

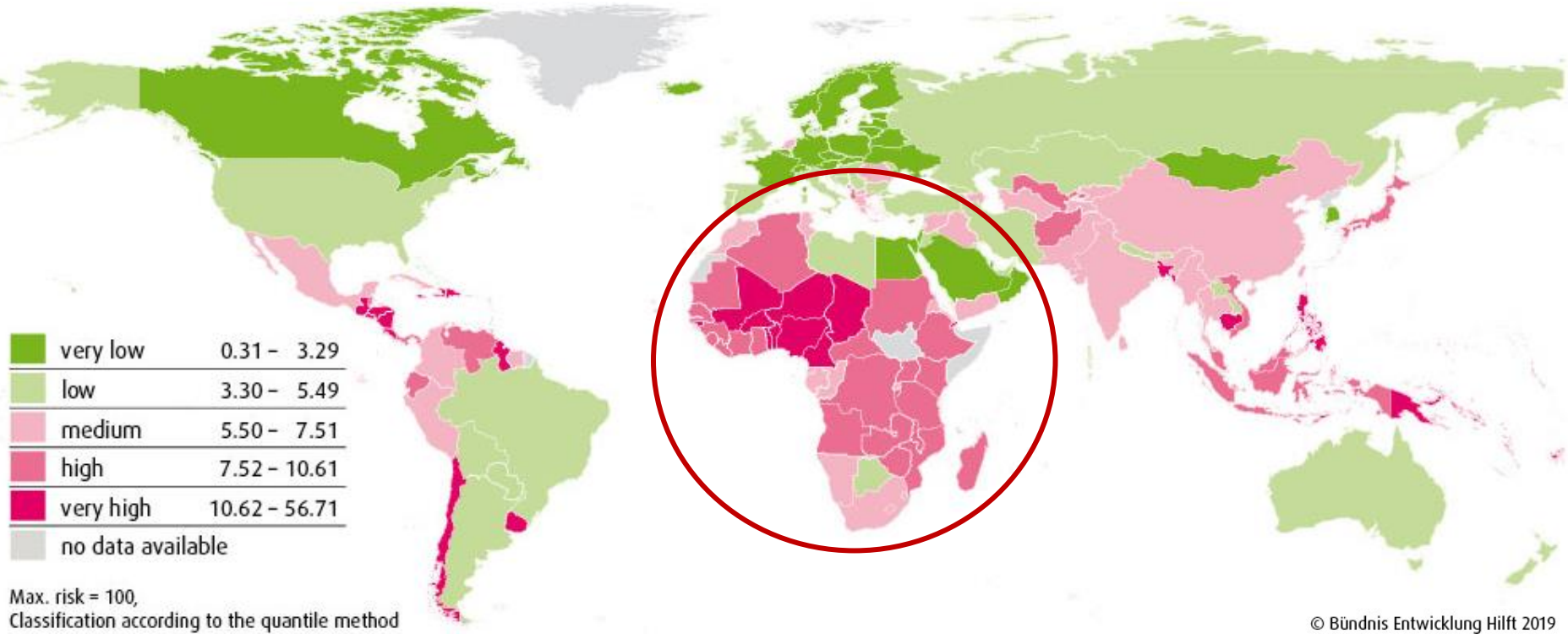
Symposium on Environment, Development, and Sustainable Communities in Africa  
African, African American and Diaspora Studies at UNC  
January 17, 2020, Chapel Hill, NC, USA

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# Flooding, drought, and human health in Africa

Carmen Anthonj  
The Water Institute at UNC

# World disaster risk index – result of exposure & vulnerability



# Flooding in Africa

The New York Times

## *Flooding in Mozambique From Cyclone Idai Made an 'Inland Ocean,' Stalling Rescues*



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## South Africa hit by floods and power cuts

10 December 2019



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## Floods kill 280 people, affect 2.8m others in East Africa

FRIDAY DECEMBER 6 2019





# Drought in Africa

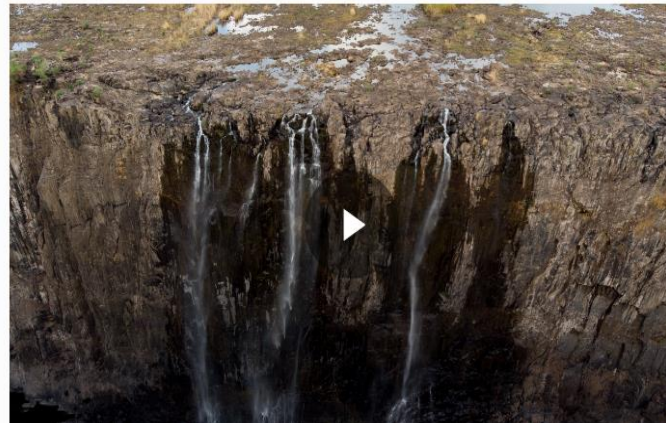
NEWS / ZIMBABWE

## Deadly drought in Southern Africa leaves millions hungry

United Nations says Southern Africa is experiencing worst drought in a century, 45 million people in 14 countries are in need of urgent assistance.

by Nicolas Haque [f](#) [t](#)

22 Dec 2019



## U.N. Aid Chief Warns of Looming 'Horror' as Somalia Again Faces Famine



Women lined up for food last month at a camp outside Mogadishu, Somalia, after fleeing drought-stricken areas. Farah Abdi Warsameh/Associated Press

By [Rick Gladstone](#)

June 5, 2019



The top humanitarian official at the United Nations sounded the alarm on Wednesday about the looming risk of famine in the Horn

The New York Times

## In Zimbabwe, the Water Taps Run Dry and Worsen 'a Nightmare'



People lining up for water at a borehole in Epworth, in southeast Harare, Zimbabwe. Zinyanga Autonomy for The New York Times

By [Patrick Kingsley](#) and [Jeffrey Moyo](#)

July 31, 2019



Flooding, drought, and human  
health in Africa -  
why am I presenting in this session?

# Research, Policy, and Practice

We are problem solvers focused on the sustainable management of water for health and human development. We contribute to improving access to safe water, sanitation, and hygiene for all.



Source: Rod Shaw





# Water scarcity & abundance versus development

- Access to sufficient safe water varies widely around the world, with the poorest often being underserved.
- Extreme weather events such as flooding or drought push water supply to its limits intensify water-related problems → impact on agriculture, education, health → development
- Providing water security :
  - guaranteeing people access to sufficient water supply (security through water)
  - protecting people from the dangers of water (security from water).



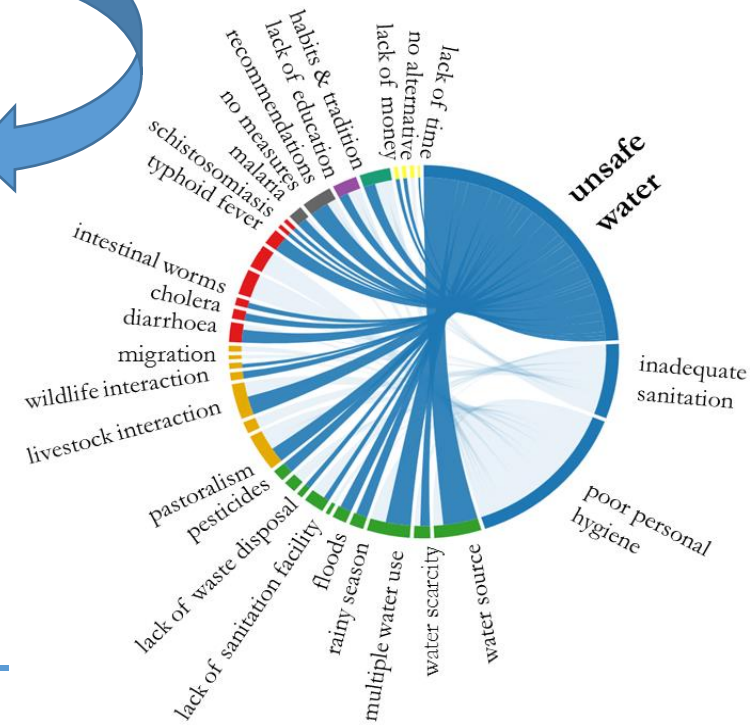
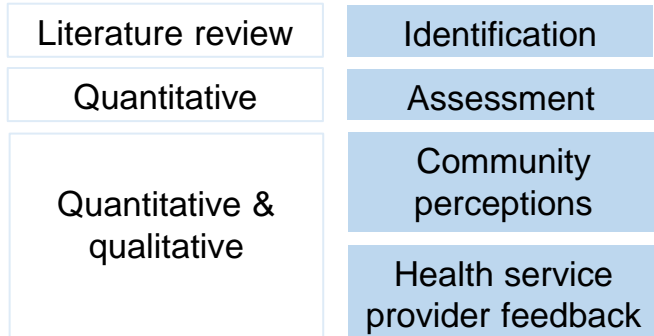
## Need for action

- counteract impacts of water scarcity & abundance
- increase resilience of societies to disasters.

# Flooding, drought, and disease exposure in Kenya

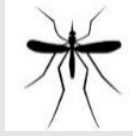


# Water-related disease exposure in wetlands in Kenya



,The water causes **diseases**. If someone **drinks the dirty water**, they can be sick. **Animals** are in the water, people dump their **waste** into the water, people use the water as **latrine** to relieve themselves and that is the same water that we use in the house. When it **rains**, **dirt** is washed into the river. **It is the same water we use**' (pa 2)

# Floods, droughts, and disease exposure



## Vector-related diseases

Increased vectors

## Waterborne diseases

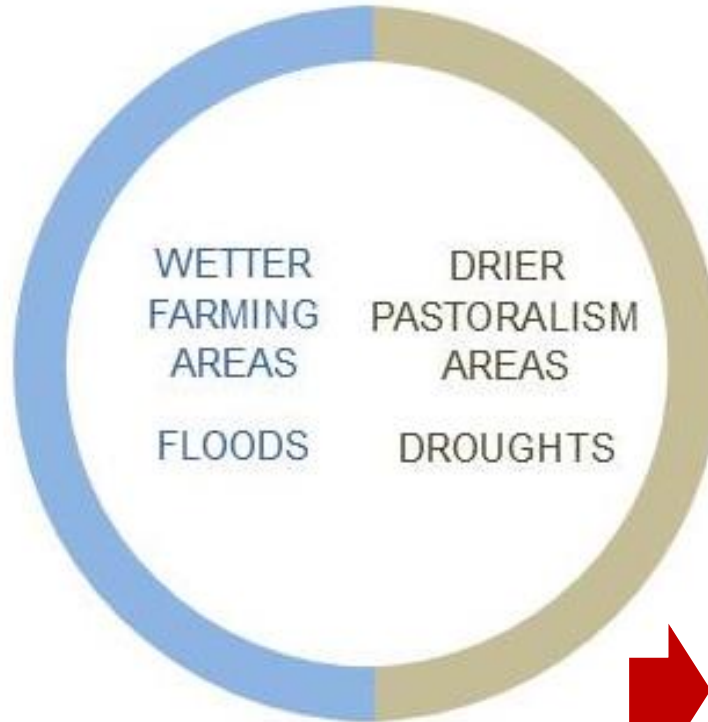
Close interaction with water

## Injuries and fatalities

Water masses

## Disruption of services

Damaged infrastructure



## Water-washed diseases

Limited water supply, sanitation, hygiene

## User conflicts

Water scarcity, loss of livestock

## Malnutrition

Food insecurity

Mental health effects



Increased disease exposure

# Highlight: grassroots recommendations



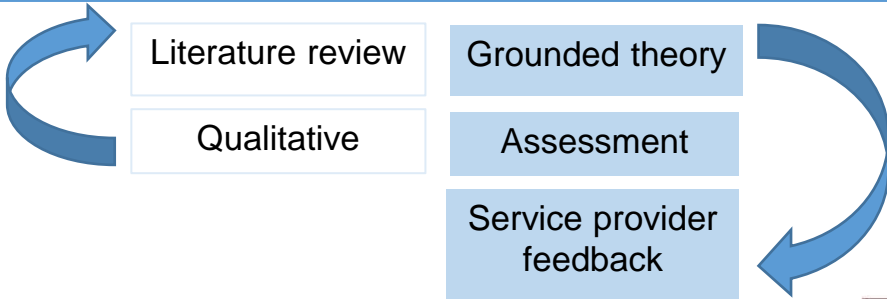
- Improving provision of safe drinking water and sanitation coverage
- Changing hygiene behavior
- Establishing a waste management system
- Adopting simple environmental options
- Targeting most vulnerable groups
- Strengthening the role of community health workers
- **Improving collaboration in view of floods and droughts between water, health, education, gender, agriculture, development, infrastructure, housing sectors**
- **Integration of grassroots reality and participation of target population**



# Flooding and health sector response in Namibia

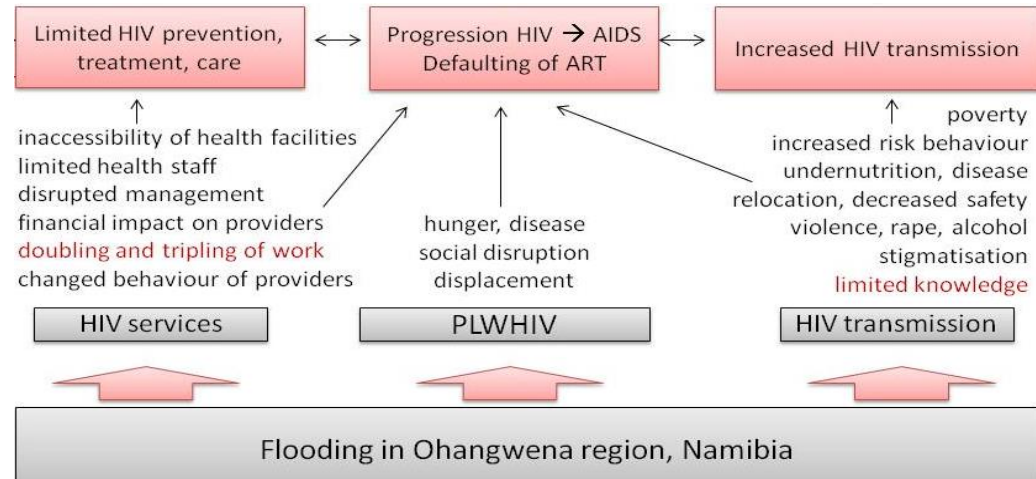


# The impact of floods on the health sector in Namibia



In the process of flooding our other activities get affected. Our **staff** are really stressed to the limit. They are **overworked** and the **quality of services is poor** (...). And at the end of the day **the quality of health care diminishes**.  
(CMO, Ohangwena region)

**Inaccessibility of services**



# Highlight: service provider recommendations



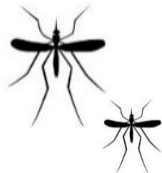
- **Proactive identification, clarification of responsibilities, improved communication, and coordination of all sectors and stakeholders involved, incl. water, health, emergency management, gender, development, infrastructure**
- **Inclusion of detailed capacity and vulnerability assessment of flood-affected populations in disaster response plans**
- Application of lessons learned from previous floods to strengthen capacity and identify potential gaps
- Reduction of flood-related risks for vulnerable groups through integrated disaster preparedness measures for future floods



# Bringing the key results together

# Politics of Environment and Infrastructure

Increased exposure



Vector-related diseases

Increased vectors

Waterborne diseases

Close interaction with water

Injuries and fatalities

Water masses

Disruption of services

Damaged infrastructure



Double  
health  
burden



Inability of health sector to respond

... during and after such events is often not sufficiently addressed by policy-makers.



# Grassroots recommendations to inform decision-making

Different exposures, local solutions

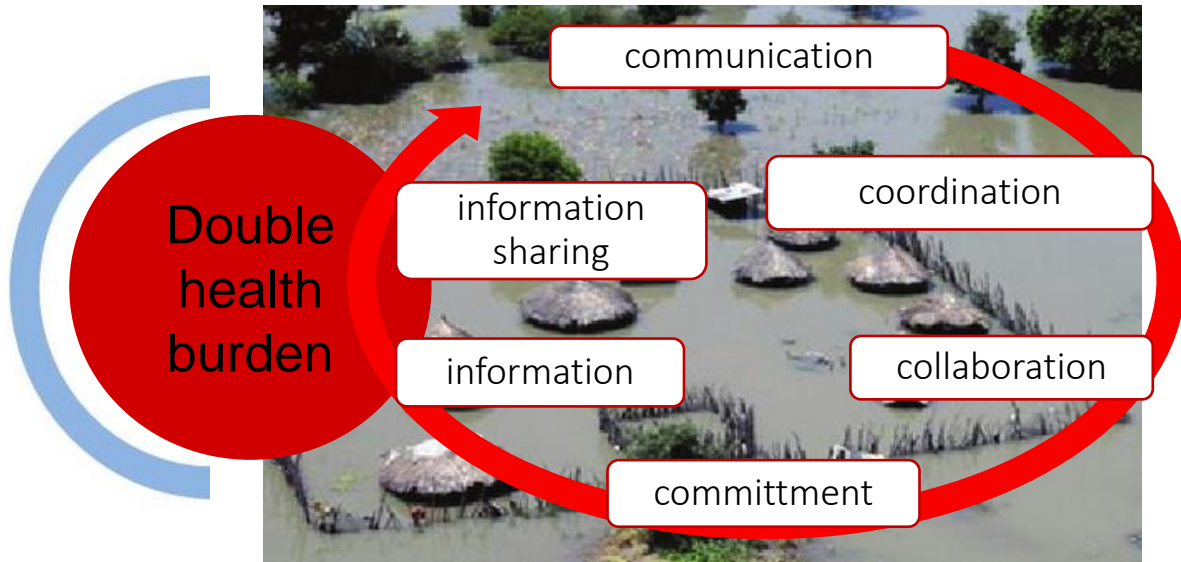


**Vector-related diseases**  
Increased vectors

**Waterborne diseases**  
Close interaction with water

**Injuries and fatalities**  
Water masses

**Disruption of services**  
Damaged infrastructure



water, health, climate, emergency management, agriculture,  
culture, education, gender, development, infrastructure  
...and the community knows best

Need for improvements in key sectors

# Takeaways



The impact of flooding and drought on human health is complex: double burden:

- Increased exposure
- Inability of health sector to respond

Implications go beyond public health, related to many other disciplines incl. engineering, infrastructure, education, culture,...

Holistic research approaches to overcome disconnect between local needs and policies:

- Mix methods from different disciplines
- Perspectives from local, regional, national, international level
- Stakeholders from different sectors

**Need to integrate grassroots recommendations to inform decision-making in flood- and drought-related water and health management and risk communication**

3 GOOD HEALTH AND WELL-BEING



6 CLEAN WATER AND SANITATION



13 CLIMATE ACTION



10 REDUCED INEQUALITIES



11 SUSTAINABLE CITIES AND COMMUNITIES



17 PARTNERSHIPS FOR THE GOALS



# Acknowledgements



Dr. Aaron Salzberg and all colleagues at the Water Institute at UNC



Dr. Thomas Kistemann and all colleagues at the GeoHealth Centre, Institute for Hygiene and Public Health, University of Bonn, Germany



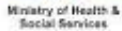
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The Ministry of Education and Research, Germany

And all enumerators and study participants who shared their information for this study

## Research, Policy, and Practice

We are problem solvers focused on the sustainable management of water for health and human development. We contribute to improving access to safe water, sanitation, and hygiene for all.



## Publications

Our research contributes to evidence-based decisions in the scientific, policy and practitioner communities domestically and internationally.

Here is a list of our publications from 2019:

- A systematic scoping review of hygiene behaviors and environmental health conditions in institutional care settings for orphaned and abandoned children. Moffa, M., Cronk, R., Fejfar, D., Dancausse, S., Acosta Padilla, L., Bartram, J. 2019. *Science of the Total Environment*. 658:1161-1174. [doi.org/10.1016/j.scitotenv.2018.12.286](https://doi.org/10.1016/j.scitotenv.2018.12.286).
- Comparative evaluation of risk management frameworks for US source waters. 2019. K Setty, R Raucher, R McConnell, and J Bartram. *AWWA Water Science*. (forthcoming)



Health risk perceptions and local knowledge of water-related infectious disease exposure among Kenyan wetland communities

Carmen Anthonj<sup>1\*</sup>, Bernd Diekkrüger<sup>2</sup>, Christian Borgemeister<sup>3</sup>, Thomas Kistemann<sup>1\*</sup>

<sup>1</sup>CentHealth Center, Institute for Hygiene & Public Health, University Hospital Bonn, Germany  
<sup>2</sup>Hygiene Research Group, Department of Geography, University of Bonn, Germany  
<sup>3</sup>Center for Development Research (ZDF), University of Bonn, Germany

### ARTICLE INFO

**Keywords:**  
• Cultural context of health  
• East Africa  
• Hydro-social interactions  
• Resilient communities  
• Water-related diseases  
• Wetland management

### ABSTRACT

**Background:** Risk perceptions have the potential of motivating and shaping health-related behaviour, i.e. the application of protective health measures. They may reduce or accelerate the risk and exposure to diseases and are therefore valuable, particularly in environments such as wetlands that entail multiple risk factors exposing humans to disease-causing infectious agents.

**Methods:** We assessed the risk perceptions towards infectious disease exposure in the Kenyan Enyao Nkato Swamp and evaluated whether the perceived risks reflect the actual risk factors. Data were collected from community meetings (target population, experts) by different methods (cross-sectional survey, in-depth interviews).

**Results:** The overall level of risk perception regarding the contraction of diseases in the wetland was high. Exposure to water-related infectious diseases was understood as being driven by direct physical contact to water during wetland use, characteristics of pathogens and vectors of disease, both in domestic and occupational environments. The risk factors closely associated with diseases in wetlands included the limited access to basic water supply, sanitation and poor environmental hygiene (WEH) (typical fever, diarrhoeal diseases, schistosomiasis), agricultural irrigation (mainly), the predominant proximity to livestock (brucellosis), the use of agrochemicals (skin and eye diseases), seasonal flooding (malaria, typhoid fever) and draught (brucellosis). Different user groups, i.e. farmers and seasonal pastoralists, perceived the use-related risks differently and different occupational risks were attributed to different groups. The understanding of disease exposure as due to the intense hydro-social interactions and change present in the single wetland was clear.

**Conclusions:** By showing that the risk perceptions reflect the actual risks and interactions, this study emphasizes

Global Health Action

action

### ORIGINAL ARTICLE

The impact of flooding on people living with HIV: a case study from the Ohangwena Region, Namibia

Carmen Anthonj<sup>1\*</sup>, Odon T. Nkongolo<sup>2</sup>, Peter Schmitz<sup>1</sup>, Johannes N. Hango<sup>2</sup> and Thomas Kistemann<sup>1</sup>

<sup>1</sup>Institute for Hygiene and Public Health, WHO CC for Health Promoting Water Management and Risk Communication, University of Bonn, Bonn, Germany; <sup>2</sup>Directorate of Special Programmes, Ministry of Health and Social Services (Ohangwena Region), Erindana, Namibia

**Background:** Floods are a disaster situation for all affected populations and especially for vulnerable groups within communities such as children, orphans, women, and people with chronic diseases such as HIV and AIDS. They need functioning health care, sanitation and hygiene, safe water, and healthy food supply, and are critically dependent on their social care and support networks. A study carried out in the Ohangwena region, Namibia, where HIV prevalence is high and extensive flooding frequently occurs, aims to provide a deeper understanding of the impact that flooding has on people living with HIV (PLWHIV) as well as on HIV service providers in the region.

**Design:** The qualitative research applying grounded theory included semi-structured interviews with PLWHIV, focus group discussions with HIV service providers, and a national feedback meeting. The findings were interpreted using the sustainable livelihoods framework, the natural hazard research approach, and health