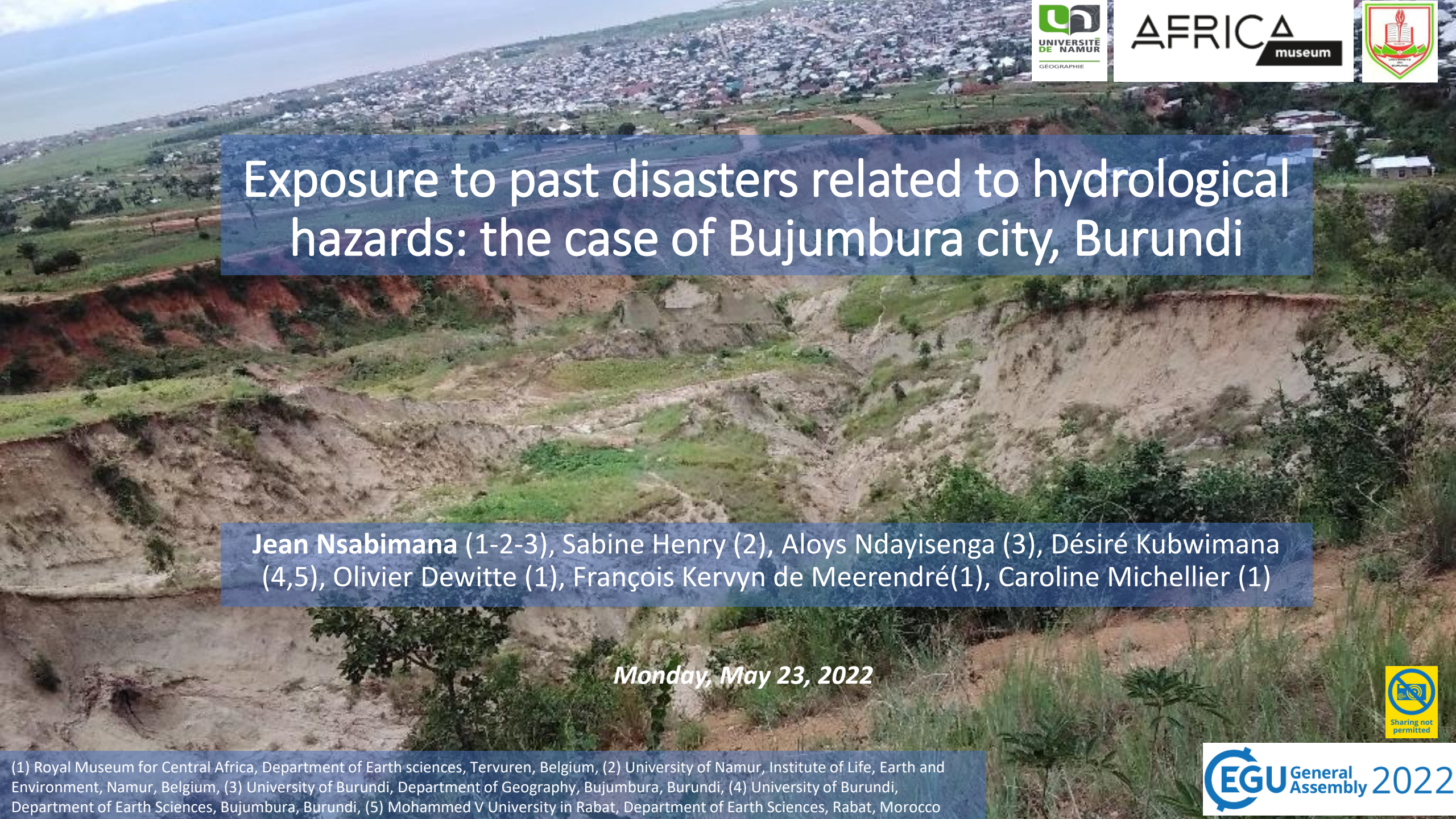


Exposure to past disasters related to hydrological hazards: the case of Bujumbura city, Burundi

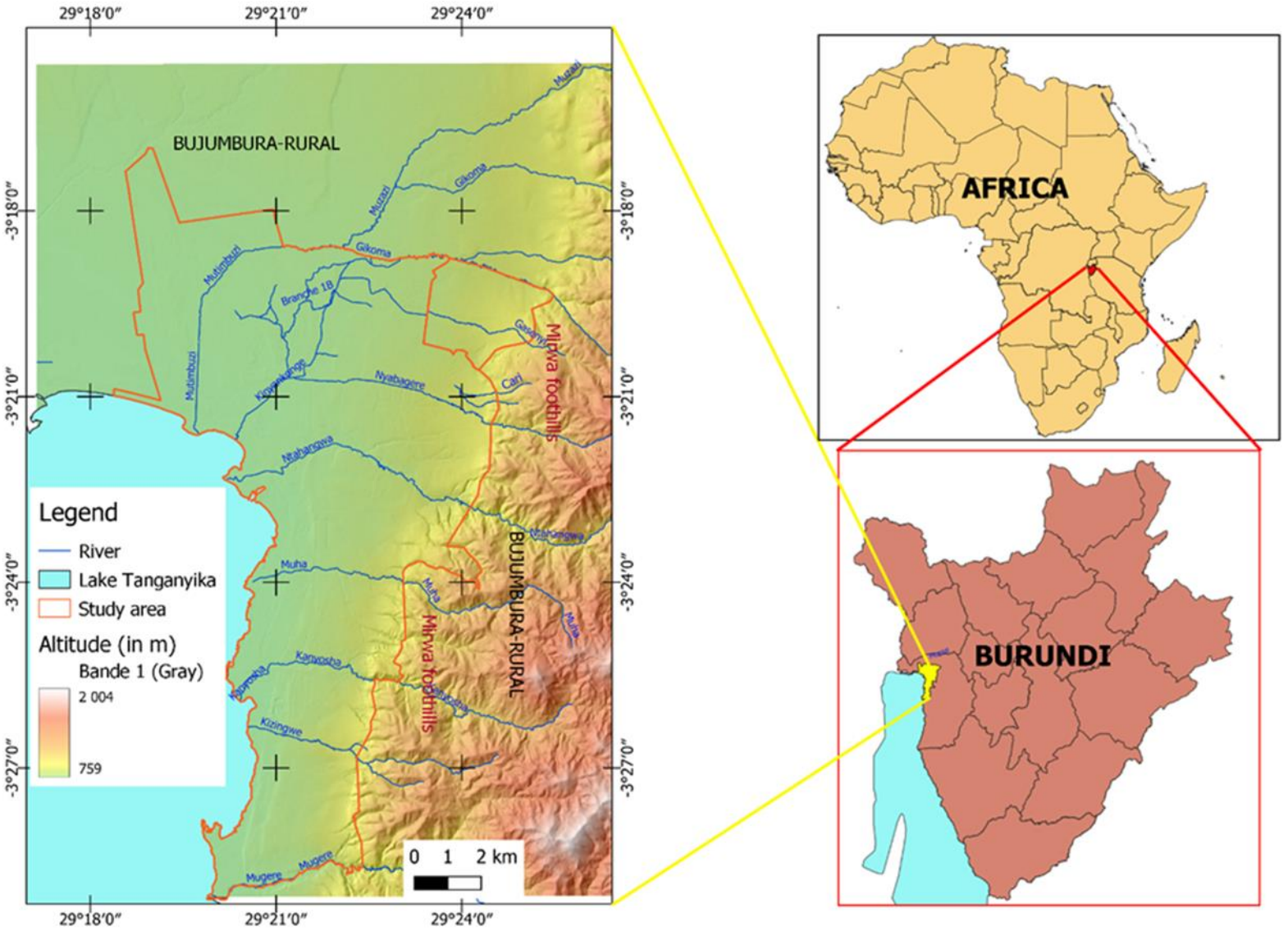
Jean Nsabimana (1-2-3), Sabine Henry (2), Aloys Ndayisenga (3), Désiré Kubwimana (4,5), Olivier Dewitte (1), François Kervyn de Meerendré(1), Caroline Michellier (1)

Monday, May 23, 2022

(1) Royal Museum for Central Africa, Department of Earth sciences, Tervuren, Belgium, (2) University of Namur, Institute of Life, Earth and Environment, Namur, Belgium, (3) University of Burundi, Department of Geography, Bujumbura, Burundi, (4) University of Burundi, Department of Earth Sciences, Bujumbura, Burundi, (5) Mohammed V University in Rabat, Department of Earth Sciences, Rabat, Morocco

EGU General Assembly 2022

I. Introduction (…)



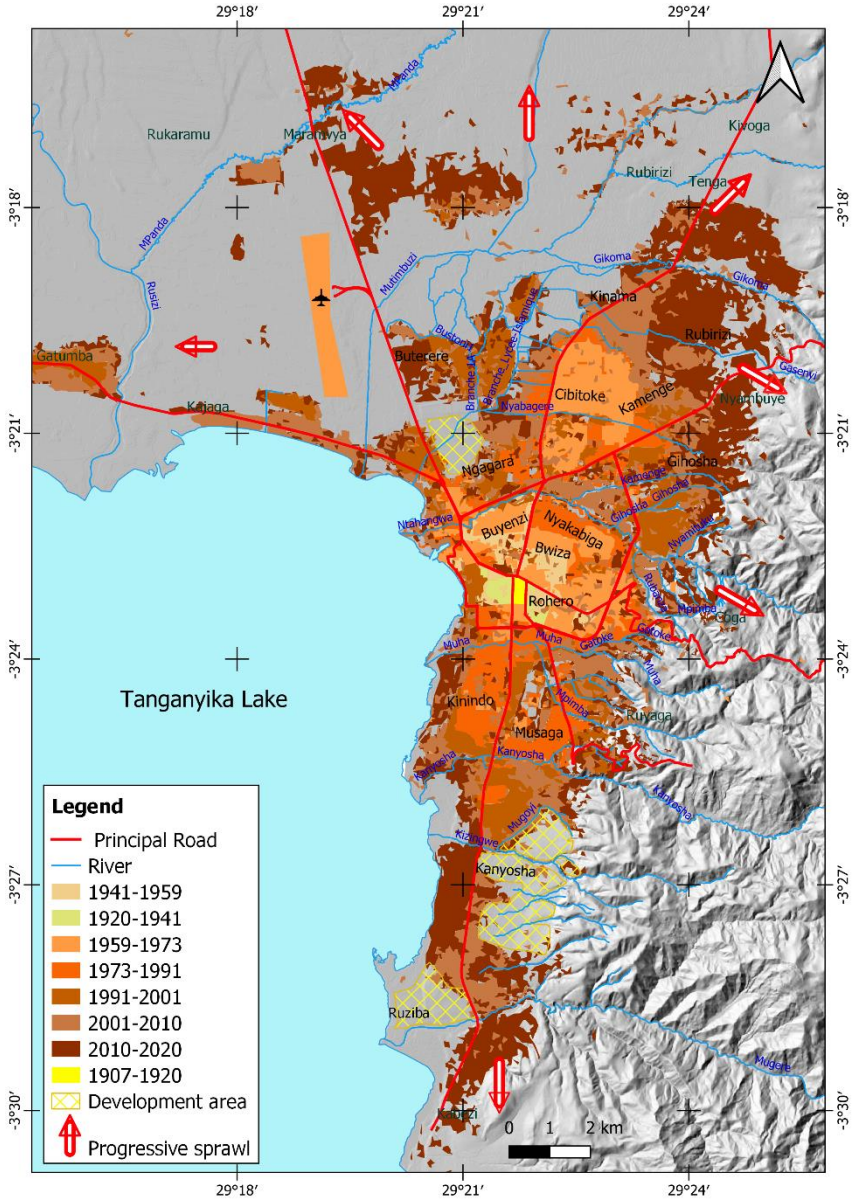
❖**Bujumbura:**

- Located in the western branch of the East African Rift,
- Burundi's economic capital,
- Approximately 800,000 people,
- Poor urban planning,
- Poor management of stormwater drainage.

fig.1 Study area

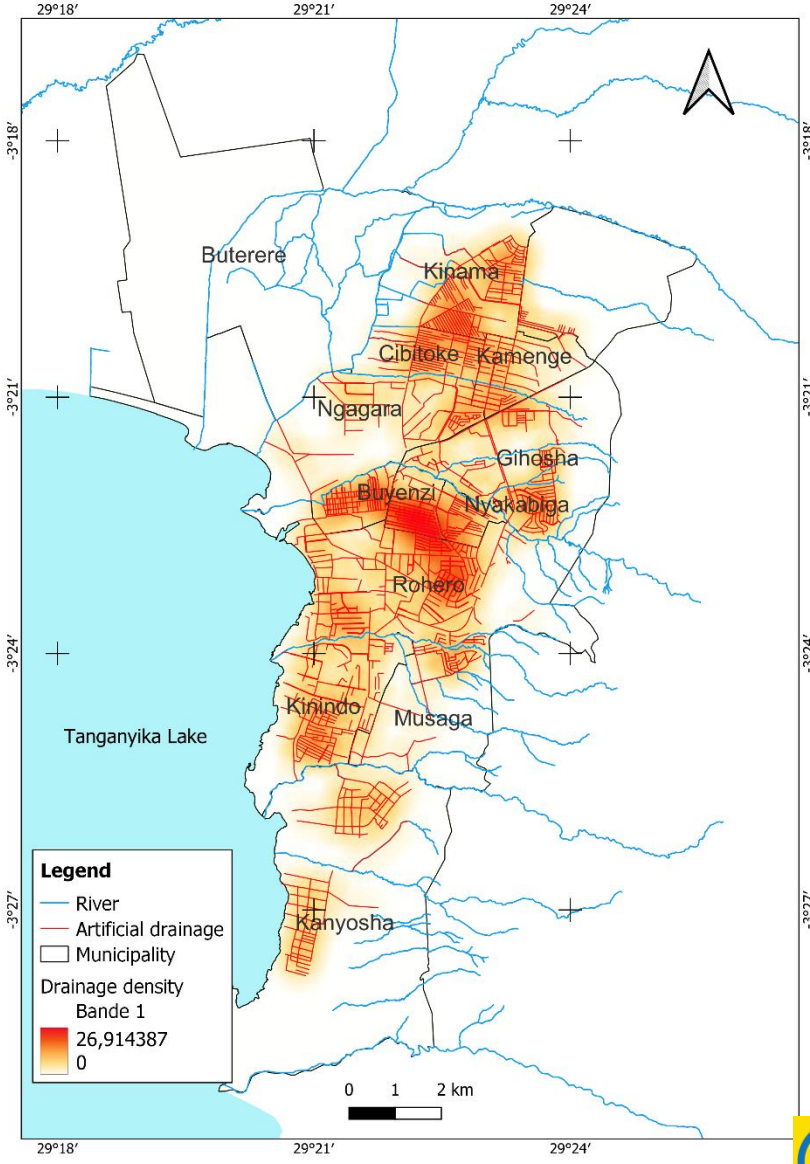
I. Introduction

(a) Urban growth and sprawl

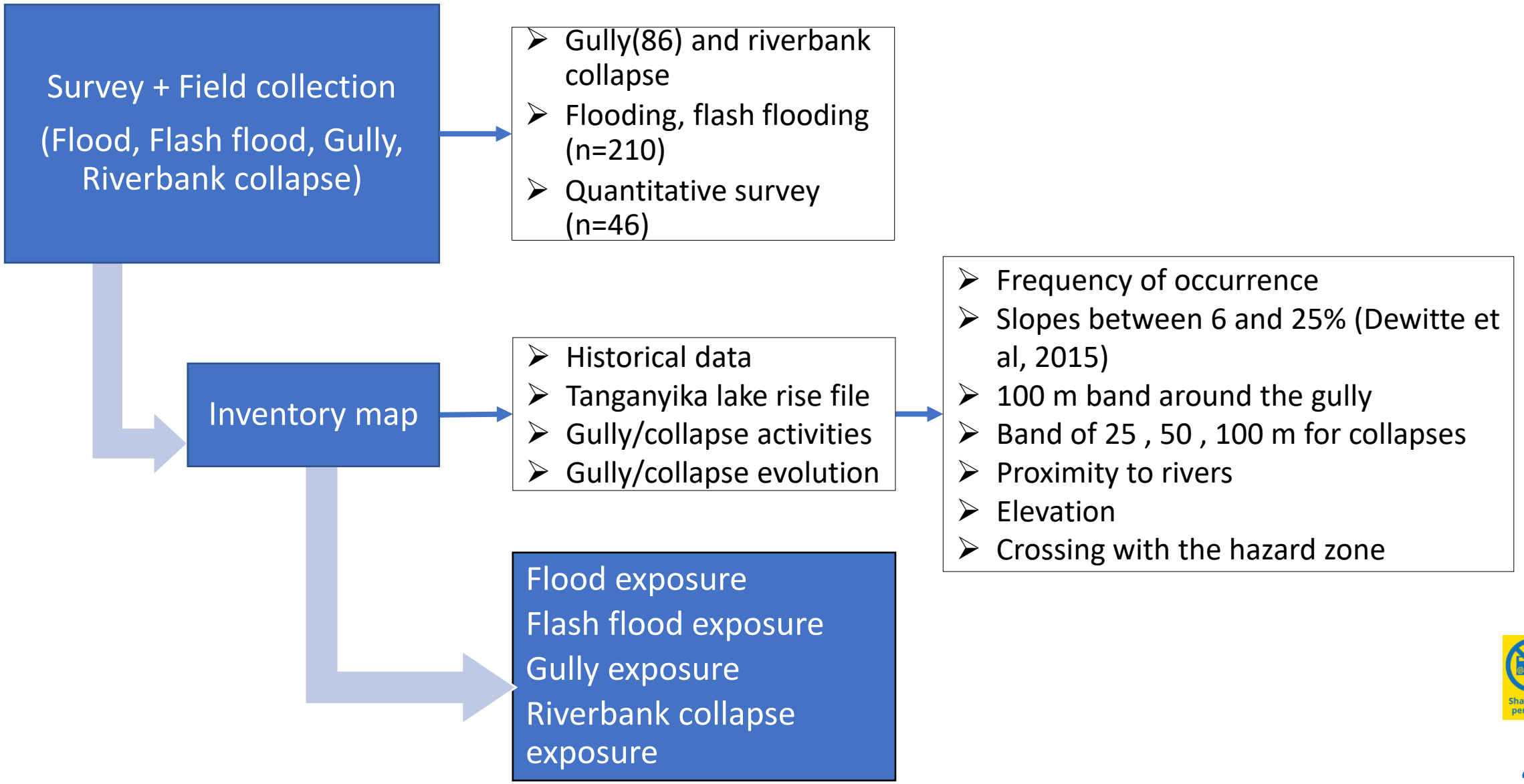


- Poor urban planning,
- Lack of development of the site ,
- Non respecting of urban planning law,
- Poor management of stormwater drainage.
- insufficient; undersized or frequently blocked

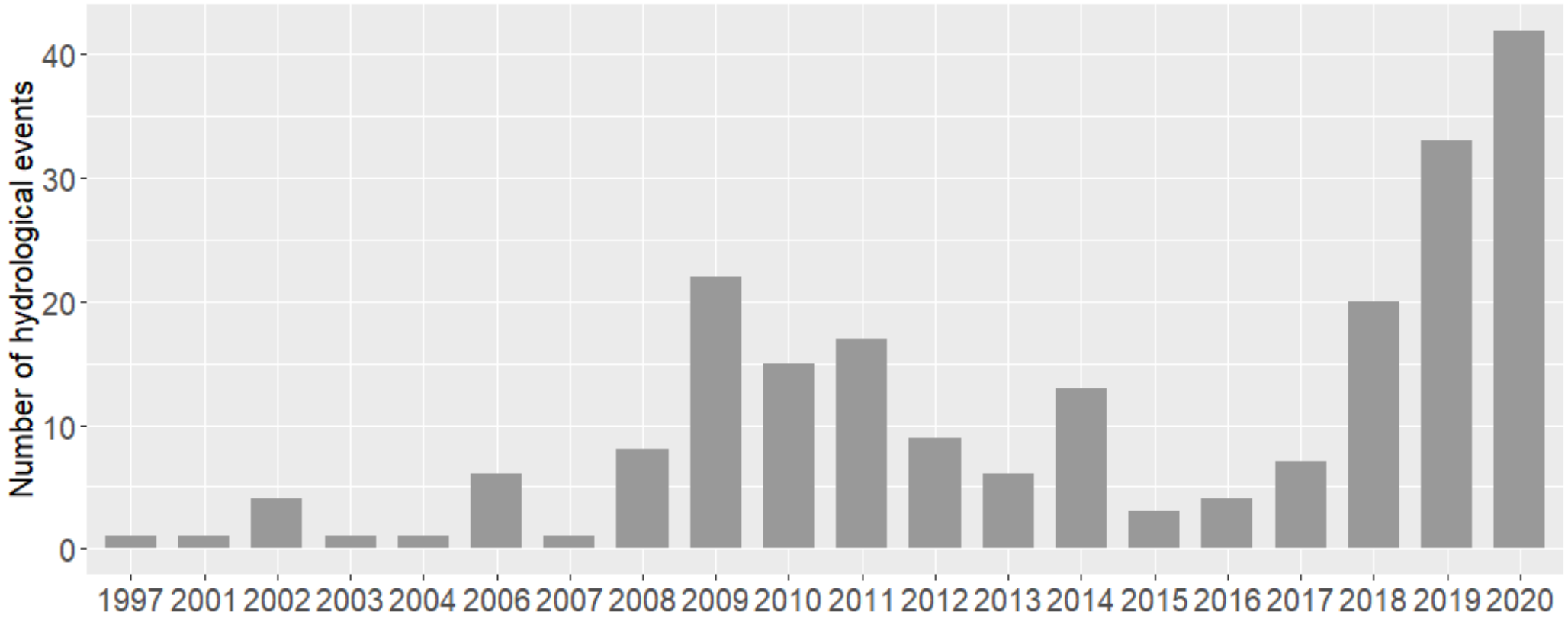
(b) Stormwater drainage density



II. Phenomenological approach



III. Flood and flash flood temporal distribution

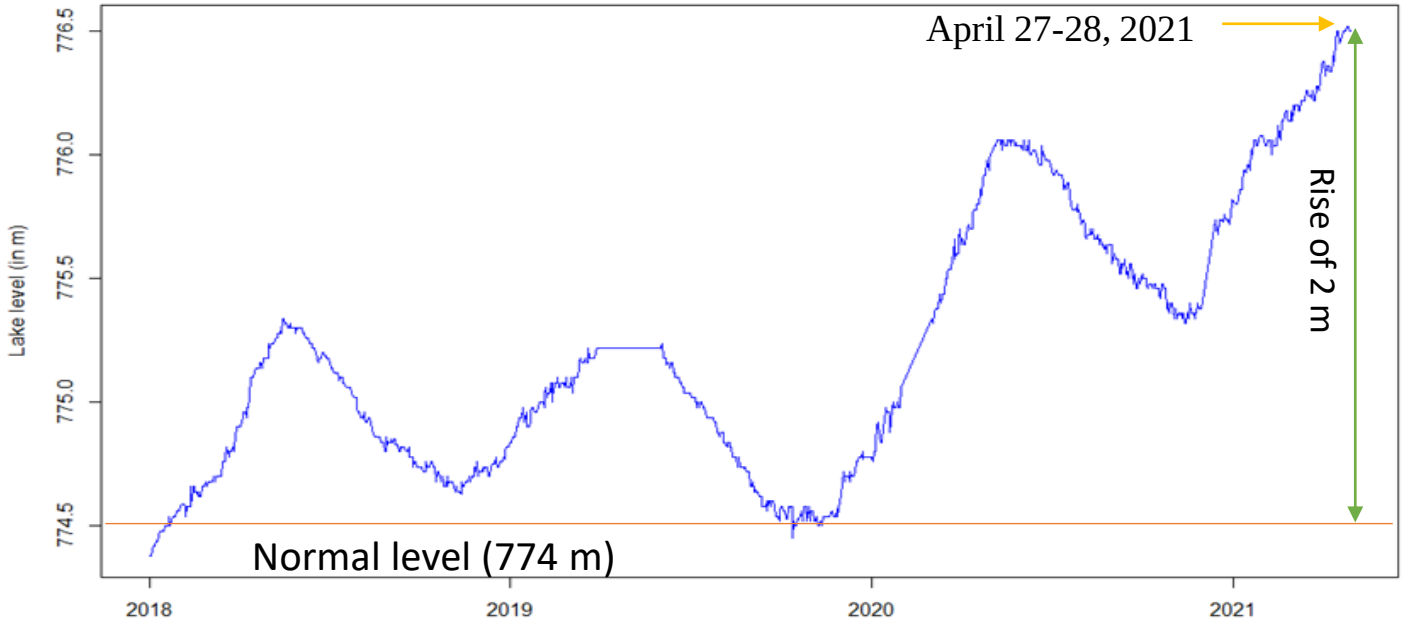


- Increase in records from 2015,
- 56.5% of events occur each rainy season

IV. Flood inventory mapping

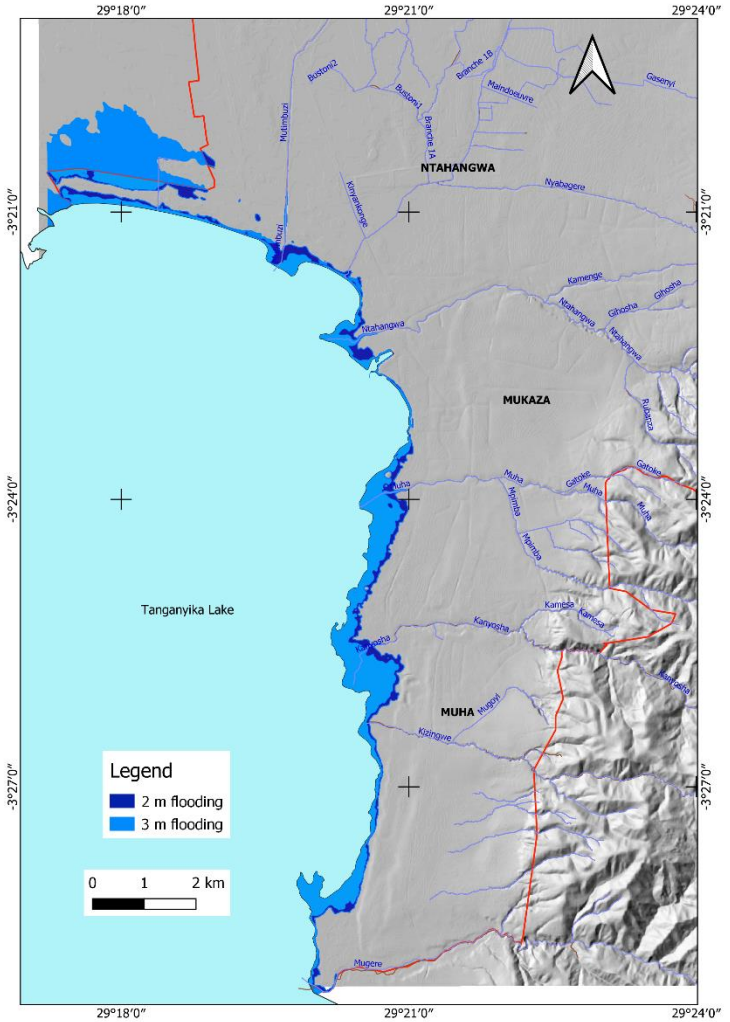
IV.1. Lake rising

(a) Daily water level height of Lake Tanganyika from 01-01-2018 to 30-04-2021



- *a large part of the lake's coastline has been affected,*
- *more than 2 m rising*

(b) Submerged area



- *Rise of the lake level, submersion beyond 774 m*

IV.2. Flood inventory map

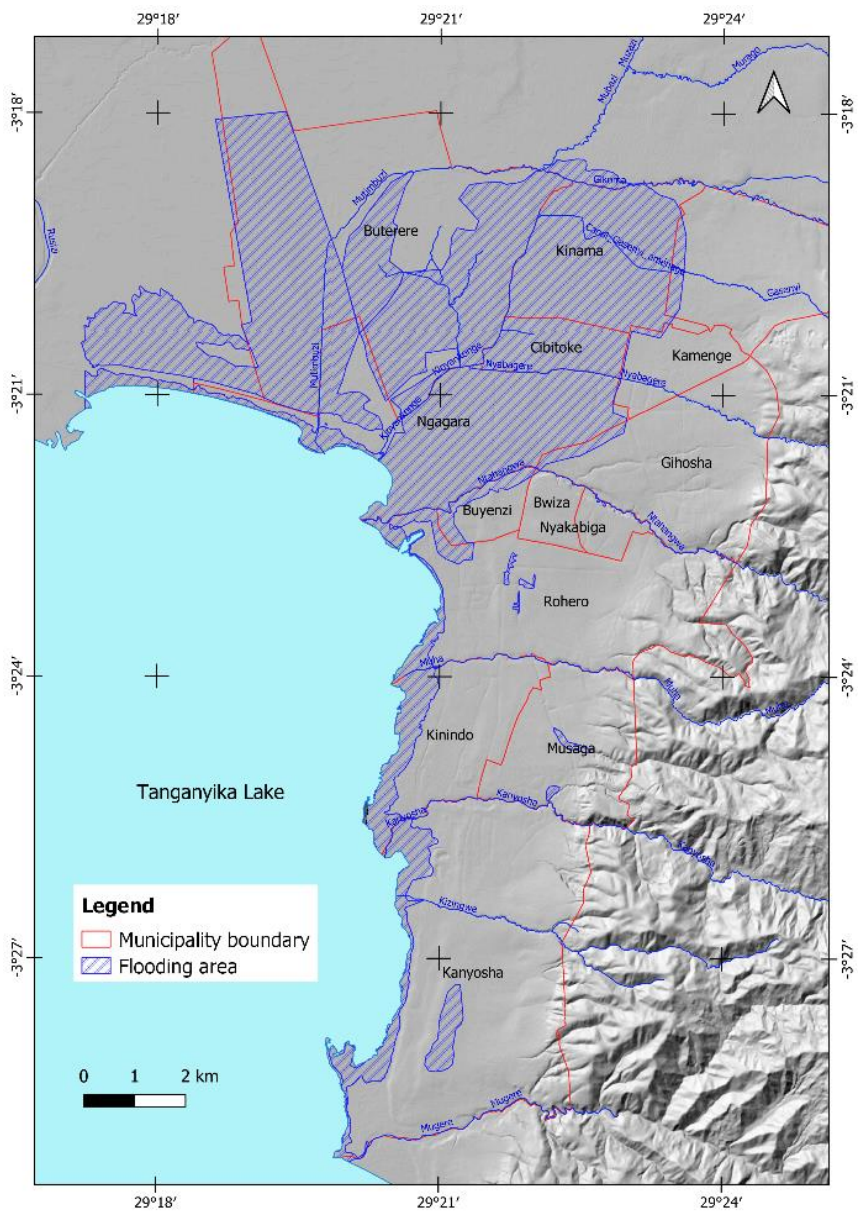


Fig. Flood inventory map

- *The flood inventory map is based to :*
  - *Historical event ,*
  - *Take into account the occurrences /neighborhood,*
  - *Tanganyika lake rising.*

V. Flash flood inventory map

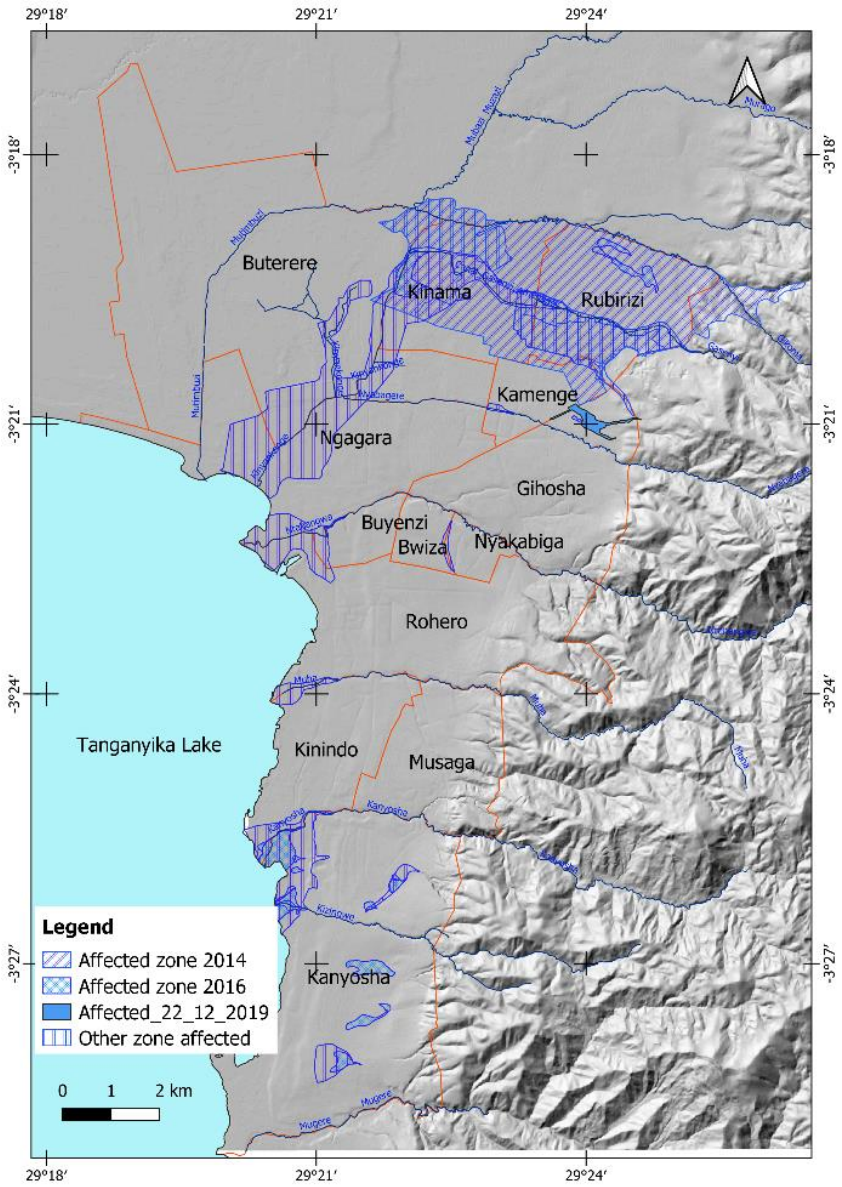


Fig. Flash flood inventory map

Flash flood in Kamenge, 2014 (Police)

Flash flood in Gatunguru, 2014 (Police)

- *The flash flood inventory map is based to:*
  - *Historical event ,*
  - *Take into account the occurrences /neighborhood.*

VI. Gully inventory map

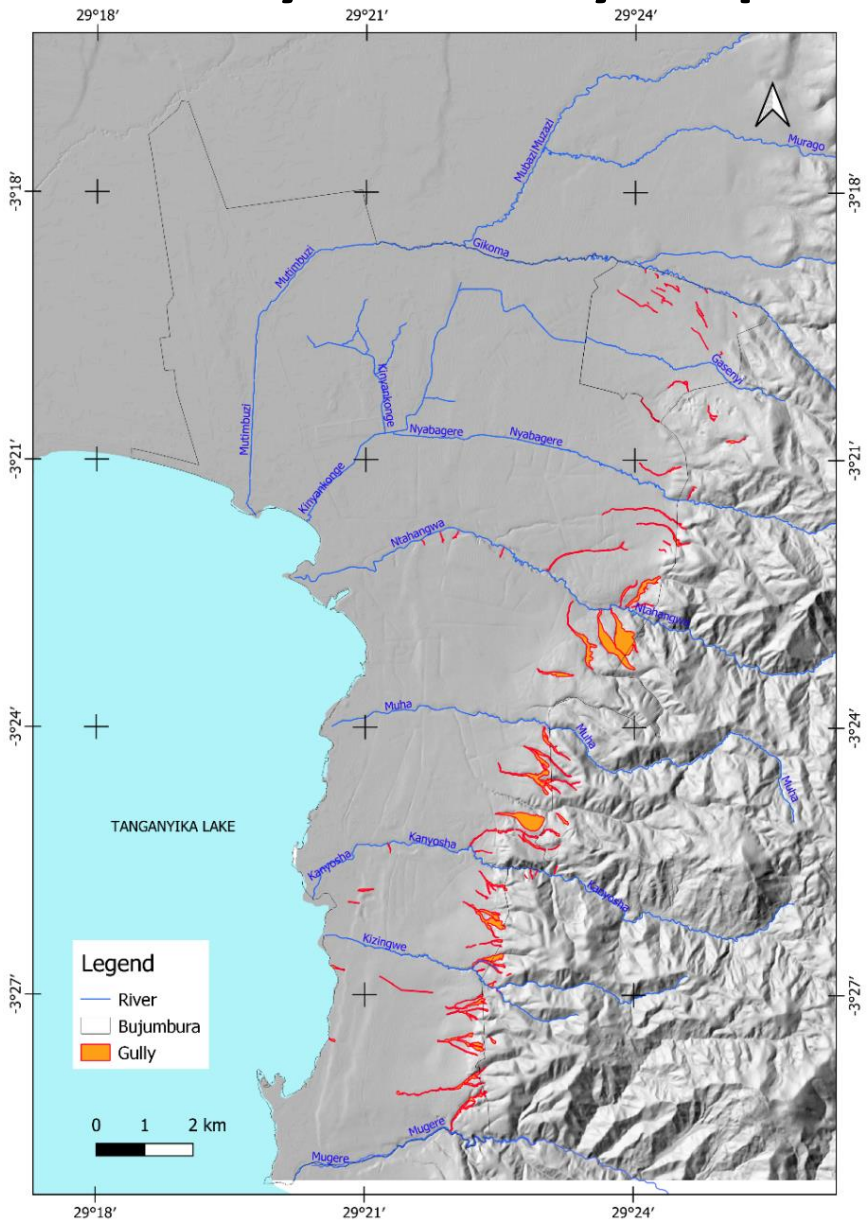
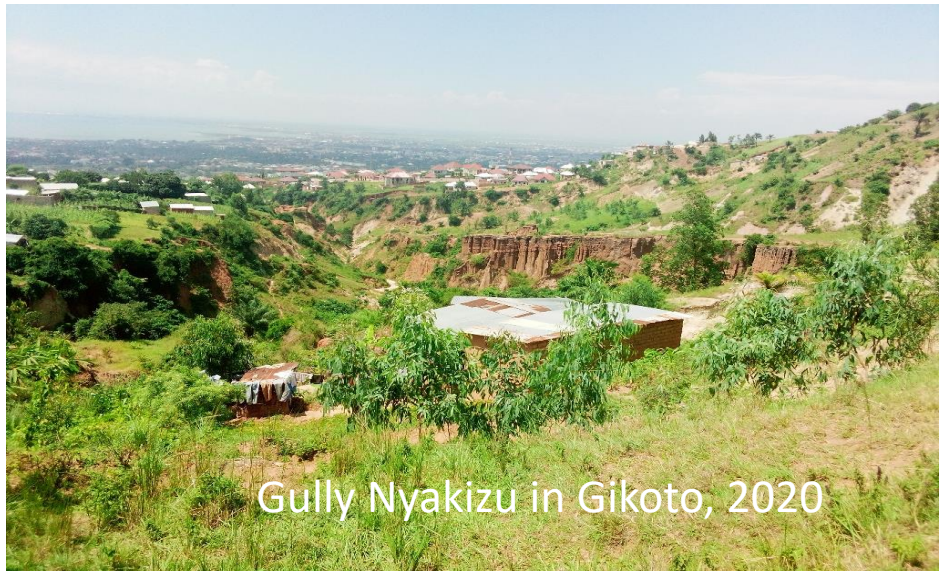


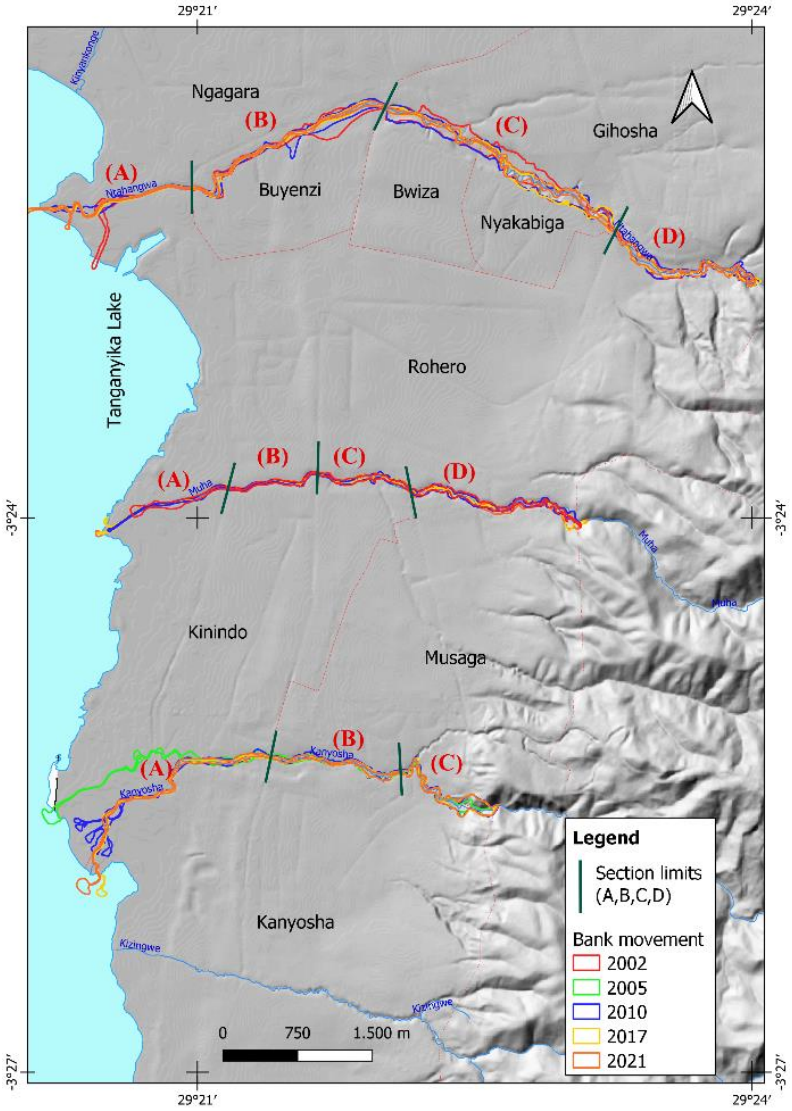
Fig. Gully inventory map

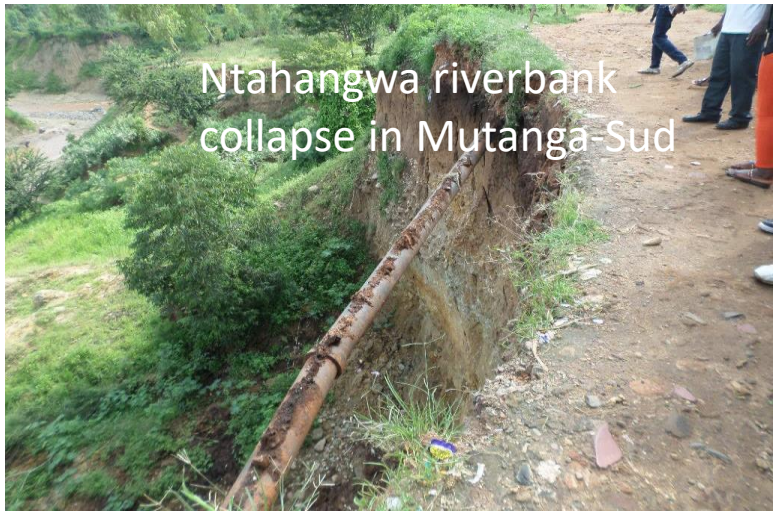


- The gully collapses map is based on the collection and googles earth images

- *Gullies collected:*
  - *concentrated at the foot of the eastern foothills,*
  - total area of gullies 116 ha

VII. Riverbank collapse inventory map



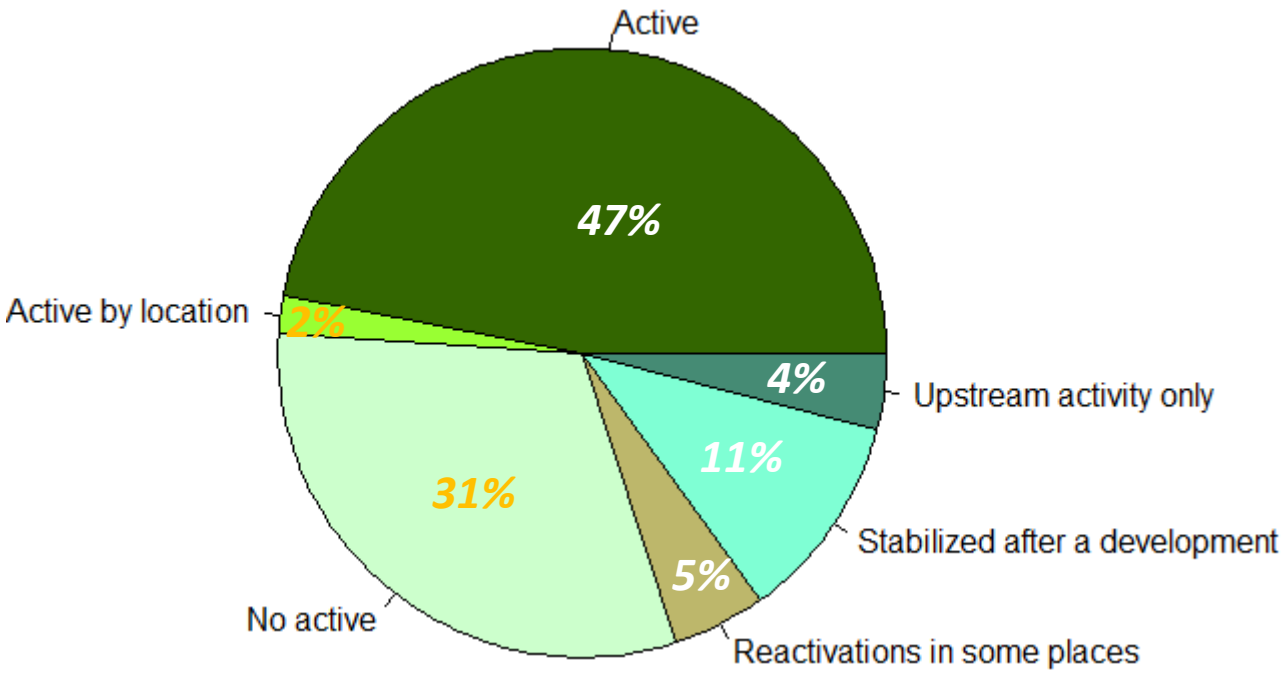


- The riverbank collapses map is based on the collection and googles earth images
- the rivers are divided into sections:
- *Highly mobile sections A*
- *Engorgement C and D*

Fig. Riverbank collapse inventory map

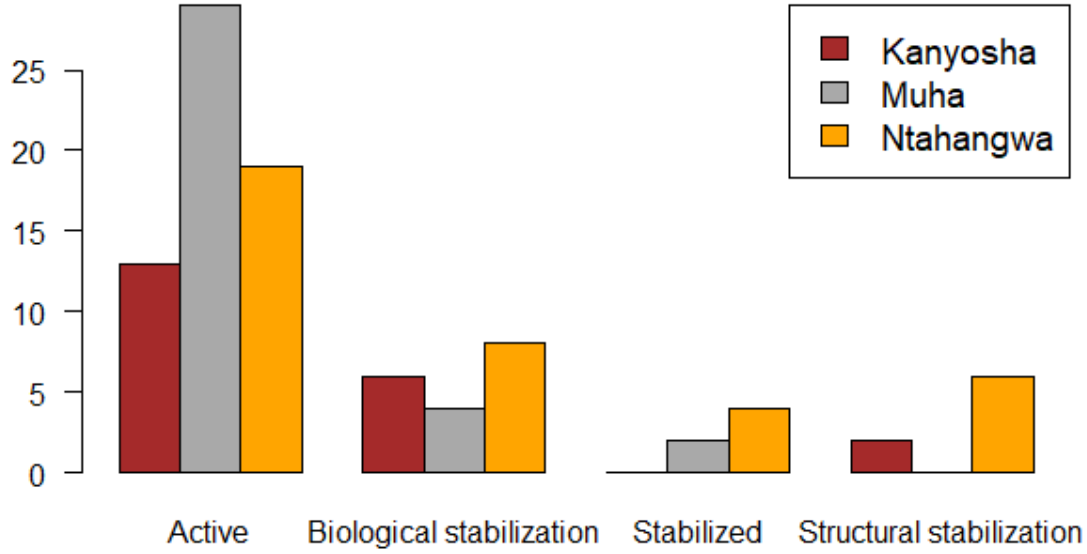
IIIV. Gully and riverbank activities

(a) Gully activities



- *High activity: 47%*
- *Other activities are noted*

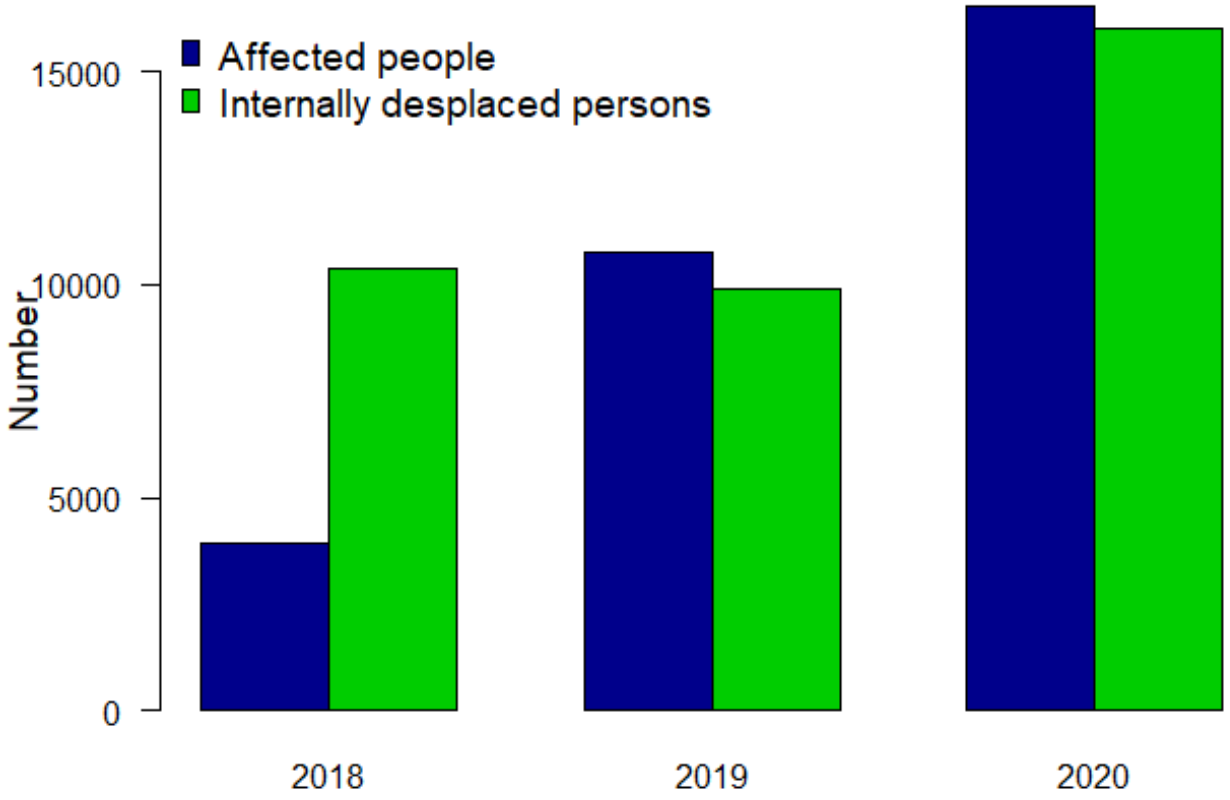
(b) Riverbank activities



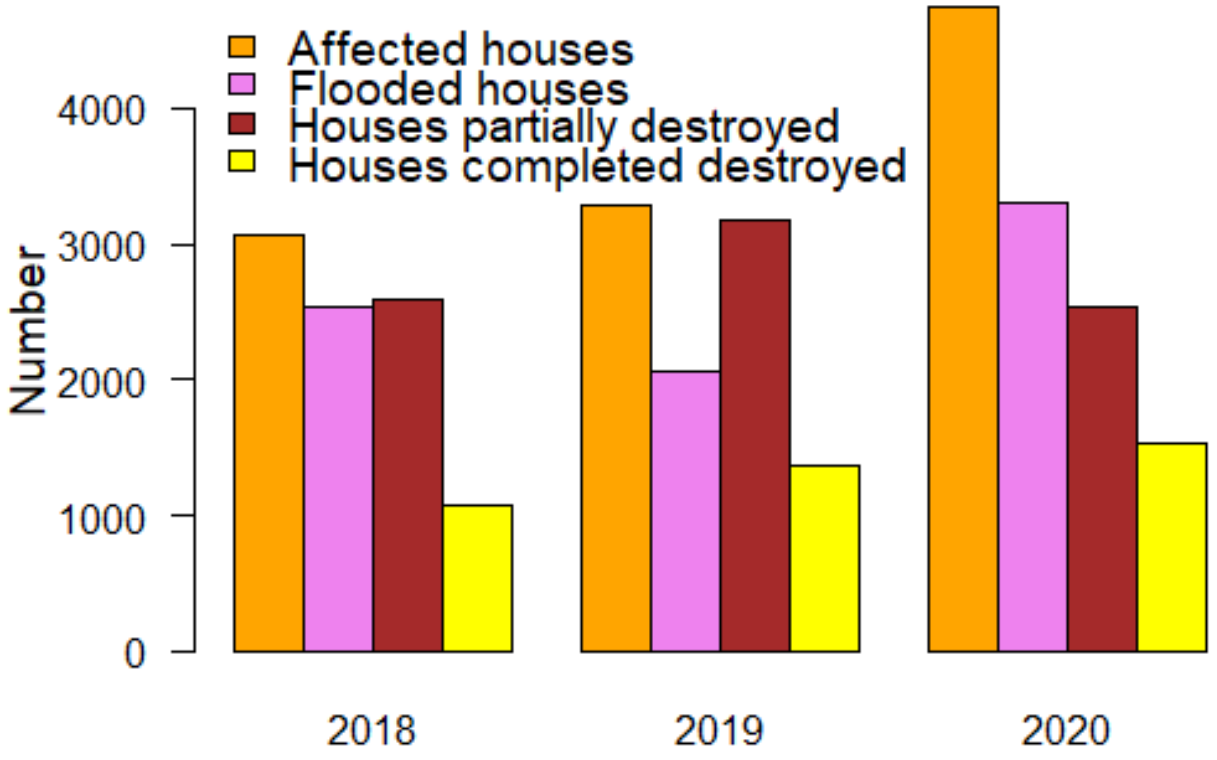
- *High activity: 66 % active*

IX. Activities and damages of hydrological events

(a) Impacts of the events on the population (DTM/IOM, 2018-2020)



(d) ***Impacts of the events on the housing (DTM/IOM, 2018-2020)***



- Over 3 years more than 30,000 inhabitants have been affected and more than 40,000 are displaced.
- A large number of houses are either flooded, partially destroyed or completely destroyed.

IX. Other damages

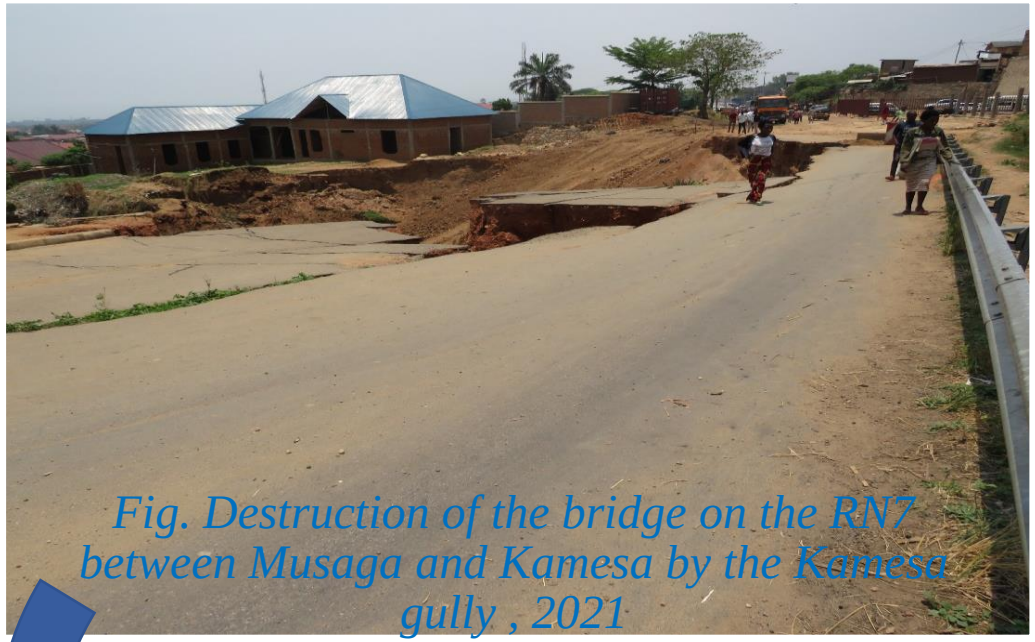
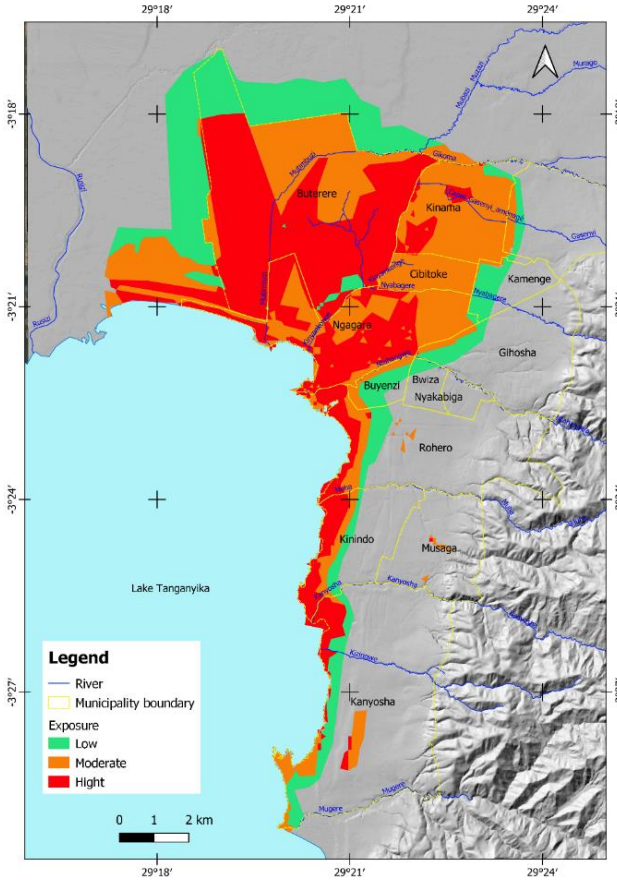


Fig. Destruction of the bridge on the RN7 between Musaga and Kamesa by the Kamesa gully , 2021

Fig. Destruction of houses by flooding

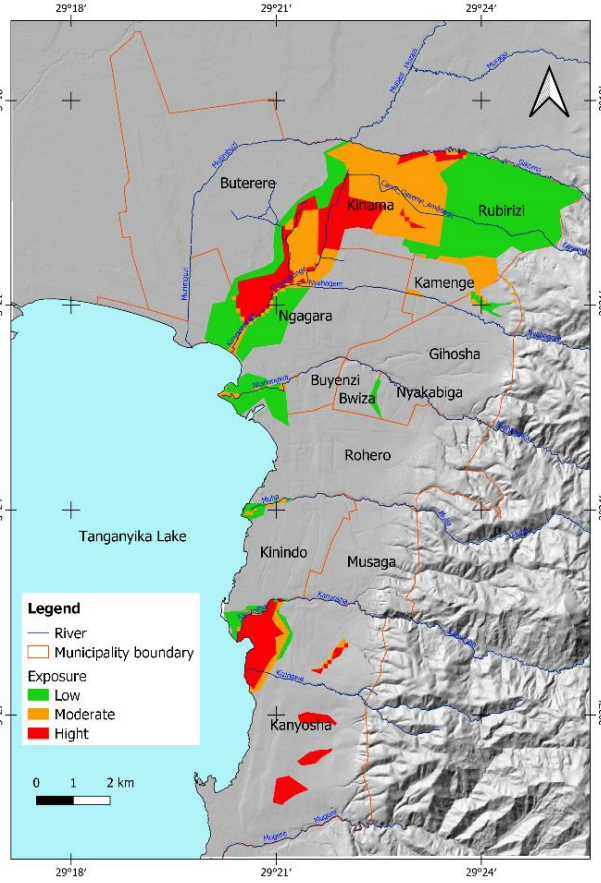
X. Exposure to hydrological hazards

a. Flood exposure



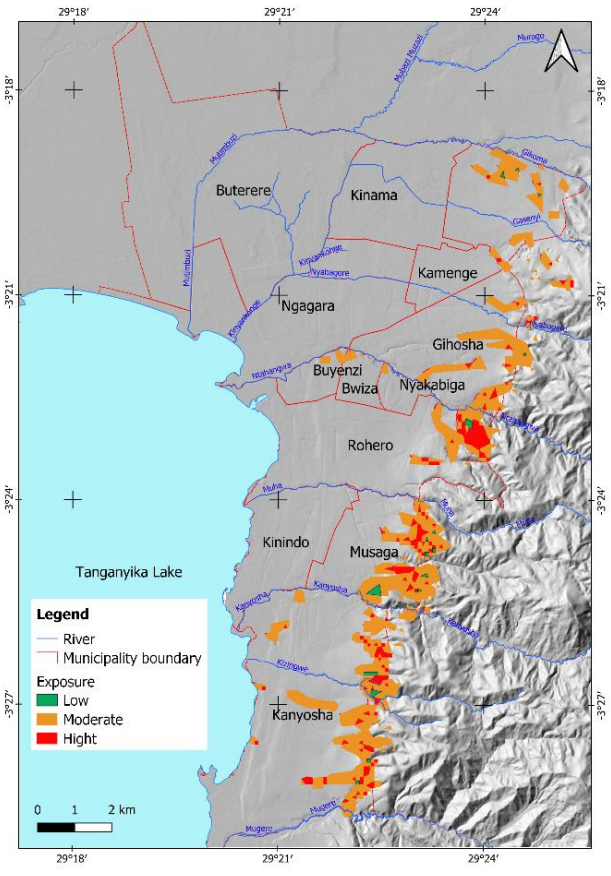
- 3,276 ha are strongly exposed,
- 3,141 ha are moderately exposed.

b. Flash flood exposure



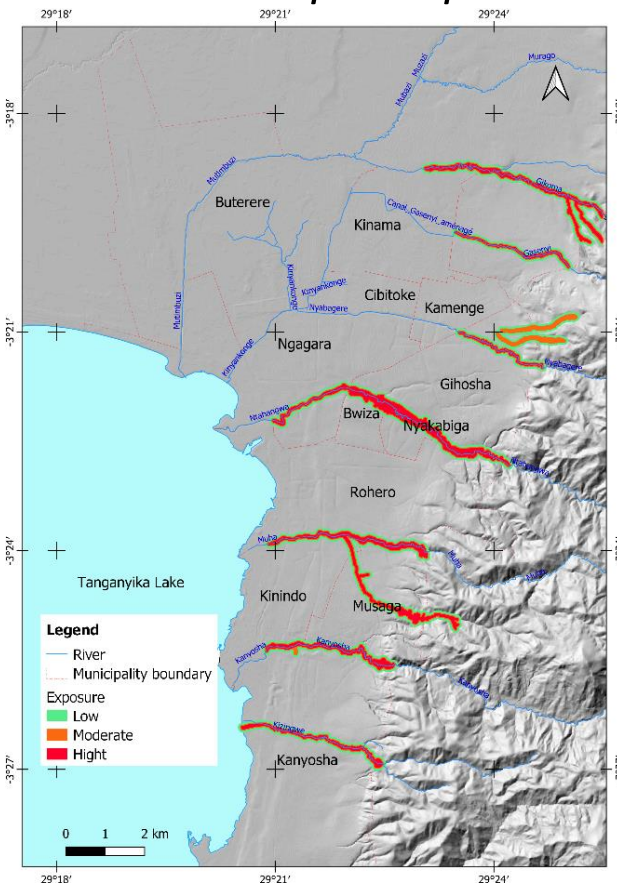
- 661 ha are strongly exposed,
- 920 ha are moderately exposed.

c. Gully exposure



- 3,677 houses are located at less than 25 m
- Roads, fields, bridges and water pipes.

d. Bank collapse exposure



- 627 houses are located at <25 m,
- 7 out of 8 bridges are exposed.

XI. Conclusion

The study showed that:

- Institutional failures as well as problems of urban planning,
- Poor management of stormwater drainage,
- non-compliance with regulations,
- and the location of infrastructure in the danger area,

==> increase the city exposure to hydrological hazards and exacerbate its vulnerability.

Thank you for your attention

- **Jean Nsabimana** (1-2-3), Sabine Henry (2), Aloys Ndayisenga (3), Désiré Kubwimana (4,5), Olivier Dewitte (1), François Kervyn de Meerendré(1), Caroline Michellier (1)

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jean.nsabimana@unamur.be