Natural Hazards and Disaster Risk Reduction in the East African Rift: Challenges, Methods and Policies

Friday 4th March 2022, 14:00-18:00 (EAT), 13:00-17:00 (CAT), 11:00-15:00 (GMT)

Executive Summary by Dr Maria Xanthou FHEA

Time (GMT)	Title	Confirmed Speakers
11:00	**Welcome, Context, Aims**	**John Macdonald, Department of Civil Engineering, University of Bristol** Overview of the day
11:15	Summary of the PREPARE and SAFER PREPARED Projects on Seismic Risk in East Africa	**Ignasio Ngoma** offered a brief summary of the PREPARE and SAFER PREPARE project. John commented on what PREPARE stands for and who the partners are. The seismic risk in East Africa evolves around hazard due to East African Rift, exposure due to dense population and vulnerability due to low building quality. The objectives of PREPARE are to develop seismic risk assessment, improve knowledge of earthquake hazards and develop seismic vulnerability processes. **Hassan Mdala** talked about the East African Rift System and Malawi Rift, the 2009 Karonga Earthquake Sequence being such an example. Hassan explained how Malawi active fault database has been developed. The aim is to make all data available, to identify which faults are active and to establish a PREPARE GPS network. Hassan further explained why faults matter by comparing hazard assessments with and without faults where it was evident that the inclusion of active faulting in the probabilistic seismic hazard assessment significantly influences the results. Ignasio then talked about vulnerability assessment of buildings, explained the aim and the steps in analysis through field surveys and assessment for the building portfolio in Malawi. The team's conclusion is that their surveys showed much greater prevalence of unreinforced fired brick masonry buildings than previous estimates. He also demonstrated examples of field testing for identifying the properties of the construction materials, particularly bricks. Then, an overview was given regarding the rapid visual inspection of schools and the assessment of their seismic vulnerability by means of the SAFER mobile app. Based on this inspection campaign **John Macdonald** talked about seismic fragility curves through numerical modelling of building typologies that use the actual geometries of a large number of surveyed buildings and the statistical distributions of material properties that resulted from the field testing.
11:30	Volcanic Activity and Hazard in the East African Rift Zone	**Juliet Biggs**, School of Earth Sciences, University of Bristol talked about volcanic activity and hazard in the East African Rift Zone. Notably, the lack of data regarding historic volcanic activity hinder the assessment of the level of the hazard. Juliet focuses on Nyiragongo in DRC. Juliet talked about the historically documented eruptions and how people were affected by them. She moved on to transcrustal magma systems and models for the current activity and seismicity. She analyzed the geology of past eruptions and the outcomes of eruption hazards i.e. formation of pumice cones. Juliet concluded with the need for multidisciplinary studies.
11:45	Climate Impacts on Water Security	**Katerina Michaelides**, School of Geographical Sciences, University of Bristol presented the ongoing work conducted in the framework of three funded projects: DRIER, MADDAD and DOWN2EARTH which focus on Kenya, Ethiopia, Somalia and Somali land. It was shown how rainfall is closely tied to water and food security and it is affected by climate change. Katerina shared a

	in East African Drylands	graph on climate change and drought in East Africa and affects rainfed agriculture, pastoralism and groundwater for drinking. It was clear that droughts are now more frequent and more severe, while the recovery periods are shorter. Katerina addressed the question of challenges with anticipating climate impacts in East African drylands. She moves on how dryland regions have distinct hydrology. Katerina talked about new hydrological model for drylands (DRYP) and what its critical components are. She linked the team's model with experimental seasonal water forecasts by linking model simulations with regional forecasts of seasonal rainfall. Katerina explained how to create water forecasts from GHACOF rainfall tercile probabilities. She offered tercile-based water forecasts for MAM 2022. Finally, Katerina reflected on multi-hazards: they lead to conflicts, migration, impacts on health, water, food, ecosystems. Climate and climate change can lead to multiple and compounding hazards. More info: http://michaelides.eri.ucsb.edu/ http://down2earthproject.org/
12:00	Earthquake Hazard	**Fred Tugume**, Directorate of Geological Survey & Mines, Uganda talked about the east and southern Africa regional seismological working group (ESARSWG) in Uganda. The ESARSWG was established in 1993. The founding members were Eritrea, Ethiopia Kenya, Uganda,Tanzania, Malawi, Zambia, and Zimbabwe. Fred talked about the background of the group and its mission which is to strengthen regional collaboration and capacity building so as to efficiently monitor and mitigate earthquake and volcanic hazards. Fred explained the core function of the group and its general objective which is to enhance infrastructure and human capacity in seismology and volcanology research in the region. Fred focused on the specific objectives of the group which include attracting talent and inducing competent young scientists. He presented the membership to ESARSWG and the universities and national bodies which are founding members of the group along with the current status of membership. Fred presents the funding offered to the group by IASPEI, UNESCO, Chinese government and what are its major activities. The talk further demonstrated the seismic stations established across East Africa by the group and the products of ESARSWG. Fred discussed the collaborations of the group with Africa Array, CTBTO, PREPARE and the challenges like lack of funding, fragile data, vandalism of equipment, lack of spare parts of hardware & competent expertise, and brain drain. Fred concluded with the future plans of the working group such as making governments aware of the need to support seismology sections, students' training, conducting more research on seismology etc.
12:15	Landslide Hazard in Changing Environment: the North Tanganyika Kivu Rift region, Afr	**Olivier Dewitte**, Natural Hazards Unit, Royal Museum for Central Africa, Belgium talked about landslide hazard in a changing environment in the North Tangakyika-Kivu Rift region in Africa. He focused on both a landslide hotspot and at the global level highlighting the very high density of the geomorphic hazards. This is a geodynamic context, a tropical environment with strong landslide drivers, hotspot of environmental change and uncontrolled deforestation, and high population densities. There are diverse landscapes and diverse processes. The work of his team includes the identification of what types of landslides are more frequent, where and when they tend to occur, what are the prevailing environmental factors etc. Olivier and team put together a regional inventory of landslide and managed to identify landslide events and triggering factors. It was noted the recent landslides in the last decades are not seismically triggered, they mostly occurred as a result of rainfall. There are shallow landslides and landslide rejuvenation. There is a link between landslides and deforestation. Olivier offered an example from Bujumbura (Burundi) of a compound-cascading event and moved on to dynamics of slow-moving landslides.

Time	Title	Description
12:30	Forecasting Exposure to Flooding from Tropical Cyclones via Emergency Bulletins	**Jeffrey Neal**, School of Geographical Sciences, University of Bristol talked about forecasting flood exposure to tropical cyclones. Jeffrey offered an overview of the Bristol/Fathom global flood model. He moved on to regional scale hazard mapping of Zimbabwe and presented tropical cyclone emergency bulletins and how these can alert in advance the UK government and other local authorities. Jeffrey explained the methodology behind flood forecasts systems like EC Copernicus and presented an example from where the prediction and the final flood extent in space was well correlated. He concluded with a list of end users of the predictive model presented that included UNICEF, OCHA Welt Hunger Hilfe, World Food Programme etc.
12:45		**Break**
13:15	Challenges and Approaches to Disaster Risk Reduction in the Global South	**Dilanthi Amaratunga**, Global Disaster Resilience Centre, School of Applied Sciences, University of Huddersfield, talked about challenges and approaches to disaster risk reduction in the global south. It was stressed that DRR is everybody's business and obviously they do not stop because of a pandemic. On the contrary, during the last two years. the hazard landscape was compounded the threat imposed by covid19 and this leads to a complicated multi-hazard exposure. In certain regions there is lack of capacity against both single and multiple hazards, hence there is a need for new knowledge, capacity building, and cross-linking to other policy agendas. Financing is another major challenge followed by a barrier between the academic developments and real world, tangible policies. This is because many stakeholders are reluctant to embrace new policies and they rely on simplified, easy to reach resources, even Wikipedia. Dilanthi also highlighted the opportunity to link research, education, decision and action and the need to integrate all hazards, stakeholders and disciplines both regionally and globally. This can be facilitated by promoting policy dialogue, knowledge sharing and capacity development, as well as by developing flexible and customizable education programmes.
13:30	Disaster Risk Management	**Francis Nkoka**, World Bank, Malawi, talked about Natural Hazard and Disaster Risk Reduction: Examples from Malawi. Francis analysed the Malawi disaster risk profile on droughts, landslides, earthquakes. He discussed the approach at World Bank trying to understand the climate and disaster risks as a means to reduce the risk, prepare for the next shock, arrange financial protection and support resilient reconstruction. Francis also presented ways to evaluate and quantify risk in order to make informed decisions, to promote mainstream climate resilient risk-informed economic growth, develop modern building codes and spatial planning tools, invest in early warning systems, contingency plans, to assess contingent liabilities, to build back better, to mitigate residual risk, and to support rapid and sustainable recovery. The main problem identified in Malawi is capacity building and awareness. The agenda is driven by different partners and not by the government. Francis offered a system approach of various stakeholders involved in the risk reduction but recognized that they are not integrated. Another important issue identified was the disaster risk financing strategy such as the risk transfer in the form of reinsurance. Coordination was further identified as a big problem: different departments working in isolation, projects not being managed in a comprehensive manner, weak vertical and horizontal coordination, and lack of motivation of specialists. Above all, it was stressed that disasters disproportionally affect poor people.
13:45	Housing Self-Recovery Unpacked –	**Jamie Richardson**, Catholic Relief Services, talked on housing self-recovery and lessons learnt from Malawi. As was pointed out by Francis Nkoka, floods also tend to affect more the poorest. Jamie showed photos from houses especially of middle-income families, after a disaster and stressed how important housing is and how difficult it is to build and own a decent residential house. He then focused on self-recovery norm after disaster where only a small percentage receive assistance for recovery. He presented

	Learnings from Malawi	the work of CRS Shelter and Settlements and underlined that they come from the humanitarian mechanism. Shelter and settlements focus on the physical living environment. Safe, dignified homes and communities ensure better housing. After the 2015 floods in Malawi those lessons were used to guide the recovery program. They tried to identify the strengths of the community's existing knowledge and enhance decisions for better shelter and local building cultures for sustainable and resilient habitats. They tried to disseminate the safer house construction guidelines published in 2021 by the minister of lands, housing and urban development and the World Bank. It was noted that the deaths each year from earthquakes, storms and floods, the health issues are far more significant and obviously there is no one size policy that fits all hazards. There has to be a differentiated approach to what people can afford to build and how they achieve this given the threats they are exposed to. For instance, in Malawi and but also globally, very few people have access to loans to build their house. Most have to either save or construct incrementally sometimes using obsolete techniques or low quality material. Information to improve housing should provide a range of solution and strategies. How to achieve housing and market ecosystem change: what will he market system look like? The community-based technical solutions presented include materials such as bamboo, jute or resin roof sheets, cement products and are associated with a list of skills and plans for housing finance.
14:00	Challenges in Preparedness and Response: a Few Things to Consider	**Michele Young**, London Borough of Tower Hamlets, formerly Save the Children International, talks about challenges in preparedness and response. Pre-Disaster preparedness involves: governance and regulation, engineering and architectural education, construction labour, material supply chain, community based (localized) approaches. In post-disaster, governance and regulation, and engineering and architectural education are policy driven and challenging to work on during a response. In construction labour and material supply chain, disasters can be an opportunity to address gaps in the market and upskilling new/existing labour. So there is a need to work with established actors/stakeholders/community groups. Households start recovery from Day 1 after the disaster. Community involvement is critical to addressing multiple hazard environments, because local knowledge is key to maintaining safer environments. Michele analyses the seasonal calendar and the ongoing disasters impacts. This requires bespoke regional approaches: construction and DRR messaging, logistics planning to climate challenges, constructions designs, construction materials, construction training. Few minutes for questions.
14:15	Organizational Lessons Learnt in Reducing Risks due to Natural Hazards	**Mark Harvey**, Infrastructure Team, Foreign, Commonwealth & Development Office, UK, talked about Organizational Lessons Learnt in Reducing Risks due to Natural Hazards. Mark gave the historical context and background of previous disasters in different countries including in Wales in 1966, in Latur, Maharashtra in 1993, in Nepal in 2015, in Freetown, Sierra Leone in 2017, 2005 during Pakistan earthquake, and the Kapichira Dam breach in 2022, Malawi. Organizational lessons learnt: there is a need for an internal guidelines on infrastructure, a refreshed technical competency framework, reversed down-skilling of last decade of 'hard' engineering expertise, internal audit findings, more case studies especially on risk. It is important for the involved organizations to know individual advisers and have breadth and depth of capabilities. FCDO needs a better system for identifying technical risks at business case stage and through the entire programme cycle. Worth reading: Lessons from Disaster: How organizations have no memory and accidents recur, T. Kletz, Institution of Chemical Engineers, UK (1993).
14:30	**Panel Discussion: Identifying Challenges,**	The panel included:

Priorities & Research Topics for Further Discussion (Chair: John Macdonald, University of Bristol)	**Atalay Ayele**, Institute of Geophysics, Space Science & Astronomy, Addis Ababa University, Ethiopia: Prof. Ayele explained in detail the difficulties on research due to budget cuts, brain drain, low pay etc. **Carmine Galasso**, Institute for Risk and Disaster Reduction, UCL, talked about challenges in cities globally, the need to enhance sustainable urban development through risk-informed planning and decision-making in cities and the need to understand the consequences of today's decisions on tomorrow's risk. He stressed that due to rapid urbanization the decisions that are made today need to be based on predictive models and not current data. It is also important to acknowledge multiple hazards and work across multiple disciplines, to recognize the risk burden on poor and marginalized communities, and to engage and co-produce solutions together with the local stakeholders. **Matthew Free**, Arup, UK talked about the risk equation between hazard, exposure and vulnerability. Vulnerability becomes difficult to quantify due to political and socio-economical decisions while hazard is not defined in a single manner. It is important to work across disciplines and to involve women.
15:00	**Close**