

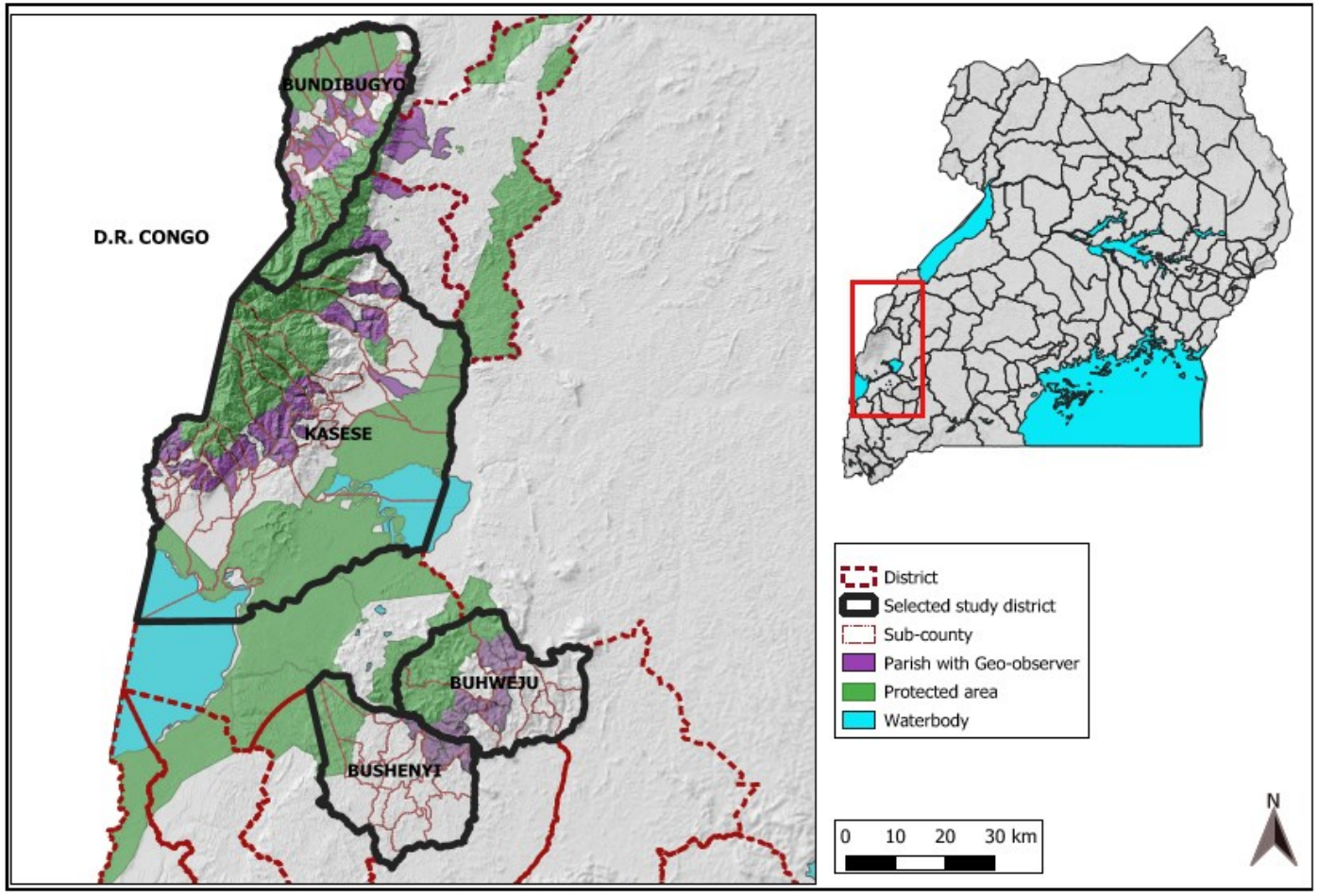
Jacobs *et al.,* (2019) https://doi.org/10.1016/j.scitotenv.2019.03.177

- Collects information on 8 different hazards (Landslides, Floods, drought, windstorm, hailstorm, Lightning, Pests and diseases and Earthquake)
- Averagely visit affected sites in 1-3days More info; https://www.citizenscienceuganda.info/

Study area

- 30 Geo-observers in Kasese and Bundibugyo since 2017

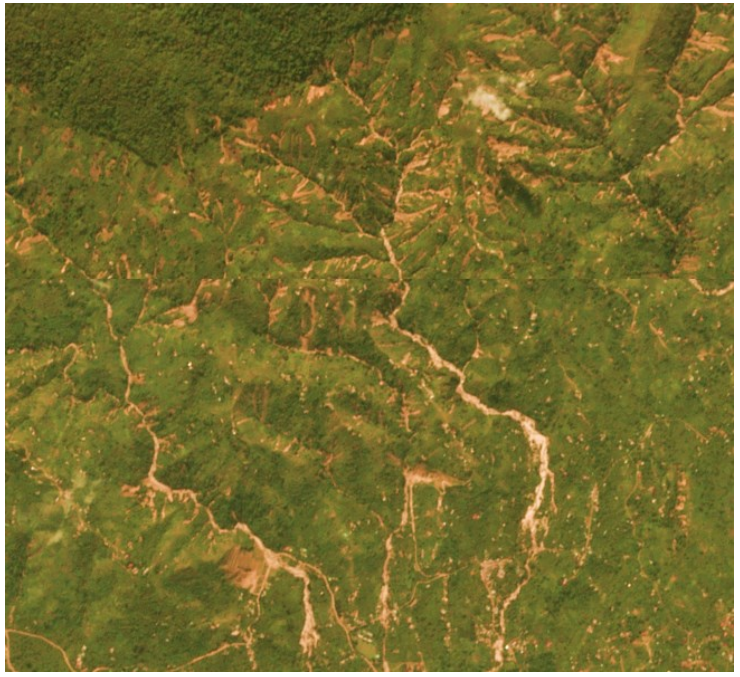
- 15 Geo-observer in Buhweju and Bushenyi since December 2019



Approach

Peer review and computer-based automatic validation

Comparison with satellite imagery-based inventory



Comparison with systematic dataset constructed through fieldwork

Results generated so far

Geo-observer-based inventory

Category	Landslides	Floods
True positive	223	41
False positive	8	0
False negative	211	37
Grand Total	**442**	**78**

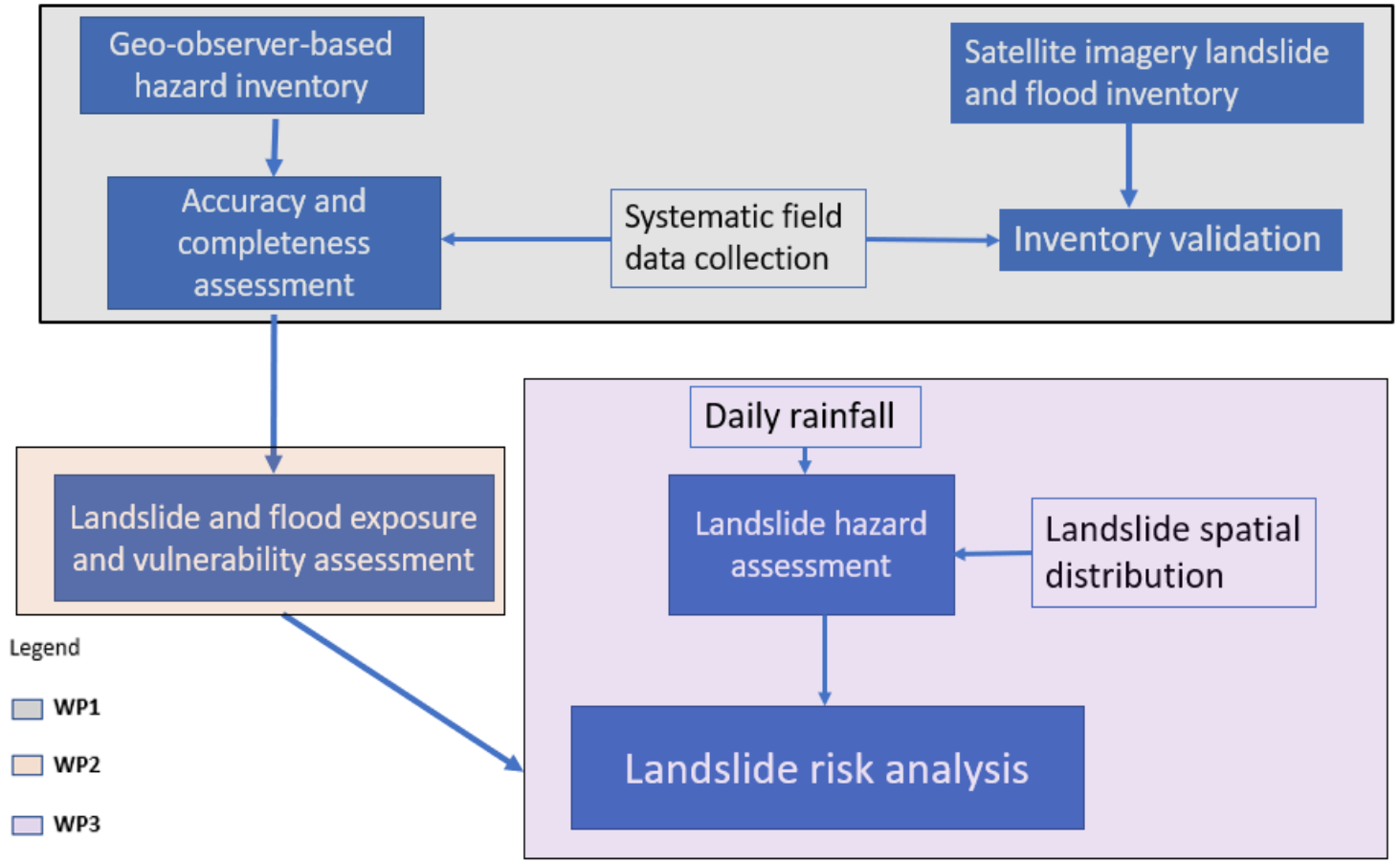
- 96% of the Geo-observer-based landslide reports are true positives. All the flood reports were true positives
- Overall Geo-observer reports represent more than 50% of all the landslide and flood prevalence

Satellite imagery inventory

Category	Landslides	Floods
True positive	455	95
False positive	360	21
False negative	260	25
Total	**1075**	**141**

- 56% of the landslides were true positives and 44% false positives. About 82% of the floods were True positives while 18% were false positives

Relevance of the study



- The temporal dimension of the citizen science data to facilitate hazard analysis
- Validated dataset to facilitate exposure and vulnerability analysis
- Exposure x Vulnerability x Hazard = Risk

Expected output

- A high quality multi-hazard database built with the help of geo-observers
- Physical exposure and vulnerability analysis
- Factors that control the level of impact by landslides and floods
- Potential economic risk case study for Uganda
- Recommendations on the actions to reduce risk, build resilience and conserve fragile ecosystems